Interest Rate Misperception in the Credit Card Market

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CEPR Household Finance

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Motivation

Fruitful findings of suboptimal leverage decisions due to behavioral biases (Bertrand & Morse, 2011; Meier & Sprenger, 2010; Stango & Zinman, 2009)

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Beliefs are crucial for understanding borrower incentives

Motivation – Shrouded Price

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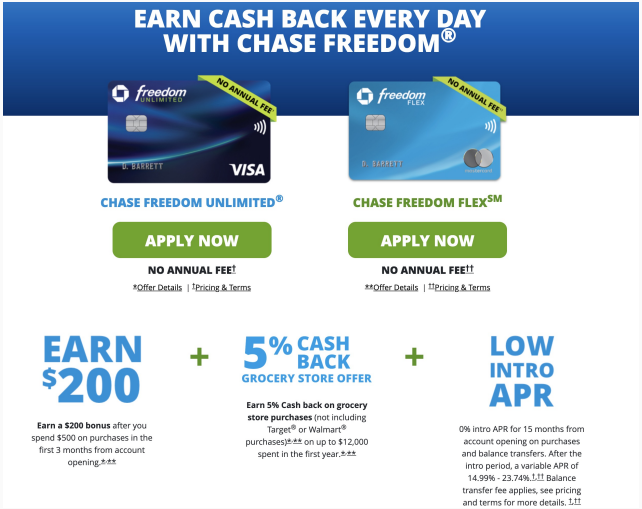
Price of a financial product, debt interest rate, is often obscure

Example: A Credit Card by Chase Bank



Source: Chase Freedom Credit Card

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- Surveys to elicit consumer perceptions of interest rate
- Information treatment: exogenous variations in perceived interest rates
- Debt is from credit registry: no confounding with intra-bank balance transfers

Result Preview

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- Long-run effect depreciates quickly after 3 months
- Potential reason: selective information avoidance

Related Literature

How consumer behavioral biases affect their borrowing decisions

- Bertrand and Morse (2011); Kuchler and Pagel (2021); Laibson, Lee, Maxted, Repetto, and Tobacman (2020); Meier and Sprenger (2010); Stango and Zinman (2009)

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Role of beliefs in explaining consumer spending-saving decisions

- Allcott et al. (2021); Ameriks et al. (2020); Bailey et al. (2019); Bucks and Pence (2008); Giglio et al. (2021); Kuchler et al. (2022); Manski (2004)

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Biased memory

- Huffman et al. (2022); Olafsson and Pagel (2022); Sial et al. (2023)

Outline

Data and Descriptive Evidence

Sample Construction

A top-10 commercial bank in China

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- Monthly income is paid as a direct deposit to this bank

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Consumers pay interest if the balance is not repaid in full within a month

- Exclude the consumers who use credit cards with 0 APR offers

Survey Design: Perceived Interest Rate Elicitation

For randomly selected customers who satisfied the criteria in Nov 2020

Q1 Suppose you spend ¥5,000 this month and repaid ¥0. What would be your interest payment next month? Choose the closest answer.

- A. 45 B. 55 C. 65 D. 75 E. 85 F. 95 G. 105

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Q2 ...and repaid ¥1000...

Q3 ...and repaid ¥3000...

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The order of choices was randomized to minimize the anchoring effect

Data Summary Statistics

3,762 credit card users. Monthly data from Sep 2020 to Feb 2021

	mean	sd	p25	p50	p75	count
Debt	5784.8	14127.0	0	0	2149.0	3762
Spending	8962.5	11534.7	2678.4	5158.5	11099.4	3762
Credit limit	10544.0	7539.2	5333.3	7948.7	14897.4	3762
Credit score	54.96	6.665	50.51	54.33	58.70	3762
Income	17345.0	8938.9	12047.1	15683.7	20630.2	3762
Savings	173902.9	121630.9	94688.8	145657.2	221310.9	3762
Age	37.09	10.36	28	35.83	45.50	3762
Female	0.591	0.492	0	1	1	3762
Education	1.847	0.813	1	1.667	2.333	3762
Perceived interest rate	0.187	0.034	0.154	0.190	0.221	3762
Interest rate	0.186	0.0100	0.178	0.186	0.197	3762

