Payout Annuity Update

Update on development of new payout annuity mortality table

Society of Actuaries & American Academy of Actuaries Joint Project Oversight Group

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Progress To-Date

- Analyzed 2000-2004 payout annuity mortality experience
- Have created a preliminary table, with confidence intervals at each age, through application of P-Splines
  - The P-Spline model fits past data to estimate past annual rates of mortality improvement to understand what's changed over the last "X" number of years.
  - Method restricted to ages 50 to 94 - lack of uniformly increasing experience at highest ages

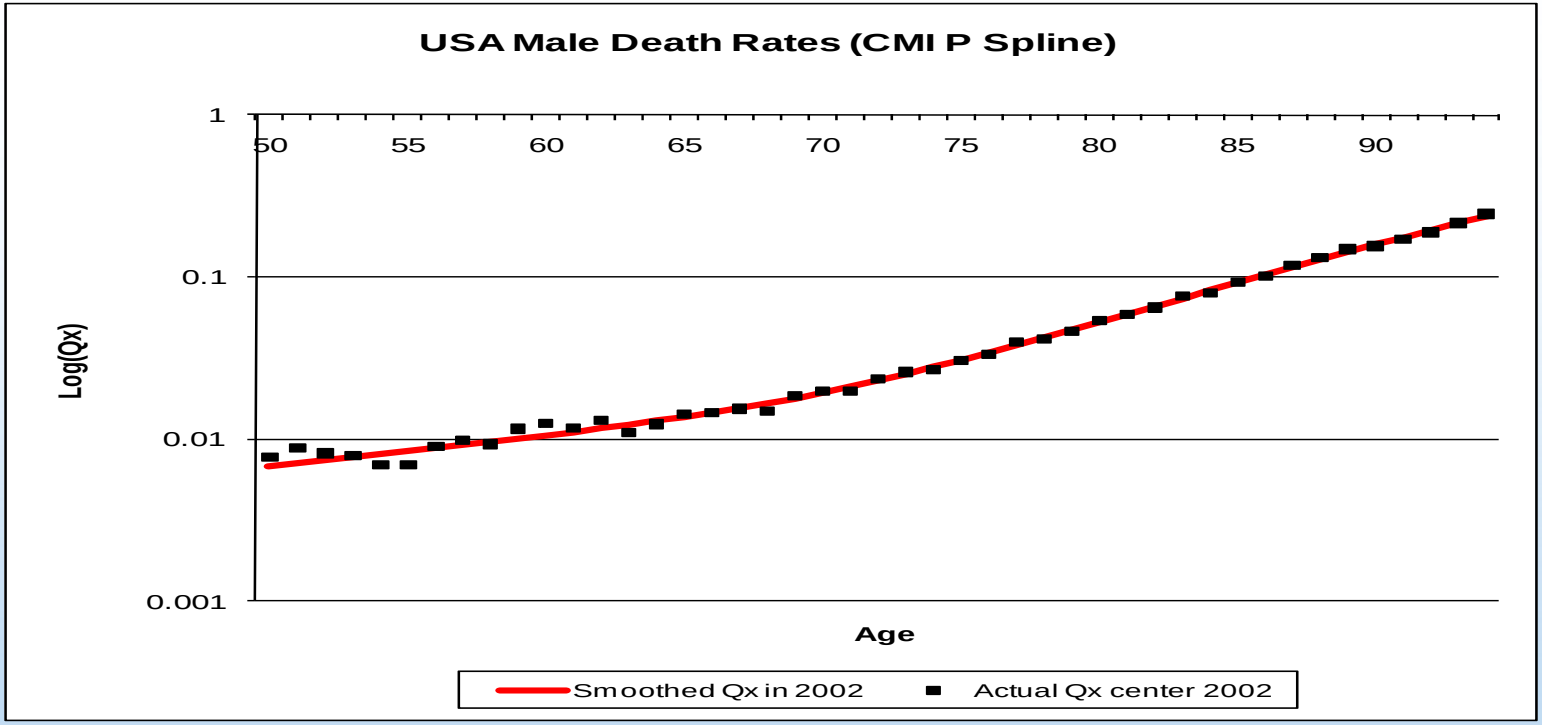
Progress To-Date cont'd

- Graduated qxs from the data for males and females with confidence intervals
  - Method used provided a 95% confidence interval of graduation
  - Result with qxs generally ranging between 99-101% of the best estimate.
- The confidence intervals (CI) are narrow at the key ages
- CI are wider at younger ages because of the credibility and volatility of the data

