

**COST COMPARISONS**  
**IN**  
**ORDINARY LIFE INSURANCE**  
**BY**  
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## INTRODUCTION

The purpose of this paper is to serve as an introduction to the subject of cost comparison in ordinary insurance to consulting actuaries, especially non North Americans, who have not been involved in the subject, although logically it should be a subject for consulting actuaries. It is not intended to replace the more detailed papers and reports on the subject, but to give an overview of them and guide the interested reader to them.

As I have been deeply involved in the subject, I have reached certain well-published conclusions, and these will in due course become apparent to the reader. The cost comparison method I consider the best is finally recommended, but I hope the reasoning that led to the conclusion will be as convincing to the reader as to me.

## BACKGROUND

Cost comparisons of ordinary insurance seem to be a peculiarly North American phenomenon. This is probably because of the differences in the life insurance industry in North America from the rest of the world, to say nothing of the consumerist movement in North America. When the furor in the United States is contrasted with the general disinterest in the subject in Canada, despite essentially similar approaches to life insurance, one is tempted to say it is a peculiarly United States phenomenon. In general it is a subject in which consulting actuaries have displayed little active interest, except in Canada where the Canadian Institute of Actuaries put one (the author) in charge of their committee on the subject to ensure that the final report had more than a "company" point of view.

Cost comparisons have probably evoked a livelier interest in North America both because of the agency system with its more aggressive selling techniques and because insurance contracts have guaranteed cash surrender or loan values and cash dividends (if participating). When there is added to this the consumerist movement (self-appointed protectors of the consumer) which generally operates on the premise that "caveat emptor" is a necessary warning at least 200% of the time, the reasons for the heatedness of the debate starts to become apparent.

Another factor lending heat to the debate in the United States is that the state regulatory bodies have endorsed one method while the Federal Trade Commission favours another; the whole controversy of federal vs. state regulation lend further spice to the controversy.

In the United States there are certain protagonists in the debate, the mention of whose name causes otherwise rational people to go into orbit. Too frequently objection is taken not to what was said, but to who said it, on the assumption that the individual in question could under no circumstances say anything correct, sensible, or unbiased.

This rather emotional background has to be understood, otherwise the student of what should be a dispassionate actuarial subject is going to be continually mystified at the tone of the arguments, and the rejection of what are apparently reasonable positions.

The most authoritative studies on the subject are (1) "Analysis of Life Insurance Cost Comparisons Index Methods", prepared by the Society of Actuaries Committee on Cost Comparisons Methods and Related Issues (Special) published in September 1974, (2) "First Report of the Committee on Cost Comparisons of Individual Life Insurance Policies" of the Canadian Institute of Actuaries, published in June 1975, and (3) "Second Report" of the same committee of the Canadian Institute, published in November 1974. (Parts of the First and Second Reports may be quoted without acknowledgement, but it is not plagiarism as the author wrote them!) These reports are complementary to each other. The Society Report is essentially an analysis and survey, and the committee was not empowered to reach conclusions. This contrasts with the mandate of the committee of the Canadian Institute which was to reach a conclusion if possible. Perhaps the best comment on difference in atmosphere on both sides of the border is the difference in the mandate given the respective committees, and the fact that the Institute committee had no difficulty in coming to an unanimous conclusion. The conclusion, which rejected all traditional methods, caused scarcely a stir in Canadian insurance circles, but ruffled quite a few feathers in the United States. Canadian consumerists, who had already embraced the method utilized by the Canadian insurance industry for several years, also objected to the Institute's report.

Other sources are indicated in the Bibliography.

## HISTORY AND METHODS

In the beginning insurance contracts were compared strictly on the basis of premium, providing the policies were of similar types. It was rapidly realized that this made no allowance for cash values or dividends so what came to be known as the "Traditional Net Cost" and "Traditional Net Payment" methods were substituted. Under the first premiums were added for a specific period (usually 20 years); from this was deducted the dividends paid during the same period and the cash value at the end of the period; the result was divided by the period to get the "net cost". The "net payment" method differs from the first only in that the cash value is not deducted.

(In general I do not intend to give the mathematical formulae for the various methods except for the method I prefer. They are all included in the Society Report to which reference should be made. However, I shall attempt to describe the more common methods in English. More

detailed descriptions can be found within the Society Report or other papers referred to in the Bibliography.)

