

# THE INSURANCE EXPENSE EXHIBIT AND THE ALLOCATION OF INVESTMENT INCOME

prepared by  
*Sholom Feldblum*

(Fifth Edition: May 1997)

[The author is indebted to David Eley and Martin Rosenberg for extensive comments on earlier versions of this paper, as well as to Martin Simons, Richard Roth, James Wilson, and Donald Manis for additional reviews. Mr. Eley, of the Texas Insurance Department, is the architect of the investment income allocation procedures in the new Insurance Expense Exhibit. Mr. Simons (Chief Property & Casualty Actuary of the South Carolina Insurance Department) was chairman of the NAIC Insurance Expense Exhibit working group, to which Mr. Rosenberg (former Assistant Insurance Commissioner of New Jersey) and Mr. Roth (Assistant Insurance Commissioner of California) contributed. Mr. Wilson reviewed the first version of this paper for the *CAS Forum* and greatly enhanced its readability. Mr. Manis reviewed the final version of this paper for publication in the *Proceedings of the CAS*, and he revised its structure to appeal to a more general actuarial audience. Any errors remaining in this paper are the author's own and should not be ascribed to the regulators and actuaries mentioned above.]

**THE INSURANCE EXPENSE EXHIBIT  
AND THE ALLOCATION OF INVESTMENT INCOME**

**Table of Contents**

Introduction .....	1
The Structure of the Insurance Expense Exhibit .....	2
IEE Part II: Allocation to Lines of Business Net of Reinsurance .....	4
Allocation of Investment Income by Line of Business .....	4
Conceptual Level .....	5
Component Level .....	5
The Allocation .....	6
Data Level .....	7
The 1992 Revisions .....	9
Profit or Loss .....	11
Allocation Procedures: An Illustration .....	11
Allocation of Surplus to Lines of Business .....	12
Investment Gain Ratio .....	13
Prepaid ("Acquisition") Expenses .....	15
Investment gain on funds attributable to insurance transactions .....	16
Investment gain attributable to capital and surplus .....	16
Part III – Allocation to Lines of Direct Business Written .....	18
Profit or Loss .....	18
The Measurement of Profitability .....	20
Prospective versus Retrospective .....	20
Allocation of Surplus .....	20
retrospective surplus allocation .....	21
prospective surplus assumptions .....	22
Reserve Run-Off versus New Business .....	23
Insurance Returns and Investment Returns .....	24
Perspectives on the IEE Procedures .....	28
Appendix A: The Part II Entries .....	30
Premiums .....	30
Dividends .....	32
Losses and Loss Adjustment Expenses .....	33
Agents' Balances .....	34
Underwriting Expenses .....	35
Appendix B: The Part III Entries .....	37
References .....	39

## **THE INSURANCE EXPENSE EXHIBIT AND THE ALLOCATION OF INVESTMENT INCOME**

### **Introduction**

The statutory Annual Statement enables state regulators to monitor the profitability and financial strength of insurance enterprises. Most revenues and expenditures that relate to particular policies, such as premiums and losses, are shown by line of business. Revenues and expenditures that cannot be directly associated with particular policies, such as investment income and general expenses, are shown only in the aggregate.

The primary focus of state regulation is on the ability of the insurance company to meet its obligations to policyholders and claimants. Profitability is an important consideration, since a consistently unprofitable insurer may soon find itself in financial distress. But the focus is on overall profitability, not on the profitability of each business segment.

But aggregate information does not suffice for all users. Rate regulators, for instance, must determine if premium rates by line of business are inadequate or excessive. Investors must determine if the capital used to support a given block of business is earning a satisfactory return. The insurer's management must determine which segments of the company are meeting desired profit levels.

The Insurance Expense Exhibit (IEE), filed by April 1 as a supplement to the statutory Annual Statement, provides the needed additional information. All revenues and expenditures, whether or not they are associated with particular policies, are allocated to lines of business. Various sets of operating returns are calculated, so that profitability by line of business may be measured.

Expense allocation may be complicated, but it is not conceptually difficult. Investment income allocation, however, particularly when used to measure the total return by line of business, requires subjective assumptions: "How should surplus be allocated to lines of business?" "Should the investment returns on policyholder supplied funds differ from those on capital and surplus funds?" "How should policyholder supplied funds be defined?"

These are not idle questions. They have been debated for years by actuaries and regulators, and their answers form the framework of the new investment income allocation procedure in the IEE. This paper reviews this allocation procedure and the resultant measures of profitability by line of business in the NAIC financial statements.

Casualty actuaries are often asked to complete the investment income columns in their

companies' Insurance Expense Exhibits.<sup>1</sup> In addition, they are often asked to evaluate the IEE profitability measures: to tell their managements whether the operating returns shown in the IEE accurately reflect the performance of each line of business. Careful study of the investment income allocation procedures in the IEE is needed to respond to such questions.

## **The Structure of the Insurance Expense Exhibit**

The structure of the IEE is as follows:

- Part I – Allocation to Expense Groups
- Part II – Allocation to Lines of Business Net of Reinsurance
- Part III – Allocation to Lines of Direct Business Written

Part I of the IEE, like Part 4 of the "Underwriting and Investment Exhibit," divides expenses along two dimensions:

- a. *Expense classification*, such as advertising, rent, salaries, or equipment, and
- b. *Expense groups*, which are loss adjustment expenses, other underwriting expenses, and investment expenses.

The IEE has a more refined division of "other underwriting expenses" into

- Acquisition, field supervision and collection expenses
- General expenses
- Taxes, licenses and fees

Part II of the IEE shows the allocation of all revenues and expenditures to lines of business, where the figures are net of reinsurance. Part III shows a similar allocation for direct business, except that investment income is not included in Part III.

In Parts II and III, lines of business are shown along the vertical axis (i.e., they are rows), and revenue and expenditure categories are shown along the horizontal axis (i.e., they are columns). A decimal point in an IEE line of business indicates that a finer breakdown is being used than is shown in the Underwriting and Investment Exhibit. Automobile liability provides a good illustration. The pre-1995 Underwriting and Investment Exhibit in the Annual Statement

---

<sup>1</sup> The statutory procedures for completing the IEE are documented in the *NAIC Proceedings*, 1992, Volume IA, pages 338-341, "Summary of Changes to the Proposal of the Insurance Expense Exhibit Working Group to the Blanks (EX4) Task Force," as well as in the NAIC instructions to the IEE.

showed a single "Line 19: Auto liability."<sup>2</sup> The IEE shows

Lines 19.1, 19.2: Private Passenger Auto Liability and  
Lines 19.3, 19.4: Commercial Auto Liability.

The exhibits of premiums and losses by state (page 15 of the Annual Statement) show all four components separately:

Line 19.1: Private passenger auto no-fault (personal injury protection)  
Line 19.2: Other private passenger auto liability  
Line 19.3: Commercial auto no-fault (personal injury protection)  
Line 19.4: Other commercial auto liability

Personal and commercial auto often have different expense characteristics (e.g., agents' contracts may provide a higher commission rate on personal auto), so this subdivision is appropriate for the IEE.

This paper concentrates on the investment income allocation procedures used for completing Part II of the IEE, columns 18 and 20. There are only passing references to Parts I and III of the IEE; in particular, there is no discussion of the expense classifications in Part I of the IEE. Moreover, the first 16 columns of Part II of the IEE, which contain the data needed for the investment income allocation procedure, are described in Appendix A, not in the body of the paper. The text of the paper deals with the computations needed to determine the entries for columns 18 and 20, and it provides an arithmetic example of the procedure.

---

<sup>2</sup> In 1995, automobile liability was split in the Underwriting and Expense Exhibit as well into personal and commercial auto liability, following the IEE split. In the Underwriting and Investment Exhibit, 19.1 is now private passenger auto liability and 19.2 is now commercial auto liability.

## IEE Part II: Allocation to Lines of Business Net of Reinsurance

*The purpose of Part II is to allocate elements of total profit (or loss) net of reinsurance to lines of business.*

– NAIC Proceedings, 1992, Volume IA, pages 339

The completion procedures for the first 16 columns of Part II of the Insurance Expense Exhibit are documented in detail in Appendix A. Readers who are preparing to complete an actual IEE will find the information in Appendix A to be essential. The focus of this paper is on the allocation of investment income in the IEE, so we begin with column 17 of Part II.

### Allocation of Investment Income by Line of Business

The allocation of investment income by line of business in the 1992 and subsequent Insurance Expense Exhibits differs from the corresponding allocation in previous years. However, the allocation in the IEE is now the same as the allocation in the NAIC "Profitability by Line by State" reports.

Before 1992, the allocation procedure was documented in the footnotes to the IEE. Now the allocation procedure appears in the instructions to the IEE. The allocation procedure is also described in the *Proceedings of the NAIC*, 1992, Volume 1A, pages 339-341.<sup>3</sup>

This paper examines the allocation procedure on three levels:

- *Conceptual*: the philosophy underlying the allocation procedure.
- *Components*: the insurance elements comprising the allocation formula, as well as the adjustments made to several of these elements.
- *Data*: the data sources for the elements of the allocation formula (primarily the previous columns of Part II of the IEE).

The NAIC instructions to the IEE show the arithmetic formula, with little or no explanation of the allocation philosophy or the rationale for the adjustments. This paper describes the concepts and formulas of the allocation procedure, and it provides a detailed example to assist the reader in understanding the method.

---

<sup>3</sup> The allocation procedure is strictly prescribed by the NAIC: "Although various methodologies might result in reasonable allocations of investment income to lines of business, the following formulae for allocating investment gain must be used in completing the allocation for Column 18, Investment Gain on Funds Attributable to Insurance Transactions and the allocation for Column 20, Investment Gain Attributable to Capital and Surplus" (page 339).

## Conceptual Level

The allocation of investment income to line of business in the IEE rests upon three principles:

- ① Investment income is allocated to each line of business in proportion to the investable funds associated with each line of business. Investable funds consist of (i) funds attributable to insurance transactions and (ii) funds attributable to capital and surplus.
- ② Funds attributable to insurance transactions are loss reserves plus unearned premium reserves minus prepaid expenses and minus uncollected premiums. [The adjustments to the unearned premium reserves for prepaid expenses and uncollected premiums occur in some parts of the allocation procedure, not in all parts (see below).]
- ③ Capital and surplus are allocated to lines of business in proportion to total reserves plus earned premium for the year.

## Component Level

The allocation procedure uses the following principles to derive the items in the "conceptual level":

1. For balance sheet items, the *averages* of the current year-end values and the prior year-end values are used. These balance sheet items are
  - Net loss and loss adjustment expense reserves
  - Net unearned premium reserves
  - Net agents' balances
  - Policyholders' surplus

The allocation procedure refers to these as "mean surplus," "mean net agents' balances," and so forth. [For example, mean surplus is the average of policyholders' surplus at December 31 of the current year and policyholders' surplus at December 31 of the prior year.]

2. Prepaid expenses, or "acquisition expenses," are

- Commission and brokerage expenses incurred
- + Taxes, licenses, and fees incurred
- + Other acquisition, field supervision, and collection expenses incurred
- + One half ( $1/2$ ) of general expenses incurred.

3. Net investment gain or loss is composed of net investment income earned and net realized capital gains or losses. It does *not* include unrealized capital gains or losses.

## The Allocation

The allocation procedure works as follows:

A. Allocate the company's mean surplus to line of business in proportion to

- Mean net loss and loss adjustment expense reserves
- + Mean net unearned premium reserves
- + Earned premium for the year

Unearned premium reserves are not adjusted for agents' balances or for prepaid expenses, in this part of the allocation procedure. The unearned premium reserves represent the amount the insurer is required to hold, not the amount of investable funds derived from premiums.

FACTS

B. Determine the company's overall "investment gain ratio" as

- Net investment gain ÷
- (Mean net loss and loss adjustment expense reserves
- + Mean net unearned premium reserves
- Mean net agents' balances
- + Mean policyholders' surplus).

"Net investment gain (or loss)" is composed of net investment income earned and net realized capital gains or losses. It does *not* include unrealized capital gains or losses.

Agents' balances are a component of written premium and therefore of the unearned premium reserve. But agents' balances are not an investable asset, so they are subtracted from the unearned premium reserve in determining the investment gain ratio.

In statutory accounting, prepaid expenses are an expenditure, not an asset. Prepaid expenses reduce policyholders' surplus, so they are already "subtracted" from the investable assets in the denominator of the "investment gain ratio." [In contrast, the agents' balances considered here are admitted assets, so they do not reduce policyholders' surplus.<sup>4</sup>]

In this part of the formula, the reserves, agents' balances, and surplus are for all lines combined.

C. For each line of business, the "investment gain on funds attributable to insurance transactions" (column 18) is the company's investment gain ratio times the funds attributable to insurance transactions for that line of business. This latter item is determined as

Funds attributable to insurance transactions =

---

<sup>4</sup> Non-admitted agents' balances do not appear on the balance sheet, since they are already deducted from policyholders' surplus.

- Mean net loss and loss adjustment expense reserves
- + Mean net unearned premium reserves  $\times [1 - (\text{prepaid expenses} \div \text{written premiums})]$
- Mean net agents' balances.

Prepaid expense are funded from surplus, not from insurance transactions, since the full (gross) unearned premium reserve must be held as a liability. The ratio of prepaid expenses to written premiums shows the percentage of each premium dollar that must be funded from surplus. The mean net unearned premium reserves are therefore multiplied by the complement of this ratio.

- D. For each line of business, the "investment attributable to capital and surplus" (column 20) is the total investment gain for that line of business minus the "investment gain on funds attributable to insurance transactions." The total investment gain for that line of business is the company's investment gain ratio times the investable funds associated with that line of business. The investable funds associated with that line of business equal that line's

- Mean net loss and loss adjustment expense reserves
- + Mean net unearned premium reserves
- Mean net agents' balances
- + Allocated policyholders' surplus.

Since policyholders' surplus is already reduced by prepaid expenses in statutory accounting, there is no need to reduce the unearned premium reserves by these expenses.

This completes the allocation procedure for investment income. The section below shows the data sources for each element of the procedure.

#### Data Level

All the data elements for the allocation of investment income to line of business are taken from the Annual Statement or from prior columns of the IEE. The following abbreviations clarify the formulas:<sup>5</sup>

LR <sub>lob</sub>	Mean net loss and loss adjustment expense reserves by line of business
LR <sub>tot</sub>	Mean net loss and loss adjustment expense reserves for all lines combined
UEPR <sub>lob</sub>	Mean net unearned premium reserves by lines of business
UEPR <sub>tot</sub>	Mean net unearned premium reserves for all lines combined
PPE <sub>lob</sub>	Net prepaid expenses, or net acquisition expenses, by line of business
AB <sub>lob</sub>	Mean net agents' balances by line of business
AB <sub>tot</sub>	Mean net agents' balances for all lines combined
WP <sub>lob</sub>	Net written premium by line of business for the current year

---

<sup>5</sup> The NAIC instructions use different abbreviations: A1 for LR<sub>lob</sub>, A2 for LR<sub>tot</sub>, B1 for UEPR<sub>lob</sub>, and so forth, through L for IG<sub>it</sub> and M for IG<sub>cs</sub>. Actuaries familiar with ancient BASIC variable naming conventions should have no difficulty with the NAIC abbreviations.

EP <sub>lob</sub>	Net earned premium by line of business for the current year
EP <sub>tot</sub>	Net earned premium for all lines combined for the current year
PHS <sub>tot</sub>	Mean policyholders' surplus for all lines combined
PHS <sub>lob</sub>	Policyholders' surplus allocated to the line of business
PHS <sub>rat</sub>	Policyholder surplus ratio
IG	Net investment gain
IGR	Investment gain ratio
IG <sub>it</sub>	Investment gain by line of business on funds attributable to insurance transactions
IG <sub>cs</sub>	Investment gain by line of business attributable to capital and surplus

1. *Net loss and loss adjustment expense reserves* are taken from page 11 of the Annual Statement, "Underwriting and Investment Exhibit," Part 3A, column 5, "net losses unpaid excluding loss adjustment expenses," plus column 6, "unpaid loss adjustment expenses." The "mean" value is determined by averaging the amounts in the current and prior Annual Statements.

2. *Net unearned premium reserves* are taken from page 9 of the Annual Statement, "Underwriting and Investment Exhibit," Part 2A, column 5, "total reserve for unearned premium." The "mean" value is determined by averaging the amounts in the current and prior Annual Statements.

3. *Net prepaid expenses* are determined from the prior columns in Part II of the IEE, as

$$\text{Net prepaid expenses} = (\text{column 12} + \text{column 13} + \text{column 14} + 1/2 \text{ column 15})$$

4. *Net agents' balances* for all lines combined is taken from page 2 of the Annual Statement, line 10.1 plus line 10.2. Agents' balances by line of business are taken from column 11 of Part II of the IEE: The "mean" values are determined by averaging the amounts in the current and prior Annual Statements and Insurance Expense Exhibits.

5. *Written and earned premium:* Net written premium is taken from column 1 of Part II of the IEE, and net earned premium is taken from column 2.

6. *Mean policyholders' surplus* for all lines combined is the average of columns 1 and 2 on line 26 of page 3 of the Annual Statement.

7. *The policyholders' surplus ratio* is defined as the ratio of policyholders' surplus to the sum of loss reserves, unearned premium reserves, and annual earned premium, or

$$\text{PHS}_{\text{rat}} = \text{PHS}_{\text{tot}} \div (\text{LR}_{\text{tot}} + \text{UEPR}_{\text{tot}} + \text{EP}_{\text{tot}})$$

8. *The policyholders' surplus allocated to each line of business* is determined as the product of the policyholders' surplus ratio and the sum of loss reserves, unearned premium reserves, and annual earned premium for that line of business, or

$$PHS_{lob} = PHS_{rat} \times (LR_{lob} + UEPR_{lob} + EP_{lob})$$

9. *The net investment gain* is taken from the Annual Statement, page 4, "Statement of Income, line 9A, "net investment gain or loss." Line 9A of page 4 is the sum of line 8 ("net investment income earned," or interest, dividends, and rent) and line 9 ("realized capital gains or losses"). Unrealized capital gains and losses, which appear on line 19 of page 4, are not included in line 9A.

10. *The investment gain ratio* is defined as the investment gain divided by investable assets, or

$$IGR = IG \div (LR_{tot} + UEPR_{tot} + PHS_{tot} - AB_{tot}).^6$$

11. *The investment gain by line of business on funds attributable to insurance transactions* is determined as

$$IG_{it} = IGR \times \{LR_{lob} + UEPR_{lob} [1 - (PPE_{lob} \div WP_{lob})] - AB_{lob}\}$$

This is the entry for column 18.

12. *The investment gain by line of business attributable to capital and surplus* is determined as

$$IG_{cs} = [IGR \times (LR_{lob} + UEPR_{lob} + PHS_{lob} - AB_{lob})] - IG_{it}$$

This is the entry for column 20.

### **The 1992 Revisions**

The major differences introduced in the 1992 IEE regarding the allocation of investment income are as follows:

- Before 1992, there was a separate "capital and surplus" account, similar to a line of business. The investment income attributable to capital and surplus was not allocated to

---

<sup>6</sup> In theory, one might make other adjustments to investable assets, such as for "bills receivable, taken for premiums" (line 11 of page 2 of the Annual Statement). Most of these other adjustments are minor, and would not materially affect the allocation procedures.

David Eley has pointed out to me that the "investment gain ratio" is applied to the investable assets by line of business. It would be extremely difficult, if at all practical, to make these adjustments by line of business. To properly allocate investment income, the investable assets by line of business should sum to the total investable assets used in the allocation procedure. Moreover, although the investment gain ratio without these adjustments may be slightly inaccurate in any one year, over a period of several years the ratio works well.

Mr. Eley is correct. These practical considerations overwhelm any theoretical advantages from additional adjustments.

lines of business. In 1992, the separate "capital and surplus" account was removed, and the investment income attributable to capital and surplus is allocated to lines of business.

- Before 1992, the investment income allocated to lines of business reflected primarily bond returns, not common stock dividends or capital gains.<sup>7</sup> Thus, the investment yield on funds attributable to capital and surplus differed from the investment yield on funds attributable to insurance transactions. In 1992, stock dividends and realized capital gains are treated as other investment income, so the difference in investment yields has been eliminated.<sup>8</sup>

---

<sup>7</sup> In the 1991 IEE, the "adjusted investment income" that is allocated to lines of business is defined as "Annual Statement, page 6, part 1, column 8, lines 10 – 11 – 12 – 2.1 – 2.11 – 2.2 – 2.21" (see step "B" of footnote "D" in the 1991 IEE). Part 1 of page 6 shows "interest, dividends, and real estate income," not capital gains. Column 8 shows the amount earned during the year. Line 10 shows the total (gross) investment income. Column 11 shows the investment expenses incurred, and column 12 shows the real estate depreciation. Lines 2.1, 2.11, 2.2, and 2.21 show dividends on (i) unaffiliated preferred stock, (ii) affiliated preferred stock, (iii) unaffiliated common stock, and (iv) affiliated common stock, respectively.

The investable assets to which the "adjusted investment income" was compared also excluded common stocks. The "investment income ratio" used for the allocation of investment income to line of business therefore reflected primarily bond returns, not stock returns.

Step "J" of footnote D to the 1991 IEE defines "investment income attributable to the capital and surplus accounts" as Annual Statement page 4, line 8, less the investment income allocated to lines of business. Page 4, line 8, equals page 6, column 8, lines 10 – 11 – 12 – 13. Line 13 is "aggregate write-ins for deductions from investment income," and it is usually a small amount.

A major portion of net investment income attributed to the capital and surplus account reflected the difference between stock and bond returns. Step "K" of footnote D to the 1991 IEE says "Realized capital gains attributable to capital and surplus accounts = Annual Statement, page 4, line 9. Page 4, line 9, comprises all realized capital gains, as shown on page 6, part 1A, line 11.

This separation of stock dividends and realized capital gains from other investment income was no longer considered appropriate. In 1992, the division between investment income attributable to insurance transactions and that attributable to capital and surplus relates to the earnings base (i.e., the amount of funds in each section), not to the type of investments "associated" with each section.

<sup>8</sup> Cf. the *NAIC Proceedings*, 1991 Volume IIA, "Insurance Expense Exhibit Working Group of the Blanks (EX4) Task Force," March 22, 1991, Attachment Four-B, page 450: "The separate treatment of realized capital gains was eliminated with the effect of relating the same rate of return to capital and surplus that is related to insurance transaction funds." Compare also the letter from David F. Eley to Dan Atkinson of February 22, 1991, "Formula for Allocating Investment Income to Lines of Business" in the *NAIC Proceedings*, 1991 Volume IIA, page 454: "A second change is that all investment gain, including realized capital gain or loss,

- More funds are attributable to insurance transactions in the 1992 and subsequent Insurance Expense Exhibits than were attributed to policyholders in the pre-1992 IEE.

### **Profit or Loss**

Part II of the IEE shows three columns of profit or loss:

- Column 17: Pre-tax profit or loss excluding all investment gain
- Column 19: Profit or loss excluding investment gain attributable to capital and surplus
- Column 21: Total profit or loss

All three columns are pre-federal income tax, though the "pre-tax" caption appears only in column 17.

The profit or loss equals revenues minus expenditures, on an accrual (not paid) basis. Thus

- Column 1, "premium written," is on a paid basis. Column 2, "premium earned," is on an accrual basis. Earned premium (column 2) is used in the profit and loss calculation, not written premium (column 1).
- Columns 7 through 10, the loss reserves, loss adjustment expense reserves, and unearned premium reserves, are liabilities, not expenditures. Column 11, "agents' balances," is an asset, not a revenue item. Columns 7 through 11 do not enter the profit or loss calculation.
- Column 16, "other income" is a revenue item. Columns 3 through 6 (policy benefits, or losses incurred, loss adjustment expenses incurred, and policyholder dividends) and 12 through 15 (expenses) are expenditure items, so they enter the profit or loss calculation.

The formula for column 17 is therefore

$$\text{column 17} = \text{columns 2} + 16 - 3 - 4 - 5 - 6 - 12 - 13 - 14 - 15.$$

Investment income is a revenue item. Thus column 19 equals column 17 + column 18, and column 21 equals column 19 + column 20. This completes Part II of the IEE.

### **Allocation Procedures: An Illustration**

The discussion above is abstract; an illustration should clarify the procedures. The example below reviews the various steps in the allocation of investment income:

---

is allocated equally. There is no longer any disparity between the rate of return earned on funds derived from the insurance transaction and the rate of return earned on capital and surplus."

- Allocating surplus to lines of business
- Calculating the investment gain ratio
- Calculating the prepaid ("acquisition") expense ratio
- Determining the investment gain on funds attributable to insurance transactions
- Determining the investment gain attributable to capital and surplus

In the illustration, we are completing the investment gain columns in Part II of the 1996 Insurance Expense Exhibit, using data from the 1995 and 1996 statutory financial statements. The IEE is for a commercial lines insurer that writes only two lines of business: workers' compensation and other liability. All amounts in the illustration are in millions of dollars.

### Allocation of Surplus to Lines of Business

We must first allocate policyholders' surplus to lines of business. Line 26 of page 3 of the 1996 Annual Statement shows statutory surplus of \$500 million at December 31, 1995, and of \$700 million at December 31, 1996. The earned premiums, unpaid losses, unpaid allocated loss adjustment expenses, unpaid unallocated loss adjustment expenses, and unearned premium reserves for workers' compensation and other liability shown in the table below are taken from the 1995 and 1996 Insurance Expense Exhibits, columns 2, 7, 8, 9, and 10, for rows 16 and 17. Alternatively, these figures may be taken from the Underwriting and Investment Exhibits in the 1995 and 1996 Annual Statements: earned premiums from Part 2 (page 7), column 4; unearned premium reserves from Part 2A (page 8), column 5; unpaid losses from Part 3A (page 10), column 5; and unpaid loss adjustment expenses from Part 3A (page 111, column 6).

(Figures in millions of dollars)	Workers' Compensation		Other Liability	
	'95	'96	'95	'96
Earned premium, year ending 12/31/9_	350	450	200	200
Loss and LAE reserves, 12/31/9_	1,400	1,700	600	600
Unearned premium reserves, 12/31/9_	75	125	100	100

The IEE investment income allocation procedure requires that we allocate the company's *mean* surplus to line of business in proportion to

- Mean net loss and loss adjustment expense reserves
- + Mean net unearned premium reserves
- + Earned premium for the year.

In this allocation, there is no adjustment of the unearned premium reserves for agents' balances or for prepaid expenses. Mean surplus is the average of the December 31, 1995, surplus and the December 31, 1996, surplus, or  $(\$500 \text{ million} + \$700 \text{ million}) \div 2 = \$600 \text{ million}$ . Mean surplus is used because investment income is earned over the course of the year.

Mean reserves are used, both for loss and loss adjustment expenses and for unearned premium. The 1996 earned premium is used, not the average 1995 and 1996 earned premiums.

- For workers' compensation, the sum of mean reserves and annual earned premium is

$$[(1,400 + 1,700) \div 2] + [(75 + 125) \div 2] + 450 = \$2,100 \text{ million.}$$

- For other liability, the sum of mean reserves and annual earned premium is

$$[(600 + 600) \div 2] + [(100 + 100) \div 2] + 200 = \$900 \text{ million.}$$

- The mean surplus allocated to workers' compensation is

$$(600) \times [2,100 \div (2,100 + 900)] = \$420 \text{ million.}$$

- The mean surplus allocated to other liability is

$$(600) \times [900 \div (2,100 + 900)] = \$180 \text{ million.}$$

### Investment Gain Ratio

We proceed to determine the "investment gain ratio." The workers' compensation and other liability figures are reproduced below.

(Figures in millions of dollars)	Workers' Compensation		Other Liability	
	'95	'96	'95	'96
Agents' balances, 12/31/9_	35	45	10	10
Earned premium, year ending 12/31/9_	350	450	200	200
Loss and LAE reserves, 12/31/9_	1,400	1,700	600	600
Unearned premium reserves, 12/31/9_	75	125	100	100

In addition, we take the following investment income and capital gains figures from the 1995 and 1996 Annual Statements, from the following exhibits:

- Net investment income: Page 4, line 8 = Underwriting and Investment Exhibit, page 6, Part 1, item 15.
- Realized capital gains: Page 4, line 9 = Underwriting and Investment Exhibit, page 6, Part 1A, item 11.
- Unrealized capital gains: Page 4, line 19 = Underwriting and Investment Exhibit, page

6, Part 1A, item 12.

Policyholders' surplus was \$500 million at December 31, 1995, and \$700 million at December 31, 1996, as shown on page 3, line 26.

