Naïve Consumers and Financial Mistakes

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Bordeaux

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 & 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. What are the consequences of financial mistakes in credit markets?
2. Can regulation achieve better outcomes?
3. How do these policies influence the interaction between consumers that make more and less mistakes?

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 un(der)studied pieces of the 2009 CARD act: information requirements and fee limits

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 (2023)
- Over-optimism, endog. spillovers: Exler, Livshits, MacGee, Tertilt (2024)
- Heterog. discount factors: Chatterjee, Corbae, Dempsey, Ríos-Rull (2023)

→ 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.

Literature — Empirical

- Evidence of financial mistakes in credit markets: Agarwal, Chomsisengphet, Liu, and Souleles (2015); Campbell, Grant, and Thorp (2022); DellaVigna and Malmendier (2004); 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 — 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

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: 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

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

- e_j – Life cycle pattern of effective labor endowment
- z – Persistent shock, Markov with finite support
- η – Transitory shock, iid, finite support

Expense Risk

- e.g. medical bills, family disruptions, ...
- Modeled as discrete iid shocks: $\kappa \in \{0, \kappa_1, \kappa_2, \dots\}$

Borrowers Pay Penalty Fees

Households are subject to financial shocks

- e.g. late payments, overdrafts $\longrightarrow$ late fees, overdraft fees, etc.
- modeled as iid, support $\varepsilon \in \{0, \Omega\}$
- In case of financial shock ε, borrowers face additional charges of $\varepsilon \cdot \phi$

Naïves suffer more financial shocks

- more likely to mishandle finances or miss a payment $\longrightarrow$ higher risk

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

- Naïve agents are unaware of higher risk

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

$\longrightarrow$ naïves behave identical to sophisticates conditional on state

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Borrowing in Unsecured Debt

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 choice of d', ϕ and household state $s = \{j, z, \eta, \varepsilon, \kappa\}$

Borrow qd' today. Maybe repay tomorrow:

- repay $d' + \phi\varepsilon'$ (and κ), or
- don't repay and declare Chapter 7 bankruptcy:
  - Suffer garnishment (share γ of income) and stigma (utility cost χ)
  - All obligations discharged ($d = 0$, $\phi \cdot \varepsilon = 0$, and $\kappa = 0$)

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Market Structure

Borrowers

- Household state perfectly observable: $s = \{j, z, \eta, \varepsilon, \kappa\}$
- Type S or N not observable by anyone
  - $\rightarrow$ Debt level d' contains information
- S and N hold same beliefs and behave identically
  - $\rightarrow$ Pooled credit contracts (conditional on observables)

Lenders

- Free entry & perfect competition
  - $\rightarrow$ zero profits
- Take optimal default choices (θ) and recovery (ρ) as given
- Offer a menu of credit contracts (d', ϕ, q) for any household state s
  - $\rightarrow$ Each contract earns same return

▸ equilibrium pricing

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Externally Determined Parameters

Economic Parameters		
CRRA consumption	σ	2
Persistent Wage Autocorr	ϱ	0.99
Persistent Wage Var	σ_z^2	0.007
Transitory Wage Var	σ_η^2	0.043
Risk Free Rate	r	1%
Expense Shocks		
Size of expense shocks	κ	$(0, 0.267, 0.8218)$
Probabilities	$[\pi_0, \pi_1, \pi_2]$	$(0.9748, 0.0237, 0.0015)$

Calibration of Naïveté

Data:

CFPB: Report "The Consumer Credit Card Market" (2019) and Data Point "Checking account overdraft" (2014)

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 $\lambda = 30\%$ (OCC)
- AFD naïve / AFD sophisticated: $p_N(\Omega) = 6p_S(\Omega)$ (OCC)

Calibration of Financial Shocks

Direct specification (CFPB)

- Financial shocks grouped by annual occurrences:
  - 0 = None
  - $\omega_1 = 1$
  - $\omega_2 = 2$ or 3
  - $\omega_3 =$ over 3

- Probabilities and relative size of shocks from data:
  - $p(\omega_1) = 12.5\%, \quad p(\omega_2) = 9.4\%, \quad p(\omega_3) = 8.3\%$
  - $\omega_1 = 0.0007, \quad \omega_2 = 0.0019, \quad \omega_3 = 0.0090$

Simulated Method of Moments

	Data (OCC)	Model
Avg. Interest / Debt (AID)	14.30%	12.97%
Avg. Fees / Debt (AFD)	6.70%	6.62%
Fraction Borrowers	0.25	0.29
Bankruptcy Rate	0.45 %	0.45%
Avg. Debt-to-Income Ratio	6%	5.2%

	Parameter	Value
Discount factor	β	0.9314
Transaction cost	τ	0.1344
Short term liquidity cost	ι	0.4025
Cost of default	χ	0.0193
Garnishment rate	γ	0.5479

▸ Benchmark Outcomes

Naïves Make Sizable Mistakes

- Naïve choose too high fees
- Sophisticates' loans are cross-subsidized → 0.3% median income

Total Cost of Credit

$$ToC = \underbrace{d' - qd'}_{\text{Interest Payments}} + \underbrace{(\phi - 1)\varepsilon}_{\text{Fee Payments}}$$

Financial mistakes

- $ToC\ Bias = \mathbb{E}(ToC)/\mathbb{E}^N(ToC) - 1$
  → $\mathbb{E}^N$: naïve expectations

- $Mistake = \mathbb{E}(ToC)/\mathbb{E}(ToC^*) - 1$
  → ToC^*: optimal "informed" contract choice (c.p.)

