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Pension Plan Valuation and Mortality Projection

A Case Study with Mortality Data

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Abstract

It is now well documented that human mortality globally declined during the course of the twentieth century. These mortality improvements pose a challenge for pricing and reserving in life insurance and for the management of public pension regimes. Assuming a further continuation of the stable pace of mortality decline, a Poisson log-bilinear projection model is applied to population mortality data to forecast future death rates. Then a relational model embedded in a Poisson regression approach is used to merge a dynamic mortality table based on data of a large population (in this case the Canadian province of Quebec) to mortality data of a given pension plan (here the Régie des Rentes du Québec) to create another dynamic mortality table, which can be used to make any assessments on the total costs of the pension plan. We provide at the end numerical examples that illustrate the impact of mortality improvements on a pension plan.

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