Consumer Debt and Default

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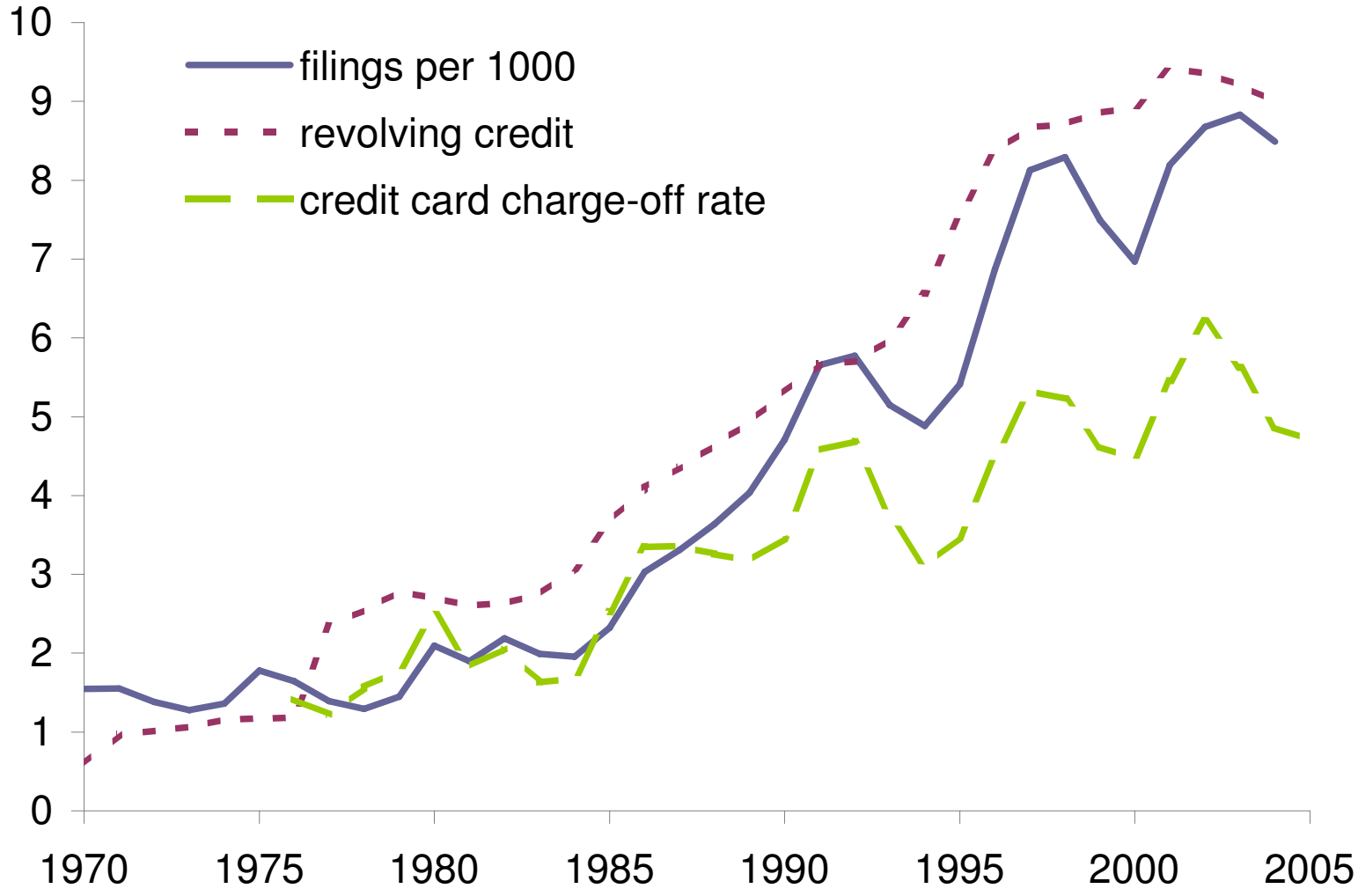
YJ Award Lecture, December 2017

Debt and Default over Time



Outline of the Talk

- (legal) Background
- Questions
- Answers
- New Avenues and Open Questions

Based largely on joint work with my longstanding co-authors Igor Livshits and Jim MacGee and very recent work also with my former student Florian Exler.

Consumer Bankruptcy Law

- Varies across countries and over time (within a country).
- Key features of US bankruptcy:
  - Chapter 7 (Fresh Start) – about 70% of all filings.
  - Discharge unsecured debt in exchange for most assets (some exemptions!).
  - Non-dischargeable: student loans, child support, alimony, tax obligations.
  - Roughly 4-month process.
  - Court and legal fees: easily add up to $2,000.
  - At least 6 years between filings.
  - Default stays on credit history for 10 years.
- Most other countries have "stricter" bankruptcy law.

Important Legal Changes related to consumer debt/default

- 1978 US Supreme Court's Marquette decision: effectively removed state usury laws.
- 1979 amendments: made bankruptcy more attractive by increasing the value of exempt assets and permitting joint filings by spouses.
- 2005 Bankruptcy Abuse Prevention and Consumer Protection Act: means-testing introduced. Increase in waiting period from 6 to 8 years.
- 2009 CARD Act: limited reset credit card interest rates, restricted credit card fees, increased transparency requirements.

Questions

- 1. Framework?
- 2. What caused the dramatic increase?
- 3. The role of financial innovation?
- 4. Optimal bankruptcy law?
- 5. What if consumers are not “rational”?

in answering these questions, biased literature survey

- Focus on formal default (Chapter 7 or 13).
  Abstract from delinquency and informal defaults.
- Focus on unsecured consumer debt (mostly credit cards).
  Abstract from secured credit (mortgages, auto loans, home equity line of credit).
- Focus on the US.
  Other countries fruitful avenue for future research.
- Focus on quantitative theory contributions.
  Also growing empirical literature.

1. Theoretical Framework

- Need model where default occurs with positive probability $\rightarrow$ rules out many models that study debt under the *threat* of default, such as Kehoe and Levine (RES 1993).
- Instead, starting point: incomplete-market model of Eaton and Gersovitz (RES 1981)
- Key idea: interest rates reflect individual default probabilities and thereby compensate lenders in non-default states for losses they suffer in default.
- Thus: borrower faces interest rate *schedule* – explicit function of amount borrowed.
- Key trade-off inherent in bankruptcy: partial insurance (through ability to walk away from debt) $\leftrightarrow$ hampers inter-temporal smoothing (Zame, AER 1993).
- Quantitative Models: Chatterjee et al (Econometrica 2007) and Livshits, MacGee and Tertilt (AER 2007).