Perceived Cost of Credit of Naïves

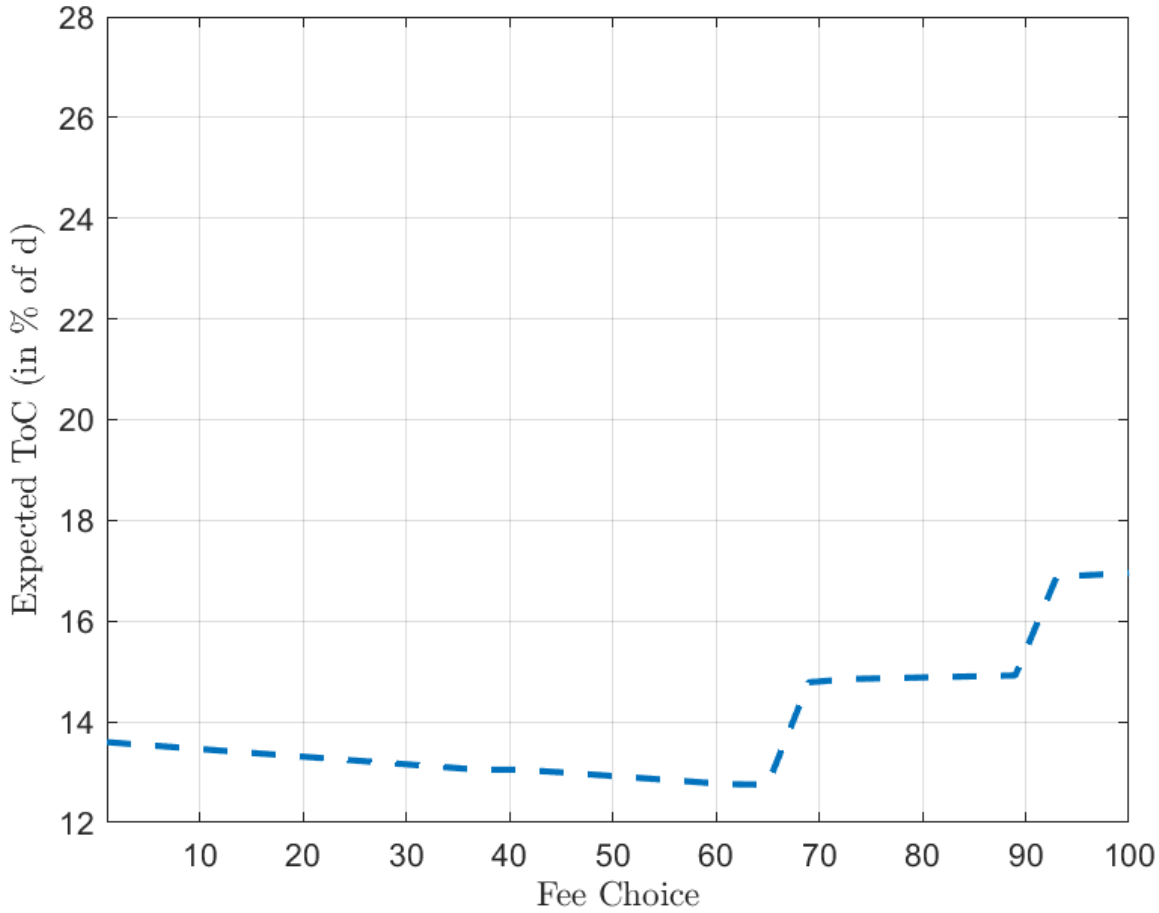
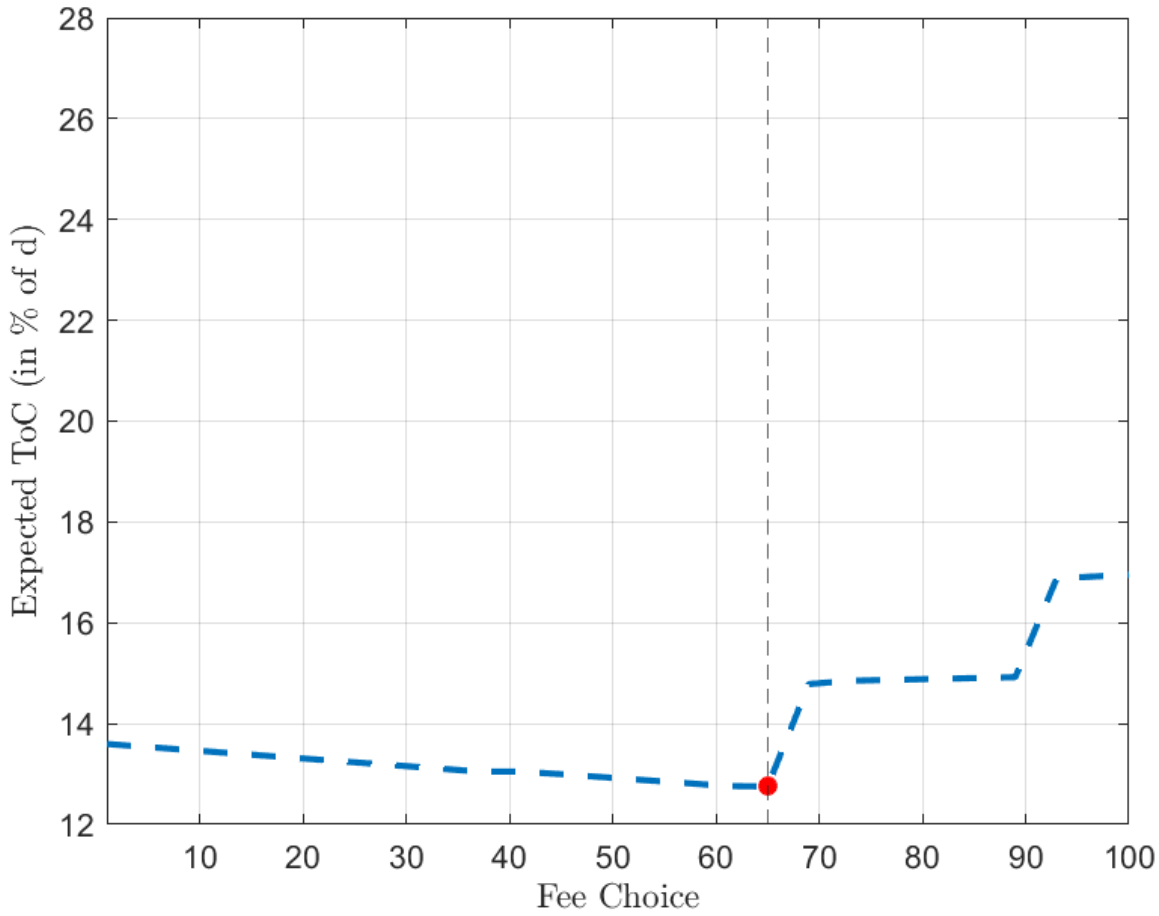


