

RETAIL PRICE COMPETITION
IN CANADIAN WHOLE LIFE INSURANCE

by

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ABSTRACT

Problems of price analysis and price comparisons at the retail level in whole life insurance are so complex as to be well beyond comprehension to the average purchaser. In addition to the initial difficulties arising from the combination of savings and insurance protection which exist in whole life insurance policies many variables exhibit influence in the analysis of retail whole life insurance prices. The determination of price is no easy task but is ably accomplished by the level-price method which is utilized in this study.

Competition, it is often expressed, should function as a sufficient deterrent against the charging of excessive prices. From economic theory the concept of effective competition dictates that prices need not be completely uniform but that they ought not exhibit substantial diversity and that they should be flexible. The flexibility of prices in whole life insurance is restricted, by the nature of the product, to changes on an annual basis.

Evidence from this study, based on 1967 data, indicates that substantial price disparity between different companies is existent in various types of whole life insurance policies offered in Canada. Competition however, operates as well on variables other than price. The extent to which the existent price disparity reflects the costs of the added variables is not completely clear. While this study only views the price competition situation at one point in time, and is therefore restricted from the advantages

of conclusions based on broad foundations in time, it nevertheless appears evident that while no conclusions can be made here on competition as a whole, competition on the basis of price alone is less than wholly effective.

TABLE OF CONTENTS

CHAPTER		PAGE
1	INTRODUCTION	1
2	PRICE DETERMINATION IN LIFE INSURANCE	3
	Methods of Determining Price	6
	Level-Price Method	10
3	THE PRODUCT	19
4	METHODOLOGY; PROCEDURE - INITIAL	23
	Responses	25
	The Sample	26
	The Data	27
5	ASSUMPTIONS	
	(a) Interest Rate	29
	(b) Mortality	31
	(c) Lapsation	34
	(d) Dividends	35
	PROCEDURE - INTERJACENT	37
6	COMPETITION	39
	Perfect Competition	40
	Conduct Requirements	43
	Market Performance	44
7	THE RESULTS	47
8	INTERPRETATION OF RESULTS	55
9	CONCLUSION	71

PAGE

SELECTED BIBLIOGRAPHY 74

APENDICES 77

LIST OF TABLES

TABLE		PAGE
I	Yearly Price Information (on a \$1,000 Basis) of a Hypothetical Policy Assuming Interest at 4%	14
II	Responses to Questionnaires	25
III	Price Results for \$1,000 Whole Life Non-Participating Policies	47
IV	Price Results for \$10,000 20 Payment Life Non-Participating Policies	49
V	Price Results for \$10,000 Whole Life Participating Policies	51
VI	Price Results for \$10,000 20 Payment Life Participating Policies	53
VII	Information on Rank Correlation between Premium and Price	57
VIII	Price Differentials in the Extremes of the Arrays . . .	58
IX	Information Relevant to the Three Standard Deviation Test	60
X	Companies with Prices 1.5 Standard Deviations from the Mean	61
XI	Relative Growth of Low Price Firms in Terms of the Amount of New Effected Insurance Policies on Whole Life Policies in Canada	66
XII	Relative Growth of High Price Firms in Terms of the Amount of New Effected Insurance Policies on Whole Life Policies in Canada	68
XIII	Structural Changes Amongst Ten Largest Firms in the Study	70

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CHAPTER I

INTRODUCTION

The loss by premature death of a human life is the loss of different values to a few, some, or many people. Although a human life may be possessed of moral, social or other values, most human lives are also possessed of an economic value. The economic value of a human life is derived from its earnings capacity and the financial dependence of other lives on that earning capacity. The basis for life insurance exists when there exists an economic value of a human life. Life insurance is a device which enables an unrealized potential of the economic value of a human life to be realized in the event of death. As a means of compensating economic loss, life insurance has grown and become a part of the existence of most Canadians. In fact, relative to the national income, Canadians own more life insurance than the people of any other country.¹ Total life insurance in force in Canada is about twice personal disposable income and annual premium payments absorb 3% of disposable income.²

Without further elaboration it is evident that in Canada, people have capitalized heavily their economic life values, through the purchase of life insurance, thus making the subject one of extreme importance in the individual and

¹Canadian Life Insurance Facts 1966 (The Canadian Life Insurance Association, Toronto, 1966), p. 30.

²Royal Commission on Banking and Finance (Queen's Printer, Ottawa, 1964), p. 238.

ultimately the national interest. A glimpse of the importance of life insurance in Canada is reflected in the net amount of life insurance in force in Canada at the end of 1966 of \$76,824 million.³

While the importance of life insurance is not usually questioned, however, a great deal of confusion appears to exist at the retail level about the subject. The primary confusion appears to arise from the potential purchaser's attempt to determine a meaningful price to pay for a particular type and amount of life insurance. The assertion is often made that the determination of price in life insurance is sufficiently complex to be well beyond comprehension to the potential purchaser.⁴ Further, the assertion is sometimes made that competition is sufficient as protection against excessive prices being charged to the purchaser.⁵ If these two statements are taken together, they raise an important question. When it appears that price analysis in life insurance may be confusingly complex to the purchaser, is price competition nevertheless effective? The purpose of this thesis is to examine this question as it relates to the Canadian whole life insurance scene. Specifically, the purpose of this thesis is to determine the effectiveness of retail price competition in the Canadian whole life insurance market.

³Report of the Federal Superintendent of Insurance, 1966 (Queen's Printer, Ottawa), Vol. 1, p. ii.

⁴see, for example, S. Huebner and K. Black, Jr., Life Insurance (6th Ed., New York: Appleton-Century-Crofts, 1964), pp. 596-98.

⁵see, for example, R. Mehr and R. Osler, Modern Life Insurance (3rd Ed., New York: MacMillan Co., 1961), pp. 714-15.

CHAPTER 2

PRICE DETERMINATION IN LIFE INSURANCE

Before any initial attempt can be made to discuss price competition, it is necessary to define and determine 'price' in life insurance. The following sections therefore, are devoted to that task.

In the Introduction, brief reference was made to the economic value of a human life. The economic value of a human life is subject to certain elements of uncertainty, the most important of which is death. The protection against this element of uncertainty is the domain of life insurance.

While various definitions of the term insurance are available from different texts on the subject, two concepts appear to underly all such definitions.

Kulp's definition readily summarizes the two concepts. He states that,

insurance is a formal social device for the substitution of certainty for uncertainty through the pooling of hazards.⁶

The first implication therefore is that uncertainty is reduced. Secondly, the implication is that losses are shared--that risks are pooled. Persons exposed to loss from a particular source combine their risks and agree to share losses on some equitable basis. Thus from the point of view of the individual insured, insurance is a device that makes it possible for him to substitute a small definite cost for a large but uncertain loss (up to the amount of the policy), under

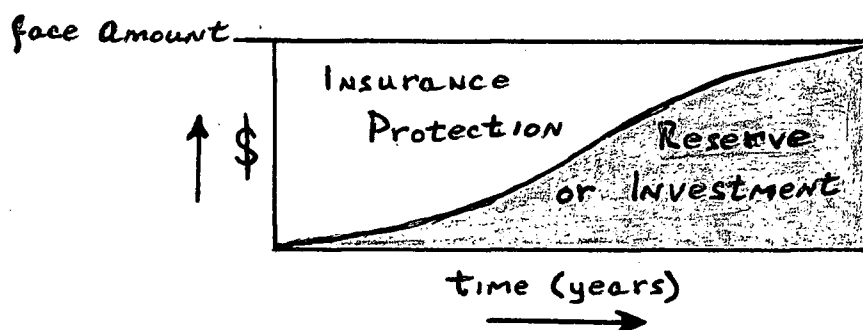
⁶C. A. Kulp, Casualty Insurance (3rd ed., New York: Ronald Press Co., 1956), p. 9.

an arrangement whereby the fortunate many who escape the loss will help to compensate the unfortunate few who suffer loss. In whole life insurance the loss is actually an eventual certainty. That is, whole life insurance provides for the payment of the face amount upon the death of the insured, regardless of when it may occur. The uncertain element in whole life insurance is the time at which the insured will die. In whole life insurance, if premiums are to be paid through the lifetime of the insured, the insurance is known as 'ordinary life'; if premiums are to be paid only during a specified period, the insurance is known as 'limited payment life'.

Both ordinary life and limited payment life are level premium plans; that is, a fixed premium is paid up to a specified number of years. In simple terms, under the level premium plan, part of the premium paid by the policyholder in any year is used to pay the death claims of others who have died during the year. Most of the remaining portion of the premium however, goes into the creation of a reserve which must be accumulated and maintained by the insurance company in order to meet definite future obligations--ultimately the certainty of the payment of the face amount of the policy. Each year as the policy continues in effect, the reserve increases until eventually it reaches the face amount. The company therefore is never at risk on the whole of the face amount. The amount of insurance protection offered by the company is the face amount of the policy less the policyholder's own accumulated excess payments--the reserve. Since the excess payments may be withdrawn by the policyholder at any time through the cash surrender, they can be

regarded as a savings or investment account.⁷ Thus, ordinary life and limited payment life, both level premium plans, do not provide only pure insurance protection, but rather a combination of decreasing insurance protection and increasing savings or investment, the two amounts being computed in such a manner that their sum in any year is equal to the face amount of the policy.⁸ Figure 1 serves to illustrate the concept.

FIGURE 1



In attempting to determine the price of the protection element in whole life policies, numerous problem factors become apparent. The time-shape of the savings element is one factor which is subject to manipulation by a company and may be used in attempting to improve a company's apparent relative price position. The so-called traditional method of price determination described later in this section is susceptible to such manipulation. Further, the 'steepness' of the dividend scale in participating policies may be manipulated

⁷In actual fact the cash surrender value is not equal to the reserve; it is somewhat less than the reserve. However for purposes of illustrating the concept of increasing savings and decreasing protection, this distinction need not be made.

⁸This is in contrast to term insurance in which there is no savings element and in which protection is given for a limited period of time, as stated in the policy, usually for 5, 10, or 20 years, or to a stated age such as 65.

for similar purposes. The use by a few companies of certain policy forms which deviate from the general, such as, for example, the use of terminal dividends, further complicates the problem of price analysis. Because of the existence of these and other complicating factors which shall be discussed in depth later on, the proposition is often put forward that price analysis in life insurance is too complicated for the comprehension of the layman. Consequently, in attempts at extreme simplification, the two parts of the package in ordinary life insurance--protection and savings--are often grouped together in terms of discussing the cost of insurance and the premium rate is thus considered as the cost of insurance.⁹ Whether or not the premium rate is a reliable estimate of a policy's price of protection is a question with which this study shall concern itself.

Despite the complications in life insurance price analysis, various methods have been developed and are in use. A brief discussion of some of these methods will help to point out their shortcomings and will lead to a description of the price analysis method utilized in this study.

METHODS OF DETERMINING PRICE

Textbook references either make no mention of the proper determination of the price of protection in life insurance or else they differ as to the proper computation of such price. It is to be emphasized that the process of computing the

⁹see for example an Article in the Financial Post, Instant Estate? Here's the Only Way, (April 13, 1968), pp. 23-4.

price of protection element of a life insurance policy involves the making of various assumptions. For this reason, no single price figure can be established as the price; rather, any price figure that is determined must be accompanied by a statement of the method and assumptions used in computing that figure. As has been discussed earlier, in whole life insurance there are two parts of the package--protection and savings--and any figure established as the price of protection must be accompanied by an assumption about the 'price' of the savings. Conversely, it is possible to make a statement about the price of the savings only if an assumption is made about the price of protection.

