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Early-release copies of *TSA* papers available

The following are five of the papers accepted for publication in Volume 47 of the *Transactions*. Biographical sketches of the authors are included. For preprints or early release copies, contact SOA Books and Publications Department.

"The 'Pension Max' Election: An Investigation of the Structural and Economic Differences between the 100% Contingent Annuity Pension Benefit Option and the Straight Life Benefit Option used in Conjunction with Pension Max" *by Klaus Shigley*

The pension max concept calls for electing an unreduced pension, that is, maximizing the pension in lieu of electing a reduced "contingent annuity" (CA) or "joint and survivor" (J&S) option. The marketing concept also calls for the purchase of employee life insurance to substitute for economic exposure created by opting out of the CA or J&S option. This concept is generating a great deal of activity among life insurance marketers.

While the marketing concept is clear and simple, its economics continue to generate discussion. It's also received some skeptical reviews in the popular news media. The most recent example is an article by Jane Bryant Quinn in the April 4, 1994, issue of *Newsweek*. This paper concludes that in certain situations, pension max is superior to the CA election. The main reason for bias is that assumptions used to calculate actuarial equivalences in qualified plans are often "hardwired" and unresponsive to current economic conditions. Reasons for this include the Supreme Court's Norris decision, which mandates unisex rates and ERISA anti-cutback rules. An appropriate analogy is that the CA benefit calculation in qualified plans uses a fixed exchange rate mechanism in contrast to the floating exchange rate mechanism used in the sale of life insurance.

The differences between pension max and the CA option are examined in three parts:
1) The differences in the funding pattern
2) The differences in the benefit pattern
3) The relative economics

This paper concludes with some generalizations based on this analysis.

Klaus Shigley, FSA 1976, MAAA 1977, EA 1976, is a vice president for John Hancock Guaranteed and Stable Value Products division. He has a B.A. in mathematics from the University of California at Berkeley and a M.A. in mathematics from the University of Massachusetts. Shigley is a member of the SOA Product Development
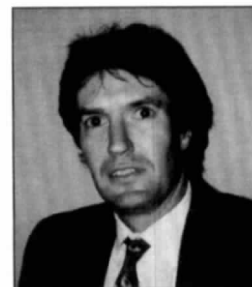
Klaus Shigley

Section Council and the Committee on Life Practice Research. He is a former chair of the Committee on Papers for the *Transactions*. His published papers include "Guaranteed Investment Contracts," in *The Handbook of Fixed Income Securities*, Fabozzi, 3rd edition, and "Unit Expense Factors for Risk-Based Capital Requirements," in *Product Development News*.

"Cash Value Life Insurance for the Twenty-First Century: Segregated Life and the Individual Death Benefit Account" *by Stephen Reddy*

Despite very distinct investment and mortality components and universal life's billing as an "unbundled" product, cash value life insurance in the United States remains very much a bundled product. Variable life products do offer some investment choices, but consumers cannot buy cash value life insurance like they typically buy a stereo system (that is, by choosing the separate components they prefer, with-

out paying a penalty). Any attempt to do so, such as buying term life insurance and investing the difference, typically results in less favorable tax treatment.

The author explores a new product form that could be thought of as "buying whole life and investing the difference." In this scenario, the product employs elements of both current and bundled structures and separate component investment products. The author offers arguments for the justification and likely preservation of current tax-deferred treatment. More importantly, this new product could provide remedies for a multitude of problems now festering in today's product environment. These problems include increasing competition from other financial products and institutions, confusing dividend scales and policy illustrations, a lack of policies backed by higher yielding equity investments, the run-on-the-bank threat, and wasteful replacement activity. Finally, the author argues that open markets, rather than prohibitive legislation, should determine product viability.