Figure: Perceived Cost of Credit (in %) for naïve borrower.
Example contract: 45 year-old. Income 3.2, loan 2.

Contract Choice



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Actual Cost of Credit

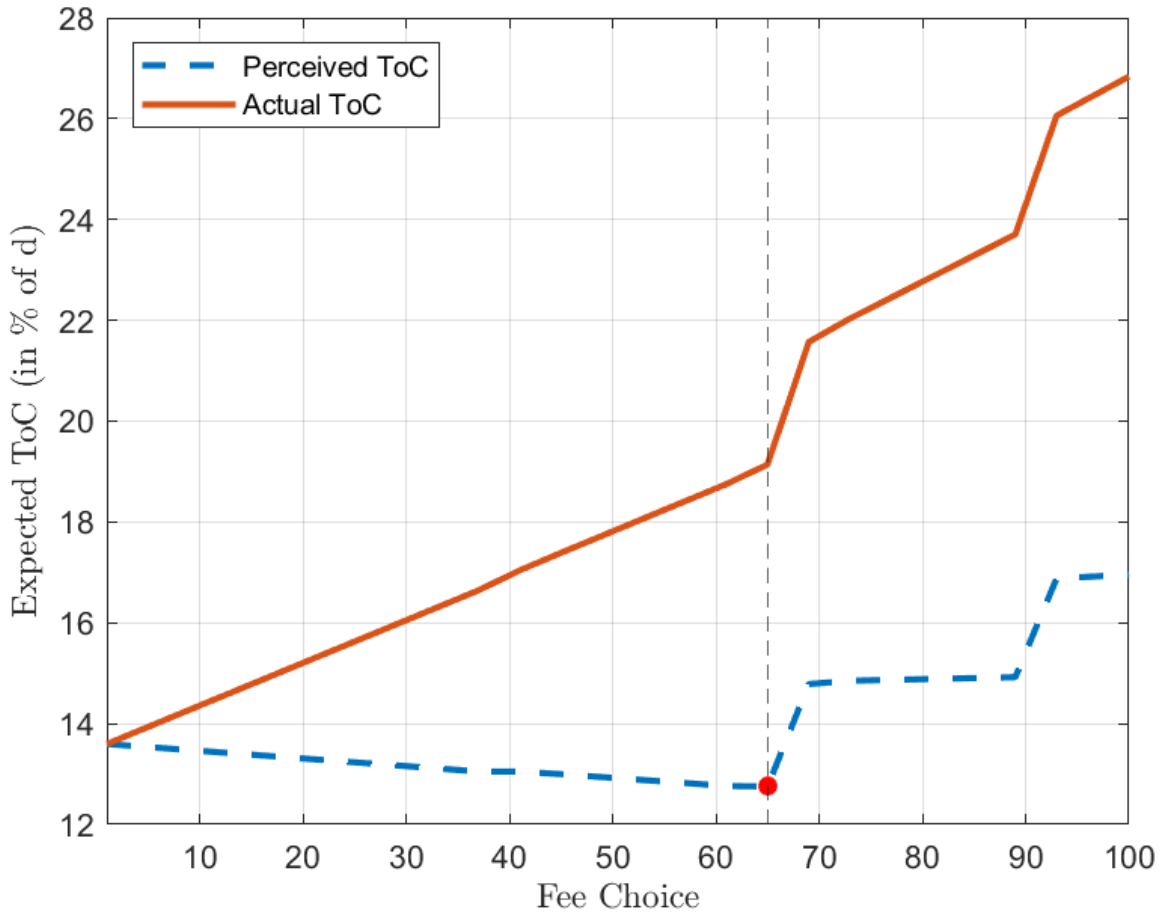
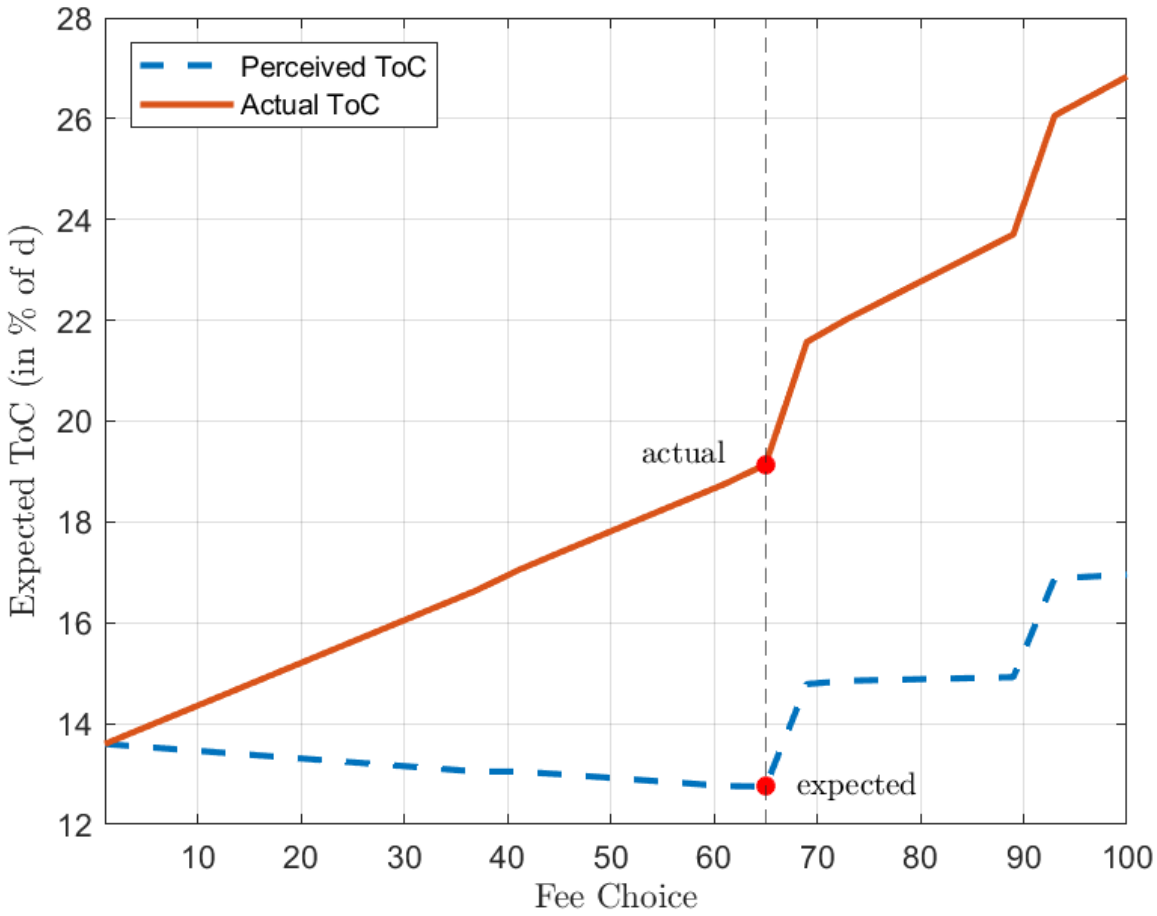


