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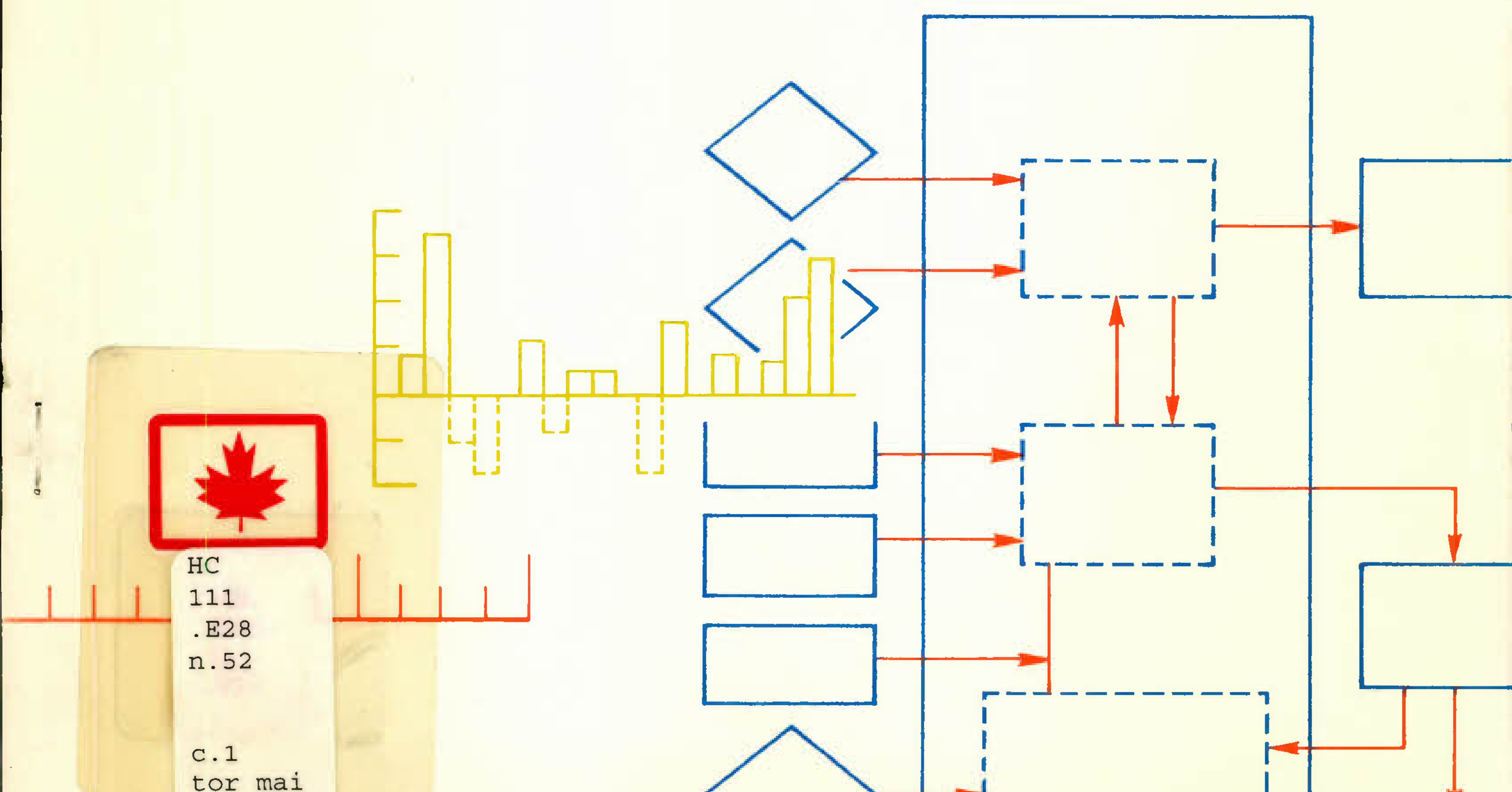

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DISCUSSION PAPER NO. 52

Rates of Return on Life Insurance Savings

by Jacques Babin

J.F. Chant commented helpfully on an earlier version. Responsibility for the views expressed, and for remaining shortcomings, rests with the author.

