TRANSACTIONS OF SOCIETY OF ACTUARIES
1968 VOL. 20 PT. 1 NO. 56 AB

STATUTORY EARNINGS, ADJUSTED EARNINGS, AND NET WORTH

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INTRODUCTION

What are the earnings of a life insurance company? How can we measure the performance of a life insurance company?

There are currently no universally acceptable criteria. This is not surprising, since there is not even agreement on the definition of earnings. Clearly, statutory earnings are not the complete answer. Statutory earnings (p. 4, l. 33, of the Annual Statement) do not take into account the change in the value of the in-force business (or, alternatively, the capital investment made to acquire it), not to mention a number of other factors. Obviously, however, if two companies both show a $250,000 gain from operations and one company increased its in force by $5 million and the other company by $25 million, there has been a vast difference in performance, other things being equal.

It hardly needs to be emphasized that the ideas, approaches, and conclusions presented herein are those of the author and the author only. The life insurance industry and the professional bodies connected with it are only now beginning to look into the question of using different accounting procedures for different purposes. There certainly is no consensus among actuaries.

The problem of defining earnings arises because of the nature of the life insurance business and the accounting practices that have evolved over the years. Originally, the annual statement was primarily seen as a document concerned with solvency, not profits (i.e., it was prepared for the purview of a supervisory body, not stockholders).

Since mutual companies, at one time, dominated the life insurance scene and since a mutual life insurance company has no stockholders or profit in the ordinary sense of the word, it is easy to see how this attitude pervaded the life insurance business. This was particularly true in the years prior to World War II, before the rapid growth in the number of stock life insurance companies. In fact, it was only in 1951 that the Annual Statement was changed to show a "gain from operations" item. Previously, only the change in surplus gave some indication of the company's financial progress.

Because of this prime concern with solvency rather than with profits,

the accounting practices of life insurance companies differ markedly, and understandably so, from those of other industries.

An analysis of a company's performance would cover many aspects of its operation, depending upon the study's purpose, time allotted, and moneys allocated. Prime areas of investigation might include the following:

1. A qualitative analysis of the company's philosophy of operation, future plans and projections, caliber of management, agency plant, outstanding stock options, capital and surplus position, tax status, company image, investment in new projects and new products, and so forth.
2. A quantitative analysis of specific facets of the company's operation: mortality and morbidity experience, quality of assets, investment return, persistency experience, expense level, commission rates, reinsurance agreements, policy portfolio, premium rate structure, and so forth.
3. A calculation of the company's adjusted earnings, adjusted book value, and net worth.

This paper will concern itself with the adjusted earnings, adjusted book value, and net worth of a company. It should be noted here that the 1959 Federal Income Tax Act casts a shadow upon any discussion of earnings and net worth. The burden of federal income taxes is by no means an insignificant one. However, a discussion of the effects of federal income taxes on the life insurance industry would require a paper of at least comparable size and will not be pursued herein. In any event, the reader should constantly keep this basic fact of life in mind. These concepts, as set forth in item 3 above, will be explored under the following topics:

1. Major Variations in Statutory Life Insurance Accounting from the Accounting Practices of Other Industries
2. Why We Need Adjusted Earnings and Net Worth
3. General Methods for Calculating Adjusted Earnings, Adjusted Book Value, and Net Worth
4. Calculation of the Present Value of Future Profits
5. Calculation of Adjusted Earnings
6. Adjusted Earnings and Net Worth from Outside a Company
7. Other Considerations
8. Conclusion

MAJOR VARIATIONS IN STATUTORY LIFE INSURANCE ACCOUNTING FROM THE ACCOUNTING PRACTICES OF OTHER INDUSTRIES

1. The capital investment made to acquire business is charged against income in the year spent rather than capitalized and amortized over the expected lifetime of the capital asset (new business) which is expected to generate future profits; that is, commissions and other acquisition costs

are charged off immediately (except to the extent deferred through a modified reserve approach).

2. The employment of the concept of admitted and nonadmitted assets is a vivid demonstration that the purpose of the annual statement is to demonstrate financial soundness. Items not admitted as acceptable assets include (*a*) advances to agents and (*b*) furniture, equipment, and leasehold improvements less accumulated depreciation.

3. About half of life insurance companies' assets are invested in government and corporate bonds. Yet, almost all bonds are valued on their amortized value instead of their market value. This is done to eliminate wide fluctuations in asset values, in recognition of the long-term nature of the life insurance business, and because most bonds are held to maturity.

4. Realized capital gains and losses are treated as surplus transactions and not as income items. The federal income tax on capital gains is deducted directly from such gains (Exhibit 4, l. 10.1).

5. The "security valuation reserve" is reported as a liability rather than as an appropriation of surplus.

6. Earnings are calculated after a statutory allocation to reserves. The actuary has relatively little freedom in the setting of reserves. Mortality rates are prescribed by statute. Interest rates cannot exceed $3\frac{1}{2}$ per cent. Reserves can only fluctuate between the Commissioners and net level methods. In addition, of course, a policy's reserve cannot be less than the corresponding cash value.

7. The increase in deficiency reserves is considered an expense, as opposed to an allocation of surplus.

8. Different reserve methods are used for statement and tax purposes.

WHY WE NEED ADJUSTED EARNINGS AND NET WORTH

An investment in a life insurance company should be an investment in future earning power. This is, of course, the same criterion as that used in buying the stock of any industrial corporation. Investors are seeking a reasonable return (dividends or capital appreciation) on their invested capital.

However, it often is more difficult to determine earnings for a life insurance company than it is for an industrial corporation of comparable size. For the life insurance company, no simple formula will suffice. A life insurance company must adopt a long-range outlook, since the earnings on any block of policies are not known until the final contract has expired. However, certain approximate methods may be used in order to estimate earnings.

It is clearly improper to take the statutory earnings as reported in the

published annual statement and multiply by a "price-earnings ratio," since the gains revealed in the annual statement do not necessarily represent the real earnings of the company. This becomes even more apparent in considering a relatively new life insurance company. Since the company is still operating at a statutory deficit or has just emerged therefrom, the price-earnings approach is meaningless. Is the company dissipating real surplus or accumulating it? The annual statement will not answer this fundamental question.

Adjusted earnings and net worth are needed under two somewhat different circumstances: (*a*) from within a company, in order to measure current performance better and to compare such performance with prior years, and (*b*) from outside a company, in order to compare the performance of two or more companies.

Under situation *a* we can presumably secure all or nearly all the information that we may require. It is primarily a matter of judging how great an expenditure of time, money, and manpower we want to make. Under situation *b* we can assume that the Convention Blank (Annual Statement) is available and perhaps not much more.

Obviously, circumstances *a* and *b* provide different ground rules and, presumably, call for different approaches. In essence, the availability of data and the intended purpose will often determine the method to be used. However, by examining the methods which home-office people may employ, it is possible to develop an approach that would be feasible for an outsider. While the material in this paper is written in terms of a stock company, the same type of analysis can be used to evaluate the safety margins in the premium and reserve structure of a mutual company.

In summary, an acceptable method of calculating adjusted earnings and net worth is desirable for the following purposes:

1. To measure the performance of a company, both from within and without the industry.
2. To aid management in planning its future course of action.
3. To observe changes in a company's intrinsic worth.
4. To determine a fair market price for the company's stock.
5. To facilitate mergers, acquisitions, mutualizations, demutualizations.
6. To provide a more intelligent report to the company's stockholders.
7. To determine what earnings a parent company may incorporate for a subsidiary life insurance company.

This is not to say that adjusted earnings and net worth are the final answer in judging the performance of a company, and/or estimating future profits, but they generally are better guidelines than statutory earnings and book value.

