Even Self-Aware Consumers Are Overconfident

Matthew N. White[1] Christopher D. Carroll[2] Daniel J. Grodzicki[3] David C. Low[4]

[1]Econ-ARK (mnwhite@gmail.com)
[2]JHU (ccarroll@jhu.edu)
[3]Ind (dan.j.grodzicki@gmail.com)
[4]CFPB (david.low@cfpb.gov)

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Self-aware consumers know they can make mistakes.

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Academics and policymakers have sought to understand:

1. The extent of consumer self-awareness and overconfidence
2. The implications for regulation

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Great for studying consumer self-awareness and overconfidence:

1. "Obviously best" payments: minimum required, then pay remainder in final month
2. Basically no one does this
3. High failure rates $\Longrightarrow$ attention from regulators

Questions of Interest

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- How do those beliefs compare to actual probabilities?
- Is there evidence that borrowers learn from experience?
- How costly are repayment mistakes for borrowers?
- How would borrowers behave if they knew the truth?

Our Approach and Main Findings

Specify a theoretical model of consumer behavior:

- Informed by institutional context and data
- Use data to estimate parameters (beliefs)
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- The riskiest borrowers are also the most over-confident
- Self-insight is most valuable to the riskiest borrowers

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- The riskiest borrowers are also the most over-confident
- Self-insight is most valuable to the riskiest borrowers
- Eliminating overconfidence and mistakes increases average consumer benefits by \$75 ($\approx$ 250% of baseline!)

Transaction-Level Deferred Interest Account Data

Administrative data from single retailer covering 12-month DI promotions in 2011-2013, matched to credit bureau data. Observe age, income, credit score, utilization rate of available credit, **sequence of payments** made.

We focus on creditworthy and sophisticated borrowers:

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Also restrict attention to those with:

- A single promotional card
- No **non-promotional** purchases on it

Data Summary

Estimation sample: **75,191** "clean" deferred interest accounts:

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- Middle 70% of debt distribution: \$1000 to \$2000

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- Very restricted dataset: MNW has never seen or worked with the data!

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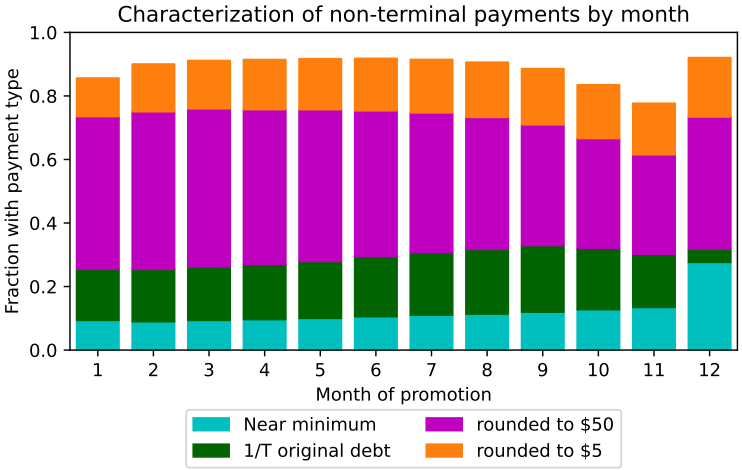
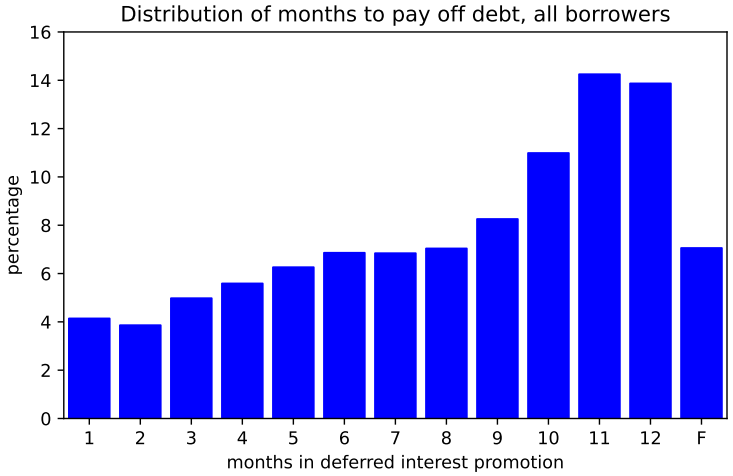
- **Outcomes:** What are we even trying to get the model to "fit"?

