Naïve Consumers and Financial Mistakes

Florian Exler[1]   Alexander Hansak[2]

[1]University of Vienna [2]VGSE / CERGE-EI

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Motivation

1. *Financial contracts are complicated.*
   - Typical contract 50 times longer than in 1980 (WSJ 2013)
   - *"I teach contract law at Harvard Law School and I can't understand my credit card contract."* (Elisabeth Warren)

Motivation

1. Financial contracts are complicated.
2. *People pay penalty fees (besides interest).*
   - In 2011, 27.7% of US consumer checking accounts experienced non-sufficient funds or overdraft (CFPB 2013)
     - 1/3 incurred more than 10 items
     - $225 average fees (conditional on being charged)
   - Average credit card holder pays $58 in fees p.a. (Agarwal et al. 2015)
     - Biggest items are late fees and over limit fees

Motivation

1. Financial contracts are complicated.
2. People pay penalty fees (besides interest).
3. *People make financial mistakes.*
   - Fail to understand key aspects, e.g. when late fees are due (GAO 2006)
   - 52% of overdrafters do not recall opting into overdraft (PEW 2013)

Motivation

1. Financial contracts are complicated.
2. People pay penalty fees (besides interest).
3. People make financial mistakes.
4. This sparks a regulatory debate.
   - Cognitive limitations: underestimate cost of financial mistakes
   - **C**onsumer **F**inancial **P**rotection **B**ureau established in 2011
   - Credit **C**ard **A**ccountability **R**esponsibility and **D**isclosure Act in 2009

This Paper

Questions

1. Are mistakes in credit markets quantitatively important?
2. How are welfare and interest rates affected?
3. Can and should the regulator help?

We propose a quantitative theory which

- allows borrowers to trade off interest rates and penalty fees
- includes naïve borrowers who commit financial mistakes
- allows for interaction between naïves and sophisticates
- allows to structurally assess two key pieces of the 2009 CARD act: information requirements and fee limits

Literature — Theory

- Naïveté and (credit) contracts: Heidhues and Kőszegi (2010); Armstrong and Vickers (2012); Eliaz and Spiegler (2006); Heidhues and Kőszegi (2015)

- Shrouding and myopia: Gabaix and Laibson (2006)

→ We incorporate the theoretical notion of naïveté into a quantitative model of unsecured debt

Literature — Empirical

- Evidence of Naïveté in credit markets: DellaVigna and Malmendier (2004); Ru and Schoar (2019); Gao, Hu, Kelly, Peng, and Zhu (2020)

- Effects of CARD act: Agarwal, Chomsisengphet, Mahoney, and Stroebel (2015); Nelson (2020)

→ We propose a structural framework of naïveté and evaluate its equilibrium effects

Literature — Quantitative Macroeconomics

Consumer debt with equilibrium default...

- Seminal papers: Livshits, MacGee, and Tertilt (2007); Chatterjee, Corbae, Nakajima, and Ríos-Rull (2007)

...with non-standard preferences/expectations

- Hyperbolic discounters: Nakajima (2017)
- Hyperbolic discounters, CARD act: Raveendranathan and Stefanidis (2020)
- Over-optimism, endogenous spillovers: Exler, Livshits, MacGee, and Tertilt (2022)

  → We introduce debt contracts with penalty fees and naïve agents that commit financial mistakes. This creates an explicit role for information requirements and fee limits.

Our Framework

Standard heterogeneous agent economy with idiosyncratic risk, unsecured debt, equilibrium default, and endogenous borrowing interest rates.