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RÉSUMÉ

La fonction première des compagnies d'assurance-vie est évidemment de procurer une certaine protection à l'égard des pertes résultant du décès. Parallèlement à cette fonction, elles procurent aussi aux agents économiques diverses possibilités quant au placement de leurs épargnes. Ainsi, elles offrent toute une gamme de régimes de pension, une grande variété de polices d'assurance-vie avec composante épargne et, enfin, elles acceptent de garder en dépôt contre remunération la valeur de rachat de ces polices une fois qu'elles sont échues. Les compagnies informent généralement leurs clients potentiels des rendements qu'ils sont en mesure d'attendre des fonds de pension et des dépôts. Par contre, l'information quant au rendement sur la composante épargne des polices d'assurance-vie avec valeur de rachat laisse beaucoup à désirer.

L'évaluation de ce rendement pose des difficultés et le présent document porte précisément sur ces problèmes. Après une revue de la littérature sur le sujet (Partie I), nous proposons une technique permettant de mesurer ce rendement et nous l'appliquons à divers types de polices (Partie II).

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ABSTRACT

The main business of life insurance companies is obviously to provide protection against loss resulting from death. Besides that, they also play an important role in supplying the economy with various types of savings media; namely deposit facilities, annuity contracts and life insurance policies embodying a savings element. While the rates of return on deposits and annuity contracts are made available to potential customers by the companies themselves, the assessment of the return on the savings element of most life insurance contracts, however, remains a partially open issue.

The purpose of this paper is to throw some light on the assessment of this yield as it pertains to savings accumulated as part of life insurance contracts written by some of the major companies doing business in Canada. A survey of the literature on the topic will be presented in Part I. Part II will include our own approach to the issue and our results.

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Part I

From the survey to follow, it will become clear that most of the controversy over the merits of savings accumulation through life insurance contracts results from a very specific point; that is, there is disagreement about the proper division of insurance premiums paid into a pure *insurance cost component* and a *savings component*.

LINTON

Although Linton is known to most students of insurance for his persistency studies, he was also a pioneer in his responses to those who criticized life insurance when it was viewed as an investment opportunity. In this regard, he devised a method to calculate the investment rate of return that would be necessary for a separate investment fund (along with term insurance, which is an example of insurance without a savings element) to match the cash value accumulation in a standard life insurance policy.[1]

Linton describes his approach as follows:

> Assuming that the amounts to be invested in each program (standard life vs term plus separate investment fund) are equal, the figure we are seeking is the net rate of

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[1] Results obtained by means of his method are revised periodically. For a summary and discussion of these results, see LINTON (1964), pp. 238-245

compound interest that must be earned on the investment fund so that at the end of a given period, such as twenty years, the fund will equal the twentieth-year guaranteed cash value of the life insurance policy.[2]

The main constraint under which the calculations are performed is that the financial position of the insured at the time of death should be strictly equivalent under the two alternative programs. It can be shown that this is achieved if the term insurance purchased is equal to the sum of 1/ the difference between the separate fund accumulation and the face value of the standard life policy, plus 2/ an amount equal to the term premium.

Results arrived at for a twenty-year period when using the 1963 financial data of ten mutual companies are as follows:

Table 1

RATE OF RETURN TO BE EARNED ON THE SEPARATE INVESTMENT FUND

(Linton's method)

Issue age	Return (net of taxes and expenses)
25	4.80 %
35	4.78 %
45	5.17 %
55	6.37 %

Source LINTON (1964) reported in FERRARI (1968), p. 183.

2 LINTON (1964), p. 241.

FERRARI

FERRARI (1968) shares Linton's concern with assessing the compound rate of return on the savings component of standard life insurance contracts. No longer is the constraint simply that the financial position should be strictly equivalent at the time of death. The approach is rather to compare the financial position at a number of durations through equivalent outlays on either standard insurance or term insurance plus a separate investment fund. As we go on, it will become clear that, with such an approach, equivalence of financial positions over the early years of a standard life policy is to be ruled out.