GENERAL METHODS FOR CALCULATING ADJUSTED EARNINGS, ADJUSTED BOOK VALUE, AND NET WORTH

In this section, we will define some terms commonly encountered in any discussion of adjusted earnings and net worth. There are no generally accepted definitions of the common terms bandied about. It must be emphasized that the definitions set forth herein are the author's alone and do not presume to represent the thinking of the life insurance industry or of any group connected with it.

The surplus account of the Annual Statement (p. 4) describes the following relationship between surplus and earnings: surplus at the beginning of a period (p. 4, l. 34, 35A, and 35B) plus statutory earnings (p. 4, l. 33) plus the net effect of the various surplus transactions equals surplus at the end of the period (p. 4, l. 49, 50A, and 50B). With a slight change, we can follow the change in capital and surplus (book value) instead of surplus alone.

Extending this process one step further, we can trace the change in a company's adjusted book: adjusted book value at the beginning of a period plus adjusted earnings plus extraordinary earnings plus the net effect of the various surplus transactions equals adjusted book value at the end of a period, where adjusted book value is defined as the sum of (*a*) capital; (*b*) an adjusted surplus taking into consideration contingency reserves, deficiency reserves, the security valuation reserve, certain portions of the nonadmitted assets, market value of certain assets, recomputation of reserves on an experience basis, deferred tax liabilities, and so forth; and (*c*) the capitalized value of the "investment in new business."

"Adjusted earnings" might be defined as the normal operational earnings resulting from the sale and servicing of insurance and the investment of the company's assets. They would include the increase in the capitalized value of the "investment in new business."

"Extraordinary earnings" might be defined as unusual operational earnings, that is, those that are nonrecurring in nature. They might result from capital gains, the sale, purchase, or reinsurance of a block of business, and so on.

"Surplus transactions" generally relate to a past fiscal period or to capital transactions. These would include the following:

1. Past-service pension contributions.
2. Change in reserve basis (Exhibit 8A).
3. Correction of a previous year's financial statement. This item should be used to correct prior years' statements; it should not be a device to improve current statutory earnings.
4. Cash and/or stock dividends.
5. Sale of stock.

6. Organization expenses.
7. Cost of acquiring a subsidiary.
8. Stock options.

It is quite apparent that it is difficult to lay down hard and fast rules. Thus, capital gains for one company might be rare and for another company usual and recurring. A company seeking capital gains will generally have a lower investment return, although its investment income plus capital gains may be higher in total than those of a similarly situated company with a higher earned interest rate.

As can be seen, the traditional separation of admitted assets and nonadmitted assets and of above-the-line (p. 4, ll. 1–33) and below-the-line (p. 4, ll. 34–51) surplus transactions has been altered.

Thus, a company's adjusted earnings is developed as follows: statutory earnings plus (1) the annual increase in the excess of statutory reserves over "experience reserves" plus (2) the increase in the capitalized value of the "investment in new business" plus (3) the increase in deficiency reserve (statutory deficiency reserves brought about solely because the gross premium is less than the valuation net premium can generally, from an earnings viewpoint, be considered an allocation of surplus and not an "increase in reserves") plus (4) capital gains for some companies, less (5) increase in deferred tax liabilities.

In the above approach, it is assumed that purchases of furniture and equipment are capitalized and then amortized over their effective lifetime and advances to agents are judged strictly on the value of the collateral, if any.

We must also examine the net worth of a company. Net worth might be defined as capital plus adjusted surplus, as heretofore defined, plus the present value of future profit on in-force business.

It should be noted that net worth and adjusted book value are not synonymous. Net worth is an actuarial concept, prospective in nature, which deals with the present value of future profit. It might also be described as a company's liquidating value. Adjusted earnings and adjusted book value, on the other hand, are accounting concepts dealing with the capitalization and amortization of a company's investment in new business and with the recomputation of reserves on an experience basis. It is a retrospective approach to a company's financial experience.

Unfortunately, the distinction between adjusted earnings and increase in net worth, and between adjusted book value and net worth, has all too often been blurred. There is no inherent reason why the two approaches should give similar results, and they do not. They are used for different purposes. Good management would dictate that the increase in

the present value of profit should bear a logical relationship to the money invested to secure it. Since adjusted earnings are a prime factor in the determination of market price, this confusion of terms is not a mere matter of semantics. A price-earnings ratio (the ratio of market value divided by earnings) represents an investor's evaluation of the future pattern of a company's earnings. It is like a barometer, anticipating the course of future earnings. In a sense, the price-earnings ratio times current earnings may be considered the present value of future profits. Thus, a high price-earnings ratio is a sign that a rapid rise in profits is anticipated. This being the case, it is clearly improper to include extraordinary earnings or the increase in the present value of future profits in a base used to project future earnings.

CALCULATION OF THE PRESENT VALUE OF FUTURE PROFITS

Three methods of calculation will be discussed—all understandably prospective in nature: the gross premium valuation, using a model office; Lidstone's formula, using a model office; and the aggregate profit projection.

Gross Premium Valuation

Under a gross premium valuation, the present value of the expected profits of the business in force is obtained by applying "present value of future profit" factors to a model-office distribution. Under this method the procedure would be as follows:

1. The insurance in force at year end would be examined to determine what combination of plans, issue ages, and years of issue could properly represent the business.
2. A model office would be created to represent the in-force business. To keep the model office within manageable proportions, only those elements that are truly indicative of the in force should be used. As a practical matter, 30 plan–issue age combinations (6 plans times 5 issue ages) may suffice for each year of issue. Thus, a mature company may have 1,000 cells. This assumes a reasonable amount of internal consistency in the policy portfolio.
3. For each plan and age combination, "realistic" rates of mortality, interest, lapse, and expense would be used to calculate "present value of future profit" factors.
4. Applying "present value of future profit" factors to each cell, we would obtain an approximation to the value of business in force on the valuation date.

In a gross premium valuation, annual earnings may be projected for as many years as are thought practical and desirable and discounted at whatever rate is deemed appropriate. Profits are the end product of a gross premium valuation, and it should be noted that, whereas minor

changes in the basic assumptions may not significantly affect funds (reserve plus surplus), comparatively small changes in the realistic assumptions will usually affect the profit picture considerably. Thus, regardless of the reserve interest rate, earnings are drastically affected by the decision to use a projected interest figure of 3½, 4, or 4½ per cent. A comparable situation may exist when minor changes are made in the other parameters. This problem is clearly illustrated in the papers of Vineberg,[1] Rydgren,[2] and Gold.[3] Mr. Rydgren showed that

> under ordinary life policies five years in force on the date of reinsurance, the present value of seven years' profits is more than doubled by assuming a mortality rate of 100% of that expected according to the American Men Select Table of Mortality instead of 110%, interest at 5¼% instead of 5%, and continuous renewal commissions of 3%, instead of nine renewal commissions of 5%. Such a variation in profit caused by so slight a variation in mortality, interest and renewal commission assumptions is truly astonishing. It demonstrates most forcibly the value, if not the necessity, of making an exhaustive study of the group of business under consideration before fixing upon the price to be paid for it.

A projection of earnings on a closed block of business can be extremely time-consuming, requiring an extensive and exhaustive actuarial, financial, and functional analysis of past operations and then a complex and sophisticated set of projections. Each block consists of subblocks, each with its own premium-rate structure. Some subblocks are profitable, some are not. Some subblocks are associated with particular forms of agency organization or contracts, or with a particular underwriting approach, or both, and may have a distinctive experience which would need to be recognized.