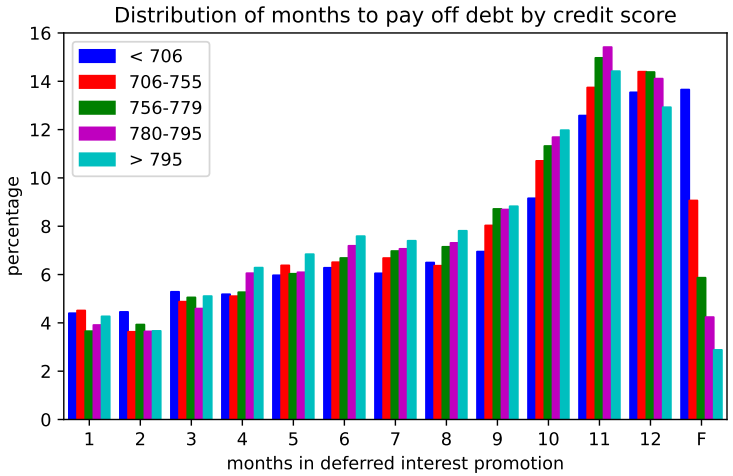
Categorization of Non-terminal Payments



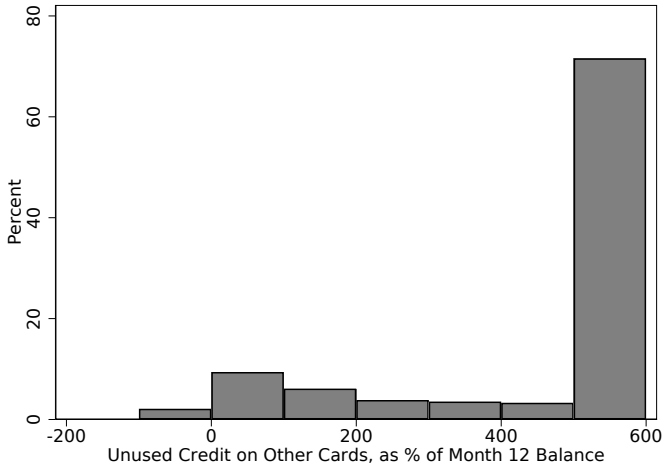
Most Borrowers Pay Off Early, but Many Others Fail



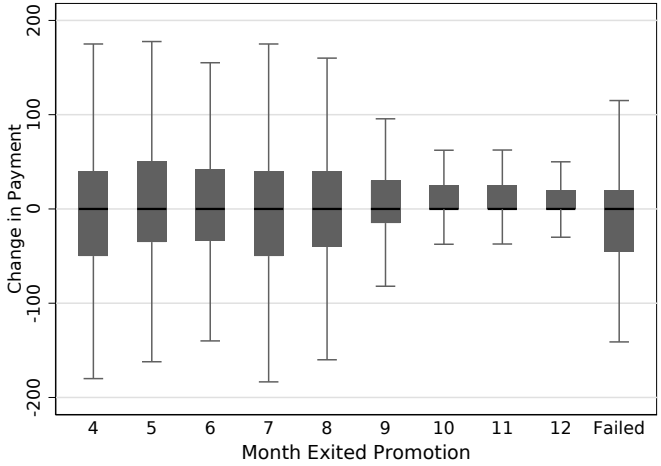
Timing of Exit Varies with Observable Characteristics



Most Borrowers Who Fail Didn't "Need" To



Borrowers Who Fail Made the Same Payment in Month 2



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4. Promotional failure is almost surely not intentional
5. Borrowers don't change their payment by much very often...
6. ...including those who fail the promotion

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- Upshot: need to model borrower beliefs about **both mistake probabilities**

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Conditional on observables, want model borrowers to match the data w.r.t:

- Categorical distribution of payment sizes (and rounding)
- Timing of successful exit from the promotion
- Rate of success in the promotion
- Frequency of missed payments

Identification of Belief Parameters

Borrower beliefs determine (subjective) best heuristic, ignoring "behavioral" factors:

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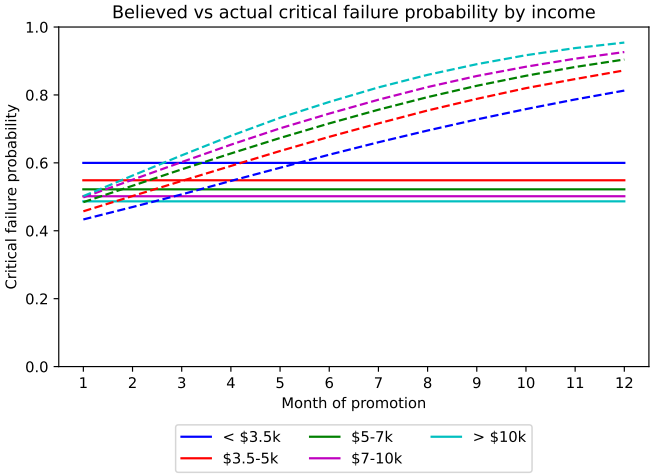
Categorical distribution of payment sizes conditional on observed characteristics identifies parameters governing (distrbution of) beliefs about mistakes.

Identification of other parameters

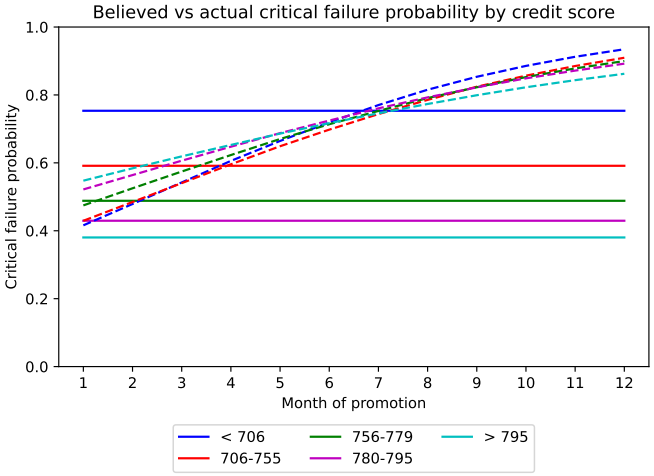
Some Estimated Parameters

Param	Description	Value	Std err
π	Probability of getting to choose new plan	9.91e-2	(0.05e-2)
τ_1	Preference bonus: paying all remaining debt	8.430	(0.062)
χ	Perceived cost of making a monthly payment ($)	-0.468	(0.003)
ω	Magnitude of penalty for large final payment	3.33e-5	(0.01e-5)
σ_η	Scale of preference shocks over payment plans ($)	2.280	(0.011)
κ_{10}	Preference bonus: payment rounded to $10	1.018	(0.014)
κ_{25}	Preference bonus: payment rounded to $25	1.439	(0.016)
κ_{50}	Preference bonus: payment rounded to $50	1.364	(0.020)
κ_{100}	Preference bonus: payment rounded to $100	1.979	(0.011)

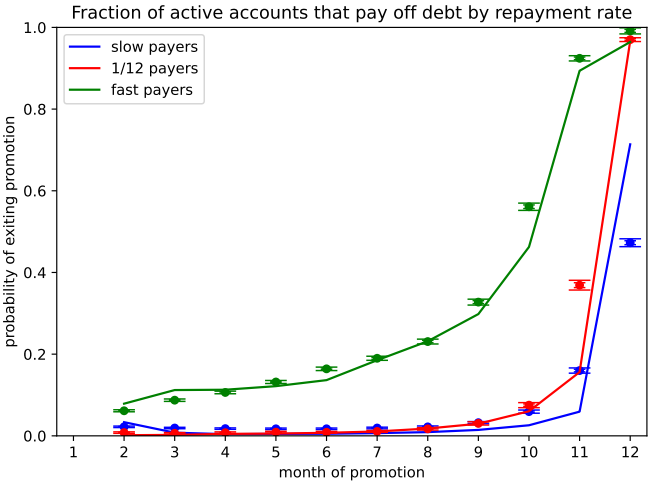
Critical Failure: Belief vs Reality by Income



Critical Failure: Belief vs Reality by Credit Score



Model Fit: Exit Rate By Cumulative Payment Size



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- **Perfect borrowers:** As above, but no behavioral biases nor preference shocks

Perfect borrowers are **guaranteed** to choose the "obviously best" repayment heuristic