This latter approach has been utilized from time to time in life insurance price analysis. One such use was made by M. A. Linton¹⁰ who made an assumption about the price of protection and assumed that the policyholder invests each year in an alternate savings medium the difference between the price of protection and the premium. Linton then computed the net rate of interest that would have to be earned on the yearly differences in the alternate savings medium in order to reach the policy's cash value at a given point in time. For reasons that will be expanded upon later in this paper, an assumption of a common price of protection as between different companies presents several problems which decrease the validity of this approach. Consequently most

¹⁰see M. A. Linton, "Life Insurance as an Investment" Life and Health Insurance Handbook, ed. D. W. Gregg (2nd ed., Homewood, Ill.: Richard D. Irwin, Inc. 1964) pp. 241-44.

price analysis methods attempt to determine the price of protection and make an assumption about the 'price' or 'opportunity cost' of the savings element--the net interest rate at which the savings element could be invested by the policyholder in an alternate savings medium with safety comparable to that found in life insurance.

Of all the numerous methods of price analysis in whole life insurance, the so-called 'traditional' method has probably enjoyed the widest use.¹¹ Under this essentially simple method the sum of the dividends payable during a given period (in the case of a participating policy) and the cash surrender value at the end of the given period (usually 20 years) is subtracted from the sum of the premiums payable during the period. The resulting figure is then divided by the number of years in the period in order to arrive at an 'average annual price' for the period. If the policy has a face amount of other than \$1,000.00, the average annual price is then divided by the face amount (in thousands of dollars) to arrive at an average annual price per \$1,000 of face amount. While the traditional method has the important attribute of simplicity the combined effect of ignoring certain factors impairs its reliability. To begin with, the traditional method ignores the fact that the amount of protection at any point in time, up to the end of the premium payment period, is not the face amount of the policy, but rather is the difference between the face amount and the

¹¹ a description of the traditional method can be found in R. W. Lord, "Analyzing Contracts and Costs", Life and Health Insurance Handbook, op. cit., pp. 227-37.

savings element. As the amount of protection during the period continually declines, and after the initial phase is always less than the face amount, this deficiency in the traditional method leads to an understatement of the price. Secondly, interest is ignored in the calculations, and this also leads to an understatement of the price. The combined effect of disregarding both the interest factor and the declining amount of protection in most level-premium policies on occasion leads to the absurd conclusion that the average annual price per \$1,000 of face amount is negative. Another deficiency of the traditional method is that the price figure is applicable only to the arbitrarily chosen period of analysis. It provides no information on the price of protection for other time periods.

Another method which partially alleviates the deficiencies of the traditional method is described in Matteson and Harwood.¹² This method does not ignore interest. This method accumulates the gross annual premium (less dividends in participating policies) over a stated period (usually 20 years) at a given rate of interest. The cash surrender value at the end of the stated period (usually 20 years) is then subtracted from the accumulated net payments as described in the preceding sentence. The result supposedly represents the net cost of the insurance protection to the policyholder during the stated period. While this method recognizes interest in part, it completely neglects

¹²W. J. Matteson and E. C. Harwood, Life Insurance and Annuities from a Buyer's Point of View, (Great Barrington, Mass: American Institute for Economic Research, Annual).

the time-shape of the cash surrender value pattern as well as the steepness of the dividend scale. Utilizing this method one might be able to make price comparisons between companies, but only on a retroactive basis--that is, at the end of the stated period of years, assuming no surrender option was exercised. This method is not at all sufficient for the potential purchaser of a policy who wishes to analyse and compare different company price positions. The potential buyer is primarily interested in what the policy is going to cost. The relevance of what a particular policy has cost in the past is not likely to be significant because of changes in cost variables companies utilize in establishing rates. The method next described--the one used in this study--gives most reliable indications of the prices of protection for different policies between different companies.

THE LEVEL-PRICE METHOD

The method used in this study to determine the price of protection is the 'level-price' method,¹³ which consists in general of two stages. The first stage is the calculation of yearly prices per \$1,000 of protection and the second stage is the calculation of level prices per \$1,000 of protection.

STAGE I - YEARLY PRICE CALCULATION

The yearly price calculation may best be illustrated by an example. Assume

¹³This method is described in an article by Joseph M. Belth, "Price Competition in Life Insurance", Journal of Risk and Insurance, (September, 1966), pp. 367-70.

that the price of protection is being computed in the 6th policy year of a whole life non-participating policy which has a face amount of \$10,000 a gross level annual premium of \$190.00 and cash surrender values of \$510.00 and \$645.00 at the end of the 5th and 6th policy years respectively.

If the policy owner should decide to discontinue the policy before paying the 6th annual premium, he would be entitled to receive the 5th year cash surrender value. If he decides to continue the insurance for another year, he is in effect investing that amount in the policy for a period of one year. Further, he is adding to it his gross annual premium payable at the beginning of the 6th year. The sum of the cash surrender value at the end of the 5th year (\$510.00) and the 6th year's repmium (\$190.00) equals the policy owner's total investment in the policy at the beginning of the 6th year (\$700.00).

If the policy owner should decide to discontinue the policy before paying the 6th year premium, the total investment calculated in the foregoing paragraph could be placed elsewhere, at interest, which for purposes of this illustration, will be assumed to be 4%.¹⁴ If the policyholder decides to discontinue the insurance the total investment would have grown by 4% by the end of the 6th year. The resulting figure may be considered the policyholder's alternate investment fund at the end of the 6th policy year. Thus total investment at

¹⁴The choice of an appropriate interest rate is not an easy task. Discussion of this problem and determination of an appropriate interest rate to be utilized in this study is to be found in a later section.

the beginning of the 6th year (\$700.00) plus 4% interest (\$28.00) equals alternate investment fund at the end of the 6th year (\$728.00).

If the policyholder continues the policy during the 6th year and then surrenders the policy at the end of that year, he would receive the 6th year cash surrender value. The cost to the policyholder of continuing the protection during the 6th year is therefore the difference between his alternate investment fund determined in the preceding paragraph, and the 6th year cash surrender value. Thus the alternate investment fund at the end of the 6th year (\$728.00) minus the cash surrender value at the end of the 6th year (\$645.00) equals the cost of insurance protection for the year (\$83.00).

While the face amount of the policy remains \$10,000 the amount of insurance protection is not constant. The amount of insurance protection is the difference between the face amount of the policy and the investment fund, which steadily increases as a result of the interest factor.

If the policy owner decides to continue the insurance during the 6th year and immediately dies at the beginning of that year, his estate would benefit to the extent of the face amount less the total investment at the beginning of the 6th year. If, however, his death occurs at the end of the 6th year, his estate would benefit to the extent of the difference between the face amount and the investment fund at the end of the 6th year. In determining the average amount of protection throughout the 6th year, the average size of the investment fund is considered as the arithmetic mean of the investment fund at the

beginning and at the end of the year in question.¹⁵ The average amount of protection is then the difference between the face amount and the average investment fund. Thus the face amount (\$10,000) minus the average size of the investment fund during the year (\$714.00) equals the average amount of insurance protection during the year (\$9,286.00).

From the preceding calculations it is now possible to determine the cost per thousand dollars of protection for the year under study. The cost of protection for the year (\$83.00) divided by the average amount of protection during the year expressed in thousands of dollars (9.286) equals the cost per thousand dollars of the average amount of protection during the year (\$8.94).

It will be noted that the illustrative example was a non-participating policy. The introduction of annual dividends into the calculating process presents no special computational problems and can be handled quite easily. In referring to the example, the cost of insurance protection for the 6th year was determined by subtracting the cash surrender value at the end of the 6th year from the policyholder's alternate investment fund at the end of the 6th year. If the policy is participating, the dividend payable at the end of the 6th year would be added to the cash surrender value at the end of the 6th year and the sum would then be subtracted from the policyholder's alternate investment

¹⁵While no detailed consideration has been given to the time distribution of policyholder's deaths over a year, the assumption of a normal distribution does not appear unreasonable and does not unduly complicate the calculating process.

fund at the end of the 6th year.

STAGE II - LEVEL PRICE CALCULATIONS

Calculations respecting only stage I of the level price method--that is, calculation of the yearly price--may be sufficient for certain purposes.

However, because of the possibility of wide variations in the different yearly prices of a policy, it is desirable to reduce a series of unequal yearly figures to a level price per \$1,000 of protection. Stage II of the level price method--the reduction of various yearly prices to a single level price--is more complicated than stage I and will best be illustrated by an example. Assume the yearly price information for the first three years of a hypothetical policy as presented in Table 1.

TABLE 1

Yearly Price Information (on a \$1,000 Basis)
of a Hypothetical Policy Assuming Interest at 4%

<u>Policy Year</u>	<u>Cost of Protection</u>	<u>Average Amount of Protection</u>	<u>Cost per \$1,000 of Average Amount of Protection</u>
1	\$ 20.11	\$ 979.31	\$ 20.54
2	6.38	979.31	6.51
3	5.15	966.10	5.33

In determining a single average cost over the 3 policy year period, it is improper for several reasons to simply add the three cost per \$1,000 of average amount of protection figures and divide by 3. In order to compute a

meaningful average cost for a period of years it is necessary to keep in mind the nature of the yearly price figures. They are simply ratios--each cost per \$1,000 of the average amount of protection is the ratio of the cost of protection to the average amount of protection for the year under study. Since the denominators of these ratios change from year to year in whole life policies, it is necessary to weight the ratios by the average amount of protection. Employing the illustrative figures, the average cost per \$1,000 of protection weighted for the average amount of protection would be calculated as follows:

$$\frac{(\$20.54) (.97931) + (\$6.51) (.97931) + (\$5.33) (.96610)}{(.97931) + (.97931) + (.96610)} = \$10.82$$

However, since the product of the cost per \$1,000 of protection and average amount of protection for a given year is identical to the cost of protection, the same result would be obtained by combining in the numerator of the above calculation, the cost of protection for the three years as follows:

$$\frac{(\$20.11) + (\$6.38) + (\$5.15)}{(.97931) + (.97931) + (.96610)} = \$10.82$$

To this point, equal recognition has been given to the yearly price figures regardless of the point in time at which they are incurred. It is necessary, however, because of the time value of money, to give greater recognition to the cost nearer to the beginning of the series than to those incurred later on. Thus, the three year average cost per \$1,000 of protection, weighted for the average amount of protection and recognizing interest, is calculated by dividing the present value of the series of cost of protection figures by the present value of the series of average amount of protection figures. The

calculation, assuming 4% interest is as follows:

$$\frac{(\$20.11) + (\$6.38) (1/1.04) + (\$5.15) (1/1.04)^2}{(.97931) + (.97931) (1/1.04) + (.9661) (1/1.04)^2} = \$11.02$$

The above three year average cost figure assumes that the policyholder will survive to incur each of the single year costs. However, there is a probability that the policyholder may die before incurring the price in the second and third policy years and hence mortality must be recognized in the levelling process. This is accomplished by further discounting the single year costs that are to be incurred in the future. For purposes of this illustration, the 1958 Commissioners Standard Ordinary Table of Mortality shall be used.¹⁶

This Table gives the probability of death at age 40 as .00353 and the probability of death at age 41 as .00384. The three year average cost per \$1,000 of the average amount of protection weighted for the average amount of protection and recognizing interest and mortality is then computed as follows:

$$\frac{(20.11) + (6.38)(1/1.04)(1-.00353) + (5.15)(1/1.04)^2(1-.00353)(1-.00384)}{(.97931) + (.97931)(1/1.04)(1-.00353) + (.9661)(1/1.04)^2(1-.00353)(1-.00384)} = \$11.04$$

The above figure, while recognizing several things, does not recognize that the policyholder faces a probability that he will discontinue the policy before incurring the price in either the second or third year.¹⁷ The recognition of lapsation in the levelling process, because of its magnitude, is an important factor in the computation. For the purposes of this illustration assume the

¹⁶a full discussion of mortality and of the appropriate rates to be employed is to be found in a later section of this study. In the above illustration the actual mortality rates utilized are unimportant. The concept and calculation method recognizing mortality, however, is not.