The representative sample for each year of issue will generally be valid for a number of ensuing valuation dates. Thus, the basic computations done for the gross premium valuation can generally be used for subsequent valuations.

If there has been a change in a basic parameter—say, a rise in interest rates—then the gross premium valuation at the beginning and end of the calendar year should be based on the current interest rate. The absolute change in the present value of profit as a result of the rise in the investment return would, in essence, be an adjustment in surplus.

Exhibit I demonstrates a gross premium valuation for a whole life policy issued at age 35. Only profits arising over the first thirty policy

[1] H. E. Vineberg, "The Worth of Business," *RAIA*, Vol. IV.

[2] A. A. Rydgren, "Value of Business Reinsured in Bulk," *TASA*, Vol. XXII.

[3] M. L. Gold, "Valuing a Life Insurance Company," *TSA*, Vol. XIV.

years are considered. Column (14), "Profit Factor," represents the present value, as of the beginning of a given policy year, of future profits per $1,000 of insurance then in force before providing for federal income taxes.

It should be noted that the cost to secure the business does not really enter into the calculation (i.e., a prospective gross premium valuation is not concerned with first-year sales costs). The reserve basis enters only indirectly in that it affects the flow of profit as it evolves. The rate at which future profits are discounted is an ultraimportant consideration.

Lidstone's Formula

An interesting variation of the gross premium valuation is Lidstone's formula for calculating the present value of the future profits of a policy. Mr. Arthur Pedoe,[4] in presenting Lidstone's formula, demonstrated that the present value of the total future profits of a policy is the valuation reserve less the reserve based on experience rates of interest and mortality and with a valuation premium equal to the gross premium less expenses.

As a further refinement, experience rates of persistency can be incorporated. Lidstone's formula demonstrates the self-evident fact that, if additional surplus is set aside under a more conservative valuation method, the present value of future profits is increased proportionately.

Under Lidstone's present-value approach, "experience" commutation columns can be prepared and a model-office calculation carried out. Under this approach, the present value of profits is the answer since there is no year-by-year projection of earnings.

Statutory reserve liabilities constitute over 90 per cent of life insurance company liabilities. The bases of these statutory liabilities are set by the various states. Since one prime function of supervisory officials is the solvency of insurance companies—covering a host of different companies, each with its own investment and mortality experience and idiosyncrasies—it follows that the reserve basis is conservatively set. Thus, one approach to valuing the insurance in force would be to calculate what the reserve would be if it were computed on a more "realistic" basis.

In attempting to utilize this approach, it must be borne in mind that cash values are generally related to statutory reserves. Hence the recomputation along with the subsequent reduction of reserves below the corresponding guaranteed cash values creates a problem of its own. While this is a problem, it is not, hopefully, an insurmountable one. The frequently mentioned analogy of amortized bonds carried below market

[4] Arthur Pedoe, "Lidstone's Formula for the Present Value of the Profits of a Policy," *TSA*, Vol. X.

EXHIBIT I

GROSS PREMIUM VALUATION*

(Whole Life—Issue Age 35)

POLICY YEAR	GROSS ANNUAL PREMIUM	COMMISSIONS AND TAXES (2)		EXPENSES	EFFECTIVE PREMIUM $=(1)_t-(2)_t-(3)_t$	INITIAL FUNDS $=[(4)_t+(7a)_{t-1}]\times 1.04$	105% 1955–60† BASIC MALE $q_{[x]+t-1}/1,000$	COST OF CLAIMS $(6)_t[(1.04)^{1/2}]-(6)_t/1,000\,[(7a)_t]$	TERMINAL RESERVE	CASH VALUE ${}_tCV_{[x]}$	LAPSE RATE	GAIN FROM LAPSE $=[(7a)_t-(8)_t](9)_t$	GAIN/1,000 IN FORCE AT BEGINNING OF YEAR $=(5)_t-(7)_t-(7a)_t+(10)_t$	TOTAL TERMINATION RATE $=(6)_t/1,000+(9)_t$	DISCOUNT FACTOR $=[1-(12)_{t-1}](13)_{t-1}$	PROFIT FACTOR‡
		Per Cent	Amount													
	(1)			(3)	(4)	(5)	(6)	(7)	(7a)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1....	18.50	95+2	17.95	9.00	− 8.45	− 8.79	.81	.83	0	0	.200	0	−9.62	.20081	1.00000	12.10
2....		7½+2	1.76	.90	15.84	16.47	1.01	1.02	13.94	0	.120	1.67	3.18	.12101	.79919	27.78
3....						30.97	1.28	1.27	28.26	10.83	.100	1.74	3.18	.10128	.70248	29.25
4....						45.86	1.47	1.44	42.91	25.39	.088	1.54	3.05	.08947	.63133	30.31
5....						61.10	1.66	1.60	57.90	40.27	.080	1.41	3.01	.08166	.57484	31.27
6....						76.69	1.90	1.80	73.21	55.46	.072	1.28	2.96	.07390	.52790	32.13
7....						92.61	2.18	2.03	88.82	70.95	.064	1.14	2.90	.06618	.48889	32.88
8....						108.85	2.50	2.29	104.74	86.75	.058	1.04	2.86	.06050	.45654	33.51
9....						125.40	2.87	2.58	120.97	102.83	.054	.98	2.83	.05687	.42892	34.05
10....						142.28	3.31	2.92	137.51	119.21	.050	.92	2.77	.05331	.40453	34.54
11....		3+2	.93		16.67	160.35	3.77	3.26	154.35	137.59	.048	.80	3.54	.05177	.38296	35.02
12....						177.86	4.25	3.61	171.48	156.29	.046	.70	3.47	.05025	.36313	34.68
13....						195.68	4.74	3.94	188.86	175.33	.044	.60	3.48	.04874	.34488	34.33
14....						213.75	5.45	4.43	206.50	194.69	.042	.50	3.32	.04745	.32807	33.87
15....						232.10	6.41	5.10	224.37	214.34	.040	.40	3.03	.04641	.31250	33.49
16....						250.68	6.94	5.39	242.48	234.28		.33	3.14	.04694	.29800	33.35
17....						269.52	7.56	5.74	260.77	254.51		.25	3.26	.04756	.28401	33.09
18....						288.54	8.32	6.16	279.27	275.00		.17	3.28	.04832	.27050	32.71
19....						307.78	9.20	6.64	297.94	295.77		.09	3.29	.04920	.25743	32.30
20....						327.19	10.09	7.09	316.81	316.81		0	3.29	.05009	.24476	31.87
21....						346.82	11.00	7.53	334.81	334.81			4.48	.05100	.23250	31.42
22....						365.54	12.06	8.04	352.89	352.89			4.61	.05206	.22064	29.72
23....						384.34	13.26	8.60	371.03	371.03			4.71	.05326	.20915	27.74
24....						403.21	14.60	9.21	389.20	389.20			4.80	.05460	.19801	25.50
25....						422.10	16.06	9.84	407.36	407.36			4.90	.05606	.18720	22.97
26....						440.99	17.69	10.51	425.49	425.49			4.99	.05769	.17671	20.12
27....						459.85	19.55	11.27	443.57	443.57			5.01	.05955	.16652	16.90
28....						478.65	21.61	12.06	461.57	461.57			5.02	.06161	.15660	13.37
29....						497.37	23.75	12.83	479.46	479.46			5.08	.06375	.14695	9.46
30....						515.98	25.83	13.50	497.20	497.20			5.28	.06583	.13758	5.08

* Before any provision for federal income taxes.

† 100 per cent of $q_{[x]+t-1}$ for years 16–30.

