Regulating Consumer Financial Products: Evidence from Credit Cards

Sumit Agarwal, Souphala Chomsisengphet, Neale Mahoney, and Johannes Stroebel

Becker Brown Bag - October 2013
Motivation

- Surge of interest in regulating consumer financial products (CFPB)
- Proponents
  - Firms exploit behavioral biases, especially among the poor
    - Late fees (inattention, over-optimism)
    - Low minimum payments (present bias, inaccurate compounding)
  - Regulation and additional information can protect consumers
Motivation

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    - Low minimum payments (present bias, inaccurate compounding)
  - Regulation and additional information can protect consumers

- Skeptics
  - Hard to transfer from producers to consumers (i.e., Whac-A-Mole).
    - “The reduced revenue stream to lenders from these fees would mean that other rates and fees would be adjusted to compensate.” (Mullainathan et al., 2009)
  - Impact of more information on repayment behavior equally unclear, in particular in non-experimental settings
Credit Card Market

- Approximately $660 billion in debt
- Seen by many as particularly exploitative
  - “The whole business model of the credit card industry is not designed to extend credit but to induce mistakes and trap consumers into debt. This is an industry that has been thriving on misleading its consumers.” (Dodd, 2009)

- Credit CARD Act (2009)
  - Requires opt-in for over-the-limit fees, limits size of late fees
  - Payoff nudge

- Pushback
  - “It appears that there have been significant trade-offs. Since the proposal and adoption of key provisions [...] average credit card interest rates have increased and credit card credit is less available, especially to subprime borrowers.” (ABA, 2013)
Key results

Fee Restrictions

- CARD Act reduced fees by approximately 2.8% of borrowing volume.
  - Particularly large drop for borrowers with FICO scores below 620
  - Reduced annual borrowing costs by $20 billion

- No off-set in other costs (interest charges)

- No decline in new accounts or credit limits

Payoff Nudge

- Small shift in consumer behavior:
  - Reduced annual interest charges by at most $70 million
Related Literature


- **Behavioral Household Finance**: Agarwal, Chomsisengphet, Liu and Souleles (2006); Agarwal, Chomsisengphet and Liu (2010); Heidhues and Koszegi (2006); Kuchler (2013); Meier and Sprenger (2010);

- **Regulating Consumer Financial Products**: Posner and Weyl (2013); Campbell, Jackson, Madrigan and Tufano (2011)

