

# **Personal bankruptcy and consumption smoothing: an empirical investigation**

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## Motivation

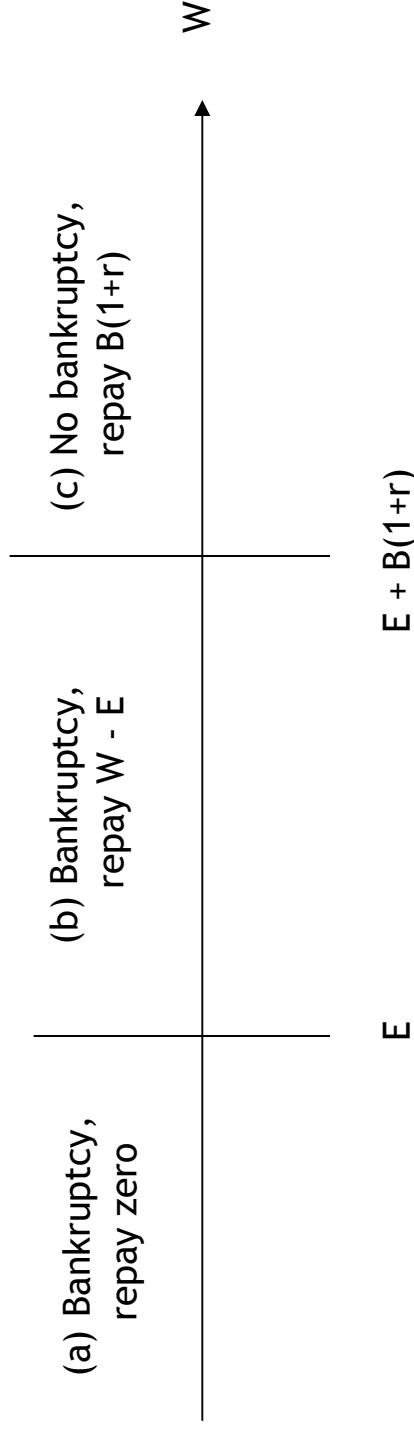
- U.S. legislation protects households in the event of default.
- **Bankruptcy exemption:** Under Chapter 7 of the Bankruptcy Code, households that default on their loans can keep a certain amount of assets.
- Exemptions provide partial **wealth insurance**: in the event of negative shock, household is not forced to repay entire debt balance.
- But higher exemptions also increase the **probability of bankruptcy**.
- Hence, bankruptcy exemptions **reduce the supply of debt**, hence diminishing the extent of households' self-insurance.
- In **theory**, it is **uncertain** whether higher bankruptcy exemptions facilitate or diminish consumption insurance.
- **Empirically, how do personal bankruptcy exemptions affect consumption smoothing?**

## Bankruptcy: the borrower's side

In period 1: borrow  $B$  at interest rate  $r$

In period 2: receive (uncertain) wealth  $W$  and repay debt

- Bankruptcy exemption =  $E$
- If  $W < E$ , declare bankruptcy and pay nothing
- If  $W - E < B(1+r)$ , declare bankruptcy and pay  $W - E$
- If  $W > B(1+r)$ , repay  $B(1+r)$  (no bankruptcy)



Bottom line: demand for loans and prob. of bankruptcy rise with exemption

## **Bankruptcy: the lender's side**

- Lenders can offset increase in default rate with higher interest rates
- BUT:
  - Higher  $r$  attracts riskier borrowers (adverse selection). [Stiglitz and Weiss, AER, 1981]
  - Higher  $r$  induces risky behavior (moral hazard). [Stiglitz and Weiss, AER, 1981]
  - Debt contracts cannot be fully enforced. Higher exemptions reduce the punishment for default. Thus lenders rationally limit credit: credit constraints. [Kehoe and Levine, RES, 1986, and Kocherlakota, RES, 1996]
- Therefore, higher bankruptcy exemptions can lead to credit rationing:
  - In the extensive margin: borrowers are turned down for credit
  - In the intensive margin: smaller size of the loans

## **Empirical research on bankruptcy laws and credit**

Gropp, Scholz and White, QJE, 1997. SCF data.

- (1) Level of bankruptcy exemption has positive effect on probability of being denied credit.
- (2) Households in low-exemption states have less debt and face higher interest rates.
- (3) Households in states with high exemptions have more debt

Grant, 2003. CEX data.