We add:

- **Debt contracts with penalty fees**
    - People face financial shocks: unexpected expenses, late payments, missed payments, overdrafts etc.
    - These shocks trigger fees: late fees, overdraft fees, bounce fees etc.
    - Borrowers trade off interest rates and penalty fees

- **Naïveté about penalty fees** (cf. Armstrong and Vickers; Gabaix and Laibson; Heidhues and Kőszegi)
    - Naïves make financial mistakes: sign contracts at too high penalty fees
    - Naïves pay more than expected (and necessary)

Heterogeneous Households

Maximize discounted expected life-time utility

$$\mathbb{E} \sum_{j=1}^{J} \beta^{j-1} u\left(c_j\right)$$

Risky income

$$y_j = e_j w$$
$$\log(w) = z + \eta$$

with

e_j – Life cycle pattern of effective labor endowment

z – Persistent shock, Markov with finite support

η – Transitory shock, iid, finite support

Borrowers Pay Penalty Fees

Households are subject to financial shocks

- Entail late fees, overdraft fees, bounce fees, etc.
- Modeled as additional forced borrowing s.t. penalty fee
- iid, support $\varepsilon \in \{0, \Omega\}$ with fee ϕ

Naïves suffer more financial shocks

- Higher risk

$$p(\varepsilon_N = \omega) > p(\varepsilon_S = \omega) \ \forall \omega \in \Omega$$

- Naïve agents are unaware of higher risk

$$\mathbb{E}_N(\varepsilon_N) = \mathbb{E}_S(\varepsilon_S) = \mathbb{E}(\varepsilon_S)$$

- Thus, naïves behave identical to sophisticates conditional on state

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Borrowing Decision

Debt Contract defined as (d', ϕ, q) with

$d' \in (0, \infty)$ Promise to repay

$\phi \in [1, \infty)$ Penalty fees for financial shocks

$q \in [0, 1]$ Endogenous loan price depends on d', ϕ, s

Households borrow in unsecured debt

- borrow qd' and either
  - repay d' plus potential fees $\phi\varepsilon$, or
  - default and repay 0 (suffer from garnishment)
- trade-off fees ϕ v.s. interest rates $1/q$

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Unsecured Debt

- One period loans, limited commitment to repay, perfect competition
- No asymmetric information: lenders observe household state
  $s = \{j, z, \eta, \varepsilon\}$
- Type (S, N) unobservable to all (but lenders know fraction of naïve)
- S & N behave the same due to identical beliefs
- Pooling of S & N in debt contracts conditional on observables

Equilibrium Prices

- For each (d', s), solve for menu of loan prizes q as function of fees ϕ
- Take as given optimal default choices
  - $\Rightarrow$ Larger debt $\rightarrow$ higher interest rate
  - $\Rightarrow$ Higher fees $\rightarrow$ lower or higher interest rates

- Naïves cross-subsidize interest rates for sophisticates

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Consumer Problem

$$V(d, \phi; s) = \max_{c, d', \phi'} \left[u(c) + \beta \mathbb{E} \max \left\{ V(d', \phi'; s'), B(s') \right\} \right]$$

$$\text{s.t. } c + d \leqslant y(s) + q(d', \phi'; s)d' - \phi \cdot \varepsilon$$

where B is value of filing for bankruptcy:

$$B(s) = u(c) - \chi + \beta \mathbb{E} \max \left\{ V(0, \phi'; s') \right\}$$

$$\text{s.t. } c = (1 - \gamma)y(s)$$

Equilibrium Loan Pricing

Lenders take as given

r lender's exogenous refinance rate

$\theta(d', \phi; s)$ optimal default decision

$\rho(d'; s)$ rate of recovery in default

For any (ϕ, d'), choose $q(d', \phi; s)$ to maximize profits. In equilibrium:

$$q(d', \phi, s) = \frac{1}{1+r} \int \theta(d', s', \varepsilon, \phi) \frac{\rho(d', s', \varepsilon)}{d'}$$
$$+ \left(1 - \theta(d', s', \varepsilon, \phi)\right) \left(1 + \frac{(\phi - 1)\varepsilon}{d'}\right) \mathrm{d}\mu(s', \varepsilon)$$

