

Appendix E

Tables

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E.0 Illustrative Life Tables

Basic Functions and Net Single Premiums at $i = 5\%$							
x	ℓ_x	d_x	$1000q_x$	$\ddot{a}_x$	$1000A_x$	$1000({}^2A_x)$	x
0	10,000,000	204,200	20.42	19.642724	64.63	28.72	0
1	9,795,800	13,126	1.34	19.982912	48.43	11.47	1
2	9,782,674	11,935	1.22	19.958801	49.58	11.33	2
3	9,770,739	10,943	1.12	19.931058	50.90	11.28	3
4	9,759,796	10,150	1.04	19.899898	52.39	11.33	4
5	9,749,646	9,555	0.98	19.865552	54.02	11.46	5
6	9,740,091	9,058	0.93	19.828262	55.80	11.67	6
7	9,731,033	8,661	0.89	19.788078	57.71	11.95	7
8	9,722,372	8,458	0.87	19.745056	59.76	12.29	8
9	9,713,914	8,257	0.85	19.699446	61.93	12.69	9
10	9,705,657	8,250	0.85	19.651122	64.23	13.15	10
11	9,697,407	8,243	0.85	19.600339	66.65	13.66	11
12	9,689,164	8,333	0.86	19.546971	69.19	14.23	12
13	9,680,831	8,422	0.87	19.491083	71.85	14.84	13
14	9,672,409	8,608	0.89	19.432543	74.64	15.50	14
15	9,663,801	8,794	0.91	19.371410	77.55	16.21	15
16	9,655,007	8,979	0.93	19.307550	80.59	16.98	16
17	9,646,028	9,164	0.95	19.240821	83.77	17.81	17
18	9,636,864	9,348	0.97	19.171075	87.09	18.70	18
19	9,627,516	9,628	1.00	19.098154	90.56	19.67	19
20	9,617,888	9,906	1.03	19.022085	94.19	20.71	20
21	9,607,982	10,184	1.06	18.942699	97.97	21.82	21
22	9,597,798	10,558	1.10	18.859825	101.91	23.02	22
23	9,587,240	10,929	1.14	18.773468	106.03	24.31	23
24	9,576,311	11,300	1.18	18.683440	110.31	25.69	24
25	9,565,011	11,669	1.22	18.589547	114.78	27.17	25
26	9,553,342	12,133	1.27	18.491584	119.45	28.77	26
27	9,541,209	12,690	1.33	18.389518	124.31	30.49	27
28	9,528,519	13,245	1.39	18.283311	129.37	32.33	28
29	9,515,274	13,892	1.46	18.172737	134.63	34.30	29
30	9,501,382	14,537	1.53	18.057738	140.11	36.41	30
31	9,486,845	15,274	1.61	17.938070	145.81	38.67	31
32	9,471,571	16,102	1.70	17.813654	151.73	41.09	32
33	9,455,469	16,925	1.79	17.684401	157.89	43.68	33
34	9,438,544	17,933	1.90	17.550034	164.28	46.45	34
35	9,420,611	18,935	2.01	17.410616	170.92	49.40	35
36	9,401,676	20,120	2.14	17.265850	177.82	52.56	36
37	9,381,556	21,390	2.28	17.115771	184.96	55.93	37
38	9,360,166	22,745	2.43	16.960229	192.37	59.52	38
39	9,337,421	24,277	2.60	16.799062	200.04	63.35	39
40	9,313,144	25,891	2.78	16.632259	207.99	67.41	40
41	9,287,253	27,676	2.98	16.459630	216.21	71.74	41
42	9,259,577	29,631	3.20	16.281129	224.71	76.34	42
43	9,229,946	31,751	3.44	16.096696	233.49	81.23	43
44	9,198,195	34,125	3.71	15.906249	242.56	86.41	44
45	9,164,070	36,656	4.00	15.709844	251.91	91.90	45
46	9,127,414	39,339	4.31	15.507365	261.55	97.71	46
47	9,088,075	42,350	4.66	15.298671	271.49	103.86	47
48	9,045,725	45,590	5.04	15.083893	281.72	110.36	48
49	9,000,135	49,141	5.46	14.862997	292.24	117.23	49

