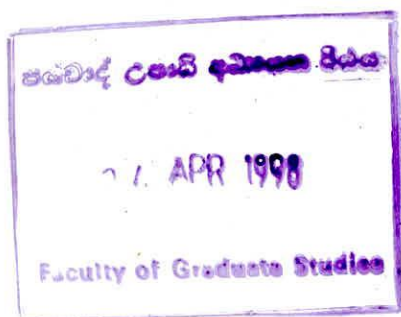


DEPARTMENT OF MATHEMATICS
University of Sri Jayawardenepura
Nuggera
Sri Lanka (Ceylon)



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**Study of the Mortality Experience
in Sri Lankan Insurance Companies**

B. W. K. N. Dissanayake

ABSTRACT

The main aim of this project being the examining of the suitability and/or adequacy of the mortality assumption of the Ceylinco Insurance Company and exploring the possibility of introducing an optimum mortality table for the company, the preliminary planning and mechanical execution of the investigation was carried out to suit this purpose. A series of descriptive and inferential statistical methods are used to critically evaluate the mortality tables tried in pursuit of optimum results. The mortality experienced by the company in the case of male and female lives are compared in order to ascertain whether any distinction can be made by sex in setting premium rates. Finally, an analysis of the accident mortality experienced by the company is carried out with the prime objective of ascertaining whether there is a chance of enhancing profits by increasing the retention limits for reinsurance.

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CHAPTER 1

Introduction

The analysis of past experience is a fundamental responsibility of an actuary. The actuary bases his assumptions regarding the future upon the inferences he draws from past experience. In this sense, the analysis and measurement of human mortality is one of the most important tasks of an actuary. Most elementary text books on life insurance mathematics present the mortality table in such a way that permits the reader to infer that the table utilized is somehow uniquely capable of providing optimum results. In reality, a major task of the actuary is the selection of the table, from a myriad of existing tables, which is most appropriate for the purpose immediately at hand. A grasp of the concepts of demography as well as of the features and characteristics of these existing tables is indispensable to the reaching of a judicious decision.

1.1 Problem Definition

The purpose of a mortality study may be either the preparation of a new mortality table based on the experience, in which event the mortality rates need to be determined, or the determination of mortality ratios, in which event the actual deaths

are divided by the deaths expected on the basis of an existing table to examine the adequacy of the mortality assumption and the suitability of the mortality table used. In this study, the former had to be ruled out due to the paucity of data (as the number of lives insured by the Company is too small) and the instability of data, which is a direct consequence of this.

Therefore, the basic problem is to examine whether the mortality assumption is reasonable in that the rate charged for mortality not only commensurate with the mortality cost incurred but also is fair and equitable. In other words, the mortality charge should not be too low in which case it would be a drain on the life fund, nor too conservative in which case the premium rates would be less competitive and most of all, it should be equitable so that each new entrant pays his fair share.

1.2 Objectives

The main objective of this study is to investigate whether the mortality assumption of Sri Lankan life insurance companies compare favorably with the actual experience i.e. to compare the mortality expected and that actually experienced by life insurance companies. The investigation is limited to the mortality experience of one company, namely Ceylinco Insurance Company Limited. Therefore, the main thrust of this investigation is towards examining the suitability of the mortality table currently used by the company and search for a more appropriate table.

A secondary objective is to investigate whether there is a significant difference between male and female mortality rates experienced by the company in order to identify whether there is a case for distinguishing between sexes in setting their premium rates.

The tertiary objective of this study is to compare the accident mortality rate experienced by the company with the expected rate or rather the reinsurance premium, in order to examine whether there is a possibility of enhancing profits by increasing the retention limits.

In a nutshell the objectives are,

- ◆ To examine the suitability and/or adequacy of the mortality table currently used by the company and to try out various standard and modified tables in search of an optimum table for the company.
- ◆ To compare the male and female mortality rates experienced by the company.
- ◆ To compare the actual and expected accident mortality rates.

1.3 Organization of this Dissertation

This dissertation contains up-to-date information relating to the mortality experience of insured lives of the Ceylinco Insurance Company and comparisons of the mortality

rates of male and female lives as well as mortality rates experienced and those contained in published mortality tables.

Some of the elementary concepts of life insurance in general and mortality and its measurement in particular, are presented in Chapter 2.

Chapter 3 and 4 essentially deals with the methodology. Chapter 3 describes the practical aspects of the investigation which more or less amounts to the design of the study whilst Chapter 4 explains the statistical methods and formulae used.

Chapter 5 contains the presentation and analysis of the data obtained from the study.

Chapter 6 reports the conclusions and recommendations along with a discussion on the interpretation of the results as well as further work suggested.

The appendix at the end of the report consists of the published mortality tables utilized in the comparisons, computer programs used, some of the details of the analysis etc.

1.4 Results of this Study

Neither the Adjusted A49-52 Select table, which was earlier used by the company, nor the Adjusted A49-52 Ultimate table, which is being currently used, appear to

properly describe the current mortality experience of the company. Unfortunately, all the other tables tried in this study fail in this regard. Out of all these tables it appears prudent to use the Adjusted A49-52 Ultimate table until a further study is done. This study also finds sufficient grounds for distinguishing between sexes in setting premium rates and also increasing the retention limit in the case of the accidental death rider.

CHAPTER 2

Background and Elementary Concepts

2.1 Introduction

Insurance is a risk transfer mechanism whereby for an agreed periodical payment called the premium the insurer agrees to compensate the insured if certain events occur. Unlike in other forms of insurance the event being insured in a life policy is certain to happen. What we do not know is when it will happen. Life insurance is an economic bridge which covers the gap between the time a man dies and the time he should die. It does not insure life rather it ensures the dependents of an income that death has stopped.

Every plan of insurance is, in effect, a cooperative arrangement whereby the members of an association or the policyholders of an insurance company band together to share the risk of financial loss which may be too serious to be borne by the affected. Life insurance is primarily concerned with the financial loss incident to death. Death causes a financial loss because of: