Discussion of 'Pension Systems and the Allocation of Macroeconomic Risks' by L. Bovenberg and H. Uhlig

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Introduction

General comments

- Ambitious project
- It provides a quantitative characterization of optimal intergenerational risk sharing in a world in which almost everything is random (productivity, demography, longevity), and in which investment is the engine of long-run growth (Ak model).
- This is done in a log-linear framework. Hence it is possible to understand precisely the role of preferences and technology on the shape of the optimal policy mix.
- A *tour de force,* indeed.

A caveat

- Of course, one can always wonder whether it makes sense to characterize in such details the optimal intergenerational redistribution while neglecting the very real possibility that public schemes simply crowd out, or substitute for, voluntary redistribution within the family.
- This does not necessarily plead for jettisoning OLG in favor of Ricardian models. Instead, this argues for thinking how much risk sharing would take place privately if agents lived, say, for three periods.
- A lot of the macroeconomic risk could be shared, without public intervention, between the newly born and the middle-aged.

A caveat

- Scope for public intervention limited to risk-sharing with the unborn, net of the risk they can diversify after they are born.
- Is it a lot? Is it mainly intergenerational?
- Conjecture: the risks of being born female or male, healthy or handicapped, from poor or rich parents dwarf the risk of being born in a recession. And indeed, most PAYG systems incorporate redistributive features to pool some of these risks within cohort.
- But these are very general points.
- Let's play the game according to the rules set by the paper!

Contributions of the paper

Related literature

- *Relative to Bohn*: deal with risk aversion and intertemporal substitution separately. But Bohn already examines the effect of age-dependent risk aversion, and of labor-leisure choices.
- *Relative to Krueger and Kubler*: go beyond PAYG system, and compute optimal mix between defined benefits and defined contributions, and funded/unfunded systems.
- *Relative to Barbie, Hagedorn and Kaul*: talk about ex ante efficiency. This is similar to Bohn. See below for interim efficiency.
- *Relative to all*: AK model. Hence feedback from work effort from young onto capital accumulation and long-run growth.

Main results

In an ex ante optimal allocation:

1. Consumption of young and old move together.
2. The old bear a larger share of macro risk than the young if they are relatively more risk averse.
3. Permanent aging of the population requires lower total consumption of the old (and more work by the young, in order to increase savings, and thus growth, in this AK model).

- Results 1 and 2 are not surprising: standard results from the theory of efficient risk sharing.
- Result 3 is semi-intuitive. But see later about formalization of longevity.

Intuition

A non-generic example

- Competitive equilibria in OLG models are *usually* not ex ante Pareto efficient.
- One exception: log utility, full capital depreciation (Blanchard and Weil, 1992, 2001; Bohn, 2003)
- This special case is not generic, yet it reveals the main features of Pareto optimal allocations.
- I borrow heavily from Blanchard and Weil (2001).

Example: log utility, full depreciation

- Generation t maximizes $(1-\beta)\ln C_{1,t} + \beta \ln C_{2,t+1}$ subject to

$$C_{1,t} + S_t = W_t,$$
$$C_{2,t+1} = R_{t+1} S_t.$$

- Optimal consumption of young and old at t (different generations!) is:

$$C_{1,t} = \beta W_t, \qquad C_{2,t} = R_t \beta W_{t-1}.$$

- Hence

$$\frac{C_{2,t}}{C_{1,t}} = \frac{R_t W_{t-1}}{W_t}.$$

Example

- With Cobb-Douglas production, full depreciation, inelastic labor supply and constant population ($N_t = 1$), market clearing requires

$$K_{t+1} = S_t = \beta W_t = \beta(1-\alpha) A_t K_t^{\alpha}.$$

- But since $R_t = \alpha A_t K_t^{\alpha-1}$, this can be shown to imply that

$$\frac{R_t W_{t-1}}{W_t} = \frac{\alpha}{(1-\alpha)\beta} \equiv \theta.$$

- Therefore:

$$\frac{C_{2,t}}{C_{1,t}} = \frac{R_t W_{t-1}}{W_t} = \theta.$$

Hence consumption of young and old are *perfectly correlated*.

Example

$$\frac{C_{2,t}}{C_{1,t}} = \frac{R_t W_{t-1}}{W_t} = \theta.$$

- One can show that, in this economy, the *unconditional expectation of the logarithm of the gross marginal product of capital* is $\ln\theta$.
- Zilcha has shown that, in this example without population growth, $\mathrm{E}\ln\theta > 0$, i.e, $\theta > 1$, entails *dynamic efficiency.*
- It then also entails ex ante *Pareto optimality,* since the competitive allocation can then be shown to solve

$$\mathrm{E}_t \sum_{s=0}^{\infty} (1+\theta)^{-s} [(1-\beta)\ln C_{1,t+s} + \beta \ln C_{2,t+s+1})].$$

Generalization of the example

- Unfortunately requires hard work.
- I suspect that the adoption of an Ak model precludes the need for a discussion of issues related to dynamic efficiency which otherwise arise naturally in these OLG models (e.g., Bohn, 2003).
- It stands to reason that optimality requires that consumption of young and old move together (result 1).
- The optimal theory of risk bearing also requires, obviously, that the less risk averse bear more risk (result 2).
- What about longevity?

Longevity

Optimal suicide

- Fascinating issue arises in the paper as to the preference for longevity.
- Suppose I have 1 unit of good to spend, and that I can choose to eat it all now and die right afterward, or to eat 1/2 of it now and 1/2 of it tomorrow (ignore impatience and discounting).
- The former strategy yields utility $q(1)$, the latter $2q(1/2)$.
- Hence it is optimal to live fast and furious rather than slow and easy iff $q(1) > 2q(1/2)$, or more generally if the derivative of $\omega q(1/\omega)$ with respect to ω is negative.
- To make sure this does not occur,the authors impose the restriction $q(z) - zq'(z) > 0$ for all z.
- Strange restriction, as it rules out, for instance log utility and anything more concave than log.

The benefits of living

- In the paper, the old don't value leisure. So nothing pathological in sometimes wanting to live fast and furious. Assume indeed, contrary to the paper, that $q(1) > 2q(1/2)$.
- Now suppose that living longer is in itself pleasurable. Call λ the utility value of an extra period of time (net of the extra hours spent in the gym to increase longevity).
- Then living fast and furious provides utility $q(1)+\lambda$, slow and easy $2q(1/2)+2\lambda$. Thus slow and easy is optimal if

$$\lambda > q(1) - 2q(1/2) > 0.$$

- So what's missing from the paper is a more careful consideration of the costs and benefits of longevity.

Schopenhauer

- Epigraph of *The Economic Theory of Suicide* by Hamermesh and Soss (*JPE* 1974):

> ...as soon as the terrors of life reach the point at which they outweigh the terrors of death, a man will put an end to his life. [Schopenhauer, *On Suicide]*

- So it's indeed crucial to think comprehensively about costs and benefits when talking about endogenous longevity.

Queries

Endogenous growth

If we take endogenous growth seriously, we should be willing to entertain the possibility that the conversion from PAYG to fully-funded might be painless, or less painless than one may think.

- Positive impact of growth on R from conversion might be stronger than negative wealth effect (young contribute but don't receive anything in exchange).
- Does nos occur in Ak, but could in other growth models.

Political implementation

Barbie & al., together with many other others, focus on interim efficiency. Why?

- Under interim efficiency, agents born in different states are treated as distinct. I.e., interim efficiency removes the Rawlsian veil of ignorance of ex ante efficiency.
- Interim efficiency leaves a place for efficiency improvements beyond the elimination of dynamic inefficiency.

Political implementation

- Crucially, interim optimal allocations can be implemented by sophisticated, state-contingent, Ponzi schemes in which agents take part *voluntarily* [Blanchard & Weil, 1992, 2001; Barbie & al., 2003].
- By contrast, the transfers required by the more demanding ex ante efficiency concepts are in most cases *not implementable* in a democracy: there is not guarantee (in contrast with interim efficiency) that the next generation will respect the social intergenerational insurance contract.

In sum, the debate about ex ante v. interim efficiency is not an "academic" debate: it is a policy debate.

Political implementation

- The authors conclude by expressing concern about the "political risk" stemming for governments facing "serious problems of committing future generations to an [ex ante] optimal risk-sharing contract."
- Bohn (2003), who also adopts an ex ante efficiency criterion, is puzzled that "fiscal institutions seem designed... to provide relatively safe transfers to retirees" and suspects that "economists who trust OG models will tend to find [the results of his paper] supportive of policy reforms that impose more risk on retirees."
- The solution to this conundrum might be to adopt instead the interim optimality criterion.

Conclusion

Conclusion

- Ambitious and very paper
- Intuitive results
- The beauty is that, despite all the ingredients (almost a Lucasian "orgy of bells and whistles"), it remains tractable, which is a real feat.
- Doubts, however, about the appropriateness of the ex ante efficiency criterion