The Model

- Stochastic life cycle model
- Two types of idiosyncratic uncertainty:
  - income shocks
  - expense shocks
- Exogenous increase in earnings by age (key to get realistic amounts of debt)
- incomplete markets:
  non-contingent debt only
  consumers can declare bankruptcy
- Competitive lenders: zero profits in equilibrium.
- Equilibrium interest rate incorporates default risk
  $\rightarrow$ interest rate depends on age, current income, total debt

Expense shocks are key for getting enough defaults

A key unexpected expense is a medical bill. Medical expenses are indeed often stated as main reason for filing for bankruptcy.

Consumer Problem (Recursive Formulation)

$$V_j(d, z, \eta, \kappa) = \max_{c, d'} \left[u(c) + \beta E \max \left\{ V_{j+1}(d', z', \eta', \kappa'), \overline{V}_{j+1}(z', \eta') \right\} \right]$$
$$\text{s.t. } c + d + \kappa \leqslant \bar{e}_j z \eta + q^b(d', z, j) d'$$

where $\overline{V}$ is value of filing for bankruptcy:

$$\overline{V}_j(z, \eta) = u(c) - \chi + \beta E \max \left\{ V_{j+1}(0, z', \eta', \kappa'), \overline{W}_{j+1}(z', \eta', \kappa') \right\}$$
$$\text{s.t. } c = (1 - \gamma) \bar{e}_j z \eta$$

and $\overline{W}$ is value of defaulting immediately following bankruptcy (only relevant if hit with large expense shock)

Model matches bankruptcies & consumption over life-cycle

Figure 1A: Bankruptcies over the Life Cycle

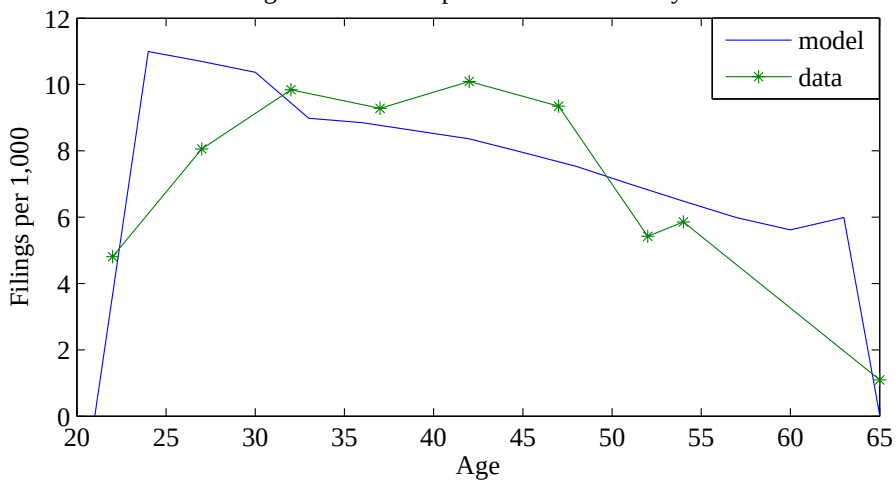
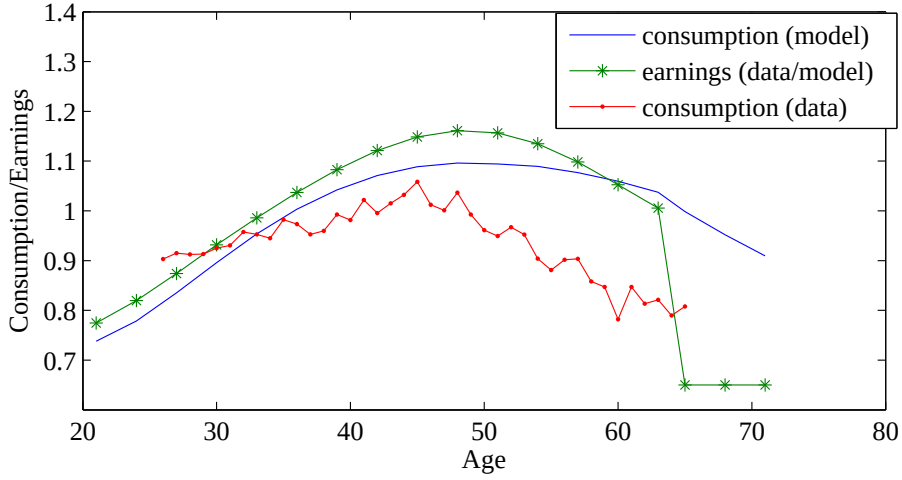
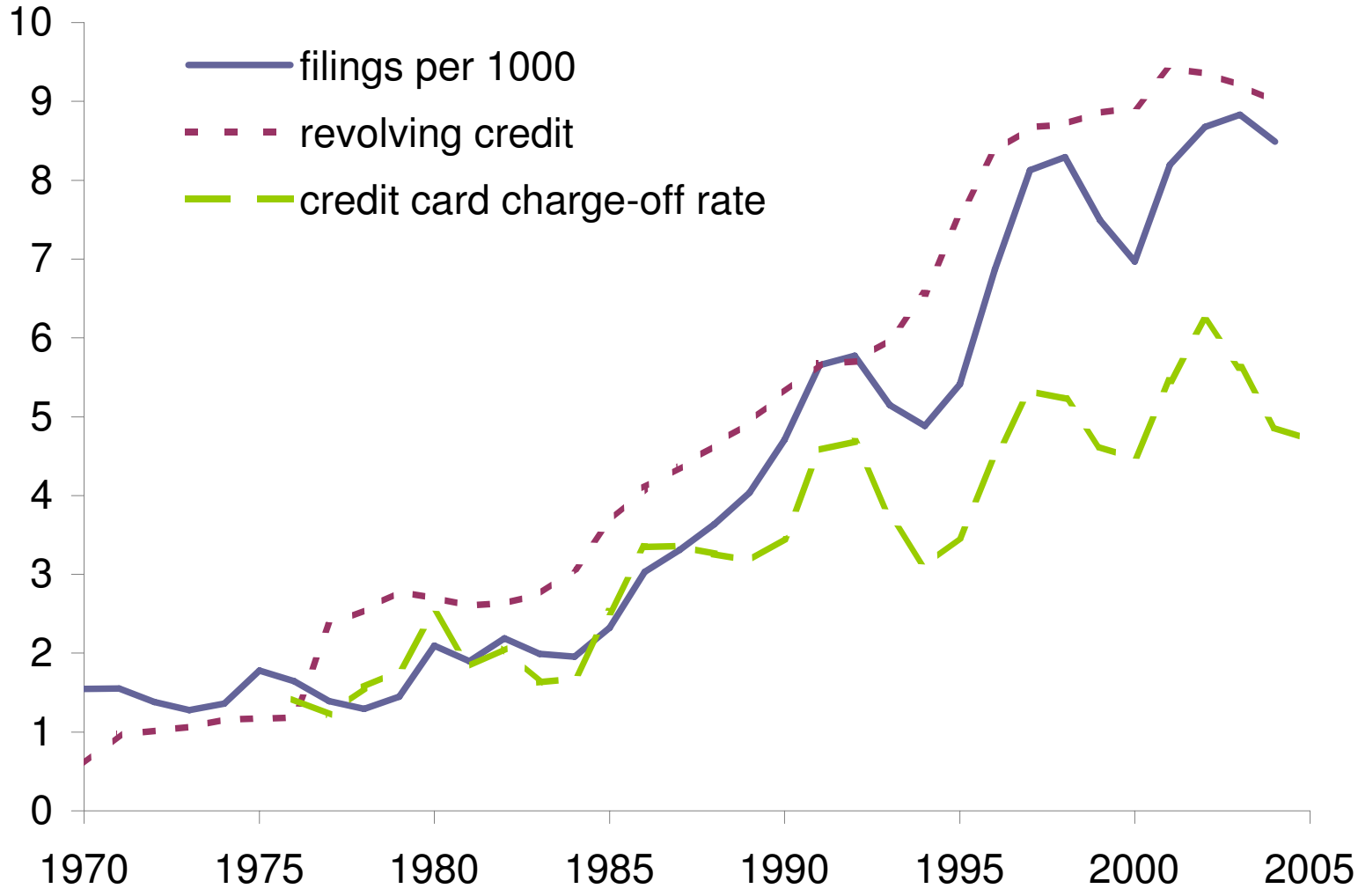


Figure 1B: Life Cycle Consumption and Earnings Profiles



Next: use the model for positive and normative questions

2. What caused the dramatic increase?



Proposed Explanations

1. Increase in earnings volatility
   (Barron, Elliehausen and Staten 2000)
2. Increase in expense risk (Warren and Warren Tyagi 2003)
3. Demographic changes in the population
   (Sullivan, Warren and Westbrook 2000)
   - Age composition (baby-boomers)
   - Marital status
4. Decrease in cost of bankruptcy – stigma? (Gross and Souleles 2002, Fay, Hurst and White 2002)
5. Removal of interest rate ceilings (*Marquette*) (Ellis 1998)
6. Credit Market Innovation (Barron and Staten 2003)

Accounting for the Rise in Consumer Bankruptcies (Livshits, MacGee and Tertilt, AEJ:Macro 2010)

- Framework to evaluate proposed explanations for rise in consumer bankruptcy filings
  - Quantitative model of consumer bankruptcy
  - Numerical experiments in calibrated model

- Compare model implications of each story to key facts:

Fact	1980-84	1995-99
Chapter 7 filings (% of HHs)	0.25%	0.83%
Unsecured Debt/Disposable Income	5%	9%
Average borrowing interest rate	11.5-12.7%	11.7-13.1%
Charge-off rate	1.9%	4.8%

Findings

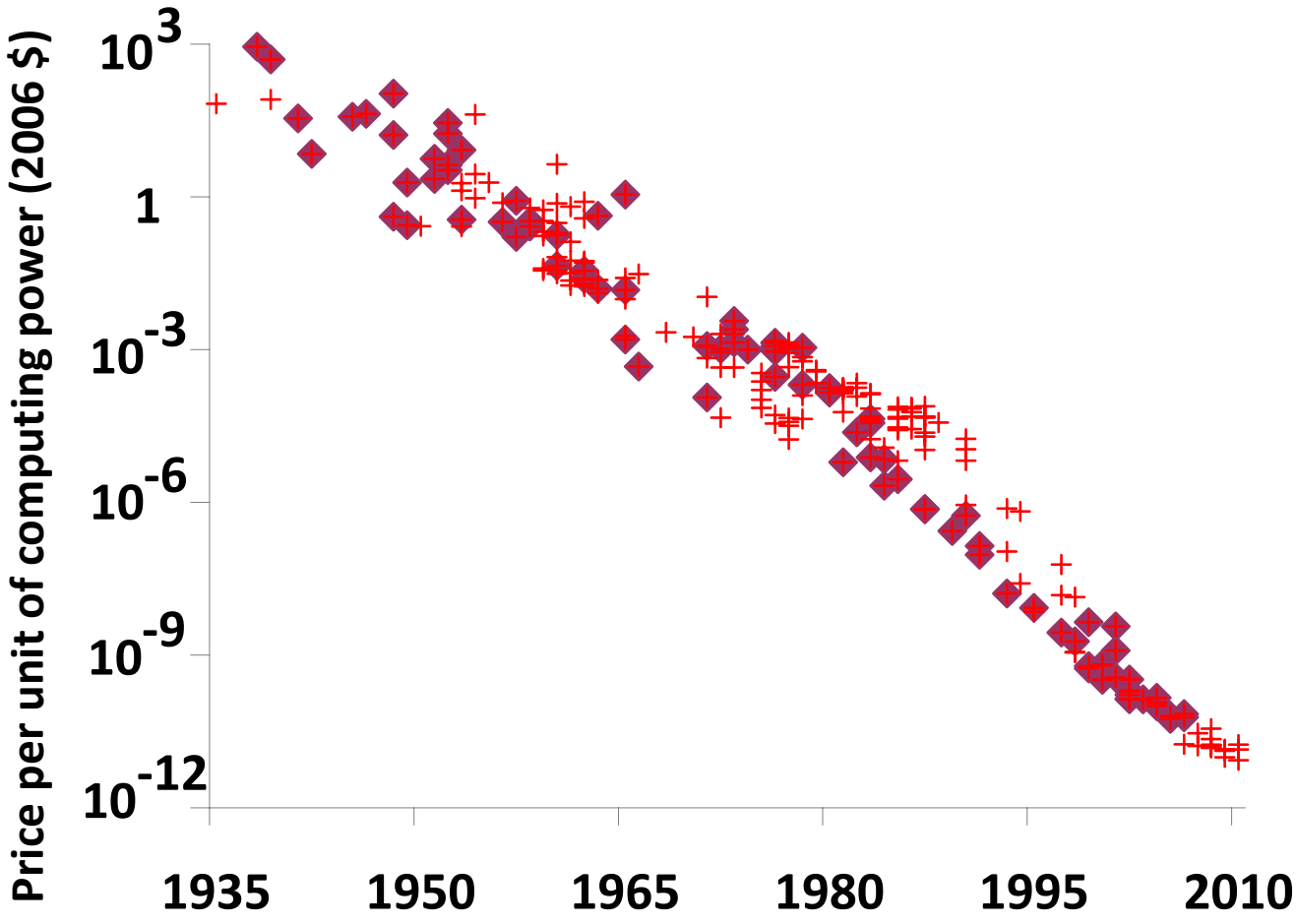
- No single story can account for all the key facts (difficult to match increase in defaults and debt simultaneously).
- Combination of stories can account for all the key facts.
- Two main forces:
  - Decrease in stigma,
  - Decrease in transaction cost of borrowing.
- Changes in uncertainty play small role quantitatively.
- Demographic changes are quantitatively unimportant.
- *Marquette:* not a main driving force.