Figure: Perceived vs. Actual Cost of Credit (in %).

Actual Cost of Credit



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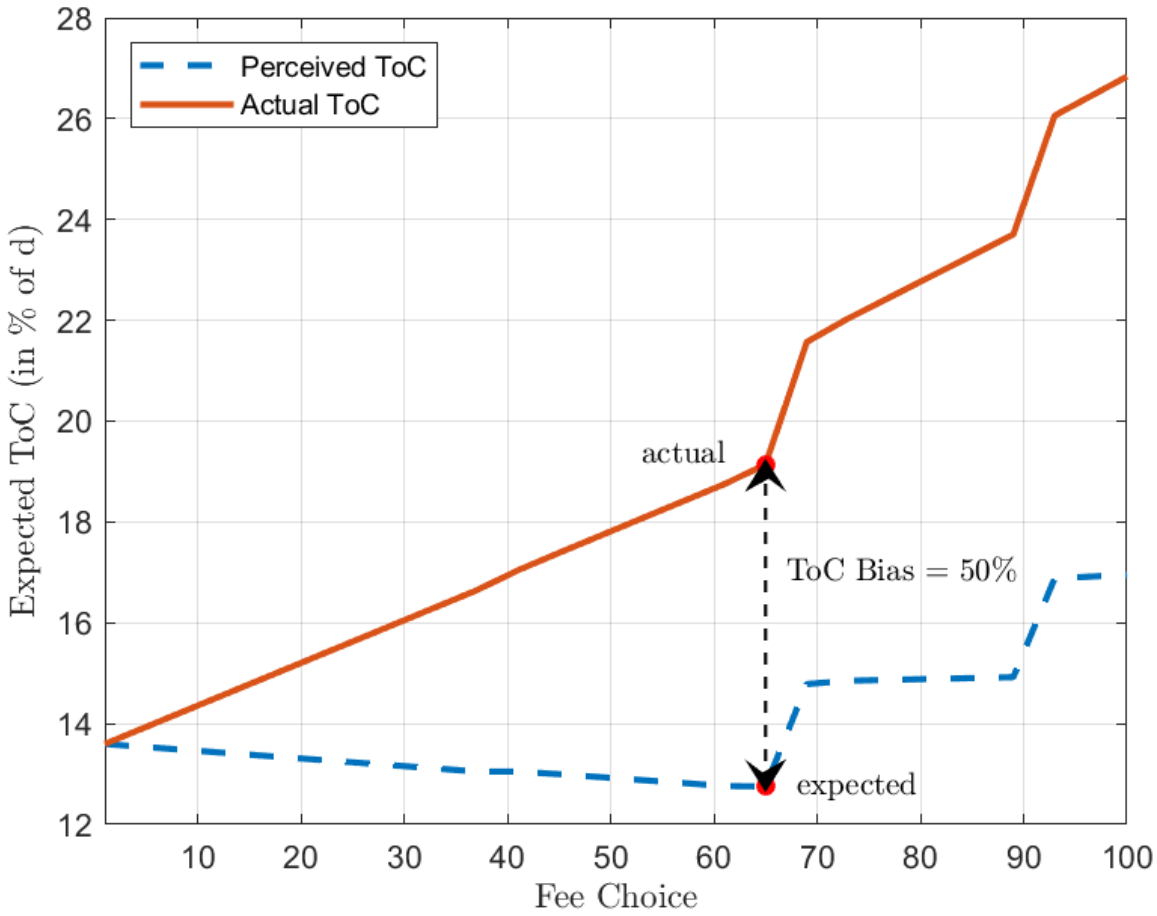
ToC Bias