Graduated q_x and CI – Male Risks

Age	Actual q_x center 2002	Smoothed q_x in 2002	Lower 2.5% CI	Upper 2.5% CI	Ratio of Lower CI to best estimate	Ratio of Higher CI to best estimate
50	0.00781	0.00686	0.00609	0.00772	89%	113%
60	0.01256	0.01057	0.01018	0.01099	96%	104%
70	0.01977	0.01939	0.01909	0.01969	98%	102%
80	0.05358	0.05266	0.05218	0.05314	99%	101%
90	0.15493	0.15877	0.15697	0.16059	99%	101%
94	0.24555	0.23899	0.23318	0.24495	98%	102%

Projected Payout Annuity Mortality Rates – Male Risks



- The graduated lines pass through the raw q_xs relatively neatly and appear to obey Gompertz/Kanisto equations
- Data is very inconsistent before age 62 and there is a flattening of the mortality curves below age 65

Graduated q_x and CI – Female Risks

Age	Actual q_x center 2002	Smoothed q_x in 2002	Lower 2.5% CI	Upper 2.5% CI	Ratio of Lower CI to best estimate	Ratio of Higher CI to best estimate
50	0.00632	0.00525	0.00459	0.00600	87%	114%
60	0.00809	0.00751	0.00718	0.00785	96%	105%
70	0.01278	0.01344	0.01319	0.01370	98%	102%
80	0.03627	0.03641	0.03603	0.03680	99%	101%
90	0.12816	0.12392	0.12265	0.12520	99%	101%
94	0.19256	0.19607	0.19207	0.20016	98%	102%

