Lecture Notes 9b: Personal Bankruptcy & Consumer Credit cont'd

Reference: Livshits, McGee, & Tertilt, "Consumer Bankruptcy: A Fresh Start," AER 2006.

Motivation

Ongoing debate over the merits of alternative bankruptcy rules.

2005 U.S. reform making expunging debt via bankruptcy harder.

European bankruptcy law: Traditionally much stricter, with many countries' legislation prohibiting the discharge of consumer debt all together.

Recent European reforms allowing partial discharge of debt under restrictive conditions (Alexopoulos & Domowitz 1998, Nieme-Kiesikainen 1997).

Ch 7 v. Ch 13/US v. European bankruptcy laws

Fresh start (FS) laws: These are intended to reflect Ch 7 bankruptcy practices, including expunging debt. Historically FS is peculiar to the American system.

No fresh start (NFS) laws: These are intended to reflect both Ch 13 and general European bankruptcy practices. They involve restructuring of debt and earnings garnishment limitations, but debt is not expunged.

Value & cost of bankruptcy laws

In a dynamic consumption model with income or expense risk, consumers wish to smooth their consumption (i) across time & (ii) across states of the world.

(i): Smoothing consumption over time is easier with more favorable interest rates.

(ii) Smoothing consumption across states requires insurance.

Generous bankruptcy protection raises interest rates, threatening objective (i).

At the same time, they provide (partial) insurance, helping consumers meet (ii).

Central question: How generous or strict are optimal bankruptcy standards?

Potential shocks

--Income, eg job loss

--Expenditures: Uninsured medical bills, divorce costs, unexpected children.

More real-world background on consumer bankruptcy in the US

Bankruptcy costs in the U.S.: ~$200 court filing fee + legal fees ~$750-1500 in 2000.

Filings first increase & then decrease with age.

Bankruptcy causes
Sullivan, Warren & Westbrook (2000):
67.5% job loss
22.1% divorce & other family issues
19.3% medical expenses

Jacoby, Sullivan & Warren (2000)
46% report medical cause or have substantial medical debt

Domowitz & Sartain (1999)
30% share of bankruptcy filings accounted for by medical debt

Duration of credit market exclusion
A bankruptcy shows up on a US consumer's credit for 10 years; many lenders now specialize in lending to households w/ past bankruptcies

Model

OLG model, households live J periods.

Each generation a continuum of households of measure 1.

Households ex ante homogenous

Idiosyncratic uncertainty; no aggregate uncertainty

No insurance markets

Assets: One-period non-contingent bonds

Risk-free interest rate set exogenously, bond prices may depend on {assets, earning capacity, age}

Households

$$W(\{c_j\}_{j=1}^{J}) = \sum_{j=1}^{J} \beta^{j-1} u\left(\frac{c_j}{n_j}\right) \qquad (1.1)$$

c_j consumption in period *j*; n_j household size in equivalence scale units; *u* increasing concave

Productivity
Household *i* age *j* productivity $y_j^i = a_j^i \bar{e}_j$

Labor endowment $a_j^i = z_j^i \eta_j$

a_j^i stochastic productivity, $\bar{e}_j$ deterministic endowment of efficiency units of labor.

a_j^i a product of persistent shock z_j^i & transitory shock η_j^i

z a finite Markov chain w/ age-independent transition matrix $\Pi(z' \mid z)$.

Transitory component η has finite support & is iid over time.

Expenses

The household may be hit at any time with expense shock $\kappa \geq 0$, $\kappa \in K$, K the finite set of all positive expense shocks.

Probability of expense shock κ_i is π_i.

Expense shocks are one-time shocks, and thus simply shift the household's asset position.

Assume η, κ independent.

Financial Markets

Risk-free interest rate r^s

Debt *d* is the amount to be repaid; $d > 0$ denotes borrowing; $d < 0$ denotes saving

Loans are generally non-contingent except through the effect of bankruptcy

Bond price $q^b(d, z, j)$

Intermediaries are competitive profit maximizers.

τ intermediary cost of making a loan, proportional to loan size

Competition => zero expected profit, no equilibrium cross-subsidization of interest rates among different borrower types.

Bankruptcy

2 systems. Each characterized by:

1. Law of motion for bankrupt household's assets
2. Repayment rule that specifies amount of household assets & earnings creditors can seize
3. Limitation of access to credit markets

Fresh Start (US, Ch 7)

1. Full discharge of all debts
2. resulting in no seizure of income after bankruptcy
3. No saving OR borrowing during the bankruptcy period; unable to declare bankruptcy again for 6 years

No Fresh Start (Europe, Ch 13)

1. No discharge of debt.
2. Debt rolled over at specified rate r, generally $r < q^b(d, z, j)$. Income garnishment as long as in bankruptcy.
3. No saving OR borrowing during the bankruptcy period.

