Introducing Bequests

Motivation

- So far, assumed people are selfish
  - Care only about own utility
  - Don't care about utility of anyone else in own generation or any other generation

Introducing Bequests

Motivation

- Now, allow for (particular form of) caring
- Allow utility of person of generation t to depend on utility of particular member of generation $t+1$
  - Parents and children
- Can give rise to bequests
  - Gift from parent to child, without expectation of repayment
- These economies get very complicated
  - Here, restrict attention to very special case for analytical tractability

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Special Case: Generation 0 Cares about Generation 1

- Assume everyone except members of generation 0 (time 1 old) selfish
- Population $N(0) = N(1)$
- Each member h of generation 0 cares about member h (junior) of generation 1
- No heterogeneity within generations in terms of endowments or preferences

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Special Case: Generation 0 Cares about Generation 1

- Focus on time 1
- From time 2 on looks like selfish economy from before

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Preferences

- Members of generation 1 have usual utility function of form

$$u_1^h(c_1^h(1), c_1^h(2))$$

where only own consumption determines own utility

- Members of generation 0 have utility function of form

$$u_0^h(c_0^h(1), u_1^h(c_1^h(1), c_1^h(2)))$$

where utility of member h of generation 0 at time 1 depends on own consumption when old and utility member h of generation 1 achieves

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Preferences

- Note that person h of generation 0 isn't imposing his/her own values on the consumption of member h of generation 1
- Parent is happy, if kid is happy

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Budget Constraints

The budget constraint of generation 0 when old (at time 1) is

$$c_0^h(1) = \omega_0^h(1) - b^h(0) - t_0^h(1) \tag{1}$$

where $b^h(0) \geq 0$ is the bequest of member h of generation 0 to member h of generation 1
The budget constraint of generation 1 when young is

$$c_1^h(1) = \omega_1^h(1) + b^h(0) - t_1^h(1) \tag{2}$$

and when old is

$$c_1^h(2) = \omega_1^h(2) \tag{3}$$

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Budget Constraints

- By assumption, generation 1 does not leave bequests, nor pay taxes/receive transfers when old
- No borrowing/lending among generation 1, since everyone identical

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Government Budget

- Government must balance its budget

$$\sum_{h=1}^{N(0)} t_0^h(1) + \sum_{h=1}^{N(1)} t_1^h(1) = 0$$

- Because all members of each generation pay same tax or receive same transfer

$$t_0^h(1) = -t_1^h(1)$$

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Finding Solution

- Solve maximization problem of member h of generation 0 at time 1
  - Plug budget constraints in to utility function and differentiate w.r.t. bequests

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Example

Example

Assume young at time 1 have utility function $u_1^h = c_1^h(1)c_1^h(2)$ *and endowment* $[2, 1]$.
Assume old at time 1 have utility function $u_0^h = \log(c_0^h(1)) + \delta u_1^h$ *and endowment of 1.*

$$c_0^h(1) = w_0^h(1) - b^h(0) - t_0^h(1)$$

$$c_1^h(1) = w_1^h(1) + b^h(0) - t_1^h(1)$$

$$c_1^h(2) = w_1^h(2)$$

$$-t_0^h(1) = t_1^h(1)$$

$$\log\left[w_0^h(1) - b^h(0) - t_0^h(1)\right] + \delta\left[w_1^h(1) + b^h(0) - t_1^h(1)\right] w_1^h(2)$$

$$+ t_1^h(1)$$

FOC

$$b^h(0): \quad -\frac{1}{c_0^h(1)} + \delta w_1^h(2) = 0$$

$$\rightarrow w_0^h(1) - b^h(0) + t_1^h(1) = \frac{1}{\delta w_1^h(2)}$$

$$\rightarrow b^h(0) = w_0^h(1) + t_1^h(1) - \frac{1}{\delta w_1^h(2)}$$

If $\left[t_1^h(1)_1 - t_1^h(1)\right] = [1/2, -1/2]$

$$\longrightarrow b^h(0) = 1 + 1/2 - 1/\delta$$

Why Do People Save?[1]

Standard Model

- People save to self-insure against
  - Earnings risk
  - Longevity risk
  - Retirement

[1] Builds largely on work by M. De Nardi and co-authors.

Why Do People Save?

Data vs. Standard Model

- People decumulate their net worth more slowly than implied by basic life cycle/OLG model

Why Do People Save?

Why does it matter?

- Important to understand why people save
- Motivating example
  - Large medical expenses provide additional precautionary savings motive
  - If ignore, choose higher discount factor to match data on net worth
  - Patience in turn will affect how people value government insurance
  - Misguided policy evaluation

Why Do People Save?

Bringing Model in Line with Data?