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Optimal Contract Choice

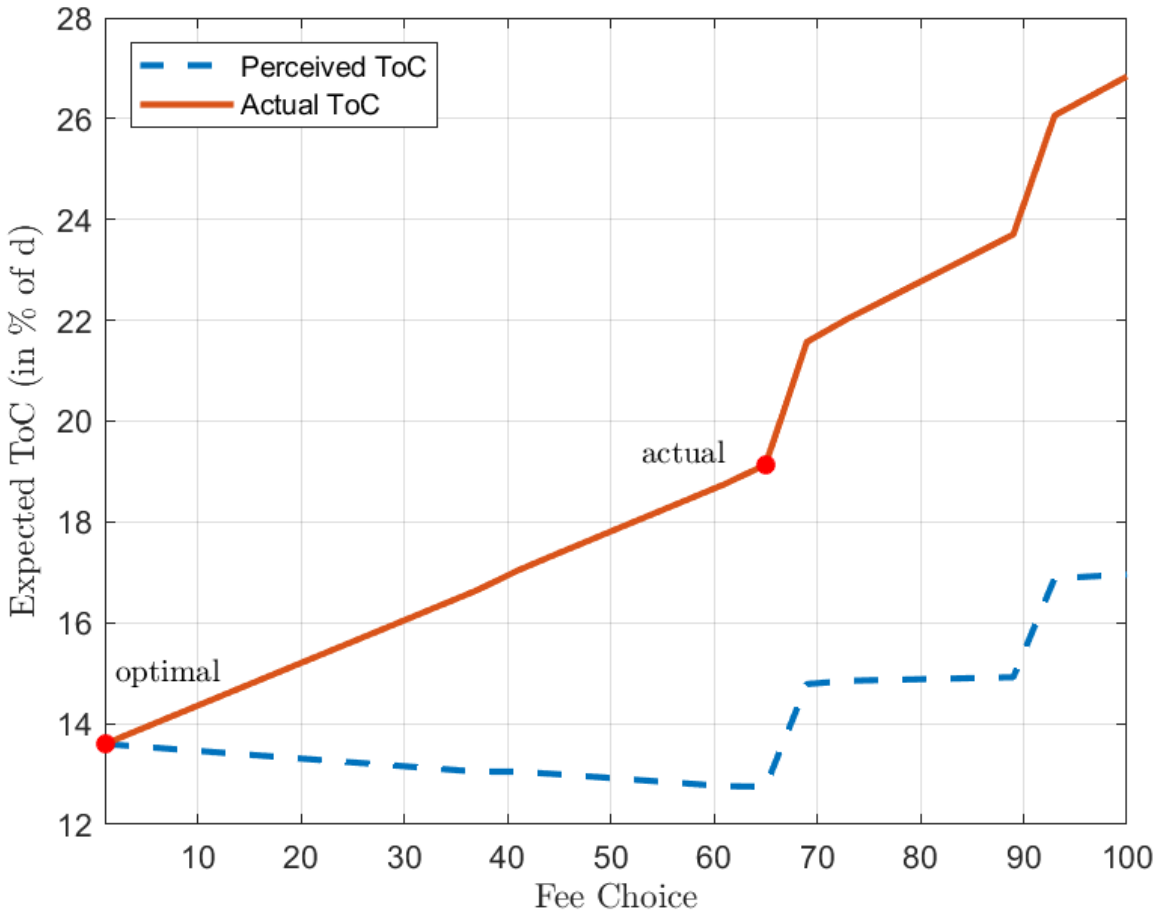


Figure: Perceived vs. Actual Cost of Credit (in %).