This method was well established when I began my actuarial career in 1949, and still reigned supreme when I left life insurance to become a consultant in 1965. The two methods were subject to the criticisms that: (1) interest was completely ignored; (2) the comparison was made over a specific period only; and (3) only *one* cash value was taken into account.

By 1971 two new methods, "Interest Adjusted Cost" and "Interest Adjusted Payment" were gaining currency. These methods differed from the "traditional" method in that both premiums and dividends were accumulated at interest for the specific period, and the division was by the appropriate accumulation "s" function. To compare different companies the same interest rate must be used. This method met the first objection to the "traditional" method, but did not meet the other two. These methods have been widely adopted by the insurance industry and are the most common methods used in North America.

The most common variant of the interest-adjusted cost method measures cost on the assumption that the purchaser lives for 20 years, keeps the insurance policy in force for that period, and then surrenders it. (The 20 years can be any period.) Why this should almost universally be regarded as a proper cost comparison method is a mystery. Certainly if one suggested that the performance of an automobile be judged *solely* on its rate of acceleration from 0 to 100 km per hour one would be laughed out of court. The chief merit of the method is its simplicity and that anyone with a pocket calculator and a modicum of mathematical knowledge can make the calculations. Comparisons can be distorted by an unethical company who artificially increase the twentieth year cash value, or introduce a terminal dividend at the twentieth year. Such manipulations have occurred.

Another older method that is frequently referred to is the "Linton Yield" method. It was developed by Albert Linton, F.S.A., a distinguished actuary, between 1927 and 1963. A description of it, adapted from the Society Report, is as follows.

The method solves for a level, effective, annually compounded interest rate, or yield. This yield is determined by equating the cash available at the end of  $n$  years from two different protection/savings programs, each with identical yearly death benefits, and then solving for the annual yield that must be achieved on the separate savings fund of the second program in order to produce the cash equivalency with the first program. The programs compared are:

- (1) A life insurance policy on, normally but not necessarily, some permanent plan. The cash used at the end of the  $n$ th year is the policy's guaranteed cash value.
- (2) A combination of a savings fund and Yearly Renewable Term (YRT) insurance. The amount deposited in the savings fund each year is assumed to be equal to the annual premium payable under the alternate program for the permanent life insurance policy (less any dividend payable at the end of the preceding year) less an assumed premium payable for YRT insurance. The amount of YRT purchased each year

is that which would be adequate to bring the combined death benefit from the savings plan and the YRT to the same as that payable under the permanent life insurance policy. The cash used for comparison with the permanent policy is the amount accumulated in the savings fund at the end of the  $n$ th year.

This method was developed, not as a cost comparison method, but to demonstrate the advantages (or otherwise) of buying permanent rather than term insurance. However, it can be used for cost comparisons giving the best rating to the policy with the highest yield.

The method has not received wide acceptance because of the complexity of the calculations, the problems in establishing an appropriate level of YRT premiums, and an inability to analyze various components of the premiums.

A powerful method is the "Company Retention" method, developed by Joseph M. Belth, Ph.D. in 1969. Under this method present values are calculated on uniform assumptions as to interest, mortality, and policy termination or lapse. The present value of the death benefits, cash values, and dividends is subtracted from the present value of the premiums to determine what is "retained" by the insurance company for expenses and profit. As a result, every element of the policy enters into calculation, and it is most difficult to manipulate by unscrupulous companies.

The Canadian Institute of Actuaries Committee modified this method by changing the lump sum present values into components of the premium, viz mortality benefits, surrender benefits, dividend benefits, and retention. They rechristened the method the "Actuaries' Index", the index itself being the retention component of the premium. The mathematics for this method is shown as an appendix, taken from the Second Report.

The mathematics of this method, and of Belth's retention method, look familiar and very logical to most pension actuaries.

Another method, of which Milton Goldberg, F.S.A., has been a staunch advocate is the "Equivalent Level Annual Premium", which is related to the "Interest Adjusted Payment with Mortality" method. This method uses mortality and interest, but not lapse, rates in the calculation. The present value of premiums less the present value of dividends is divided by an annuity factor to get the result. The period can be the policy duration, or a shorter period. The method ignores cash values. (Trowbridge's suggestion is of the same family except it uses the entire lifetime.)