Stephen Reddy

Stephen Reddy, FSA 1983, is a consultant on asset/liability management issues as a vice president for Morgan Stanley and Company in New York. After receiving his B.A. in mathematics from Bucknell University, Reddy worked at three large mutual life insurers before joining Morgan Stanley. He currently serves on the Investment Section Council and also is a member of the American Academy of Actuaries. His research activities include development of an interactive

asset/liability computer model, recently co-authoring the Academy paper, "Fair Valuation of Life Insurance Company Liabilities" (1995), and co-editing the SOA's *Dynamic Financial Condition Analysis Handbook* (1995).

"Paygo Funding Stability and Intergenerational Equity"
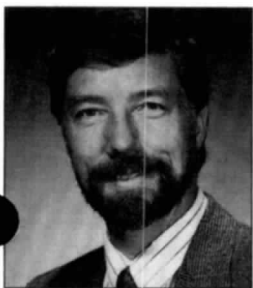*by Rob Brown*

Nearly every western industrialized nation provides its citizens with significant social security benefits, funding virtually every plan on a pay-as-you-go (paygo) basis. The most rapidly aging population is in Canada.

Population aging has obvious repercussions for paygo systems. These systems will come under increasing pressure as the ratio of retirees to workers rises, especially after 2015.

Using Canadian data, the author formulates an age-of-entitlement model, under which any paygo social security system can achieve a wealth transfer equilibrium. This occurs by using a rising age of entitlement for social security retirement income benefits. For any wealth transfer ratio thought desirable, there exists a corresponding age-of-entitlement formula.

The author presents the age shift that will keep Canada's wealth transfer constant over the next 50 years. Other western industrialized nations could achieve this equilibrium with smaller shifts in the age of entitlement.

Robert L. Brown, FSA 1976, FICA 1977, ACAS 1980, is professor in the Department of Statistics and Actuarial Science and director of the Institute of Insurance and Pension Research at the University of Waterloo, Ontario. He received an honors bachelor's degree in mathematics and master of arts degree in gerontology from the University of

Rob Brown

Waterloo. He has served as president of the Canadian Institute of Actuaries, director of SOA publications, and on the SOA Board of Governors. He is the author of five books, including *Economic Security in an Aging Population* (Toronto, Ontario: Butterworths Canada, 1991) and *Introduction to the Mathematics of Demography,* 2nd edition (Winsted and Avon, Connecticut: Actex Publications, 1993). He has published several papers in scientific and technical journals.

"Orphanhood in the United States"
by Bertram Kestenbaum

Alfred Lotka demonstrated in 1931 how indirect methods could measure prevalence and incidence of orphanhood. For several decades, interest in both subject matter and methodology was substantial but has diminished lately, presumably because orphanhood no longer tops the list of social problems besetting children.

This paper presents some improvements on the Lotka methodology and some substantive results for 1989/90.

Bertram M. Kestenbaum, ASA 1985, is an actuary in the Office of the Actuary of the Social Security Administration. He graduated summa cum laude from Brooklyn College with a bachelor's degree in mathematics and received a master's degree in biostatistics

Bertram Kestenbaum

from the Johns Hopkins University School of Hygiene and Public Health. His papers have appeared in the *Journal of the American Statistical Association, Demography,* and other journals. He serves on the SOA Course 161 (demography) Examination Committee.

"Testing Financial Stability of Continuing Care Retirement Communities" *by Ernest J. Moorhead and Niels H. Fischer*

This paper introduces continuing care retirement communities to the *Transactions.* It outlines recent major developments in financing procedures and regulatory requirements aimed at keeping these entities solvent. It describes the major differences that sometimes occur in the bottom line as a result of using AICPA guidelines rather than American Academy of Actuaries guidelines.

The paper will be helpful for actuarial consultants who may advise continuing care retirement communities (CCRCs), for insurance company actuaries responsible for senior market products, and for Society members who contemplate living in these facilities.

Ernest J. Moorhead, FSA 1938, MAAA 1965, AIA 1971, began his actuarial career at Great-West Life in 1929. He was with a predecessor of the Life Insurance Marketing and Research Association (LIMRA) from 1945-48.

