

Enhanced pension: an Italian way to long term care?

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Market failure (Barr, 2010)

- Supply: classical problems + high variability of biometric distributions
- Demand: Intertemporal myopia, incertitude and complexity of the contract, risk of change in public coverage
- Academics papers/expenditure particularly low (Brown and Finkelstein, 2011)

Disability free life expectancy

- Equilibrium, compression, pandemic scenario.
Equilibrium as an average
- Natural hedging corner solution: financial hedging is expensive (basis risk, reinsurance oligopoly)
- *Morbidity & mortality* most effective form of hedging

Doubling-in-sickness pension

- Using the multiple for LTC benefit, not the difference, increases idiosyncratic risk
- Three state Markov chain with triangular transition matrix: nonhomogeneous and dynamic (each probability is a matrix)
- Levantesi and Menzietti (2016) applied Lee-Carter to the estimation of these probabilities, mining in public allowances
- Markov property does not fit mortality of LTC: the shorter the sejour, the higher the mortality

Results

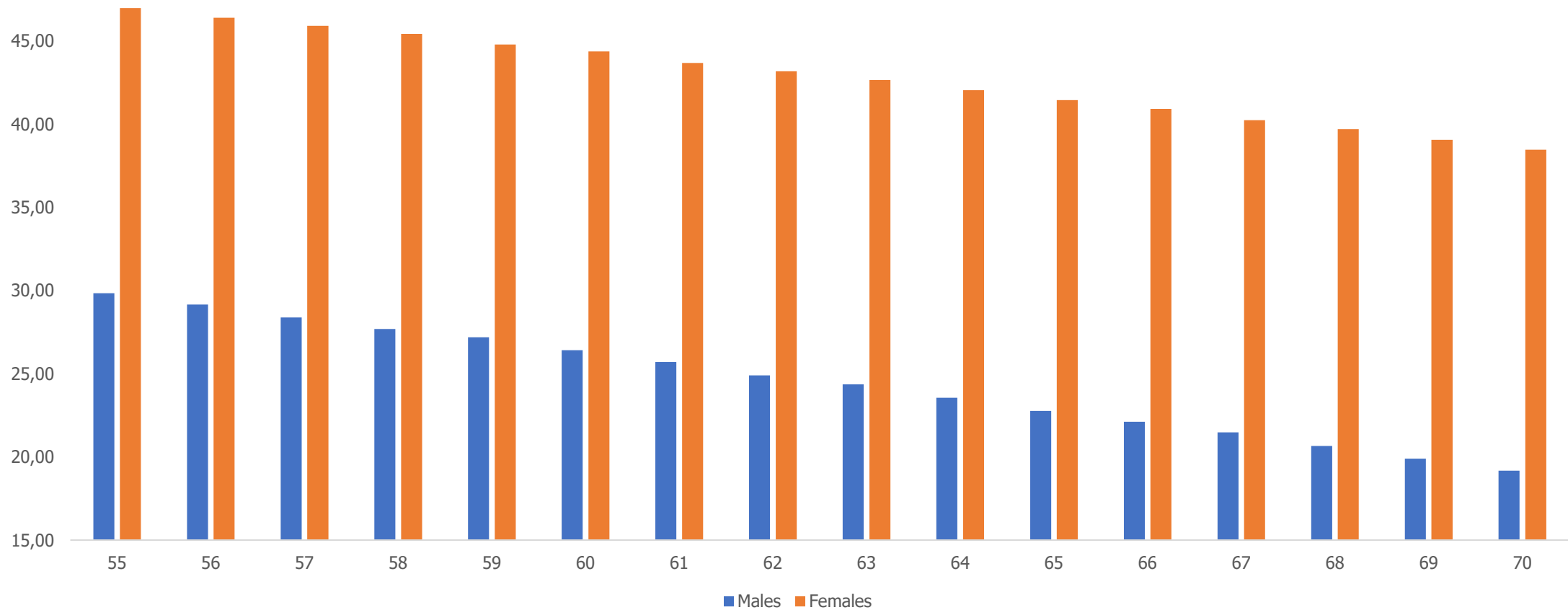
- Prices for the entry ages from 55 to 70. Results are conditioned by entry age
- The relative cost for LTC guarantee is higher for males and increasing with the entry age