Timing

Households see productivity & expense shocks and then make bankruptcy, consumption, and asset choices.

<u>Consumer's Problem</u>

Fresh Start

3 value functions:

Value of no bankruptcy:

$$V_j(d, z, \eta, \kappa) = \max_{c,d'} \left[u\left(\frac{c_j}{n_j}\right) + \beta E \max\{V_{j+1}(d', z', \eta', \kappa'), \overline{V}_{j+1}(z', \eta')\} \right] \quad (1.2)$$

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

Value of bankruptcy:

$$\overline{V}_j(z,\eta) = u\left(\frac{c_j}{n_j}\right) + \beta E \max\{V_{j+1}(0,z',\eta',\kappa'), \overline{W}_{j+1}(z',\eta',\kappa')\} \quad (1.3)$$
where $c = \bar{e}_j z\eta - \Gamma$ & $\Gamma = \gamma \bar{e}_j z\eta$ garnishment

Value of default:
$$\overline{W}_j(z,\eta,\kappa) = u\left(\frac{c_j}{n_j}\right) + \beta E \max\{V_{j+1}(0,z',\eta',\kappa'), \overline{V}_{j+1}(z',\eta')\} \quad (1.4)$$
where $c = \bar{e}_j z\eta(1-\gamma)$ & $d' = (\kappa - \gamma \bar{e}_j z\eta)(1+r)$

Decision to declare bankruptcy:
$I_j(d+\kappa, z, \eta)$ is 1 if declare, 0 otherwise.

Borrowers declare bankruptcy only if $V_j(d,z,\eta,\kappa) > \overline{V}_j(z,\eta)$.

No Fresh Start
This problem is much simpler, with one value function:

$$\begin{aligned} V_j^{NFS}(d,z,\eta,\kappa) &= \max_{c,d',I}\left[u\left(\frac{c_j}{n_j}\right) + \beta E V_{j+1}^{NFS}(d',z',\eta',\kappa') \right] \\ s.t.\ & c + d + \kappa \le \bar{e}_j z\eta + q^b(d',z,j)d' \text{ if } I = 0 \\ & c = (1-\gamma)\bar{e}_j z\eta \text{ if } I = 1 \\ & d' = \max\{(d+\kappa-\gamma \bar{e}_j z\eta), 0\}(1+r) \text{ if } I = 1 \end{aligned} \quad (1.5)$$

<u>Intermediaries' Problem</u>

Fresh Start
The fair zero default probability bond price is
$$\bar{q}^b = \frac{1}{1+r^s+\tau}$$

Without garnishment & w/ full discharge of debt, zero profit implies

$$q^b(d', z, j) = (1 - \theta(d', z, j))\overline{q}^{-b}$$

With garnishment, we have

$$q^b(d', z, j) = (1 - \theta(d', z, j))\overline{q}^{-b} + \theta(d', z, j)E\left(\tfrac{\Gamma}{d'+\kappa'} \mid I = 1\right)\overline{q}^{-b} \quad (1.6)$$

No Fresh Start

This one's messier, but a rough description is

$$q^{NFS}(d', z, j) = \left[1 - \theta(d', z, j) + \theta(d', z, j)E\left(\tfrac{\Gamma + q(d'', z', j+1)d''}{d'+\kappa'} \mid I = 1\right)\right]\overline{q^b}, \quad (1.7)$$

where $d'' = \frac{\max\{d'+\kappa'-\Gamma, 0\}}{\overline{q}^{-b}}$

Equilibrium

Fresh Start

Given prices $\{r^s, \overline{q}^{-b}\}$, a recursive competitive equilibrium is

Value functions $V, \overline{V}, \overline{W}$, decision rules $c, d', I(d, z, \eta)$, default probability $\theta(d', z, j)$, & pricing function $q^b(d, z, j)$ such that

1. Value functions satisfy (1.2)-(1.4) & $c, d', I(d, z, \eta)$ are the associated optimal policies
2. Bond prices q^b are determined by zero profit condition (1.6)
3. Default probabilities are correct, i.e. $\theta(d', z, j) = E(I_{j+1}(d' + \kappa', z', \eta'))$.

No Fresh Start
As above, but inserting requirement that V^{NFS} satisfies (1.5) & q^{NFS} satisfies (1.7) where appropriate.

In the FS case, it turns out that there is a critical value property to debt levels, with households repaying only if $d \geq \bar{d}$.

Benchmark Parameterization

Life beings at 20, J = 18, each period = 3 years.

Work 15 periods, retire 3.

