SOCIETY OF ACTUARIES

Article from:

The Actuary

November 1976 – Volume 10, No. 9

stem's actual needs based on the particular risk or remoteness of possible termination or of future limitations on ability to pay.

There is one aspect of the level of funding that this reviewer thinks should be given consideration. Two fund balances can be available from the accounts of the system or developed by actuarial valuation; namely, the accumulated member contributions and the retired reserve fund representing the balances available for retired members and beneficiaries. In my opinion, the total assets of the system should never be less than the sum of the balances in the members' accounts and in the retired reserve fund since these might both be considered as representing liabilities that should be fully funded at any given time. This posture is helpful in dealing with legislators and others who try to liberalize benefits with the plea that the assets are far in excess of the amount currently required for benefit payments. If they are made to realize that the contributing members have little, if any, equity in the fund besides their own contributions (although many of them have substantial vested accrued benefits) and that the liabilities for retired members and beneficiaries should be fully funded, they may be less likely to think in terms of the total assets as being available for liberalizing benefits for present pensioners and others retiring in the near future.

The current benefit levels in the plans of state and local government employees are frequently more generous than corresponding plans in private industry. While most public employee plans require substantial member contributions, this feature is more than offset by; the liberality of the final average pay definition, the fact that most benefit formulas are not coordinated with Social Security, and the generally very liberal provisions for early retirement. Furthermore, a high percentage of these public employee plans provide for automatic increases after retirement on the basis of the Consumer Price Index or by means of periodic ad hoc increases.

In a chapter entitled Goals and Limits Retirement Income it is pointed out that a goal of 80% of final salary including Social Security has special significance for an employee retiring at age 65. This level can provide as much *net income* as when the employee was working. In view of this it is reasonable to set a goal for retirement income not in excess of a full continuance of net income for the retiring career employee.

There are three chapters that relate to Social Security, the first describing the need for reform, the second discussing the merits of coverage for public employees and the third, suggesting ways of integrating public employee systems with Social Security. The question of the merits of government units electing Social Security coverage is very well presented and then later the possibility of withdrawing from coverage is discussed. The question of withdrawal of public employee groups is a very lively issue at the present time and the author's discussion is well worth reading.

Other chapters involve the discussion of portability of pension credits, investment policies, and procedures and pension plans for policemen and firemen. Plans for the last group inevitably require extremely high contribution rates because of early retirement ages, liberal pensions and special provisions for service-connected death and disability.

A later chapter covering several general policy questions discusses special treatment of pensions for legislators, judges and executives in the public employee plans. An interesting question is raised whether or not the nondiscrimination requirements of the Internal Revenue Code with respect to qualified pension plans would be satisfied when such members are provided more liberal treatment than the general state employees.

Three chapters are devoted to the public retirement systems in New York, Massachusetts and Illinois. They provide a detailed insight into the problems that arise in these systems and mention the so-called "leap-frogging" phenomenon where each public retirement system in a state tries to outdo the others in liberalizations.

Many of these public plans provide either directly by law or indirectly by interpretation that benefit rights, whether accrued or for future service, may not be diminished or impaired for an existing member nor may his contribution rates be increased. Consequently, if retirement benefits in one of these systems get out of line, it is not possible to reduce them for the present membership but only for members joining in the future. Such changes have occurred in several of the large systems within the recent years.

Note: A more detailed review of this book will be published in the Transactions. □

OASDI

Report of the Consultant Panel on Social Security to the United States Congressional Research Service, Government Printing Office, Washington, D.C., August, 1976, $1.90.

by C. L. Trowbridge

This report contains the results of another government-initiated study of the OASDI system. This study puts forth a second solution to a problem first publicly identified by the 1975 Advisory Council on Social Security (a problem which has come to be known as the "decoupling" issue). Because the solution proposed by the actuaries and economists making up this consultant panel is significantly different from that of the Advisory Council, this report has inspired some degree of friendly debate among actuaries (and others) interested in the technicalities of the OASDI benefit formula. Panel members are Peter A. Diamond, James C. Hickman, Ernest J. Moorhead, and William C. Hsiao, Chairman.

The Reports of the Quadrennial Advisory Council on Social Security, published in March, 1975 and reviewed in the 1975 *Transactions*, include an extremely important recommendation. To correct what the Advisory Council considered to be a serious flaw in the OASDI benefit structure (operating under the so-called "automatic" provisions incorporated into the Social Security Act by the 1972 Amendments), the Council proposed a set of benefit formula changes. These would isolate the benefits for those not yet beneficiaries from the CPI adjustments for those already on the beneficiary rolls—hence the "decoupling" terminology. The purpose of these proposed changes is to stabilize replacement ratios by the elimination of what has come to be recognized as an over-indexing of the worker's potential benefit.