- Elasticity of prices to entry age:

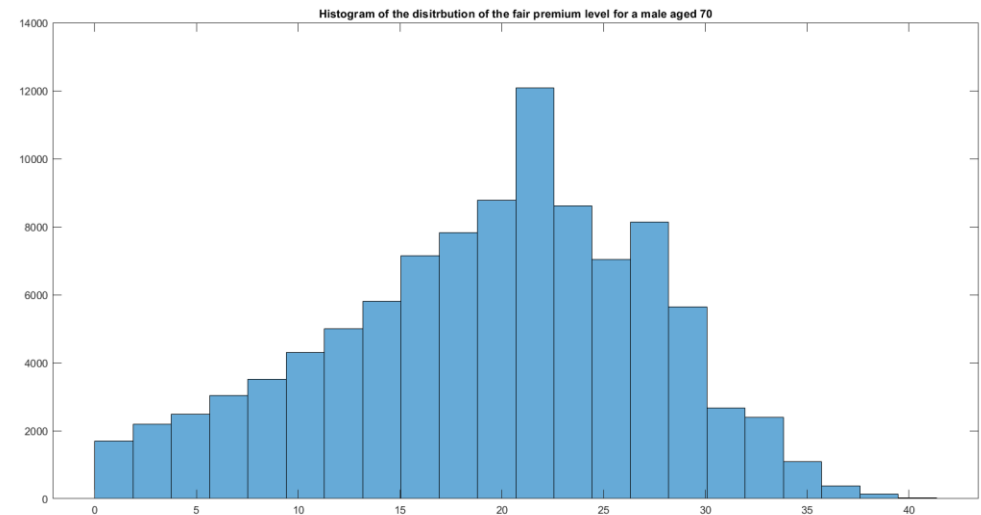
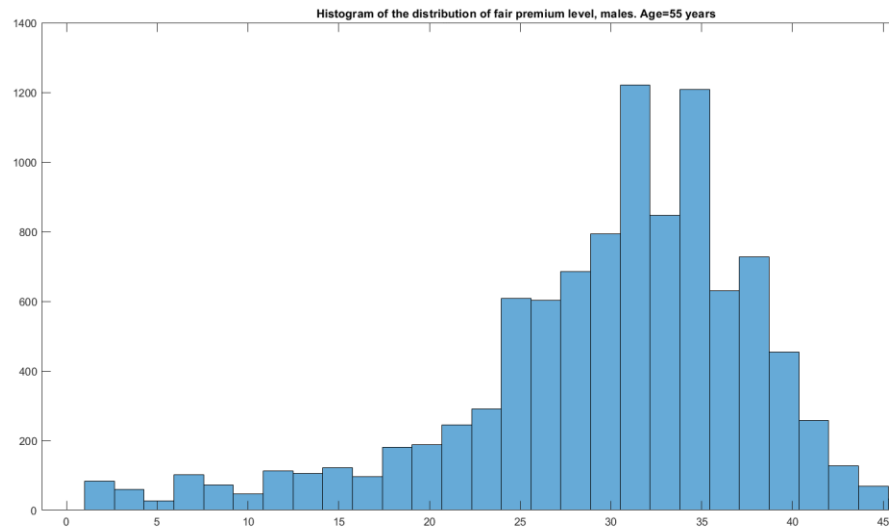
	Doubling annuity	Vanilla
Males	-0,71	-0,90
Females	-0,57	-0,94

- Fair premium distribution more variable for males (8.2 vs 4.4). Expected shortfall shows females are exposed to less extreme losses.

