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Taylor's Law and Relationship between Life Expectancy at Birth and Variance in Age at Death in Period Life Table

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Abstract : Taylor's Law is a widely observed empirical pattern that relates variances to means in sets of non-negative measurements via an approximate power function, which has found application to human mortality. This study adds to this research by showing that Taylor's Law leads to a model that reasonably describes the relationship between life expectancy at birth (e0, which also is equal to mean age at death in a life table) and variance at age of death in seven World Bank regional life tables measured at two points in time, 1970 and 2000. Using as a benchmark a non-random sample of four Japanese female life tables covering the period from 1950 to 2004, the study finds that the simple linear model provides reasonably accurate estimates of variance in age at death in a life table from e0, where the latter range from 60.9 to 85.59 years. Employing 2017 life tables from the Human Mortality Database, the simple linear model is used to provide estimates of variance at age in death for six countries, three of which have high e0 values and three of which have lower e0 values. The paper provides a substantive interpretation of Taylor's Law relative to e0 and concludes by arguing that reasonably accurate estimates of variance in age at death in a period life table can be calculated using this approach, which also can be used where e0 itself is estimated rather than generated through the construction of a life table, a useful feature of the model.

Keywords : empirical pattern, mean age at death in a life table, mean age of a stationary population, stationary population
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