



SOCIETY OF ACTUARIES

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The Actuary

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Letters

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If we now express $S_{\overline{n}|i}$ as the sum of the accumulated values at $t = n$ of \$1 invested at $t = 1, 2, \dots, n$, we obtain

$$\frac{a(n)}{a(i)} + \frac{a(n)}{a(i)} + \dots + \frac{a(n)}{a(n)}$$

and we have to conclude that Formula II produces the only right answer since

$$\frac{a(n)}{a(i)}$$

is different from $a(n-t)$ at rate i simple.

The error most people make is to think (unconsciously) of the investment as being made at zero. They neglect the fact that the force of interest varies with time under simple interest, making theory actually more difficult. (I admit all this stuff is not practical but purely theoretical).

The question now is: what does

$$\sum_{t=0}^{n-1} (1 + ti)$$

represent? Actually nothing. Indeed it represents the sum of the accumulated values of a series of dollar units all invested at $t=0$ but for various durations: the first invested to $t=1$, the second to $t=2$, . . . the n th to $t=n-1$.

Finally, I do not understand why Mr. Kellison, in his reply to Mr. Garfield, says that Formula II assumes compound interest. I believe it is good for any law of interest.

Pierre Chouinard

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Acronymity

Sir:

Now that the accountants, consulting actuaries and programmers have made their appropriate profit out of GAAP, no doubt at the ultimate expense of the policyholders, we feel it is time to introduce his Scottish cousins, MacGAAP (more accurate generally accepted accounting principles) so that we can go through the whole process once more.

MacGAAP would drop the obviously inaccurate assumption that conditions remain unchanged in the future and in-

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COMMITTEE ON WAYS AND MEANS

Staff Report On The Disability Insurance Program; Superintendent of Documents, Washington, D. C., 20402, 447 pages, \$4.25. by John Haynes Miller

This interesting and informative report reminded me of the words of M. Albert Linton in 1948, when he was serving as a member of the Advisory Council on Social Security of the Senate Finance Committee. Proposals to introduce disability benefits into the OASI system were under discussion. Mr. Linton, the only Council member with experience or technical knowledge concerning disability, endeavored to point out the underwriting hazards. He favored appropriate support for the disabled but not through a payroll tax supported system under which benefits would be considered a matter of right. He predicted that any legislation adopted would be on a very restrictive basis, and that initially the administrative officials would lean over backwards to keep costs within budgeted projections. Then, with a good record to point to, expansion and liberalization would come, through legislation, adjudication, and administration. This report shows Mr. Linton's predictions to have been accurate.

Social Security disability benefits were first introduced in 1954 in the form of the "disability freeze" which protected old-age and survivors accrued benefits from erosion during periods of permanent or long term disability. No cash benefits were enacted until 1956 when "fully, currently, and disability insured" persons, aged 50 or over, became entitled to disability income, subject to a workmen's compensation offset, with no dependents' benefits.

In 1958 the "currently insured" requirement and the offset were dropped, and dependents' benefits were added. In 1960 the minimum age was eliminated. In 1965 benefits were integrated with workmen's compensation so as to limit combined benefits to 80% of average monthly wage or of the average of the highest five consecutive years' earnings in covered employment; this maximum was indexed to changes in wages in covered employment (a forerunner of the indexing of all benefits and of the taxable earnings base introduced in 1972). The 1967 Act made a technical modification in the offset provision, and in 1972 a third alternative to the earnings to be used as the average was added.

Meanwhile the disability definition was being liberalized. Originally disability had to be medically determinable and expected to result in death or to be of long-continued and indefinite duration. In practice the disability definition of "long continued and indefinite duration" was generally interpreted as a period of 18 months. A lower limit, 12 months, was established in the 1965 Act and at the same time an easier test was applied to blind persons aged 55 and over. Then, in the 1967 Act, with the intent of tightening the definition to counteract adverse court rulings, Congress defined disability as inability to engage in any substantial gainful work existing in the national economy.

The nominal elimination period was reduced in 1972 from 6 months to 5 months, resulting in an effective average deferment of 6½ months. The 1972 Amendments also introduced the principle of indexing all OASDI benefits, with future benefits related to the CPI. At the same time the taxable earnings base was indexed to the increase in average earnings in covered employment.