As compared to those who write summaries of publications, those who write reviews are not expected to be entirely objective with respect to the work under

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Expert Witness

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grees to qualify as an expert; he need only have special skill in or knowledge of a particular subject."

On matters of ethics, a person asked to testify as an expert is cautioned to "insure that he understands fully the nature of the subject matter about which he is expected to testify." Messrs. Van Matre and Clark add: "The expert may find it necessary to advise the lawyer that the subject matter is so commonplace as to be beyond the need of expert testimony, or so at variance with the expert's own field of knowledge that another expert should be consulted." This will sound very familiar to actuaries whose ethical standards require expertise in a given field before rendering advice in it.

The authors also caution that the expert witness may be easily caught up in the zeal of the advocate who employs him, and state that he should remain an independent agent. The expert witness is not an advocate and "can best serve himself as well as his employer by being neutral. If the results of his study fail to support the lawyer's position, the lawyer will not likely use the data or the expert."

Speaking with benefit of some experience in this area, the reviewer can add that in the case of actuarial testimony (as in other highly technical fields) the witness frequently may find his role to be largely an educational one. This may come about through helpful suggestions to the attorney in preparing proper and meaningful questions having clear answers. But the educational role is most evident in the rendering of answers from the stand in as simple and unambiguous language as possible for the benefit of the court and of the jury (when there is one). The communicating of technical concepts so as to be comprehensible to laymen is the key to effective testimony, and can be a deciding factor in the outcome of a case.

But an actuary who is a purist may sometimes shake his head in frustration at the precision expected in his answers, only to find that the settlement awarded bears no obvious relationship to his carefully researched figures. That, is because his testimony is only one of many guides to the jury or the judge who often have the habit of averaging testimony, or even claims and testimony!

One case illustration in the article under review demonstrated a use of probabilistic evidence by a mathematician that, to a down-to-earth actuary, seems a little far out. It concerned a criminal case where defendants were convicted largely on the basis of unsubstantiated probabilities introduced by a mathematician. It had been established that the assailant in the case was a white female with blond ponytails, and her companion a black male with a mustache and beard, and that they had escaped in a yellow automobile. Defendants answered to these descriptions and had a yellow car. The expert computed that the joint probability of observing these various characteristics was one in twelve million, on his own assumptions, which helped "clinch" the case. Fortunately, in this reviewer's opinion, the State Supreme Court reversed the decision, pointing out (1) there was no statistical support for the assumed probabilities of the various characteristics, and (2) the probabilities were assumed to be independent and such was not true for certain of the factors involved.

All in all, the article would make helpful reading to anyone facing his first experience as an "expert witness."

The American Statistical Association has kindly given the Society of Actuaries permission to reproduce the article and copies may be had on request to the Chicago office. □

OASDI

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review; but they are expected to state their biases. It is therefore incumbent upon this reviewer to acknowledge that he was one of a five-member group of consultants to the 1975 Advisory Council, and is clearly associated with the solution proposed by the Council. Since the four-man panel responsible for this new report can be viewed as challenging the conclusions of the Advisory Council's consultants, this reviewer's objectivity may be suspect. He admits to continuing to hold his original views as to the superiority of the Advisory Council approach; but he considers this new report to have merit and to be worthy the attention of any actuary interested enough to delve into an extremely interesting analytical problem.

In form the two competing proposals are much alike. Both would index benefits for those on the beneficiary rolls as under current law. Both would introduce the principle that the social security wage records are also to be indexed before they are averaged, thus replacing the AMW (average monthly wage) in current law by an AMIE (average monthly indexed earnings). Both would replace the complicated multi-step formula now defining the PIA (primary insurance amount) in terms of average wages with a simpler two or three step formula. In both cases this formula would be designed to fit as closely as possible the PIA's for those becoming beneficiaries on or near the effective date of change. In both cases the breakpoints in the formula would be dynamic, being themselves indexed. Moreover, both approaches would leave unchanged the slowly lengthening averaging period, the five-year drop-out, and the other details of what earnings a taken into the calculation of averaging earnings. Both would maintain the present "automatic" procedure for keeping the taxable wage base current.

The technical differences are largely concentrated in the indexing of the wage records (for the calculation of the AIME) and in the indexing of the breakpoints (for the calculation of the PIA).

The Advisory Council would base the indexing of both of these quantities on "average earnings in covered employment," consistent with the indexing of the taxable earnings base, but different from the CPI indexing of benefits for those already beneficiaries.

The consultants submitting this new report (hereinafter called the Hsiao panel) base the indexing of both quantities on the CPI, consistent with the indexing of benefits for those on the beneficiary rolls, but different from the indexing of the taxable earnings base.