Fair premium vectors



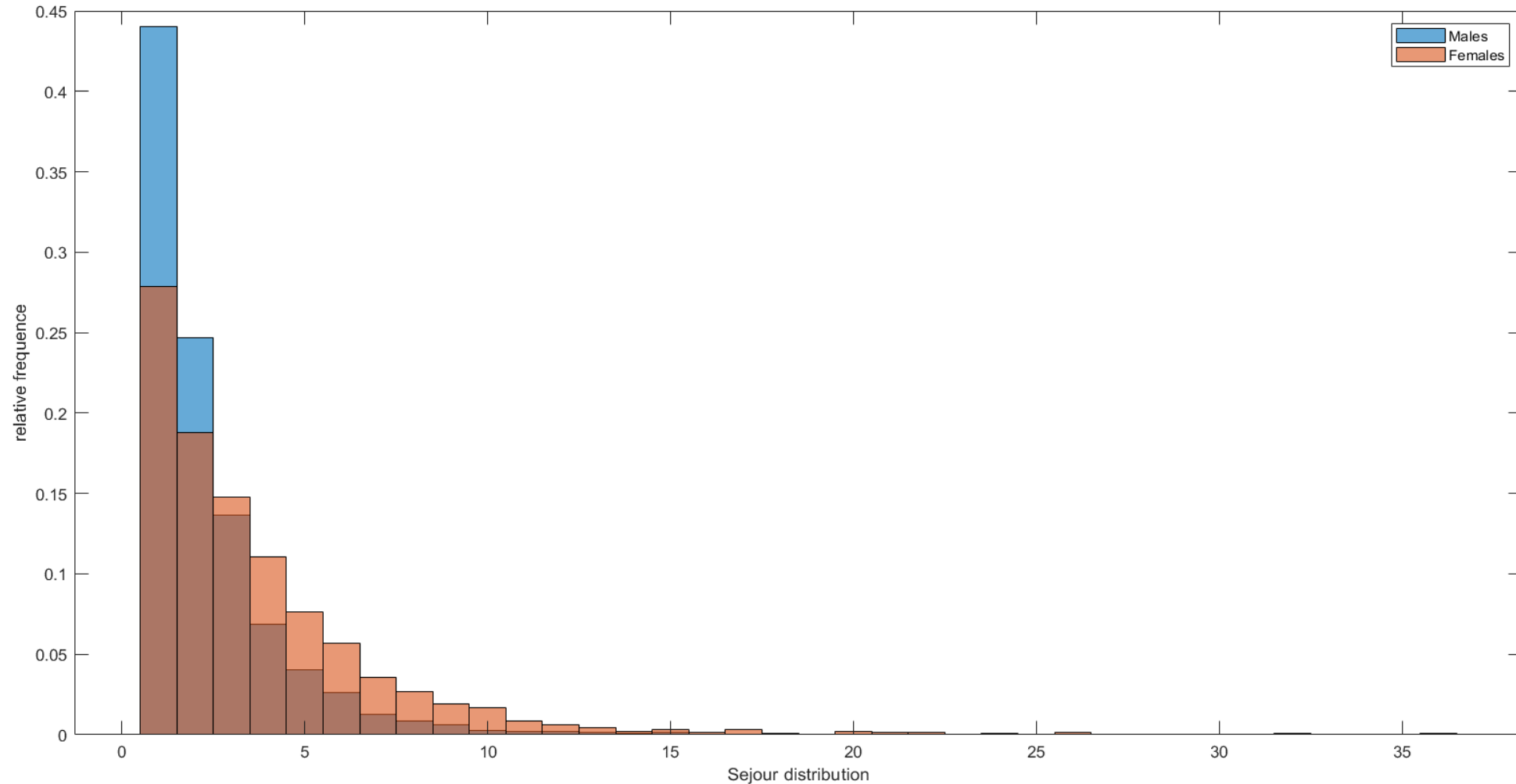
Two modes, two populations



What about sejour?

