General Session 2: Social Insurance Perspectives and Implications

Discussant: Sam Gutterman, FSA, MAAA, FCAS, FCA, HONFIA

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Presented Papers:

Mortality Projections in the United Kingdom
Adrian Gallop, FIA

Mortality Projections for Social Security
Michel Montambeault, FSA, FCIA
Jean-Claude Menard, FSA, FCIA

Mortality Projections for Social Security
Alice Wade

We are indeed fortunate to have three excellent papers presented at this session. Each describes the basis of the mortality projections prepared by the government department responsible for the long-range actuarial projections of their respective social insurance retirement system. The authors of the papers are Alice Wade, Jean-Claude Ménard and Michel Montambeault, and Adrian Gallop regarding the U.S., Canadian and U.K. projections, respectively. In addition, each has provided a wealth of additional information concerning such topics as the stochastic modeling methods used, inter-country comparisons and the effect on mortality of significant personal risk characteristics of their overall populations.

The following discussion highlights some elements of the papers that I found particularly noteworthy that have not already been presented by the authors or discussed elsewhere during the course of this symposium.

Similarities

The general mortality patterns shown for the three countries are strikingly similar. The primary difference pointed out is a cohort effect that has been evident in the United Kingdom that has not been observed in the experience of North America. U.K. males born in the late 1920s and in the 1930s have consistently exhibited through their lifetime greater mortality improvements than those born earlier and later, with female mortality exhibiting similar, but not as significant, differentials. As an explanation for this effect, Mr. Gallop has pointed to possible differences in smoking, diet quality, education, health care and birth rates. Others have mentioned the possible effect of different amounts of food intake—the cohort with the favorable mortality has benefited from lower energy input in their youth.

All three sets of authors consider:

- Expert opinions. These are sought by all of the three government departments, although in different ways and at different intervals. The United States studies mortality every year, while in the United Kingdom a study is conducted every other year and in Canada every third year. In the United States, technical panels of expert actuaries, economists and demographers are formed every four years. In Canada, an independent peer review of the projections is conducted by a panel of actuaries every three years, and in the United Kingdom a wide range of experts is convened to provide input to the entire set of demographic projections prior to its biannual study.

- Mortality by cause (by age group). These are considered primarily for projections over the short-term. The U.S. projections consider mortality and mortality improvement by cause in an explicit manner, while the other two consider trends by cause on a judgmental basis.

- All three papers note a significant difference in population mortality by income, social class or occupation. In Canada, differences in life expectancy are given for high, middle and low income individuals, with a

larger difference for males than females between those of middle and high income. In the United Kingdom, differences in life expectancy by social class (generally determined by occupation category) are shown. The U.S. projections differentiate mortality by income level indirectly, in terms of its effect on average benefits payable.

- An important input to mortality projections is the determination of the current mortality level. Each country's projections use a somewhat similar technique, with all utilizing a smoothed set of rates as a starting point for their projections. In the United States, a regression of recent experience by age, gender and cause of death is used, while in Canada and the United Kingdom, a smoothed table over several years is used by age and gender.

Other Experience

Recent experience trends in the three countries in mortality of the oldest old (say, over age 85) appeared unclear and inconsistent, but the projections all assume reasonably significant improvements.

Each of the papers provides relativities between the life expectancies of males and females. In each country, the difference peaked 20 or 30 years ago and has been decreasing since then. These can be seen in the following table (in terms of difference in years of life expectancy):

	Canada		**United Kingdom**		**United States**	
	at birth	**at 65**	**at birth**	**at 65**	**at birth**	**at 65**
At peak	7.1	4.3	6.3	4.0	7.8	4.3
Recent	4.5	3.1	4.2	2.8	5.1	2.9

This decrease has in part been due to differences in the change in smoking patterns; that is, the peak of male smoking occurred earlier than that of female smoking. The mortality projections of each country result in a continuing decrease in

the difference in life expectancy between the two genders, although in all of the projections some difference is assumed to remain.

Display of Uncertainty

Ms. Wade's paper indicates that the uncertainty associated with the United States' mortality projections is displayed in two ways: (1) high and low deterministic projections are provided in addition to that of the intermediate estimate; and (2) a range of projections based on a stochastic methodology. Canadian projections primarily display the projection uncertainty by means of the results of a stochastic model, while the United Kingdom displays a deterministically determined high and low variant, similar to the first method used by the United States

Additional Information

Several interesting additional variables have been studied and are described in the papers. These are worthwhile to look at.

Included in the Montambeault and Ménard paper is a comparison between the mortality rates of those who were born in Canada and of those who weren't. Because, at least in part, immigrants to Canada are required to pass a medical examination, these immigrants have been found to experience better mortality than that of those who are not immigrants.

In both the Canadian and U.S. papers, relative mortality experience by marital status is provided. In both countries, mortality is shown to be better for those who are married when compared with that for those not married. The U.S. paper shows additional differentiation between those who are single, divorced and widowed, the differences of which vary by age and gender.

I encourage you to read all three papers. They provide significant and interesting differences in the background of and projection methodology and results of the three sets of mortality projections used in the assessment of the financial condition of each country's actuarial projections.