The disability benefit is equal to an individual's Primary Insurance Amount, with additional benefits for children and for the wife if there is at least one dependent child under 18. It is interesting therefore to see the changes which have taken place in the minimum PIA and in the earnings base, which is a determining factor in the amount of benefits in excess of the minimum.

| | 1955 | 1965 | 1975 |
|----------------------------|------|------|------------------------|
| Minimum PIA ⁽¹⁾ | \$30 | \$44 | \$93.80 ⁽²⁾ |
| Earnings Base | 4200 | 4800 | 14,100 ⁽²⁾ |

(1) Primary insurance amount.
(2) Subject to automatic provisions.

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clude fluctuation and trend factors for interest, mortality, withdrawals and expenses. This would start a new ball game with economists joining the others in a share of the pie.

Then there is GAAP's other cousin SOAP (Society of Actuaries Principles). SOAP might follow Frank Redington's sound advice:

"A particular valuation basis may be desirable for many reasons, but it must be a servant of realities for it cannot be his master."

SOAP would stick to simplicity with practicability and use a Zillmerized valuation basis, now used or advocated in most of the world outside the American continent, thus giving at least a supportable claim to be "generally accepted."

*L. H. Longley-Cook
David D. Stott*

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Actuaries in Literature

Sir:

I have recently come across another reference, and quite a flattering one, to actuaries in a novel. It occurs in Michael Gilbert's "Small Bone Deceased". One of the characters, in explaining that he became a lawyer because the work was easy, goes on to say, "If you want a really difficult job you ought to try actuarial work. I trained for 18 months as an actuary in New York."

It is interesting to note that Mr. Gilbert is a solicitor in England.

J. Bruce MacDonald

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Social Security Note

Erwin S. Janush, *Occupational Differences in Separation Rates of Railroad Workers, 1968-71*; Actuarial Study No. 11, U.S. Railroad Retirement Board, Chicago, Illinois, September 1974, pp. 43.

This study, which is the latest in a series, presents an analysis of separation data in the railroad retirement system in the period 1968-71. Experience rates are shown separately for active service mortality, disability retirement, non-disability retirement, and withdrawal.

For free copies write to the U.S. Railroad Retirement Board, 844 Rush Street, Chicago, Illinois 60611. □

Committee on Ways and Means*(Continued from page 3)*

The contrast between the relatively modest increases in the first decade after 1955 and the escalation in the following decade is quite striking.

The Staff Report presents 10 findings and recommendations which, briefly summarized, are:

(1) Actuarial Deficiency in Disability Program

In the last five years the estimates of cost have almost doubled. The "built-in safety" factor inherent in the "level earnings" assumption has been nullified by the new indexing feature. The report points to slow progress with a major study by the Social Security Administration (SSA) to find the reasons for the "unanticipated adverse experience in the systems," and recommends no further reallocations of income among trust funds, OASDI, DI and HI, until an adequate explanation is received.

(2) Study of Federalization of State Disability Determination Mechanisms

The original concept was that local administration was preferable to federal administration and that if claimants were required initially to report to the state agencies charged with the rehabilitation program, there would be some assurance that rehabilitation opportunities would not be overlooked. Nevertheless the General Accounting Office (GAO) stated in 1959 that its "review indicated that the handling of applications for disability benefits by the state agencies *** results in unnecessary costs and excess processing time" and recommends that the Secretary "determine whether the benefits derived from the states' participation in the disability program are commensurate with the costs."

(3) Social Security Appeals Procedure

The original determinations by the state agency, some of which are reviewed at the federal level, are being challenged at an increasing rate leading to an "appeals crisis." It is suggested that the Ways and Means Committee "may wish to reexamine the complex structure of the appeals procedures." Some alternative approaches are presented for consideration.

(4) Examination of the Definition of Disability

The staff recommends that HEW, with the assistance of skilled personnel from the state agencies and the private sector, should explore "whether the definition of disability can be stated more specifically in the law or regulation, and whether more operational presumptions may be incorporated into its administration***."

(5) Federal Review of State Agency Decisions

The practice has changed over the years from a review of all cases determined at the state level to the review of a 5% sample (introduced in 1972). "*** statistics indicate *** the distinct possibility that a rather large number of individuals are coming on the rolls who may not meet the standards of the law." The staff recommends that administrative decisions which affect the basic legislative structure of the program should be reexamined.

(6) Regionalization and Bureaucratization: An Added Dimension

The staff notes "a tendency to proliferate administrative units" and a proliferation of quality control units seeming "to have a 'Linus' security blanket" effect on the administrators" and suggests that GAO be asked to examine the current administrative direction.

(7) Impact of Black Lung Program

This program, initiated in 1969, involved an instant case load of about 100,000 claims filed within one month of enactment. The staff expressed its concern that any further enlargement of Social Security responsibilities may be "the straw that breaks the camel's back," and recommends that HEW should keep the Committee better informed as to possible developments.