The criticisms addressed by Ferrari to Linton's approach have to do with both the use of the premium on one-year term insurance as a proxy for the cost of pure insurance and the complexity of the computations involved. A normal insurance program would call for a guaranteed insurability clause which extends over a period longer than the usual nine years of renewability attached to most one-year term plans. The pure cost of insurance as approximated by premiums on one-year term would then understate the lifetime cost of pure insurance: Ferrari uses premiums on five-year term insurance. As for computational complexities, the problem can be alleviated without any great loss of generality. This, then, is the major departure from Linton's approach. In Ferrari (1968), the insurance protection which corresponds to the amount of term insurance to be purchased for each duration is simply set equal to the face amount of a given standard life policy less the cash surrender value at the same duration.

The after tax rates of return on the separate investment fund as assessed by means of this method are only slightly higher than Linton's rate due to the fact that more term insurance is purchased under the simplified approach. Smaller provisions entering the separate fund mean that its rate of return must be higher to match the cash value accumulation in a given standard life insurance contract. Table 2 shows two sets of rates of return; the first results from an extension of Linton's method

Table 2

RATE OF RETURN ON SEPARATE INVESTMENT FUND NECESSARY TO MATCH SURRENDER VALUE IN A $10,000 PARTICIPATING STRAIGHT LIFE POLICY, ISSUE AGE 35, 1964 DIVIDEND SCALE, ANNUAL PREMIUM $234.20

Duration in years	Linton's method	Linton's method is simplified for term insurance determination
1	-.9428	-.9424
2	-.2571	-.2540
3	-.0857	-.0820
4	-.0145	-.0120
5	.0162	.0186
6	.0314	.0335
7	.0395	.0414
8	.0455	.0486
9	.0490	.0505
10	.0509	.0523
11	.0504	.0516
12	.0500	.0511
13	.0501	.0511
14	.0502	.0510
15	.0501	.0509
16	.0501	.0508
17	.0500	.0508
18	.0500	.0507
19	.0500	.0506
20	.0500	.0506

Source Ferrari (1968), p. 186.

to cover a number of durations and the second shows the rates of return based on Linton's method as simplified by Ferrari for the amount of term insurance to be purchased.

As can be seen from Table 2, the extension of Linton's approach to a number of durations including the early years of a standard life policy casts doubt on the relevance of starting with the constraint of equivalent financial positions under the various insurance programs to be compared. This table shows negative rates of return on savings in early years. Should a policy terminate in those early years, (either because of voluntary withdrawal or because of death), equivalence of financial positions would then require a negative return on the separate investment fund. Over those years, any reasonable separate investment and appropriate term insurance would, for equal outlays, lead to a better financial position than would standard life insurance alone.

Ferrari's own results appear in the last column of Table 2. Equal outlays are assumed and the stream of annual savings (i.e., the difference between the premiums on standard life insurance and the premiums on appropriate five-year term insurance) is invested in a fund at the available "reasonable" rate. The second step is to compare financial positions attainable under the two alternatives. This comparison is twofold: 1/ the separate investment fund accumulation at the end of each year under the assumed rate of return is compared to the accumulated cash value plus dividends available at the end of that same year to ascertain the relative financial position at each duration if the insured should surrender and 2/ the term insurance death proceeds plus the separate investment accumulation are compared against the face amount plus post-mortem dividends of standard life insurance to ascertain the relative financial position at each duration should the insured die. Those two sets of relative financial positions ranked along duration are discounted by an assumed discount factor and then weighted by the appropriate probability of termination (voluntary or by death) for each duration. The last step of the procedure involves the summing up of the resulting, expected, discounted values and the search, through trial and error and interpolation, for a rate which produces an expected discounted value of zero.

Results obtained by means of this method show the expected return on a separate investment fund necessary for term insurance plus separate investment to provide for a financial position comparable to that which at all durations would be attainable through standard life insurance. Those results are positively linked to persistency and although they tend towards Linton's estimates, they never quite reach them.