Investment Income and Policyholders' Surplus (\$000,000)		
	'95	'96
Net investment income, year ending 12/31/9_	250	250
Realized capital gains, year ending 12/31/9_	100	50
Unrealized capital gains, year ending 12/31/9_	100	150
Policyholders' surplus, year ending 12/31/9_	500	700

The company's overall "investment gain ratio" is defined as

- Net investment gain ÷
- (Mean net loss and loss adjustment expense reserves
- + Mean net unearned premium reserves
- Mean net agents' balances
- + Mean policyholders' surplus)

"Net investment gain" for 1996 is used, not the average of the 1995 and 1996 values. It consists of net investment income earned (line 8 of page 4) and net realized capital gains or losses (line 9 of page 4). It does *not* include unrealized capital gains or losses (line 19 of page 4).

In this example, "net investment gain," or line 9A of page 4 of the Annual Statement, equals

$$\$250 \text{ million} + \$50 \text{ million} = \$300 \text{ million.}$$

The reserves, agents' balances, and surplus figures are needed for the company as a whole, not for each line of business. In this example, the figures are

- Mean net loss and loss adjustment expense reserves are

$$(\$1,400 \text{ M} + \$1,700 \text{ M} + \$600 \text{ M} + \$600 \text{ M}) \div 2 = \$2,150 \text{ million}$$

- Mean net unearned premium reserves are

$$(\$75 \text{ M} + \$125 \text{ M} + \$100 \text{ M} + \$100 \text{ M}) \div 2 = \$200 \text{ million}$$

- Mean net agents' balances are

$$(\$35 \text{ M} + \$45 \text{ M} + \$10 \text{ M} + \$10 \text{ M}) \div 2 = \$50 \text{ million}$$

- Mean policyholders' surplus is

$$(\$500 \text{ M} + \$700 \text{ M}) \div 2 = \$600 \text{ million}$$

The "investment gain ratio" is

$$[\$300 \text{ M} \div (\$2,150 \text{ M} + \$200 \text{ M} - \$50 \text{ M} + \$600 \text{ M})] = 10.34\%$$

### Prepaid ("Acquisition") Expenses

We now proceed to determine the prepaid expenses by line of business. We take the following data from the 1995 and 1996 Insurance Expense Exhibits (figures in millions of dollars):

(Figures in millions of dollars)	Workers' Compensation		Other Liability	
	'95	'96	'95	'96
	Written premium, year ending 12/31/9_	400	500	200
Commission & brokerage, year ending 12/31/9_	40	50	25	30
Taxes, licenses & fees, year ending 12/31/9_	8	10	5	5
Other acquisition expenses, year ending 12/31/9_	8	10	5	5
General expenses, year ending 12/31/9_	40	60	20	20

Prepaid expenses, or "acquisition expenses," are defined as

- Commission and brokerage expenses incurred
- + Taxes, licenses, and fees incurred
- + Other acquisition, field supervision, and collection expenses incurred
- + One half (1/2) of general expenses incurred.

For prepaid expenses, we use the 1996 figures, not the average of the 1995 and 1996 figures.

- For workers' compensation, prepaid expenses are

$$[\$50 \text{ M} + \$10 \text{ M} + \$10 \text{ M} + (0.5)(\$60 \text{ M})] = \$100 \text{ million}$$

- For other liability, prepaid expenses are

$$[\$30 \text{ M} + \$5 \text{ M} + \$5 \text{ M} + (0.5)(\$20)] = \$50 \text{ million}$$

The prepaid expense ratio is prepaid expenses divided by written premium, not earned premium (see the calculations below). Acquisition expenses, underwriting expenses, and premium taxes all relate to written premiums (or written exposures), not to earned premiums.

## **Investment gain on funds attributable to insurance transactions**

Column 18 of the Insurance Expense Exhibit asks for the "investment gain on funds attributable to insurance transactions." We now determine the appropriate column 18 entries for workers' compensation and other liability, using the accounting information from the company's 1995 and 1996 financial statements, as shown above.

For each line of business, the "investment gain on funds attributable to insurance transactions" is the company's investment gain ratio times the funds attributable to insurance transactions for that line of business.

In this example, the investment gain ratio is 10.34%, as determined above. The funds attributable to insurance transactions are defined as

$$\begin{aligned} & \text{Funds attributable to insurance transactions} = \\ & \text{Mean net loss and loss adjustment expense reserves} \\ & + \text{Mean net unearned premium reserves} \times [1 - (\text{prepaid expenses} \div \text{written premiums})] \\ & - \text{Mean net agents' balances} \end{aligned}$$

Prepaid expenses were determined above as \$100 million for workers' compensation and \$50 million for other liability. The 1996 written premium is \$500 million for workers' compensation and \$200 million for other liability, so the factor of

$$1 - (\text{prepaid expenses} \div \text{written premiums})$$

is 80% for workers' compensation and 75% for other liability.