Measures of Financial Welfare from DI Promotion

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- Value calculation for each heuristic includes rounding preferences, etc
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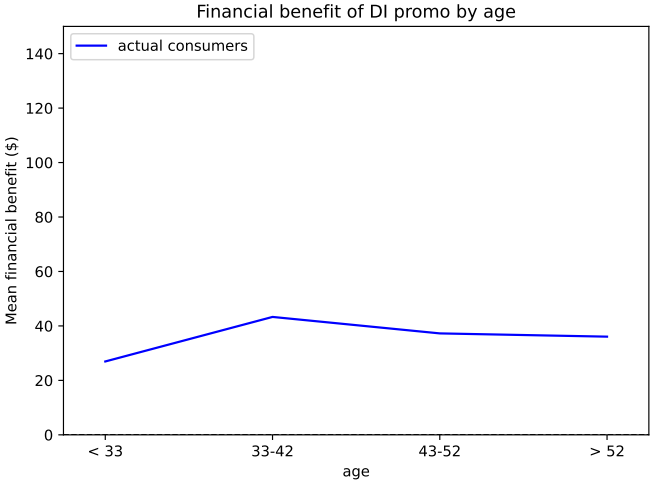
- **Net financial benefit:** Accumulated "delay value" less late fees and DI
- That's measured purely in actual money

Decomposition of Borrowers' Financial Benefits



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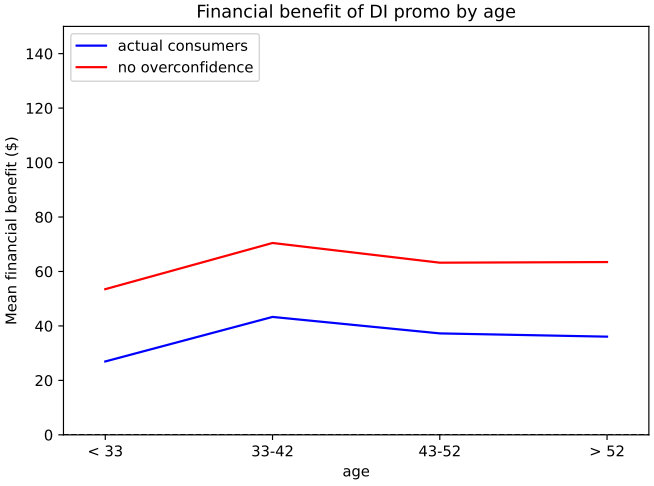

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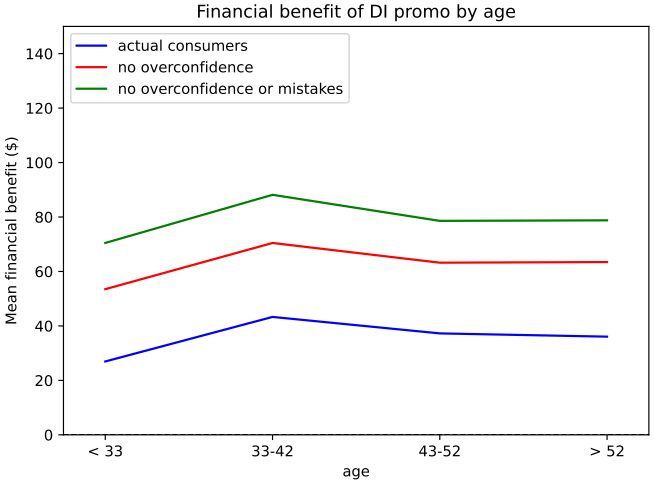

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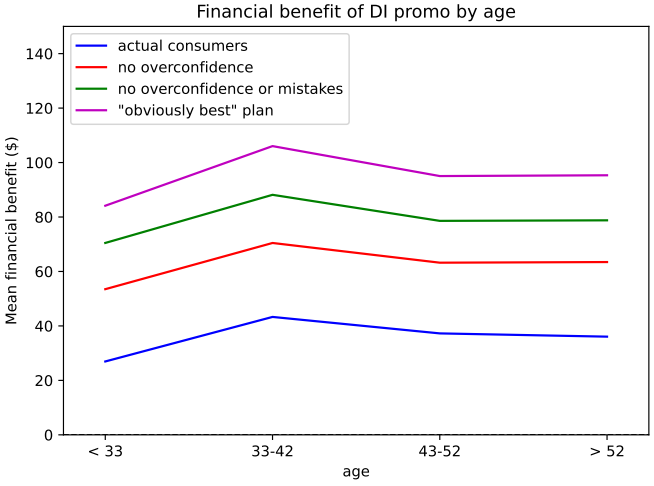

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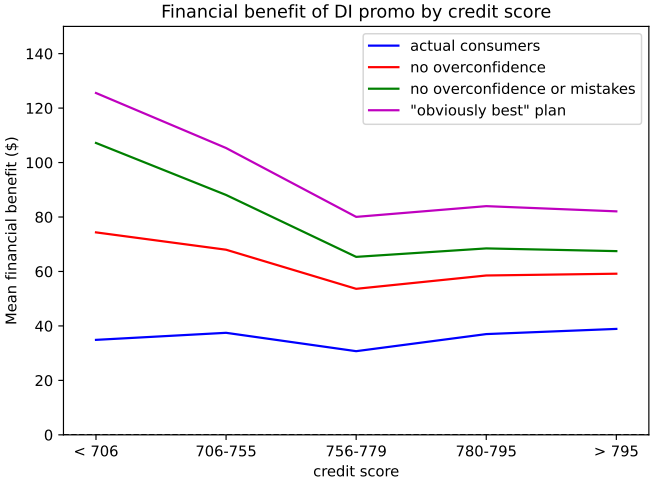

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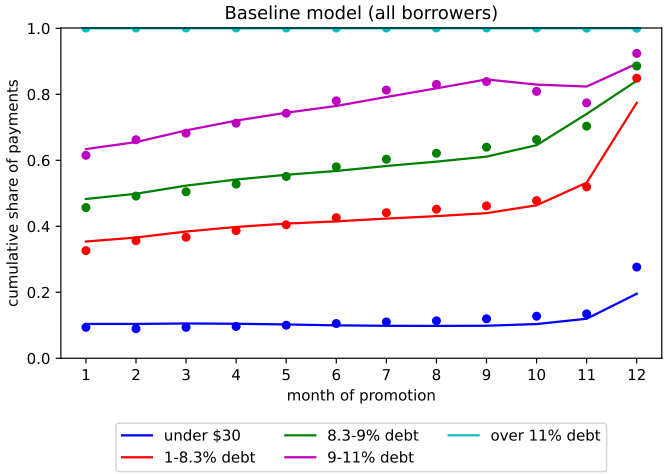
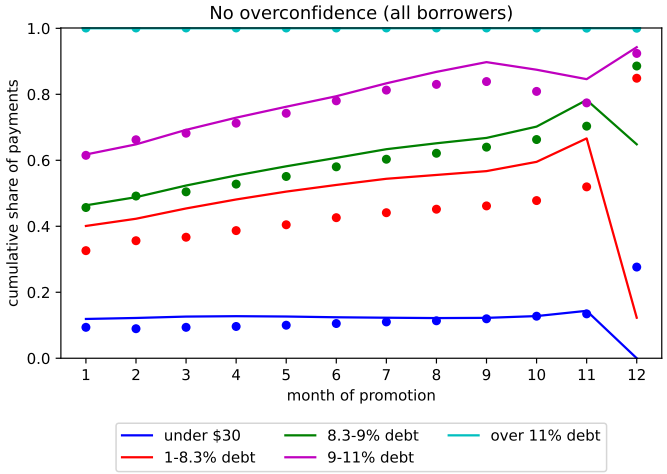
- **Perfect borrowers**: Everyone chooses "obviously best" plan. Obviously.

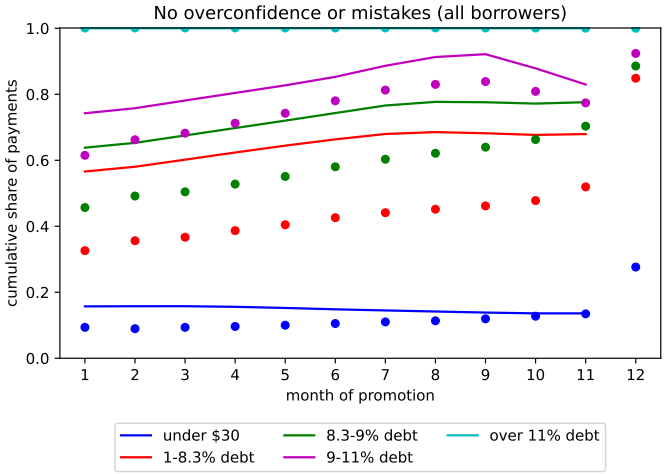
Payment Categorization: Actual Consumers



