

Accounting for the Rise in Consumer Bankruptcies

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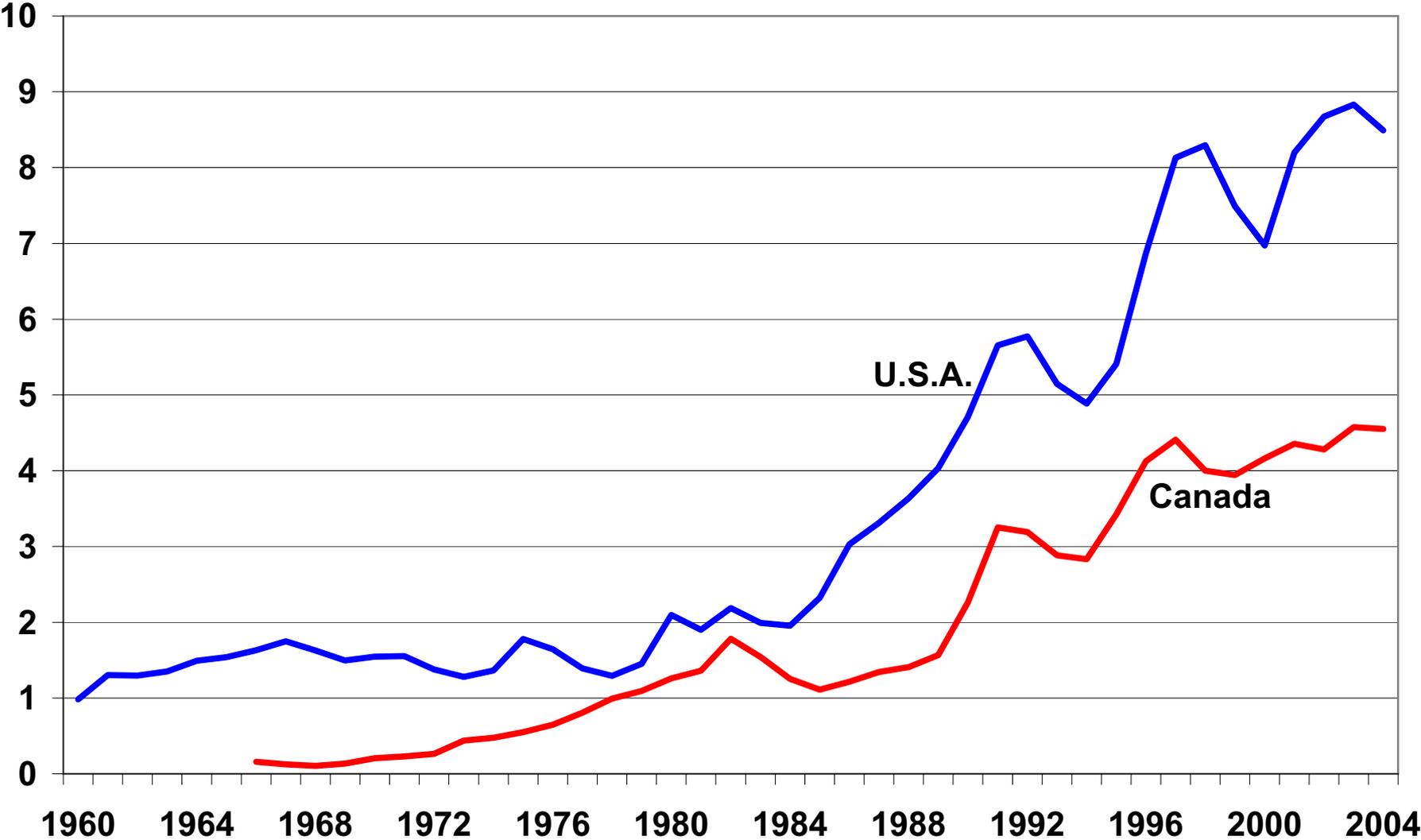
Motivation

1. Large increase in consumer bankruptcy filings.
 - 1.4 filings per 1,000 adults in 1970
 - 8.5 filings per 1,000 adults in 2002
 - Similar increase in Canada:
from 0.2 per 1,000 adults in 1970 to 4.3 in 2002.

2. Policy debate about reforming bankruptcy law.
 - Canada tightened BIA in 1997
 - US tightened in 2005

Understanding (1) important for (2).

