Credit Cards and the Great Recession: The Collapse of Teasers

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- **Big picture:** What caused the Great Recession?
  - Two views:
    - Common shock (burst of housing bubble):
      house prices $\downarrow \Rightarrow$ HH net worth $\downarrow \Rightarrow$ consumption demand $\downarrow \Rightarrow$ recession $\downarrow$
      (Mian, Rao and Sufi, 2013; Mian and Sufi, 2014)
    - Credit channel:
      financial crisis $\downarrow \Rightarrow$ credit supply to HH and firms $\downarrow \Rightarrow$ demand $\downarrow \Rightarrow$ recession $\downarrow$
      (Gilchrist Zakrajsek, 2017; Mondragon, 2015; Greenstone, Mas, Nguyen, 2012)

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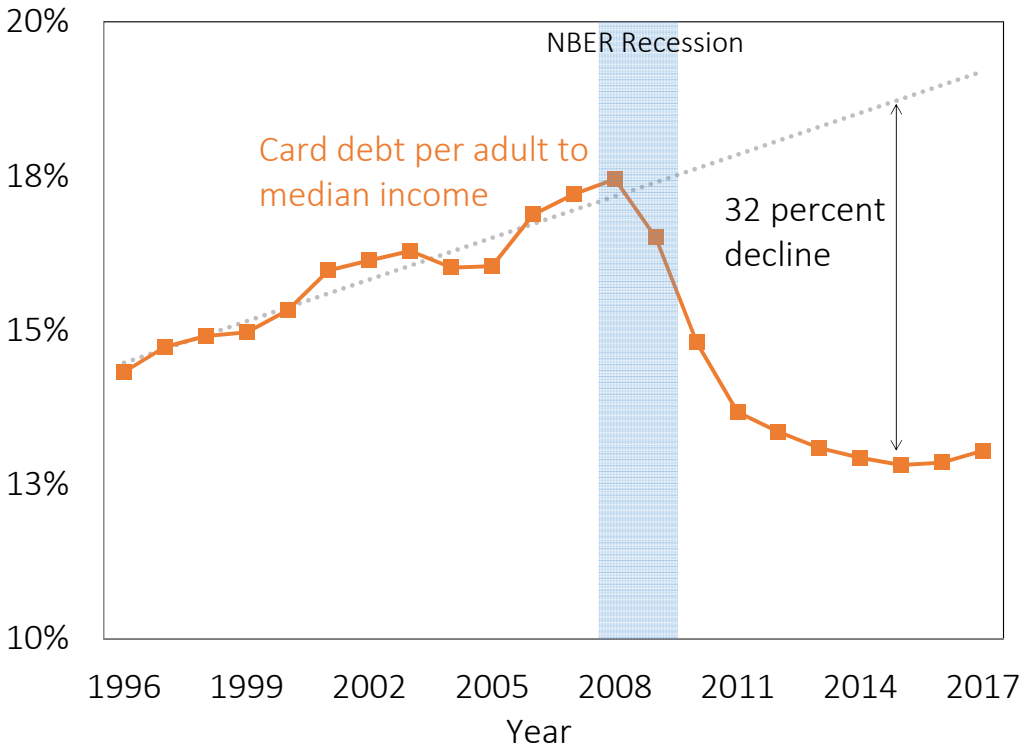
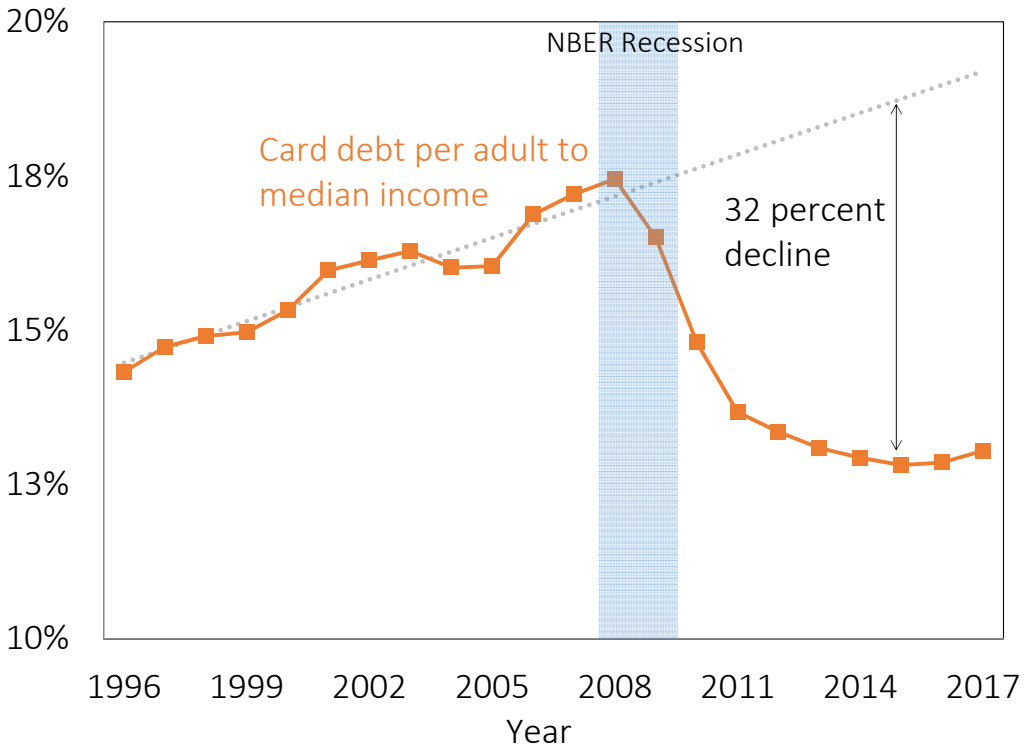
- **This paper:** A case study of a single market: the credit card market


20%
18%
15%
13%
10%
NBER Recession
Card debt per adult to median income
32 percent decline
1996
1999
2002
2005
2008
2011
2014
2017
Year



$\Rightarrow$ Credit view offers a compelling explanation of deleveraging on credit cards

What We Do

- Test credit channel hypothesis in a disciplined manner:

Fact 1

Prior to the crisis, many borrowers relied on promotional introductory "teaser" offers to, in effect, borrow for the long term on promo rates.

Fact 2

Promotional offers vanished from the market in 2009 and 2010 and promo activity collapsed, setting the stage for a classic rollover crisis.

Fact 3

The collapse of promo activity was coincident with deleveraging on credit cards.

What We Do

- Test credit channel hypothesis in a disciplined manner:

Fact 1 ⇒ model

Prior to the crisis, many borrowers relied on promotional introductory "teaser" offers to, in effect, borrow for the long term on promo rates.

Fact 2 ⇒ disciplined shock

Promotional offers vanished from the market in 2009 and 2010 and promo activity collapsed, setting the stage for a classic rollover crisis.

Fact 3 ⇒ result?

The collapse of promo activity was coincident with deleveraging on credit cards.

Literature

Mian and Sufi (2010-IMF)

- Show reliance on credit cards across the U.S. counties prior to the crisis a strong predictor of the decline in auto sales after 2008 even when controlling for household leverage

Outline

1. **Data**
2. Model
3. (Mechanism)
4. Calibration and quantitative findings

Data Sources and Description

1. **Supervisory OCC/Y14M account level micro-data** focusing on general purpose credit cards from 6 largest credit card lenders tracked between 2008 and 2017, and eight in total, having an approximate market share of over 50 percent in 2007.[1]

2. **Mintel Compremedia, Inc. Direct Mail Monitor** surveying mail offerings received by the U.S. households.

3. **Experian credit bureau data** comprising of a representative panel of 200,000 credit records tracked between 2001 and 2013.[2]

[1] The data is on an account level with a monthly frequency and is provided by bank holding companies subject to DFAST. The sample before 2013 is limited to several largest banks and it comes from OCC merged data with Y14M reporting. We focus on this sample here. Data after 2013 covers a broader sample of banks.

[2] The credit bureau data summarizes credit history of 200,000 credit market participants: the first 100,000 records are representative as of 2001 and the second one is representative as of 2013. We use observations from both panels.

Credit Card Market Prior to 2008 Crisis

Credit Card Market Prior to 2008 Crisis

1. A large fraction of card debt had promo status with a median duration of 12+ months.

Statistic	2008Q1
1. Use of promotional debt:	
Promo debt to total debt[a] [%]	35
Promo debt with 670+ FICO to total debt [%]	43
Median duration of promo spell (originated in 08)[c] [months]	10
Average duration of promo spell (originated in 08)[c] [months]	12
Median duration of promo spell (all accounts)[c] [months]	12
Average duration of promo spell (all accounts) [c] [months]	16

[a] Debt are credit card balances carried over for at least one billing cycle, hence 2008Q1 effectively starts in Feb.