- **Nudges**: Thaler and Sunstein (2007); Stewart (2009)
Outline

- Data

- Pre-CARD Act market overview
  - Profits by FICO

- CARD Act description

- Fee restrictions
  - Theory: Surplus transfer vs. pass-through
  - Evidence

- Payoff nudge
  - Repayment Behavior
Data

- OCC Credit Card Metrics dataset

- Near universe of credit card issued by 8 largest US banks
  - 180 million general purpose credit card accounts; \( \sim 30\% \) of total
  - Monthly from April 2008 to December 2012
  - Contract terms, utilization and payments
  - FICO and credit bureau information
<table>
<thead>
<tr>
<th>Quarter</th>
<th>Banks</th>
<th>Reporting Accounts</th>
<th>Average Daily Balance</th>
<th>Annualized Purchase Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2</td>
<td>8</td>
<td>177,713,728</td>
<td>1,294</td>
<td>1,760</td>
</tr>
<tr>
<td>Q3</td>
<td>8</td>
<td>180,284,192</td>
<td>1,233</td>
<td>1,722</td>
</tr>
<tr>
<td>Q4</td>
<td>8</td>
<td>180,366,912</td>
<td>1,266</td>
<td>1,584</td>
</tr>
<tr>
<td>2009</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1</td>
<td>8</td>
<td>185,079,440</td>
<td>1,334</td>
<td>1,483</td>
</tr>
<tr>
<td>Q2</td>
<td>8</td>
<td>181,871,392</td>
<td>1,316</td>
<td>1,567</td>
</tr>
<tr>
<td>Q3</td>
<td>8</td>
<td>178,302,784</td>
<td>1,282</td>
<td>1,648</td>
</tr>
<tr>
<td>Q4</td>
<td>8</td>
<td>168,607,120</td>
<td>1,287</td>
<td>1,673</td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1</td>
<td>8</td>
<td>164,606,800</td>
<td>1,272</td>
<td>1,632</td>
</tr>
<tr>
<td>Q2</td>
<td>8</td>
<td>162,466,176</td>
<td>1,228</td>
<td>1,816</td>
</tr>
<tr>
<td>Q3</td>
<td>8</td>
<td>159,884,496</td>
<td>1,209</td>
<td>1,894</td>
</tr>
<tr>
<td>Q4</td>
<td>8</td>
<td>156,683,184</td>
<td>1,196</td>
<td>1,936</td>
</tr>
<tr>
<td>2011</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1</td>
<td>8</td>
<td>156,066,400</td>
<td>1,172</td>
<td>1,839</td>
</tr>
<tr>
<td>Q2</td>
<td>8</td>
<td>156,183,376</td>
<td>1,113</td>
<td>2,009</td>
</tr>
<tr>
<td>Q3</td>
<td>8</td>
<td>157,558,864</td>
<td>1,194</td>
<td>2,264</td>
</tr>
<tr>
<td>Q4</td>
<td>8</td>
<td>147,511,504</td>
<td>1,338</td>
<td>2,564</td>
</tr>
</tbody>
</table>
Outline

• Data

• Pre-CARD Act market overview
  - Profits by FICO

• CARD Act description

• Fee restrictions
  - Theory: Surplus transfer vs. pass-through
  - Evidence

• Payoff Nudge
  • Repayment Behavior
Revenue and Costs

• Credit Card Revenue
  • Interest Charges
  • Fee Revenue
  • Interchange Income

• Credit Card Costs
  • Charge-offs (Defaults)
  • Cost of Funds
  • Rewards and Fraud Expenses
  • Operational Expenses

Total fees (annualized percent of ADB) = \left(1 + \frac{\text{Total fees}}{\text{ADB}}\right)^{12} - 1
# Revenue and Cost: Pre-CARD Act

## Panel A: Capacity and Utilization

<table>
<thead>
<tr>
<th>FICO Score Range</th>
<th>Total</th>
<th>&lt;620</th>
<th>620-659</th>
<th>660-719</th>
<th>720-759</th>
<th>760-799</th>
<th>800+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of Accounts</td>
<td>100.0%</td>
<td>17.3%</td>
<td>12.6%</td>
<td>24.6%</td>
<td>18.6%</td>
<td>19.2%</td>
<td>7.6%</td>
</tr>
</tbody>
</table>

- **Credit Limit**: 8,042, 2,025, 3,546, 7,781, 11,156, 12,400, 11,390
- **Average Daily Balance**: 1,410, 804, 1,469, 2,029, 1,797, 1,110, 486
- **Purchase Volume**: 1,820, 730, 1,019, 1,651, 2,306, 2,892, 2,282