Financial Mistake

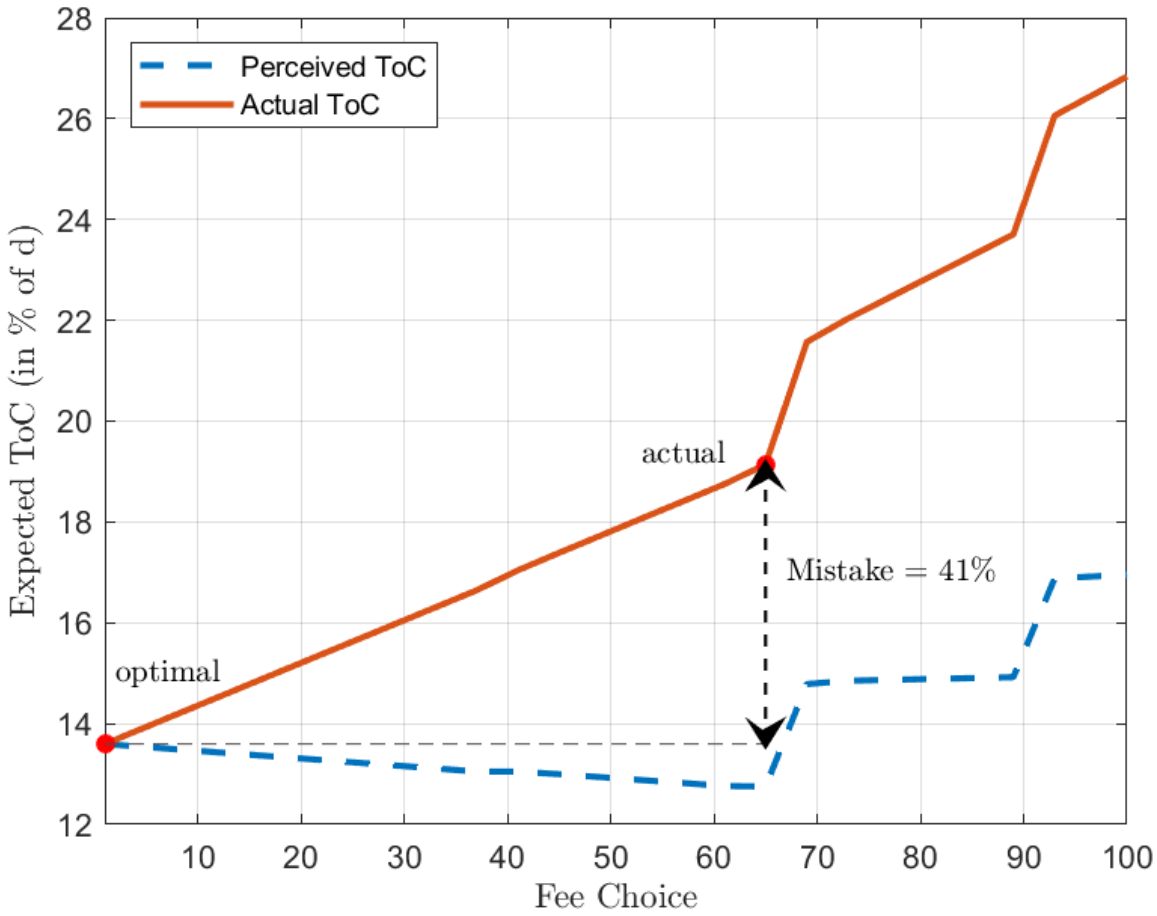


Figure: Perceived vs. Actual Cost of Credit (in %).

2009 CARD Act: Two Key Pieces

We focus on two key 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 reduction of financial mistakes
   - Limit cost of financial mistakes

Welfare Assessment

Welfare affected by:

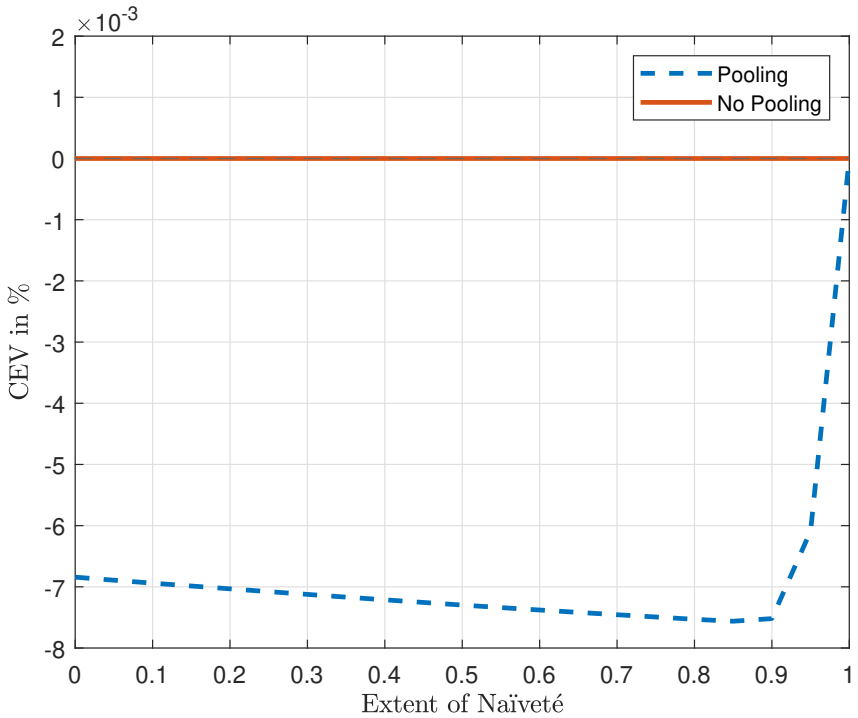
1. Fewer and/or less costly financial shocks
2. Naïves avoiding mistakes
3. Cross-subsidization: affect equilibrium fees (ϕ) and interest ($1/q$)