Ernest J. Moorhead

Following this, his career included working for United States Life in New York City, New England Mutual Life, and Integon in Winston-Salem, North Carolina, where he retired from in 1972. Since that time, he has participated in public interest activities, including advisory work for the U.S. Senate Subcommittee on Antitrust and Monopoly and two studies of the financial problems of the Social Security system. He has served as SOA president (1969-70) and as president of the American Academy of Actuaries (1973-74). He has also served the SOA as chair of the Committee on Papers and as editor of *The Actuary.* He wrote *Our Yesterdays: the History of the Actuarial Profession in North America, 1809-1979,* published by the Society as part of the profession's centennial celebration in

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1989. He has published several papers, discussions, and book reviews in the *Transactions*.

Niels H. Fischer, FSA 1953, MAAA 1965, is a consultant with Bay State Actuaries in Needham, Massachusetts.

Niels Fischer

His practice is principally in accident and health special risks and inter-national reinsurance. Following U.S. Navy service in World War II and graduation from Middlebury College, he worked for Aetna from 1949 to 1976. As vice president heading individual, special risk, and small-group health insurance operations, he introduced the industry's first cash value disability policy. He was later with Metropolitan Life and Milliman and Robertson, where he formed their Boston health practice. He has written articles for *Best's Review, Insurance Advocate,* and *Money Magazine*. He was a contributor to *Life Insurance* (Heubner and Black) and co-authored the SOA textbook, *Health Insurance Through Individual Policies*.

"Graduation by Kernel and Adaptive Kernel Methods with a Boundary Correction"
by John Gavin, Steven Haberman, and Richard Verrall
This paper discusses how the humble moving-weighted-average is perhaps the oldest method for graduating a mortality table. Despite its simplicity and intuitive appeal, it is often criti-cized because of its failure to produce graduations that match the smoothness of other methods. In this paper, the authors take advantage of the power of computers to re-examine the moving average technique through a more recent method known as kernel smoothing. The authors explore the strong relationship between these two

techniques, but argue that kernel methods offer a more flexible solution to graduation.

John Gavin graduated in mathe-matics from University College, Cork, Ireland, in 1987. He received his diploma and a master's degree in actuarial science from City University, London. Now studying for a Ph.D. in

John Gavin

statistics at the University of Bath, his work experience includes four years with The Sun Alliance Insurance Group. He has published papers in *Insurance: Mathematics and Economics* and *The Journal of the Institute of Actuaries*.

Steven Haberman, ASA 1976, FIA 1975, is professor of actuarial science at City University, London, and head of the Department of Actuarial Science and Statistics. Founding director of the Actuarial Research Centre at the university, he graduated in mathemat-ics from Cambridge University in 1972 and joined Prudential Assurance

Steven Haberman

Company. He joined City University in 1974 as a lecturer and received his Ph.D. there in 1982. In his second term on the Council of the Institute of Actuaries, he

has served on several committees, including the CMI AIDS Sub-Committee. He is co-author of *Pensions: The Problems of Today and Tomorrow* (1987: Allen and Unwin) and *Actuarial Mathematics* (1993: Institute and Faculty of Actuaries). He has published more than 60 papers in several journals. He also has won two research prizes from the Institute of Actuaries. His research interests focus on graduation methods, pension fund models, motor insurance premium rating, mortality and morbidity.

Richard Verrall is director of the Master of Science program in Actuarial Science and senior lecturer in the Department of Actuarial Science and Statistics at City University, London. Graduating in mathematics from St. John's College, Cambridge, England, in 1981, he received a master's in

Richard Verrall

statistics from University College, London, in 1982 and a Ph.D. from City University in 1989. He has published papers on claims reserv-ing, graduation, motor premium rating, and excess mortality rating in *Insurance: Mathematics and Economics, ASTIN Bulletin, Journal of the Institute of Actuaries, and Scandinavian Actuarial Journal*. In 1993 he received first prize in the Casualty Actuarial Society's prize competition on the variability of loss reserves.