Alan Greenspan famously said in his testimony before Congress (1999): Americans have lost their sense of shame

3. Alternative Interpretation?

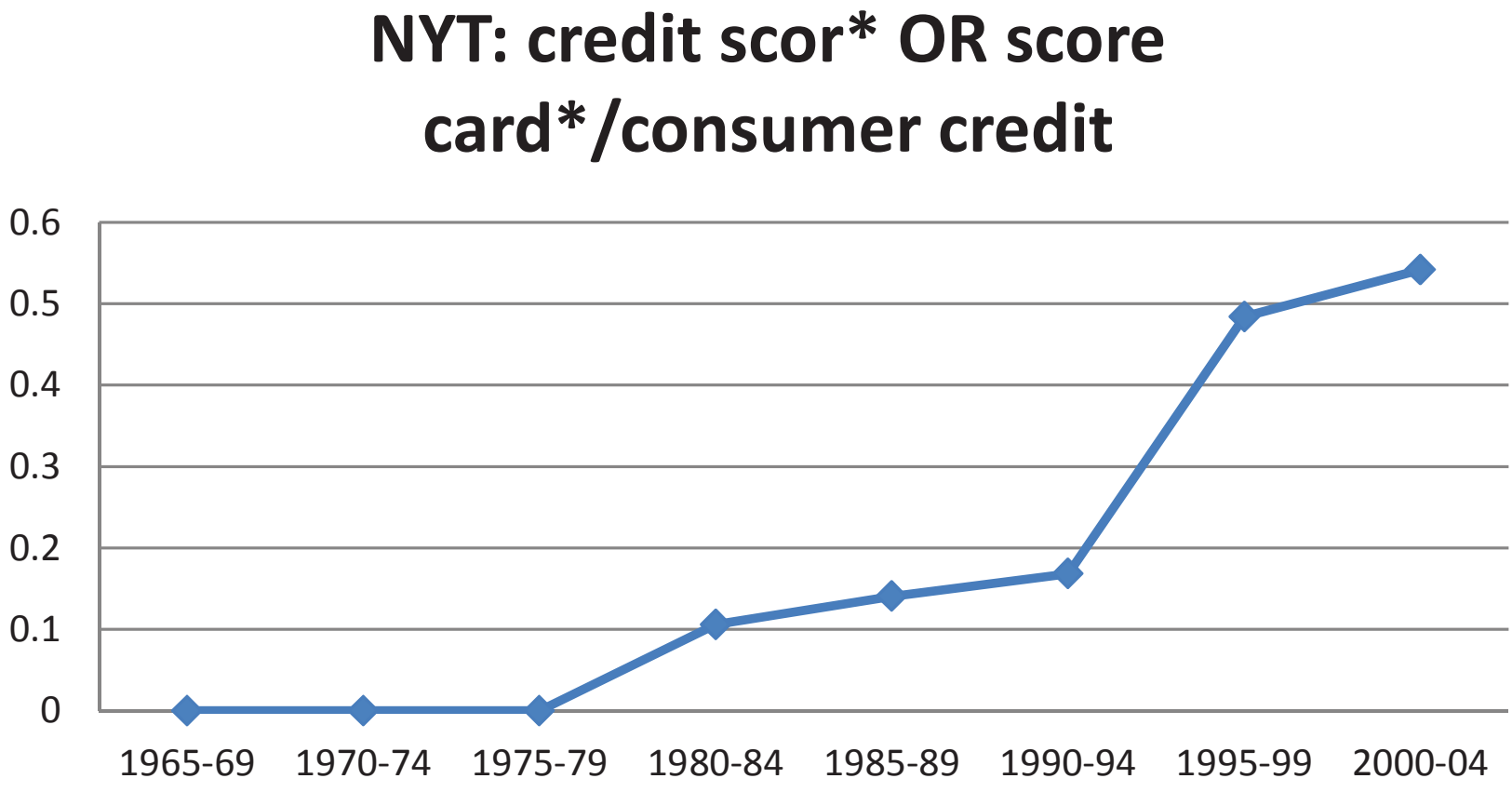
- We view $\tau \downarrow$ (transaction cost) and $\chi \downarrow$ (stigma) as reduced form ways of modeling changes in the credit market environment.
- What are those changes?
- Promising candidate: technological progress in the financial sector (such as credit scoring).

Cost of Computation per Second (Nordhaus 2007)



Diffusion of Credit Scoring Technology

Evidence from newspaper keywords



Intensive vs. Extensive Margin

- Inspired much follow-up research modeling how better IT led to better information and affected credit markets: Narajabad (RED 2012), Sanchez (2010), Athreya, Tam and Young (AEJ:Macro 2012)
- Mechanism in those papers works along intensive margin: existing (good) borrowers borrow more and hence default more often.
- However, data shows large changes in extensive margin.