## Panel B: Realized Profits

<table>
<thead>
<tr>
<th>Category</th>
<th>Total Income</th>
<th>Interest Charges</th>
<th>Total Fees</th>
<th>Interchange Income</th>
<th>Total Costs</th>
<th>Net Charge-offs</th>
<th>Cost of funds</th>
<th>Rewards and Fraud</th>
<th>Operational Costs</th>
<th>Realized Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25.0%</td>
<td>14.3%</td>
<td>7.6%</td>
<td>3.2%</td>
<td>23.4%</td>
<td>15.6%</td>
<td>2.3%</td>
<td>2.2%</td>
<td>3.4%</td>
<td>1.6%</td>
</tr>
<tr>
<td></td>
<td>45.7%</td>
<td>20.6%</td>
<td>23.3%</td>
<td>1.8%</td>
<td>37.8%</td>
<td>30.8%</td>
<td>4.4%</td>
<td>1.3%</td>
<td>3.4%</td>
<td>7.9%</td>
</tr>
<tr>
<td></td>
<td>31.5%</td>
<td>19.2%</td>
<td>10.9%</td>
<td>1.5%</td>
<td>30.2%</td>
<td>23.4%</td>
<td>2.3%</td>
<td>1.0%</td>
<td>3.4%</td>
<td>1.3%</td>
</tr>
<tr>
<td></td>
<td>21.0%</td>
<td>15.2%</td>
<td>4.1%</td>
<td>1.7%</td>
<td>22.5%</td>
<td>15.8%</td>
<td>2.2%</td>
<td>1.2%</td>
<td>3.4%</td>
<td>-1.6%</td>
</tr>
<tr>
<td></td>
<td>16.9%</td>
<td>11.8%</td>
<td>2.5%</td>
<td>2.6%</td>
<td>17.2%</td>
<td>9.7%</td>
<td>2.2%</td>
<td>1.8%</td>
<td>3.4%</td>
<td>-0.2%</td>
</tr>
<tr>
<td></td>
<td>17.1%</td>
<td>9.3%</td>
<td>2.4%</td>
<td>5.4%</td>
<td>15.6%</td>
<td>6.3%</td>
<td>2.2%</td>
<td>3.7%</td>
<td>3.4%</td>
<td>1.5%</td>
</tr>
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<td>3.1%</td>
</tr>
</tbody>
</table>

## Expected Profits, Q2 2008 to Q4 2011 Charge-offs

<table>
<thead>
<tr>
<th>Category</th>
<th>Total Income</th>
<th>Interest Charges</th>
<th>Total Fees</th>
<th>Interchange Income</th>
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<th>Realized Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected Profit</td>
<td>2.0%</td>
<td>8.7%</td>
<td>1.9%</td>
<td>-1.2%</td>
<td>0.0%</td>
<td>1.6%</td>
<td>3.2%</td>
<td>4.0%</td>
<td>5.0%</td>
<td>-1.6%</td>
</tr>
</tbody>
</table>

## Expected Profits, Q1 1985 to Q1 2013 Charge-offs

<table>
<thead>
<tr>
<th>Category</th>
<th>Total Income</th>
<th>Interest Charges</th>
<th>Total Fees</th>
<th>Interchange Income</th>
<th>Total Costs</th>
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</thead>
<tbody>
<tr>
<td>Expected Profit</td>
<td>7.9%</td>
<td>20.4%</td>
<td>10.8%</td>
<td>4.8%</td>
<td>3.7%</td>
<td>3.7%</td>
<td>4.0%</td>
<td>5.0%</td>
<td>5.0%</td>
<td>3.1%</td>
</tr>
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Revenue and Cost: Pre-CARD Act

Finance Charge Income

Fee Income

Net Charge-offs

Interchange Income - Rewards Expense

Source: NY Fed
• Profits of CC portfolio: 1.6% of ADB (adjust for taxes to get ROA).
• Scale by leverage ($\approx 10$) to get return on equity
Historical Chargeoffs

Pre-CARD sample period average 7.9%
Sample period average 7.7%

Historical average 4.7%

Source: NY Fed
Return on Assets (ROA) - All U.S. Banks

Note: Produced by BankRegData using call reports data. Return on Assets defined as "Net income after taxes and extraordinary items (annualized) as a percent of average total assets"
Profits: Pre-CARD Act

Key Takeaway:

• Credit card lending highly profitable even in middle of financial crisis
• Low-FICO score segment most profitable, significantly driven by fees
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CARD Act

• Introduced to “help protect consumers by prohibiting various unfair, misleading and deceptive practices in the credit card market”

