

# **LIFE INSURANCE**

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Life insurance products. The common insurance products on the duration of life of the individual are presented and distinction is made between products that pay benefits in the case of death and products that pay benefits in the case of survival.

Demographic basis. The duration of life is considered as a random variable, with its distribution and density function. The concept of survival function and death curve are introduced. The force of mortality is introduced. The concept of mortality table is presented and difference is made between contemporaries table (like SIF92 and SIM92) and generation table. The concept of projected mortality table is also explained and the Italian example (RG 48 and IP 55) illustrated.

Premiums and reserves. The actuarial equivalence principle is illustrated and the method of calculation of the premium is illustrated for the traditional life insurance products considered. Difference is made between single premium and periodical premiums. The natural premium is introduced and calculated for all life insurance products. The relationship between natural premiums and periodic level premium is illustrated. The concept of prospective mathematical reserve is illustrated and the behaviour of the reserve over time for the most common life insurance products is reported. The recursive equations for the reserve are derived and used for a first analysis of the profitability of a policy.

Flexible benefits. The most common types of policies that provide flexible benefits are illustrated; among them, the index-linked and the unit linked policies, the with-profit and the universal life products. In particular, the structure of the unit linked is illustrated in detail, together with profit testing techniques.

Premium charged and other aspects. The structure of the premium charged to policyholders is explained, inclusive of expenses and commissions. The reinsurance business, the most common claim functions adopted and premium calculation principles are also illustrated.