‡ $(14)_{30}=(11)_{30}\times v$; $(14)_t=v[(11)_t+[1-(12)_t](14)_{t+1}]$ for $t<30$.

value is an imperfect one. However, the author cannot help but point out that, while a recomputation of experience reserves may increase surplus, a revaluation of bonds on a market basis will, under current conditions, reduce surplus.

Exhibits IIA and IIB demonstrate the application of Lidstone's formula to the same whole life policy. Exhibit IIA develops the necessary commutation functions for issue age $x = 35$ to be used as the basis of Lidstone's experience reserves. Exhibit IIB shows the calculation of such reserves as of durations 0, 1, and 2. The difference between these experience reserves and the actual policy reserves (from col. [7a] of Exhibit I) is shown in the accompanying tabulation. The difference represents the

Duration	Policy Reserve	Lidstone Reserve	Difference
0.....	$ 0	−$12.14	$12.14
1.....	0	− 27.80	27.80
2.....	13.94	− 15.33	29.27

present value of future profits and is the same as column (14) of Exhibit I except for rounding. Thus the equivalence of the two methods is readily apparent.

Aggregate Profit Projection

An aggregate profit projection projects earnings as a whole based on past experience. No examination of individual policies or creation of a variety of parameters is required. Essentially, estimated future profit is split into two segments—earnings produced by current in-force business and earnings to be generated by future production. The former is used in the calculation of net worth (liquidating value); the two items taken together are used in the calculation of "going concern" value. The procedure for this method is as follows:

1. Calculate the average annual profit attributed to renewal business. This involves breaking the insurance operation "gain" into two parts—surplus drain on account of new business and contribution to surplus from renewal business. The most difficult element here is probably the breakdown of expenses into first and renewal.

2. Calculate (in $1,000 units) the amount of renewal business which produced this profit. This is, essentially, the in force at the end of the previous year less one-half of the amount of insurance issued in the previous year.

3. Take the ratio of item 1 to item 2. This gives the renewal insurance earnings per $1,000 of renewed insurance (i.e., insurance more than one year in force). The final ratio used is the average of item 3 for the last few calendar

years. This average we call V, the net renewal income per $1,000 of renewed insurance.

4. The value of in-force life insurance per $1,000 renewed insurance (V_n^{inf}) is calculated by $V_n^{\text{inf}} = V[1 + vp + (vp)^2 + \ldots + (vp)^{n-1}]$, where V is the net renewal income per $1,000 of renewed insurance, v is the discount factor, p is the persistency rate, and n is the number of future years on which the investor wishes to base his investment.

For the sake of simplicity, the above formula makes use of a constant V, v, and p. In actual practice, the analyst will often vary the renewal profit, the discount rate, and the persistency rate. A major change in management can bring about a tremendous increase in the lapse rate in the first year or so after such a change. The period n and the renewal profit V will vary for different

EXHIBIT IIA

DEVELOPMENT OF COMMUTATION FUNCTIONS FOR USE AS BASIS OF LIDSTONE'S EXPERIENCE RESERVES

t	$l_{[x]+t-1}$ (1)	$D_{[x]+t-1} = (1)_t \cdot v^{t-1}$ (2)	$N_{[x]+t-1} = \Sigma_t^{w}(2)_t$ (3)	$q_{[x]+t-1}$ (4)	$C_{[x]+t-1} = (2)_t(4)_t v^{1/2}$ (5)	$M_{[x]+t-1} = \Sigma_t^{w}(5)_t$ (6)	$w_{[x]+t-1}$ (7)	$W_{[x]+t-1} = (2)_t(7)_t v$ (8)
1...	100,000	100,000	778,006	.00081	79	3,051	.200	19,231
2...	79,919	76,845	678,006	.00101	76	2,972	.120	8,867
3...	70,248	64,948	601,161	.00128	82	2,896	.100	6,245
4...	63,133	56,125	536,213	.00147	81	2,814	.088	4,749
5...	57,484	49,137	480,088	.00166	80	2,733	.080	3,780
6...	52,790	43,390	430,951	.00190	81	2,653	.072	3,004
7...	48,889	38,637	387,561	.00218	83	2,572	.064	2,378
8...	45,654	34,693	348,924	.00250	85	2,489	.058	1,935
9...	42,892	31,341	314,231	.00287	88	2,404	.054	1,627
10...	40,453	28,422	282,890	.00331	92	2,316	.050	1,366
11...	38,296	25,871	254,468	.00377	96	2,224	.048	1,194
12...	36,313	23,588	228,597	.00425	98	2,128	.046	1,043
13...	34,488	21,541	205,009	.00474	100	2,030	.044	911
14...	32,807	19,703	183,468	.00545	105	1,930	.042	796
15...	31,250	18,046	163,765	.00641	113	1,825	.040	694
16...	29,800	16,547	145,719	.00694	113	1,712	.040	636
17...	28,401	15,164	129,172	.00756	112	1,599	.040	583
18...	27,050	13,887	114,008	.00832	113	1,487	.040	534
19...	25,743	12,708	100,121	.00920	115	1,374	.040	489
20...	24,476	11,617	87,413	.01009	115	1,259	.040	447
21...	23,250	10,611	75,796	.01100	114	1,144	.040	408
22...	22,064	9,682	65,185	.01206	114	1,030	.040	372
23...	20,915	8,825	55,503	.01326	115	916	.040	339
24...	19,801	8,034	46,678	.01460	115	801	.040	309
25...	18,720	7,303	38,644	.01606	115	686	.040	281
26...	17,671	6,629	31,341	.01769	115	571	.040	255
27...	16,652	6,006	24,712	.01955	115	456	.040	231
28...	15,660	5,431	18,706	.02161	115	341	.040	209
29...	14,695	4,900	13,275	.02375	114	226	.040	188
30...	13,758	4,412	8,375	.02583	112	112	.040	170
31...	12,852	3,963	3,963	.....	.....	.....	.....	.....

EXHIBIT IIB

CALCULATIONS OF LIDSTONE'S EXPERIENCE RESERVES

(As of Durations 0, 1, and 2)

Reserve at t = *0*

$$\frac{1{,}000\{M_{[x]}-M_{[x]+30}\}}{D_{[x]}}+\frac{497.20\ D_{[x]+30}}{D_{[x]}}+\frac{\sum_{1}^{30}W_{[x]+t-1}\cdot {}_{t}CV_{[x]}}{D_{[x]}}$$

$$-\left\langle\frac{-8.45D_{[x]}}{D_{[x]}}+\frac{15.84\{N_{[x]+1}-N_{[x]+10}\}}{D_{[x]}}+\frac{16.67\{N_{[x]+10}-N_{[x]+30}\}}{D_{[x]}}\right\rangle$$

$$=\frac{1{,}000(3{,}051-0)}{100{,}000}+\frac{497.20(3{,}963)}{100{,}000}+\frac{3{,}805{,}462.21}{100{,}000}$$

$$-\left[-8.45+\frac{15.84(678{,}006-254{,}468)}{100{,}000}+\frac{16.67(254{,}468-3{,}963)}{100{,}000}\right]$$

$$=30.51+19.70+38.05+8.45-67.09-41.76$$

$$=-12.14\ .$$

Reserve at t = *1*

$$\frac{1{,}000\{M_{[x]+1}-M_{[x]+30}\}}{D_{[x]+1}}+\frac{497.20\ D_{[x]+30}}{D_{[x]+1}}+\frac{\sum_{2}^{30}W_{[x]+t-1}\cdot {}_{t}CV_{[x]}}{D_{[x]+1}}$$