Changes in Access to Credit Cards

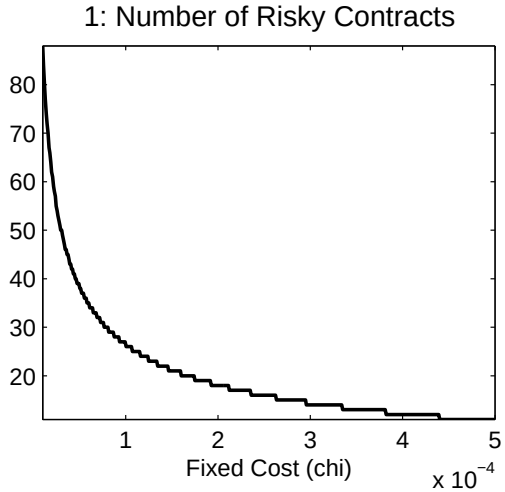
	1983	1989	1995	1998	2001	2004
% Pop. has card	43%	56%	66%	68%	73%	72%
% Pop. has balance	22%	29%	37%	37%	39%	40%

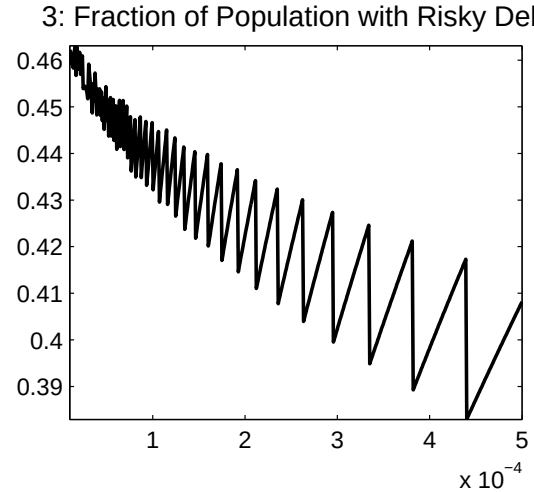
Likely these new borrowers are different (riskier).

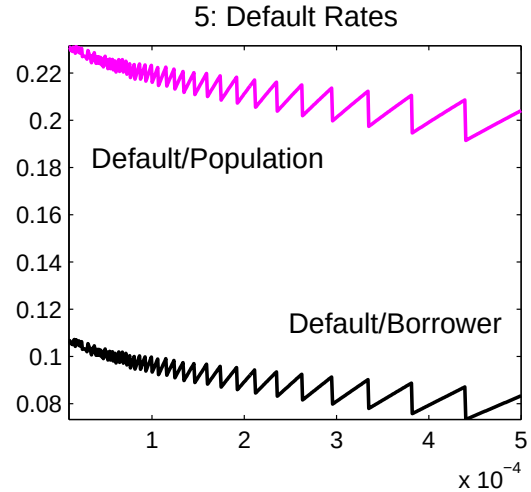
The Democratization of Credit and the Rise in Consumer Bankruptcies – Livshits, MacGee and Tertilt (Restud 2016)

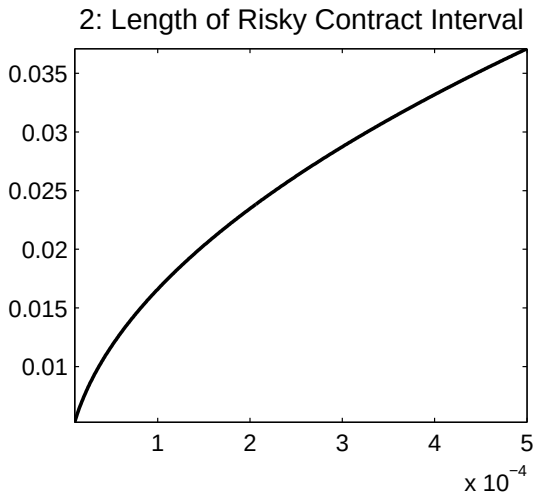
- We pursue this idea in a separate paper.
- Key feature: fixed cost of designing a lending contract (specifies a loan amount, interest rate and who is eligible) $\rightarrow$ Overhead costs.
- Leads to (some) pooling even with perfect information.
- Equilibrium will feature a menu of different contracts and some (the riskiest) consumers with no access to credit.
- Idea: fixed costs falls over time. Leads to more contracts. Riskier consumers get access to credit $\rightarrow$ file for bankruptcy more often.