$u(c) = \dfrac{c^{1-\sigma}}{1-\sigma}$, with $\frac{1}{\sigma} = 0.5$ the intertemporal elasticity of substitution.

Discount $\beta = 0.94^3$

Family size life cycle matched to US 1990 census data

Equivalence scales from Fernandez-Villaverde & Krueger (2000); vary over life-cycle

Interest
Fixed savings interest rate of 4%, the average return on capital in McGrattan & Prescott (2000).

→ over 3 years this implies 12.49% risk-free return

Transaction cost 4%, a bit < cost of credit card loans in Evans & Schmalnsee (1999).

Total 3 year risk-free rate of lending: (1.08)^3=25.97%

γ calibrated so that benchmark $\frac{d}{y}$ equals the US average of unsecured debt to personal disposable income over 1995-1999: 8.4%

$\Rightarrow \gamma = 0.355$

Income process
Follows Gournichas & Parker (2002)

Standard model for the volatility of log earnings:

$$\ln y_j^i = \ln z_j^i + \ln \eta_j^i + \ln g(X_j^i)$$
$$\ln z_j^i = \rho \ln z_{j-1}^i + \varepsilon_j^i$$

so that the persistent idiosyncratic earnings shock follows an AR(1) process.

$g(X)$ the deterministic component of earnings given household characteristics; $\varepsilon_j^i \sim N(0, \sigma_\varepsilon^2)$; $\eta_j^i \sim N(0, \sigma_\eta^2)$

Fixed income parameters:

$$\rho = 0.99,\ \sigma_\varepsilon^2 = 0.007,\ \sigma_\eta^2 = 0.043$$

Retirement
Assume no income or expense shocks in retirement.

Pension = 0.35*average work-life earnings + 0.30*last pre-retirement earnings

etc. (see paper)

Expenses
3 values $\kappa \in \{0, \kappa_1, \kappa_2\}$

To calibrate κ_1 & κ_2 use data on out-of-pocket medical bills, divorces, & unplanned pregnancies

(1) Medical bills
--Out-of-pocket spending in 1996-7 waves of the Medical Expenditure Panel Survey (MEPS) &

--aggregate data from the US Health Care Financing Administration (HCFA)

--Account for unpaid medical bills using 1996 American Hospital Association data → attribute a fraction of the difference between medical charges & expenditures to the expense shock

A very high κ_2 value is supported by a small fraction of household w/ immense out-of-pocket medical bills = several x annual income. κ_2 is assumed to reflect only extreme medical expenses.

(2) Divorce & child expense shocks
Census Bureau 2000 data on numbers of households, divorces, & unwanted children

Assume:
-Probability of divorce & child shocks independent
-Divorce & child shocks happen at most once every 3 years

-Every household equally likely to realize shocks

Annual Pr(divorce) = 1.244%

Annual Pr(unplanned & unwanted pregnancy) = 0.5%

Divorce expense: $5000 average legal cost + economies of scale loss = average 3 year divorce expense shock of $36,558.

Child expense: USDA (1997) annual cost of young child = $8000, 3 year shock $24,000.

Middle expense shock κ_1 is assumed to reflect the average of these similar divorce and child expenses, and its probability is calibrated in the model to reflect the probability of a divorce shock, a child shock, or a medical expense shock of comparable (moderate) size.

Table 1 describes the expense shock support & probability density.

Benchmark Results

Table 2 compares model calibration predictions for the bankruptcy declaration rate & the average conditional bond rate with the true numbers for the US.

Note the assumption of the FS law.

The predicted default rate is 85% of the actual, which the authors attribute to the rate of small-business-derived personal bankruptcies in the US (20%).

Actual interest rates of 11.2-11.8% in the table are for 2-year personal loans and credit cards carrying balances, respectively.

Figures 1 relates bankruptcies over the life cycle between the model and the data.

Figures 2 and 4b describe the ability to borrow & cost of borrowing over the life-cycle in the model.

FS v. NFS

ECV is the percent increase in lifetime consumption required to equalize expected lifetime utility in both regimes.

A positive ECV means that FS is better for consumers in welfare terms, a negative means NFS is better.

Table 4 reports simulated debt/earnings ratios and defaults under the 2 bankruptcy laws, along w/ the ECV.

Figure 3 shows the trade-off between smoothing over time and across states of the world.

Figure 4a shows much tighter endogenous borrowing constraints under FS than under NFS.

Livshits, McGee, & Tertilt's final central finding is that the optimal bankruptcy policy is highly sensitive to the relative magnitudes of persistent and transitory shocks (income v. expense).

Larger persistent shocks: Ex ante welfare greater under FS.

Larger transitory shocks: Ex ante welfare greater under NFS.