CAMERON

Cameron's method differs from both Linton's and Ferrari's in that the assessment of the rate of return on savings through life insurance is straightforward. In other words, no reference is made either to a separate fund in which the appropriately defined savings component of annual premiums would accumulate or to the rate of return which could be considered as the opportunity cost (expressed in percentages) of savings channelled through life insurance.

Cameron's approach consists first of isolating the savings component of premiums on life insurance and then of searching for the rate of return which will cause this stream of annual savings to accumulate to the known terminal cash value of the contract.

The savings element in each year is found as the residual of the net premium on standard life after deduction of the protection element. The latter is defined as the product of the average amount of protection provided during the year, and its unit cost. The average amount of protection is defined as the difference between the face value of the contract and the accumulated cash value. The unit cost of protection is the mortality cost of insuring a given type of policy holder plus other fixed charges. In Cameron's paper, this cost of protection is covered by the use of a proxy which is the sum of the term premiums charged by Sun Life of Canada on a five-year renewable term insurance plus a policy fee charged by this same company for each policy issued.

Results of computations for 265 policies using data from 1972 *Stone and Cox Life Insurance Tables* are as follows, (a twenty-year holding period is assumed):

Table 3

AVERAGE RATE OF RETURN ON SAVINGS THROUGH DIFFERENT TYPES OF STANDARD LIFE INSURANCE CONTRACTS

	Participating	Nonparticipating
Canadian companies	4.35	3.10
British companies	3.74	2.75
Foreign companies	4.07	2.86

Source CAMERON, Table 1, p. 10a.

QUIRIN AND WATERS

Part of their study on the Canadian mutual fund industry is devoted to the assessment of the rate of return on the savings part of insurance contracts which, along with mutual funds, are savings media incorporating a prepaid sales charge. Their approach is similar to Cameron's except that their premium rates, surrender values and dividend rates, are averages of the rates quoted by three companies (Crown Life, Manufacturers Life and Great-West Life). The average premium charged by the three companies on a one-year renewable term is used as a proxy of the cost of protection. The results for the three types of policies, issued at age 35, using premiums and dividends as quoted in 1967 *Stone and Cox Life Insurance Tables* are as follows:

Table 4

RETURN ON SAVINGS THROUGH $10,000
LIFE INSURANCE POLICIES ISSUED AT AGE 35

Year	Ordinary life nonparticipating	Ordinary life participating	20-year endowment participating
1	-1.000	-1.000	-1.000
2	-1.000	-1.000	- .753
3	- .559	- .442	- .183
4	- .260	- .226	- .094
5	- .138	- .120	- .054
6	- .071	- .064	- .023
7	- .039	- .029	- .004
8	- .014	- .010	.006
9	- .003	.005	.013
10	.007	.013	.018
11	.016	.023	.024
12	.022	.029	.029
13	.025	.033	.032
14	.028	.036	.034
15	.030	.039	.036
16	.032	.041	.038
17	.033	.043	.039
18	.035	.044	.040
19	.035	.046	.041
20	.036	.049	.043

Source QUIRIN and WATERS, (1969) pp. 5.19-5.21.

The four approaches we briefly surveyed above suggest that the maximum rate of return which one can get on the savings element of life insurance contracts for a twenty-year holding period is approximately 5 per cent and that this rate is available on ordinary life participating contracts. When rates of return are assessed for all durations up to twenty years, computations show that those rates are very low in the early years (in fact they are negative). They also indicate that they will increase to become positive before the tenth year.

From a methodological point of view, a feature common to these four approaches is that they all make use of a decreasing amount of effective protection in their computations. Cash surrender value is then viewed as the insured's own accumulated savings which finance a part of the available death benefit should death occur before the end of the contract. Given the constant face value of a standard life contract, a rising cash value leads to a decreasing amount of effective protection.

Part II

Our approach will be quite different from that of the previous studies in the field. We will neither make use of a separate investment fund nor will we try to split the cost of standard life insurance into its protection and savings components. Instead, we will view life insurance companies as issuers of essentially two types of life insurance contracts. (*standard life contracts* or insurance-savings packages and *term contracts* or pure insurance contracts) which, even for identical face values or death benefits, involve different outlays on the part of the insured and likely have a different impact on his wealth at the time of termination.