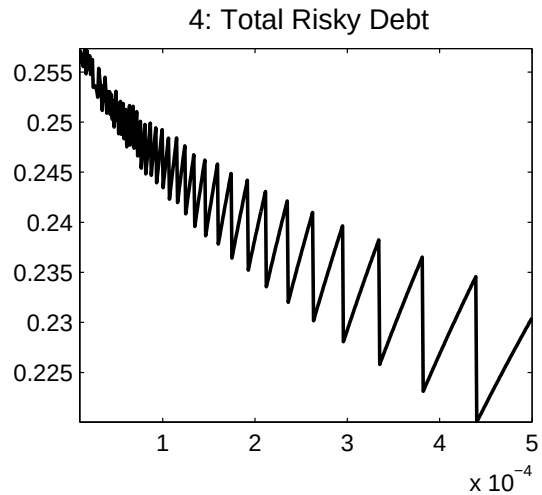
Comperative statics in fixed cost χ

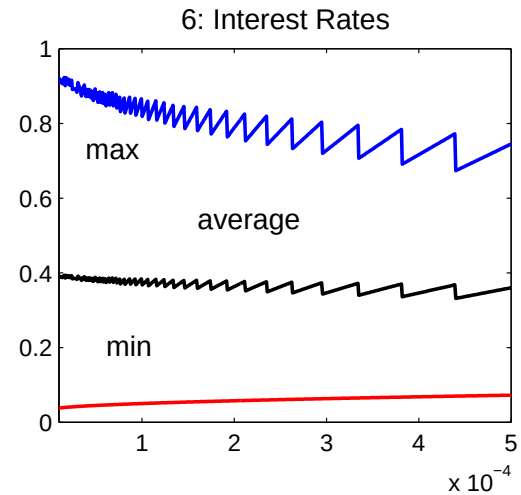




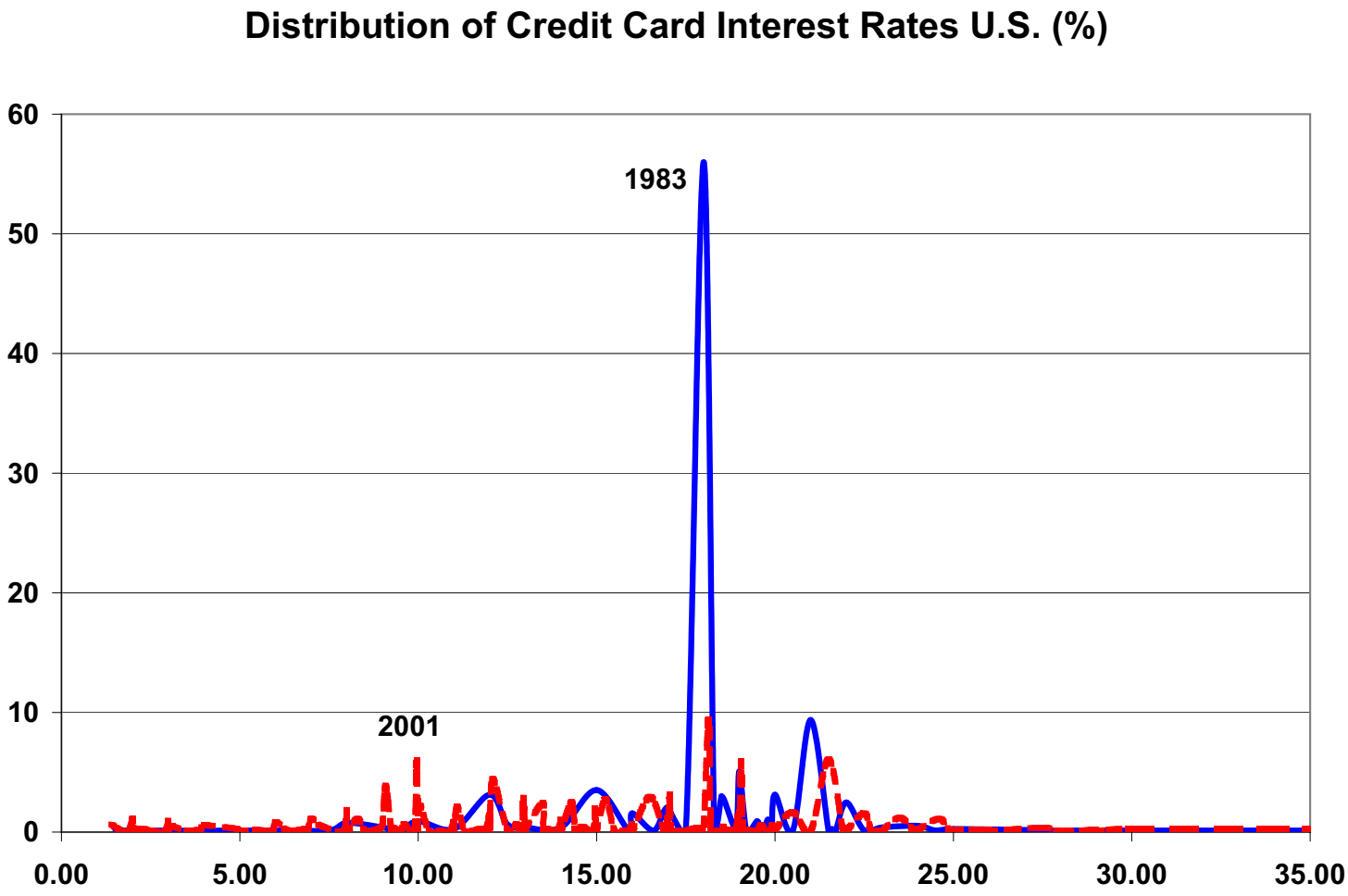








Indeed, number of Contracts (=interest rates) increased

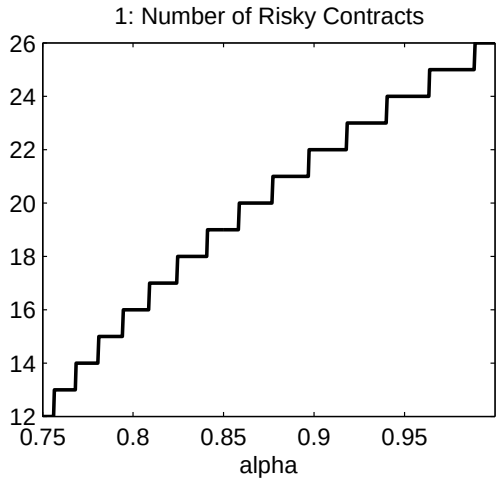


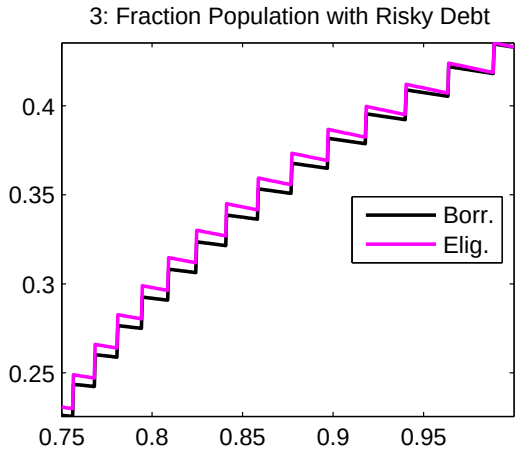
We also find evidence that the "new borrowers" are more risky.

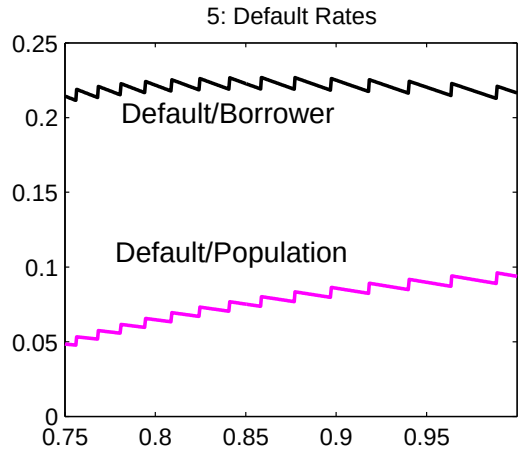
What about improvements in credit scoring technology?