- Hitting LTC barrier probability higher for males (54% vs 25%)
- Average sejour greater for females (3.7 vs 2.35)
- Greater variability for females, decreases in the entry age
- Distributions are positively skewed. Females more skewed; asymmetry decreases with entry age

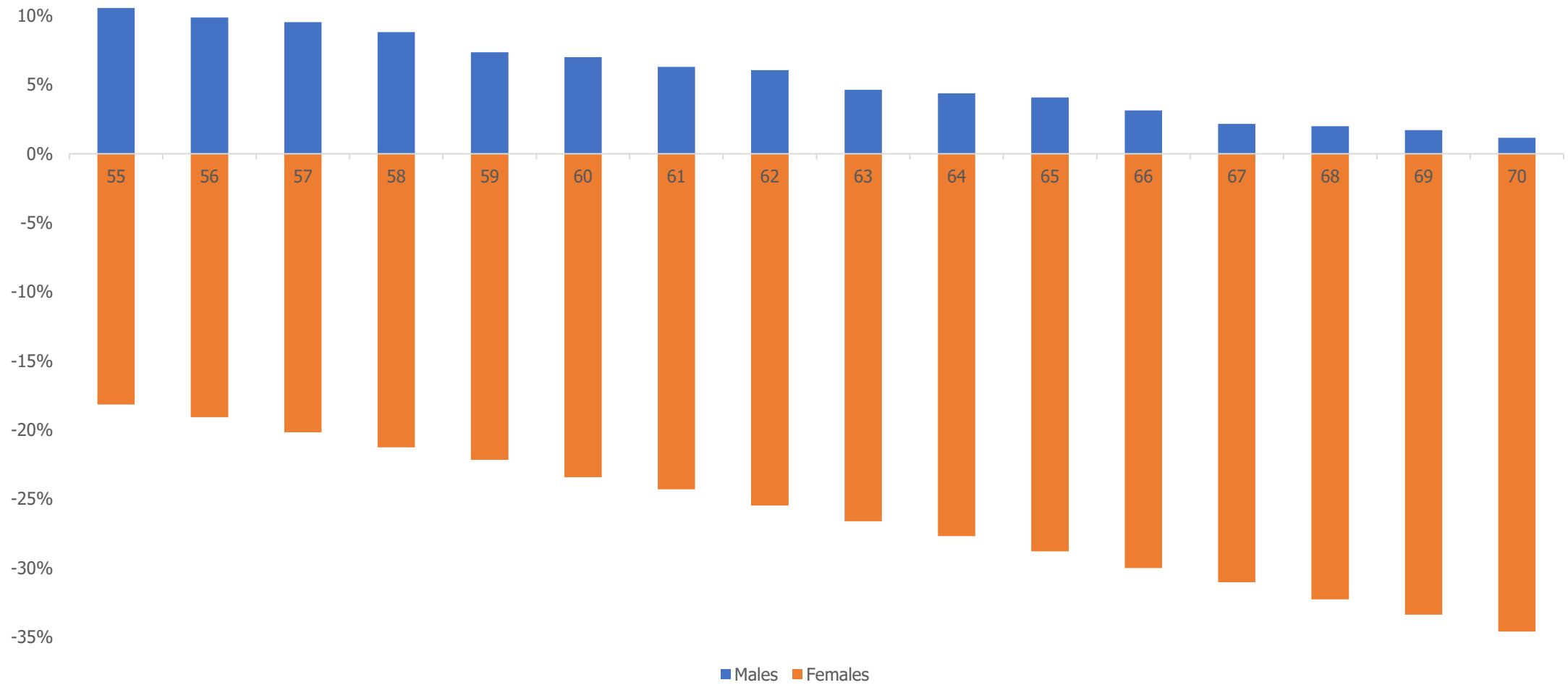
Sejour distributions (55 years)



