

# Time-consistent and market-consistent actuarial valuations

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# Propositions

for the dissertation

“Time-consistent and Market-Consistent Actuarial Valuations”

By: **Ahmad Salahnejhad Ghalehjooghi**

1. Under time-consistency, the Variance premium principle converges to the non-linear exponential indifference price.
2. Standard-Deviation and Cost-of-Capital prices both converge to the expected value price under a risk-adjusted insurance process.
3. When the underlying insurance process has Poisson jumps, we no longer observe that the time-consistent Variance, Standard-Deviation and Cost-of-Capital prices converge to the same limit, as each of them reflects the effect of the jump differently.
4. The Cost-of-Capital principle fails to capture the jump risk for small jump probabilities, and its time-consistent price depends on the distribution of the premium jump.
5. If the market for the financial risk is complete, the two-step market valuation can turn any pricing operator into a market-consistent valuation.
6. Market-consistent best-estimate price ignores the uncertainty attributable to the future dynamics of the unhedgeable risks, the EIOPA risk-margin reflects part of it, and the time-consistent price fills this gap by taking the middle-time scenarios and capital-on-capital effect into account for long-dated contracts.
7. When the correlation between the financial and actuarial risks increases, the two-step actuarial valuation captures all hedgeable risks and all three prices converge to the risk-adjusted best-estimate price.
8. Time-consistent valuation could diminish the problem caused by underestimation of the pension liabilities, which caused increasing the retirement age in the Netherlands, by taking the uncertainty involved in the future mortality into account and giving more realistic estimation on the valuation of the contracts.
9. The time-consistent and market-consistent valuation can handle payoffs with more than two risk drivers and also path-dependent attribute of the actuarial risk for example in the hybrid crediting mechanism of the pension funds.
10. The regression-based methods such as Least Square Monte Carlo (LSMC) and regress-later are consistent with the conditional operators involved in the two-step valuation and give faster numerical performance than nested scenarios.
11. A small bug of double-discounting in your computer code, can delay your PhD degree four months. However, it can also discover a lot of hidden mistakes in your calculations that you would never notice and find without that bug.