Payment Categorization: No Overconfidence



Payment Categorization: No Overconfidence or Mistakes



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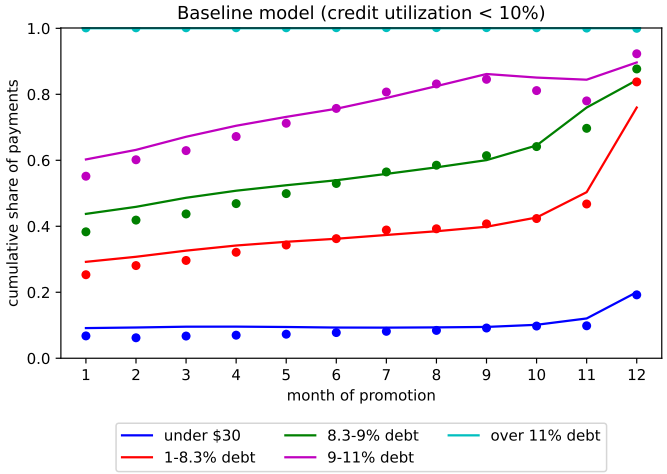

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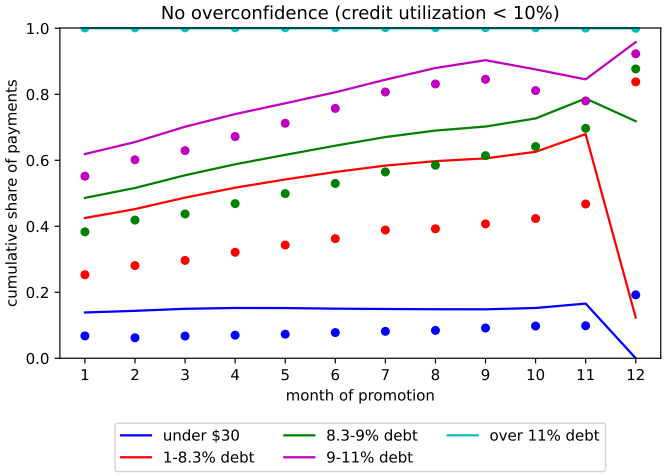

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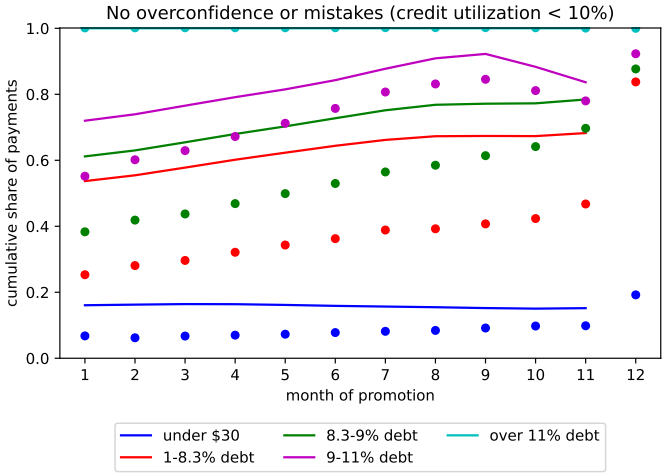

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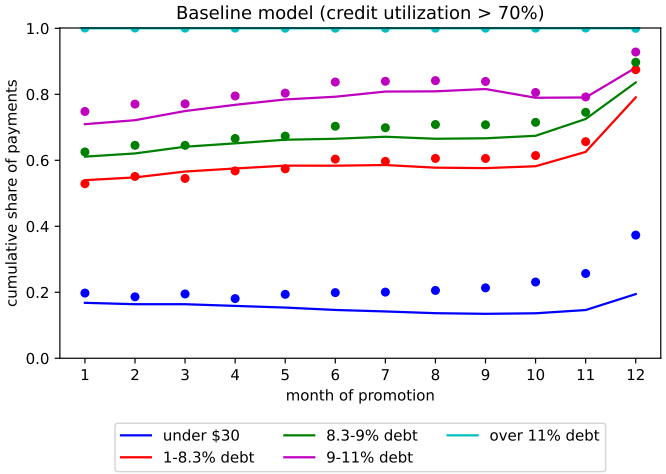

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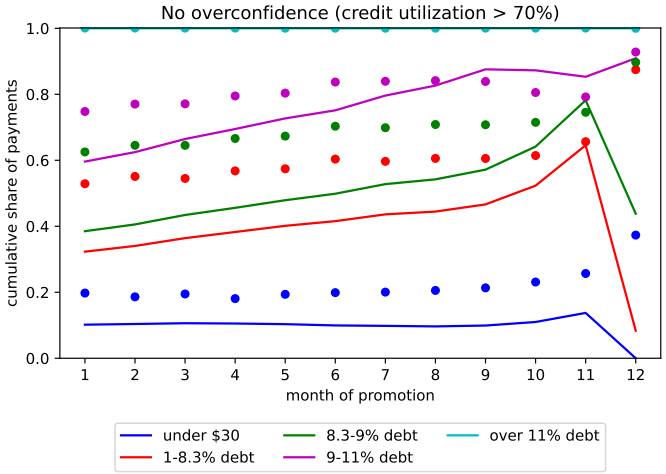

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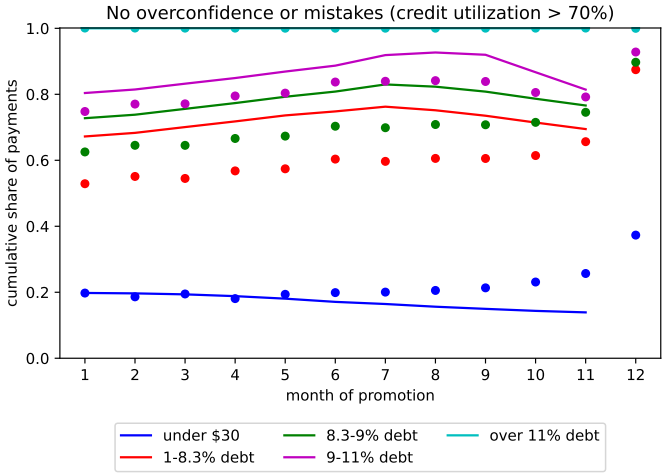

CONCLUSION

Conclusion

DI provides excellent setting to study self-awareness and over-confidence. We find:

- Borrowers are both self-aware and overconfident
- Riskiest borrowers are the most overconfident and would benefit most from self-awareness
- Without biases consumers would benefit far more from DI
- Many lessons for regulators that we leave for the future

STOP HERE

Deferred Interest Account Mechanics

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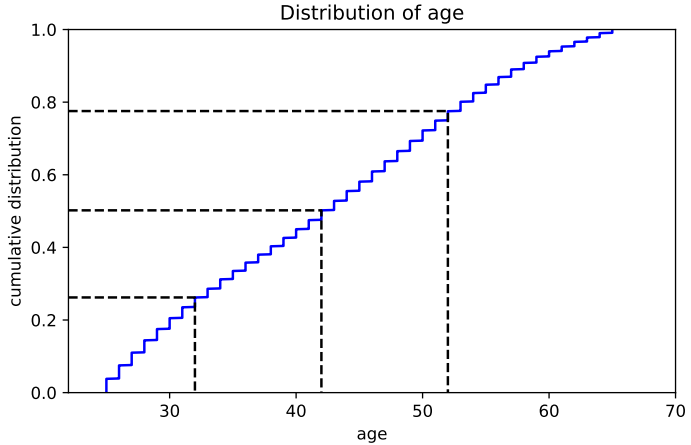
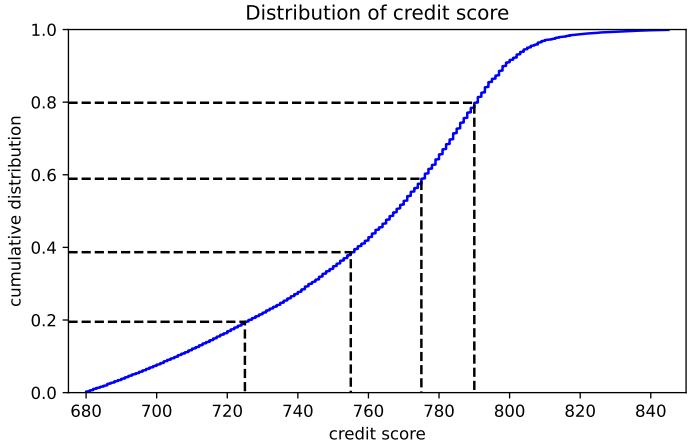
- **Only pay** DI if **any** debt remains after 12 months
- Becomes a normal credit card after the promotion, ordinary interest