[b] Promo debt on low APR is the promo debt for which the promotional APR is lower than the step-up APR by at least 50 percent.

[c] The spell is a number of months for which an account has a positive promotional balance, among accounts originated in 2008. We find equal median and higher mean for all accounts, which suggests accounts originated prior to 2008 had a longer promotional spell.

Credit Card Market Prior to 2008 Crisis

2. Promo card debt provided a major discount relative to non-promo and step-up rates.

Statistic	2008Q1
2. Interest rates (in APR):	
Median promo APR [%]	3.5
Average promo APR [%]	4.3
Median step-up APR on promo accounts w/ debt [%]	16.0
Average step-up APR on promo accounts w/ debt [%]	17.3
Average non-promo APR [%]	15.5

Credit Card Market Prior to 2008 Crisis

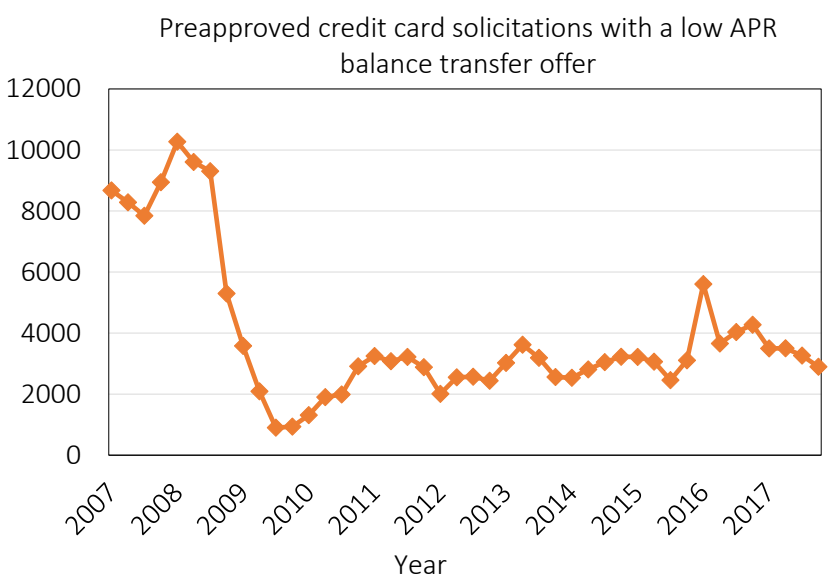
3. A large volume of balance transfers sustained the stock promotional debt, consistent with the idea of "chaining" of promo offers to, in effect, borrow for the long-term.

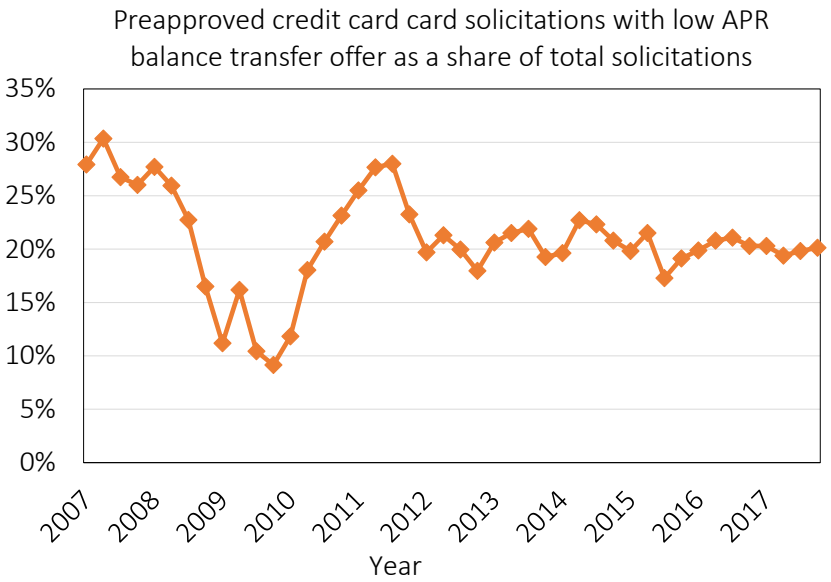
Statistic	2008Q1
3. Refinancing and balance transfers:	
BT to flow of promo debt nearing expiration (last quarter) [%]	104
BT to promo accounts to BT total [%]	92
Average transferred amount per BT [$]	$4,290

Credit Card Market After the Crisis

Promo Activity Collapsed After 2008 Crisis

4. Promotional offers vanished from the market between 2009 and 2010.

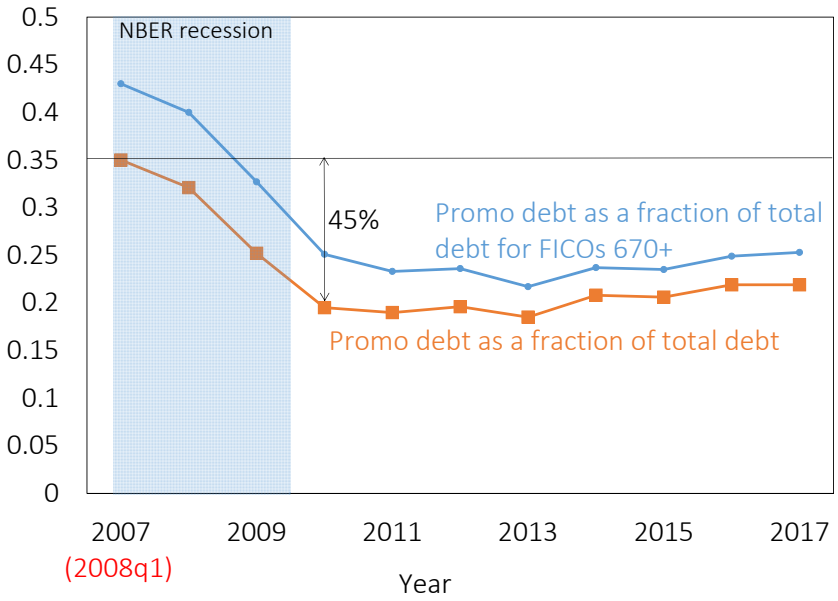


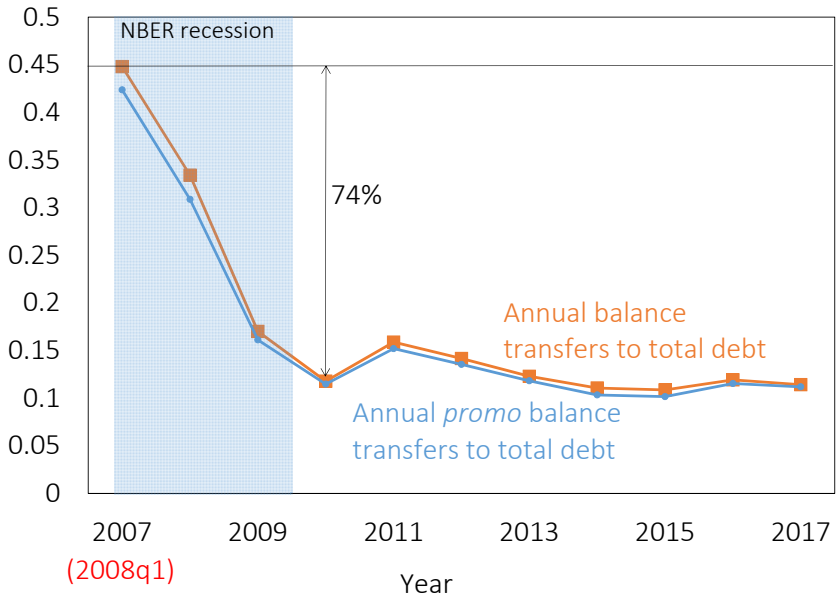


Source: Mintel Compremedia, Inc. Direct Mail Monitor.