The method can make allowance for this lack by subtracting the present value of the cash value at the end of the period in the premium calculation, thereby becoming the "Interest Adjusted Cost with Mortality". Neither this method, nor Scheel's "Risk Premium Index", nor Ryall's "Net Cost", have received any currency. Further information on these can be obtained from the Society Report, or the articles cited in the Bibliography.

## CHARACTERISTICS AND CRITERIA OF METHODS

The Society Report suggested four characteristics of methods that should be considered. They were:

1. Does the cost comparison index method involve arbitrary assumptions, other than zero, in its calculations?
  2. Does the cost comparison index method produce a result which could be described as "true cost" if a specific but rather unlikely set of circumstances occurs?
  3. Does the cost comparison index method produce a result based on group-average assumptions?
  4. Does the cost comparison index method separate the policy into insurance and savings elements?
- The methods considered in this paper give the following answers to each question.

Que.	Traditional		Interest Adjusted		Linton	Retention	ELAP
	Net Cost	Net Payment	Cost	Payment			
1	No	No	Yes (1)	Yes (1)	Yes (2)	Yes (3)	Yes (4)
2	Yes	Yes	Yes	Yes	Yes	No	No
3	No	No	No	No	No	Yes	Yes
4	No	No	No	No	Yes	Yes	No

- (1) Interest only
- (2) Scale of YRT Pension
- (3) Interest, Mortality, and Lapse
- (4) Interest, and Mortality

A debate has raged as to whether a cost index should be "event-specific" or "group average". Event-specific measures the cost on the basis of an assumed set of events, and gives a "real" cost in that event. "Group average" methods try to measure a cost on certain average assumptions. The actual cost to an insurance purchaser, of course, depends upon the precise date of death or of policy termination. For example, if someone dies in the first year, the very cheapest policy is the most economical. The following paragraphs are derived from the Institute Reports.

Event-specific methods are criticized because they can only attempt to represent cost under a specific but rather unlikely set of circumstances. Group-average methods are subject to criticism of the mortality and/or lapse assumptions which they embody as being inapplicable to an individual circumstance. In any event, a group average cost index will never be the "true cost" for an individual purchaser, except by coincidence. A cost comparison method should attempt to be applicable to the vast body of consumers. In certain cases, another approach or method may be more appropriate. For example, if a purchaser feels that he will never wish to borrow or surrender his policy, a method which ignores cash values may be quite appropriate. If a purchaser knows that his need for insurance will end in 20 years, he may have no need of comparisons over a more extended period. There is probably no cost comparison method which can cover all situations.

Calculations for the Retention and Actuaries' Index are made on a "group-average" basis rather than an "event-specific" basis. No life insurance purchasers know when they will die, and very few know when or if they will surrender. Instead of making assumptions that death or surrender will occur at one set point of time, a series of probabilities is set for each event, and these, together with a rate of interest, are used to find a weighted average value of all death and surrender benefits. For participating policies, the same probabilities give the weighted average value of all dividends. The "retention" is simply the gross premium minus the value of death benefits, surrender benefits, and dividends (if participating).

There is no logical reason to expect an event-specific method to make meaningful cost comparisons, except for the specific event assumed: too many items are simply ignored. An event-specific method may well be a valid method of cost comparison, but, if it is, it is by good fortune.

It can be demonstrated that most other cost comparison methods are merely special cases of the Actuaries' Index. For example, this method can be transformed into the twenty year Interest-Adjusted Net Cost by setting mortality and lapse rates at zero for twenty years, and the termination rate at 1.000 at the end of 20 years.

Inasmuch as virtually all actuarial calculations for insurance premiums or pension plans are made on a group average basis, it is difficult to understand the reluctance of many United States actuaries to adopt a similar method for cost comparisons.

The Society Report suggests seven objective criteria:

1. Does the cost comparison index method reflect, in some manner, the levels of premiums, dividends, cash values and death benefits at all durations?
2. Does the cost comparison index method reflect, in some manner, the time value of money?
3. Does the cost comparison index method fairly reflect differing degrees of guarantees in different policies?
4. Can the cost comparison index be used to fairly compare any one policy with any other?
5. Can the cost comparison index method theoretically be adapted for use in replacement situations?
6. Does the cost comparison index method reflect, in some way, any and all changes that might occur in the cash flows of a policy, either as to their amounts or incidence or both?
7. Does the cost comparison index method reflect the services and quality of the agent and the company, or the value of additional options and non-cash benefits in the policy?