Basic Functions and Net Single Premiums at $i = 5\%$							
x	ℓ_x	d_x	$1000q_x$	$\ddot{a}_x$	$1000A_x$	$1000({}^2A_x)$	x
50	8,950,994	52,990	5.92	14.636061	303.04	124.46	50
51	8,898,004	57,125	6.42	14.403131	314.14	132.08	51
52	8,840,879	61,621	6.97	14.164220	325.51	140.10	52
53	8,779,258	66,547	7.58	13.919449	337.17	148.53	53
54	8,712,711	71,793	8.24	13.669034	349.09	157.36	54
55	8,640,918	77,423	8.96	13.413011	361.29	166.63	55
56	8,563,495	83,494	9.75	13.151498	373.74	176.33	56
57	8,480,001	90,058	10.62	12.884699	386.44	186.47	57
58	8,389,943	97,156	11.58	12.612883	399.39	197.05	58
59	8,292,787	104,655	12.62	12.336384	412.55	208.08	59
60	8,188,132	112,669	13.76	12.055342	425.94	219.56	60
61	8,075,463	121,213	15.01	11.770064	439.52	231.49	61
62	7,954,250	130,291	16.38	11.480898	453.29	243.87	62
63	7,823,959	139,892	17.88	11.188205	467.23	256.69	63
64	7,684,067	149,993	19.52	10.892369	481.32	269.94	64
65	7,534,074	160,626	21.32	10.593780	495.53	283.63	65
66	7,373,448	171,728	23.29	10.292913	509.86	297.73	66
67	7,201,720	183,212	25.44	9.990230	524.27	312.23	67
68	7,018,508	195,044	27.79	9.686158	538.75	327.11	68
69	6,823,464	207,229	30.37	9.381167	553.28	342.37	69
70	6,616,235	219,527	33.18	9.075861	567.82	357.96	70
71	6,396,708	231,945	36.26	8.770664	582.35	373.88	71
72	6,164,763	244,248	39.62	8.466182	596.85	390.09	72
73	5,920,515	256,358	43.30	8.162908	611.29	406.56	73
74	5,664,157	267,971	47.31	7.861452	625.65	423.26	74
75	5,396,186	278,929	51.69	7.562297	639.89	440.15	75
76	5,117,257	288,972	56.47	7.265989	654.00	457.21	76
77	4,828,285	297,809	61.68	6.973063	667.95	474.38	77
78	4,530,476	305,218	67.37	6.683979	681.71	491.66	78
79	4,225,258	310,810	73.56	6.399299	695.27	508.97	79
80	3,914,448	314,330	80.30	6.119411	708.60	526.31	80
81	3,600,118	315,514	87.64	5.844708	721.68	543.60	81
82	3,284,604	314,041	95.61	5.575590	734.50	560.84	82
83	2,970,563	309,770	104.28	5.312277	747.03	577.99	83
84	2,660,793	302,506	113.69	5.055031	759.28	594.95	84
85	2,358,287	292,168	123.89	4.803941	771.24	611.84	85
86	2,066,119	278,802	134.94	4.558938	782.91	628.49	86
87	1,787,317	262,539	146.89	4.319797	794.29	645.05	87
88	1,524,778	243,675	159.81	4.085991	805.43	661.36	88
89	1,281,103	222,592	173.75	3.856599	816.35	677.76	89
90	1,058,511	199,815	188.77	3.630178	827.13	694.07	90
91	858,696	175,973	204.93	3.404320	837.89	710.54	91
92	682,723	151,749	222.27	3.175241	848.80	727.33	92
93	530,974	127,890	240.86	2.936743	860.15	745.41	93
94	403,084	105,096	260.73	2.678823	872.44	764.65	94
95	297,988	84,006	281.91	2.384461	886.46	787.86	95
96	213,982	74,894	350.00	2.024369	903.60	817.60	96
97	139,088	66,067	475.00	1.654770	921.21	847.96	97
98	73,021	49,289	675.00	1.309539	937.65	885.10	98
99	23,732	23,732	1000.00	1.000000	952.35	914.67	99

