

Life insurance and the mathematics of mortality

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Life insurance was the branch of insurance in which the mathematical tradition of Basel was most directly relevant. A life insurer must calculate premiums that, together with the interest earned on the reserves, will cover the payments due on the death of the insured persons or on the maturity of their policies. The calculation requires mortality tables, which estimate the probability of death at each age, and assumptions about the interest rate and the costs of the insurer.

The mathematics of mortality had been developed in the seventeenth and eighteenth centuries by Jan de Witt, Edmond Halley, Abraham de Moivre and others. It rested on the theory of probability to which the Bernoullis had contributed. In the nineteenth century, actuarial science became a profession. The Swiss Association of Actuaries was founded in 1905. The University of Basel and other Swiss universities offered courses in actuarial mathematics.¹ The Basler Lebensversicherungs-Gesellschaft and the other Swiss life insurers employed actuaries who calculated premiums and reserves on the basis of mortality tables adapted to the Swiss population.

Life insurance served several purposes. It protected families against the loss of income when the breadwinner died. It provided savings for old age through endowment policies, which paid a capital sum at a fixed date or on earlier death. It allowed debtors to secure their loans, since a life insurance policy could be pledged to a creditor. And it served as an instrument of wealth planning, since the benefits of a life insurance policy could be directed to designated beneficiaries outside the ordinary rules of succession.

The last purpose connects life insurance with the private banking business that Part E examines. Wealthy individuals in Switzerland and abroad used life insurance policies, in particular single-premium policies with investment components, to structure the transmission of their wealth, to benefit from favourable tax treatment and, in some cases, to protect their

assets against creditors. The insurance wrapper, as such policies are called, became an important instrument of cross-border wealth planning in the twentieth century. Part I examines its modern use and regulation. The author of this book wrote his doctoral thesis on the prospectus liability of life insurers, a question that arises when the information provided to the buyers of such policies proves to be incorrect.

1 Notes

1. On the foundation of the Swiss Association of Actuaries (Vereinigung schweizerischer Versicherungsmathematiker) in 1905, see its publications. To be verified. ↩

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