The following table answers these questions with respect to the seven methods discussed in this paper.

Que.	Traditional		Interest Adjusted		Linton	Retention	ELAP
	Net Cost	Net Payment	Cost	Payment			
1 (a)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(b)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(c)	No	No	No	No	Yes	Yes	No
(d)	No	No	No	No	Yes	Yes	No
2	No	No	Yes	Yes	Yes	Yes	Yes
3	No	No	No	No	No	No	No
4	No	No	No	No	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	No	No	No	No	Yes	Yes	No
7	No	No	No	No	No	No	No

1 (a) Premiums                      (c) Cash Values  
 (b) Dividends                      (d) Death Benefits

The Society finally suggested four subjective criteria:

1. Is the cost comparison index method acceptable to the consumer?
2. Is the cost comparison index method capable of being understood by the agent?
3. Is the cost comparison index method capable of being understood by the consumer?
4. Is the cost comparison index method simple to calculate?

For a method to be valid it should take into account all elements of the policy — death benefits, cost values, and dividends at as many durations as possible. Most methods either ignore cash values, or focus on only one. The only methods that take into account all elements at all durations are Linton Yield, the Company Retention, and Hill's Standard Mortality Cost Index (not considered in this paper). Earlier I had noted certain objections to the Linton Method. The Standard Mortality Cost Index has certain technical flaws which limit its usefulness, which is why it has never received serious consideration. The Linton Method, further, is event-specific.

The Retention and Actuaries' Index certainly should meet the first three subjective criteria as well. The mathematics are more complicated than in the interest-adjusted methods and can only be performed on a reasonably sophisticated computer. However, they are neither difficult nor expensive, given the computer. They cannot be calculated by the agent or consumer without access to a computer and a knowledge of programming, but not many consumer testing programs of any product are simple to perform.

As a result of this consideration I have concluded that the Company Retention Method or the variant known as the Actuaries' Index is by far the most suitable overall method for cost comparisons yet devised. The Committee of the Canadian Institute reached the same conclusion, though in a somewhat more restrained form. The Canadian Institute of Actuaries subsequently made a public statement on the subject, which is reproduced as an Appendix.

### FURTHER CONSIDERATIONS

In calculating the Actuaries' Index a standard set of assumptions must be made. These assumptions will obviously vary from time to time and from place to

place. Results can vary depending upon the precise assumptions used. Detailed studies were made by the Institute (and by the Society earlier) as to how results changed if the assumptions were varied. The methodology and results are described in the Reports cited. For current use in Canada the following assumptions were suggested:

Mortality: CA(M) 1958-1964, select-ultimate, age nearest or age last as appropriate  
 Withdrawal: Moorehead "S", modified  
 Interest: 6½%  
 Period: 40 years, or the benefit period, if shorter

Considerable work was also done to determine whether any of the various competing methods of cost comparisons gave substantially the same rankings. The conclusion reached was that, except over very short periods (10 years or less) ranking varied markedly with the method used. The degree of co-relation was not high enough to warrant endorsing some other method as a practical expedient.

### LIMITATIONS

Lest anyone believe that the problem of choosing the best insurance contract has now been solved, or alleges that I have overlooked many important points, I hasten to point out the limitations, with the language being taken almost verbatim from the Institute Report.

There are many features vital to the purchaser of an insurance policy which cannot be embodied in an arithmetical cost comparison method. Among these are:

- (i) the financial soundness of the company,
- (ii) the company's reputation for dealing with policyholders,
- (iii) the company's ability and willingness to provide local service,
- (iv) differences in policy provisions, as in the suicide, incontestability, loan, conversion and settlement option clauses.

None of these factors can be included in any method of Cost Comparison, but they are all sufficiently important that they may over-ride conclusions reached solely from comparisons of possible cost.

Extra charges for Accidental Death Benefits and Disability Benefits which are built into contracts can be handled by promulgating additional assumptions relating

to accidental death rates and morbidity and expense rates to allow such policies to be stripped down to their basic benefits before applying the Company Retention method. This approach clearly has some difficulties resulting from potentially substantial variations in definitions of disability, limitations of coverage, and possibly burdensome disability calculations.