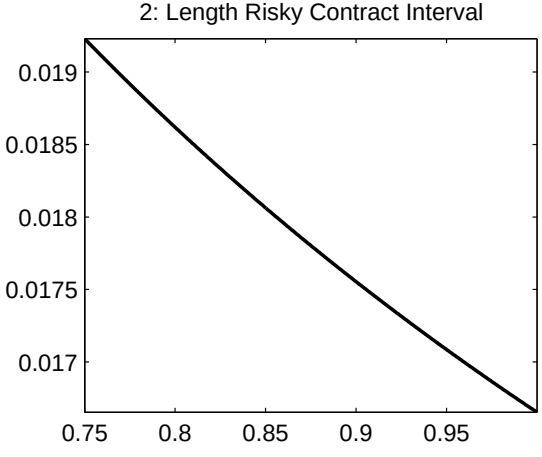
- Add asymmetric information.
- Lenders observe noisy signal of HH risk type.
  - Some borrowers will be misclassified.
  - Good borrowers with bad signals opt out.
  - Bad borrowers with good signals stay in.
  - Higher interest rate for any given contract.
  - Also need a larger pool of people to recover overhead costs.
- Credit scoring = accuracy of signal improves.
- Need smaller pools to recover overhead costs.
- More contracts in equilibrium
- More (riskier) people with access to credit.
- Hence more default.

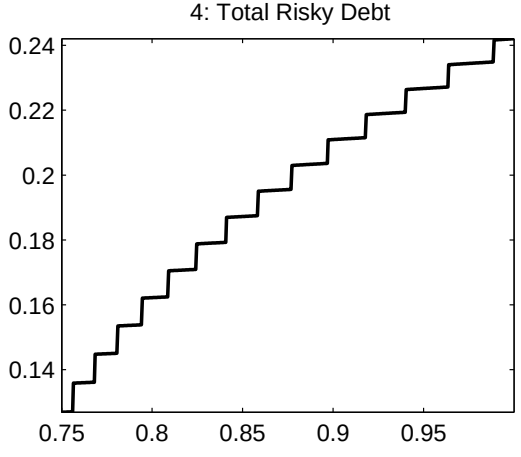
Comp statics in signal accuracy α

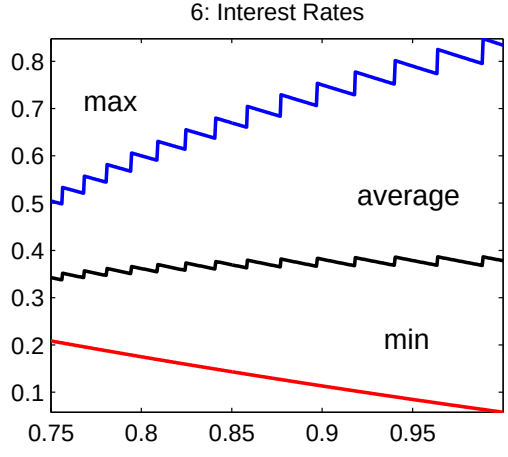












4. Optimal bankruptcy law?

In an incomplete market framework:

- Default itself comes with a deadweight cost.
- However, default acts as partial insurance – eliminating this option can lead to welfare losses.
- More commitment (through harsher bankruptcy punishments) does not necessarily make borrowers ex-ante better off as it takes the partial insurance option away.
- Rather than optimal law, literature has evaluated current law (and proposed changes) quantitatively.

Results all over the map

- Athreya (2002): eliminating consumer bankruptcy welfare improving.
- Li and Sarte (2006) find opposite (in model with GE effects).
- In Livshits et al (2007) we find Fresh Start is preferred to life-long liability of debt.
- Chatterjee and Gordon (2012) eliminating Fresh Start would be welfare improving (in model with explicit garnishment).
- Athreya (2002) and Li and Sarte (2006) find only modest effects of means-testing while Chatterjee et al (2007) and Gordon (20014) find large welfare benefits.

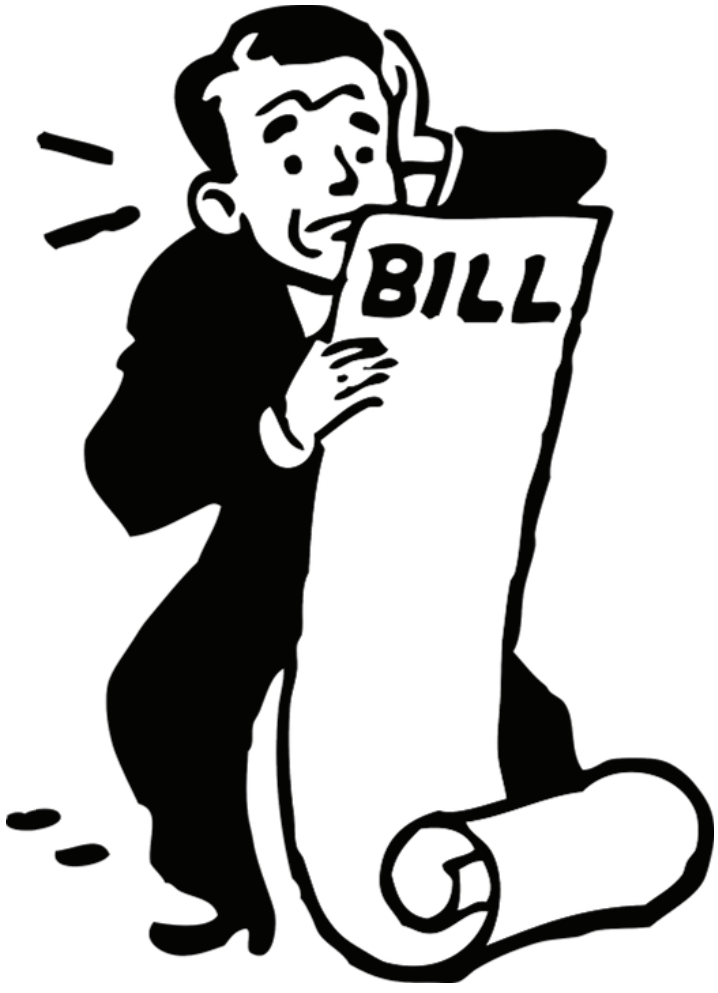
Consumer Bankrupty: A Fresh Start
Livshits, MacGee and Tertilt (AER 2007)

- Contrast US Fresh Start with life-long liability for debt (which most European countries had until the late 1990s).
- Man finding:
  - welfare comparison very sensitive to
    - the nature and magnitude of uncertainty (temporary shocks easy to smooth without bankruptcy, greater volatility of persistent shocks make easy discharge option attractive).
    - life-cycle profile of earnings and family size (affects desired smoothing over time).
  - Thus, in world without expense shocks, a no-fresh-start system is preferred.
  - In a world with flatter life-cycle earnings profile, no-fresh-start is preferred.
- Likely explains the dispersion in findings in literature.
- May also explain the stricter bankruptcy law in many European countries (since they have more social insurance!)