Figure 1: Consumer Bankruptcies per 1000 of 18-64 yr-old



Our Contribution

- Framework to evaluate proposed explanations for rise in consumer bankruptcy filings
 - Quantitative model of consumer bankruptcy
 - Numerical experiments in parameterized model
- Compare model implications of each story to key facts:
 - Increase in bankruptcy filing rate
 - Increase in aggregate unsecured debt / income
 - Average real interest rate on loans roughly constant

Key Facts

Fact	1980-84	1995-99
Chapter 7 filings ¹	0.25%	0.83%
Average borrowing interest rate ²	11.5-12.7%	11.7-13.1%
Debt ³ /Disposable Income	5%	9%

¹ Non-business Ch. 7 filings as percent of all households.

² 24 month personal loans and credit cards, respectively.

³ Estimate of unsecured credit.

Proposed Explanations

1. Increase in Uncertainty

- Increase in earnings volatility
- Increase in expense risk
- Demographic changes in the population
 - Age composition (baby-boomers)
 - Marital status

2. Changes in Credit Markets

- Decrease in stigma
- 1978 bankruptcy law amendments
- Removal of interest rate ceilings (*Marquette*)
- Improved lending technology
 - Decrease in transaction cost of borrowing

Summary of Our Results

- None of the explanations “works” by itself.
- We can match all three key facts with a combination of:
 - Decline in stigma
 - Decline in transaction cost of lending
- Uncertainty based stories play small role quantitatively.
- Demographic changes: not important quantitatively.
- *Marquette*: not a driving force.

Model Used to Evaluate Stories

- Stochastic life cycle model
- Two types of idiosyncratic uncertainty:
 - Income shocks
 - Expense shocks
- Incomplete markets
 - Non-contingent debt only
 - Consumers can declare bankruptcy
- Equilibrium interest rate incorporates default risk
⇒ depends on age, current income, amount borrowed

Model: Households

Preferences:

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

Expense Shocks

- Exogenous increase in household's debt
- Idiosyncratic expense shock: $\kappa \in K$, iid

Earnings:

$$y_j^i = z_j^i \eta_j^i \bar{e}_j$$

- Effective labor endowment follows life cycle pattern, \bar{e}_j
- z – persistent shock, Markov with finite support
- η – transitory shock, iid, finite support

Model: Bankruptcy Punishment

1. Fraction γ of earnings is garnisheed.
 - Lenders receive $\Gamma = \gamma y$.
2. Cannot save or borrow in default period.
 - Captures seizure of assets.
3. Cannot file following period.
 - Captures 6 year waiting period.
4. Stigma – utility cost χ during default period.

Model: Financial Markets

- Asset structure: one-period non-contingent bonds
- Risk free bond prices q^s , q^b exogenously given
- Perfectly competitive financial intermediaries
 - Accept deposits and make loans
 - Pay proportional transaction costs τ on loans
 - Observe household's debt, productivity (z) and age
- Competitive financial markets
 - Zero expected profits on each loan
 - Law of large numbers \Rightarrow zero ex-post profits

Equilibrium: Bond Prices

- $q(d, z, j)$ depends on debt d , productivity z , and age j .
- $q^b = \frac{1}{1+r^s+\tau}$ = price of a bond with no risk of default.
- Zero-profit condition:

$$q(d', z, j) = (1 - \theta(d', z, j))q^b + \theta(d', z, j)E \left(\frac{\Gamma(z', j+1)}{d' + \kappa'} \mid I = 1 \right) q^b$$

where θ is the default probability.

- Borrower's bond price determined by:
 - risk free borrowing rate
 - default probability
 - garnishment rule
- Usury law: If $q(d', z, j) < \frac{1}{1+\bar{r}}$, then $q(d', z, j)$ is set to 0.

The Plan

- Calibrate benchmark economy to match late 90's.
Targets: Filings, unsecured debt, interest rates.
- Run “backward” experiments trying to match early 80's.
- Consider each story individually.
 - Plausible changes in relevant parameters.
 - Changes required to match the early 80's.
- Try promising combinations.

Benchmark Parameterization

- 16 periods (3 years each). Last period is “Retirement”.
- Utility is CRRA with $\sigma = 2$, $\beta = 0.94^3$.
- Interest rate on savings $r^s = 3.44\%$.
- No interest rate ceiling.
- No stigma.