The charges for fractional premiums add an additional awkward dimension, and do give a company which writes much monthly business an opportunity to have apparently low annual premiums and a high loading for monthly premiums.

The question of age nearest versus age last companies presents a practical impediment to the compilation of any "shopper's guide" under any known method. Averaging of cost comparison index values is probably satisfactory except for policies paid-up or maturing at a specific age.

All of the special problems mentioned apply to any other cost comparison method. The fact that they are awkward to deal with under the Actuaries' Index is not an argument against the method. Further, certain special problems that plague other comparison methods can be handled very neatly by the Actuaries' Index (for example, death benefits varying by duration, or different dividend options, such as the English bonus system).

In setting non-participating rates the insurance company makes assumptions somewhat less favourable than it expects to experience (or in some other manner provides a profit margin). In participating insurance a higher premium is quoted than for the company's similar non-participating policy, and dividends are based on its assessment of current experience. In general, as of the date of issue, a company which issues both participating and non-participating policies will expect that a participating policy will provide a more favourable ultimate cost than a corresponding non-participating policy. Whether it actually will depend on future experience. It must also be remembered that premiums are level and dividends are generally monotonically increasing. Thus, for a number of years after issue, the premium minus the current dividend on a participating policy is generally greater than the premium on a non-participating policy, although ultimately the reverse should hold. Thus Company Retentions calculated over *short* durations will generally be *higher* for participating policies than for non-participating policies. However, Company Retentions calculated over *long* durations will generally be *lower* for participating policies.

In the Actuaries' Index there is identified that part of the premium allocated to death benefits, surrender values, dividends, and expenses plus profit. The first two components are guaranteed. However, dividends may be increased or decreased. Thus the "retention" on a participating policy may increase or decrease depending on whether dividends are decreased or increased. This is unlike the position with respect to a non-participating policy where the Actuaries' Index may be regarded as fixed.

This makes comparisons between participating and non-participating policies difficult, and to some extent also complicates the comparison of similar participating policies. However, a sophisticated buyer may wish to apply an adjustment factor to the dividends which would

reflect his knowledge of the company or of the economy. Any such adjustment of the dividend component would result in a similar adjustment to the Actuaries' Index. He would then proceed to the ranking process using the adjusted retention (or retentions).

The Actuaries' Index can thus provide a reasonable comparison between participating and non-participating policies and on a basis better than other methods – but a degree of sophistication is required. However, it is arguable that participating and non-participating policies should not be compared by the Actuaries' Index method or any other numerical comparison method. This argument would be based on the contention that participating and non-participating policies are fundamentally different products.

It should be noted that the Actuaries' Index method makes better allowance for the incidence and level of dividend scales (as it does for cash values) than any other method. By extending the calculation over 40 years (or the benefit period, if shorter) any anomalies which may be present in current scales are properly taken into account.

Finally, insurance should not be bought solely by cost comparison. The purchase of life insurance raises three questions: (1) whether to buy at all; (2) the type of policy to purchase; and (3) the specific company and specific policy. Cost comparison methods may be of considerable help in answering the third of these questions, of some help in the second, but of little assistance in the first. Insurance needs and insurance is not a simple subject, and in most cases there is a real need for professional advice. No one should expect to be able to choose an insurance policy which best suits his needs unless he has expert knowledge. Cost comparison indices are relative rather than absolute, and they are intended to lead a purchaser in a *general way* toward an economical solution of his insurance needs.

## **COST COMPARISONS AND THE CONSULTING ACTUARY**

Obviously the consulting actuary is in a position to make cost comparisons using the various formulae involved. It is not likely, however, that any purchaser would be prepared to pay the fee necessary to determine the most economical contract, nor would the actuary be prepared to make a recommendation unless he were satisfied that the right type of contract were being purchased in the first place.

However, it might be feasible for the consulting actuary to produce a "shoppers guide" at periodic intervals which would be available to interested parties on subscription. Presumably the guide would be limited to a few policies at four or five ages. Preparation of such a guide would obviously involve the co-operation of the insurance companies.