Standard Values

CRRA Conspt	σ	2
Wage Autocorrelation	ϱ	0.95
Persistent Wage Var	σ_z^2	0.025
Transitory Wage Var	σ_η^2	0.05
Risk Free Rate	r	1%
Garnishment	γ	30%
Stigma	χ	1.5

Calibration of Naïveté

Data:

CFPB: Report "The Consumer Credit Card Market" (2019)

OCC: Credit Card Account Data from the Office of the Comptroller of the Currency (as in Agarwal et al., QJE 2015)

Direct specification:

- Naïve agents correspond to FICO < 660: share $\mu = 30\%$ (OCC)
- Financial shocks occur not at all, once, or repeatedly: $\varepsilon \in \{0, \omega_1, \omega_2\}$
    - $p(\omega_1) = 21\%, \quad p(\omega_2) = 9\%$ (CFPB)
    - $\omega_2 / \omega_1 = 7$ (CFPB)

Simulated Method of Moments

Parameters		
Discount factor	β	0.917
Size small financial shock	ω_1	0.049
Relative likelihood of financial shock	$p(\varepsilon_N)/p(\varepsilon_S)$	5.14

	Data (OCC)	Model
Avg. Interest / Debt	14.30%	14.01%
Avg. Fees / Debt (AFD)	7.10%	6.81%
AFD naïve / AFD sophisticated	6	6.1

Contract Illustration
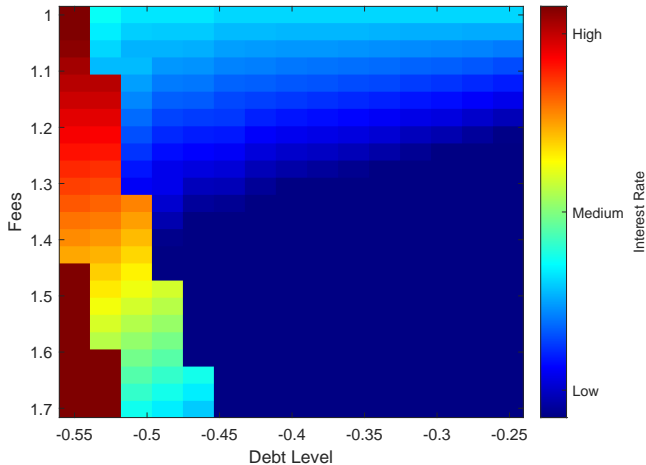
Figure: Example contract space at age 50 with median income

Naïves Make Sizable Mistakes

In equilibrium, naïves . . .

. . . make mistakes by choosing contracts with too high fees
- Actual cost of credit higher than perceived
- Average mistake: naïves overpay 80%

. . . cross-subsidize lower interest rates for sophisticates
- Sophisticates save 0.5% of mean income in interest payments

Example Contract
- 22 year-old
- Income 0.35 (normalized to median income)
- Wants to borrow 0.15 (normalized to median income)
- Compare total cost of credit $\equiv \mathbb{E}\left[\frac{d' - qd' + (\phi - 1) \cdot \varepsilon}{qd'}\right]$

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Perceived Cost of Credit of Naïves

defined as $\mathbb{E}_{\mathsf{N}}\big[\frac{d'-qd'+(\phi-1)\cdot\varepsilon_{\mathsf{N}}}{qd'}\big] = \mathbb{E}\big[\frac{d'-qd'+(\phi-1)\cdot\varepsilon_{\mathsf{S}}}{qd'}\big]$
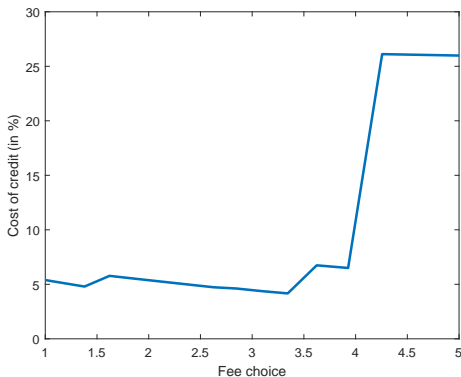
Figure: Perceived Cost of Credit (in %) for naïve borrower with example contract.