• Signed by President Obama in May 2009

• Two Key Implementation Phases:
CARD Act

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  • February 2010:
    • Restrict Over Limit Fees (Opt In)
    • Some restrictions on Late Fees
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<tr>
<td>Only the minimum payment</td>
<td>10 years</td>
<td>$3,284</td>
</tr>
<tr>
<td>$62</td>
<td>3 years</td>
<td>$2,232 (Savings of $1,052)</td>
</tr>
</tbody>
</table>
CARD Act

- Introduced to “help protect consumers by prohibiting various unfair, misleading and deceptive practices in the credit card market”
- Signed by President Obama in May 2009
- Two Key Implementation Phases:
  - February 2010:
    - Restrict Over Limit Fees (Opt In)
    - Some restrictions on Late Fees
    - Payoff Nudge
  - August 2010
    - Limit size of late fees
- Other changes: Double billing cycle, Notification Period, Some limits on rate increases, College campus
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Model Setup

- Salient price: $p_1$
- Non-salient price: $p_2$
- Aggregate demand: $Q(p_1 + \psi p_2)$
  - $\psi \in [0, 1]$ parameterizes the degree of salience
- Constant marginal cost: $c$ (paper allows for selection)
Markup Formula

• FOC for $p_1$ (Weyl Fabinger, 2013)

$$p_1 + p_2 - c = \theta \cdot \mu(p_1 + \psi p_2).$$

• $\theta \in [0, 1]$ is a conduct parameter (Bresnahan, 1989)
  - Perfect competition: $\theta = 0$
  - Monopoly: $\theta = 1$
  - Homogeneous products Cournot: $\theta = \frac{1}{n}$

• $\mu(p_1 + \psi p_2) \equiv -\frac{Q(p_1 + \psi p_2)}{Q'(p_1 + \psi p_2)}$ is markup term
Pricing Offset

- Consider regulation that decreases max allowable price $p_2$

- **Q: How much of drop in $p_2$ will be offset by increase in $p_1$?**

- Totally differentiating and rearranging yields

$$\omega \equiv - \frac{dp_1}{dp_2} = \frac{1 - \psi \theta \mu'}{1 - \theta \mu'}$$

- Depends on
  - Degree of competition: $\theta$
  - Degree of salience $\psi$
  - Change in pass-through: $\mu' \equiv \frac{\partial \mu}{\partial p_1}$, which is related to log curvature of demand $(\log Q)'' = \frac{\mu'}{\mu^2}$
Extremes

$$\omega \equiv -\frac{dp_1}{dp_2} = \frac{1 - \psi \theta \mu'}{1 - \theta \mu'}$$

**Example (Perfect Competition)**

If there is perfect competition ($\theta = 0$), then the price limit will be fully offset ($\omega = 1$).

**Example (Perfect Salience)**

If $p_2$ is perfectly salient ($\psi = 1$), then the price limit will be fully offset ($\omega = 1$).
Increasing Offsets

\[ \omega \equiv -\frac{dp_1}{dp_2} = \frac{1 - \psi \theta \mu'}{1 - \theta \mu'} \]

**Proposition (Offset)**

The offset is converging toward full \((\omega \to 1)\) as (i) the market becomes more competitive \((\theta \to 0)\) and (ii) \(p_2\) becomes more salient \((\psi \to 1)\).
Fees by FICO

Annualized Total Fees (% of ADB)

- <620
- 620-659
- 660-719
- 720-759
- 760-799
- 800+

Years:
- 2008m1
- 2009m1
- 2010m1
- 2011m1
- 2012m1
Key Take-Aways

- Late Fees and Over-Limit Fees dropped significantly
  - Total decline in fees: Annualized 2.8% of ADBs.
  - Regression specification with bank-specific time polynomial
- Biggest decline for low-FICO consumers
  - FICO < 620: Approximately 14% of ADBs.
- No noticeable uptick in other fees.
- Offsetting costs in other area?
Potential Concerns, Additional Evidence

