



Subject: Statistic & Risk Modelling

Chapter: UNIT 4

Category: Practice Questions

1. CS2A – September 2019 Question 2

The government of a small country is interested in projecting mortality over the next 20 years. Life tables are available by single years of age for each calendar year for the past 10 years. The country has a new Chief Statistician who suggests fitting an exponential curve to the time trend in mortality at each age x and forecasting mortality separately at each age using the parameters estimated for that age.

- (i) Comment on this suggestion. [3]
- (ii) Suggest an alternative approach which may be more suitable for projecting mortality in this country.

2. CS2A – April 2022 Question 1

- (i) Write down the two-factor Lee–Carter model, clearly defining each of the terms you use.

A statistician is using the two-factor Lee–Carter model to project future mortality rates and has fitted the model to a set of mortality data. The statistician has observed that the fitted forces of mortality do not vary regularly with each calendar year but vary more regularly with age. Therefore, the statistician suggests that, before projecting future mortality rates, the k parameters in the Lee–Carter model should be smoothed using penalised regression splines but the a and b parameters should be kept as separate, unsmoothed parameters for each age.

- (ii) Discuss the statistician's suggestion by considering each of the three parameters of the Lee–Carter model, k , a and b , in turn.