

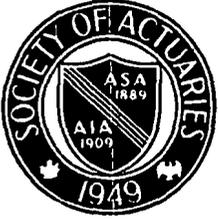


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# The Actuary

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## APOSTLES vs. PROPHETS

by David S. Williams

No, this is not a report on last weekend's game in the Ecclesiastical Football League. Rather, it has to do with your appraisal of the "world problematique", the global complex of problems popularized through the "Limits to Growth" controversy. Are you basically a "prophet of doom", or do you count yourself as an "apostle of hope"? Whether you occupy one of the extreme positions or a point somewhere in between, you are assured of the support of numerous experts, e.g.,

"The battle to feed humanity is over. Unlike battles of military forces, it is possible to know the results of the population-food conflict while the armies are still in the field. Sometime between 1970 and 1985, the world will undergo vast famines—hundreds of millions of people are going to starve to death. That is, they will starve to death unless plague, thermo-nuclear war, or some other agent kills them first."

"Even if there were no new discoveries in food-growing technology from now on, and we continued to cultivate only the very small proportion of the earth's surface now used as farmland, a raising of all other countries' efficiency of cultivation to that of the Netherlands would already suffice to feed 60 billion people."

"We can and must commit ourselves to a lower rate of growth in the use of natural resources. In one decade, 1959 to 1968, the United States alone used more resources than all the world's people in all of previous history."

"It is not reasonable to assume that general resource exhaustion will reduce industrial output ever, let alone within a few hundred years."

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## VARIABLE LIFE INSURANCE

by Robert O. Dausman

At the Spring Meeting of the Southeastern Actuaries Club held on June 13 and 14, Mr. Walter S. Rugland discussed various aspects of Variable Life Insurance including the many problems still awaiting solution.

He began his address by stating that the viability of the VLI product depends upon favorable treatment of the product by various regulatory bodies. It appears that development work by the interested companies has ceased until the regulatory picture is cleared.

He noted some possible threats to VLI. Some of them were: (1) a commission rate at mutual fund rates, (2) investment gains taxed directly to the policyholder, (3) proceeds to beneficiaries could be taxed, and (4) insurance company taxes on VLI product line could be restrictively high.

His personal feelings are that VLI, as defined today, is a weak answer to inflationary problems inherent in permanent life insurance. Since the design of this product in 1968-1969, there has arisen a new dimension to inflation and to the equity market place.

Mr. Rugland then discussed the eight pertinent development issues other than the technical aspects. They are: alternative VLI approaches, agency officer commitment, proposed amendment to Rule 3c-4 — Marketing Implications, external influences, NAIC model, VLI investment vehicles, and finally, basic questions.

1. *Alternative VLI Approaches.* Mr. Rugland felt that product designs should be the creation of a product to fill a market need. Each company needs to evaluate its market and why people buy from it. His conclusion was that a company should not

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## SOLVENCY, THE INTERNATIONAL VIEW

*Financial Guarantees Required from Life Assurance Concerns, Organization for Economic Cooperation and Development, Paris, 1971.*

by James C. Hickman

Life insurance is a serious business. Through the political process, the public long ago made it clear that it expects a high degree of stability and continuity in the operation of life insurance companies. One of the principal obligations of the actuarial profession to the public it serves, is to design and manage life insurance systems that have a high probability of remaining solvent. Consequently, any discussion of solvency standards for life insurance companies is, in fact, a discussion of the foundations of actuarial science.

To honor the chairman of the committee that prepared the report, and in response to the imposing length of its title, this document is usually referred to as the Buol report. During the time that the report was being prepared, Mr. Buol was a member of the Swiss Insurance Supervisory Service.

The OECD, the organization that commissioned the Buol report, may not be well known to actuaries. It was created by an international convention signed in Paris in 1960. Twenty four countries, including the United States and Canada, are members. Yugoslavia has a special status, different from full membership. Member countries account for about 70% of world trade and 95% of all development aid. OECD sponsors a broad program of research and technical services with the objective of achieving the goals stated in its name.

The Buol report was written by representatives from ten European countries. Consequently, North American actuaries may find some of the actuarial terms

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## Solvency

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employed a little strange. The objective was to study how solvency standards for life insurance companies might be aligned in order to promote international insurance operations. The Foreword of the report stresses that the report does not commit either the member governments or OECD itself. Nevertheless, Chapter V of the report does go so far as to propose a procedure by which the participating countries might devise a multinational system of solvency standards.

Although the United States and Canada were not represented on the Buol committee, the report has much to say to North American actuaries. In the United States we are engaged in another of our periodic reviews of solvency standards. In this review, it would seem prudent to study the ideas of our European colleagues.