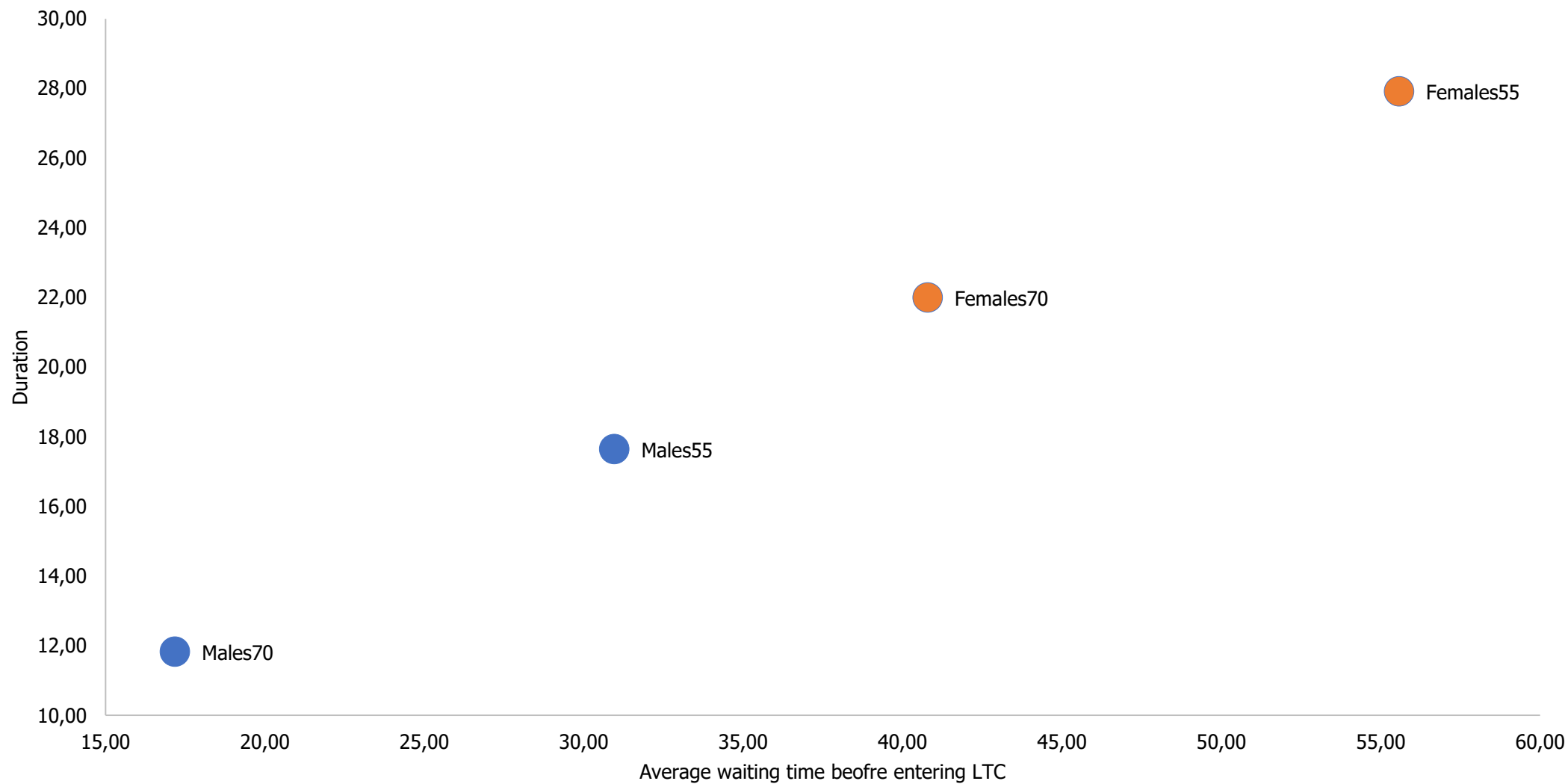
Rewarded discounts

- Considering market benchmark, females have relevant discounts (market price < fair price). Portfolio optimizations and diversification. Few females joining supplementary schemes
- Load is decreasing with age. Longevity load decreases with age, by contrast morbidity load increases with age
- Gender-neutral pricing badly works as females are few, and entry ages are correlated with sex

