

MS Module 23: Actuarial risk classification – homework assignment

(The attached PDF file has better formatting.)

Reading on discussion forum: Actuarial risk classification

Homework assignment

The mean values and the number of observations in each cell of a 2×2 classification table are

<i>Means</i>	<i>Column 1</i>	<i>Column 2</i>	<i>Observations</i>	<i>Column 1</i>	<i>Column 2</i>
<i>Row 1</i>	20	12	<i>Row 1</i>	5	4
<i>Row 2</i>	8	3	<i>Row 2</i>	2	3

Illustration: The cell in row 1 column 1 has a mean of 20 from a sample of 5 observations.

An actuary is setting class relativities for insurance pricing using a multiplicative model balance principle, with

- ! a base rate of 10
- ! a starting relativity for column 1 of 1.8
- ! a starting relativity for column 2 of 1.0

We use the following notation:

- B = base rate
- r_1 = relativity for Row 1
- r_2 = relativity for Row 2
- c_1 = relativity for Column 1
- c_2 = relativity for Column 2

- A. What are the observed totals for each cell, row, and column?
- B. What are the formulas for each cell, row, and column using base rates and relativities?
- C. What is the equation to balance along Row 1?
- D. What is the implied relativity for Row 1, given the starting relativities by column?
- E. What is the equation to balance along Row 2?
- F. What is the implied relativity for Row 2, given the starting relativities by column?
- G. What is the equation to balance down Column 1?
- H. What is the implied relativity for Column 1, given the computed relativities by row?
- I. What is the equation to balance down Column 2?
- J. What is the implied relativity for Column 2, given the computed relativities by row?

(The homework assignment has a format similar to that of the practice problem for this module, though the figures in each cell differ.)