Essays in pension economics and intergenerational risk sharing

Vos, S.J.

Publication date
2012

Citation for published version (APA):

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: https://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.
Contents

1 Introduction and Overview 1

2 Intergenerational risk sharing, pensions and endogenous labour supply in general equilibrium 9
   2.1 The command economy ........................................ 12
      2.1.1 Individuals and preferences .......................... 12
      2.1.2 Investment and production ........................... 12
      2.1.3 The resource constraints ............................. 14
      2.1.4 The social planner’s solution ....................... 14
   2.2 The decentralized economy ................................. 15
      2.2.1 The pension systems .................................. 16
      2.2.2 Individual budget constraints ....................... 19
      2.2.3 Individual and firm optimization ..................... 19
      2.2.4 Market equilibrium conditions ....................... 20
   2.3 Optimality of pension systems ........................... 20
      2.3.1 Pension fund optimality conditions ................. 20
      2.3.2 Optimality of different pension systems .......... 21
   2.4 Discussion ................................................. 23

Appendix to Chapter 2 ........................................... 25
   2.A Derivation of the planner’s solution ................... 25
   2.B Individual first-order conditions ....................... 25
      2.B.1 Period 1 individual first-order conditions .......... 25
      2.B.2 Period 0 individual first-order conditions .......... 26
   2.C Infinite horizon model ................................. 27
      2.C.1 Notation ............................................. 27
      2.C.2 Social Planner ....................................... 27
      2.C.3 Decentralised economy ............................... 28
3 Sharing of Demographic Risks in a General Equilibrium Model with funded Pensions

3.1 The command economy ................................................. 34
  3.1.1 Individuals and preferences ....................................... 34
  3.1.2 Demographics ...................................................... 35
  3.1.3 Production .......................................................... 35
  3.1.4 Resource constraints .............................................. 35
  3.1.5 The social planner’s solution ...................................... 36
3.2 The decentralized economy ............................................. 37
  3.2.1 The pension arrangements ....................................... 37
  3.2.2 Individual budget constraints and generational accounts ...... 40
  3.2.3 Individual and firm optimization ................................. 41
  3.2.4 Market equilibrium conditions ................................... 43
3.3 Optimal pension policy ................................................ 43
  3.3.1 The optimum under perfect demographic foresight ............. 44
  3.3.2 Demographic uncertainty ......................................... 46
3.4 Calibration ............................................................... 47
3.5 Numerical results ....................................................... 48
  3.5.1 Measures for welfare comparison .................................. 48
  3.5.2 No demographic uncertainty ...................................... 49
  3.5.3 Deterministic variation in demographic variables ............. 50
  3.5.4 Introducing demographic uncertainty ............................ 53
  3.5.5 Fertility risk ...................................................... 57
  3.5.6 Mortality risk ..................................................... 58
  3.5.7 Simultaneous presence of both types of demographic risk ..... 61
3.6 Robustness: varying the degree of risk aversion ..................... 69
3.7 Conclusion ............................................................... 70
Appendix to Chapter 3 ....................................................... 73
  3.A Description of solution of model ................................. 73
  3.B Proof of Proposition 1 .............................................. 73
    3.B.1 Part (i) .......................................................... 73
    3.B.2 Part (ii) .......................................................... 75
  3.C Derivatives of expressions in Proposition 1 ....................... 77
    3.C.1 DRB ............................................................. 77
    3.C.2 DWB ............................................................. 78
4 Voluntary Participation and Intergenerational Risk Sharing in a Funded Pension System

4.1 Introduction ........................................ 79
4.2 Model and autarky solution ......................... 83
4.3 Introduction of a pension fund ....................... 84
  4.3.1 Individuals ........................................ 85
  4.3.2 The pension fund .................................. 85
4.4 The participation constraint .......................... 87
  4.4.1 Recursive formulation of the participation constraint ........... 89
  4.4.2 Equilibrium definition ............................. 90
  4.4.3 Solutions for $\tilde{r}$ ................................ 91
  4.4.4 Properties of the solutions for $\tilde{r}$ .................. 92
  4.4.5 Assumption about initial beliefs .................... 96
  4.4.6 Feasible pension fund rules ....................... 96
  4.4.7 The optimal pension fund rule ..................... 98
4.5 A numerical example .................................. 100
4.6 Conclusion ........................................... 107

Appendix to Chapter 4 ................................. 108
  4.A Details on first-order condition pension fund without participation con- 
    straint .................................................. 108
  4.B Details on $U_p(r, \tilde{r}^p = r)$ ....................... 108
    4.B.1 $U_p(r^*, \tilde{r}^p = r^*)$ approaches $U_a$ from below as $r \uparrow r^*$ . 108
    4.B.2 Second-order derivative of $U_p(r, \tilde{r}^p = r)$ ....................... 110
  4.C Calibration of the returns process .................. 111

5 Redesigning the Dutch occupational pension contract: Simulation of alternative contracts involving soft and hard entitlements .......................... 113
5.1 Introduction ........................................... 113
5.2 The Model ............................................. 116
  5.2.1 Demographics ...................................... 116
  5.2.2 Wage income and pension fund contributions .............. 117
  5.2.3 Second-pillar entitlements and liabilities under the old contract .... 118
  5.2.4 Assets ........................................... 120
  5.2.5 Economic shocks .................................. 121
  5.2.6 The timing ........................................ 122
5.3 Pension fund policy .................................... 123
  5.3.1 The current contract .............................. 124