In our method, the differential impact on wealth will be compared to the stream of differences in outlays. Thus the compound rate of return on the savings component of standard life insurance will be the compound rate necessary to make the difference in outlays accumulate to the amount of that differential impact on wealth.

Differences in outlays will be derived as follows. For outlays on pure insurance, we will use the annual premium (including a policy fee) on five-year term renewable and convertible policies. This type of policy provides guaranteed insurability for entire life through successive renewals and conversion, the latter being generally available until ages 65 or 70. Only this kind of term insurance provides insurance protection which, because of its guaranteed insurability clause (without medical), may be viewed as a meaningful alternative to protection secured through standard life insurance over a relatively long horizon.[3] As for outlays on standard life insurance, two types of saving insurance packages will be considered: ordinary life policies (participating and nonparticipating or with and without dividends) and endowment policies. As mentioned earlier, all of those share the common feature of cash surrender value rising with effective duration of the contract. Differences in outlays will then be the difference between the premiums paid on standard life insurance and the premiums paid on five-year term insurance.

The difference impact of the two types of insurance programs on the wealth of the insured is obviously related in some way to the fact that standard policies have a cash surrender value whereas term policies do not. Cash surrender value may be thought of as an asset in that it can be withdrawn at any duration of the contract (thus bringing it to an end). The insured can also borrow from the company an amount not exceeding

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[3] As mentioned earlier, one-year term insurance is generally renewable for a maximum of nine years and, in most cases, is not even convertible.

the cash value of his policy at a rate which used to be determined at the time of issue. Should the contract terminate because of death, however, the cash surrender value is included in the death benefit which is equal to the face value of the policy, regardless of the level reached by the cash surrender value at that time. In other words, cash surrender value is lost to the insured or to his estate whenever a standard life insurance contract terminates because of death. *Cash surrender value can then be viewed as an asset with uncertain value and its expected value at any duration may be defined as the product of multiplying its predetermined value for that duration by the probability of survival of the insured to that duration.*

The discussion above allows us to refer to equal and constant face values of policies when comparing the costs and benefits of the various standard life contracts to the costs and benefits of appropriate term contracts, since the contingency of death, which could reduce the value to the insured of the cash surrender value to zero, is fully accounted for through the survival rate. Then, for example, costs and benefits to the insured of a $10,000 twenty-year endowment policy will be compared to the costs and benefits attached to a $10,000 five-year term insurance contract renewed three times.

From a computational point of view, our approach will be as follows. *The annual cost of standard life insurance* will be the net premium; that is, the gross premium (basic rate x face value + policy fee) less dividends. Dividends available at the end of each year will be deducted from the gross premium of the following year. For each year, *net savings* will be the difference between the net premium on standard life and the premium (basic rate x face value + policy fee) on five-year renewable and convertible term insurance.

For every duration t, the rate of return r on net savings accumulated over years 1 to t will be the compound rate that equates those accumulated savings to the expected cash surrender value as of the end of year t. The problem is then to solve the following equation for r:

$$ECV_t = \sum_{i=1}^{t} \frac{NS_i \, (1+r)^t}{(1+r)^{i-1}} \qquad (t = 1,2,\ldots,)$$

where:

ECV_t is the expected cash value at the end of year t and is equal to the quoted cash surrender value as of the end of t times the probability for the insured to survive to the end of year t.[4]

NS_i is net savings or addition to accumulated savings at the beginning of year i.

The data used to solve the equation above are taken from *Stone and Cox Life Insurance Tables* 1973 and survival rates are based on 1958 *CSO Mortality Table*. Table 5 shows our assessment of the rates of return on the savings component of three types of policies (nonparticipating standard life, participating standard life and twenty-year endowment policies[5] written for a man, at age 35, and issued by three major companies operating in Canada.[6] For each policy and for each duration (from 1 to 20), Table 5 shows the *expected cash value*, the annual *net savings* and the *yield*. The last column of each table shows the average *yield* for each type of policy.