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Committee on Ways and Means

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(8) Earnings Limit for Disability Benefits

The disabled worker loses his disability benefits if his earnings exceed a limit, which was established in 1968 at \$140 per month. During a 9-month trial work period all earnings are disregarded. The report observes, "The current figure [\$140] would appear to constitute a major inhibiting factor to work and rehabilitation." (The writer has been informed that this limit was subsequently raised to \$200.)

(9) Private Disability Insurance and Social Security

The staff has been informed by SSA that about 20 million people have disability protection through private pension plans and 8.6 million have group LTD benefits. Reference is made to such plans under which disability benefits are integrated with Social Security. Where pension plans are involved, IRS regulations limit the offset to a given percentage of Social Security benefits. "It is not clear from the legislative history that the prohibition against reduction is intended to apply to Social Security disability as well as retirement benefits." This should be clarified, the staff suggests. A report by the Committee questions the basic validity of the offset but recommended deferral of any legislation pending a study. The staff report notes that disability contracts "present a more difficult problem since their regulation had traditionally been left to the states," and raises the question as to who benefits from the "major reductions in costs to insurers." Are profits increased, premiums reduced or policyholder dividends increased? The staff intends to explore these questions with interested parties.

(10) Rehabilitation

Despite the seeming validity of the initial concept of exposing all disability claimants to the opportunities and facilities for rehabilitation, only about 14,500 disabled workers, children and widows "who have been rehabilitated under the 1965 provision and its subsequent liberalizations have actually left the benefit rolls. Such terminations, moreover, have levelled off in recent years" despite the expenditure of substantially more money from the trust fund. In 1972 rehabilitants accounted for less than 6% of the terminations by recovery status. It is noted that the Chairman has requested a study by the GAO.

Federalization versus State Administration

The original concept of decentralized administration through the use of existing State agencies was generally followed. The rehabilitation agencies have been contracted for this function in all states except four, where the public assistance agencies are used, and two which have special disability departments. This decentralized, state administered system appears to have the capability of focusing attention on prospects of rehabilitation of every claimant. On the other hand it has been said to involve an actual or potential conflict of interest. The states receive compensation for administration, share no part of the benefit cost, and are relieved of financial responsibility to disabled residents, many of whom would otherwise become public charges.

Supplemental Security Income Program (SSI)

The 1972 social security amendments created this noteworthy, if not well known, new system by "federalizing" the "State public assistance programs for the needy aged, blind, and disabled into the new *** program, which pays Federal benefits under uniform rules, financed from general revenues. Payments under the SSI program, which started in January of 1974, may be supplemented by the individual State." Disabled persons on state programs in June 1973 were automatically brought into the SSI program under a grandfather clause. Subsequent applicants must meet the Social Security definition of disability and, as to new applicants, the federal income and assets requirements must also be met.

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Record

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Transactions, Editor Arne Eide expects to publish the 1974 *Reports of Mortality and Morbidity Experience* in late July of 1975. The 1974 *Reports* will appear in paper and in cloth-bound editions.

The Actuary and *Arch* will continue without change.

Papers accepted by the Committee on Papers will be periodically sent to all members in galley form and members will be encouraged to submit written discussions within a reasonable period of time. The publication of papers and discussions in the *Transactions* will proceed independently of the meeting schedule of the Society, and papers will be discussed at Society meetings only when they appear particularly germane to the moderator of a Concurrent Session.

The Board has appointed a Publications Board and a Coordinator of Publications for a period of two years. The new publication arrangements will be reviewed at the end of that time.

The Publications Board expects to serve as liaison between all Society publications. Its members include all Society Editors plus the Education Chairman of the E & E Committee, the Chairman of the Continuing Education Committee, the Chairman of the Committee on Papers and the Chairman of the Committee on Review.

The Publications Board will seek authors willing to write books and papers that can fill gaps in the elementary and advanced literature of actuarial science.

A recent volume by Dr. Lewis Thomas¹ approvingly quotes the thought that each scientific paper adds a small piece to the huge jigsaw puzzle of science. The secret of Western science since the seventeenth century has been its ability to solicit many modest contributions which collectively have far exceeded what could have been accomplished by any one individual.

The Publications Board would hope to nurture such a spirit within the ranks of actuaries and to issue as attractive an invitation as possible to more actuaries to put words on paper. □

¹ Lewis Thomas, *The Lives of a Cell* (New York: The Viking Press, 1974).