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

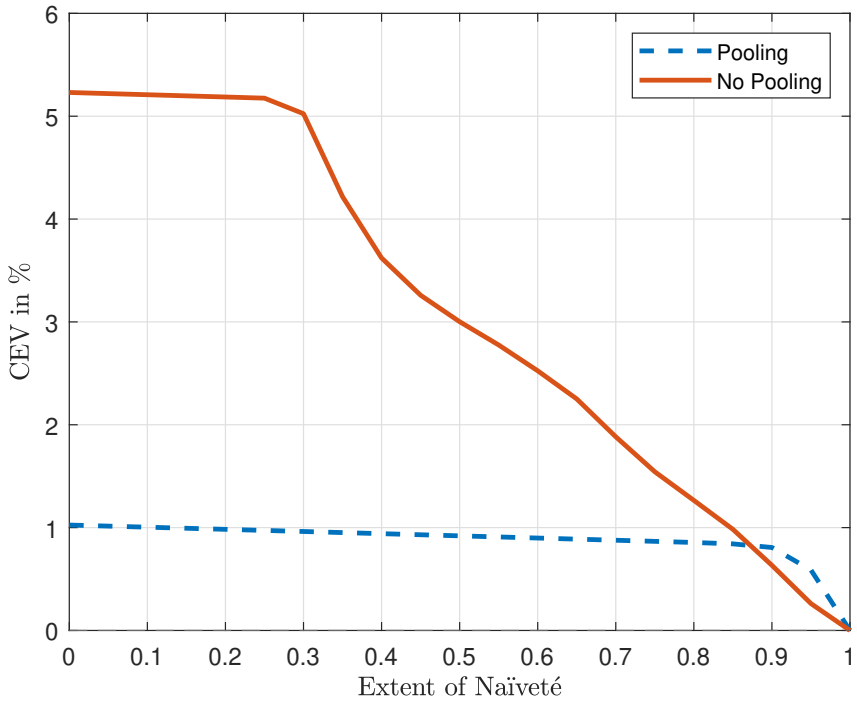
Welfare measure:

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

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



(a) sophisticates

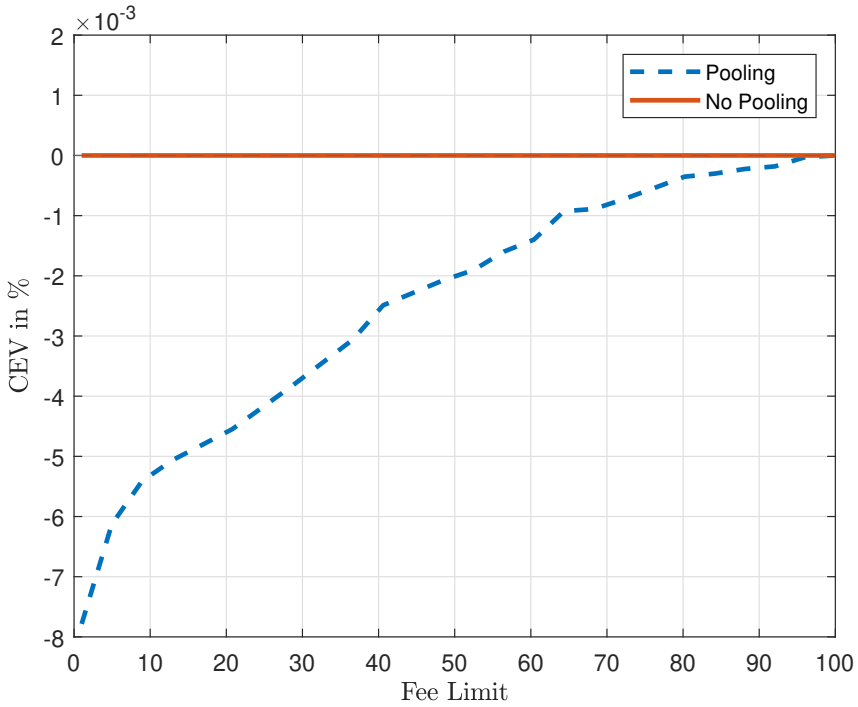


(b) naïves

Figure: Welfare Effects of Reducing Naïveté.

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

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



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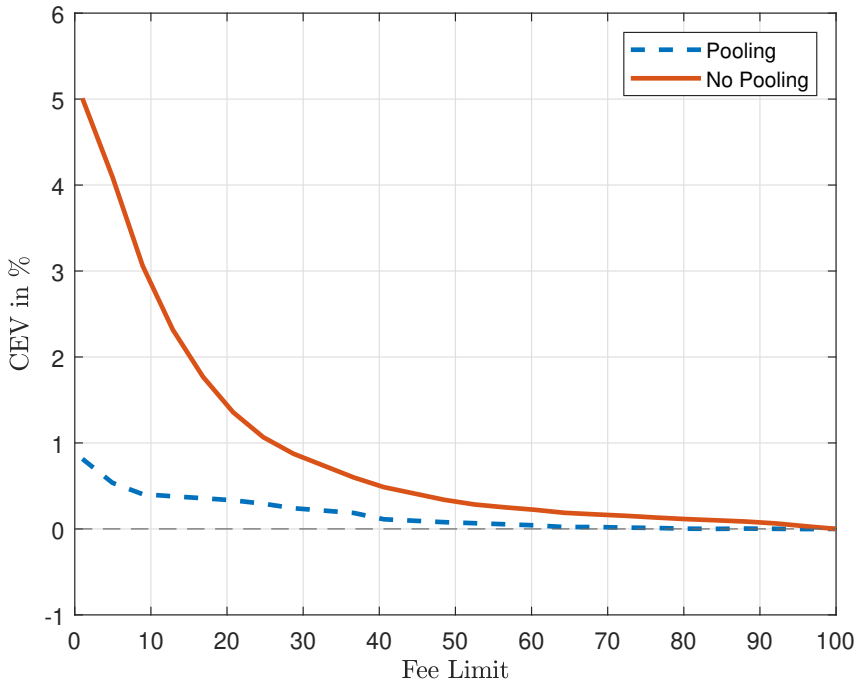