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4 Let us assume that a policy is issued on the day when the insured reaches age "a"; then,

$$ECV_t = \prod_{j=0}^{t-1} (1-d_{a+j}) \; CV_t$$

where d_a is the mortality rate for ages between a and a+1.

5 Participating and nonparticipating policies differ in that the former yields dividends while the latter does not. The main characteristic of endowment policies is that their cash surrender value reaches their face value at some predetermined date.

6 The computer program was provided by Pierre MERCIER of the Economic Council of Canada.

Table 5-A

YIELD ON SAVINGS THROUGH A $10,000
NON-PARTICIPATING LIFE POLICY ISSUED AT AGE 35

	COMPANY A			COMPANY B			COMPANY C			
Duration	ECV	NS	Yield	ECV	NS	Yield	ECV	NS	Yield	Average Yield
1	0.0	102.90	-1.00000	0.0	108.30	-1.00000	0.0	96.00	-1.00000	-1.00000
2	0.0	102.90	-1.00000	0.0	108.30	-1.00000	0.0	96.00	-1.00000	-1.00000
3	0.0	102.90	-1.00000	128.97	108.30	-0.39551	49.60	96.00	-0.64938	- .68163
4	0.0	102.90	-1.00000	257.05	108.30	-0.18441	178.04	96.00	-0.28474	- .48972
5	414.07	102.90	-0.07156	404.21	108.30	-0.09595	305.62	96.00	-0.14688	- .10480
6	561.93	92.20	-0.02159	556.03	97.50	-0.03912	444.04	83.00	-0.06631	- .04234
7	708.52	92.20	0.00334	706.56	97.50	-0.01020	581.30	83.00	-0.02573	- .01086
8	853.69	92.20	0.01652	855.64	97.50	0.00557	717.26	83.00	-0.00351	.00619
9	997.29	92.20	0.02362	1003.11	97.50	0.01444	851.77	83.00	0.00925	.01577
10	1139.11	92.20	0.02733	1148.77	97.50	0.01946	984.66	83.00	0.01674	.02118
11	1298.17	71.90	0.03404	1305.85	78.10	0.02630	1138.02	53.60	0.02843	.02959
12	1454.79	71.90	0.03783	1460.52	78.10	0.03031	1279.15	53.60	0.03443	.03419
13	1608.68	71.90	0.03981	1612.48	78.10	0.03256	1422.77	53.60	0.03846	.03694
14	1759.51	71.90	0.04064	1751.40	78.10	0.03355	1563.60	53.60	0.04077	.03835
15	1906.92	71.90	0.04070	1906.92	78.10	0.03398	1701.27	53.60	0.04193	.03887
16	2050.50	42.70	0.04180	2057.92	48.40	0.03583	1850.27	30.50	0.04443	.04069
17	2189.80	42.70	0.04219	2204.50	48.40	0.03684	1995.07	30.50	0.04587	.04163
18	2324.41	42.70	0.04210	2346.23	48.40	0.03723	2135.25	30.50	0.04655	.04196
19	2453.81	42.70	0.04167	2482.60	48.40	0.03719	2270.31	30.50	0.04666	.04185
20	2577.48	42.70	0.04097	2613.03	48.40	0.03683	2399.72	30.50	0.04642	.04141