Debt Interest Rate Misperception

Misperception: $Bias_i = Perceived\_r_i - r_i$

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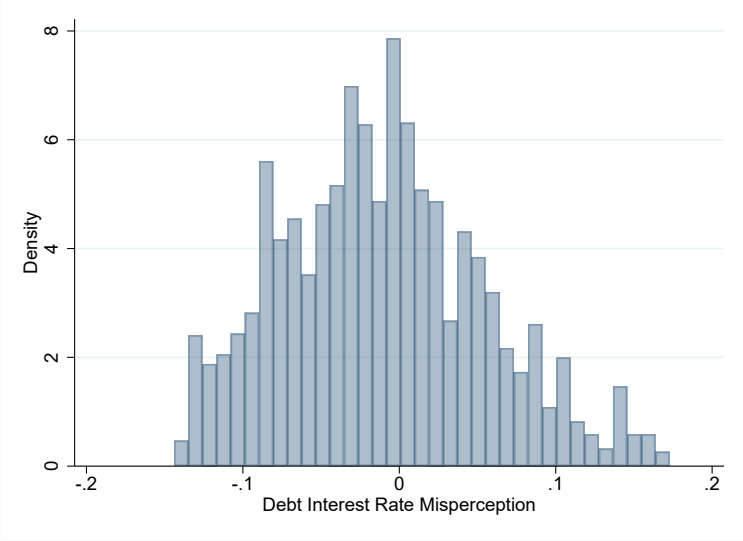
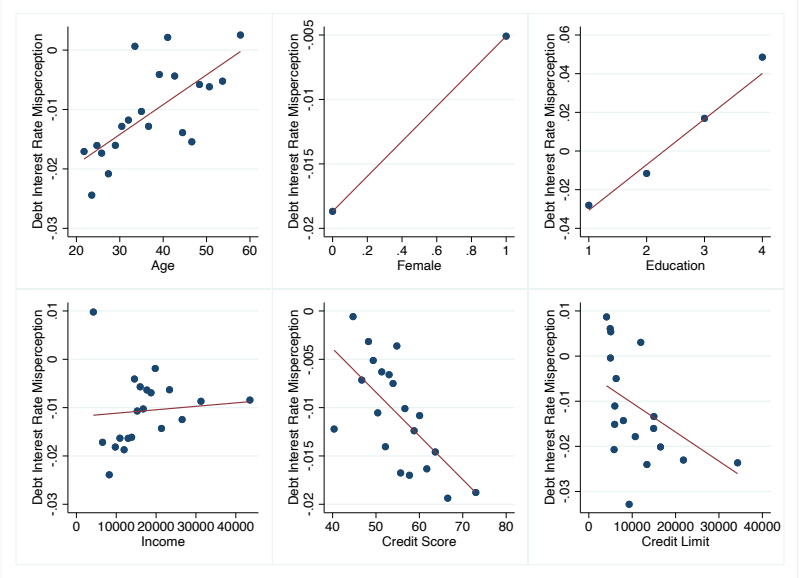
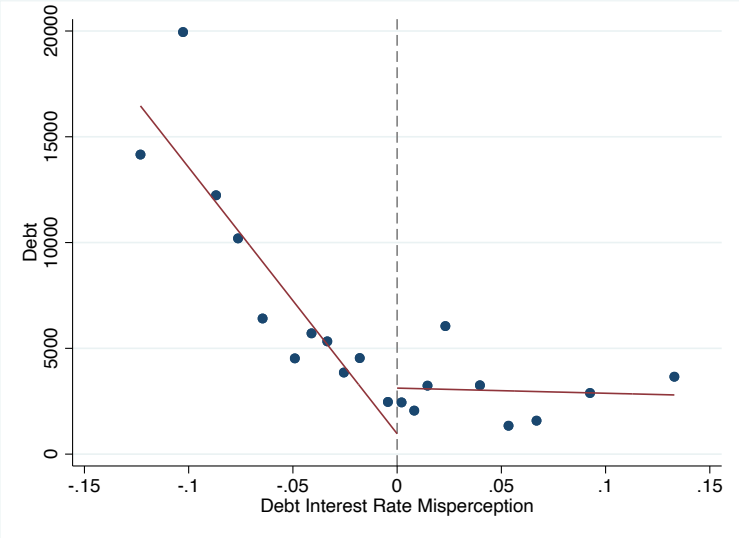


