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Macrodemographic feasibility study RFP to be issued

by Judy Anderson
SOA Education Actuary

Actuaries are often slow to react quantitatively to public issues when more timely actuarial input can make a difference in the decision-making process. In contrast, other professionals may be quick to take a stand and make comments based on unreliable data. Our profession's slow response is often attributed to a lack of concrete supporting data on the issue and general reluctance to make bold deductions from shaky statistics.

Recently, debate about retirement income has increased. Discussions range from the adequacy of funding for government benefits, to the relative virtues of defined benefit and defined contribution plans, to the tax implications of changes in public policy on retirement income. Many professionals complain about the lack of reliable and universally accepted data on which to base specific analysis. Different professionals may arrive at contradictory conclusions by using different data.

As a profession, we owe it to the public to provide opinions on actuarial matters. To express our professional opinions with authority, we must base our conclusions on rigorous analysis of relevant facts. All these require a solid and universally recognized and accepted data source as a basis for our studies.

In Bob Berin's inaugural address last October, he said, "If the actuarial profession does not participate in or develop the costs of various national proposals, it is certain that others will, with the result that costs may be downplayed or ignored, at great loss to society. The profession's quantitative contribution would be left out of the debate. This kind of research to generate the data base could have a substantial payoff, because once developed, it would answer cost

questions related to any series of national time payment, such as welfare and unemployment."

The Society of Actuaries, the SOA Pension Section, the Conference of Consulting Actuaries and the American Society of Pension Actuaries are contributing funds in support of efforts to get the actuarial profession more involved in modeling that addresses national retirement income policy and health care reform.

Possible approaches to access or establish a central data source

Several public and private macrodemographic models already exist, with varying capabilities and sources of data. Some actuaries contend that efforts should be concentrated on making the existing models available for use without much extension.

Other actuaries believe that the existing models could be used as a starting point for building a new macrodemographic model. However, they want to identify the cost of creating and maintaining a model. They also question whether the existing data could be incorporated into a new model easily and how the data could be updated.

At the very least, we should find out more about the models currently available: how they work and what they have to offer.

Request for proposal (RFP) of a feasibility study

The above points to the need for a feasibility study. The Society of Actuaries has prepared a draft RFP which is being circulated to the Retirement Systems Practice Area committees, the Pension Section, and the other actuarial organizations for comment. The final RFP should be

sent to prospective researchers shortly.

Objective of the feasibility study

The feasibility study is intended to analyze each major existing database/model and investigate whether it would be practical to access it or to extend it into a new macrodemographic model. For each existing model, the study will address:

- The comprehensiveness and reliability of the database
- The availability and adaptability of the database for extension to a macrodemographic model
- Enhancements to these existing models and the expenses involved
- Maintenance requirements

This study will answer such critical questions as:

- The capability and efficiency of the ultimate model
- The flexibility and possible future extensions of this model
- Compatibility and communication with other databases/models

Scope of the macrodemographic model

Discussions on the scope, intended users, targeted benefit areas, and capabilities of a desirable model continue. Bob Berin has explained the concept at several actuarial clubs and association meetings and has received enthusiastic support and many valuable comments and suggestions. As a result of extensive discussions, the target scope of the model is currently formatted as follows:

Data base or dynamic model

The system may include a database and a dynamic model. A database is needed to provide universal and reliable demographic data for critical studies. A dynamic model will facilitate efficient and competent analysis of current issues.

Intended users

The system should contain critical information useful to both public and private sector organizations. The data could be used by actuaries to analyze the effect of economic and demographic changes on private companies or to provide accurate cost of public proposals involving federal or local governments.

Breadth of the data

To be universal, a model should cover the entire nation. Initially, the feasibility study would consider only the United States, with the hope of extending the model to Canada later.

To analyze the effect of various public policies, the model should contain specific data by geographical regions, industry, and plan sponsor.

Capability of the model

Ideally, the model would be dynamic and able to capture the interplay between government policy, the economic climate, and the private sector response. Thus, the model would provide an instrument to assess the effect of these items on one another and project that effect into the future.

Maintenance and update

To be effective, the database must be continually updated and the model

frequently expanded to cope with the ever-changing environment.

Importance

This project is probably one of the most extensive and important research projects that the actuarial profession has considered undertaking. The potential payoff is tremendous. Its success hinges on the general support received from the members of the profession. Any member with comments or any member interested in receiving a copy of the Request for Proposal may contact Judy Anderson or Tom Edwalds in the Society office.

Research studies multiple lives dependency risk in annuities

Jacques Carriere and Edward W. Frees

The world is becoming more competitive, and margins are shrinking. Actuaries are called upon to justify their assumptions to management and to other professional financial analysts. Explicit allowance should be made for risk, not only because of competitive market pressures but also for social equity considerations.

The Annuity Valuation with Dependent Mortality research project examines the standard industry practice of assuming independent lives for insurance products. To illustrate, when considering annuities, joint annuitants are often married couples. Social scientists generally agree that dependencies exist among the mortality of married couples. This may be due to a common living environment (is there adequate food and shelter?), shared health practices (do they belong to a health maintenance organization?), attitudes

towards risk (is skydiving a relaxing way to spend a weekend?), and so on.

Our research project investigates the use of models of dependent mortality. We consider a broad class of parametric models using a bivariate survivorship function called a copula. Using data from a large insurance company to illustrate our methods, we calculate maximum likelihood estimates to calibrate the model.

The estimation results show strong positive dependence between joint lives. This statistically significant result translates into real economic significance. When dependent mortality models are used instead of the standard models that assume independence, annuity values decrease by about 5%. We show that the results are robust in terms of the choice of parametric family of distribution functions. The dependence becomes stronger when we account for the significant adverse



selection against the company that the data reveals.

The "Annuity Valuation with Dependent Mortality" research report is available at no charge from the SOA Research Department, 708/706-3574. Jacques F. Carriere is associate professor at the University of Manitoba's Warren Centre for Actuarial Studies and Research in Winnipeg. Edward (Jed) W. Frees is professor of business and statistics at the University of Wisconsin's School of Business in Madison.