$$-\left\langle\frac{15.84\{N_{[x]+1}-N_{[x]+10}\}}{D_{[x]+1}}+\frac{16.67\{N_{[x]+10}-N_{[x]+30}\}}{D_{[x]+1}}\right\rangle$$

$$=\frac{1{,}000(2{,}972-0)}{76{,}845}+\frac{497.20(3{,}963)}{76{,}845}+\frac{3{,}805{,}462.21}{76{,}845}$$

$$-\left[\frac{15.84(678{,}006-254{,}468)}{76{,}845}+\frac{16.67(254{,}468-3{,}963)}{76{,}845}\right]$$

$$=38.68+25.64+49.52-87.30-54.34$$

$$=-27.80\ .$$

Reserve at t = *2*

$$1{,}000\ \frac{\{M_{[x]+2}-M_{[x]+30}\}}{D_{[x]+2}}+\frac{497.20\ D_{[x]+30}}{D_{[x]+2}}+\frac{\sum_{3}^{30}W_{[x]+t-1}\cdot {}_{t}CV_{[x]}}{D_{[x]+2}}$$

$$-\left\langle\frac{15.84\{N_{[x]+2}-N_{[x]+10}\}}{D_{[x]+2}}+\frac{16.67\{N_{[x]+10}-N_{[x]+30}\}}{D_{[x]+2}}\right\rangle$$

$$=\frac{1{,}000(2{,}896-0)}{64{,}948}+\frac{497.20(3{,}963)}{64{,}948}+\frac{3{,}805{,}462.21}{64{,}948}$$

$$-\left[\frac{15.84(601{,}161-254{,}468)}{64{,}948}+\frac{16.67(254{,}468-3{,}963)}{64{,}948}\right]$$

$$=44.59+30.34+58.59-84.55-64.30$$

$$=-15.33\ .$$

classes of business, such as life, endowment, term, group, and so forth, if such a breakdown is made. The discount factor should be chosen with some thought given to the effect of federal income taxes.

5. The value of the in-force business is then computed by multiplying V_n^{inf} by the year-end in force less one-half of the previous year's issue.

CALCULATION OF ADJUSTED EARNINGS

Adjusted earnings as defined herein can be obtained by adding the following major items to statutory earnings: (1) the annual increase in the excess of statutory reserves over "experience" reserves and (2) the increase in the capitalized value of the "investment in new business." Experience reserves are reserves based upon experience rates of interest and mortality.

Two approaches which may be followed in the capitalization of the investment of new business are (*a*) capitalization of excess first-year expenses and (*b*) capitalization of the new-business strain.

Capitalization of Excess First-Year Expenses

Excess first-year expenses are first-year expenses in excess of loading. Such excess first-year expenses are amortized over the expected lifetime of the policy—a highly flexible procedure. The first-year expenses employed should probably be limited to those expenses inherent in the structure of the gross premiums.

It should be noted that this approach is self-adjusting with respect to the reserve method; that is, a modified reserve valuation approach would produce a smaller excess first-year expense to amortize.

Exhibits IIIA and IIIB demonstrate this approach. Commutation functions and reserve accumulation factors are developed in Exhibit IIIA. Then, reserve net premiums per $1,000 can be calculated as follows:

$$P_x^1 = \frac{1{,}000\, C_{[x]}}{D_{[x]}} = \$0.79\,.$$

$$P_x^{2\text{-}30} = \frac{1{,}000\{M_{[x]+1} - M_{[x]+30}\} + 497.20\, D_{[x]+30}}{\{N_{[x]+1} - N_{[x]+30}\}}$$

$$= \$13.6632\,.$$

Experience reserves (shown in col. [9] of Exhibit IIIA) were derived from the reserve accumulation factors (cols. [7] and [8]) and the net premiums. The present value of future profits, before capitalization of excess first-year expenses, is then developed and shown in column (11) of Exhibit IIIB. The equivalence of this method and Lidstone's method

EXHIBIT IIIA

DEVELOPMENT OF COMMUTATION FUNCTIONS AND RESERVE ACCUMULATION FACTORS FOR USE IN CAPITALIZATION OF EXCESS FIRST-YEAR EXPENSES

t	$q_{[x]+t-1}$ (1)	$l_{[x]+t-1}$ $=[1-(1)_{t-1}](2)_{t-1}$ (2)	$D_{[x]+t-1}$ $=(2)_t v^{t-1}$ (3)	$N_{[x]+t-1}$ $=_t\Sigma^{\omega}(3)_t$ (4)	$C_{[x]+t-1}$ $=(1)_t(3)_{t+1}v^{t/2}$ (5)	$M_{[x]+t-1}$ $=_t\Sigma^{\omega}(5)_t$ (6)	$u_{[x]+t-1}$ $=(3)_t/(3)_{t+1}$ (7)	$1{,}000k_{[x]+t-1}$ $=1{,}000(5)_t/(3)_{t+1}$ (8)	${}_tV'_{[x]}$ (9)
1	.00081	100,000	100,000	1,742,182	79	10,409	1.0408	.8222	0
2	.00101	99,919	96,076	1,642,182	95	10,330	1.0410	1.0294	13.19
3	.00128	99,818	92,288	1,546,106	116	10,235	1.0413	1.3089	26.66
4	.00147	99,690	88,624	1,453,818	128	10,119	1.0415	1.5043	40.49
5	.00166	99,543	85,090	1,365,194	139	9,991	1.0417	1.7017	54.71
6	.00190	99,378	81,681	1,280,104	152	9,852	1.0420	1.9390	69.31
7	.00218	99,189	78,390	1,198,423	168	9,700	1.0423	2.2337	84.24
8	.00250	98,973	75,211	1,120,033	184	9,532	1.0426	2.5507	99.53
9	.00287	98,726	72,138	1,044,822	203	9,348	1.0430	2.9350	115.12
10	.00331	98,443	69,165	972,684	224	9,145	1.0435	3.3794	131.01
11	.00377	98,117	66,284	903,519	245	8,921	1.0439	3.8586	147.16
12	.00425	97,747	63,494	837,235	265	8,676	1.0444	4.3591	163.61
13	.00474	97,332	60,793	773,741	283	8,411	1.0449	4.8644	180.37
14	.00545	96,871	58,178	712,948	311	8,128	1.0457	5.5899	197.31
15	.00641	96,343	55,636	654,770	350	7,817	1.0467	6.5849	214.24
16	.00694	95,725	53,152	599,134	362	7,467	1.0472	7.1324	231.53
17	.00756	95,061	50,754	545,982	376	7,105	1.0479	7.7633	249.17
18	.00832	94,342	48,433	495,228	395	6,729	1.0487	8.5531	267.08
19	.00920	93,557	46,182	446,795	417	6,334	1.0497	9.4779	285.22
20	.01009	92,696	43,997	400,613	435	5,917	1.0506	10.3871	303.62
21	.01100	91,761	41,879	356,616	452	5,482	1.0516	11.3497	322.31
22	.01206	90,752	39,825	314,737	471	5,030	1.0527	12.4498	341.22
23	.01326	89,658	37,832	274,912	492	4,559	1.0540	13.7070	360.34
24	.01460	88,469	35,894	237,080	514	4,067	1.0554	15.1132	379.61
25	.01606	87,177	34,010	201,186	536	3,553	1.0570	16.6584	399.04
26	.01769	85,777	32,176	167,176	558	3,017	1.0587	18.3601	418.56
27	.01955	84,260	30,392	135,000	583	2,459	1.0607	20.3476	438.12
28	.02161	82,613	28,652	104,608	607	1,876	1.0630	22.5198	457.72
29	.02375	80,828	26,954	75,956	628	1,269	1.0653	24.8202	477.35
30	.02583	78,908	25,302	49,002	641	641	1.0676	27.0464	497.15
31	.....	76,870	23,700	23,700	.....	.....	.....	.....	.....