- Additional ingredients
  - Bequests and human capital transmission across generations
  - Heterogeneous preferences
  - Heterogeneous rates of return
  - Rich(er) earnings dynamics
  - Medical and nursing home expenses

Why Do People Save?

Bequests and Human Capital Transmission Across Generations

$$\max_{c_t} E \sum_{t=0}^{T} \beta^t \left(s_t \frac{c_t^{1-\sigma}}{1-\sigma} + (1-s_t) s_{t-1} \phi(a_t) \right)$$

consumption

$s_t = 0$, $s_{t-1} = 1$: dead this period, alive last period

$$a_{t+1} = y_t + (1+r) a_t - c_t + b_t$$

y_t: labor income

r: net interest rate

b_t: bequests

Why Do People Save?

Bequests and Human Capital Transmission Across Generations

- Earnings and lifetime uncertainty $\Rightarrow$ Accidental bequests
- Parents value leaving bequests $\Rightarrow$ Voluntary bequests
- Children partially inherit parents' earnings ability

Why Do People Save?

Bequests and Human Capital Transmission Across Generations

- Warm glow altruism

$$\phi(a_t) = \frac{(a_t + \eta)^{1-\sigma}}{1-\sigma}$$

  - The larger η the more bequests are luxury goods
  - Large variation in bequests in data

Why Do People Save?

Bequests and Human Capital Transmission Across Generations

- Results
  - Accidental bequests don't help explain concentration in upper tail of wealth distribution
  - Voluntary bequests help explain wealth concentration because of non-homoteticity
  - Transmission of earnings ability across generations increases wealth concentration in upper tail
  - But wealthy in model still not wealthy enough and poor too poor

Why Do People Save?

Heterogeneous Preferences

$$\max_{c_t} E \sum_{t=0}^{T} \beta_i^t s_t \frac{c_t^{1-\sigma_i}}{1-\sigma_i}$$

$$a_{t+1} = y_t + (1+r)a_t - c_t$$

Why Do People Save?

Heterogeneous Preferences

- Results
  - Heterogeneous preferences might drive important difference in savings
  - But even large heterogeneity in both parameters doesn't generate very wealthy people

Why Do People Save?

Heterogeneous Returns

$$\max_{c_t} E \sum_{t=0}^{T} \beta^t s_t \frac{c_t^{1-\sigma}}{1-\sigma}$$

$$a_{t+1} = y_t + (1 + r_t^i) a_t - c_t$$

Why Do People Save?

Heterogeneous Returns

- Results
  - Lots of empirical evidence of heterogeneous returns across both households and asset classes
  - Returns correlated with household wealth and across generations

Why Do People Save?

Heterogeneous Returns

Entrepreneurship can generate realistic wealth distribution
- potentially high return for investing in own firm
- borrowing constrained
- keep saving to grow firm even when wealthy

→ rationalizes high savings and high wealth

- Rates of return depend on investment choices
- What might be affecting them?
  - Entrepreneurial choices
  - Portfolio choice
  - Heterogeneous investor sophistication

Why Do People Save?

Richer Earnings Dynamics

$$\max_{c_t} E \sum_{t=0}^{T} \beta^t s_t \frac{c_t^{1-\sigma}}{1-\sigma}$$

$$a_{t+1} = y_t + (1+r)a_t - c_t$$

Why Do People Save?

Richer Earnings Dynamics

- Earnings dynamics typically much richer than in our models
  - Earnings processes typically estimated on datasets that miss highest earners
- High earners face more downward earnings risk

Why Do People Save?

Heterogeneous Returns

- Results
  - If don't match wealth inequality by construction, richer earnings process doesn't generate more wealth concentration at top
    - Fits wealth holdings of poorest 60% better
    - Note: missing entrepreneurial income and risk

Why Do People Save?

Medical (and Long-term Care) Expenses

$$\max_{c_t} E \sum_{t=0}^{T} \beta^t s_t \frac{c_t^{1-\sigma}}{1-\sigma}$$

$$a_{t+1} = y_t + (1+r)a_t - c_t - m_t$$

Why Do People Save?

Results

- Medical expenses increasing with age and permanent income in US
  - Important reason why high permanent income elderly don't run down their assets
  - Government insurance covers low permanent income individuals who never save

Why Do People Save?

What have we learned so far?

- Life cycle/OLG model right approach (not everyone middle-aged)
- Precautionary savings against earnings risk not only reason people save (retirement, medical expenses, long-term care)
- Modelling intergenerational links important
- Modelling family potentially important
- Entrepreneurship can explain why many households are wealthy

Why Do People Save?

Future Directions

- Role of the family
  - How should we model the family?
  - How does the family affect risks and insurance?
- Do children help parents? Do they do it for the money?
- How should we best model health investment?
- Cross-country comparisons