DEMG 6090 Homework 5

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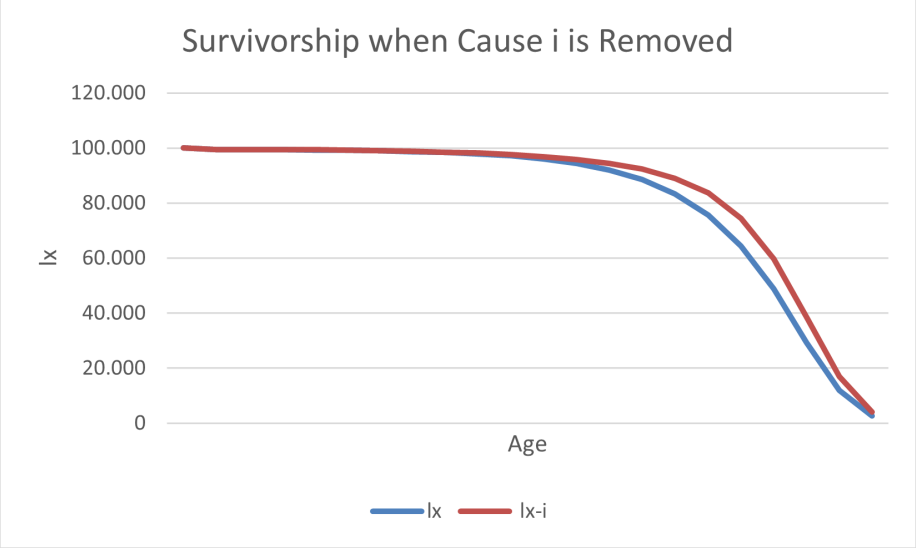
PSET4 Part A

Problem 1 - 3

See spreadsheet.

Eliminating malignant neoplasms as a cause of death increased survivorship in this population, especially in mid-to-late life. This is seen by comparing lx, which indicates survivorship when accounting for death of all causes, with lx-i, which shows survivorship when accounting for all deaths except those due to malignant neoplasms.



Problem 4

Survivorship at age 85 has increased by 22.47 percent the elimination of malignant neoplasm as a cause of death, with $\frac{\bar{l_{85}i} - l_{85}}{l_{85}} = 0.2247$, or a factor of 1.2247. For all causes, the probability of surviving to age 85 is $\frac{1}{1.2247} = 0.81653$

PSET4 Part B

Problem 1

Probability of being never married at age 50 for a newborn = ${}_{50}p_0^{total} = e^{-5*\sum_{x=0,5,\ldots}^{45} {}_5M_x^D + {}_5M_x^M}$

Problem 2

Probability of being never married at age 50 for a newborn in this cohort, net of mortality = ${}_{50}p_0^{net} = e^{-5*\sum_{x=0,5,\ldots}^{45} {}_5M_x^M}$

Problem 3

Probability for the second cohort with mortality rates 20 percent less than those of the first cohort = ${}_{50}p_0^{total} = e^{-5*\sum_{x=0,5,\ldots}^{45} 0.8*{}_5M_x^D + {}_5M_x^M}$, that is, being exposed to lower mortality rates pushes the probability of being never married at age 50 for a newborn to be lower overall by a factor of $e^{0.8}$. The probability of being never married at age 50 net of mortality remains the same, and the expression is unchanged.

Problem 4

If mortality rates decrease at every age, while marriage rates remain the same, there will be an increase in first marriages. However, this increase must be proportional to the decrease in mortality of never-married individuals at every age since marriage rates remain constant.