Promo Activity Collapsed After 2008 Crisis

5. Promo activity came to a halt, with the share of promo debt falling by at least 45%.

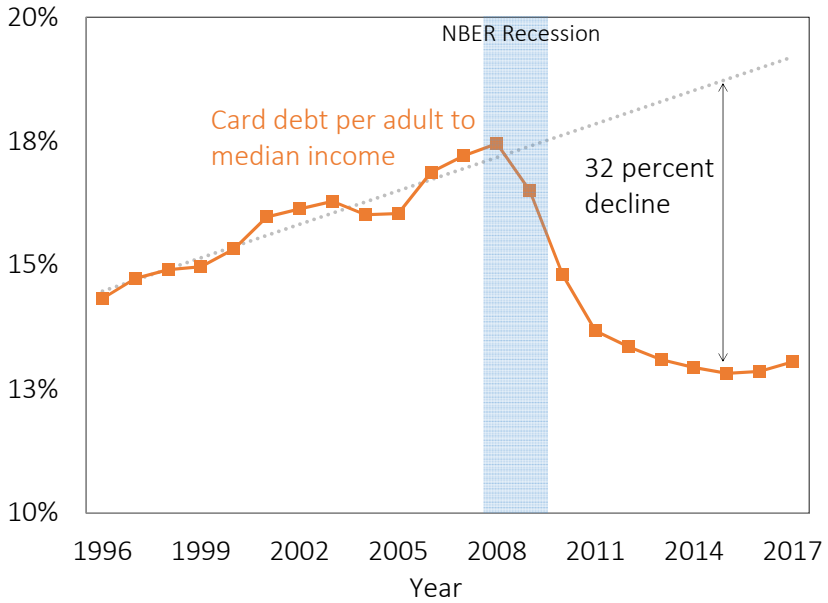


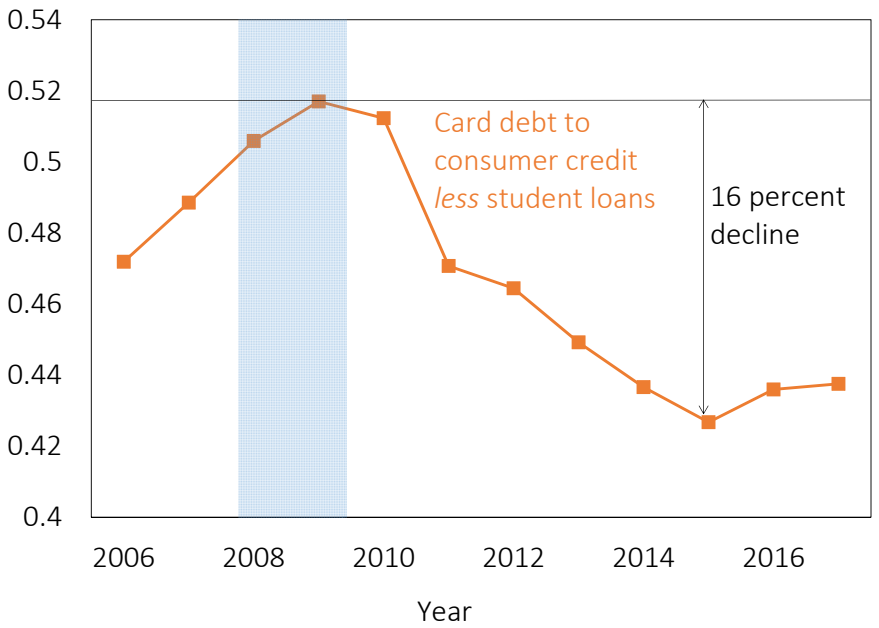


(BT decline consistent with 70% decline in solicitations.)

Promo Activity Collapsed After 2008 Crisis

5. The collapse in promo activity was coincident with deleveraging on credit cards.





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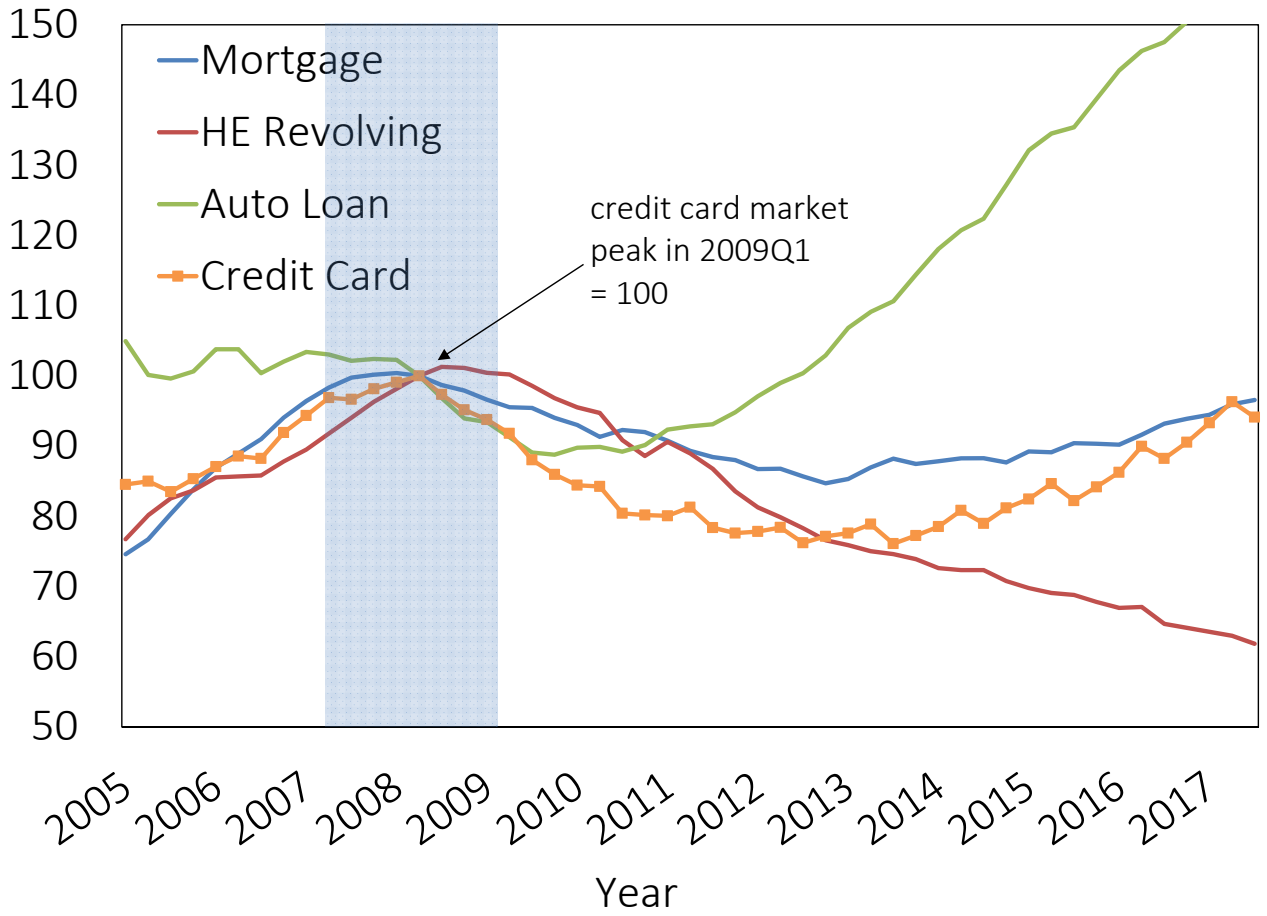
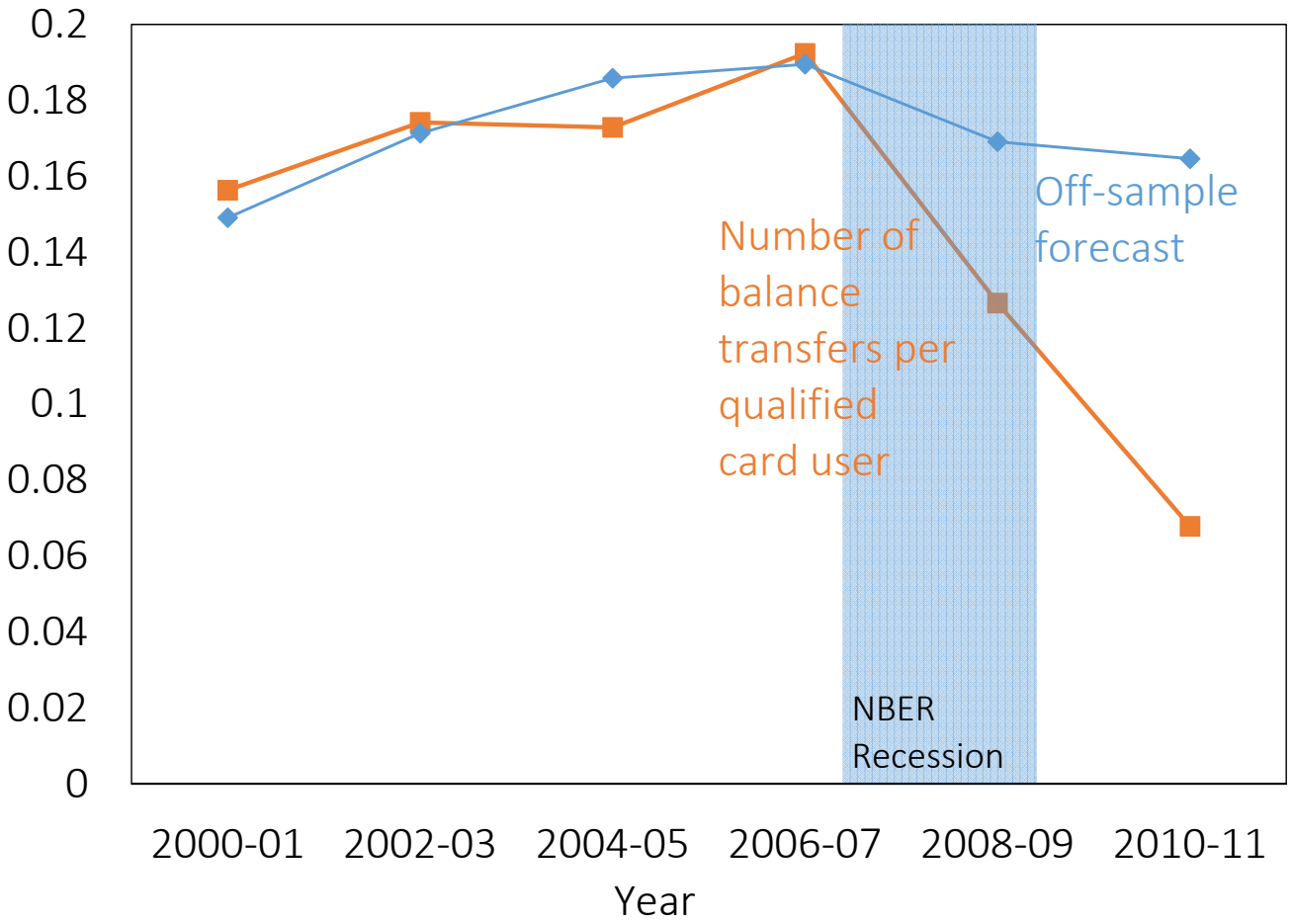