Table 5-B

YIELD ON SAVINGS THROUGH A $10,000
PARTICIPATING LIFE POLICY ISSUED AT AGE 35

	COMPANY A			COMPANY B			COMPANY C			
Duration	ECV	NS	Yield	ECV	NS	Yield	ECV	NS	Yield	Average Yield
1	0.0	167.10	-1.00000	0.0	137.60	-1.00000	0.0	134.20	-1.00000	-1.00000
2	79.59	145.30	-0.61909	0.0	124.60	-1.00000	0.0	120.70	-1.00000	- .87303
3	235.12	137.40	-0.28250	126.97	123.50	-0.44882	99.21	117.40	-0.51938	- .41690
4	388.71	129.40	-0.14727	276.94	119.40	-0.22177	247.27	114.00	-0.24676	- .20527
5	542.23	121.30	-0.08007	423.92	114.80	-0.12079	394.35	110.50	-0.13112	- .11066
6	703.39	102.50	-0.03517	579.21	99.80	-0.05908	552.10	93.90	-0.06065	- .05163
7	863.14	98.80	-0.01011	733.96	96.10	-0.02501	708.52	89.30	-0.02250	- .01924
8	1021.31	95.00	0.00492	886.83	91.60	-0.00480	863.44	84.60	-0.00028	- .00005
9	1177.73	91.20	0.01435	1038.03	86.90	0.00799	1016.69	79.80	0.01357	.01197
10	1332.18	87.40	0.02044	1187.38	82.10	0.01640	1168.07	74.90	0.02252	.01979
11	1513.25	63.10	0.02933	1350.02	57.00	0.02609	1330.82	40.60	0.03332	.02958
12	1691.53	59.00	0.03516	1510.16	52.26	0.03258	1491.06	35.46	0.04046	.03607
13	1866.68	54.93	0.03899	1667.49	47.52	0.03696	1648.52	30.32	0.04524	.04040
14	2038.32	50.92	0.04150	1821.68	42.78	0.03994	1802.84	25.18	0.04848	.04331
15	2206.04	46.86	0.04310	1972.35	38.04	0.04195	1953.66	20.04	0.05063	.04523
16	2369.38	13.60	0.04525	2130.22	3.60	0.04513	2101.82	-8.20	0.05313	.04784
17	2527.83	9.34	0.04667	2283.50	-1.20	0.04734	2261.45	-12.58	0.05539	.04980
18	2680.89	5.08	0.04755	2431.72	-6.00	0.04886	2408.07	-16.96	0.05663	.05101
19	2828.00	0.82	0.04804	2574.34	-10.80	0.04986	2549.15	-21.34	0.05738	.05176
20	3070.76	-3.44	0.05057	2798.79	-15.60	0.05265	2843.23	-25.72	0.06152	.05491

Table 5-C

YIELD ON SAVINGS THROUGH A $10,000, 20-YEAR ENDOWMENT INSURANCE POLICY ISSUED AT AGE 35

Duration	COMPANY A			COMPANY B			COMPANY C			Average Yield
	ECV	NS	Yield	ECV	NS	Yield	ECV	NS	Yield	
1	0.0	422.70	-1.00000	0.0	383.00	-1.00000	0.0	392.80	-1.00000	-1.00000
2	467.58	397.10	-0.31787	358.15	362.00	-0.39627	0.0	363.90	-1.00000	- .57138
3	879.97	383.84	-0.14637	751.00	353.90	-0.17639	714.29	354.90	-0.19913	- .17396
4	1288.78	370.70	-0.07685	1165.71	345.30	-0.08252	1122.61	345.60	-0.09747	- .08561
5	1695.70	357.30	-0.04199	1528.10	336.30	-0.04952	1543.60	336.00	-0.04675	- .04609
6	2149.47	332.70	-0.01433	1972.64	316.30	-0.01693	1978.53	313.10	-0.01601	- .01576
7	2599.21	322.80	0.00111	2413.27	306.60	0.00098	2425.02	301.80	0.00268	.00159
8	3044.45	312.60	0.01029	2849.55	296.70	0.01148	2867.09	290.20	0.01367	.01181
9	3484.68	302.10	0.01600	3280.95	286.40	0.01791	3304.24	278.30	0.02043	.01811
10	3919.32	291.30	0.01963	3706.94	275.80	0.02195	3735.90	266.00	0.02471	.02210
11	4468.70	259.90	0.02693	4217.13	245.40	0.02862	4247.85	223.90	0.03172	.03646
12	5009.67	247.70	0.03165	4719.47	232.98	0.03291	4751.93	209.85	0.03625	.03360
13	5541.22	235.50	0.03469	5213.04	220.55	0.03566	5247.18	195.82	0.03918	.03510
14	6062.22	223.30	0.03659	5696.75	208.14	0.03738	5732.54	181.78	0.04104	.03834
15	6571.39	211.10	0.03773	6169.44	195.72	0.03839	6206.83	167.74	0.04215	.03942
16	7067.35	169.70	0.03877	6748.47	153.60	0.04116	6778.13	130.60	0.04472	.04155
17	7548.58	155.26	0.03934	7311.59	138.34	0.04299	7333.64	114.80	0.04639	.04291
18	8013.57	140.82	0.03958	7857.16	123.08	0.04414	7871.71	99.00	0.04741	.04371
19	8460.60	126.39	0.03956	8383.25	107.82	0.04479	8390.44	83.20	0.04797	.04411
20	9123.39	111.94	0.04136	9106.50	92.56	0.04691	9124.28	67.40	0.05012	.04613

