Centraal Planbureau

Welfare effects and discontinuity risks of intergenerational risk sharing

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Recent developments in pension contracts

- DB no longer feasible
  - Ageing of population, increase contribution less effective
  - New accountancy rules
  - Risks are borne by participants of the fund

- Collective DC contracts
  - The Netherlands, UK?

- Individual DC contracts
  - Australia, Canada, UK, Denmark, Sweden, US

Research question

- What is impact of financial shocks in real-world funded pension systems?
  - Equity market risk, inflation risk, interest rate risk
- Theoretical literature
  - Optimal allocation of shocks if consumption effect is spread evenly over all current and future generations
- In practice
  - Discontinuity risk if fund's deficit or surplus for future generations is large

Hypotheses

1. Collective contracts enable risk sharing with future generations
   - Risks are shared between generations by smoothing financial shocks via collective buffer

2. Collective contracts lift borrowing constraint of younger generations

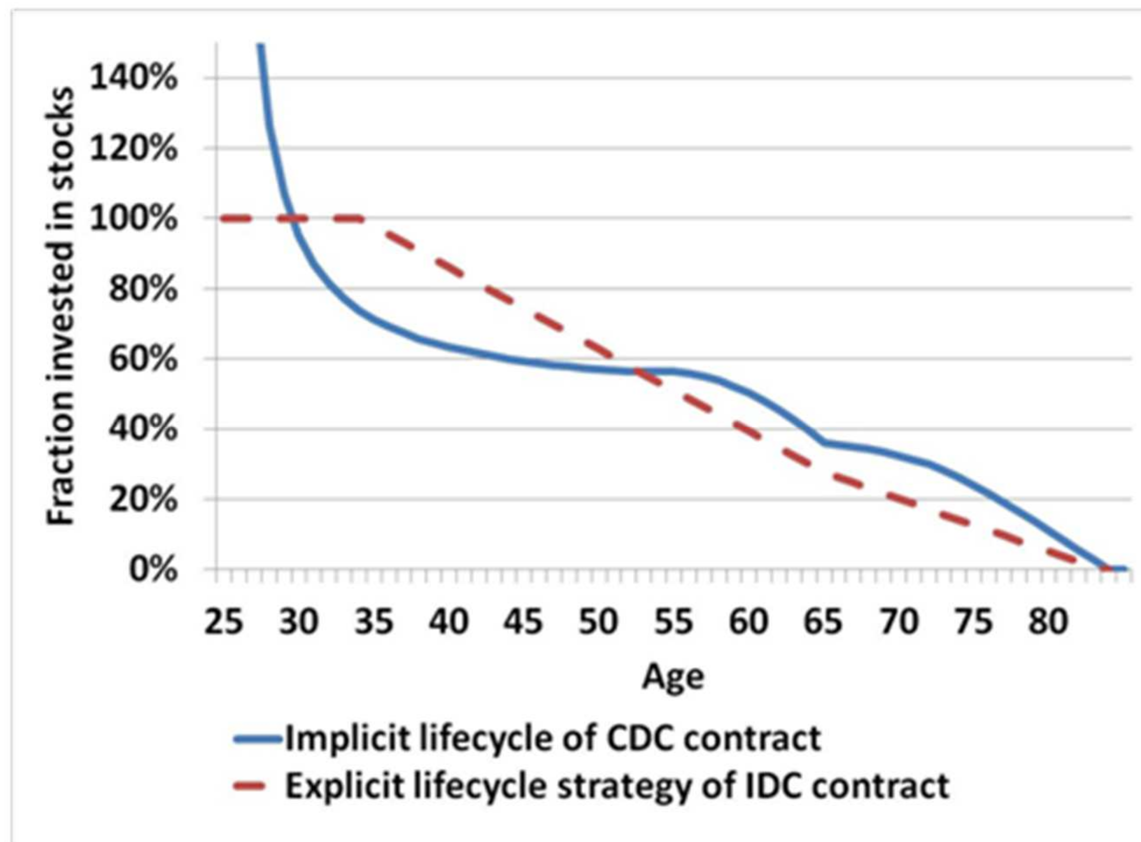
Pension model

- Impulse response analysis
  - Shock in stock prices and interest rate
  - No longevity risk