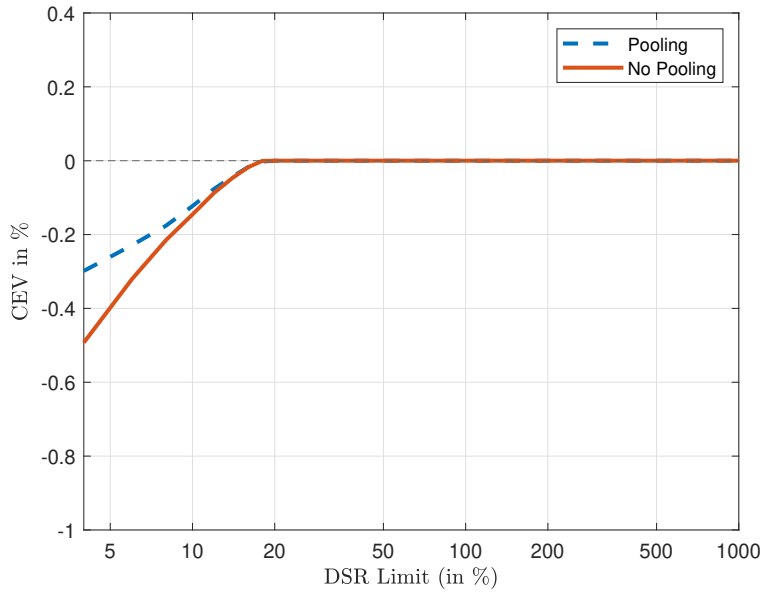
(b) naïves

Figure: Welfare Effects of Fee Limits.

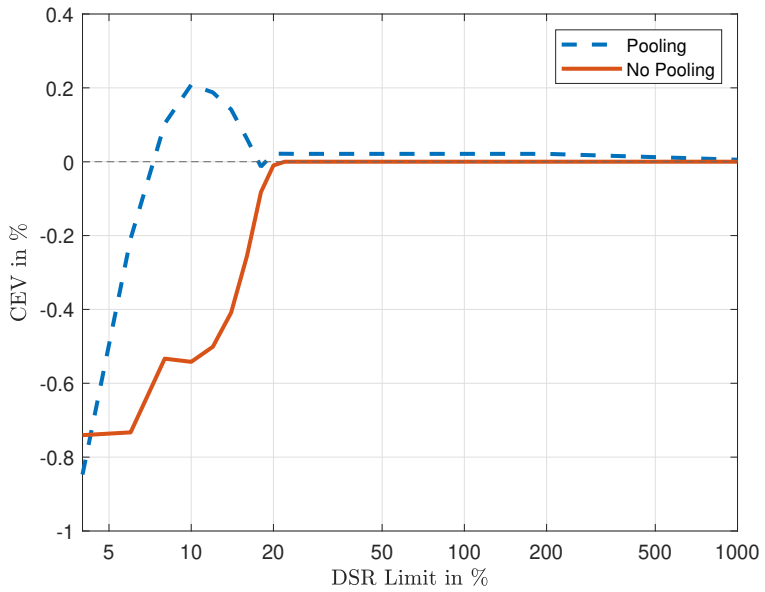
Tight limits force insurance and improve naïve's welfare.
Sophisticates lose cross-subsidization.

Or Maybe A Borrowing Limit?

Debt service ratio limit: $(1-q)d'/y \leqslant \overline{DSR}$



(a) sophisticates



(b) naïves

Figure: Welfare Effects of a Debt Service Ratio Limit.

DSR limit *can* help naïves. But not too tight:
Borrowers might substitute interest payments with higher fees.

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 explicit role for information requirements & penalty fee limits

We use it to structurally assess important parts of CARD act

- naïve borrowers choose too high fees
- CARD act limits fees and helps avoid mistakes
  - improves welfare of naïves by up to 1%
  - reduces cross-subsidization and harms sophisticates
- Borrowing limits can benefit naïves (but not too tight)

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 (d', ϕ, s), find $q(d', \phi; s)$ to satisfy zero profits. In equilibrium:

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

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Equilibrium Outcomes

	Sophisticated	Naïve	Average
Avg. Interest / Debt (AID)	12.96%	12.99%	12.97%
Average Fees / Debt (AFD)	2.78%	15.59%	6.62%
Fraction Borrowers	0.28	0.30	0.29
Debt-to-income ratio	4.8%	6.2%	5.2%
Bankruptcy Rate	0.33%	0.71%	0.45%
Cross-Subsidization	0.28%	−0.33%	
ToC Bias		66.4%	
Financial Mistake		64.5%	

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