Contract Choice
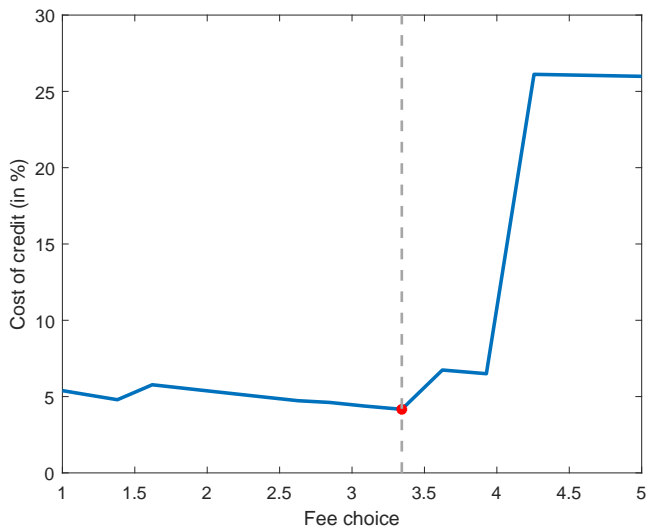
Figure: Perceived vs. Actual Cost of Credit (in %).
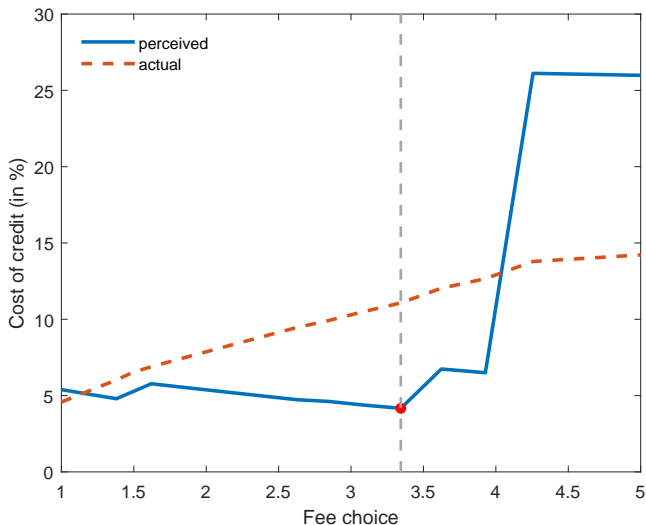
Actual Cost of Credit

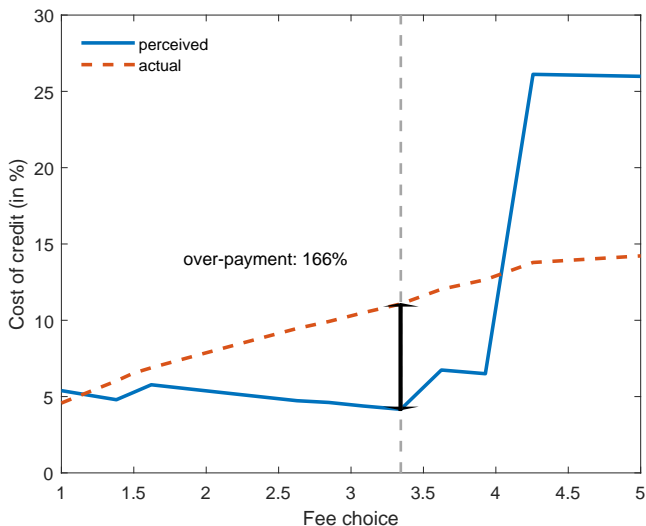Figure: Perceived vs. Actual Cost of Credit (in %).

Financial Mistake

Figure: Perceived vs. Actual Cost of Credit (in %).