NOTE.—Age 35, $i = .04$.

EXHIBIT IIIB

CAPITALIZATION OF EXCESS FIRST-YEAR EXPENSES

t	Gross Premium (1)	Net Premium (2)	Expenses, Commissions, Taxes (3)	Excess Loading (1)−(2) −(3) (4)	Experience Reserve ${}_tV^{(z)}$ (5)	Cash Value ${}_tCV^{(z)}$ (6)	(5)−(6) (7)	Lapse Rate (7a)	Gain from Lapse (7)×(7a) (8)	Gain/1,000 in Force at Beginning of Year =(4) 1.04 +(8) (9)	(9)[(13) Exhibit I] (10)	Profit* Factor (11)	Expense† Adjustment at Interest (12)	Adjusted Gain per 1,000 in Force at Beginning of Year (9)+(12) (13)
1	18.50	.79	26.95	−9.24	0	0	0	.200	0	−9.61	−9.61	12.14	9.61	0
2		13.66	2.66	2.18	13.19	0	13.19	.120	1.58	3.85	3.08	27.83	−1.42	2.43
3					26.66	10.83	15.83	.100	1.58	3.85	2.70	28.54		2.43
4					40.49	25.39	15.10	.088	1.33	3.60	2.27	28.74		2.18
5					54.71	40.27	14.44	.080	1.16	3.43	1.97	28.87		2.01
6					69.31	55.46	13.85	.072	1.00	3.27	1.73	28.95		1.85
7					84.24	70.95	13.29	.064	.85	3.12	1.53	28.98		1.70
8					99.53	86.75	12.78	.058	.74	3.01	1.37	28.94		1.59
9					115.12	102.83	12.29	.054	.66	2.93	1.26	28.83		1.51
10					131.01	119.21	11.80	.050	.59	2.86	1.16	28.68		1.44
11			1.83	3.01	147.16	137.59	9.57	.048	.46	3.59	1.37	28.49		2.17
12					163.61	156.29	7.32	.046	.34	3.47	1.26	27.46		2.05
13					180.37	175.33	5.04	.044	.22	3.35	1.16	26.42		1.93
14					197.31	194.69	2.62	.042	.11	3.24	1.06	25.37		1.82
15					214.24	214.34	− .10	.040	0	3.13	.98	24.29		1.71
16					231.53	234.28	− 2.75		− .11	3.02	.90	23.21		1.60
17					249.17	254.51	− 5.34		− .21	2.92	.83	22.16		1.50
18					267.08	275.00	− 7.92		− .32	2.81	.76	21.13		1.39
19					285.22	295.77	−10.55		− .42	2.71	.70	20.13		1.29
20					303.62	316.81	−13.19		− .53	2.60	.64	19.16		1.18
21					322.31	334.81	−12.50		− .50	2.63	.61	18.24		1.21
22					341.22	352.89	−11.67		− .47	2.66	.59	17.22		1.24
23					360.34	371.03	−10.69		− .43	2.70	.56	16.09		1.28
24					379.61	389.20	− 9.59		− .38	2.75	.54	14.82		1.33
25					399.04	407.36	− 8.32		− .33	2.80	.52	13.39		1.38
26					418.56	425.49	− 6.93		− .28	2.85	.50	11.79		1.43
27					438.12	443.57	− 5.45		− .22	2.91	.48	9.99		1.49
28					457.72	461.57	− 3.85		− .15	2.98	.47	7.95		1.56
29					477.35	479.46	− 2.11		− .08	3.05	.45	5.64		1.63
30					497.15	497.20	− .05		0	3.13	.43	3.01		1.71

* $(11)_{30} = (9)_{30}v$; $(11)_t = v[(9)_t + [1 - (12)_t \text{ of Exhibit I}](11)_{t+1}]$ for $t < 30$.

† 9.24 × 1.04 for $t = 1$; 1.37 × 1.04 for renewal years.

can then be demonstrated by comparing the difference in experience reserves, as shown in the following tabulation. The difference rep-

Duration	Capitalization Method	Lidstone's Method	Difference
0.....	$ 0	−$12.14	$12.14
1.....	0	− 27.80	27.80
2.....	13.19	− 15.33	28.52

resents the present value of future profits and is the same as column (11) except for rounding. The equivalence of this method and the gross premium valuation method can be shown by comparing the difference in reserves for the two methods at duration t with the difference in present values of future profits at that time.

The first-year expense in excess of loading, $9.24, can then be uniformly distributed over renewal years. First, calculate

$$\sum_{2}^{30} v^{t-1} \cdot [\,(13)_t \text{ of Exhibit I}\,] = 6.78006\,.$$

Then the equivalent level renewal amount equals $1.37 (i.e., $9.24 ÷ 6.78006). Column (12) of Exhibit IIIB shows these expense adjustments at interest, and an adjusted gain is shown in column (13). The end result is a much smoother year-to-year release of earnings, as can be seen by comparing column (13) of Exhibit IIIB with column (11) of Exhibit I.

Capitalization of the New-Business Strain

Under this approach, the new-business strain is capitalized and then written off as the business goes off the books.

As a first step, a company's gain from insurance operations as set forth in the Annual Statement is split into (*a*) first-year cost and (*b*) renewal profit.

First-year cost (also called new-business strain) is the cost of putting new business on the books and is equal to first-year home-office expense plus first-year sales cost plus first-year mortality cost plus the loss of interest in the first year plus first-year reserve minus first-year premiums. In essence, the first-year cost (or first-year investment in new business) is equal to the total first-year cost in excess of first-year premiums. The loss of interest on the surplus investment in new business should not be ignored.

Renewal profit is the net profit accruing to the company from the re-

newing business. It is the earnings that the company would realize if there were no investment in new business.

The writing of new business invariably involves an investment of surplus. Thus, a $300,000 gain from operations may actually mask a $500,000 gain from renewal operations less a $200,000 investment in new business. $300,000 is the so-called statutory gain from operations appearing on page 4, line 33, of the Annual Statement.

The sum of the first-year cost plus renewal profit should equal statutory earnings.

The second step would be the capitalization and amortization of the new-business strain.

With respect to write-off charges to be made as the business goes off the books, two methods may be considered: (1) recouping the original cost or (2) recouping the replacement cost.

Under method 1 the company would have to maintain records of acquisition expenses incurred in each calendar year and the paid-for new business of each year. In the year of original issue and each following year, the original acquisition expenses would be written off in proportion to the original issues terminating in such year. The increase in the total amount of past acquisition expenses after write-offs (unamortized new-business strain) would represent the annual adjustment. It can be shown that this is exactly equal to the current year's new-business strain less the sum of all write-offs made in the current year, that is, all write-offs occasioned by the current year's terminations (see tabulation on p. 31).

If the original acquisition expenses are disregarded as a matter of past history and the write-offs are based on the replacement cost, that is, on the current cost of acquiring new business to replace the amount of insurance that terminates in the current year, the computation of the adjustment is simplified and the maintenance of separate records for each past year's issues and corresponding acquisition costs can be dispensed with. Under method 2, the adjustment would be defined as the current year's acquisition expenses less that part thereof which corresponds to the current year's terminating business, or, in other words, that percentage of the current year's acquisition expenses which corresponds to the ratio of the increase in premiums in force during the year to first-year premiums written during such year (see tabulation on p. 32).