The difference is therefore in the handling of any differences between wage change and price change, which difference may be called the "gain in real earnings." The Advisory Council indexes the potential benefits for those still working to include gain in real wages, while

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e Hsiao panel does not. In the likely situation where gain in real earnings is positive, the Advisory Council approach means that potential benefits go up with average earnings levels, and replacement ratios are essentially preserved. In similar circumstances the Hsiao panel approach preserves the purchasing power of benefits, but permits replacement ratios to decline. When the necessary legislation becomes effective, benefits under either system start at present law levels, but PIA's would be expected to increase faster in dollar-terms under the Advisory Council system than under the Hsiao panel formula. Either would prevent the increase in replacement ratios that is the likely result of current law.

The above somewhat simplified statement of the differences between the two recommendations is not sufficient to judge their relative merits. Concentration on the details of the benefit formula leads to the technical consideration of the relative merits of wage vs. price indexing; but this is not where the basic issues really lie. This becomes apparent when it is noted that indexing of wage records is not a necessary feature of either system. The earliest forms of the Advisory Council's stabilized replacement ratio formula included breakpoint indexing but no wage record indexing; and the Hsiao panel objective of slowly declining replacement ratios can be achieved by other means as well (including the decoupling of the present system without further change).

The real differences between the Hsiao panel and the Advisory Council approaches lie in differences in philosophy as to which of the problems of the system can best be solved today; which are better left to the future.

The Advisory Council approach is early enactment of their decoupled formula, thus putting the system on a track that leads neither to a shrinking nor an expanding system. The long range deficit will thereby be improved (but in no way eliminated), so the next order of business becomes the decision as to what other measures can best solve the system's short and long-range financing problems.

The Hsiao panel concept is somewhat more subtle. They, too, would get the system off of its current expansionary track — but the Hsiao panel would go further, reversing the direction and putting the system in the direction of declining replacement ratios leading to a shrinking system. The long range actuarial deficit might be largely eliminated by the assumption (backed by the automatic provisions in the new legislation) that replacement ratios would decline, since under the economic assumptions now employed by the SSA the decline in replacement ratios could largely offset the adverse demographic factors which are expected to hit the system around the turn of the century.

The subtle (but not really secret) part of the Hsiao panel approach is that the panel does not really expect the system to shrink — in fact, they no more favor a contracting system than does the Advisory Council. Their approach is therefore that of a "semi-automatic" system, always on a track leading downward, but jacked-up periodically by further legislative action accompanied by appropriate additional financing. In the long run the benefits and the financing of the system might look not much different than under the Advisory Council approach, but the system would have come to that point by a "more conservative" indexing framework now considered only "semi" automatic, modified upward by occasional ad hoc adjustments.

So the issue is joined. The Hsiao report suggests that the Advisory Council approach over-commits the future by actions taken in the present. They would prefer to "promise less," and leave more of the decision to the future.

Advocates of the Advisory Council prefer not to rely on the rationality of future decision making in such a difficult area. They fear that advocacy for a contracting system may well fail and thus result in no change at all. They are dubious that replacement ratio declines can be corrected by general benefit increases without unsatisfactory side effects, and they also consider the actuarial projections under the Hsaio approach to be needlessly dependent upon the relationships between future wage and price changes.

By concentrating on what he considers the main thrust of this report, this reviewer has simply not done justice to other recommendations in the report, nor has he mentioned much useful information to be found there. The reader can get a broader view of the Hsiao panel proposals by reading the summary appearing in the September 1976 issue of *The Actuary*.

The actuarial profession and the public at large are indebted to the Hsiao panel for a prodigious effort and a well thought out report. Even if the panel's proposals eventually lose out to the earlier proposals of the Advisory Council (as seems to this reviewer the likely result), actuaries and others interested in the success of the OASDI system should have gained a better understanding of its dynamic nature. □

Letters

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Is it too much to expect actuaries to become familiar with a translation system of this nature?

By adopting a further convention for transposing order indicators in complicated contingent insurance functions, these could be readily translated into linear form and their scope could, in fact, be improved by placing the upper and lower order indicators respectively before and after the relevant parameters, with colon separators. For example:

$$m{}^{(r)}P_x : \underset{4}{y} : \overset{2}{z} : \overline{n|}$$

becomes mPx,y,2:z,t:n:4/(r)

and $$A_x : \underset{1}{y}\ \overset{2}{\overline{n|}}$$

becomes Ax,y:1,2:t:n

This is just a short demonstration to indicate one possible scheme of translation and I have no doubt that this scheme could be improved. I believe it demonstrates, however, that it is possible to develop a simple method of translation which could be applied by actuaries on sight with very little practice. I believe that the development of a system on these lines would be of considerable benefit to the profession and could greatly facilitate international communication between actuaries.

S. H. Cooper

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Death

Wilmer A. Jenkins