E.1 Commutation Columns

Illustrative Life Table and $i = 5\%$					
x	D_x	N_x	C_x	M_x	x
0	10,000,000.0	196,427,244.2	194,476.190	646,321.725	0
1	9,329,333.3	186,427,244.2	11,905.669	451,845.535	1
2	8,873,173.7	177,097,910.9	10,309.902	439,939.866	2
3	8,440,331.7	168,224,737.2	9,002.833	429,629.964	3
4	8,029,408.3	159,784,405.5	7,952.791	420,627.131	4
5	7,639,102.8	151,754,997.2	7,130.088	412,674.340	5
6	7,268,205.9	144,115,894.4	6,437.351	405,544.252	6
7	6,915,663.5	136,847,688.5	5,862.106	399,106.901	7
8	6,580,484.1	129,932,025.0	5,452.102	393,244.795	8
9	6,261,675.6	123,351,540.9	5,069.082	387,792.693	9
10	5,958,431.5	117,089,865.3	4,823.604	382,723.611	10
11	5,669,873.0	111,131,433.8	4,590.011	377,900.007	11
12	5,395,289.1	105,461,560.8	4,419.168	373,309.996	12
13	5,133,951.4	100,066,271.7	4,253.682	368,890.828	13
14	4,885,223.8	94,932,320.3	4,140.595	364,637.146	14
15	4,648,453.5	90,047,096.5	4,028.633	360,496.551	15
16	4,423,070.0	85,398,643.0	3,917.508	356,467.918	16
17	4,208,530.1	80,975,573.0	3,807.831	352,550.410	17
18	4,004,316.0	76,767,042.9	3,699.321	348,742.579	18
19	3,809,935.0	72,762,726.9	3,628.692	345,043.258	19
20	3,624,880.8	68,952,791.9	3,555.683	341,414.566	20
21	3,448,711.8	65,327,911.1	3,481.399	337,858.883	21
22	3,281,006.0	61,879,199.3	3,437.382	334,377.484	22
23	3,121,330.2	58,598,193.3	3,388.732	330,940.102	23
24	2,969,306.7	55,476,863.1	3,336.921	327,551.370	24
25	2,824,574.3	52,507,556.4	3,281.798	324,214.449	25
26	2,686,788.9	49,682,982.1	3,249.804	320,932.651	26
27	2,555,596.8	46,996,193.2	3,237.138	317,682.847	27
28	2,430,664.6	44,440,596.4	3,217.824	314,445.709	28
29	2,311,700.8	42,009,931.8	3,214.296	311,227.885	29
30	2,198,405.5	39,698,231.0	3,203.366	308,013.589	30
31	2,090,516.2	37,499,825.5	3,205.496	304,810.223	31
32	1,987,762.3	35,409,309.3	3,218.348	301,604.727	32
33	1,889,888.6	33,421,547.0	3,221.755	298,386.379	33
34	1,796,672.2	31,531,658.4	3,251.079	295,164.624	34
35	1,707,865.3	29,734,986.2	3,269.268	291,913.545	35
36	1,623,269.1	28,027,120.9	3,308.445	288,644.277	36
37	1,542,662.1	26,403,851.8	3,349.789	285,335.832	37
38	1,465,852.2	24,861,189.7	3,392.370	281,986.043	38
39	1,392,657.4	23,395,337.5	3,448.443	278,593.673	39
40	1,322,891.9	22,002,680.1	3,502.576	275,145.230	40
41	1,256,394.5	20,679,788.2	3,565.765	271,642.654	41
42	1,193,000.4	19,423,393.7	3,635.854	268,076.889	42
43	1,132,555.0	18,230,393.3	3,710.464	264,441.035	43
44	1,074,913.3	17,097,838.3	3,797.993	260,730.571	44
45	1,019,929.0	16,022,925.0	3,885.414	256,932.578	45
46	967,475.5	15,002,996.0	3,971.241	253,047.164	46
47	917,434.0	14,035,520.5	4,071.618	249,075.923	47
48	869,675.1	13,118,086.5	4,174.399	245,004.305	48
49	824,087.6	12,248,411.4	4,285.278	240,829.906	49

Illustrative Life Table and $i = 5\%$

x	D_x	N_x	C_x	M_x	x
50	780,560.0	11,424,323.8	4,400.881	236,544.628	50
51	738,989.6	10,643,763.8	4,518.379	232,143.747	51
52	699,281.3	9,904,774.2	4,641.901	227,625.368	52
53	661,340.3	9,205,492.9	4,774.263	222,983.467	53
54	625,073.6	8,544,152.6	4,905.357	218,209.204	54
55	590,402.8	7,919,079.0	5,038.129	213,303.847	55
56	557,250.3	7,328,676.2	5,174.462	208,265.718	56
57	525,540.1	6,771,425.9	5,315.486	203,091.256	57
58	495,198.9	6,245,885.8	5,461.362	197,775.770	58
59	466,156.6	5,750,686.9	5,602.760	192,314.408	59
60	438,355.9	5,284,530.3	5,744.566	186,711.648	60
61	411,737.3	4,846,174.4	5,885.897	180,967.082	61
62	386,244.8	4,434,437.1	6,025.437	175,081.185	62
63	361,826.8	4,048,192.3	6,161.376	169,055.748	63
64	338,435.6	3,686,365.5	6,291.679	162,894.372	64
65	316,027.9	3,347,929.9	6,416.853	156,602.693	65
66	294,562.1	3,031,902.0	6,533.683	150,185.840	66
67	274,001.7	2,737,339.9	6,638.678	143,652.157	67
68	254,315.3	2,463,338.2	6,730.866	137,013.479	68
69	235,474.2	2,209,022.9	6,810.823	130,282.613	69
70	217,450.3	1,973,548.7	6,871.439	123,471.790	70
71	200,224.1	1,756,098.4	6,914.416	116,600.351	71
72	183,775.2	1,555,874.3	6,934.453	109,685.935	72
73	168,089.5	1,372,099.1	6,931.684	102,751.482	73
74	153,153.6	1,204,009.6	6,900.656	95,819.798	74
75	138,959.9	1,050,856.0	6,840.801	88,919.142	75
76	125,502.0	911,896.1	6,749.626	82,078.341	76
77	112,776.0	786,394.1	6,624.796	75,328.715	77
78	100,781.0	673,618.1	6,466.295	68,703.919	78
79	89,515.6	572,837.1	6,271.206	62,237.624	79
80	78,981.7	483,321.5	6,040.218	55,966.418	80
81	69,180.5	404,339.8	5,774.257	49,926.200	81
82	60,111.9	335,159.3	5,473.619	44,151.943	82
83	51,775.8	275,047.4	5,142.073	38,678.324	83
84	44,168.2	223,271.6	4,782.374	33,536.251	84
85	37,282.6	179,103.4	4,398.990	28,753.877	85
86	31,108.3	141,820.8	3,997.853	24,354.887	86
87	25,629.1	110,712.5	3,585.383	20,357.034	87
88	20,823.2	85,083.4	3,169.300	16,771.651	88
89	16,662.4	64,260.2	2,757.228	13,602.351	89
90	13,111.7	47,597.8	2,357.230	10,845.123	90
91	10,130.1	34,486.1	1,977.109	8,487.893	91
92	7,670.6	24,356.0	1,623.757	6,510.784	92
93	5,681.6	16,685.4	1,303.294	4,887.027	93
94	4,107.7	11,003.8	1,020.006	3,583.733	94
95	2,892.1	6,896.1	776.493	2,563.727	95
96	1,977.9	4,004.0	659.303	1,787.234	96
97	1,224.4	2,026.1	553.902	1,127.931	97
98	612.2	801.7	393.559	574.029	98
99	189.5	189.5	180.470	180.470	99

E.2 Multiple Decrement Tables

Illustrative Service Table					
x	ℓ_x	$d_{1,x}$	$d_{2,x}$	$d_{3,x}$	$d_{4,x}$
30	100,000	100	19,990	0	0
31	79,910	80	14,376	0	0
32	65,454	72	9,858	0	0
33	55,524	61	5,702	0	0
34	49,761	60	3,971	0	0
35	45,730	64	2,693	46	0
36	42,927	64	1,927	43	0
37	40,893	65	1,431	45	0
38	39,352	71	1,181	47	0
39	38,053	72	989	49	0
40	36,943	78	813	52	0
41	36,000	83	720	54	0
42	35,143	91	633	56	0
43	34,363	96	550	58	0
44	33,659	104	505	61	0
45	32,989	112	462	66	0
46	32,349	123	421	71	0
47	31,734	133	413	79	0
48	31,109	143	373	87	0
49	30,506	156	336	95	0
50	29,919	168	299	102	0
51	29,350	182	293	112	0
52	28,763	198	259	121	0
53	28,185	209	251	132	0
54	27,593	226	218	143	0
55	27,006	240	213	157	0
56	26,396	259	182	169	0
57	25,786	276	178	183	0
58	25,149	297	148	199	0
59	24,505	316	120	213	0
60	23,856	313	0	0	3,552
61	19,991	298	0	0	1,587
62	18,106	284	0	0	2,692
63	15,130	271	0	0	1,350
64	13,509	257	0	0	2,006
65	11,246	204	0	0	4,448
66	6,594	147	0	0	1,302
67	5,145	119	0	0	1,522
68	3,504	83	0	0	1,381
69	2,040	49	0	0	1,004
70	987	17	0	0	970