- (4) Households in low exemption states have less debt
- Interpretation: bankruptcy exemptions increase demand and restrict supply of household credit

## Bankruptcy laws

- Under Chapter 7, debtors receive **discharge from unsecured debt** in return for giving up assets in excess of exemption level ( $E$ ).
- Each state has its own level of exemptions, which change over time.
- Exemptions are asset-specific: homestead, cash, automobiles, tools of the trade, wild card, etc.
- I add up the homestead and non-homestead limits (i.e. I assume that assets are fungible):  **$E = \text{homestead } E + \text{non-homestead } E$**
- There is also a **federal exemption**, which in some states can be chosen instead of the state exemption. So in practice

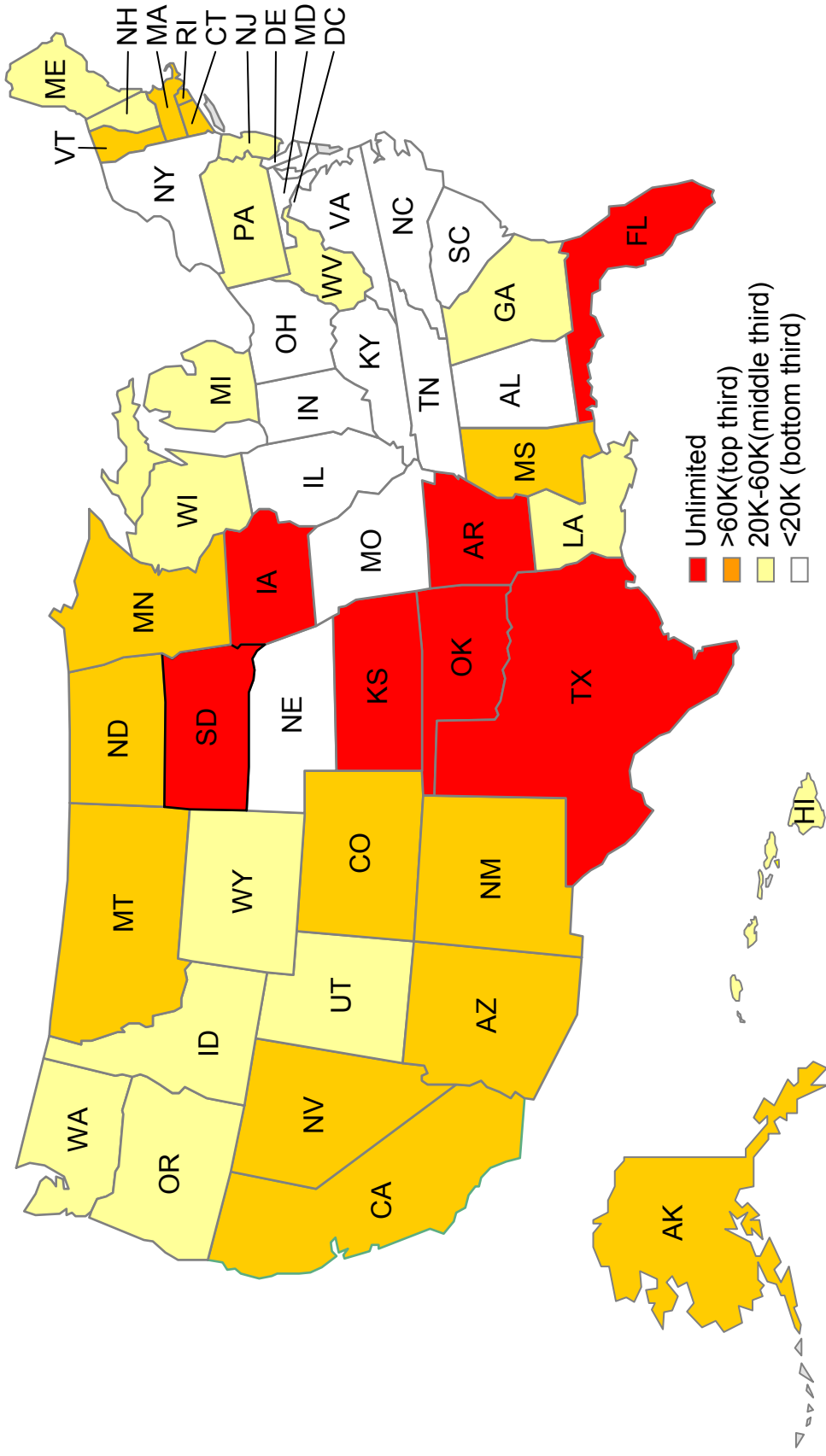
$E = \max \{\text{federal } E, \text{state } E\}$ , if federal exemption available, and