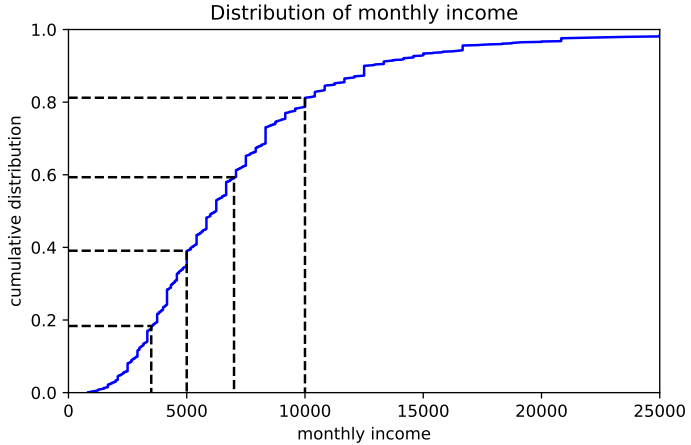
Distribution of Age of Borrowers



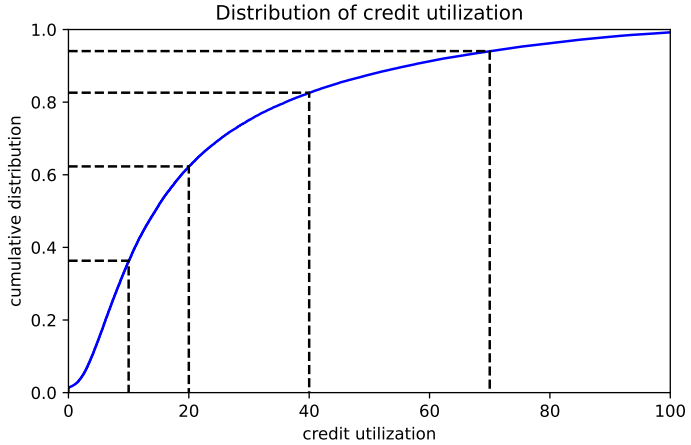
Distribution of Credit Score of Borrowers



Distribution of Monthly Income of Borrowers



Distribution of Credit Utilization of Borrowers



Payment Heuristics

Borrowers choose a **heuristic** from a discrete menu of options:

- Minimum: pay greater of \$25 or 1% of original debt
- Dollar-based: pay in increments of \$5
- Timing-based: pay $\frac{1}{N}$ of original debt (for $N = 1, ..., 12$)

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Plan to make constant payments each month, pay any left over at end

- Believe heuristic choice is a once-and-for-all decision...
- ...But actually have a small chance π to change each month

Back

Account Mechanics

- Agent enters the model at $t = 0$ with D_0 in debt; promotion lasts T months.
- Each month, they make a payment P_t to pay down debt: $D_{t+1} = D_t - P_t$.
- DI (starting at $Z_0 = 0$) accumulates each month: $Z_{t+1} = Z_t + r_Z(Z_t + D_t)$.

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- If a payment is missed or below a minimum threshold $P_t < \underline{P}$, a fee of $M > 0$ is assessed to the agent immediately.

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Preferences: Costs and Benefits

Borrowers are risk neutral: maximize expected net benefits in dollars.

Two obvious costs of participation:

1. **Missed payment fee** for missing a monthly payment
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Benefits of participation are less obvious:

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- Borrowers had *some* plan for payment before being offered DI– what was it?
- What is the rate of interest the borrower faces if they *decline* the DI promotion?

Back

Estimating Interest Rates With the SCPC

Reduced form estimation using Survey of Consumer Payment Choices:

- Survey of **how** consumers paid for purchases: cash, card, etc
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- **Upshot:** estimate multinomial logit on SCPC, generate **predicted distribution** of "personal interest rate" **conditional on observables**
- In model, solve & simulate accounts **for each rate**, apply predicted weights

Back

Behavioral Preferences

Observed borrowers don't act "rationally," so need some "quirky parameters":

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- Unobserved heterogeneity: iid shocks to utility for each heuristic, dist'd $N(0, \sigma_\eta)$
- Occasionally change heuristics: "Calvo fairy" taps borrower w/ probability π

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Mistake Probability Heterogeneity

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- Error terms mean zero, normally distributed with respective stdevs of σ_α and 1, correlation coefficient is ρ_A: little and big mistakes can be correlated

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Beliefs About Mistakes

Model borrowers don't know their true ς_i nor φ_i, but have *beliefs* about them:

- Each borrower has **constant** belief about their probability of missing a payment.

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- Beliefs about failure **drift** at rate δ over time

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- Actual chance to fail to notice: 35-80%, depending on characteristics
- $\widetilde{\varphi}_{it} = 1$ represents borrower thinking it's **possible** to fail to notice

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Most other parameters fairly straightforward to identify

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