Deleveraging Robust to Composition Changes

7. Decline in BT orthogonal to measured risk composition of the borrower pool.



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Mechanism Outline

- Consumers underestimate how much they will borrow in the future, which leads to promos
  - Approach inspired by Ausbel and Shui (2005) and Agrawal at al. (2015)
- Financial crisis shuts down the flow of promos, which triggers deleveraging

Environment

- Life-cycle setup with continuum of consumers and a large number of lenders:
  - Consumers:
    - face random income (and access to market)
    - borrow from lenders to smooth consumption
    - can default on debt at a fixed utility cost (stigma)
  - Lenders:
    - have unlimited access to funds at exogenous cost of funds r
    - extend unsecured open ended credit lines to consumers
    - compete in the market in Bertrand fashion (max U s.t. zero pf)

Consumer preferences

- Borrowers discount the future hyperbolically and are naive about it:
  - Preferences as of *current* period t

$$u(c_t) + \eta\beta[u(c_{t+1}) + \beta u(c_{t+2}) + \beta^2 u(c_{t+3}) + ...]$$

  - Actual preferences in future period

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$$u(c_{t+1}) + \eta\beta[u(c_{t+2}) + \beta u(c_{t+3}) + \beta^2 u(c_{t+3} + ..]$$

$\Rightarrow$ Consumers overestimate how fast their future self will pay down debt

Lending protocol

- Credit line is: $F \leq R$ - promo rate, R - step-up rate, L - pre-authorized credit limit

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- Borrowers can switch by refinancing with a new lenders (without recall)
- Incumbent lenders continually reprice under CARD Act of 2009 restriction:
  - Rates cannot be raised above R (can be lowered)
  - Cannot slash credit limits below debt

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  - Cannot slash credit limits below debt
- **Refinancing friction:** Even when the consumer refinances, she continues to pay interest for a ρ fraction of the next period (can be probabilistic)

Timing of Events Within the Period

Consumers

Period t

Initial endogenous state is
Debt B, Credit line C

1. Markov random variable s resolves *all* uncertainty within the period (income; arrival of offers)

3. Consumer decides whether to *accept* or *reject* market offer *M*

5. Consumers strategically decides whether to *repay* and chooses consumption c and current borrowing *b* accordingly

Period t+1

...

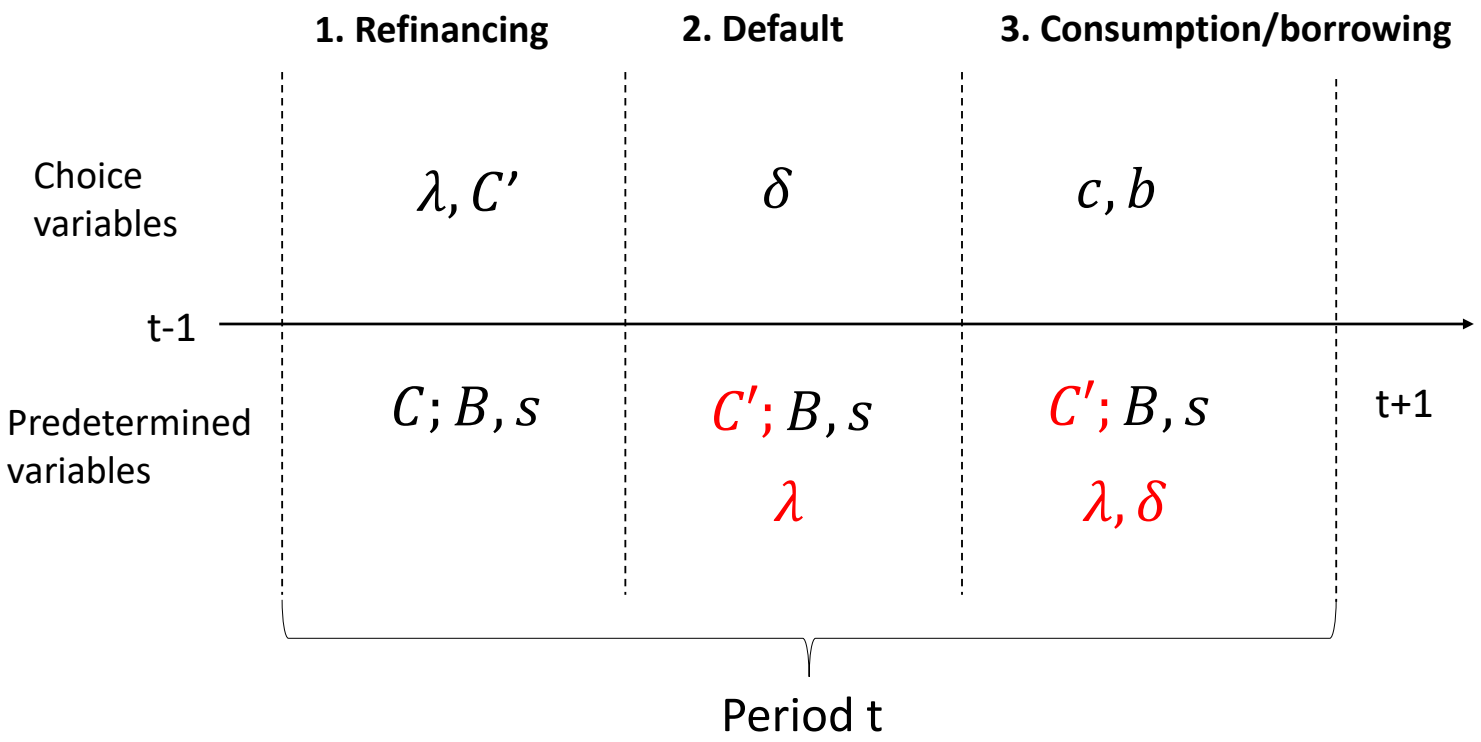
Lenders

2. Consumer receives *market offer M*

4. Incumbent reprices *C* to *I*

Consumer problem

Consumer Problem: Timing of Decisions



Consumer Problem: Refinancing λ

1. Consumers choose whether to refinance or stay with the incumbent by solving:

$$V_t^\eta(\mathcal{C}, B, s) = \max_{\lambda=0,1} U_t^\eta(M_t^\eta(\mathcal{C}, B, s), I_t^\eta(\mathcal{C}, B, s; M_t^\eta(\mathcal{C}, B, s), \lambda), B, s; \lambda)$$

where

- $M_t^\eta(\mathcal{C}, B, s)$ is *market offer*
- $I_t^\eta(\mathcal{C}, B, s; M_t^\eta(\mathcal{C}, B, s), \lambda)$ is *incumbent's repriced offer*

(Note: $\lambda = 0$ if refinancing option not available under s.)

Consumer Problem: Default δ

2. Consumers *strategically* plan default by solving:

$$U_t^\eta(\mathcal{C}_M^\eta, \mathcal{C}_I^\eta, B, s; \lambda) = \max_{\delta=0,1} U_t^\eta(\mathcal{C}_M^\eta, \mathcal{C}_I^\eta, B, s; \lambda, \delta)$$

where

- $\mathcal{C}_I^\eta := I_t^\eta(\mathcal{C}, B, s; \lambda) = (F_I^\eta, R_I^\eta, L_I^\eta)$ *repriced contract* from incumbent
- $\mathcal{C}_M^\eta := M_t^\eta(\mathcal{C}, B, s) = (F_M^\eta, R_M^\eta, L_M^\eta)$ *market offer* (active or inactive)

(Note: $\lambda = 0$ if market offer inactive.)

Consumer Problem: Consumption c and Borrowing b

3. Consumers choose consumption and current borrowing by solving:

$$U_t^\eta(\mathcal{C}_M^\eta, \mathcal{C}_I^\eta, B, s; \lambda, \delta) = \max_{(c,b)\in\Gamma} \{u(c) - \chi(s)\delta + \eta\beta\mathbb{E}_s[\delta V_{t+1}^1(\mathcal{C}_{-1}, 0, s') + (1-\delta)V_{t+1}^1(\lambda\mathcal{C}_M^\eta + (1-\lambda)\mathcal{C}_I^\eta, b, s')]\}$$

subject to budget constraint given by

$$\begin{aligned} c &\leq Y_t(s) - B + b - (1-\delta)\left[(1-\lambda)F_I^\eta + \lambda(\rho F_I^\eta + (1-\rho)\frac{F_M^\eta}{1-\rho})\right] b^+ \\ b &\leq (1-\lambda)\min\{L_M^\eta, L_I^\eta\} + \lambda L_I^\eta \end{aligned}$$

where $\mathcal{C}_{-1} = (r_{-1}, 0, 0)$ exogenous *seed* contract.

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Lemma

L_I^η never binds following $\lambda = 0$ and L_M^η can be assumed tight without loss.

Consumer Problem: Consumption c and Borrowing b

3. Consumers choose consumption and borrowing by solving:

$$U_t^\eta(\mathcal{C}_M^\eta, \mathcal{C}_I^\eta, B, s; \lambda, \delta) = \max_{(c,b)\in\Gamma} \{u(c) - \chi(s)\delta + \eta\beta\mathbb{E}_s[\delta V_{t+1}^1(\mathcal{C}_{-1}, 0, s') + (1-\delta)V_{t+1}^1(\lambda\mathcal{C}_M^\eta + (1-\lambda)\mathcal{C}_I^\eta, b, s')]\}$$

subject to budget constraint given by

$$\begin{aligned} c &\leq Y_t(s) - B + b - (1-\delta)\left[\lambda F_M^\eta + (1-\lambda)(\rho F_I^\eta + F_M^\eta)\right] b^+ \\ b &\leq (1-\lambda)L_M^\eta + \lambda L_I^\eta \end{aligned}$$

where $\mathcal{C}_{-1} = (r_{-1}, 0, 0)$ exogenous *seed* contract.

Lemma

L_I^η never binds following $\lambda = 0$ and both L_I^η, L_M^η can be assumed tight without loss.

Lender problem

Lender Problem: Market offer M

- The equilibrium *market offer* solves:

$$M_t^\eta(\mathcal{C}, B, s) = \underset{\mathcal{C}_M^\eta}{\operatorname{argmax}}\, U_t^\eta(\mathcal{C}_M^\eta, I_t^\eta(\mathcal{C}, B, s; \mathcal{C}_M^\eta, 1), B, s; 1)$$

subject to

$$\Pi_t^M(\mathcal{C}_M^\eta, I_t^\eta(\mathcal{C}, B, s; \mathcal{C}_M^\eta, 1), B, s) = 0$$

where $\mathcal{C}_I^\eta$ is equilibrium repriced offer (simultaneous game).

Lender Problem: Incumbent's repriced offer I

- The equilibrium *repriced offer* solves:

$$I_t^\eta(\mathcal{C}, B, s; \mathcal{C}_M^\eta, \lambda) = \underset{\mathcal{C}_I^\eta}{\operatorname{argmax}}\, \Pi_t^I(\mathcal{C}_M^\eta, \mathcal{C}_I^\eta, B, s; \lambda)$$

subject to

$$R_I^\eta \leq R, \quad F_I^\eta \leq R, \quad L_I^\eta \geq B$$

and

$$U_t^\eta(\mathcal{C}_M^\eta, \mathcal{C}_I^\eta, B, s; \lambda) \geq U_t^\eta(\mathcal{C}_M^\eta, \underline{\mathcal{C}}_I^\eta, B, s; \lambda)$$

where $\underline{\mathcal{C}}_I^\eta = (R, R, B)$ and $\mathcal{C}_M^\eta$ is equilibrium repriced offer.

Lender profit function Π

Omitted.

Equilibrium

Equilibrium Definition

Recursive equilibrium comprises consumer's policy functions

$$c_t^\eta, b_t^\eta, \delta_t^\eta$$

lender pricing policies

$$M_t^\eta, I_t^\eta$$

and consumer and lender value functions

$$V_t^\eta, U_t^\eta, \Pi_t^I, \Pi_t^M$$

such that they are consistent with consumer problem and lender problem.

Outline

1. Data
2. Model
3. **(Mechanism)**
4. Calibration and quantitative findings

Simplified (analytic) setup

- Three-periods $T = 3$
- Two-state income process: $Y(s = 1) := \overline{Y} > Y(s = 0) = \underline{Y}/$
- Extremely convex cost of defaulting $\chi(s = 1) = \infty$, $\chi(s = 0) = 0$.
- Cost of funds normalized to zero (for convenience)

go to numerical example

Relevant Special Case

- Let $R_\lambda^\eta(R)$ be equilibrium expectations of repricing by the incumbent lender

Lemma

In equilibrium, $R_\lambda^1(R) = R$.

*does not apply to $\eta < 1$ due to the presence of an off equilibrium path.

- Assume $R_\lambda^\eta(R) = R$ for $\eta < 1$ (the paper deals with the complementary case as separately).

Consumer Problem

- Consumers solve:*

$$U(F,R,L) := \max_{b_1 \leq L, b_2} u_1(c_1) + \eta\beta(1-p)[u_2(c_2) + \beta(1-p)u_3(c_3)]$$

subject to

$$\begin{aligned} c_1 :=& \bar{Y} - B + b_1 - Fb_1^+ \\ c_2 :=& \bar{Y} - b_1 + b_2 - \left(1_{R>\bar{R}}(\rho R + p) + 1_{R\leq\bar{R}} R\right) b_2^+ \\ c_3 :=& \bar{Y} - b_2 \end{aligned}$$

where $\bar{R}$ solves $\rho\bar{R} + p = \bar{R}$, implying $\bar{R} = \frac{p}{1-\rho}$.

*In period 2, lenders always relax credit limit and new lenders zpf implies $F = p$.

Lender Problem

- First period equilibrium contract solves

$$\max_{(F,R,L)\in\Theta} U(F,R,L)$$

subject to

$$\Pi(F,R,L) = (F-p)b_1^+ + (1-p)(1_{R>\bar{R}}\rho R + 1_{R\leq\bar{R}}(R-p))b_2^+ = 0$$

where

$$b_2^\eta = arg\max_{b_2} u(c_2) + \eta\beta(1-p)u(c_3)$$

subject to

$$\begin{aligned} c_2 =& \bar{Y} - b_1 + b_2 - \left(1_{R>\bar{R}}(\rho R + p) + 1_{R>\bar{R}} R\right) b_2^+ \\ c_3 =& \bar{Y} - b_2 \end{aligned}$$

where, as before, $\bar{R}$ solves $\rho\bar{R} + p = \bar{R}$, implying $\bar{R} = \frac{p}{1-\rho}$.