¹⁷a full discussion of withdrawal is found in a later section.

probability of withdrawal in the first policy year is .097 and .081 in the second policy year. The three-year average cost per \$1,000 of protection weighted for the average amount of protection and recognizing interest, mortality and withdrawal is then calculated as:

$$\frac{(20.11) + (6.38)(1/1.04)(1-.00353-.097) + (5.15)(1/1.04)^2(1-.00353-.097)(1-.00384-.081)}{(.97931) + (.97931)(1/1.04)(1-.00353-.097) + (.9661)(1/1.04)^2(1-.00353-.097)(1-.00384-.081)} = \$11.53$$

Although stage I and stage II of the level-price method have been followed through step by step, no formulae have as yet been presented. The formulae for the computation of yearly and level prices per \$1,000 of protection are as follows:

Formulae for Price Calculations

Explanation of Symbols:

t	A given policy year.
x	The first policy year in a series of n policy years.
n	A given number of policy years, beginning with x, and ending with x+n-1.
i	Annual interest rate (expressed as a decimal).
v	$1/(1+i)$.
j	Index of summation.
m^Z_x	Probability of surviving and persisting from beginning of year x until beginning of year x+m.
GAP_t	Gross annual premium payable at beginning of policy year t.
VAL_t	Cash value at end of policy year t (special case: when t+1, $VAL_{t-1}=0$).
DIV_t	Dividend payable at end of policy year t.
$FACE_t$	Face amount payable in event of death during policy year t.
YP_t	Price of protection in policy year t.
AMT_t	Average amount of protection in policy year t (expressed in thousands of dollars).
YPT_t	Price per \$1,000 of protection in policy year t.
LP_n	Level price per \$1,000 of protection, weighted for amount of protection and recognizing interest, mortality, and lapsation, for n policy years.

Computation of Yearly Prices per \$1,000 of Protection:

$$\begin{aligned} YP_t &= (GAP_t + VAL_{t-1})(1 + i) - (VAL_t + DIV_t) \\ AMT_t &= \left[(FACE_t) - (GAP_t + VAL_{t-1})(1 + .5i) \right] (.001) \\ YPT_t &= (YP_t)/(AMT_t) \end{aligned}$$

Computation of Level Prices per \$1,000 of Protection:

$$LP_n = \frac{\sum_{j=x}^{x+n-1} (YP_j)(v^{j-x})(j-xZ_x)}{\sum_{j=x}^{x+n-1} (AMT_j)(v^{j-x})(j-xZ_x)}$$

In the application of the level price method to this study, the formulae were slightly modified to ease the burden of computation. For computational purposes the symbols in the formulae $(v^{j-x})(j-xZ_x)$ were combined by use of a hand calculator and the resulting figures for each of the 20 policy years were termed Z factors, which therefore combined the interest discount factor and the mortality and lapsation factors. A reproduction of the Z factors is to be found in Appendix A.

CHAPTER 3

THE PRODUCT

The determination of an exacting definition of product in life insurance is a particularly difficult task. Identical contractual life insurance coverage for two individuals does not necessarily constitute an identical product. Although the contractual coverage may be identical, the level of service provided as well as the risk of mortality may not be equal. If product is defined in this manner, however, identical policies issued by any two different companies, or even by the same company through two different agents, would be different products and any comparisons would be impossible. For practical purposes insurance companies utilize class rating systems that group individuals together and assume that all individuals within the group are of equal risk. Differences in the service provided, however, may be very real, and probably cost more money to provide, therefore justifying an addition to the price by a high-service company.

Service is an example of an intangible aspect, reflecting the terms and circumstances surrounding the purchase, which may appear trivial to the outside observer. To the buyer however, intangibles are important and he may be willing to pay extra to get them. In a total assessment of product therefore, one must consider 'total product' and not just physical product. 'Total product' as conceived by contemporary students of marketing embraces not just the physical product itself, but the diverse elements of a "package" including dependability, availability, extent, and cost of service provided,

credit supplied, as well as the other satisfactions the customer may derive from purchasing from a given source.¹⁸

The problem of assessing the substance or triviality of product differentiation is rendered doubly difficult in dealing with a service industry, such as insurance, in which the "physical" product is itself partially intangible, a contract of insurance. In terms of whole life insurance, such a contract is a contingent one in respect of when certain events will materialize.

Primarily, perhaps, the buyer of life insurance is buying peace of mind. He probably hopes he is going to get nothing else out of the transaction, except of course, cumulative savings in whole life insurance policies. In the event of death of the insured however, the policyholder hopes that benefits will be forthcoming expediently to the beneficiaries.

Such a contract, may of course, not be worth very much. It could be written by anyone; anyone with capacity to contract could write a valid policy though he might violate one of several statutes in doing so. If he didn't have the financial capacity to meet his contractual obligations it would be worthless. Canadian legislation in the field of insurance was first prompted by an apparent need to license insurance companies to see to it that they were able to meet their obligations, and this remains the primary concern of the federal Department of Insurance (and, with respect to provincially-licensed comp-

¹⁸E. J. McCarthy, Basic Marketing: A Managerial Approach (Rev. Ed. Homewood, Ill.: Irwin, 1964), pp. 315-16.

anies , of provincial departments as well.) Presumably such regulation is required because buyers of insurance are unable to assess insurers' financial capacity.

The buyer expects far more than mere solvency on the part of the insurer , however . He may want to have his premium financed , he may want to change his coverage at 2 a.m. on New Year's morning . He wants the life insurance benefits handled as quickly as possible with a minimum of personal inconvenience to the beneficiaries . He may want some or all or more of these . Some of them are immediate , the others constitute a bundle of contingent future services which he may be hard put to evaluate a priori.¹⁹

This total package of services is provided partly by the company which writes the policy and expedites it in the event of death and partly by the agent which sells it.

While cognizance ought to be taken of the total product concept and of the competitive influence of the various intangibles associated with that concept , it is extremely difficult , perhaps impossible , and well beyond the scope of this study , to objectively evaluate the intangibles provided by each company and its agents . Therefore , for purposes of objective comparison , the product has been defined in this study as one providing identical coverage for indi-

¹⁹Just how to form a reliable appraisal of his potential future treatment by a company in the event of any one of the multitude of potentially possible catastrophes , in the light of his apparent inability to determine whether it is financially able to treat him at all , remains a risk to the policyholder.

viduals in the same rate class: i.e. for individuals of the same age at entry.

Four types of \$10,000 life insurance policies available in Canada to standard males at age 30 in 1967 are surveyed in this study. The four types of policies are as follows:

- 1) Whole life participating
- 2) Whole life non-participating
- 3) 20 payment life participating
- 4) 20 payment life non-participating

CHAPTER 4

METHODOLOGY

PROCEDURE - INITIAL

Having determined the appropriateness of the level price method in application to this study, the next procedural step was the gathering of data relevant to the study. Initially, it was thought that Stone and Cox²⁰ would provide the necessary data. However, an analysis of this information revealed that in most instances cash surrender values and dividends, on the type of policies utilized in the study, were only given for illustrative policy years such as years 1, 2, 3, 4, 5, 10, 15 and 20. Although with such information it would be possible by an interpolation technique to estimate values for the years not reported, it was felt that the room for error would be too large to place any meaningful validity on the results. In view of the fact that it was possible to obtain definite values, it was considered that the greater effort and expense in obtaining definite figures would be justified in alleviating the possibility for errors that interpolation would create. Accordingly, in early 1967 identical questionnaires were sent to 102 federally registered life insurance companies operating in Canada. The names of the companies were obtained from Canadian Life Insurance Facts, 1966 published by the Canadian Life Insurance Association. The companies are therein segregated in terms of Canadian,

²⁰The Stone and Cox Life Insurance Tables are published annually by Stone and Cox, Ltd., Toronto, Ontario and is considered a universal Canadian life insurance rate manual.

British or Foreign ownership and this segregation has been maintained in order that the ultimate price results could be available on this basis of differentiation. Companies which it was known had ceased to write new business in Canada as well as provincially incorporated companies operating under a provincial license only, i.e. without federal registry, were excluded, because of their localized and limited influence on the total Canadian life insurance retail market.²¹

The companies were assured that their names would be kept on a confidential basis. Accordingly the price results appear by company number, not name. A copy of the questionnaire is to be found in Appendix B. Special typing services at the University of British Columbia were utilized in order that the questionnaires would appear as a personalized communication. Department stationery was used. As some of the original questionnaires were forwarded to the head offices of several of the foreign companies, responses continued to be received for approximately a two month period after the mailing date of the original questionnaires.

Largely as a consequence of receipt of responses to the original questionnaires, certain problems became apparent. Follow up letters were sent to fifteen companies to ascertain information relevant to the problems. These problems and the methods used to handle them are detailed in subsequent sections. In

²¹Provincial companies accounted for only 6% of the life insurance in force at the end of 1965 according to Canadian Life Insurance Facts, op. cit., p. 2.

addition second questionnaires were sent to 18 of the non-respondents to the original questionnaire.

RESPONSES

The number of respondents to the original questionnaire was 77, indicating a response ratio of .755. In view of the fact that companies were under no obligation to respond, the response ratio obtained is particularly satisfying and was no doubt at least partially prompted by use of departmental stationery. However, not all replies received from companies were useful as input data. Table II gives a breakdown of the reaction to the questionnaires.

TABLE II
RESPONSES TO QUESTIONNAIRES

	<u>Total Number Questionnaires Sent</u>	<u>Number of Useful Replies</u>	<u>Replies Not Useful</u>	<u>Non-Responses</u>
1)	102	56	21	25
2)	18	4	1	13

Replies were not useful primarily because the company had ceased to write business in Canada or was involved in re-insurance only. Other replies were classified as not useful for a variety of reasons, such as, (a) policy form deviation from the general form utilized in the level-price method, (b) assurance that a copy of this study would be forwarded free of charge, and (c) unwillingness to participate in a price comparability study. Despite some inevitable unwillingness to participate on the part of a few companies, it is

felt that the insurance companies to whom questionnaires were sent, were extremely generous in their effort to provide the author with the appropriate information. Although the data from the companies is not confidential, it appears that in some instances, considerable time and effort was expended in providing the same. Further, there was no assurance of any direct benefit to the companies for their effort in providing the information.

THE SAMPLE

While 60 companies participated in the study, not all of these companies provided information on each of the four types of policies. The number of companies submitting information and thus being included in the analyses on each of the four types of policies is as follows:

<u>Policy</u>	<u>Number of Companies Included</u>
Whole life participating	40
Whole life non-participating	44
20 pay life participating	42
20 pay life non-participating	41

In terms of premium volume, the 60 companies appearing in the study accounted for 73.7% of the total Canadian life insurance market in 1965.²² Although no statistical techniques have been applied in testing the validity

²²In terms of "insurance premiums and annuity considerations" from The Report of the Superintendent of Insurance for Canada, Vol. 1, 1965, pp. 40c, 66c, 72c.

of the sample, it is considered that the overall sample consisting of almost 75% of the population, is representative. Unfortunately, it is not possible because of lack of data to determine the percentage of the market represented in each of the four policies in the study.

