

Problem Set 4: Solutions

Demography Camp

Summer 2013

Instructions

- Fill in the following life table.
- If you make assumptions, state them below.
- Feel free to use a calculator, excel, etc.

Assumptions

Assumptions are needed about the distribution of deaths in each interval in order to calculate ${}_nL_x$. Referring to the handout: ${}_1L_0 \approx 0.3l_0 + 0.7l_1$

Therefore:

- ${}_1L_0 \approx 0.3 \cdot 100000 + 0.7 \cdot 99877 = 99913.9$

From this we can backtrack to find ${}_1a_x$

- ${}_1L_0 = 99913.9 = l_1 + (l_0 - l_1) \cdot {}_1a_x$
- $99913.9 = 99877 + (100000 - 99877) \cdot {}_1a_x$
- ${}_1a_x = 0.3$

For the rest of the ${}_na_x$ column (except the open ended interval), it is safe to assume that ${}_na_x = \frac{n}{2}$

x	n	l_x	${}_np_x$	${}_nq_x$	${}_nd_x$	${}_na_x$	${}_nL_x$	${}_nm_x$	T_x	e_x	$e_x + x$
0-1	1	100,000	0.999	0.001	123	0.3	99914	0.0012	3395846	34.0	34.0
1-4	4	99877	0.956	0.044	4443	2.0	390622	0.0114	3295932	33.0	34.0
5-9	5	95434	0.944	0.056	5311	2.5	463893	0.0114	2905310	30.4	35.4
10-14	5	90123	0.943	0.057	5100	2.5	437865	0.0116	2441418	27.1	37.1
15-19	5	85023	0.945	0.055	4690	2.5	413390	0.0113	2003553	23.6	38.6
20-24	5	80333	0.926	0.074	5941	2.5	386813	0.0154	1590163	19.8	39.8
25-29	5	74392	0.928	0.072	5361	2.5	358558	0.0150	1203350	16.2	41.2
30-34	5	69031	0.869	0.131	9010	2.5	322630	0.0279	844793	12.2	42.2
35-39	5	60021	0.720	0.280	16799	2.5	258108	0.0651	522163	8.7	43.7
40-44	5	43222	0.722	0.278	12022	2.5	186055	0.0646	264055	6.1	46.1
45-49	5	31200	0.000	1.000	31200	2.5	78000	0.4000	78000	2.5	47.5