Monotonic Transformation

Lemma

Consider the following monotonic transformation of the contract space given by:

$$R = \frac{1}{\rho}\max(\hat{R} - \bar{R}, 0) + \min(\hat{R}, \bar{R}),$$

where $\bar{R} = p/(1-\rho)$. *Then, the lender problem is* **globally differentiable.**

Sketch of the Proof

- Plugging in, we obtain:

$$\max_{(F,\hat{R},L)\in\hat{\Theta}} U(F,\hat{R},L)$$

subject to

$$\Pi(F,\hat{R},L) = (F-p)b_1^+ + (1-p)(\hat{R}-p)b_2^{\eta+} = 0,$$

where

$$b_2^\eta = arg\max_{b_2} u(c_2) + \eta\beta(1-p)u(c_3)$$

and

$$U(F,R,L) := \max_{b_1\leq L, b_2} u(c_1) + \eta\beta(1-p)[u(c_2) + \beta(1-p)u(c_3)]$$

subject to:

$$\begin{aligned} c_1 :=& \bar{Y} - B + b_1 - Fb_1^+ \\ c_2 :=& \bar{Y} - b_1 + b_2 - \hat{R}b_2^+ \\ c_3 :=& \bar{Y} - b_2 \end{aligned}$$

Assumption

Assumption

We assume equilibrium satisfies local monotonicity: that is, in equilibrium consumer borrowing $b_1(F, R, L)$, $b_2(F, \hat{R}, L)$ is decreasing in F and $\hat{R}$, respectively, and lender profits are strictly increasing in F and R at $F = R = p$ (L slack).

Result 1

Proposition

Equilibrium features: $F = p = R$, L *nonbinding, and no refinancing.*

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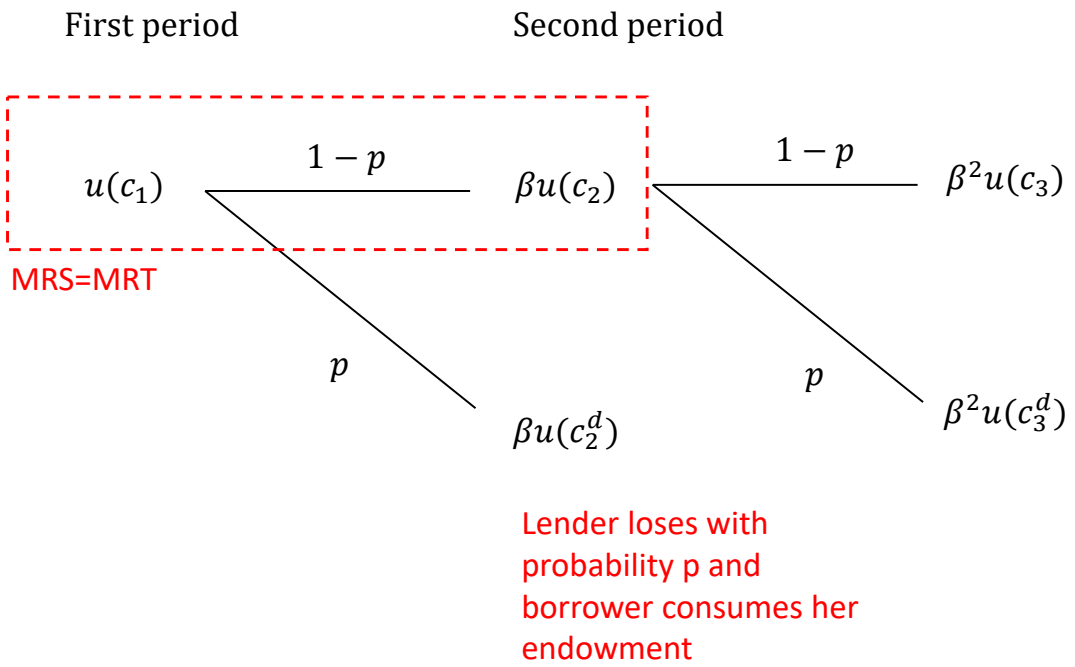

Result 1

Proposition

Equilibrium features: $F = p = R$*,* L *nonbinding, and no refinancing.*

- $MRT = -(1-p)$ and $MRS = -(1-p)\beta\frac{u'(c_2)}{u'(c_1)}$, which implies

$$u'(c_1) = \beta u'(c_2).$$

- Implementation requires $F = p$ because the consumer's Euler equation is

$$(1-F)u'(c_1) = \beta(1-p)u'(c_2)$$

- Tricky bits: CQ holds and binding L is suboptimal

Result 2

Proposition

Equilibrium features $F < p < R$. *If, in addition,* $\frac{b_2}{b_2^{\eta}} \leq (1-p)$ *and* ρ *is sufficiently low, the consumer necessarily refinances.*

Result 2

Proposition

Equilibrium features $F < p < R$. If, in addition, $\frac{b_2}{b_2^\eta} \leq (1-p)$ and ρ is sufficiently low, the consumer necessarily refinances.

- Unconstrained optimality now requires

$$u'(c_1) = \beta u'(c_2) \frac{b_2}{b_2^\eta}.$$

- Implementability requires $F < p$ because the consumer's Euler equation is

$$(1-F)u'(c_1) = \beta(1-p)u'(c_2)$$

- Tricky part: CQ holds, binding L also implies $F < p$.

Result 3

Proposition

"Chaining" of offers propagates promo pricing. (See paper for more details.)

- Implementability requires $(F + \rho R_{-1}) < p$ even for $\eta = 1$ because the consumer's Euler equation is

$$(1 - F - \rho R_{-1})u'(c_1) = \beta(1 - p)u'(c_2)$$

Numerical example

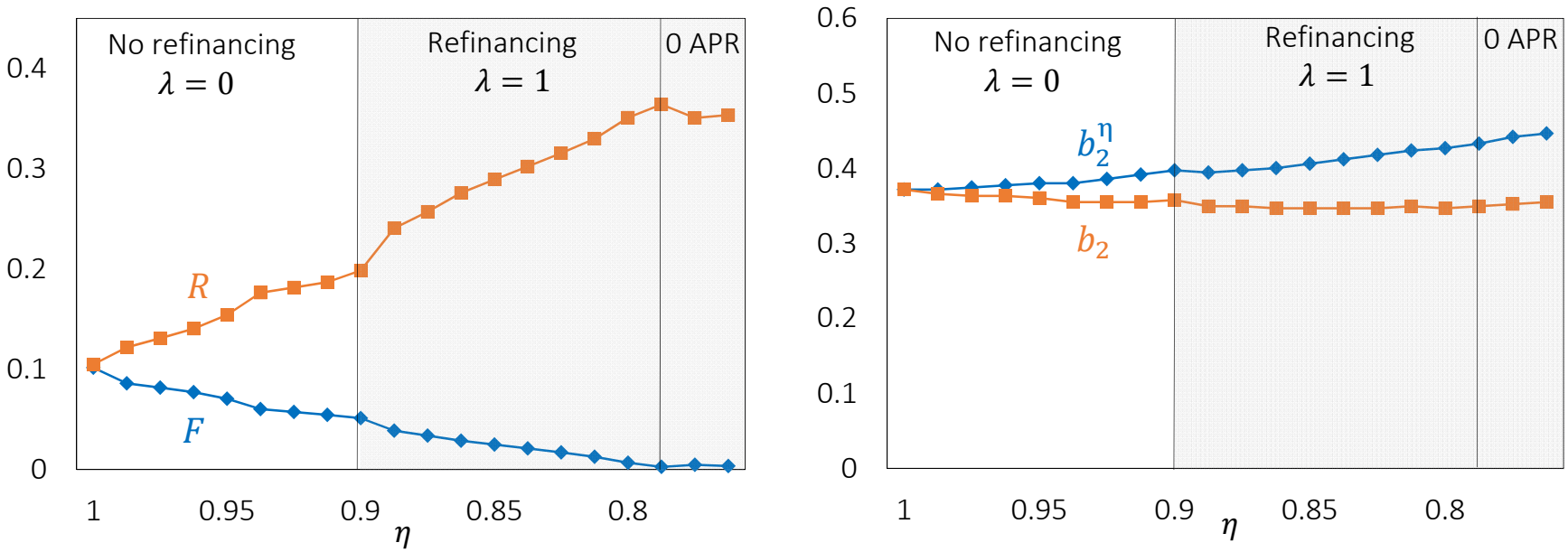

Figure: A numerical example: Equilibrium contract as a function of η ($\beta = 1$).

Notes: The figure illustrates equilibrium contract for a range of values of hyperbolic discount factor η, assuming $Y_l = 1/2, Y_h = 1, B = 1, \rho = .5, p = .1, \beta = 1$ and $u(c) = \log(c)$. F is restricted to be non-negative. The shaded area indicates when refinancing occurs on the equilibrium path. The right panel shows the wedge between ex ante and ex post borrowing that creates incentives to set promotional terms.