$E = \text{state } E$ , otherwise

## Bankruptcy exemption calculation: examples from 2003

	Homestead	Non-homestead	Federal?	Total exemption (homeowner)	Total exemption (non-homeowner)
	\$17,425	\$3,700	---	\$21,125	\$3,700
1	South Carolina \$5,000	\$1,000	no	\$6,000	\$1,000
2	Pennsylvania \$0	\$300	yes	\$21,125	\$3,700
3	North Dakota \$80,000	\$6,200	no	\$86,200	\$6,200
4	Texas unlimited	\$60,000	yes	unlimited	\$60,000

# Bankruptcy exemption (for a married couple with a house, 2003)



## Consumption model (I)

Standard inter-temporal consumption problem, with iso-elastic utility:

$$\max_{\{C_{i,t+k}, A_{i,t+k}\}_{k=0}^T} E_t \sum_{k=0}^{T-t} \left( \frac{1}{1 + \delta_i} \right)^k \frac{C_{i,t+k}^{1-\rho}}{1-\rho} \exp(h_{i,t+k})$$

$$\text{subject to } A_{i,t+k} = (1+r_{i,t+k-1})A_{i,t+k-1} + y_{i,t+k} - C_{i,t+k}$$

where  $h$  is a preference shifter, assumed to take this form

$$h_{i,t+k} = \alpha_1 Age_{i,t+k} + \alpha_2 Age_{i,t+k}^2 + \alpha_3 \ln(AE_{i,t+k})$$

(AE stands for “adult equivalents,” a measure of the size and age composition of the household).

## Consumption model (II)

Solve the problem and derive this equation (Zeldes, JPE, 1989)

$$\Delta \log(C_{i,t+k+1}) = \beta_0 + \beta_1 \omega_i + \beta_2 \gamma_{t+k+1} + \beta_3 \ln(1 + r_{i,t+k}) + \beta_4 \Delta Z_{i,t+k+1} + \varepsilon_{i,t+k+1}$$

where  $\beta_0 \equiv (1/\rho)(\alpha_1 + \alpha_2)$ ,

$$\omega_i \equiv -\ln(1 + \delta_i),$$

$\Delta Z_{i,t+k+1}$  is the column vector  $[Age_{i,t+k}; \Delta ae_{i,t+k+1}]$ ,

$$\varepsilon_{i,t+k+1} \equiv -(1/\rho) \ln(1 + e_{i,t+k+1}) - (1/\rho) 0.5(\sigma_{i,t+k+1}^2).$$

## Testing the effect of bankruptcy laws on consumption insurance

- Introduce a “shock,”  $X(t+1)$ :

$$\Delta c_{i,t+1} = \beta_0 + \beta_1 \omega_i + \beta_2 \tilde{\gamma}_{t+1} + \beta_3 \ln(1 + r'_{i,t}) + \beta_4 \Delta Z_{i,t+1} + \phi X_{i,t+1} + \varepsilon_{i,t+1}$$

- I want to estimate the effect of the exemptions conditional on observing a shock (in this case a layoff):

$$\Delta c_{i,t+1} = \beta^* \text{controls} + \phi X_{i,t+1}^* \text{exemp} + \theta^* \text{exemp} + \varepsilon_{i,t+1}$$

- Effect of the exemption on consumption smoothing :  $\Phi$

## Data

- Consumption and unemployment: PSID, from 1976 through 1993, plus 1997 through 2003.
- Approx. 37,000 observations and 5,700 households
- Bankruptcy exemptions: state and federal laws (same years)
- Dependent variable =  
 $100 * \log(\text{food expenditures}(t+1)) - \log(\text{food expenditures}(t))$
- Unemployment shock: dummy variable (Cochrane, JPE, 1991)  
0 if employed at t and employed at t+1  
1 if employed at t and *unemployed* at t+1  
**(only involuntary unemployment!)**

## A couple of important sample restrictions

- Age between 25 and 59 (marginal attachment to labor force of young and old workers)
- Include only if employed at time  $t$  (want to estimate marginal effect of layoffs)
- Exclude workers who quit voluntarily (endogenous)
- Exclude households whose composition changes significantly between  $t$  and  $t+1$ : change of head or spouse, or change in marital status (change in tastes)