Debt Interest Rate Misperception: Heterogeneity



Misperception of Debt Interest Rate: Relation to Debt



Information Treatment on Interest Rate

Causal Effect of Perceived Interest Rate on Debt

Naive OLS estimates are unlikely causal because *Perceived_r* are endogenous

- Omitted variable bias: e.g., unobserved confounders
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RCT to perturb perceived interest rates exogenously: *Perceived_r* $\longrightarrow$ Debt

- Treatment status is an instrumental variable (IV) for perceived interest rates

Information Treatment Design

In the survey, random 40% of the participants who paid interest in 2020 saw

- The annualized interest rate is X_1% on your credit card
- If you carry over ¥8,000 of debt from your credit card this month, you will need to pay ¥X_2 next month

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Then, 2nd-round elicitation for all participants who have paid interest in 2020

- Suppose you spend ¥6,000 on credit cards this month and repaid ¥3,000. What would be your interest payment next month?

Information Treatment – First Stage

	Control		Treatment	
	Before	After	Before	After
Bias	-4.63		-4.19	
	(0.31)		(0.34)	
|*Bias*|	7.24		6.81	
	(0.17)		(0.23)	

Information Treatment – First Stage

	Control		Treatment	
	Before	After	Before	After
Bias	-4.63	-5.02	-4.19	
	(0.31)	(0.33)	(0.34)	
|*Bias*|	7.24	8.11	6.81	
	(0.17)	(0.24)	(0.23)	

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	Control		Treatment	
	Before	After	Before	After
Bias	-4.63	-5.02	-4.19	0.31
	(0.31)	(0.33)	(0.34)	(0.30)
|*Bias*|	7.24	8.11	6.81	4.63
	(0.17)	(0.24)	(0.23)	(0.26)

Information Treatment – 2SLS on Debt

	(1) ΔDebt	(2) ΔDebt	(3) ΔDebt	(4) ΔDebt
Δ*Bias*	-924.33**	-927.04**		
	(357.15)	(323.11)		
Δ|*Bias*|			1782.78*	1634.57*
			(945.22)	(984.55)
Constant	411.739	-1170.910	133.805	-1228.636
	(371.197)	(851.643)	(303.334)	(847.047)
Observations	1342	1342	1342	1342
Control	No	Yes	No	Yes
Fstat	225.812	209.142	65.279	81.058

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- Consumers take our info treatment as truth and reduce debts

Long-Run Effect

Perceived Interest Rate in the Long Run

- 3rd-round elicitation on the same consumers after 9 months

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	Control		Treatment		9m DID
	Before	9 Months Later	Before	9 Months Later	
Bias	-4.63	-4.82	-4.19		
	(0.48)	(0.46)	(0.57)		
|*Bias*|	7.24	7.32	6.81		
	(0.28)	(0.28)	(0.35)		