Earnings

- Age profile from Gourinches and Parker (2002).
- Persistent state – discretized AR(1) with $\rho = 0.96$ and $\sigma_\epsilon^2 = 0.014$.
- 3 transitory shock values, $\sigma_\eta^2 = 0.05$.

Parameterization: Expense Shocks

Use data on:

1. Medical bills (MEPS 1996-97)
2. Divorce (US Vital Statistics, Equivalence Scale)
3. Unwanted children (US Vital Statistics, USDA)

Combine to construct two expense shocks:

1. 82% of avg. earnings with probability 0.46%
2. 26% of avg. earnings with probability 6%

Parameterization: Calibration

Choose the remaining two parameters

- τ – transaction cost of lending,
- γ – garnishment rate

to match two key facts:

- Bankruptcy filing rate of 0.83%,
- Unsecured debt = 9% of disposable income.

Result: $\tau = 3.56\%$ and $\gamma = 28.3\%$.

Note: Average borrowing rate falls within the data range.

Analysis: Individual Stories

Demographic changes are quantitatively unimportant

- Age composition
- Marital status

Numerical Experiments

1. Change in variance of income
 - (a) Transitory
 - (b) Persistent
2. Increasing expense shocks
3. Decreasing stigma
4. Decline in transaction cost of lending
5. Change in usury laws

Summary of Experiments

Experiment	Defaults	Debt/earnings	avg. r^b
1995-99 (model/data)	0.84%	9.04%	11.7%
1980-84 data	0.25%	5%	11.5%
Realistic Income	0.822%	12.1%	9.8%
No Transitory	0.818%	11.7%	9.4%
No Persistent	0.63%	20.6%	8.01%
Realistic Expense	0.73%	9.03%	10.9%
No small shock	0.25%	8.91%	8.6%
Stigma	0.26%	12.89%	7.9%
Transaction Cost	0.81%	4.06%	20.16%
Usury $\bar{r} = 8\%$	0.59%	2.04%	7.79%
Combination	0.26%	5.24%	11.77%

Experiment 1: Income Shocks

- Variance of shocks has increased
HSV (2004): σ_η^2 up 25%, σ_ϵ^2 up 42%
- Persistence of income has decreased

Experiment	Defaults	Debt/earnings	avg. r^b
1995-99 (model/data)	0.84%	9.04%	11.7%
1980-84 data	0.25%	5%	11.5%
$\sigma_\eta^2 \downarrow, \sigma_\epsilon^2 \downarrow$	0.822%	12.1%	9.8%
$\sigma_\eta = 0$	0.818%	11.7%	9.4%
$\sigma_\epsilon = 0$	0.63%	20.6%	8.01%
$\rho = 0.98, \sigma_\epsilon^2 = 0.014$	0.92%	5.97%	12.92%
$\rho = 0.98, \sigma_\epsilon^2 = 0.007$	0.85%	9.98%	9.41%

Conclusion: Cannot generate large change in filings.

Experiment 2: Expense Shocks

Aim: Decrease expense shocks to match 1980-84 filings

Experiment	Defaults	Debt/earnings	avg. r^b
1995-99 (model/data)	0.84%	9.04%	11.7%
1980-84 data	0.25%	5%	11.5%
No small shock	0.25%	8.91%	8.6%
No large shock	0.74%	8.89%	11.5%

Conclusion:

- Extreme changes in expense shocks can match filings.
- But generates insufficient changes in debt/income ratio.

What is a realistic change in expense shocks?

Experiment 2.2: Realistic Expense Shocks

Increase in Out-Of-Pocket Medical Spending in the Data

- Real OOPS per HH: \$1,477 in 1980 → \$1,946 in 1998.
- As fraction of median income: 3.55% → 4.16%.
- Fraction of uninsured HHs: 13% in 1987 → 16% in 1998.

Experiment: Decrease magnitudes and probabilities by 15%.

Experiment	Defaults	Debt/earnings	avg. r^b
1995-99 (model/data)	0.84%	9.04%	11.7%
1980-84 data	0.25%	5%	11.5%
15% decrease	0.73%	9.03%	10.9%

The probability of **family-related shocks** has gone down, not up!

Experiment 3: Stigma

Aim: Introduce stigma to match filings in 1980-84.