## Results, without exemptions

$$\Delta \log(C) = c + b_1 \text{layoff} + b_2 \text{age} + b_3 \text{hh composition} + b_4 \text{interest rate} + \text{year dummies} + \varepsilon$$

Variable	Coefficients	
	OLS	Fixed effects
Layoff	-6.22* (1.64)	-5.41* (1.99)
Age	-0.15* (0.01)	-0.51 (0.46)
Household composition change	0.05* (0.02) x10 <sup>-1</sup>	0.05* (0.02) x10 <sup>-1</sup>
Interest rate	0.19 (0.16)	1.19* (0.30)
Sample size		36,571
Number of households		5,667

Interpretation:  
A layoff reduces consumption between 5% and 6%

95% Confidence intervals	
OLS	Fixed effects
(-9.4, -3)	(-9.3, -1.5)

\*Statistically significant at the 5% level. Standard errors in brackets.

## Results, including exemption variables (I)

$$\Delta \log(C) = c + b1*layoff*exemption + b2*exemption + b3*age + b4*hh\ composition + b5*interest\ rate + year\ dummies + \epsilon$$

Variable	coefficients			Fixed effects
	OLS	Fixed effects	OLS	
Layoff * Bottom exemption	-3.85 (2.93)	-3.23 (3.76)	-3.68 (2.94)	-2.64 (3.77)
Layoff * Middle exemption	-4.61 (2.62)	-1.83 (3.16)	-4.67 (2.61)	-1.87 (3.15)
Layoff * Top exemption	-8.79* (3.41)	-9.73* (3.93)	-8.79* (3.40)	-9.62* (3.91)
Layoff * Unlimited exempt.	-17.65* (6.05)	-17.20* (6.26)	-17.41* (6.05)	-16.98* (6.28)
State unemployment rate	no	no	yes	yes
Division dummies	no	no	yes	yes

Interpretation:  
 A layoff reduces consumption by 17% for households in states with unlimited exemption, and about 9% in states in the top third of limited exemptions

\*Statistically significant at the 5% level. Standard errors in brackets.

## Results, including exemption variables (II)

- Effects of layoff are economically large in states with high exemptions

Variable	95% confidence intervals			
	OLS	Fixed effects	OLS	Fixed effects
Layoff * Top exemption	(-15%, -2%)	(-17%, -2%)	(-15%, -2%)	(-17%, -2%)
Layoff * Unlimited exempt.	(-30%, -6%)	(-29%, -5%)	(-29%, -6%)	(-29%, -5%)
State unemployment rate	no	no	yes	yes
Division dummies	no	no	yes	yes

## Other robustness checks and a puzzle

$$\Delta \log(C) = c + b1*\text{layoff*exemption} + b2*\text{exemption} + b3*\text{age} + b4*\text{hh composition} + b5*\text{interest rate} + \text{year dummies} + \varepsilon$$

Variable	coefficients			
	State fixed effects	State fixed effects	Home owners	Renters
Layoff * Bottom exemption	-3.91 (3.41)	-3.83 (3.40)	1.89 (0.34)	-6.67 (5.23)
Layoff * Middle exemption	-4.72* (2.79)	-4.68* (2.79)	-4.10 (3.63)	2.92 (6.29)
Layoff * Top exemption	-8.76** (2.81)	-8.69** (2.78)	-10.91** (3.95)	12.32 (14.57)
Layoff * Unlimited exempt.	-17.57** (5.05)	-17.36** (5.11)	-18.37** (6.44)	---
State unemployment rate	no	yes	yes	yes
Obs	36,571	36,571	27,650	8,921

\*\*Statistically significant at the 5% level; \*statistically significant at the 10% level. Standard errors in brackets.

## **Other robustness checks and a puzzle (II)**

- Why don't I observe any effect of exemptions on renters?
  - Non-homestead exemptions vary less across states than homestead exemptions
  - Only collateralized consumer debt (as opposed to e.g. personal loans and credit card debt) is used for consumption self-insurance
  - Unemployment shocks are different for homeowners and renters

## Summary and conclusions

- Bankruptcy exemptions are not necessarily welfare-improving.
- Ex post (after filing for bankruptcy), exemptions clearly benefit borrowers.
- Ex ante, exemptions provide wealth insurance.
- But exemptions may also reduce the supply of debt (credit rationing), and thus limit the amount of credit available for consumption self-insurance.
- In the event of a layoff, consumers with the highest exemptions are hit the hardest. The effect is both economically and statistically significant.