Load by age of purchase



Duration



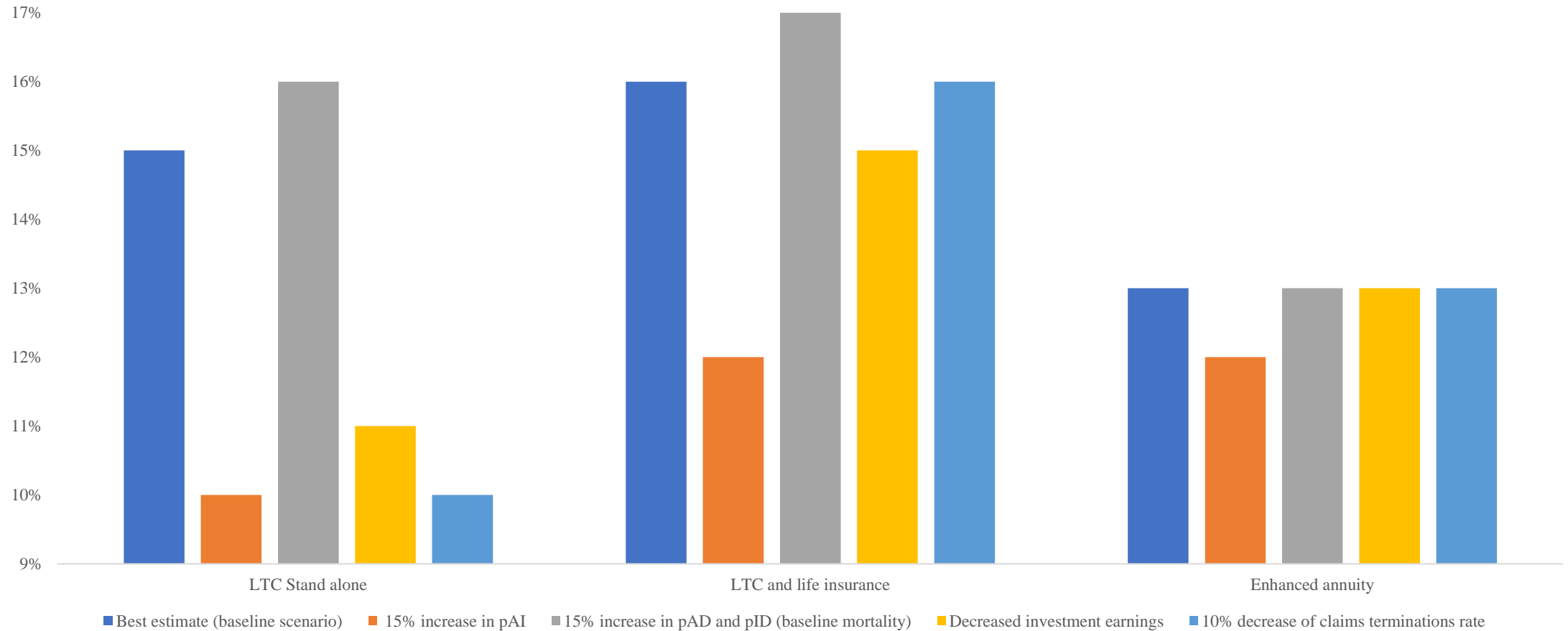
Thank you for your kind attention

Further research

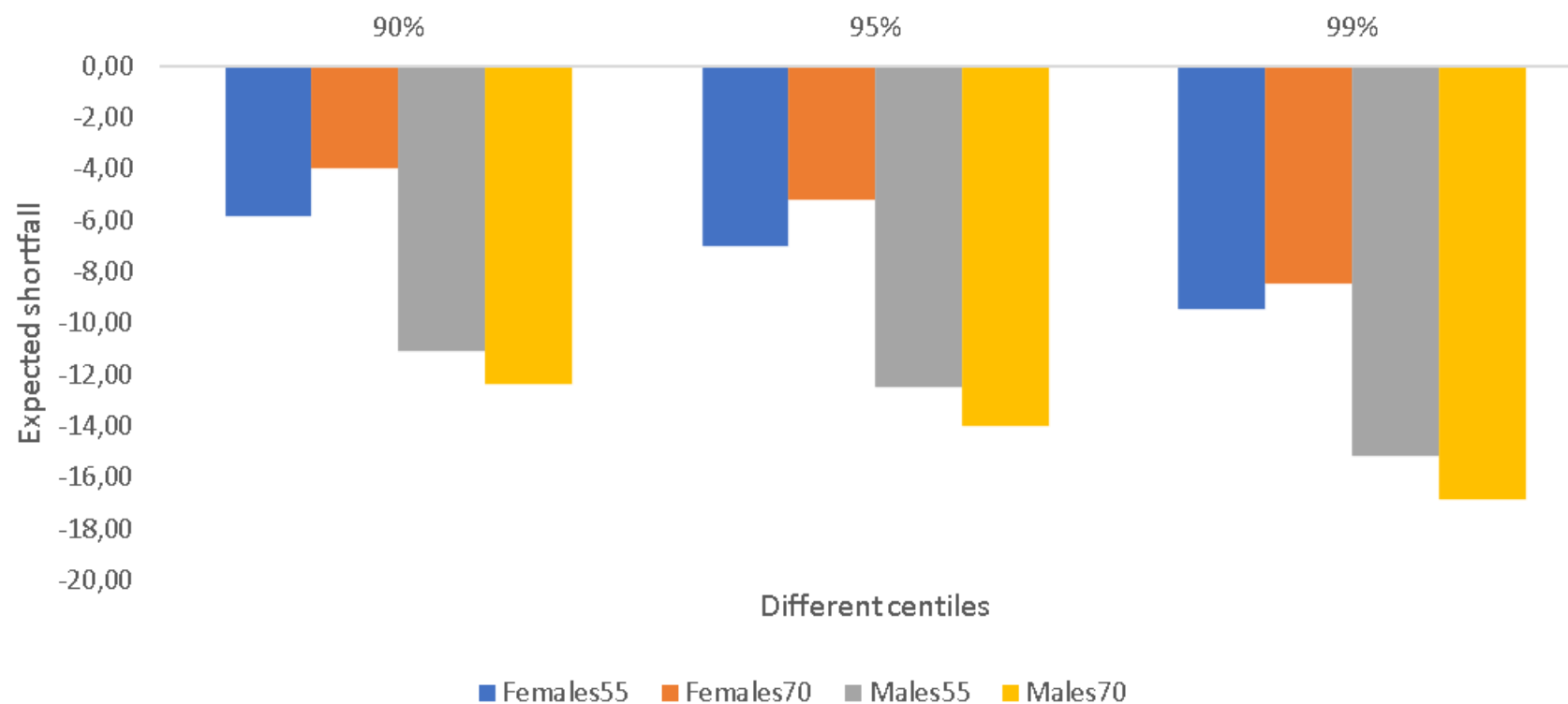
- Partitioning morbidity status: lack of data
- Introducing severe dependency: *reformatio in melius*?
- Repricing reversionary annuities: accumulation of mortality for the beneficiary once the insured dies?