THE DATA

Certain problems of comparability with respect to the data became apparent as responses to the original questionnaires were received from the companies. In the participating policies a few companies issued terminal dividends or expressed the dividends as additions to the sum assured. These companies were excluded from the analysis as their number did not justify the considerable task of rendering them comparable. The main problem experienced with the data concerned the waiver of premium provision. This is a provision offered by some companies automatically or as an optional provision, which provides that if the insured suffers a total disability, the company will waive any premium subsequent to the disability. The policy still continues in effect. The extent to which this provision increased the premium was ascertained by follow-up letters to four different companies. The replies from the four companies indicated very close agreement between the companies concerning the influence of the waiver of premium provision on the premiums for the various policies. Specifically, on the basis of this information, premiums on the few companies that automatically included the waiver of premium provision, were adjusted downward as follows:

Downward Premium Adjustment

Whole life participating	2.6%
Whole life non-participating	3.2%
20 pay life non-participating	1.4%
20 pay life participating	1.1%

CHAPTER 5

ASSUMPTIONS

The application of the level-price method involves the making of certain assumptions. While an assumption is not, by its nature, imbedded in fact, it ought to spring as far as is possible from reason. The assumptions made in the application of the level-price method to this study are discussed in the remainder of this section.

(a) Interest Rate

The choice of an appropriate interest rate to be used in the study is of fairly crucial importance. As aforementioned, any figure established as the price of protection element in a whole life policy must be accompanied by an assumption about the price of the savings element. It was therefore necessary in utilizing the level-price method, to establish a price or opportunity cost of the savings element. In establishing an appropriate interest rate it was assumed that Government of Canada long-term bonds represent an acceptable alternate savings medium to the buyers of \$10,000 whole life policies. Accordingly, the average interest yield on long-term Government of Canada bonds was computed over a 10-year period, ending December, 1963. The result of this calculation indicated the average yield to be 5.09%. However this figure is a before tax interest yield to the investor in this savings medium. Since the interest built into the savings element of a life insurance policy is currently exempt from federal income tax, the tax bracket of the policyholder enters into the determination of an appropriate interest rate to be used in the

price calculations.

Considerable difficulty was experienced in attempting to determine the average net income tax rate for persons buying any of the four \$10,000 whole life policies. However, after careful consideration and consultation with various individuals, a general figure of something slightly in excess of 20% was concluded as the most reasonable probability. Accordingly, a specific average net income tax rate of 23% was utilized. Application of this tax rate to the previously determined average yield of long-term Government of Canada bonds results in a rounded price of the savings element of 4%. This represents the net interest rate at which the savings element could be invested by the policyholder in an alternate savings medium with safety at least comparable to that found in life insurance.

In light of the current plateau of relatively high interest rates in this country, an after tax rate of 4% on the savings element of a whole life policy may seem unduly conservative. It may be. However, at least two factors may tend to mitigate against this criticism. In the first instance the volatility of Canadian interest rates in recent years may be expected to be reduced if international forces and situations stabilize and if domestic management both monetary and fiscal chooses appropriate remedies. Secondly, individuals purchasing \$10,000 whole life policies are not generally heavy risk takers insofar as their investment in the savings element of life insurance is concerned.

Information publicly available, as for example as contained in Stone and Cox, indicates the interest rate utilized by different companies in determining their

cash surrender values. The 1965 edition of Stone and Cox indicates that the general average valuation interest rate utilized was 3 to 3 1/2%.

The extent to which an upward change in the interest rate would affect the final price of protection figures becomes of importance in view of interest developments in Canada. While it is recognized that differences in policy data, such as the time-shape of the savings element--the cash surrender value--between different company's policies, may change the relative price position of the policies if a different interest rate is utilized, the change is not considered to be significant if the interest rate is moved 1% such as from 4% to 5%.²³

(b) Mortality

As life insurance may be loosely thought of as a futures contract, it is essential that best possible estimates concerning relevant variables in the future be made. Mortality is one of the most relevant variables in forecasting for life insurance purposes. Its relevance stems from the fact that accumulations to meet future obligations--and therefore premium rates--are all based on the mortality experience of the insured lives.

Mortality forecasting is a problem in predictability. As with most other forecasting problems, the validity of mortality forecasts depends upon two

²³The results reported in a U. S. analysis by Dr. Belth indicate only a slight shift in relative price positions in moving from 3% to 4% interest. See J. M. Belth, op. cit., p. 373.

factors: (a) the accuracy of mortality statistics underlying the estimates, and (b) the number of exposure units or the volume of mortality experience utilized. With respect to the first factor, mortality statistics have been drawn from two general sources--the general population and insured lives. For various reasons such as the possibility that general population mortality may not be wholly reflective of insured lives mortality and the lack of comparable detailed information in the general population mortality statistics, virtually all life insurance companies today utilize mortality tables based on the experience of insured lives.²⁴

Various mortality tables are presently in existence, several of which have been approved by the Canadian and British Insurance Companies Act.²⁵ In the course of attempting to determine the most appropriate table to be utilized in this study, several mortality tables were scrutinized. For example, the Canadian Assured Lives '52-'56 Table, being based on relatively recent Canadian mortality experience appeared as a logical alternative. However, as it has not been approved by the Canadian and British Insurance Company Act at the implementation of this study, it was discarded. The mortality table finally chosen for the study is the 1958 Commissioners Standard Ordinary Table as it is based on relatively recent mortality experience, has been

²⁴D. M. McGill, Life Insurance, (Homewood, Illinois: Richard D. Irwin, 1959), p. 134.

²⁵Section 82 (2)(b) Third Schedule.

approved by the Act, and is in general use. The 1958 Commissioners Standard Ordinary Table is reproduced in Appendix C.

Experience has conclusively proved that the rate of mortality among a group of recently insured lives is lower, age for age, than that among policyholders who have been insured for some years. This result follows from the fact that lives insured for individual life insurance are selected at entry. That is, through medical selection, or otherwise, the company satisfies itself that the potential insured is an acceptable risk. As would be expected, the rate of mortality among such selected lives is less than among a more general body of lives of the same age, for some years after entry. The disparity in death rates between selected lives and policyholders who have been insured for some years, is at its maximum during the first year of insurance, thereafter gradually diminishing. For practical purposes it is generally assumed in the United States and Canada that the effect of selection wears off after 5 years.²⁶

In order to properly recognize the effects of selection on a man age 30 at entry, the tabular rates given in the 1958 Commissioners Standard Ordinary Table have been adjusted in the first five years. The adjustment was made on the following basis:²⁷ mortality in the first policy year is 50% of tabular,

²⁶D. M. McGill, op. cit., p. 141; A. Pedoe, Life Insurance, Annuities and Pensions, (Toronto: University of Toronto Press, 1964.) p. 48.

²⁷This adjustment to show the effects of selection is found in R. E. Larson and E. A. Gaumnitz, Life Insurance Mathematics (New York: John Wiley and Sons, 1951) p. 120.

65% in the second policy year, 75% in the third policy year, 85% in the fourth policy year, 95% in the fifth policy year, and 100% after five policy years.

(c) Lapsation

Since the policyholder faces a probability that he will discontinue the policy before incurring the price in any policy year subsequent to the first, lapsation must be recognized in the leveling process. The position might be put that whereas a policyholder is presumed to lack control over the mortality aspect, he can control his own policy lapsation situation and therefore lapsation should be ignored in the calculation of the price of protection to the buyer. However various future elements and contingencies some of which are beyond the control of the policyholder such as diverse financial developments may affect his proclivity to lapsation of the policy. As complete ignorance of lapsation--equivalent to its recognition with zero lapse rates--is not appropriate for the average policyholder, although it might be appropriate for a given policyholder, some account must be taken of lapsation in the price calculating process.²⁸

Although individual companies usually calculate their own lapsation tables, the Linton 'A' Table²⁹ is well known and has long been accepted as a standard. In consultation with Mr. M. H. Farrant, Actuary, of Farrant & Company,

²⁸Indications are, that on ordinary insurance, over-all lapse ratios are about 3%. See for example D. M. McGill, op. cit., p. 715.

²⁹Published by M. A. Linton in 1924 in the Record of the American Institute of Actuaries, Volume 13, p. 283.

Vancouver, Mr. Farrant stated that Linton's Rate 'C' giving higher lapse rates than the 'A' Table is perhaps most illustrative of Canadian experience. However, because the diversity between the Linton 'A' and 'C' Tables is not excessive and because it was considered that the lapse rates used ought to be conservative in order to take account of, to some extent, the element of control that the policyholder has over lapsation, the Linton 'A' lapsation table was chosen for purposes of price calculation. The Linton 'A' Table is reproduced in Appendix D.

(d) Dividends

Dividends are paid on participating policies. With the price analysis of participating life insurance policies, dividend information must be taken into account. A limitation inherent in the use of dividend information from life insurance companies is that projected dividends are only estimates and are not guaranteed. The extent to which projected dividend estimates are reliable is questionable. All companies submitting dividend information did so on the basis of their respective 1967 dividend scales. Since illustrative dividend scales are mere extensions of current assumptions, they create cost patterns that have not necessarily been delivered to policy owners in the past and may probably not be delivered in the future. On the other hand, actual dividend histories create cost patterns that have actually been delivered to policy owners. The figures therefore have some tangible meaning. A possible approach to determining the reliability of a company's estimated future dividends is to determine the extent to which past estimates have approached

actual past dividends. However, complete dividend histories are very difficult to obtain and do not appear in the trade publications.³⁰ In many instances no dividend histories at all are reported for a given company. In those instances where some dividend information is given, there exists a 'blind spot' with respect to policies issued during the 19-year period immediately preceding the point at which the price analysis is being performed. For example, if an analysis is being made in 1967, some 20 year dividend projections for 1967 issues, based on the company's 1967 dividend scale and some 20-year histories for 1947 issues are available in the 1967 editions of the trade publications; similarly, some 20 year projections for 1966 issues, based on the company's 1966 dividend scale and some 20 year histories for 1946 issues are available in the 1966 editions. However, concerning policies issued during the period 1948 to 1966, only dividend projections are generally available and such projections are based on the dividend scale applicable only in the respective years of issue. The only information available in 1967 on a policy issued in 1960, for example, would be found in the 1960 editions of the trade publications and would be based on the company's 1960 dividend scale. While a few companies report ten year dividend histories, a blind spot still exists in respect of a 9 year period immediately preceding the time at which the analysis is undertaken.

Thus, the extreme difficulty of obtaining appropriate dividend history inform-

³⁰ such as, for example, the Stone and Cox Life Insurance Tables.

ation coupled with the fact that the closeness of the relationship between past dividend projections and histories may very probably change (history is unlikely to repeat itself here) precluded any serious effort at determining the reliability of the dividend information provided by the companies. Consequently the dividend data presented by the companies was deemed acceptable to the price analysis. This is not to suggest, however, that the dividend information utilized was judged reliable. It may or may not be. It is recognized that the validity of the price results on participating policies is reduced because of partial dependence on dividend information whose reliability is somewhat questionable. However, for reasons such as company reputation, it is considered that federally registered companies would generally not put to the public exorbitant and clearly unreasonable dividend projections.