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Bias	-4.63	-4.82	-4.19	-2.55	
	(0.48)	(0.46)	(0.57)	(0.44)	
|*Bias*|	7.24	7.32	6.81	4.67	
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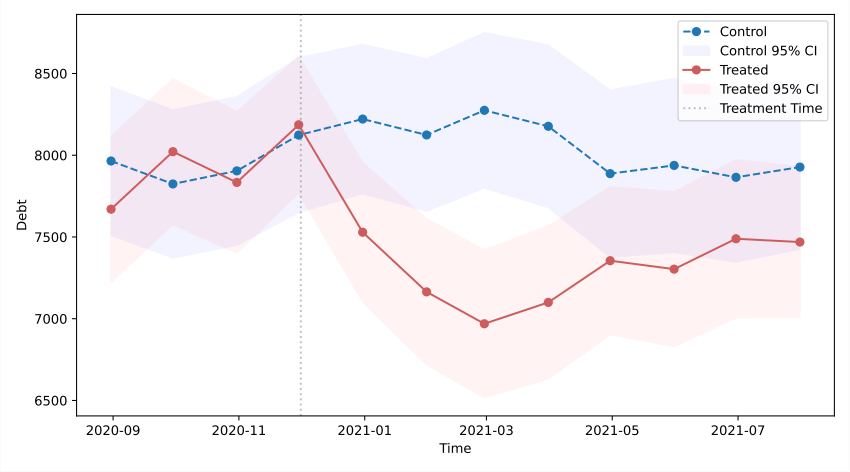
	Control		Treatment		9m DID
	Before	9 Months Later	Before	9 Months Later	
Bias	-4.63	-4.82	-4.19	-2.55	1.83**
	(0.48)	(0.46)	(0.57)	(0.44)	(0.87)
|*Bias*|	7.24	7.32	6.81	4.67	-2.22***
	(0.28)	(0.28)	(0.35)	(0.28)	(0.75)

Debt Trajectories



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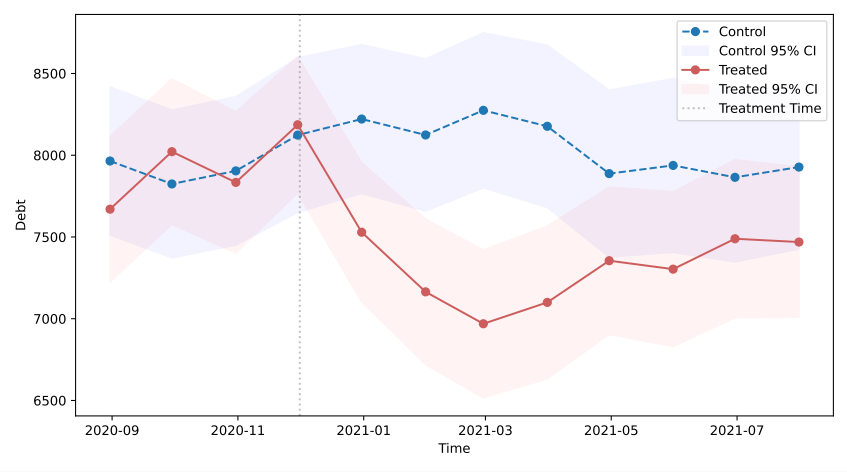

Reasons for misperception are more than shrouded prices and calculation errors

Suggestive Evidence: Selective Information Avoidance

Information Acquisition: Monthly Logins to the Banking App

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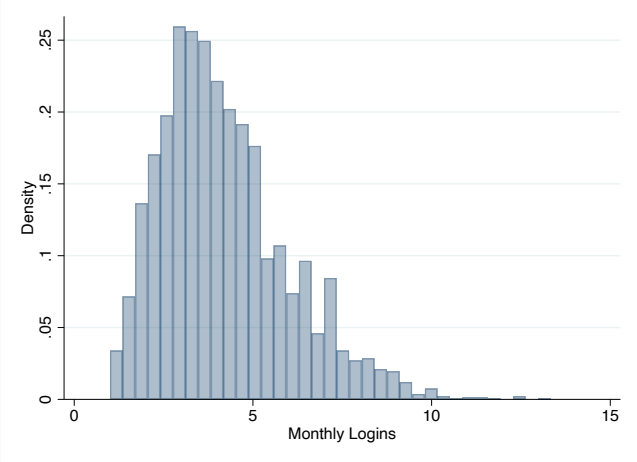

Login Frequency and Interest Rates

	(1) Logins	(2) Logins	(3) Logins	(4) Logins
r_i	-0.602***	-0.631***		
	(0.102)	(0.109)		
$r_i \times$ High Var				
Observations	22572	22572	22572	22572
Individual FE	Yes	Yes	Yes	Yes
Control	No	Yes	No	Yes
R^2	0.151	0.161	0.184	0.196

- Information avoidance: $r_i \searrow$ logins

Login Frequency and Interest Rates

Interest rate variability: High Var = $\mathbb{1}(\sigma(r_i) > \text{median})$

	(1) Logins	(2) Logins	(3) Logins	(4) Logins
r_i	-0.602***	-0.631***	-0.387***	-0.389***
	(0.102)	(0.109)	(0.077)	(0.072)
$r_i \times$ High Var			-0.532***	-0.576***
			(0.111)	(0.104)
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- Information avoidance: $r_i \searrow$ logins
- Avoidance is selective: only focus on "good news" when high variability

Logins, Interest Rate Variability, and Misperception

	Bias				Debt			
	High Attention		Low Attention		High Attention		Low Attention	
	3m DID	9m DID	3m DID	9m DID	3m DID	9m DID	3m DID	9m DID
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High Var	3.77***				-2804.32***			
	(0.71)				(534.87)			
Low Var	0.32				-256.87			
	(0.53)				(398.09)			

- Interest rate variability ↗ misperception

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High Var	3.77***		6.83***		-2804.32***		-5234.25***	
	(0.71)		(1.26)		(534.87)		(639.84)	
Low Var	0.32		4.52***		-256.87		-3687.19***	
	(0.53)		(0.72)		(398.09)		(587.42)	

- Interest rate variability ↗ misperception
- Low attention (less logins) ↗ misperception

Logins, Interest Rate Variability, and Misperception

	Bias				Debt			
	High Attention		Low Attention		High Attention		Low Attention	
	3m DID	9m DID	3m DID	9m DID	3m DID	9m DID	3m DID	9m DID
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High Var	3.77***	3.36***	6.83***		-2804.32***	-2535.98***	-5234.25***	
	(0.71)	(0.64)	(1.26)		(534.87)	(575.23)	(639.84)	
Low Var	0.32	0.21	4.52***		-256.87	-132.34	-3687.19***	
	(0.53)	(0.67)	(0.72)		(398.09)	(296.16)	(587.42)	

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	Bias				Debt			
	High Attention		Low Attention		High Attention		Low Attention	
	3m DID	9m DID	3m DID	9m DID	3m DID	9m DID	3m DID	9m DID
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High Var	3.77***	3.36***	6.83***	1.54***	-2804.32***	-2535.98***	-5234.25***	-1032.21**
	(0.71)	(0.64)	(1.26)	(0.33)	(534.87)	(575.23)	(639.84)	(410.77)
Low Var	0.32	0.21	4.52***	2.17***	-256.87	-132.34	-3687.19***	-1609.77***
	(0.53)	(0.67)	(0.72)	(0.58)	(398.09)	(296.16)	(587.42)	(534.68)

- Interest rate variability ↗ misperception
- Low attention (less logins) ↗ misperception
- Selective info avoidance could explain why misperception resumes/persists

Conclusion

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Ubiquitous presence of debt interest rate misperception

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- *Bias* and debt started to revert back after 3 months
- Suggestive evidence: selective information avoidance

Appendix

Survey Design: Novelty

- Novelty: high-frequency nature of the question
- Present value P, periodic interest rate r, time horizon T. The future value F with periodic compounding is

$$F = P(1 + r)^T$$

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- Prior literature (Bertrand & Morse, 2011; Stango & Zinman, 2009) focuses on the exponential bias $\hat{F} = (1 + r)^{(1-\theta)T}$, where θ denotes mistakes about compound rates over T
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- There is little effort on disentangling these three mistakes
- Our survey identifies the perceptions/mistakes about r by fixing $T = 1$ and varies P with hypothetical values

back

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