Projected Payout Annuity Mortality Rates – Female Risks

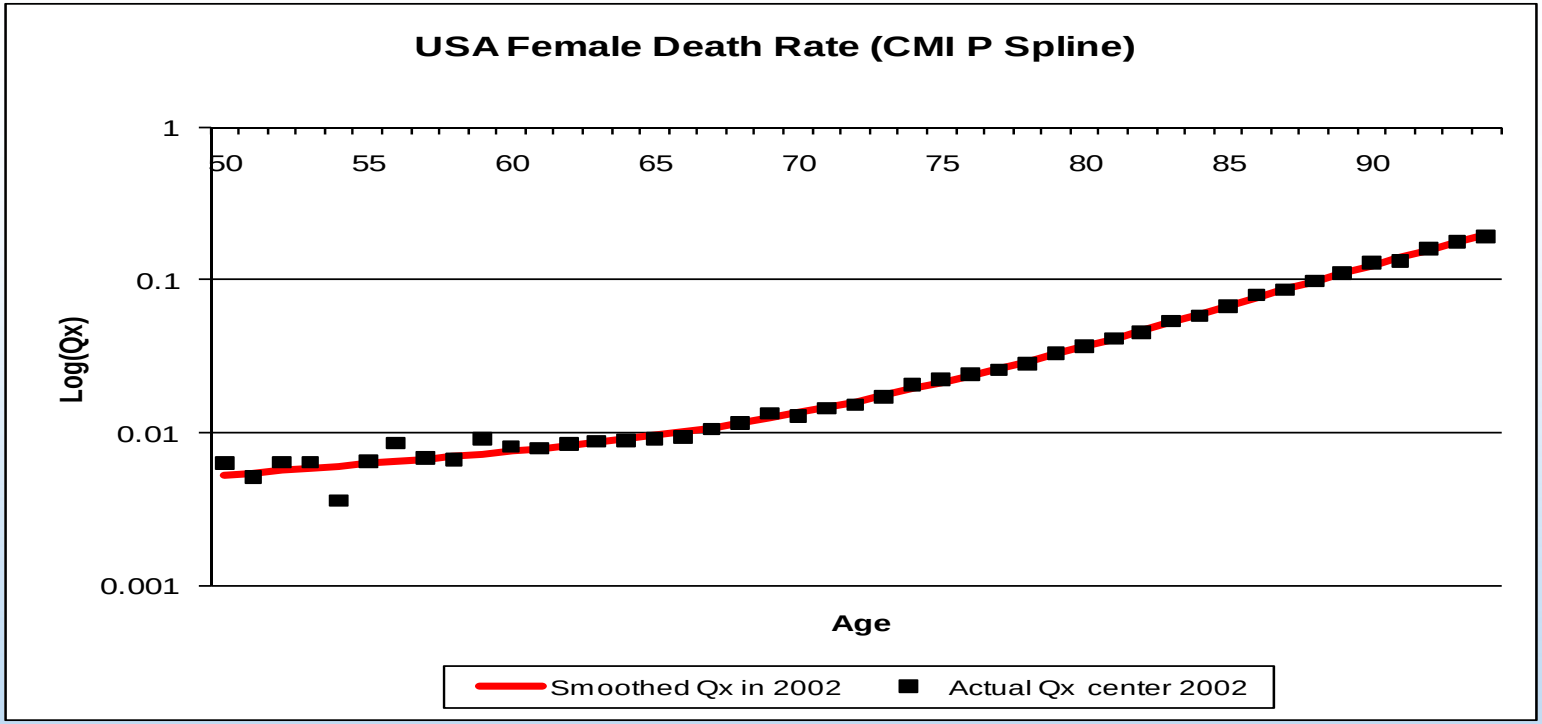


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Table Development Considerations

- There is much uncertainty in the older and younger age data
  - The number of deaths we had at age 50 was pretty sparse
  - Using 100 deaths as a benchmark, do not reach benchmark until ages in the lower 60s
  - Data has 100 deaths through age 99 and 102 for males and females, respectively
- Reviewing whether mortality reaches an ultimate level at some point
  - Need to be careful as there might be some inconsistency in the reporting on these older contacts.
- Suggesting to use actual data up to age 99
- Need to use another extrapolation method in order to get a good fit beyond that point
  - Looking at using the Kannisto method
  - Reviewing past mortality experience data from SSA in order to determine historical annual rates of change in mortality rate

Summary of Annuity Change

	All Amounts				2,500 to 24,999			
	Males		Females		Males		Females	
Age	Number	Amount	Number	Amount	Number	Amount	Number	Amount
< 50	-4.89%	-7.11%	-4.15%	-4.25%	-6.75%	-7.24%	-6.58%	-6.93%
50-54	-1.89%	-5.60%	-4.09%	-6.96%	-2.50%	-1.77%	-4.26%	-3.86%
55-59	-1.09%	-0.51%	-3.53%	-1.86%	-0.65%	-0.78%	-3.14%	-1.88%
60-64	-0.38%	0.97%	-1.57%	-0.30%	0.16%	0.31%	-0.57%	-0.15%
65-69	0.72%	1.80%	-0.37%	0.11%	1.42%	1.75%	0.44%	0.47%
70-74	1.25%	2.25%	0.05%	0.60%	1.72%	2.07%	0.50%	0.54%
75-79	1.15%	2.04%	0.45%	1.21%	1.63%	1.85%	0.94%	1.19%
80-84	0.77%	1.65%	0.55%	1.05%	1.29%	1.42%	0.97%	1.15%
85-89	0.13%	1.04%	0.24%	0.68%	0.72%	0.84%	0.85%	0.96%
90-94	-0.50%	0.28%	-0.13%	0.88%	0.00%	0.32%	0.38%	0.47%
95-99	-0.95%	-0.43%	-0.61%	0.14%	-0.41%	-0.24%	0.14%	0.14%
100+	-0.63%	-1.30%	-0.72%	-0.88%	-0.71%	-0.93%	0.43%	0.54%
All ages	0.54%	1.49%	0.13%	0.77%	1.14%	1.35%	0.69%	0.81%

Next Steps

- Continue to analyze male and female data split by pension amount.
  - There is a clear difference in experience based on pension amount
  - May suggest the final table be based on lives with pension amounts of $2,500 and over
- Goal is to have proposed table with projection scale for August LHATF meeting