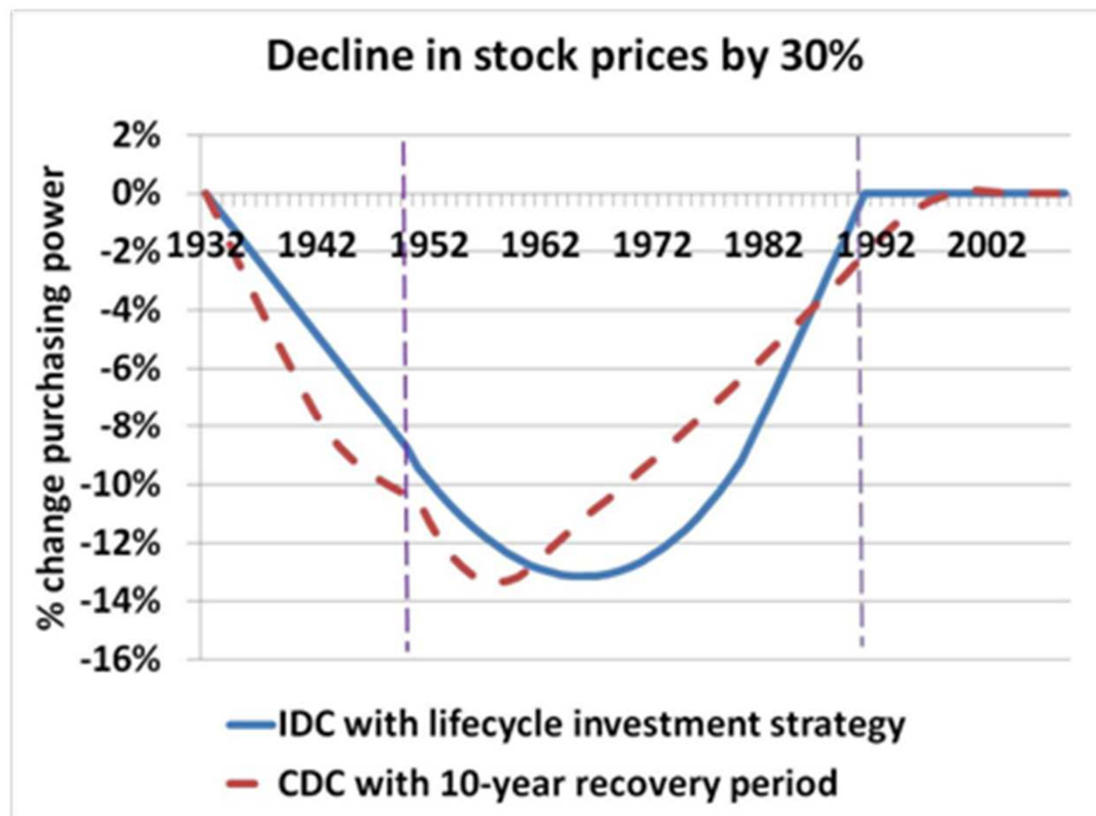
- Collective pension contract
  - Returns on investment are smoothed over 10 years
  - Investment mix is constant
  - Contributions are fixed

- Individual pension contract
  - Investment mix follows life cycle
    - Share of equity 100% to age 35, declines to 0% at age 85

Equity risk in IDC/CDC in life cycle nearly similar, except around labour market entry



Decline in stock prices affects middle ages most in IDC and CDC, shift to future in CDC is limited



Uncertainty replacement rate in CDC < IDC

Interest duration of liabilities, assets in IDC/CDC

Implicit duration (in years)

50
40
30
20
10
0
-10
-20
-30

25 30 35 40 45 50 55 60 65 70 75 80

Age

Assets CDC, 100% hedge
Assets CDC, 50% hedge
Assets CDC, no hedge
Assets IDC Lifecycle

Welfare effects and discontinuity risk

- Intergenerational risk sharing improves pension income ex ante
  - Welfare effect increases with more gradual absorption of shock
- Risk sharing may result in negative impact on pension ad interim
  - Pension wealth may be low at start of career
  - Then contract provides little stability in bad states, but absorbs profits in good states
- Welfare effects according to Merton model (Bas Werker)

% of shock absorbed in one year	Ex ante welfare (% pension income)	Ad interim welfare loss (5% chance)
10%	3.6%	-4.1%
5%	8.5%	-8.2%

Conclusions

- Spread equity risk over long horizon is rewarded
  - Equity risk during retirement should be allowed
  - Equity risk before entry possible with collective buffer

- Replication of CDC in IDC
  - CDC without risk sharing with future participants reasonably replicable in IDC
  - CDC with risk sharing with future participants gives somewhat better results in bad states than IDC

- Risk sharing with future participants in CDC improves welfare, but results in discontinuity risk