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DUKE CONFERENCE ON SIMULATION

by Edward A. Lew

In its continuing endeavors to explore new mathematical and statistical techniques which might be of value to the actuarial profession, the Society's Committee on Research co-sponsored a conference on simulation at Duke University, Oct. 31-Nov. 2. The other sponsors were Duke University and the committee on Mathematical Theory of Risk of the Casualty Actuarial Society.

The conference focused on applications to insurance of mathematical and simulation models developed for complex business processes. With computer simulation techniques, it is now feasible to construct elaborate models that include a variety of realistic complications which cannot easily be encompassed by a mathematical model alone. Involvement in the construction of simulation models provides a very effective way for visualizing complicated operations.

Some 106 individuals, including nearly 100 actuaries, took part in the conference, which was built around ten papers on key topics, supplemented by prepared and informal discussions. The participants gave their undivided and enthusiastic attention to the proceedings over a two and one-half day period, which not only indicates the interest in simulation but is also a tribute to the expository ability of the speakers.

The conference opened with a broad review by Professor Thomas H. Naylor of Duke University of computer simulation models for economic systems and firms, Professor Naylor is the principal author of the recommended text, *Computer Simulation Techniques* (John Wiley, 1966). In his remarks, he stressed the value of tying in the effects

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ACTUARIAL SCIENCE PROGRAM AT UNIVERSITY OF CONNECTICUT

by William T. Fisher, Ph.D.

The enrollment in the actuarial science program at the University of Connecticut School of Insurance in Hartford has increased steadily since its inception in July 1966. The program is offered in the late afternoon and evening to persons employed in actuarial work who are seeking the professional designation of Associate or Fellow of the Society of Actuaries.

Designed to follow the syllabus of the examinations of the Society of Actuaries, the courses deal with the subject matter relating to Parts I through VIII. The schedule has been arranged to permit students to complete courses relating to a particular Society examination shortly before the examination is to be written either in May or November.

To be admitted to the program, the applicant must have earned a bachelor's degree from a college or university of approved standing and submit a recommendation from an actuarial official of his insurance company. The courses do not carry credit at the University of Connecticut, but they are of such level as to be intellectually challenging and provide academic experiences equivalent to those normally expected in graduate study.

Since membership by examination in the Society of Actuaries is an important criterion of professional actuarial status, the relation of the courses in the program to the actuarial examinations is of interest. Courses offered by the University of Connecticut are as follows: General Mathematics; Probability and Statistics; Finite Differences, Compound Interest and Annuities Certain; Life

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FINAL REGULATIONS ON INTEGRATION WITH SOCIAL SECURITY

by E. F. Boynton

The revised Income Tax Regulations pertaining to integration of qualified pension plans with Social Security benefits were published in final form on Nov. 13. As expected, the principles underlying the determination of the basic integration limit remain essentially unchanged from the proposed Regulations issued in July. The basic integration limit is set at 30% of excess compensation, and represents a decrease of 20% from the prior limit of 37½%.

Although there have been no major changes from the proposed regulations, a few modifications have been made in the direction of simplification of certain rules which were particularly complicated in the original proposal. The principal modifications made from the proposed Regulations are:

(1) The effective date has been postponed from Jan. 1, 1971, to Jan. 1, 1972, thus giving an extra year to make any necessary amendments.

(2) The moving wage base concept which required a separate "bend point" in final average plan formulas for each year of retirement has been simplified somewhat by using an averaging device, so that a single fixed bend point can apply for an extended period of time. For example, the bend point in a final average excess plan can be $6000 for employees retiring in the period 1972 to 1978, $6600 for the period 1979 to 1993, etc.

(3) Any compensation level up to the applicable maximum average Social Security earnings for the year of retirement can be used as a bend point. For example, if the change is made effective Jan. 1, 1972, a final pay excess plan could use a fixed bend point of $6000

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Consumer Price Index

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of the Retired Couple's Budget moved up 130% or about 5.3% per year, with prices up about 3.0% per year and improved levels of living 2.3%. Computations based on comparable data for autumns of 1959 and 1966 show that real upgrading in the level of living approximated an annual rate of 2.2% for City Worker's Families and 2.3% for Retired Couples.