What are the innovative ideas in the Buol report? First of all the main problem of valuing life insurance liabilities is divided into two subproblems. The first subproblem concerns solvency standards for insurance portfolios consisting of life, endowment, and annuity policies with significant savings elements. For such portfolios a traditional actuarial solution, reserves based on a strengthened interest rate assumption, is recommended. For other life insurance portfolios, where the mortality risk is predominant because the portfolio is young, or because it consists of short term or complementary insurance such as accidental death or disability, a special risk theory based reserve is recommended. The force of the recommendation is to produce a special risk reserve that consists of a constant amount plus an amount proportional to the total premium in force.

Because the problem is familiar and has been rehashed recently in connection with the determination with the interest assumption for the released from risk reserves required by GAAP accounting, North American actuaries will probably study paragraphs 61, 62, and 63 with particular care. In these paragraphs, the question of a basic valuation interest rate and its strengthening is discussed. Other than a fixed maximum rate, the report recommends that the basic valuation rate be a function of a twenty year moving average of the effective annual rate of yield on life insurance assets in

the country in question. Certain modifications of this basic rate, to allow for recent interest rate trends, are suggested. After the basic valuation rate is determined, it is strengthened by reducing it by 20%. Appendix I is devoted to demonstrating that this strengthened rate will produce safety margins adequate for significant changes in mortality and management expenses.

Chapter III contains the discussion of the special risk reserve. This chapter will seem novel to many North American actuaries. Nevertheless, the basic proposition that reserves proportioned to net premiums may not be adequate for young companies or for risk portfolios in which the claims risk dominates, has been expressed by several members of the Society of Actuaries. The development of the formula for the special risk reserve, which is stated in paragraph 80 of the Buol report, is discussed by Ammeter in "The Solvency Problem Risk Life Insurance," *ARCH* 1972-3. A sketch of the development also appears in Appendix IV of the Buol report. The collective risk model is used with a negative binomial distribution for the number of claims and a gamma distribution for the individual claim amounts. With the asymptotic probability of ruin fixed at .005, a set of reasonable and conservative estimates of the parameters of the risk process are derived. The final result is a special reserve formula with two terms. The constant term depends on the average claim size and the safety loading, while the variable term depends on the total premium and the safety loading. The report also wisely provides for grading the special risk reserve down to zero for companies for which pure risk insurance is a relatively small part of its total business.

Measuring liabilities is only one half of the job in determining solvency. An estimate must also be made of the present value of future income from investments. The report restates conventional views on valuing bonds, direct loans, mortgages and real estate. It also provides some useful information about European practice in valuing assets. On the especially perplexing issue of valuing common stocks, the report suggests 80% of market value or adjusting market value by the application of a reduction factor that depends on the quotient of the year end stock market index and the three year average of year end stock market index values. The enforced re-

duction that might occur shortly after the purchase of common stocks would seem unreasonable to some, even if for the laudable purpose of conservatively measuring solvency.

On two issues of interest to North American actuaries, the committee took an equivocal stand. The first concerns the use of modified reserves (Zillmerized reserves) to provide at least partially for the amortization of acquisitional costs. This practice is an established part of North American valuation practice. Yet the Buol Committee could not agree upon either support or opposition to modified reserve systems. The conventional arguments are reviewed in paragraph 49 and Appendix III is a primer on amortizing initial expenses by way of the reserve system.

The second troublesome issue concerns the degree of emphasis to be placed on the interdependence of the rate of interest used in valuing future payment streams arising from insurance liabilities and investments. The development of a theory of matching between these future cash flows is probably the principal contribution of British actuaries to contemporary thought on insurance management. After acknowledging the validity of the British view on the importance of the degree of matching, the report concludes that the British system probably cannot be exported. The relaxed regulatory system, the highly developed capital markets, with ample long term investment opportunities, and flexible surrender values seem to be unique to Britain and this may limit the applicability of matching ideas to the United Kingdom.

Besides providing fresh insights into a perpetual actuarial problem, the Buol report forcefully brings several questions to the attention of North American actuaries. Can the two key ideas (fixing valuation rates as a strengthened rate determined by a statistical formula, and a special risk reserve for small portfolios in which claims risk dominates) be implemented in our rapidly changing North American economy? And, of course, there is a dual question. What are the penalties for not adopting a more flexible solvency measurement system which might employ some of the novel ideas of the Buol report?

*This report may be purchased for \$3.00 from, OECD Publication Center, Suite 1207, 1750 Pennsylvania Avenue, N.W., Washington, D.C. 20006. □*