It should be noted that this approach is also self-adjusting with regard to valuation method, that is, the net level method would produce a greater first-year strain and thereby more to amortize. In lieu of premi-

ums, the increase in insurance in force can be compared to insurance issued. This latter method was suggested by Frederick S. Townsend as a simplified method of deriving adjusted earnings.

ADJUSTED EARNINGS AND NET WORTH FROM OUTSIDE A COMPANY

It is particularly difficult to analyze the operations of a life insurance company from the annual statement alone. A life insurance company's annual statement (Convention Blank) is a voluminous report indeed. It presents detailed information about a company's assets and liabilities. The insurance operations are broken down into various lines of business. A company's investment return is shown. The amount of insurance reinsured and the premiums, claims, and reserves transferred are shown. Expenses are rather fully broken down by account. Certainly, a life insurance company's Convention Blank supplies far more information

Calendar Year	New-Business Strain	Amortization of New-Business Strain				New-Business Strain less Write-offs
		From Year (−1)	From Year (−2)	From Year (−3)	From Year (−4)	
	(1)	(2)	(3)	(4)	(5)	(1)−(2)−(3)−(4)−(5)
1962.....	1,000,000					1,000,000
1963.....	1,100,000	300,000				800,000
1964.....	1,200,000	330,000	200,000			670,000
1965.....	1,300,000	360,000	220,000	100,000		620,000
1966.....	1,400,000	390,000	240,000	110,000	50,000	610,000

1966 Unamortized New-Business Strain:

$3,700,000 = $1,400,000
+ $1,300,000 − $390,000
+ $1,200,000 − $360,000 − $240,000
+ $1,100,000 − $330,000 − $220,000 − $110,000
+ $1,000,000 − $300,000 − $200,000 − $100,000 − $50,000

1965 Unamortized New-Business Strain:

$3,090,000 = $1,300,000
+ $1,200,000 − $360,000
+ $1,100,000 − $330,000 − $220,000
+ $1,000,000 − $300,000 − $200,000 − $100,000

Increase:

$ 610,000

than the published statements of many other industrial or financial companies.

Yet, it is difficult to estimate the adjusted earnings and net worth of a life insurance company. What are a company's underlying mortality and morbidity experience, lapse rate, reinsurance agreement, investment policy, expense rate, or commission rate? How does one measure the inherent profit potential in the policy portfolio? How can one calculate a company's new-business strain?

OPERATING STATISTICS (IN 000'S)

Year	Increase in Premiums in Force (a)	First-Year Premiums in Force (b)	Ordinary Life Operating Earnings				Equity in New Business (g)	Ordinary Life Adjusted Earnings (h)
			Ratio (c)	Total (d)	Renewal (e)	First Year (f)		
1962...	$44,000	$179,000	25%	$4,300	$6,100	−$1,800	$450	$4,750
1963...	49,000	180,000	27	4,700	6,300	− 1,600	432	5,132
1964...	91,000	235,000	39	4,400	6,400	− 2,000	780	5,180
1965...	95,000	258,000	37	4,400	6,500	− 2,100	777	5,177
1966...	88,000	283,000	31	4,900	7,400	− 2,500	775	5,675

(a) = P. 7, l. 20 less l. 10, cols. (3)–(6) of Annual Statement.
= Current year less previous year.
(b) = P. 7, l. 9, cols. (3)–(6) of Annual Statement.
= Current.
(c) = (a) divided by (b).
= Proportion of new business which shows up as an increase in the premiums in force. Thus, in 1962, *75 per cent of the new premiums replaced terminating premiums; the other 25 per cent showed up* as an increase in premium in force.
(d) = P. 5, l. 33, cols. (3)–(6) of Annual Statement.
= (e) plus (f).
(e) and (f) must be determined by allocating (d) between new business and renewal business.
(f) = Unrecouped excess first-year expense.
(g) = (c) times (f).
= Unrecouped excess first-year expense on the increase in the premiums in force.
(h) = (d) + (g).

Yet, at times we have no choice but to study a company's operation from a distance with what little information is at hand. A number of approaches have been used, based generally on the avenues discussed in the previous section.

Approach 1 (Short-Form Gross Premium Valuation)

Because of the complexity and time-consuming nature of an extensive gross premium valuation, rules of thumb are often used. The present value of future profit is approximated by applying average per $1,000 factors to the in-force business. In essence, they are supposed to be a layman's gross premium valuation. However, they are often quite incorrectly applied to the insurance in-force business in order to obtain an approximation to adjusted earnings.

The following is a typical schedule:

Permanent plans (net level premium reserves)	\$20–\$25 per \$1,000
Permanent plans (modified reserves)	\$15–\$20 per \$1,000
Term plans	\$ 5–\$7.50 per \$1,000
Group life	\$ 2–\$5 per \$1,000
Industrial	\$15–\$20 per \$1,000 or 30–40 times the amount of weekly premium debit
Individual—loss of time	37½–50 per cent of annual premiums
Other individual health insurance All group health insurance	25–37½ per cent of annual premiums

Any attempt to derive an average yardstick for the value of in-force business, or for the amount which can be allocated to write it, is usually futile, self-deceiving, and dangerous. "Each \$1,000 of business was not created equal." At best, rules of thumb are indications of values and not values themselves. The true value can be established only by an analysis of the company's potential earnings.

These rules of thumb generally ignore the considerable variation in premium rates and cash values among companies and, consequently, the resulting profits; gloss over the fact that reinsured business is less profitable business; do not take into consideration that a substantial amount of term insurance may be included in column (1) of the policy exhibit (although the footnotes on p. 15 try to correct for the considerable variation among companies in their reporting of term insurance); do not take into consideration the fact that a new portfolio of policies may have an inherent profit which differs considerably from the old business; are not sensitive to the great complexity of plans currently issued; gloss over the limit on earnings which stockholders can realize on participating business; and do not take into consideration potential federal income tax liability.

Approach 2 (Short-Form Gross Premium Valuation)

An increasingly popular approach is to assign a value to in-force life business equal to a percentage of one year's premium. Generally, for net worth the business is valued at one year's premium and for adjusted earnings at 75 per cent of one year's premium.

This rule-of-thumb approach suffers from most of the objections raisep against Approach 1. It does have the virtue of being extremely simple to

explain and it does differentiate, to some extent, by plan (i.e., between decreasing term plans and level term plans). However, who is to say that a twenty-year endowment is $2\frac{1}{2}$ times as valuable as a whole life or that a whole life plan is 5 times as valuable as a mortgage policy?

Approach 3 (Breiby's Short-Form Profit Valuation)

William Breiby[5] made use of the profit valuation approach (as an outside investor) in a lucid and comprehensive analysis of 117 stock life insurance companies. The only source of information that he had available was a company's annual statement. Many assumptions had to be made, probably the most difficult of which was the breakdown of annual-statement expenses into first year and renewal—a difficult task even for a company executive.

Approach 4 (Moody's Adjusted Earnings Approximation)

The approach used by Moody capitalizes "first year expenses" which are derived from total expenses and not first-year expenses alone. Thus, the amount added to statutory earnings to estimate adjusted earnings is $(1 - t)(E)[1 - (I/I')]$, where t equals federal tax rate; E, gross expenses (p. 4, ll. 21–25); I, average insurance in force; and I', adjusted insurance in force, which equals (1) in force at beginning of year, (2) 5 times the amount of ordinary business issued, and (3) 3 times the amount of group business issued.

The following comments are in order:

1. The value of the increase in business may have little relationship to the moneys expended.
2. There is nothing sacred about the 5 times and 3 times—they are rules of thumb and nothing more.
3. There is no real recognition of a company's lapse rate and percentage of business reinsured.