PROCEDURE - INTERJACENT

Having finalized the necessary assumptions, a computer program, incorporating the level-price formulae and interest, mortality and lapsation data (appearing as Z factors), was formulated with the assistance of the University of British Columbia Computing Department. The policy information appropriate to the study was coded and subsequently put on punched cards for use in the University of British Columbia I.B.M. computer. The punched cards were double checked for errors. A copy of the computer program utilized is to be found in Appendix E. Before the program was run through it was thought advisable to calculate by use of a hand calculator the level price for a particular policy. The policy chosen was Number F42 Whole Life Participating.

Hand calculations of the level-price method on one policy over a 20-year period take approximately two hours. The result of \$5.59323 subsequently proved to be exactly the result as computed through the use of the computer. Having made this final check in the program, the rest of the policies were run through and the price results obtained.

CHAPTER 6

COMPETITION

The assessment of the effectiveness of competition depends on what standards are to be applied. Competition, monopoly and the various patterns in between, have received attention from scholars in a number of disciplines, although economics ranks first in giving attention to the matter. The study of the workings of competitive markets has constituted the main body of economic theory at least since the days of Adam Smith. The achievement of Smith lay in his analysis of the workings of a system from which monopoly was excluded and in focussing attention on the positive advantages of a competitive system.

Monopoly is usually criticised because it leads to a higher price for the monopolized article than is possible under a more appropriate system. This enhancement of price is achieved by restriction of output, relative to what output would be under competition. If the latter is taken as an ideal, too little of the monopolized commodity is produced and too much of those commodities which are not monopolized. This misdirection of productive efforts means that labor and capital (factors of production) are badly allocated. Where misdirection of the factors of production exists such that certain commodities have a market price in excess of factor costs, the allocation of resources is said to be inefficient.

The importance of the efficiency concept is that it creates the path down which one may move from an inefficient allocation of resources to an

efficient one, and give more of some desired product(s) to at least one member of society. Efficiency is thus a necessary condition (although not necessarily by itself sufficient) for attaining a position of maximum economic welfare.

PERFECT COMPETITION

Unfortunately however, complete efficiency is a rather utopian concept. Completely efficient resource allocation in an economy can be shown to be consistent with only one type of market, which must be present throughout the economy. This type of market is usually identified as 'perfect competition'. It lies at one extreme end of the scale of types of monopoly--competition that economists have analyzed, and is almost universally recognized as being unattainable in the real world. However, it has value as an ideal type and standard, and thus merits consideration.

Requisites for perfect competition are generally considered to include the following:³¹

- (a) Homogeneity of product. The products or services coming from the various producers in the industry are not differentiated in the minds of the buyers.
- (b) Perfect knowledge of alternatives and foresight as well as an absence of uncertainty.

³¹See, D. S. Watson, Price Theory and Its Uses, (Boston: Houghton Mifflin Co., 1963), p. 106.

- (c) The existence of a large number of buyers and sellers such that it is not worthwhile for anyone to exercise any slight control he may have over price.
- (d) Perfect mobility of resources.
- (e) Buyers are only economically motivated as are sellers. Competition is on the basis of price only.

The foregoing requisites, taken together, would produce an instantaneous mutual adjustment of supply and demand, resulting in an efficient use of resources at all times. Perfect competition dictates that there is no price disparity for a given product. While the economic theorist's concept of perfect competition is an ideal, it is one which is virtually unattainable in the real world. As an attainable standard, economists have attempted to develop a standard of 'effective' or 'workable' competition. Some idea of the relationship between perfect and workable or effective competition is available in the following statement:³²

"'Workable' or 'effective' competition supplies no formula which can substitute for judgment. It suggests leads to data of significance, and a means of organizing data bearing on the question whether a given market of itself is sufficiently competitive in its structure and behaviour to be classified as workably competitive. And it provides some benchmarks or criteria, representing somewhat different points of vantage, for the process of making that judgment."

"Workable competition differs from pure and perfect competition in several ways. In the first place, the two theories have different

³²from the Report of the Attorney General's National Committee to Study the Anti-Trust Laws, March 31, 1955, U.S.A.

purposes. The theory of pure and perfect competition is an instrument of theoretical analysis; the theory of workable competition seeks to provide a method for making necessarily less exact but more practical realistic judgment of actual market situations. Secondly, to the extent that the two theories are concerned with the same broad elements--the definition of the product and market, the number and relative size of sellers, and conditions of entry--the concept of workable competition posits a lesser degree of 'perfection'. Thus perfect competition would require an extremely large number of sellers. Criteria of workable competition, as is explained above, could be satisfied by a lesser number of sellers, some of whom may well produce significant fractions of total supply, provided they really compete and do not foreclose entry of new competitors, except by reason of their superiority."

There is some disagreement amongst economists concerning just what constitutes 'effectiveness' or 'workability'. The factors which are usually taken into account are the structural characteristics of the industry, the way in which competition is conducted and the performance which results from the interaction of the structural and conduct factors. Structural factors³³ may help determine whether individual firms possess market power or are not likely to in the absence of collusion. While they can indicate the likelihood that market power exists, they cannot indicate its absence or whether it is exercised. Those who feel the possession of market power is as serious as its exercise are probably likely to place great weight on structural factors. On the other hand, those who regard performance and results as the valid object of concern are apt to regard structural facts as only one set of factors to be considered. Except for those whose concern is essentially the possession of market power,

³³a detailing of structural factors is found in C. Wilcox, Public Policies Toward Business, (Homewood, Ill., Richard D. Irwin, 1955), pp. 103-4.

and for whom performance, no matter how good at a particular point in time, is irrelevant, the object of concern is usually performance.

CONDUCT REQUIREMENTS

Conduct requirements prescribe the type of behaviour by firms which is necessary for competition to be effective. One such requirement is that firms in the industry behave independently, each seeking to increase its own profits. It is not necessary, however, that all firms behave in this manner. In spite of partial cartelization, competition may be effective if the non-collaborating firms in the industry are sufficiently large, numerous and aggressive.

Another requirement is that there be an absence of actions which are deliberately aimed at excluding present or potential competitors or at restricting their ability to compete. Actions which are contrary to this requirement include the enlistment of the regulatory agencies of the state to help exclude potential competitors, predatory price cutting in selected markets, and the use of exclusive dealing arrangements forcing buyers to buy all of their requirements from a single source although part could be obtained equally well elsewhere.

Further, there must be evidence of active price competition in the market.

While price need not be the only competitive weapon utilized, if it is the only one not used, the probability of prevalent ineffective competition is high.

A final conduct requirement is the nature and extent of product differentiation.

In general, where product differentiation has given one firm a dominant market

position from which it is enabled to destroy competition and prevent change, product differentiation is considered as contrary to effective competition. However, where product differentiation is based on real differences in product quality (as opposed to subjective differences) and where the relative market positions of competitors are flexible in response to a high rate of innovation, product differentiation is usually considered as contributing to the effectiveness of competition. The relevance of product differentiation is judged in the light of the performance of the market.

MARKET PERFORMANCE

Where the performance record of an industry in response to growing demand is one of raising prices rather than increasing output, the effectiveness of competition is suspect, unless natural resource limitations prevent an increase in output. Where the record is one of introducing cost-reducing innovations, permitting the cutting of prices (relative to other commodities) and growing with the market, competition is most likely effective.

In a perfectly competitive market, all producers are 'price-takers'. Price is set by supply and demand in the market, and firms accept the going price or stay out of the market. This is feasible in a few situations such as where organized commodity exchanges exist. No serious departure from the competitive ideal exists, however, where firms go through the motions of setting their own prices, as long as the latter are responsive to the interplay of supply and demand. Where this is effectively operative, the power of indi-

vidual producers to set prices is largely illusory.

The existence of price discrimination is usually regarded as incompatible with effective competition. Price discrimination is the charging of different prices for an identical product under identical conditions of sale. It normally arises because individuals are able to exploit differences in individual buyer's demand curves for the product. It may also arise in certain situations where price is not self-evident, where buyers are unable to determine the real price of the product. If strong competition were prevalent, price discrimination would not usually survive, unless certain non-price factors were dominant.

Perhaps the most unequivocal evidence of effective competition is to be found in the relationship between price and marginal cost.³⁴ An absence of discrimination in a competitive context implies that prices for the products in an industry will be proportional to their marginal costs. From an analysis of the price and cost structure of an industry it is possible to determine the existence or non-existence of discrimination, and by implication, the effectiveness of competition. This task is not only one of enormous magnitude, however, but is often rendered impossible in many industries because of lack of satisfactory cost data for analysis.

Another type of price performance regarded as incompatible with effective competition is the truly administered price where the price is set and is

³⁴Marginal cost may be defined as the cost of producing an additional unit of a given product during a particular period.

totally unresponsive to supply and demand for years at a time. Few markets of the truly administered price exist, however. In one sense ordinary life insurance in Canada is an administered price industry. Policy data are established in trade publications until revised annually. Such a form of pricing detracts from the competitive ideal. Thus, to an extent, the existence of even the form of administered prices in life insurance, represents an attenuation of the competition from the perfectly competitive model. However, it is a mistake to infer from this that the mere existence of this form of administered pricing is evidence that competition is ineffective.

Life insurance is in effect, sold in a futures market only, since the coverage extends into the future. Prices primarily reflect expected costs not yet incurred. The frequency with which changes in expected costs are perceived as well as technical and communication constraints, dictate that annual price changes are the most expedient for the company.

CHAPTER 7

THE RESULTS

TABLE III

PRICE RESULTS FOR \$10,000 WHOLE LIFE NON PARTICIPATING POLICIES

<u>Company Number</u>	<u>Level Price</u>	<u>Company Rank by Level Price</u>	<u>Premium</u>	<u>Company Rank by Premium</u>
1	\$ 6.42500	20	\$ 137.40	25
2	6.52049	22	131.50	17
3	5.01960	1	130.70	15
4	7.07141	36	138.60	31
5	6.70806	30	131.60	18
6	6.57528	26	132.60	20
8	6.41049	19	132.40	19
11	7.22532	38	139.60	33
13	6.14992	15	126.30	5
14	6.04204	11	140.50	35
15	5.55813	4	137.50	26
16	5.60322	5	124.00	1
18	9.31510	44	158.30	43
19	6.70154	29	128.30	8
20	6.54882	24	128.10	7
21	5.44384	2	124.50	2
23	7.47814	40	135.20	24
24	5.80565	7	128.70	10
25	6.51315	21	124.70	3
27	6.10143	13	128.50	9
28	5.54197	3	126.00	4
29	6.99195	33	138.20	29
31	6.13109	14	140.40	34
32	6.64045	28	134.60	23
33	6.19589	17	127.00	6
34	5.84050	8	130.60	14
36	6.93987	32	137.70	27
38	5.98105	10	128.90	11
F 2	6.78103	31	142.60	38
F 7	6.09761	12	138.50	30

TABLE III(Cont'd.)

<u>Company Number</u>	<u>Level Price</u>	<u>Company Rank by Level Price</u>	<u>Premium</u>	<u>Company Rank by Premium</u>
F 9	\$ 6.56945	25	\$ 130.00	12
F 10	7.24841	39	133.50	22
F 11	6.21470	18	137.80	28
F 14	5.98084	9	133.10	21
F 25	7.12663	37	152.60	41
F 26	8.32217	43	158.30	42
F 27	7.04671	35	141.50	36
F 31	8.23824	42	164.80	44
F 32	7.68909	41	144.50	40
F 50	6.59171	27	139.40	32
F 52	6.53768	23	143.30	39
F 55	6.15368	16	130.50	13
F 59	7.01439	34	142.20	37
F 64	5.70708	6	130.90	16

Total Number of Companies = 44

-----LEVEL PRICE-----				-----PREMIUM-----		
	<u>Canadian Owned</u>	<u>Foreign Owned</u>	<u>Total</u>	<u>Canadian Owned</u>	<u>Foreign Owned</u>	<u>Total</u>
Mean	\$ 6.40998	6.83246	6.56361	\$ 132.94	141.47	136.04
Standard Deviation	.799	.744	.806	7.103	9.630	9.120
Coefficient of Variation	12.46%	10.89%	12.27%	5.34%	6.81%	6.70%

TABLE IV

PRICE RESULTS FOR \$10,000 20 PAYMENT LIFE
NON PARTICIPATING POLICIES

<u>Company Number</u>	<u>Level Price</u>	<u>Company Rank by Level Price</u>	<u>Premium</u>	<u>Company Rank by Premium</u>
1	\$ 8.73065	25	\$ 216.40	25
3	8.14482	14	225.80	29
4	9.04058	29	217.50	27
5	9.40318	31	207.80	11
6	7.21606	4	202.90	6
8	9.98386	34	208.30	13
9	8.87358	27	216.80	26
11	8.67668	23	210.20	17
13	7.38706	6	204.30	8
14	7.96212	11	229.60	32
15	6.69625	2	213.70	21
18	11.45197	39	237.10	35
19	7.13828	3	201.90	5
20	7.96153	10	209.00	14
21	6.41367	1	196.00	2
24	7.54565	7	188.50	1
25	7.36316	5	203.60	7
27	8.14305	13	196.60	3
29	8.48558	18	212.20	19
31	10.13617	35	241.70	36
32	9.93644	33	249.30	37
33	10.34412	37	226.10	30
36	8.79381	26	215.80	24
38	9.48601	32	231.80	34
F 2	8.32085	16	219.00	28
F 7	8.22364	15	199.80	4
F 9	8.62272	19	207.70	10
F 10	9.21873	30	209.00	15
F 11	8.40401	17	213.00	20
F 13	8.62927	20	214.10	22
F 14	7.60206	8	206.60	9
F 25	12.11006	41	257.40	39
F 26	11.20411	38	251.20	38
F 27	10.14301	36	226.80	31

TABLE IV (Cont'd.)

<u>Company Number</u>	<u>Level Price</u>	<u>Company Rank by Level Price</u>	<u>Premium</u>	<u>Company Rank by Premium</u>
F 31	\$ 12.08589	40	\$ 282.80	41
F 32	8.92056	28	215.50	23
F 50	8.63475	21	210.40	18
F 52	8.70389	24	231.30	33
F 55	8.09180	12	209.70	16
F 59	8.64197	22	260.10	40
F 64	7.61105	9	208.00	12

Total Number of Companies = 41

-----LEVEL PRICE-----				-----PREMIUM-----		
	<u>Canadian Owned</u>	<u>Foreign Owned</u>	<u>Total</u>	<u>Canadian Owned</u>	<u>Foreign Owned</u>	<u>Total</u>
Mean	\$ 8.55476	9.12755	8.79226	\$ 215.12	224.85	219.15
Standard Deviation	1.238	1.370	1.325	14.809	22.988	19.297
Coefficient of Variation	14.47%	15.01%	15.07%	6.88%	10.22%	8.81%

TABLE V

PRICE RESULTS FOR \$10,000 WHOLE LIFEPARTICIPATING POLICIES

<u>Company Number</u>	<u>Level Price</u>	<u>Company Rank by Level Price</u>	<u>Premium</u>	<u>Company Rank by Premium</u>
2	\$ 6.84763	29	\$ 175.30	14
5	4.42039	5	172.20	9
6	6.43126	25	182.20	25
9	4.65251	8	167.60	4
10	9.00089	40	182.40	27
11	6.86222	30	170.40	5
13	5.04511	10	178.90	19
15	4.49998	6	179.00	20
16	5.12904	11	184.60	30
18	8.57224	38	170.60	7
20	4.61628	7	173.50	12
21	5.22219	14	178.00	18
24	4.79775	9	176.70	16
25	5.30817	17	156.00	2
27	5.20750	13	181.40	24
28	3.60793	1	172.00	8
29	7.17267	35	182.30	26
30	4.04561	2	173.20	11
31	5.87340	22	170.50	6
32	6.95080	33	183.50	29
33	8.68667	39	185.20	31
34	6.92871	32	176.20	15
38	7.04214	34	189.10	32
F 9	5.55828	19	215.10	39
F 11	4.10948	3	228.00	40
F 14	5.40840	18	172.30	10
F 21	5.28499	16	195.60	35
F 25	6.86279	31	196.50	36
F 26	6.61053	27	190.80	34
F 27	7.70257	36	189.10	33
F 29	5.93760	23	159.60	3
F 40	6.55912	26	179.90	22
F 41	5.74132	21	180.70	23
F 42	5.59323	20	202.80	37
F 43	6.68462	28	183.50	28
F 45	7.97176	37	204.50	38

TABLE V (Cont'd.)

<u>Company Number</u>	<u>Level Price</u>	<u>Company Rank by Level Price</u>	<u>Premium</u>	<u>Company Rank by Premium</u>
F 52	\$ 6.36896	24	\$ 177.60	17
F 58	4.41085	4	148.00	1
F 62	5.28447	15	174.30	13
F 65	5.20069	12	179.00	21

Total Number of Companies = 40

	-----LEVEL PRICE-----			-----PREMIUM-----		
	<u>Canadian Owned</u>	<u>Foreign Owned</u>	<u>Total</u>	<u>Canadian Owned</u>	<u>Foreign Owned</u>	<u>Total</u>
Mean	\$ 5.95309	5.95822	5.95527	\$ 176.56	186.90	180.95
Standard Deviation	1.497	1.010	1.312	7.002	18.963	14.490
Coefficient of Variation	25.15%	16.95%	22.04%	3.97%	10.15%	7.99%

TABLE VI

PRICE RESULTS FOR \$10,000 20 PAYMENT LIFEPARTICIPATING POLICIES

<u>Company Number</u>	<u>Level Price</u>	<u>Company Rank by Level Price</u>	<u>Premium</u>	<u>Company Rank by Premium</u>
2	\$ 8.40131	23	\$ 273.70	15
5	6.98451	16	277.20	18
6	7.79423	20	276.60	17
9	6.11485	9	266.40	9
10	11.96828	40	283.50	22
11	7.79047	19	240.20	2
13	6.33799	11	270.60	13
15	5.17553	4	271.00	14
16	6.30896	10	285.50	25
18	10.53311	33	266.70	10
20	5.74464	8	264.10	7
21	7.41648	17	286.50	26
24	5.57388	7	266.30	8
25	5.54476	6	231.40	1
27	6.43080	12	281.00	20
28	3.80455	1	292.00	29
29	8.11169	22	279.60	19
30	4.96500	3	262.10	6
31	6.84944	15	268.30	11
32	9.40803	30	289.80	27
33	10.00239	31	294.10	30
34	8.62195	26	270.50	12
38	10.78161	34	290.50	28
F 9	8.03801	21	308.40	33
F 11	10.85051	35	350.00	42
F 13	11.54299	39	284.00	23
F 14	6.75426	14	256.90	5
F 21	8.82031	28	324.00	39
F 25	10.87393	37	317.80	36
F 26	10.07317	32	324.40	40
F 27	10.85872	36	301.70	32
F 29	8.43966	24	298.40	31
F 33	9.36626	29	316.30	35
F 40	11.98859	41	313.50	34
F 41	11.38169	38	320.20	37
F 42	7.48603	18	322.20	38
F 43	8.59204	25	276.10	16

TABLE VI (Cont'd.)

<u>Company Number</u>	<u>Level Price</u>	<u>Company Rank by Level Price</u>	<u>Premium</u>	<u>Company Rank by Premium</u>
F 44	\$ 4.63030	2	\$ 244.50	4
F 45	12.58592	42	328.20	41
F 58	5.20348	5	242.30	3
F 62	8.66183	27	281.20	21
F 65	6.73112	13	284.60	24

Total Number of Companies = 42

	----- LEVEL PRICE-----			-----PREMIUM-----		
	<u>Canadian Owned</u>	<u>Foreign Owned</u>	<u>Total</u>	<u>Canadian Owned</u>	<u>Foreign Owned</u>	<u>Total</u>
Mean	\$ 7.42017	9.09889	8.17959	\$ 273.37	299.72	285.29
Standard Deviation	2.032	2.212	2.274	15.034	28.932	25.973
Coefficient of Variation	27.38%	24.31%	27.80%	5.50%	9.65%	9.10%

CHAPTER 8

INTERPRETATION OF RESULTS

Some information with respect to theories of competition has been presented in order to serve as a background in the interpretation of the results of this study. From the results of this study, several things seem apparent. Indications from the results previously reported are that: as determined by the coefficients of variation -

(a) for each of the four types of policies with the exception of 20 payment life non-participating, the relative price variation is greater amongst Canadian owned companies than amongst foreign owned companies.

(b) for each of the four types of policies, the relative premium variation is greater amongst foreign owned companies than amongst Canadian owned companies.

(c) relative price variation is greater amongst the two types of participating policies than amongst the two types of non-participating policies. This result is perhaps to be expected since the prices of participating policies reflect the companies' non-guaranteed 1967 dividend scales, while the prices of the non-participating policies are based entirely on contractual guarantees.

(d) relative premium variation in each of the four types of policies is substantially lower than the relative price variation.

Further, (e) the mean level prices as well as mean premiums in each of the four types of policies are greater for foreign owned companies than for Canadian owned companies. One speculative reason for this occurrence is the possi-

bility of higher risk attendant to foreign companies operating in Canada with consequent attempt at higher rates of return.

The greater variation in prices as opposed to premiums suggests the possibility that premium competition is being substituted for price competition.

If premium competition is being substituted for price competition does it make any difference? Is the premium rate for a policy a reliable measure of the policy's price? A scan analysis of the rank data as presented in the Results indicates no close positive correlation between premium and price. More detailed evidence supporting this conclusion is found in the computation of Spearman's coefficient of rank correlation as presented in Table VII.

Level premiums are easy to compare, easy to obtain, and involve no calculations on the part of the buyer. Accurate prices however, such as the price of protection determined by the level price method, are extraordinarily difficult to determine. In addition to a lack of appropriate information confronting the buyer, such price analysis involves complexities that place such analysis beyond the reach of the average buyer and perhaps beyond reach of the fairly sophisticated buyer. As a competitive market approaches, although never attains, the ideal of perfect competition, the expectation is that the tendency will be towards more uniform prices. As this study indicates that there is much more uniformity amongst premiums than amongst prices and as the problems of price determination are substantial, support is lent to the proposition that at least to an extent throughout the market competition is expressed on the basis of premium.

Information on Rank Correlation between Premium and Price

<u>Type of Policy</u>	<u>Spearman's coefficient of rank correlation between price and premium *</u>
Whole life non-participating	.6399
20 pay life non-participating	.6521
Whole life participating	.3381
20 pay life participating	.7171

* Calculations were performed on a hand calculator. The computational formula used is found in C. G. Paradine and B. H. P. Rivett, Statistical Methods for Technologists (London, England: English Universities Press, 1966), pp. 212-3.

The unreliability of premium as a measure of a policy's price is revealed by the rank correlation evidence in relation to the fact that if total positive correlation were present--if the premium and price rank orders were identical--Spearman's coefficient of rank correlation would be equal to one.

At least a general definition of an excessive price is necessary in attacking the question of the effectiveness of price competition. From economic theory, in a perfectly competitive market an excessive price would be one which exceeded marginal cost. While it is not appropriate to consider the Canadian life insurance industry in extensive relationship to perfect competition, conclusions respecting the effectiveness of competition could be reached if applicable cost data were available. Unfortunately, however, in respect to this study, the road is closed here. Moreover, such a cost analysis if performed on only a handful of companies may give misleading results. For

example, if the sample included inefficient companies, these companies could justify prices that buyers might consider clearly excessive in relation to the prices charged by efficient companies.

A more feasible possibility for this study, in defining an excessive price, is to make comparisons between price figures in the various arrays. While this comparison is to a large extent subjective, it can also be reasonable. In making comparisons one possibility is to look at the prices in the extremes of the arrays. Table VIII indicates the existent price differentials given by such a comparison.

TABLE VIII

Price Differentials in the Extremes of the Arrays

<u>Type of Policy</u>	<u>Company Price Ranking (1 = lowest)</u>	<u>Companies with a Price at least Double Number Percentage</u>	
20 Pay Life Non-Participating	1	0	0
20 Pay Life Participating	1	24	57.1
	2	14	33.3
	3	12	28.6
	4	10	23.8
	5	10	23.8
	6	5	11.9
	7	5	11.9
	8	4	9.5
	9	1	2.4
	10	0	0
Whole Life Non-Participating	1	0	0

TABLE VIII (Cont'd.)

<u>Type of Policy</u>	<u>Company Price Ranking (1 - lowest)</u>	<u>Companies with a Price at least Double</u>	
		<u>Number</u>	<u>Percentage</u>
Whole Life Participating	1	5	12.5
	2	3	7.5
	3	3	7.5
	4	1	2.5
	5	1	2.5
	6	1	2.5
	7	0	0

No premium was double the lowest ranking premium in any one of the four types of policies. The greater price disparity evident from the foregoing table in the two participating types of policies may be attributed to the unguaranteed provisions.

It appears that for the participating policies studied, the evidence suggests the existence of excessive prices. The price disparity suggested by Tables VIII and IX between identical contractual products is of such a degree as to render, from a subjective analysis, the prices in the extreme high price end of the two arrays, excessive. However, the comparison of prices in the extremes of an array may seem to exaggerate price differentials.

Another approach to the determination of the possibility of existence of excessive prices is to exclude for comparative purposes the few prices in the extremes of the array, and compare prices within the main body of prices in the array. The body or group of prices utilized may be defined as lying within

a certain distance from the mean. If a distance of three standard deviations is established as appropriate the prices included in the group could be considered as those lying within 1.5 standard deviations to each side of the mean. Whether or not the group should be defined by boundaries equidistant from the mean depends on the skewness of the price distribution. The results of this study indicate a slight skewness to the right of the mean for three of the four types of policies studied. The extent of the skewness is not significant however; consequently the three standard deviation test shall be applied in directions equidistant from the mean. Information pertinent to this type of analysis is found in Table IX.

TABLE IX

Information Relevant to the Three Standard Deviation Test

<u>Type of Policy</u>	<u>PRICE</u>		<u>Prices 1.5 Standard Deviations from the Mean</u>	
	<u>Lowest</u>	<u>Highest</u>		
Whole Life Non-Participating	\$ 5.01960	- 9.31510	\$ 5.35533	- 7.77189
Whole Life Participating	3.60793	9.00089	3.98687	7.92367
20 Pay Life Non-Participating	6.41367	12.11006	6.80484	10.77969
20 Pay Life Participating	3.80455	12.58592	4.76827	11.59091

Revelations respecting the size of the price group determined by the three standard deviation test are given in Table X.

TABLE X

Companies with Prices 1.5 Standard Deviations from the Mean

<u>Type of Policy</u>	<u>Number of Companies Within Group</u>	<u>Number of Companies Beyond Group</u>	<u>Percentage of Companies in the Sample Beyond Group</u>
Whole Life Non-Participating	40	4	10.0
20 Pay Life Non-Participating	35	6	17.1
Whole Life Participating	35	5	14.3
20 Pay Life Participating	37	5	13.5

It seems very unlikely that a buyer of, for example, the 20 payment life non-participating policy studied here, would pay \$10.78 for the policy if he is aware of the fact that the price is \$10.78 and that an alternative is available at \$6.80. From the information in Table X this conclusion can be extended to the other three types of policies as well. In each case the price disparity appears to be large enough as to render prices 1.5 standard deviations above the mean, excessive. While the absolute difference between the prices given may appear small, these figures are prices "per year per \$1,000 of protection". When the purchase involves many units of protection over many years, the difference amounts to a large sum. For example, extending the 20 payment life non-participating figures of \$6.80 and \$10.78 to the face amount of the policy (\$10,000) and the appropriate time period (20 years), the full prices are \$1,360. and \$2,156. Quite clearly, the magnitude of the foregoing higher price, in relation to the lower price, for an identical contractual product,

renders the higher price excessive.

To the extent that excessive prices exist in whole life insurance in Canada it appears that price competition is not wholly effective. The validity of the foregoing sentence, however, hinges on the extent of the existence of excessive prices. Given, by the results of this study, that substantial price disparity existed in Canadian whole life insurance in 1967, the question arises as to the causes of such disparity. One possible explanation is that the price disparity is not rigid but only reflects competitive company price policy in an annual state of flux. Adherents to this explanation would probably purport that the evident price disparity in 1967 would be extensively different, in terms of magnitude and company rank by price, in any other year. The ideal condition in determining the true nature of the price disparity would be to perform the same price analysis on the same life insurance policies at another point in time. Such an undertaking would in all likelihood lead to unequivocal conclusions respecting the causes of the 1967 price disparity. Unfortunately however the analysis at another point in time is beyond the scope of this study. Consequently, increased stress shall be placed on the price information as it is and on some other variables relevant to conclusions respecting competition.

Before leaving the explanation that the price disparity is reflective only of a competitive situation in a constant state of disequilibrium, it appears to the author that two factors mitigate against acceptance of such an explanation. In the first instance, the potential to perpetuate price disparity in whole life

insurance is considerable, in view of the fact that price, being shrouded by complexity, is virtually indeterminable to the average buyer. Secondly, illustrative information concerning the magnitude of the price disparity has been presented in Tables VIII and IX. The immensity of the price disparity over a period of one year therein indicated would appear to suggest that the disparity is not indicative of effective competition in partial disequilibrium. The extent of the price disparity is just too substantial to lend much credence to such an explanation.

Another explanation for the price disparity and one which appears to the author as more feasible is that the price disparity included evidence of excessive prices that would not prevail if competition on the basis of price were more effective. Effectiveness is a matter of degree, however, and while price competition respecting only the contractual product does not appear wholly effective, other factors become operative in consideration of the total product.

Price in life insurance is to some extent unique in its complexity and in the confusion it generates. Consequently, various sources have stressed the importance of non-price factors in the purchase of life insurance. Competition therefore may be found to operate on variables other than price such as product differentiation, convenience, service and salesmanship. Convenience and the services provided by the agent could well be very decisive factors in the decisions of many buyers. Some information on the importance of salesmanship and service is provided in the following excerpt of the Canadian Life Insurance Officers Association Submission to the Royal Commission on Banking

and Finance.³⁵

Life insurance has always had to be sold. Most people require some persuasion to put aside for tomorrow a dollar which is available to be spent today. This is the continuing task of life insurance representatives. Also, in the face of the complexities of law, taxation and estate administration, the tailoring of life insurance programs to changing needs requires continuing service as well.

Non-price competitive variables are particularly difficult to measure since they are often intangible. The extent to which price differentials reflect the cost of added services and other variables is not at all clear. While an analysis of this particular aspect is beyond the scope of this study, the factor of the high magnitude in the price disparity may attenuate the proposition that competition in the total product is wholly effective.

Although consideration of the total spectrum of factors in assessing competition is not possible here, attention shall be given to some generally accepted relevant factors in order to resolve whether or not they have a bearing on other indications in this study. A criterion generally considered necessary for effective competition is freedom of entry and exit. That is, the market should be such that new competitive influences may enter without undue restriction if they so desire; similarly no competitive influence should be effectively locked in to the market such that its freedom to exit is prohibited. Entry into the Canadian life insurance industry and the requisite federal registry (except for provincially licensed companies) is not particularly easy because of substantial deposit requirements by the federal government. However, for a

³⁵The Canadian Life Insurance Officers Association, Submission to the Royal Commission on Banking and Finance, Toronto: July, 1962.

company which possesses the resource capacity to meet these requirements entry is prohibited only by the nature of the life insurance product itself. Entry into the life insurance industry requires substantial resources in terms of labor, primarily for the sales function, and capital. Until sales are expanded to the point where the law of large numbers takes effect and to where sales are sufficient to generate reserve capacity, substantial capital, in reserves to meet contingencies, is required.

In the context of effective competition a completely static situation over a period of time where no firms exit or enter the market would likely indicate competition is not functioning effectively. A market situation where the number of firms is not static and where there is some turnover and growth of firms in the market, would appear to support a conclusion that competition is effective.

Some information respecting the ease of entry criterion is available from the Federal Superintendent's Reports. For the year 1961 there was a net positive change of one new federally registered company (Acadia Life) operative in the Canadian life insurance market³⁶. For the year 1963 the net change was an increase of five new companies operative in the market.³⁷ For the year 1964

³⁶Report of the Superintendent of Insurance for Canada 1961, Vol. 1, p. vii.

³⁷Report of the Superintendent of Insurance for Canada 1963, Vol. 1, p. vii.

there were four new registrants including Allstate Life, Family Life, and Federated Life. Two companies exited from the market.³⁸ In 1966 there were no new entrants or exits in the market.³⁹ Bearing in mind the resource requirements and the fact that there are over 100 federally registered life insurance companies in Canada, the foregoing entry-exit information reveals nothing contrary to the proposition that effective competition exists.

Another factor often appraised in attempts to determine the effectiveness of competition is the growth behaviour of the low price firms in the market. Information respecting this factor is presented in Tables XI and XII.⁴⁰

TABLE XI

Relative Growth of Low Price Firms
in Terms of the Amount of New Effected
Insurance Policies on Whole Life Policies in Canada

<u>Type of Policy</u>	<u>Rank by Price</u>	<u>Change in Rank by</u> <u>Amount of New</u> <u>Effected Insurance</u>	
		<u>1961-64</u>	<u>1964-66</u>
<u>Whole Life Non-Participating</u>			
<u>Company Number</u>			
3	1	+ 37	- 3
21	2	- 1	0
28	3	0	0
15	4	- 7	- 3
16	5	- 1	- 1

³⁸Report of the Superintendent of Insurance for Canada 1964, Vol. 1,
pp. vii - viii.

³⁹Report of the Superintendent of Insurance for Canada 1966, Vol. 1,
pp. 1A -2A.

⁴⁰The Growth data portrayed in Tables XI, XII and XIII is based on the

TABLE XI (Cont'd.)

<u>Type of Policy</u>	<u>Rank by Price</u>	<u>Change in Rank by</u> <u>Amount of New</u> <u>Effectuated Insurance</u>	
		<u>1961-64</u>	<u>1964-66</u>
<u>20 Payment Life Non-Participating</u>			
<u>Company Number</u>			
21	1	- 1	0
15	2	- 7	- 3
19	3	+ 5	- 5
6	4	- 6	+ 4
25	5	- 3	- 2
<u>Whole Life Paricipating</u>			
28	1	0	0
30	2	+ 1	- 1
F 11	3	+ 1	0
F 58	4	- 4	- 1
5	5	- 2	+ 1
<u>20 Payment Life Participating</u>			
28	1	0	0
F 44	2	- 4	- 4
30	3	+ 1	- 1
15	4	- 7	- 3
F 48	5	- 4	- 1

Total net rank change for above firms 1961 - 1966 = -25

amount of "New effected Insurance Policies" on whole life insurance in Canada found in the Report of the Superintendent of Insurance for Canada, 1961, Vol. 1, pp. 2A-12A; 1964, Vol. 1, pp. 2A-8A, 10A-14A; 1966, Vol. 1, pp. 2C-8C, 10C-16C.

TABLE XII

Relative Growth of High Price Firms
in Terms of the Amount of New Effected
Insurance Policies on Whole Life Policies in Canada

<u>Type of Policy</u>	<u>Rank by Price</u>	<u>Change in Rank by</u> <u>Amount of New</u> <u>Effected Insurance</u>	
		<u>1961-64</u>	<u>1964-66</u>
<u>Whole Life Non-Participating</u>			
<u>Company Number</u>			
18	44	+ 7	0
F 26	43	- 3	- 3
F 31	42	- 5	- 1
F 32	41	+ 2	+ 7
23	40	- 2	- 3
<u>20 Payment Life Non-Participating</u>			
F 25	41	- 3	- 2
F 31	40	- 5	- 1
18	39	+ 7	0
F 26	38	- 3	- 3
33	37	+ 3	- 5
<u>Whole Life Participating</u>			
10	40	+ 5	- 1
33	39	+ 3	- 5
18	38	+ 7	0
F 45	37	- 3	0
F 27	36	- 6	- 5
<u>20 Payment Life Participating</u>			
F 45	42	- 3	0
F 40	41	- 1	- 1
10	40	+ 5	- 1
F 13	39	+ 2	- 2
F 41	38	- 7	- 3

Total net rank change for above firms 1961 - 1966 = -29

The general expectation, where effective competition on the basis of price exists, is that low price firms would grow in terms of sales volume, relative to high price firms. Evidence from Tables XI and XII gives contrary indications to this expectation. Both the very high and very low price firms exhibited net negative growth behaviour of almost the same magnitude over the period 1961 to 1966. The evidence of the low price firms is even more startling when it is considered that one firm accounted for the vast majority of positive rank changes. If this one firm was excluded from the evidence the low price firms would have fared far worse than the high price firms. While this evidence appears to support conclusions that competition on the basis of price alone is not effective, caution must be exercised. The computed prices are based on 1967 data while the sales growth behaviour is studied over the period 1961 - 1966.⁴¹ As discussed in a previous section, although the extent of the consistency in prices over years is not clear, the opinion of the author is that extensive price fluctuations by an individual company are very much the exception if in fact they occur at all.

Table XIII provides some information on market rank changes within the ten companies participating in the study having the largest amount of new insurance policies effected.

⁴¹Comparable sales growth data subsequent to 1966 is not as yet available from publications.

TABLE XIII

Structural Changes Amongst Ten Largest Firms in the Study

<u>Company Number</u>	<u>Rank by amount of new Insurance Policies Effected on Whole Life Insurance in Canada</u>		
	<u>1966</u>	<u>1964</u>	<u>1961</u>
24	1	1	1
F 43	2	2	2
28	3	3	3
F 52	4	4	4
20	5	6	7
11	6	5	5
5	7	8	6
F 9	8	11	11
25	9	7	8
30	10	9	10

It is evident from Table XIII that while the positions of the largest four companies remained constant throughout the period, rank changes were experienced by the remaining firms in Table XIII. In terms of the total competitive picture--not only competition on the basis of price--this representation of company mobility does not appear contrary to the proposition that competition is effective.

CHAPTER 9

CONCLUSION

The price evidence developed in this study and any indications to which the evidence points, are based on the level-price method of price analysis. The appropriate recognition made by this method of the various complex factors operative in whole life insurance price analysis, especially in comparison to other price determination methods, renders the level-price method a valid and reliable measure.

The average buyer of whole life insurance is faced with numerous problems in any attempt that he may make to determine meaningful prices for various policies. The lack of available policy information as well as the complexities involved in price determination in all probability preclude the average buyer from an awareness of the price he pays when he buys life insurance as well as an awareness of the prices of available alternatives. In consequence then, whether or not the buyer purchases on the basis of premium rather than price is not clear. No lack of clarity exists however in the relationship of premium to price. The premium is not a reliable measure of a policy's price.

The substantial price disparity, between identical contractual products, evident in the results of this study support the conclusion respecting the buyer's general lack of awareness of price. The price disparity is also of such magnitude as to indicate the conclusion that competition on the basis of price alone is less than wholly effective. This conclusion is further sup-

ported by growth evidence of the high and low price firms--the net relative growth of the low and high price firms being almost identical and of a negative character.

Although the evidence points to the existence of substantial price disparity it does not appear to the author that the price disparity is evidence of price discrimination. A requisite for price discrimination is that conditions of sale are identical. The conditions of sale in whole life insurance, particularly as perceived by the buyer, differ widely. Intangibles operative in the sale of whole life insurance assure a stature not otherwise generally reached, because of the apparent neglect of price as a meaningful factor to the buyer. The extent to which the price disparity reflects the cost of added services and other non-price variables involved in the total product concept is not at all clear.

The effect of other than price variables does not appear insignificant, however; non-price variables seem to be important competitive factors. Evidence not inconsistent with effective competition as a whole is found in the entry and exit behaviour of firms in the market as well as in structural changes amongst the larger firms participating in this study.

The extension of conclusions here to competition as a whole is not possible with the limited information with which this study deals. Indeed, it is perhaps venturesome to conclude that price competition alone is less than completely effective when the analysis is undertaken at only one point in time. However, the nature of the evidence appears to the author to support this conclusion despite the limitations in the analysis. Further research is

needed in making the conclusion completely unequivocal and in extending the realm of intensive analysis to competition as a whole.

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APPENDIX A

Z FACTORS

<u>Policy Year</u>	<u>Factor</u>
1	1.
2	.86051
3	.77246
4	.69993
5	.63802
6	.58326
7	.53474
8	.49173
9	.45353
10	.41865
11	.38674
12	.35717
13	.32975
14	.30432
15	.28075
16	.25891
17	.23841
18	.21896
19	.20057
20	.18322

The present value figures used in computing the Z factors are taken from William R. Minrath, Handbook of Business Mathematics, D. Van Nostrand Co., Inc., Toronto 1959.

THE UNIVERSITY OF BRITISH COLUMBIA

78

VANCOUVER 8, CANADA

FACULTY OF
COMMERCE AND BUSINESS ADMINISTRATION

February 13, 1967.

Dear

The ~~XXXXXXXXXXXX~~ has been included in the sample in a research project presently being carried out in the Division of Finance, Faculty of Commerce, University of British Columbia. Your assistance in providing the following information, relevant to your company, would be greatly appreciated.

Current information concerning the following policies for 1 to 20 years inclusive:

1. Assume \$10,000 straight life participating policy issued at age 30.

Request information re:-

- (a) Annual premium (most favorable classification).
- (b) Cash surrender values per \$1,000 of face amount in each of the first 20 policy years.
- (c) Annual dividends in each of the first 20 policy years as projected in Stone & Cox.

2. Assume \$10,000 straight life non-participating policy issued at age 30.

Request information re:-

- (a) Annual premium (most favorable classification).
- (b) Cash surrender values per \$1,000 of face amount in each of the first 20 policy years.

3. Assume \$10,000 20 pay life participating policy issued at age 30.

Request information re:-

- (a) Annual premium (most favorable classification).
- (b) Cash surrender values per \$1,000 of face amount in each of the 20 policy years.
- (c) Annual dividends in each of the 20 policy years as projected in Stone & Cox.

4. Assume \$10,000 20 pay life non-participating policy issued at age 30.

Request information re:-

- (a) Annual premium (most favorable classification)
- (b) Cash surrender values per \$10,000 of face amount in each of the 20 policy years.

Please be assured that your Company will not be identified. Enclosed is a return envelope for your convenience.

Yours truly,

D. H. Mitchell
Research Assistant
Division of Finance

DHM/d1

APPENDIX C

1958 COMMISSIONERS STANDARD
ORDINARY MORTALITY TABLE

<u>Age</u>	<u>Probability of Death</u>	<u>Adjusted to Show Effects of Selection</u>
30	.00213	.00107
31	.00219	.00142
32	.00225	.00165
33	.00232	.00197
34	.00240	.00228
35	.00251	
36	.00264	
37	.00280	
38	.00301	
39	.00325	
40	.00353	
41	.00384	
42	.00417	
43	.00453	
44	.00492	
45	.00535	
46	.00583	
47	.00636	
48	.00695	

Source: D. M. McGill, Life Insurance (Homewood, Illinois: Richard D. Irwin, Inc., 1959), pp. 158-9.

APPENDIX D

THE LINTON 'A' LAPSATION TABLE

<u>Policy Year</u>	<u>Probability of Lapse During Year</u>
1	.104
2	.065
3	.056
4	.050
5	.047
6	.044
7	.041
8	.038
9	.037
10	.036
11	.036
12	.036
13	.036
14	.036
15	.036
16	.037
17	.039
18	.041
19	.043

\$FCRTRAN

C LIFE INSURANCE

```

1      REAL LEVP
2      INTEGER H,G,F,E
3      DIMENSION VAL(50),DIV(50),Z(50),AMT(50),YPT(50),YP(50)
4      DIMENSION TITLE(6)
5      READ (5,17) N2
6      17 FORMAT (I10)
7      READ(5,21) N
10     21 FORMAT (2I10)
11     READ(5,22)(Z(G),G=1,N)
12     CC 15 F = 1,N2
13     READ(5,32) TITLE
14     32 FORMAT (6A6)
15     READ (5,20) ANIN,FACE,GAP
16     20 FORMAT (3F10.5)
17     READ(5,22)(VAL(M),M=1,N)
20     READ(5,22)(DIV(K),K=1,N)
21     22 FORMAT (8F10.5)
22     B = 1.+ANIN
23     CC 16 I = 1 ,N
24     L = I - 1
25     IF(I.EQ.1) GO TO 19
26     X = (GAP+VAL(L))*B
27     W = GAP + VAL(L)
30     GO TO 25
31     19 X = (GAP)*B
32     W= GAP
33     25 Y= VAL(I) + DIV(I)
34     YP(I) = X - Y
35     AMT(I) = ((FACE)-(W)*(1.+0.5*ANIN))*0.001
36     16 YPT(I) = (YP(I))/AMT(I)
37     WRITE (6,33) TITLE
40     33 FORMAT ( 6A6)
41     WRITE (6,30) GAP
42     30 FORMAT ( F10.5)
43     WRITE(6,14)(YPT(I),I=1,N)
44     14 FORMAT(8F10.5)
45     SUMA = 0.C
46     SUMB = 0.C
47     N1 = N+1
50     CC 40 E = 1,N
51     J = N1 -E
52     SUMA = SUMA + YP(J)*Z(J)
53     SUMB = SUMB + AMT(J)*Z(J)
54     40 CONTINUE
55     LEVP = SUMA/SUMB

56     WRITE(6,12) LEVP
57     12 FORMAT (1X, F12.5)
60     15 CONTINUE
61     STOP
62     END

```

\$ENTRY