5. But what if consumers are not "rational"?

- Recent policy debate that consumers need to be "protected" from predatory lenders.
- Idea that some people over-borrow and there is excessive default. Worry that lenders design contracts to "exploit" systemic mistakes.
- Idea that regulation can protect such consumers.
- How to evaluate this debate in a model?
- Need model with "behavioral" consumers.
- We pursue this in ongoing work (joint with Livshits, MacGee and Exler).

Some people are repeatedly surprised by bills



Over-optimism about expense shocks (our version of behavioral consumers)

Framework

Consumers

- Idiosyncratic income risk
- Two types
  1. "*realists:*" accurate beliefs about expense shock process
  2. "*over-optimists:*" more risky, but same beliefs
- Over-optimists ignorant about their bias $\Rightarrow$ identical beliefs
- Identical support
- Borrow in incomplete markets
- Non-contingent debt but can declare bankruptcy

Competitive Lenders cannot directly observe consumer type

- Observe income, debt & histories
- Form posterior of consumer type: *credit (type) scores* $\equiv$ Pr(Realist)
- Equilibrium interest rate incorporates default risk: depends on credit score, age, current income, debt

Key Mechanisms

Endogenous pooling of types within credit-score bins

- Both types in bin face same interest rate schedule
- Lenders incorporate expected default risk in bond price schedules, so bins with more risky types have higher interest schedules

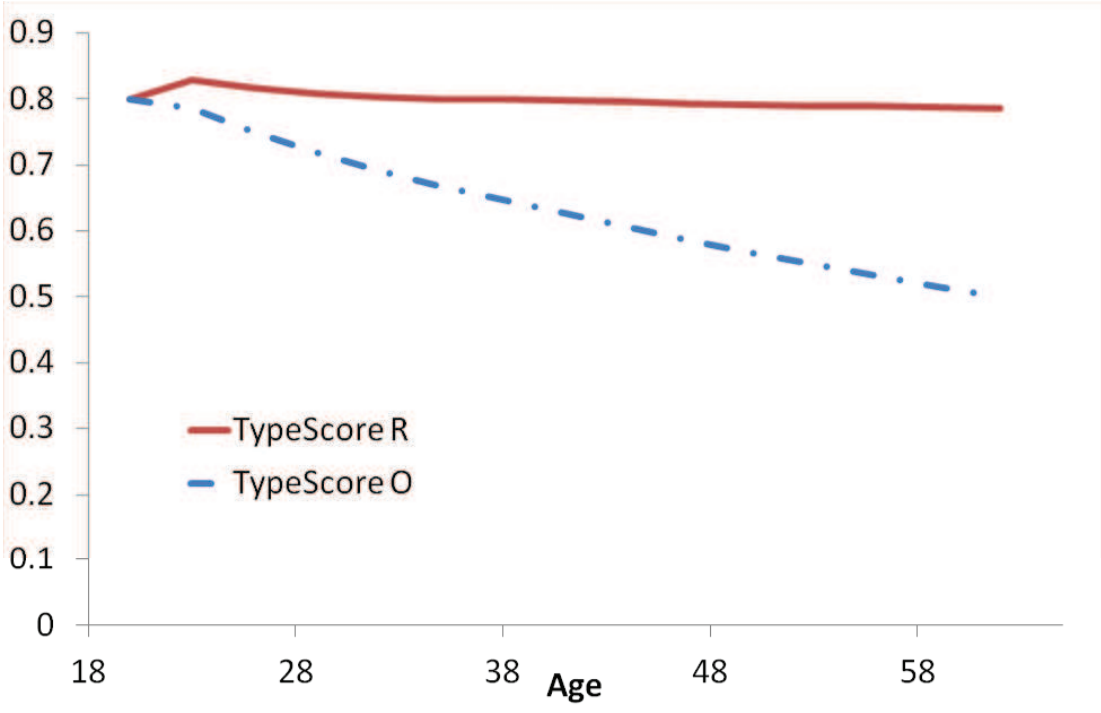
Life-cycle of credit (type) scoring

- Longer histories lead to more precise posteriors
- Fraction of "misclassified" households falls

Abstract from adverse selection

- Study cross-subsidization, credit scores, etc.
- Avoid many technical issues associated with adverse selection

Evolution of Type Scores in the Model



Probability of being a "good" type decreases over time for the over-optimists as they are experiencing more adverse shocks.

Results

- Since overoptimists believe they are realists, they behave identically to realist.
- No way for the bank to tell them apart either $\rightarrow$ Pooling.
- Reduces over-optimists interest rate $\rightarrow$ cross-subsidization.
- Behavioral people **benefit** from this.
- If someone is "exploited," it is the realists, not the over-optimists!

Paternalistic Point of View

- From a paternalitic point of view, overoptimists make wrong choices.
- They borrow too much (overoptimistic about ability to repay)
- and file too late (overoptimistic about ability to get out of debt).
- What should a planner do?
- Perhaps decrease the cost of bankruptcy.
- $\rightarrow$ However, this will affect realists adversely!

Experiment: Financial Literacy Education

- Tell people who they are.
- Over-optimistic will make better decisions (from paternalistic point of view) $\rightarrow$ welfare improving
- However, banks will also know who is who. Eliminates cross-subsidization. $\rightarrow$ Will benefit the realists and hurt the over-optimists
- Overall, over-optimists might be worse off. (quantitative question... ongoing work)

Caveat: Results may change with other types of "behavioral" consumers (interesting new work on self-control by Schlafmann (2016), Nakajima (2012, 2017)). Also related to Kőszegi's Award Lecture 2 years ago (but no default!).

Broad Lessons

- Incomplete markets model with competitive lenders and default useful framework for analyzing many household finance questions.
- Increase in US bankruptcies likely related to technological progress in the financial sector (credit scoring and number crunching).
- "Fresh Start" bankruptcy seems a useful system in the US – but very sensitive to details of environment. Small changes make more commitment (higher punishment) preferred.
- Possible to expand framework to think about "behavioral consumers." Results may not always coincide with what policy-makers seem to have in mind.

Things left off the table
$\rightarrow$ Fruitful Avenues for Future Research

- Other countries (recall that legal settings differ quite a bit)
- Business cycles and financial crisis.
- Interaction bankruptcies and foreclosures (default on unsecured vs. secured debt).
- Informal bankruptcy and delinquency.
- Extreme interest rates (e.g. Payday lending).
- Very active empirical research area (lots new data in recent years) $\rightarrow$ should bring empirical and theoretical approaches closer together.