Cost Comparisons

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been proposed, and set forth certain desirable attributes of a cost comparison method. Chapters five, six, and seven describe the contents of the large data bank assembled about one year ago under the joint sponsorship of the NAIC and U.S. Senate Antitrust and Monopoly Subcommittee, and set forth the findings of the analyses done on this store of data. Chapter eight describes the deficiencies of various types of cost comparison indices.

Chapter nine develops the algebraic relationship of the various cost comparison method formulas to a widely recognized general form of gross premium formula. The four appendices contain (in order) (A) list of companies contributing to the data bank and the extent of their contribution, (B) assumed mortality and persistency and YRT rates, (C) descriptions of statistical tools used in the report, and (D) a mathematical proof (for the purist) of the equivalence of two of the formulas used.

There is so much information presented that it is difficult to pick out some specific examples to round out this review. Seven of the conclusions summarized on pages 158-161 of the report and supported by data presented earlier in the analysis are quoted below:

- "2. The introduction of a non-zero interest rate makes a significant difference in the rankings of policies. Varying the interest rate by as much as 2% had a noticeable but not appreciable impact on the rankings. As many as 95%-98% of all possible pairs of policies ranked the same way with a 2% change in the interest rate assumed."
- "3. Introducing an assumed rate of mortality does not significantly affect the policy rankings."
- "6. Vastly different patterns of lapse rates produce very similar policy rankings."
- "7. There is a substantial difference in the rankings between the results produced by methods which totally ignore cash values and those which either reflect the cash value at the end of the period analyzed or reflect all cash values over that period."

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Committee on Ways and Means

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The report speaks of the "irony" of the fact that although this new program purports to federalize these three State assistance programs the preponderance of the work load will fall on State employees since the same general arrangement as for the regular disability insurance will be followed. These determinations will be reviewed on a seven-percent sample basis. The result will be that the regular (Title II) disability determinations will be checked in the central office in Baltimore, along with cases where applications are made under both programs, while the ten regional offices will be checking the SSI determinations. The report observes, "The present disability determination system is undoubtedly one of the most complex governmental arrangements in existence. To now make this a central office, regional, and State arrangement is a fairly major step and somewhat anomalous in the so-called Federal social security system."

The new SSI program seems to offer increased hope for rehabilitation of the persons served. Under the State welfare plan, agencies were not required to refer the blind or disabled recipients for vocational rehabilitation although they frequently did so. The report concludes that, "it seems reasonable to state that Supplemental Security Income disabled applicants, whether allowed or denied, will have a greater likelihood of being served and rehabilitated than did their counterparts under the old program."

The magnitude of the SSI program may be judged from the following. "In the fall of 1973 it was estimated that during fiscal 1974 there would be 1.6 million determinations of disability for the social security program and 800,000 SSI determinations." At the end of May there had already been 1,000,000 and 450,000 respectively, under the two programs. Whereas in 1973 the total number of disabled workers receiving Title II benefits under the social security plan was just over 2,000,000, the number of recipients of SSI payments for the blind and disabled in January 1974 totaled 1,350,000. Mr. Robert J. Myers has observed that "SSI may well be a sleeping giant, just as Medicaid was in the legislation in 1965 that established Medicare." (*TSA XXV*, page 667.)

The Black Lung Program

The Federal Coal Mine Health and Safety Act, as amended, provided that "all black lung (coal workers' pneumoconiosis) program and case-related costs are chargeable to Federal general tax revenues not Social Security Trust Funds." From a fiscal standpoint the black lung program therefore has little or no impact on the disability program. However in other respects it has been a matter of great concern to SSA. The initial filings under the original law amounted to 100,000 claims in the first month, and 247,000 by the end of calendar year 1970. Through May 19, 1972, when amendments were enacted, over 340,000 cases had been filed. This necessitated the reassignment of large numbers of claims personnel previously engaged in Title II administration. Following the enactment of the 1972 amendments over 183,000 new claims were filed and 194,000 others required reexamination and redevelopment. (These numbers contrast rather sharply with the 1968 estimate "that 125,000 coal miners had black lung and that 50,000 were totally disabled by it." This estimate is cited in a paper by Professors J. David Cummins and Douglas G. Olson—*An Analysis of the Black Lung Compensation Program*, Journal of Risk and Insurance, December 1974).