The Retention Method can also be used as a powerful tool in analyzing the economics (though not policy provisions) of replacement situations. These are cases where it is recommended that one policy be terminated (or changed to paid-up) and replaced by another in a different company. Complicated loan arrangements are often involved. The usual analysis of such situations is far from clear, and often it is suspected that there be ulterior

motives, such as commission, for the replacement. However, there are cases where the replacement makes sense. The Retention Method can compare the amount being retained for expenses and profit in the future on both policies. If the computer program were written, a comparison of the situation could be performed quite easily.

## APPENDIX A

1. Our modification of the Company Retention formula follows from formula (1) on page 174 of the Society of Actuaries report "Analysis of Life Insurance Cost Comparison Index Methods".

Let IBEN and IPR be the benefit and premium durations for a given policy cell. Let ICALC be the cost comparison period, F the face amount in thousands, and G the gross premium for the cell.

Then for the the level premium, level benefit plans we have used in this study, we have the simple representation:

$$G \cdot \sum_{t=1}^m v^{t-1} \cdot {}_tZ[x] = 1000 F \cdot \sum_{t=1}^n v^{t-1} Z[x] \cdot q^d[x] + {}_{t-1}$$

$$+ F \left\{ \sum_{t=1}^n v^t \cdot {}_tCV[x] \cdot {}_tZ[x] \cdot q^w[x] + {}_{t-1} + v^n \cdot {}_nCV[x] \cdot {}_nZ[x] \right\}$$

$$+ F \left\{ \sum_{t=1}^n v^{t-1} Z[x] \left( {}_tDIV[x] + q^d[x] + {}_{t-1} \cdot {}_tTDDTH[x] + q^w[x] + {}_{t-1} \cdot {}_tTDSUR[x] \right) + v^n \cdot {}_nZ[x] \cdot {}_nTDSUR[x] \right\}$$

$$+ \sum_{t=1}^n v^{t-1} \cdot {}_tL[x] \cdot {}_tZ[x],$$

where

$$m = \min \{ IPR, ICALC \},$$

$$n = \min \{ IBEN, ICALC \}$$

${}_tZ[x]$  = probability of surviving and persisting from  $[x]$  to  $[x]+t$ ,  ${}_tCV[x]$ ,  ${}_tDIV[x]$ ,  ${}_tTDDTH[x]$ ,  ${}_tTDSUR[x]$  = cash value, annual cash dividend, terminal dividends on death and on surrender, all per thousand, for issue age  $[x]$  in year  $t$ ,  ${}_tL[x]$  = the implicit loading for issue age  $[x]$ , policy year  $t$ , as at the beginning of the year.

Dividing through by  $\sum_{t=1}^m v^{t-1} \cdot {}_tZ[x]$ , and renaming

the four resulting expressions on the right-hand side, we have:

$$G = DEATH + SURR + DIVD + RET,$$

a representation of the actual policy gross premium in terms of its components for death benefits, surrender benefits, dividends, and the "retention" for expenses, profits and contingencies. Note that *all* of the non-guaranteed terms are grouped together in DIVD.

2. An interesting result obtains if we define ANC as

$$ANC = RET + DEATH = G - SURR - DIVD.$$

This "Actuarial Net Cost" is the sum of the retention and death benefit components, *i.e.* the portion of the policy gross premium to provide for the death benefit, expenses, profits and contingencies. From  $ANC = G - SURR - DIVD$ , it is also the premium component which is the net equivalent of the *voluntary* cash flows.

From the derivation in 1., it is readily apparent that if mortality and lapse rates are set to zero, ANC reduces to Interest-Adjusted Net Cost *per policy*.

Interest-Adjusted Net Cost is thus merely a special case of Actuarial Net Cost.

3. Another result obtains from the definition

$$ANP = RET + DEATH + SURR = G - DIVD.$$

This "Actuarial Net Payment" is the premium component to provide for all guaranteed benefits as well as expenses, profits and contingencies. By definition, it also equals the gross premium less the premium component for policy dividends.

It is apparent that Interest-Adjusted Net Payment *per policy* is a special case of Actuarial Net Payment.

## APPENDIX B

### STATEMENT BY THE CANADIAN INSTITUTE OF ACTUARIES ON COST COMPARISONS OF INDIVIDUAL LIFE INSURANCE POLICIES

Cost comparisons of individual life insurance policies have developed over the years and now have a high degree of sophistication. The earliest method was known as "Surrender Net Cost", and was obtained merely by comparing the sum of premiums paid, less dividends (if any), with the cash value of the contract at the end of a certain period (usually ten or twenty years). The time value of money (interest) was very largely ignored.