Achieved with utility loss \approx consumption loss of 28%.

Experiment	Defaults	Debt/earnings	avg. r^b
1995-99 (model/data)	0.84%	9.04%	11.7%
1980-84 data	0.25%	5%	11.5%
Stigma	0.26%	12.89%	7.9%

Conclusion: Can match the change in filings rates
but generates counterfactual debt/income and interest rates.

Experiment 4: Transaction Cost

Experiment: Increase transaction cost τ (benchmark = 3.56%).

Experiment	Defaults	Debt/earnings	avg. r^b
1995-99 (model/data)	0.84%	9.04%	11.7%
1980-84 data	0.25%	5%	11.5%
$\tau = 5.56\%$	0.82%	6.01%	15.8%
$\tau = 7.56\%$	0.81%	4.06%	20.16%

Conclusion:

- Small effect on filings.
- Too large change in average interest rate.

Experiment 5: Usury Law

1978 *Marquette* Decision essentially removed any interest caps.

Experiment	Defaults	Debt/earnings	avg. r^b
1995-99 (model/data)	0.84%	9.04%	11.7%
1980-84 data	0.25%	5%	11.5%
$\bar{r} = 10\%$	0.68%	8.9%	8.25%
$\bar{r} = 8\%$	0.59%	2.04%	7.79%

Conclusion:

- Tight interest rate ceiling affects filing rates.
- Implies large changes in debt and interest rates.
- No comparable change in law in Canada.

Experiment 6: Combination

Combine Stigma, Transactions Costs, Income and Expense

Experiment	Defaults	Debt/earnings	avg. r^b
1995-99 (Model/Data)	0.84%	9.04%	11.7%
1980-84 Data	0.25%	5.0%	11.6%
Combo	0.26%	5.24%	11.77%
No Δ Exp.	0.31%	5.21%	11.94%
No Δ Stigma	0.71%	4.35%	18.18%
No Δ τ	0.31%	12.74%	7.93%
No Δ Transitory	0.27%	5.25%	11.82%

Conclusion:

- The combination of stories accounts for the rise.
- Stigma and transaction cost are most important.

Summary

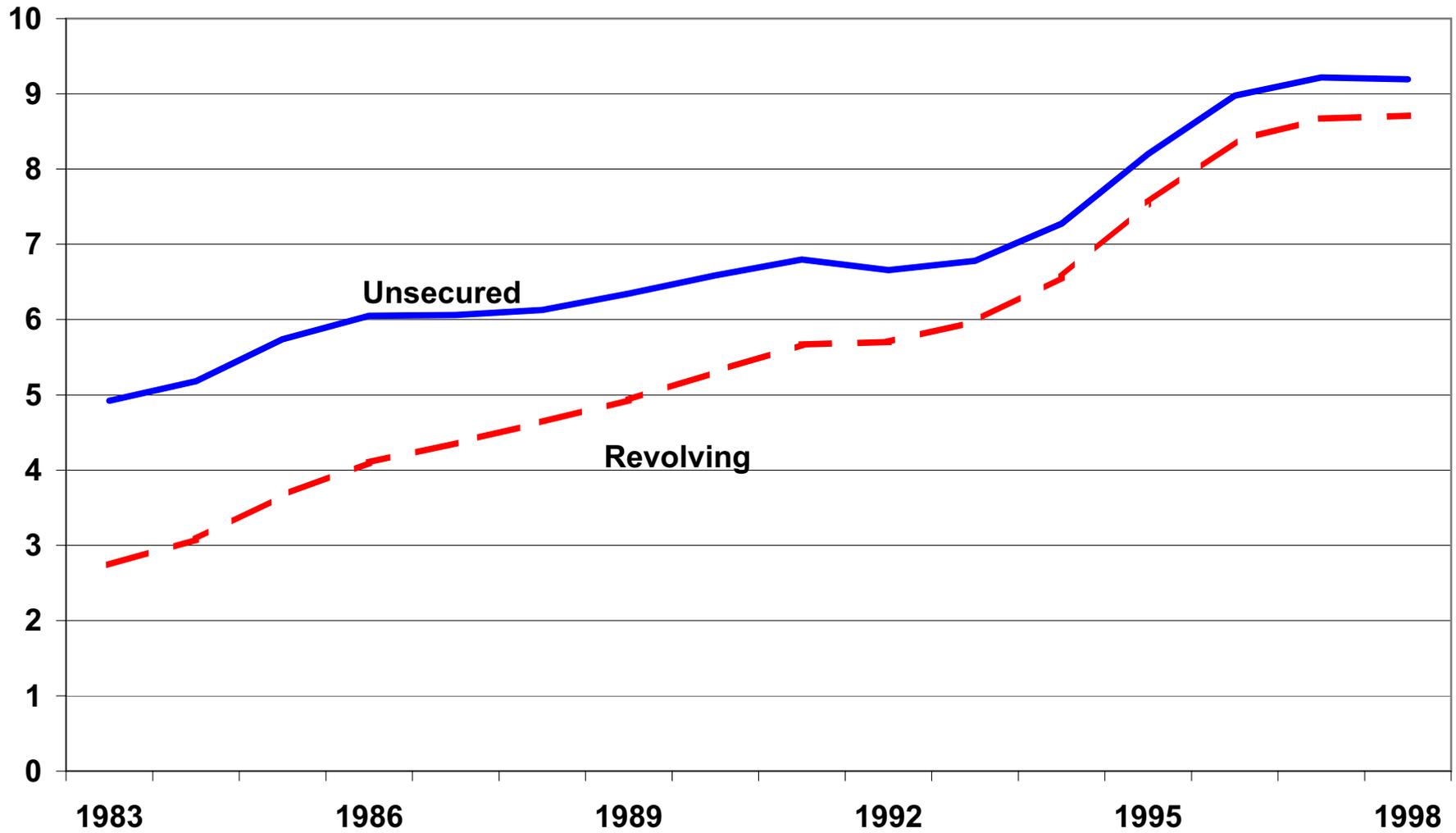
- No single story can account for all the key facts.
- Combination of stories can account for all the key facts.
- Two main forces:
 - Decrease in stigma,
 - decrease in transaction cost of borrowing.
- Changes in uncertainty play surprisingly small role.
- Demographic changes are quantitatively unimportant.

Needed: Theory of stigma.

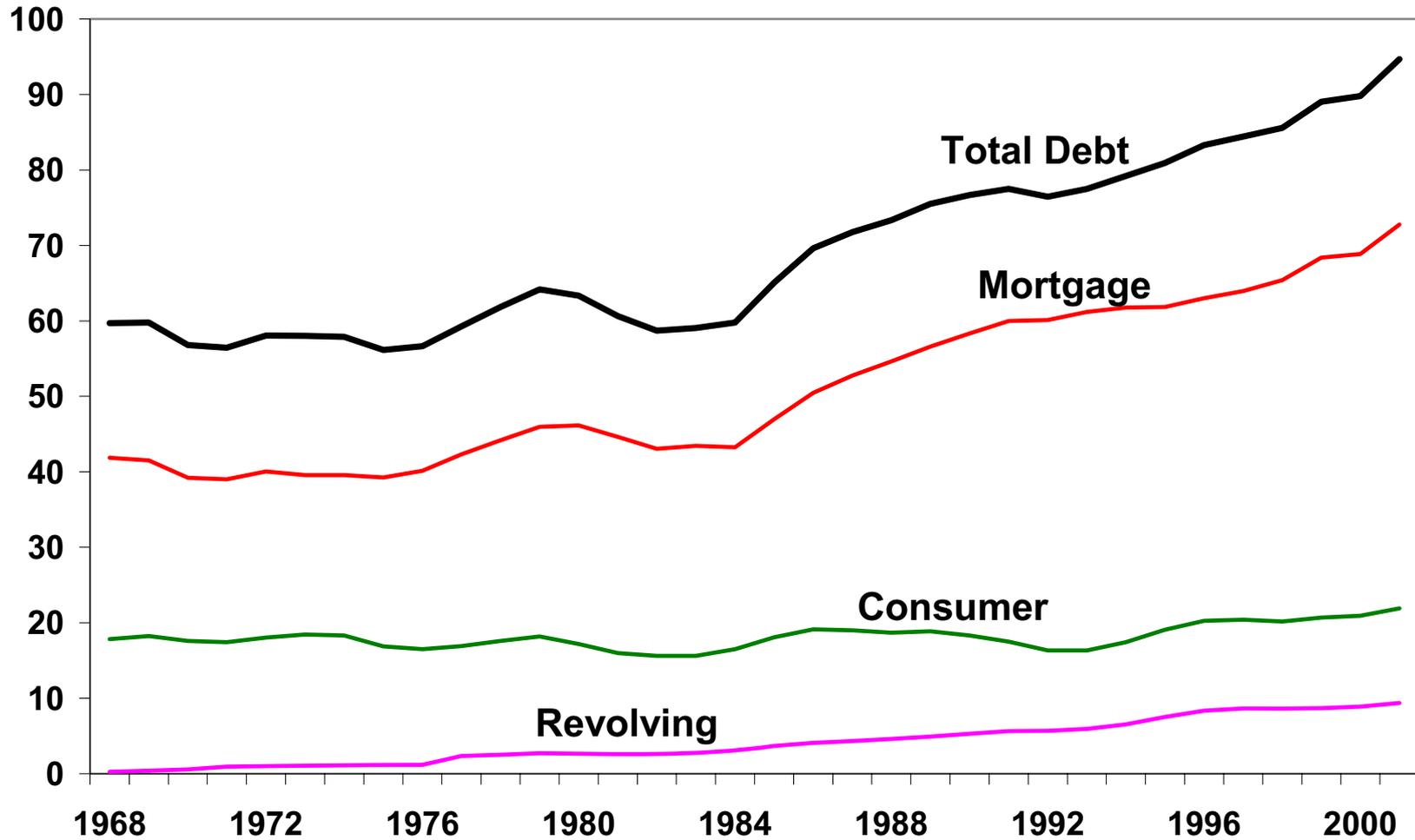
Challenges

- Characteristics of Bankrupts.
- Including **collateralized