The effects on adjudication were quite pronounced. Social Security Administrative Law Judges were used to assist the relatively few Black Lung Administrative Law Judges in dealing with a case load which "now numbers 35,000 for black lung alone. *** early in 1972 it totaled almost 40,000 *** but *** was virtually eliminated when 30,000 cases were remanded from the hearing stage for redetermination by the Bureau of Disability Insurance. After the massive redetermination of these cases ***, over 40,000 requests for hearings had been received by the Bureau of

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Committee on Ways and Means

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Hearings and Appeals in 1974." The result is that the ALJ's fall further behind in dealing with the regular Social Security cases and may "be in a real crisis when the full impact of the SSI appeals is felt. *** Finally, the number of cases pending in Federal courts has reached record highs, and the ability to effectively litigate these cases appears to be getting increasingly marginal."

In addition to the direct results, "black lung filings resulted in greater knowledge of eligibility for social security disability insurance benefits and contributed to an increase in claims for social security DI benefits."

To be Continued in Next Issue

Editor's Note: The report gives the claim experience since 1967 and an analysis of this experience will appear in our next issue.

Cost Comparisons

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"8. Policy rankings vary significantly when the comparisons are made at different policy durations. No one duration is a very accurate representation of the rankings found at another."

"13. Participating policies, as a group, rank quite consistently better than guaranteed cost policies, as a group, under any one of several different cost comparison methods. The rankings are similar or may favor guaranteed cost policies ignoring the cash values and when measured over shorter durations."

"14. Dividends could be reduced a significant degree from those currently illustrated and the cost comparison indices of participating policies, as a group, would still be similar to those of guaranteed cost policies, as a group, for durations 20 and longer."

The Committee report deals well with the questions referred to at the beginning of this review. It would seem desirable to have more research by the insurance industry on the following:

(1) The different requirements of different categories of buyers — such as needs of corporate executives who are informed (or who can and will seek out appropriate decision information) as compared to the needs of less sophisticated insurance prospects.

(2) The possibility of organizing the cost information on different levels—for example, every prospect could be presented with a simple understandable disclosure statement and more sophisticated individual-oriented analyses could be requested if and when desired by a particular buyer.

The committee report findings seem to indicate that the interest adjusted cost

method, which is relatively simple, produces company rankings that do not change substantially by the addition of assumed mortality or lapse rates.

(3) The impact of a more price-conscious marketplace on future life company marketing methods and products, on the character and methods of tomorrow's life insurance agent, and on future life company expenses and persistency.

(4) The different buyer disclosure needs of a direct marketing type of sale (e.g. direct mail) as compared to those of an agent-generated sale. There has been an increasing interest in direct marketing procedures, especially in approaching the lower and middle income markets.

The Committee report is well organized, quite easy to read and, most importantly, it is "must reading" to any actuary concerned about the form of inevitable future required communication between the company and its agents, its policyholders, and its prospective buyers. The Committee's research has been conducted in a thorough and objective manner.

Note: The Report is available from the Chicago office at a cost of \$7.00. □

Actuarial Meetings

April 10, Baltimore Actuaries Club

April 10, Actuaries Club of Winnepeg

April 11, San Francisco Actuarial Club

April 15, Central Illinois Actuarial Club

May 1, Actuarial Club of Indianapolis

May 8, Baltimore Actuaries Club

May 29, Boston and Hartford Actuaries Clubs

ARCH

Issue 1975.1

A New Proof of $Mx = Dx - dNx$, Ralph Garfield.

Notes on Individual Risk Theory and Released From Risk Reserves, James C. Hickman.

Applications of the Cauchy-Schwarz Inequality to N-year Temporary and Life Annuities, Allan J. Kroopnick and Steven F. McKay.

A Solution of Ziocck's Autocorrelation Problem, G. C. Taylor.

Symmetry Between Components of an Analysis of Surplus, G. C. Taylor

The Interest Rate Delta, Richard W. Ziocck.

Subscriptions can still be sent to David G. Halmstad, M & R Services Inc., P. O. Box 124, Ridgefield, Conn. 06877.

No back numbers prior to 1974 are available.

Veterans Insurance Act

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the time elapsed between the termination of his or her SGLI coverage and August 1, 1974. These retroactive VGLI participants, however, must submit evidence of insurability with their application for VGLI coverage prior to August 1, 1975. There is no provision for substandard VGLI coverage although individuals with service-connected disabilities are offered standard rate coverage in the VGLI program. Sometime during the 120 day period immediately prior to termination of their VGLI coverage, all veterans will receive a mailing advising them of their conversion rights as well as a listing of all companies participating in the SGLI/VGLI conversion pool.

As of January 31, 1975, approximately 3.3 million individuals were covered under the SGLI program for approximately \$65.7 billion of insurance coverage, making this the largest single group life contract in existence (to our knowledge). Additionally, approximately 46,000 individuals were enrolled in the VGLI program for \$850 million of insurance coverage. □