Policy Evaluation: 2009 CARD Act

We focus on two central pieces that are un(der)studied:

1. Transparency requirements: $\mathbb{E}(\varepsilon_N) \Downarrow$
   - e.g. advance notice of rate increases, minimum payments disclosures, prevention of deceptive marketing . . .
   - Improve understanding of contracts and management of finances
   - Reduce likelihood of financial shocks for naïves
   - Equally reduce degree of naïveté

2. Fee limits: $\phi \leqslant \overline{\phi}$
   - e.g. limits on reset rates, bans & limits on fees . . .
   - Force insurance against financial shocks
   - Limit cost of financial mistakes

Welfare Assessment

Welfare affected by:

1. Fewer and/or less costly financial shocks
2. Naïves avoiding mistakes
3. Cross-subsidization: change equilibrium fees (ϕ) and interest ($1/q$)

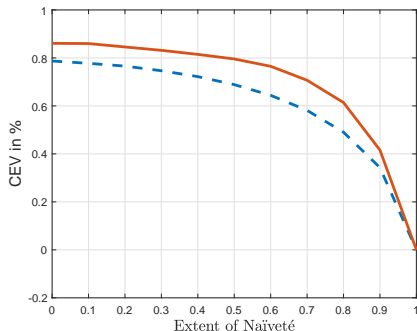$\Rightarrow$ besides (pooling) benchmark, we calculate a no pooling economy to isolate **3.**

Welfare measure:

- Consumption equivalence variation (CEV in %)
- Paternalistic welfare measure for naïves

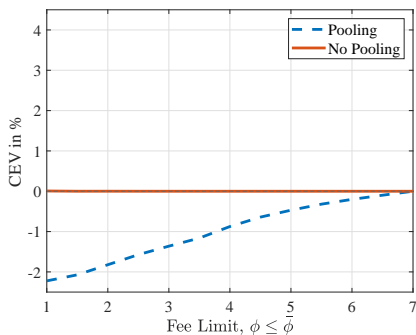# 1. Transparency Requirements: $\mathbb{E}(\varepsilon_N) \Downarrow$
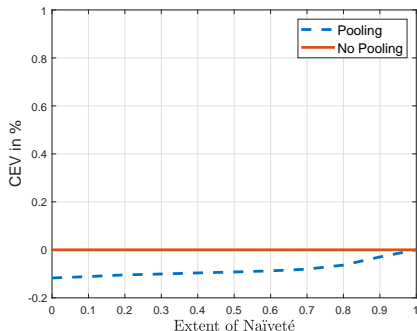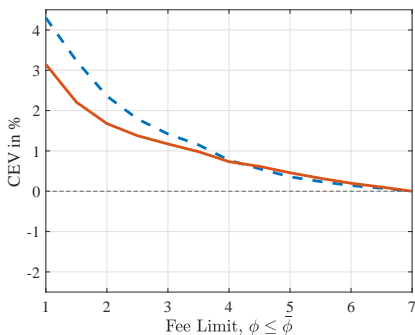

(a) sophisticates

(b) naïves

Figure: Welfare Effect of Reduced Naïveté.

Naïves are better off avoiding mistakes. Sophisticates lose cross-subsidization.

2. Fee Limits: $\phi \leq \overline{\phi}$

(a) sophisticates

(b) naïves

Figure: Welfare Effect of Fee Limits. Benchmark: $\overline{\phi} = 10$.

Tight limits force insurance and improve naïve's welfare.
Sophisticates lose cross-subsidization.

Conclusion

We build a quantitative theory of credit which

- allows to trade off penalty fees vs. interest rates
- introduces financial mistakes due to naïveté
- allows for spill-overs through interest rates
- has an explicit role for information requirements & penalty fee limits

We use it to structurally assess important parts of CARD act

- naïve borrowers choose wrong contracts
- financial mistakes can be costly
- CARD act
  - improves welfare of naïves
  - reduces cross-subsidization and harms sophisticates