- CARD Act restricts ability to adjust interest rates for existing accounts
  ⇒ Examine interest charges for new accounts
Potential Concerns, Additional Evidence

• CARD Act restricts ability to adjust interest rates for existing accounts
  ⇒ Examine interest charges for new accounts

• Interest rates would have counterfactually decreased (ABA, 2013)
  ⇒ No decrease for high FICO that did not experience ↓ fee revenue
  ⇒ Within FICO, no (relative) decrease at banks that saw smaller ↓ fee revenue
Cross-Bank Heterogeneity

February 2010 Implementation Date

![Graph showing the relationship between increase in interest charges and decline in fees across different banks. The x-axis represents decline in fees (ppt), and the y-axis represents increase in interest charges (ppt). The graph includes different categories of banks with distinct symbols: <620, 620-660, 660-720, 720-760, 760-800, and 800+. The data points are scattered across the graph, indicating variability in the relationship.]
Cross-Bank Heterogeneity

August 2010 Implementation Date

![Graph showing the relationship between decline in fees and increase in interest charges.](image_url)
Total Income by FICO

Annualized Total Income (% of ADB)

2008m1 2009m1 2010m1 2011m1 2012m1

<620 620-659 660-719 720-759 760-799 800+

<620 620-659 660-719 720-759 760-799 800+
Profitability

- Income declines sharply around CARD Act implementation
- What about cost of lending?
Total Charge-offs by FICO

Month of Origination

Annualized Net Charge-offs (% of ADB)
CARD Act Conclusion

• Overall profitability of lending declined as a result of the CARD Act.

• Fees declined by an annualized 2.8 percentage points of ADB.

$$0.028 \times \$744 \text{ billion} = \$20.8 \text{ billion}$$

• Consistent with a model of low fee salience and limited market competition.

• Access to credit?
Credit Limit, New Accounts

Credit Limit ($) vs. Year:
- 2008m1
- 2009m1
- 2010m1
- 2011m1
- 2012m1

Credit Score Ranges:
- <620
- 620-659
- 660-719
- 720-759
- 760-799
- 800+

Graph showing trends in credit limits for different credit score ranges over the years from 2008 to 2012.
Credit Limit, All Accounts

Credit Limit ($)

2008m1 2009m1 2010m1 2011m1 2012m1
<620 620-659 660-719 720-759 760-799 800+

Credit Limit ($)
CARD Act Conclusion

- Overall profitability of lending declined as a result of the CARD Act.
- Fees declined by an annualized 2.8 percentage points of ADB.
  
  \[0.028 \times 744 \text{ billion} = 20.8 \text{ billion}\]

- Consistent with a model of low fee salience and limited market competition.
- No observable decline in access to credit.
- Consistent with very high ROA pre-CARD Act, particularly for low-FICO borrowers.
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Payoff Nudge

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- Idea: By showing people the cost of making minimum payment only, change their payoff behavior.
Pre CARD-Act Payoff Behavior

![Graph showing Pre CARD-Act Payoff Behavior]

- Share of Account-Months
- Months to Payoff
Pre CARD-Act Payoff Behavior - By FICO

- Overall: 28.0%
Pre CARD-Act Payoff Behavior - By FICO

- Overall: 27.9%
Change around 36-Months Target
Change around 36-Months Target - By FICO
Repayment Behavior

- About 0.5% of account holders are nudged to target payoff amount.
- Most of them were making smaller payments previously.
- Most effect on middle of FICO score distribution.
- Very modest aggregate annual interest savings: $70 million
- Good if costless to implement, other policy alternatives might have been relatively more beneficial.
CARD Act Conclusion

- Reduced fees significantly:
  - Annualized 2.8 percentage points of ADB ($20 bn)
  - Annualized 10 percentage points of ADB for low-FICO borrowers
  - Regulation can transfer surplus consumers, in particular in an environment of imperfect cost salience and imperfect competition.
- Small, but noticeable effect on payoff behavior