debt** and Chapter 13 option.

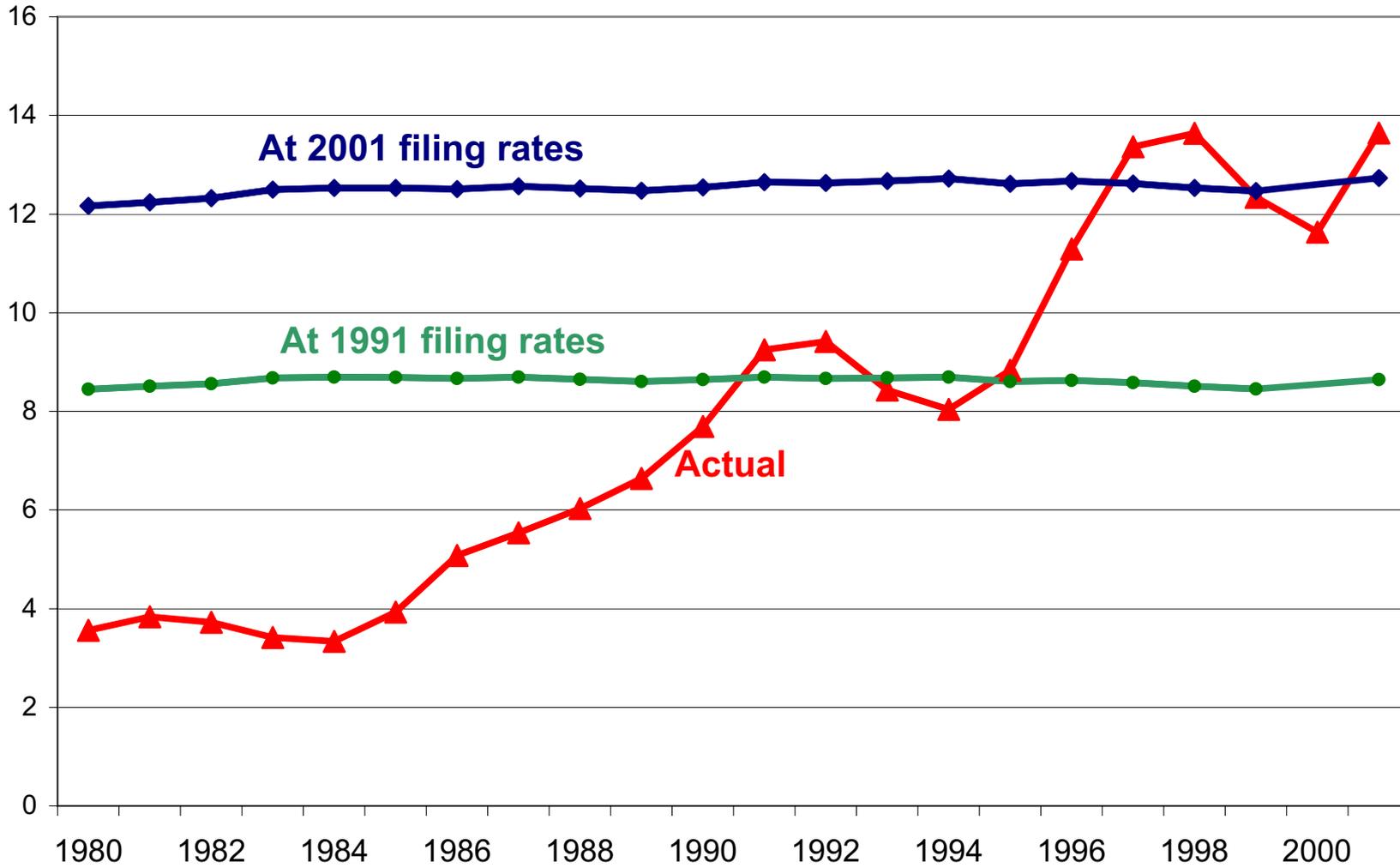
Unsecured and Revolving Credit as % Disposable Income



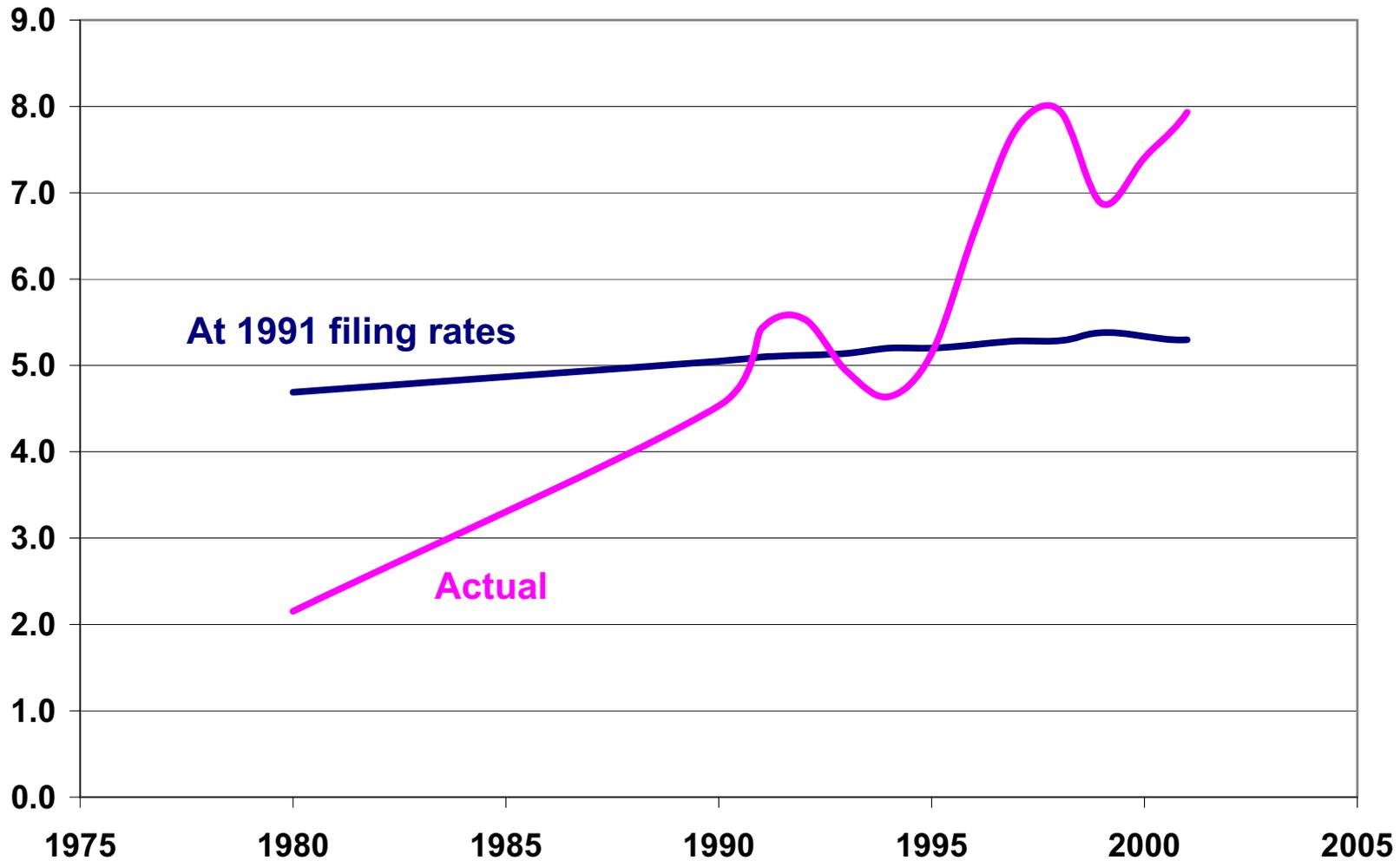
Debt as % of Disposable Income, USA



Constructed Bankruptcy Rates per 1,000 Households (U.S.) (holding age specific filings rates constant)



**Implied Bankruptcy Rates (per 1,000 25+ adults), U.S.
(holding marital status specific filing rates constant)**



Equilibrium: Household Problem

$$V_j(d, z, \eta, \kappa) = \max_{c, d'} [u(c) + \beta E \max \{V_{j+1}(d', z', \eta', \kappa'), \bar{V}_{j+1}(z', \eta')\}]$$

$$\text{s.t. } c + d + \kappa \leq \bar{e}_j z \eta + q^b(d', z, j) d'$$

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

$$\bar{V}_j(z, \eta) = u(c) - \chi + \beta E \max \{V_{j+1}(0, z', \eta', \kappa'), \bar{W}_{j+1}(z', \eta', \kappa')\}$$

where $c = (1 - \gamma)\bar{e}_j z \eta$

and \bar{W} is value of defaulting immediately following bankruptcy:

$$\bar{W}_j(z, \eta, \kappa) = u(c) - \chi + \beta E \max \{V_{j+1}(d'(\kappa), z', \eta', \kappa'), \bar{V}_{j+1}(z', \eta',)\}$$

where $c = (1 - \gamma)\bar{e}_j z \eta$, $d' = (\kappa - \gamma\bar{e}_j z \eta)(1 + r^r)$

Equilibrium: Definition

Given a bankruptcy rule (\bar{y}, γ, ϕ) , and risk-free bond prices (q^s, \bar{q}^b) , a recursive competitive equilibrium is value functions V, \bar{V}, \bar{W} , policy functions $c, d', I(d, z, j)$, default probabilities $\theta(d', z, j)$, and a pricing function q^b such that:

1. Value functions satisfy functional equations, and c, d' and I are the associated optimal policy functions.
2. The bond prices q are determined by zero profit condition.
3. The default probabilities are correct:
$$\theta(d', z, j) = E(I(d' + \kappa', z', j + 1))$$

Benchmark: Causes of Bankruptcy

Income Shock	Small κ	Large κ	$\kappa = 0$	Total
None	48.32%	7.93%	13.50%	69.75%
Lower Persist.	11.01%	2.22%	6.95%	20.18%
Bad Transitory	5.35%	0.90%	1.53%	7.78%
Pers. + Trans.	1.23%	0.25%	0.80%	2.28%
Total	65.91%	11.31%	22.78%	100%

‘Family’ Expense Shocks

The probability of family related shocks has gone down, not up!

U.S.	1980	1998
Births per 1,000 population	15.9	14.3
Births per 1,000 women aged 15-44	68.4	64.3
Births per 1,000 unmarried women	29.4	43.3
Intended Births	61.9%	69%
Births per 1,000 teenagers (15-19 yrs old)	53.0	50.3
Divorces per 1,000 population	5.3	4.1

Overview Bankruptcy Law

United States Ch. 7, 11, 13	Canada Straight, Proposal
Chapter 7	Straight Bankruptcy
Discharge unsecured debt in exchange for assets.	
Non-dischargeable: child support, taxes, etc.	
6 years between filings	No limit on frequency
roughly 4 months process	9 months
Court fees: \$209, Legal fees: \$750-\$1,500	Fees: \$1,347, Counselling costs: \$170
roughly 70% filings	roughly 85% filings