Outline

1. Data
2. Model
3. (Mechanism)
4. **Calibration and quantitative findings**

Parameterization

- Log-utility, hyperbolic discount from Ausubel and Shui (2005): $\eta = 0.81$
- Cost of defaulting is parameterized by χ_0: $\chi(y) = \chi_1 \max(y - \chi_0, 0)$.
- Income of a working age in economy state $\omega = \{R, E\}$ is:

$$y_t(\omega) = e_t k_t z_t(\omega)$$

where

y_t - agent's income at age t

e_t - deterministic age-dependent income profile

k_t - a 3 state discrete i.i.d. process

$z_t(\omega)$ - 6x6 state Markov process that depends on ω

- Individuals start life at the age of 24 years, retire at the age of 65 year, and die at the age of 80 years and period length is l (parameter we calibrate)
- Demographics simulated starting from 2010 population structure and using death probability tables and .9 population growth

Calibration

Table: Data targets and calibrated values of jointly selected parameters.

	Data	Model
A. Targeted moments		
1. Credit card debt of card holder to median personal income [%]	22	22
2. Net charge-off rate [%]	4	4
3. Promo debt as a fraction of total debt	35	33
3. Average duration of promo offers [months]	12	12
4. Average step up rate on promo accounts [%]	17	19
5. Average rate on credit card debt [%]	12	12
B. Jointly calibrated parameters		
Discount factor β		0.926
Cost of defaulting χ_0		0.867
Period length l [months]		20
Refinance delay ρ		0.4
Lender cost of funds r		0.07
Rate discount to qualify as promo		50%
C. Preset parameters		
Hyperbolic discount factor η		0.81
Income process (see the Online Appendix)		

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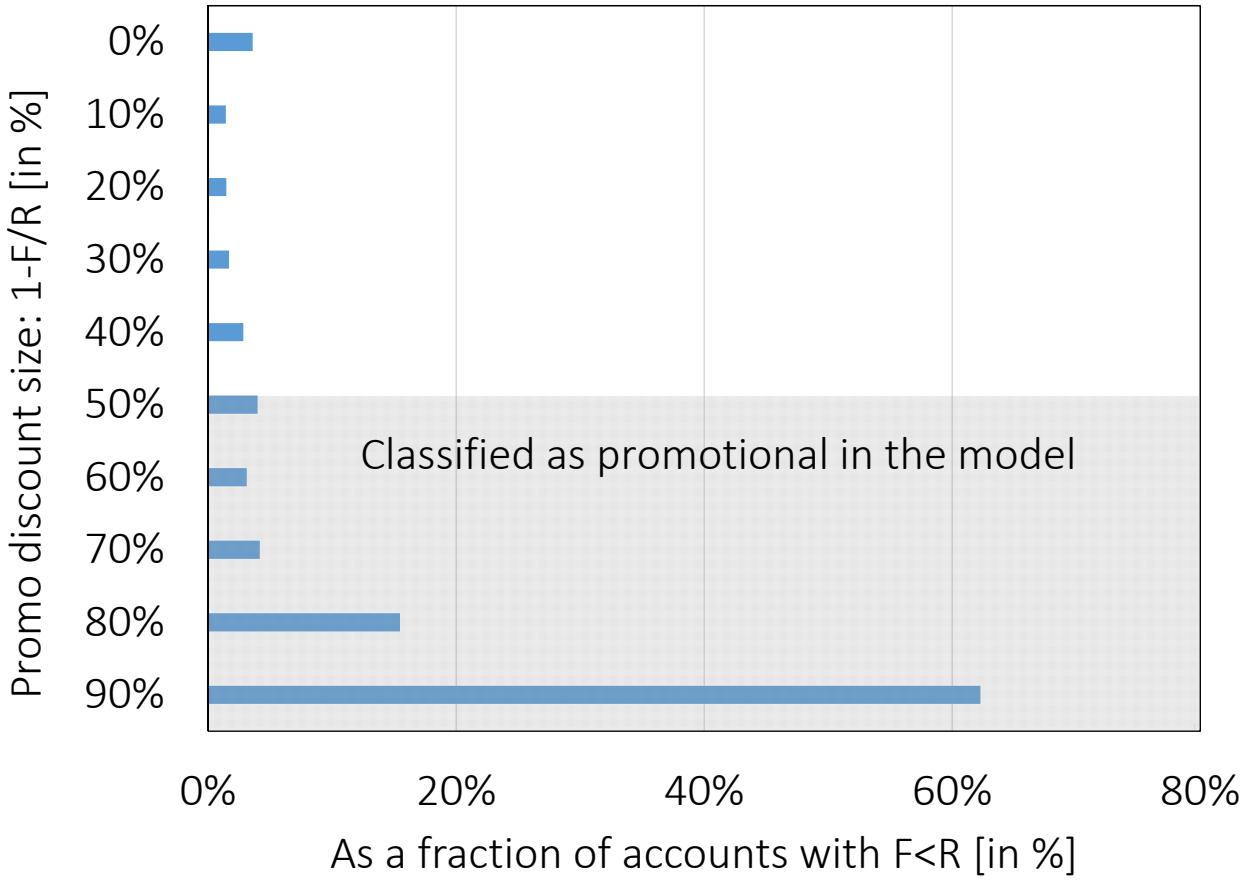
Hyperbolic discount factor η		0.81
Income process (see the Online Appendix)		

Calibration

- Classification of promo accounts based on rate discount:



Quantitative Findings (1/2)

- Model matches key moments we did not target reasonably well:

Table: Data targets and calibrated values of jointly selected parameters.

Statistic (in percent % unless otherwise noted)	Data	Model
Annual balance transfers as a fraction of debt	39	44
Average interest rate on promo debt (data+3)	7	6
Median interest rate on promo debt (data+3)	6	6
Share of revolvers among card users	59	60

Can the model account for 2009-14 deleveraging on cc's?

Calibration

- We model recession as an exogenous regime switch to "recessionary income process," following Guvenen et al (2007).

- We model collapse of promo by introducing an MIT shock with a permanent and transient component to match the evolution of the share of promo debt in total debt:

    - Permanent component: permanent decline in refinancing probability by 30 percent (expected upon occurrence)

    - Transient component: unexpected residual decline to account for the residual decline in the share of promo debt

Calibration of Collapse of Promo Shock

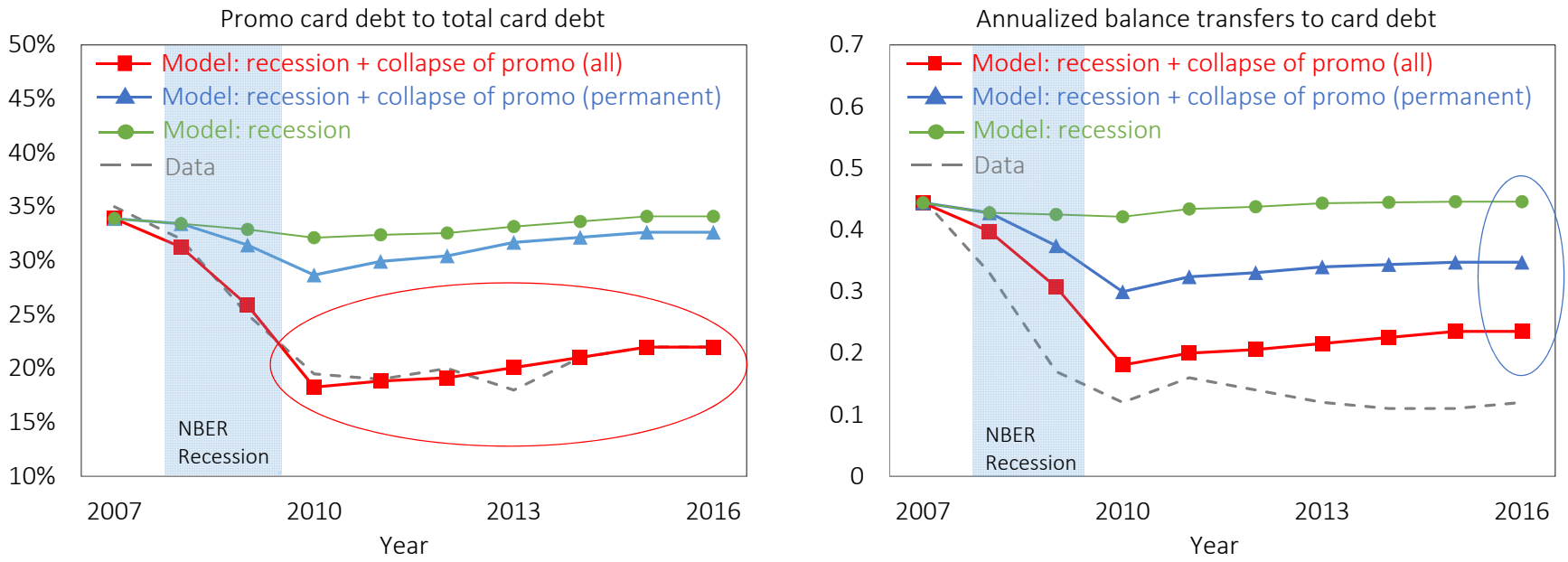


Figure: Collapse of promotional activity: model via-á-vis the U.S. data.

Notes: The figure illustrates the decline in the share of promotional credit card debt to total debt (left panel) and the collapse of balance transfers (promotional balance transfers) as a fraction of debt. Solid lines correspond to the model and the dotted line is the data. We consider three models that incrementally add shocks. The total contribution of the collapse of promo shock is the difference between green line with circles and the orange line with squares.

Quantitative Findings: Deleveraging

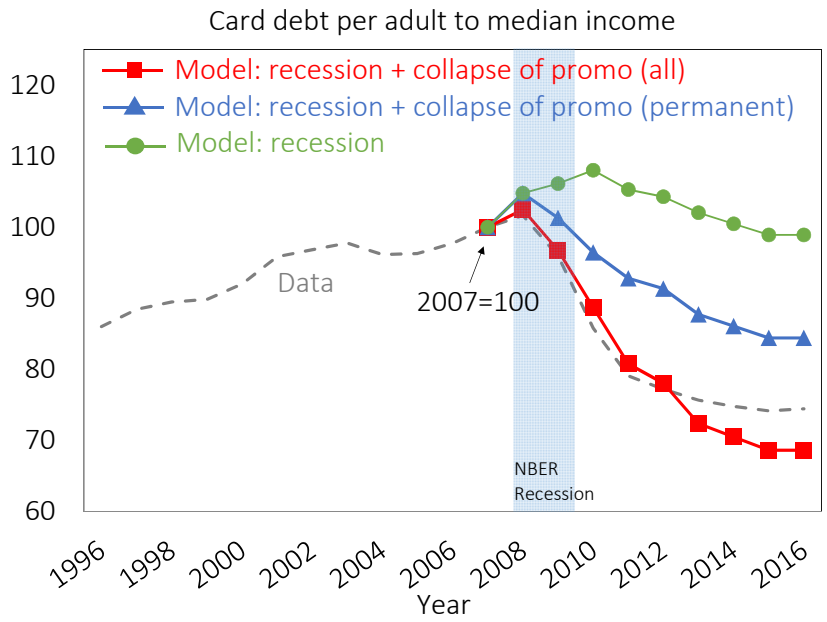


Figure: Deleveraging on credit cards: model via-á-vis the U.S. data.

The figure illustrates deleveraging on credit cards relative to median income and in absolute terms (in data real value detrended using the 1996-2006 linear trendline). Solid lines correspond to the model and the dotted line is the data. We consider three models that incrementally add shocks. The total contribution of the collapse of promo shock is the difference between green line with circles and the orange line with squares.

Quantitative Findings: Charge-offs and Interest Rates

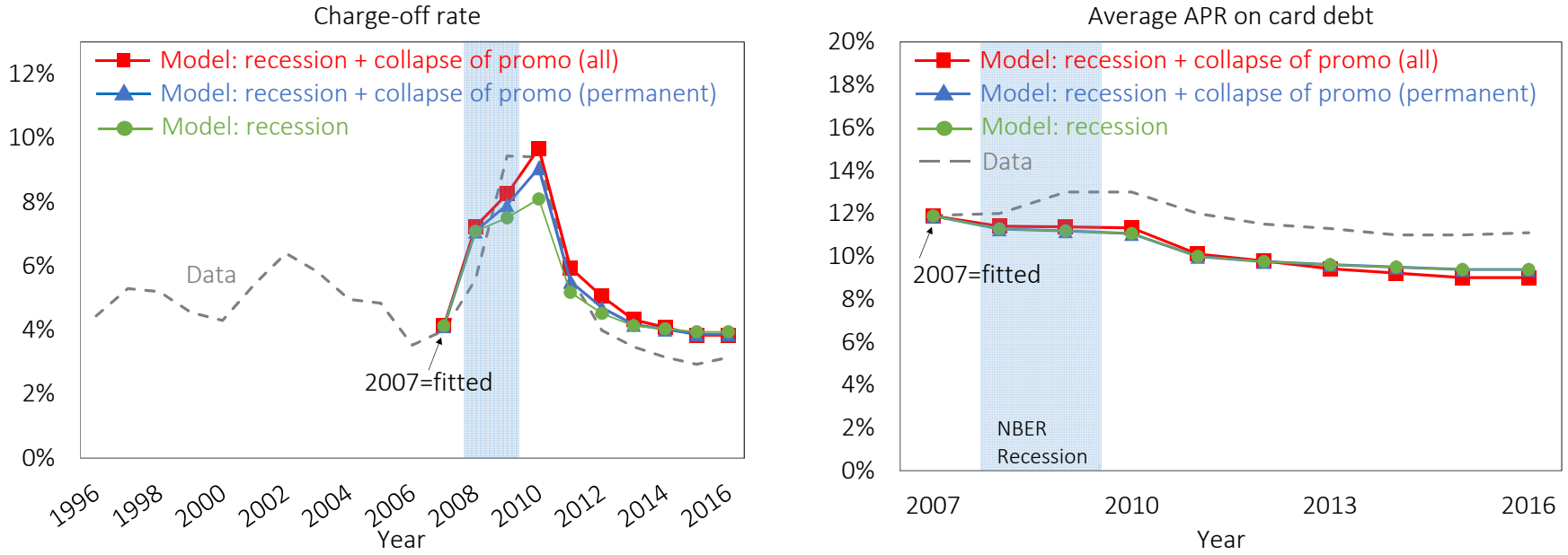


Figure: Charge-off rate and interest rate on card debt: model via-á-vis the U.S. data.

Note: The figure illustrates the net charge-off rate on card debt (fraction of debt defaulted on) and the average interest rate paid on credit card debt estimated using our account level dataset. Solid lines correspond to the model and the dotted line is the data. The charge-off rate is for all banks and comes from FRB. We consider three models that incrementally add shocks. The total contribution of the collapse of promo shock is the difference between green line with circles and the orange line with squares.

Quantitative Findings: Aggregate Implications

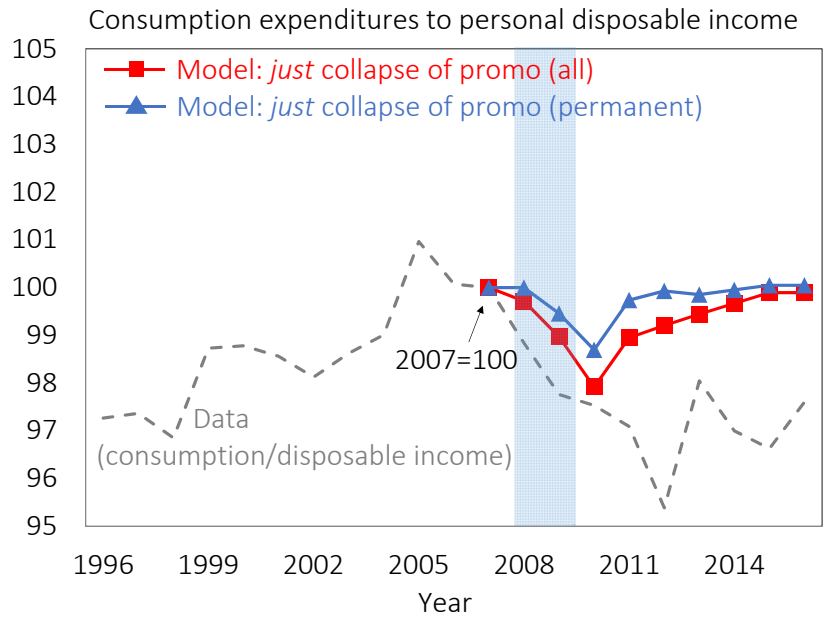


Figure: Consumption to disposable income: model via-á-vis the U.S. data.

Note: The figure illustrates the net contribution of the collapse of promo shock to decline in consumption to disposable in the model (red line with squares). The red line refers to contribution of promo shock (with transition) net of recession shock and demographic changes.

Conclusions

- Credit view offers a compelling explanation of deleveraging on credit cards
- The shock was sizable to have a discernible effect on aggregate consumption demand