Approach 5 (Adjusted Earnings Approximation)

A number of insurance stock analysts have suggested variations of the following approach in the calculation of adjusted earnings:

Adjustment to statutory earnings:

Add (1) the increase in the capitalized value of first-year expenses. First-year expenses are generally defined to be commissions plus those items from Exhibits 5 and 6 clearly first year in nature (medical and inspection fees; advertising, agency, and branch-office expenses; expense reimbursement, etc.). These expenses are then amortized over the average lifetime of the company's in-force business.

[5] William Breiby, "Valuing a Stock Life Insurance Company," *The Spectator*, 1930.

Add (2) the reduction in the statutory "increase in reserve" element. This reduction is made by estimating the effect of assuming an experience mortality and interest rate. Thus the reduction in the reserve increment due to a higher interest rate might be based on the familiar approximation—a 1 per cent "absolute" increase in the reserve interest rate reduces reserve by approximately 10 per cent. While it is more difficult to estimate the effect of using a more modern mortality table, the financial effect on a company's reserves is relatively minor.

Subtract (3) the effect on the "increase in reserve" element if all reserves were calculated on a net level basis. Since first-year expenses are amortized in item 1, it is particularly illogical to value on a modified valuation method and thereby permit a double allowance for the new-business strain. This adjustment is quite small where a company has been writing all or most of its business on a preliminary term basis for many years. Here the substantial increase in first-year reserves is largely offset by the smaller increases in renewal reserves required by a net level approach. However, where a company has recently changed to a modified reserve approach or is a new company, this adjustment will be substantial.

Subtract (4) a cash-value adjustment where cash values exceed adjusted reserves. Essentially, income is "charged with the excess of surrender benefits paid annually over adjusted reserves on voluntary terminated policies," that is, the liability for the following year is set aside.

Add (5) a portion of the increase in the unearned premium reserves on accident and health business. This portion might be calculated by estimating what would accrue to the company after deducting estimated claims and expenses. The "actuarial" accident and health reserves are treated in a manner similar to the treatment of life reserves.

Add (6) the increase in deficiency reserve.

Subtract (7) the increase in future taxes inherent in the above adjustments.

OTHER CONSIDERATIONS

1. In any discussion of earnings we can hardly proceed without examining the effect of the 1959 Federal Income Tax Act. Formerly, the income tax was essentially a charge against investment income and was so treated in any projection of earnings. Today, particularly for the stock company, underwriting gains are taxed. As such, whenever we discuss earnings and net worth, we must clearly understand whether it is before or after taxes. Any adjustment in earnings and net worth should be offset by an increase in deferred taxes.

2. The valuation placed on a home-office building can affect the earnings of a small insurance company rather significantly.

3. The degree to which policy information has been computerized will help to determine what approach the analyst will employ in the computation of adjusted earnings and/or net worth.

4. No value has been placed on the change in value of the agency system. This item has been left out (but not ignored) for two reasons: (*a*) placing a value of *X* dollars on each agency or agent is often self-deception and (*b*) our purpose here was to arrive at an earnings figure that would be comparable to the reported earnings of corporations in other industries.

5. In judging the operations of a life insurance company, interest on the capital funds should be examined separately from the company operations. These earnings arise because of the initial and subsequent investment made by the stockholders and the reinvestment of the earnings of prior years; they are not part of the insurance operations' earnings.

Thus, if Company A has $5 million of capital and surplus and Company B has $25 million of capital and surplus, Company B has a number of inherent advantages (all other factors being approximately the same): investment income on an additional $20 million of capital and surplus; a higher retention with the concomitant reduction in reinsurance costs; and greater freedom of action in looking at different sales and investment possibilities.

It is manifestly unfair to lump all companies together and to examine the change in surplus without some indication of the surplus level itself. Accordingly, the investment return should be separated into interest on capital funds and interest on reserves and other insurance liabilities.

It should be noted that the investment income allocated to the insurance operation is not just interest required to maintain the reserve but is rather the company's average investment return applied to the reserves and other insurance liabilities. The required interest item may differ significantly from the company's investment yield.

6. We should be aware of the dilution in stockholders' interest when stock options are granted at a price below the stock's value. Normally, value is measured by the market price. This is reflected by a dilution in "per share earnings," since the numerator (money paid by optionee) does not increase in proportion to the increase in the denominator (number of shares).

This problem was brought to the fore by the large number of newer companies granting options to agents at a price often considerably below market price.

The Securities and Exchange Commission requires that the financial effect of such a transaction be reflected in any distributed prospectus. The theory here is that the cost to the stockholders of these "cheap" options would be offset by the savings in commission dollars. There are situations, however, where the granting of stock options considerably below market value results in no real stock dilution. This occurs, of course, when a

company's stock is substantially overpriced. The disbursing of stock itself (not options) to individuals presumably deserving of such a bonus is another matter, although here also the value of the gift must be set (generally the market value) and considered a cost of operation through the surplus account.

7. No specific mention has been made of health insurance, although many of the comments made herein are generally applicable to this facet of the business. There are one or two important differences: (*a*) the investment in new health business is generally much lower than that in new life insurance business and (*b*) a portion of the unearned gross premium reserve can generally be considered redundant.

8. Group life and group health are generally accorded little value in any analysis of earnings, although again it must be emphasized that considerable variation exists among companies in their group operations and earnings.

9. Where a stock company writes participating business, consideration must be given to the interest of such policyholders in the surplus of the stock company. Such interest could arise from liberal guaranteed settlement options, from deferred dividend credits, and from the provision of the funds necessary to complete the administration of paid-up policies. It goes without saying, of course, that the analyst should constantly keep in mind any limitation (statutory, corporate, or otherwise) on the stockholder's interest in the earnings of the participating branch.

10. Notwithstanding all the words, tables, and formulas presented herein, attempting to analyze a company without understanding its inner workings is engaging in a practice of self-delusion, if not worse. Analysis of a company is more, much more, than the calculation of adjusted earnings and net worth. Thus, if a company in recognition of its social obligations engages in projects which would surely reduce its net gain, are we to accord these management decisions no recognition? There are many public problems demanding attention. The biblical injunction of the tithe applies to corporate entities no less than to individuals.

CONCLUSION

The accounting practices of life insurance companies differ in certain important respects from those of other industries because of the prime concern with solvency and not with profits. The principal departure is that the "capital" investment made to acquire business is charged against income in the year made rather than capitalized and then amortized over the expected lifetime of the income-producing asset.

Because of these practices, adjustments are often made to statutory

earnings in order to calculate earnings on a basis similar to those of other industries' accounting principles. This is usually done in order to analyze the year-by-year operations of a company and to compare its performance with other companies both within and without the industry.

It must be emphasized that any representation of true earnings is, of necessity, an estimate. No one knows how the actuary's estimate of a company's future mortality, investment return, persistency, and expenses will jibe with reality; we are only making an educated guess.

The actuary uses a prospective approach—which adjusts earnings by adding the increase in value of the company's in-force business. In essence, he is estimating the increase in the company's net worth. An accounting or retrospective approach adjusts earnings by capitalizing the investment in new business and recalculating reserves on an "experience" basis. It is to this estimate of earnings that the investment community applies a price earnings ratio.

The specific method used will depend on the purpose of the study, the information available, and the time and money apportioned. Because of the paucity of information available, adjusting earnings and calculating net worth from the Convention Blank alone is sometimes an exercise in futility.

These two terms—"adjusted earnings" and "increase in net worth"—are not interchangeable and certainly not equivalent. Unfortunately, some analysts have confused these two fundamentally different concepts.

It is hoped that this paper will act as a catalyst and focus attention on a facet of our business too long neglected by the insurance industry.