Our results show rates of return which are only slightly higher than those found in previous studies (see Tables 1 to 4). This can be explained by the fact that we assume constant insurance protection to be purchased under term contract. Let us recall that other students of the problem, whether they use one-year or five-year term insurance as part of an alternative to standard life insurance, all assume that the protection purchased decreases over the years.

Earlier in this paper, we criticized the use of one-year term premiums and we suggested that premiums on five-year term insurance be used. Cameron has done so but his approach was formulated in terms not at all practical since, in his assessment of the cost of protection, premiums on five-year term insurance are multiplied by an amount of protection which decreases every year. In so doing, his approach falls only partly out of the range of our criticism of all the methods. By underestimating what we think to be the relevant cost of protection, we feel that all methods provide overestimated streams of annual savings. In the face of a given pattern of cash surrender value accumulation, it is no surprise that these approaches lead to relatively low rates of return.

As in previous studies, standard life participating policies rank first in terms of average yield when a twenty-year holding period is assumed. Twenty-year endowment policies rank second and nonparticipating policies rank third. The minimum holding period for the yield to become positive is 7 years, the negative yields over the early years resulting from heavy front-end loading.

Starting from those results, one has to be cautious when inferring about the whole population of standard life insurance policies. Those yields should merely be viewed as an indication of the returns available. They do, however, show an important feature of such rates which is their dependence on the length of the assumed holding period. Coupled with probable heavy withdrawal rates in the early periods of the contracts, this last point would lead to very low effective yields.

Concluding Remarks

When a comparison is to be made between these yields and yields on other financial assets, a number of differences have to be stressed;namely, differences in *tax status, liquidity and risk.*[7] In a competitive world, these differences would account for the observed differences in nominal rates of return. We shall conclude with some comments on these three issues.

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[7] This last section draws heavily on CAMERON, pp. 15-20.

There are some *tax* advantages to saving through life insurance. For example, the policy holder pays no income tax on the amounts which his savings earn while in the life policy. Moreover, at the end of the holding period, only part of the cash surrender value becomes taxable; more precisely, the taxable amount is then the terminal value less the total of net premiums paid (that is, both the *savings elements* and the *protection elements*). In this way, the cost of protection can be deducted. When the savings element is small, relative to the protection element, this feature may remove the entire tax liability.

On the *liquidity* side, the insured can borrow up to 90 or 95 per cent of accumulated cash value at an interest rate which used to be guaranteed in the contract at time of issue. However, in the early years, only part of the net level premium reserve held for the policy holder is made available through cash surrender value so that the advantage of realization applies to only a part of the policy holder's investment in his policy.

As for *risk*, one can think of various sources of uncertainty that cause investment in life insurance to be a risky investment. The first source applies only to participating policies, the return on which is contingent upon profits and dividends.[8]

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[8] In our calculations, we used the dividends projected by the companies themselves which were based on past experience.

The second source of uncertainty is related to the probability of termination because of death. This aspect has already been discussed in relation to its effect on expected returns. At any time, however, termination of the contract because of death will cause the effective return to be zero, whereas, in the case of voluntary withdrawal, the effective return for the same duration will be larger than that shown in Table 5. A third source of uncertainty has been revealed by recent studies in the field which have suggested that a probability can also be assigned to voluntary withdrawal. Consideration of this probability in our calculations would reduce the expected returns and would add to uncertainty.

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