Sensitivity analysis of return

Source: Chow et al., 2012

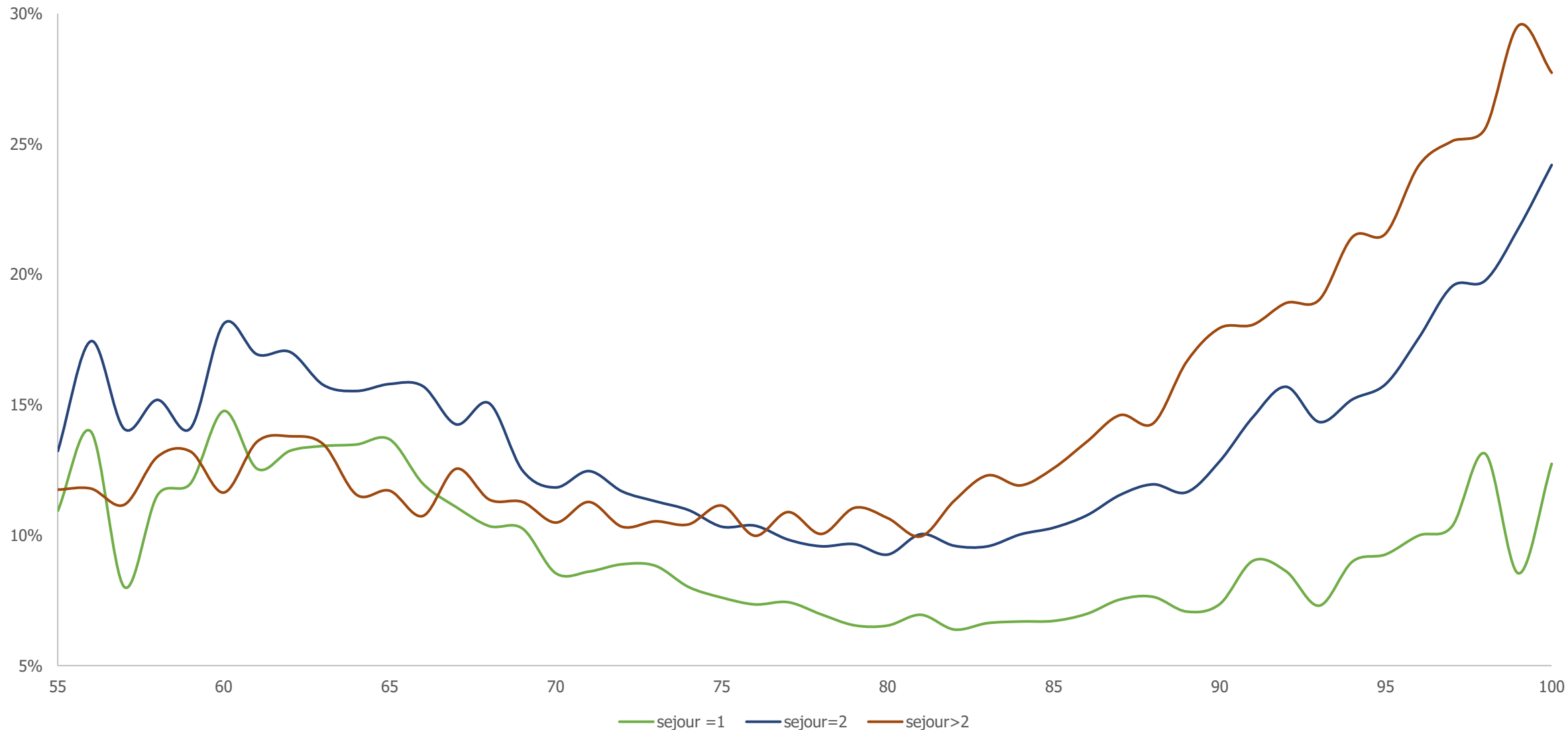


Females have less extreme loss



Mortality conditioned to sejour, females.

Data courtesy of Levantesi



Mortality conditioned to sejour, males.

Data courtesy of Levantesi