These budgets reflect changes in the cost of living for the particular groups at a moderate level. Unfortunately, they are compiled infrequently and the older data are limited in terms of city coverage. The available figures, however, provide a rough check of other more regularly available data for such measurement. The quarterly and annual data on the changes in personal income and on wage and salary disbursements compiled by the Office of Business Economics of the Department of Commerce can readily be used for this purpose. These figures, computed per capita, reflect the wherewithal available to Americans for the maintenance of their changing levels of living as affected by price increases, i.e. changes in their cost of living.

Other Comparisons

Between 1950 and 1966, using annual data, the per capita personal income increased at the approximate annual rate of 4.4% and wage and salary disbursements at the rate of 4.7%. CPI during this period advanced at the average rate of 1.9% per year. Improvements in the real levels of living approximated on this basis 2.4% per year when measured in terms of personal income and 2.7% when related to wages and salary disbursements.

Data on per-capita personal income or wage and salary disbursements can be used as suitable approximations in adjusting pensions for changes in the cost of living. They are available on a current basis, though with a lag of a few months following the end either of a calendar quarter or of a year. They are also subject to subsequent revisions. CPI is typically not revised except in case of major computational or reporting errors. Should these figures be used, cumulative corrections would be introduced whenever the pension levels are scheduled for subsequent revisions through the use of the latest available figures and their comparison with the data last utilized.

It is also possible to compute the effect of the changes in the cost of living by combining CPI with data on the output per man-hour in the private economy. The latter statistics may be deemed to measure the ability of the nation to improve consumption, i.e. its real level of living. As shown by BLS, output per man-hour in the private economy gained between 1950 and 1966 at the approximate annual rate of 3.1% (the rate was about the same whether man-hours were derived from establishments reports or household surveys). With CPI moving up at about 1.9% a year, the estimated rise in the cost of living computed from these figures approximates 5.0% per year.

Initial Pension Adequate?

Information on the output per man-hour in the private economy is periodically released by the Bureau of Labor Statistics and is also published in the annual Economic Report of the President. The use of the current data on changes in output per man-hour could of course be replaced by data on its long range average behavior.

The adjustment of pensions for price changes alone or for changes in cost of living affected both by price changes and upgrading in living standards do not provide needed corrections if pensions were inadequate when first established. In the case of negotiated pensions, a review of their adequacy can take place in the course of contract negotiations. In the case of social security benefits, this is up to the Congress. No pre-determined formula can be provided to correct initial shortcomings of a pension structure. To be otherwise, all parties to the drafting of initial pension formulae would have to agree on the extent of inadequacies. This is not likely to occur. □

Social Security Integration

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for all employees and applicable to all service.

(4) The complex transitional clause has been simplified, but is still far from a full grandfather clause. Benefits accrued up to Jan. 1, 1972 under existing plans may be preserved without change, with formula changes affecting only future service benefits. Further, the prospective benefit at retirement, projected on the basis of current pay levels and the present formula, may be preserved as a minimum benefit for all employees at retirement, except for major stockholder-employees. This latter change is largely for the benefit of individual policy plans.

(5) The integration limits for females may be tested at age 60, rather than age 65 as in the proposed regulations. However, no liberalization is indicated for easing integration rules applicable to subsidized early retirement provisions which have become popular recently.

At present the full implications of the new regulations cannot be accurately determined until IRS issues a supplemental Revenue Ruling, which presumably will contain more detailed explanations and examples of the applications of the new rules.

With IRS now approaching the finale on this long-discussed integration question, one must conclude that the entire experience has been frustrating and disappointing. Despite sound actuarial and practical objections to the so-called mathematical approach from most experts in the field, including the actuaries at the Social Security Administration, Treasury did not change its approach. Most experts in the field believe that the integration regulations have always gone well beyond the intent of the Congress in writing the non-discrimination rules, but have been willing to go along with the prior rules as long as they produced a reasonable answer. Many observers now feel that the long-range implications of the new regulations on integrated plans are serious enough that it would be worthwhile to bring the whole matter before the Congress in order to clarify the intent of the original Internal Revenue Code provisions. □