This method was eventually refined and improved into the "Interest-Adjusted Net Cost" which made allowance for the time value of money, but implicitly assumed that the purchaser lived for a given period (usually ten or twenty years) and then terminated his insurance contract for its cash value, *i.e.* it was a snapshot view of a course actually followed by few purchasers. This method of comparison is subject to the criticism that it ignores cash values at all durations except the one chosen, and all policy values after the comparison period selected. Because of the concentration on only one cash value, the value can potentially be manipulated to give favourable results, although there is no evidence that this has actually happened in *Canada*.

### The Actuaries' Index

A special committee of the Canadian Institute of Actuaries has been studying the problem and has produced two reports which deserve study by all interested in this subject. For cost comparisons, the Committee has modified and further developed certain proposed methods

to arrive at what has been termed the "Actuaries' Index". While the method may be thought mathematically complicated, it is easy to understand the underlying concept. For each year of the contract, a probability of utilizing each of the major policy benefits is assigned (i.e. mortality rates for death benefits, termination rates for cash values, etc.). These are then discounted at interest and converted into a level annual premium. The difference between the actual premium and this item just calculated is the *expected portion* of the total premium (based on the assumptions used) that will not be returned in benefits, and is called the "Actuaries' Index". The lower the "Actuaries' Index", the more economical the insurance contract may be deemed to be.

It should be noted that the "Actuaries' Index" is calculated on a standard set of assumed rates of interest, mortality and policy termination, for all companies. These assumed rates will differ from the actual rates for any particular company, because of variations in underwriting standards, investment policy, etc., etc., from company to company. Thus the "Actuaries' Index" numbers are useful only as a valid means of cost comparisons but have no intrinsic meaning by themselves.

The "Actuaries' Index" is by far the best place to start in making any cost comparison between similar policies of different companies. It may also be used, with some limitations, in comparing dissimilar policies. The index is less subject to manipulation than any other index studied to date. It should be calculated over as long a period as possible (the committee's report suggests 40 years or the benefit period, if shorter) in order to give the broadest view possible of the benefits provided by the contract. It is recognized that, for participating insurance, the illustration of policy dividends over an extended period (they may, in fact, be higher or lower, depending on actual experience) limits the value of cost comparisons. However, the discounting inherent in the calculation of this index minimizes this concern, and there is considerable advantage in having a single index reflecting a broad planning horizon. In situations where policy values are not available at extended durations, or where a shorter planning horizon is desired, the Actuaries' Index can be determined for shorter periods. However, in the absence of a specific planning horizon, the Actuaries' Index is the best comparison index yet devised, and meets the requirements of more purchasers than any other method known. Assumptions suggested for determining the Actuaries' Index are contained in the Committee's Second Report.

The calculation techniques used to determine the Actuaries' Index allow the value of the various benefits of a policy to be isolated. In particular, a sophisticated purchaser might look at the numerical value of a non-guaranteed benefit component, such as illustrated dividends under a participating policy, and adjust the value based on his assessment of the economy in general or the company in particular.

For situations in which the purchaser has a specific planning horizon, or specialized requirements (such as an interest in premium outlay in the near future being of primary concern, or little interest in cash values) it is recognized that other cost comparison techniques may be more appropriate. The Committee determined whether any of these other indices gave results that had a high

degree of co-relation with those under the Actuaries' Index. In general, such a co-relation did not exist. Thus these other methods do not have the same general applicability as the Actuaries' Index.

### Other Considerations in Life Insurance Purchases

There are many factors that cannot be put into any cost comparison index yet devised. These include the reputation, financial soundness, and ability to give service of the insurance company, the policy loan interest rate, etc. While these are important and may override considerations of possible cost, they are not susceptible to inclusion in a cost index. Further, no index by itself can determine the type of policy which should be purchased to best suit the needs of the individual purchaser. Other elements of disclosure, such as presentations of policy values on a year-by-year basis, will also aid the prospective purchaser in making a rational choice.

### Conclusion

While we do not believe that any *one* index can always be a valid measure of cost comparisons between insurance companies, we believe that the "Actuaries' Index" is a better measure than any other yet devised, and if only one index is to be used, it should be the "Actuaries' Index".

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