The mean values for reserves and agents' balances were determined above. Using these values, the funds attributable to insurance transactions are as follows:

- For workers' compensation:

$$[(1,400+1,700) \div 2] + \{[(75+125) \div 2] \times 80\% \} - [(35+45) \div 2] = \$1,590 \text{ million.}$$

- For other liability:

$$[(600 + 600) \div 2] + \{[(100 + 100) \div 2] \times 75\% \} - [(10 + 10) \div 2] = \$665 \text{ million.}$$

The "investment gain on funds attributable to insurance transactions" is therefore 10.34% x \$1,590 million = \$165 million for workers' compensation and 10.34% x \$665 million = \$69 million for other liability.

## **Investment gain attributable to capital and surplus**

Column 20 of the Insurance Expense Exhibit asks for the "investment gain attributable to capital and surplus." We now determine the appropriate column 20 entries for workers' compensation and other liability, using the accounting information from the company's 1995

and 1996 financial statements, as shown above.

For each line of business, the "investment gain attributable to capital and surplus" (column 20) is the total investment gain for that line of business minus the "investment gain on funds attributable to insurance transactions."

- The "investment gain on funds attributable to insurance transactions" for workers' compensation and other liability were determined above.
- The total investment gain for the line of business is the company's investment gain ratio times the investable funds associated with the line of business. The investable funds associated with the line of business equal the line's

Mean net loss and loss adjustment expense reserves  
+ Mean net unearned premium reserves  
- Mean net agents' balances  
+ Allocated policyholders' surplus.

Note carefully the distinction between "investable funds attributable to insurance operations" and "investable funds associated with the line of business." The former has an adjustment for prepaid ("acquisition") expenses. The latter includes policyholders' surplus allocated to lines of business. As noted above, prepaid expenses are already deducted from surplus. So if surplus enters the formula, there is no deduction of prepaid expenses from the unearned premium reserves.

The mean values for reserves and agents' balances were determined above, as was the allocation of policyholders' surplus to lines of business. Using these values, the investable funds associated with the lines of business are as follows:

- For workers' compensation:

$$[(1,400+1,700) \div 2] + [(75+125) \div 2] - [(35+45) \div 2] + 420 = \$2,030 \text{ million.}$$

The total investment gain = 10.34% of \$2,030 million = \$210 million. The investment gain attributable to funds from insurance operations is \$165 million, as determined above, so the investment gain attributable to capital and surplus is \$45 million.

- For other liability:

$$[(600 + 600) \div 2] + [(100 + 100) \div 2] - [(10 + 10) \div 2] + 180 = \$870 \text{ million.}$$

The total investment gain = 10.34% of \$890 million = \$90 million. The investment gain attributable to funds from insurance operations is \$69 million, as determined above, so the investment gain attributable to capital and surplus is \$21 million.

### Part III – Allocation to Lines of Direct Business Written

*The purpose of Part III is to allocate elements of profit (or loss) on a direct basis to lines of business. Part III simulates what the results were without reflecting the effect of reinsurance.*

– NAIC Proceedings, 1992, Volume IA, pages 340

Part III, "Allocation to Lines of Direct Business Written," is similar to Part II, except that Part III shows direct experience whereas Part II shows net experience. Two other differences result from this:

- Because most Annual Statement exhibits show net experience, not direct experience, there are few direct cross-checks from Part III of the IEE to the Annual Statement.
- Because investment income relates to net experience, not to direct experience, there are no investment income columns in Part III of the IEE.

#### **Profit or Loss**

Part III of the IEE shows only underwriting gain or loss, in column 17: *Pre-tax profit or loss excluding all investment gain*. Column 17 of Part III is calculated in the same fashion as column 17 of Part II: revenues minus expenditures, on an accrual basis.

Part III has no allocation of investment income. Investment income is earned on assets actually held by the company: that is, on assets net of reinsurance. Investment income on direct business is a theoretical amount. In 1991, the IEE Working Group of the NAIC debated whether to show a theoretical investment income figure for direct business. In April 1991, the Insurance Expense Exhibit Working Group of the Blanks (EX4) Task Force voted to show such a figure in Part III:

*The working group then discussed the proposal to calculate investment income on a direct basis. Members of the advisory committee expressed concerns that the proposal creates assumptions on what would exist on a direct basis; that the numbers go beyond the financial accounting data historically included in annual statement data; that companies would be projecting income that they do not have. Members of the working group indicated that it would assist a state in seeing the impact of the state's premium dollar without excluding the reinsured portion of the premium dollar. Further, the information would be qualified using italics and footnotes in order to caution users of the nature of the data. It was moved and second that investment income on funds attributable to insurance transactions be calculated on a direct basis using italics to qualify the data. Voted to adopt with California opposed. (NAIC Proceedings, 1991 Volume IIA, "Insurance Expense Exhibit Working Group of the Blanks (EX4) Task Force," April 13, 1991, Attachment Four-A, page 448).*

The Working Group subsequently decided not to include such figures in Part III:

*Columns 18 and 19 on Part III, Allocation to Lines of Direct Business Written will be deleted. Column 18 developed an implicit investment gain on funds attributable to insurance transactions. Column 19 developed an implicit profit or loss excluding investment gain attributable to capital and surplus (NAIC Proceedings, 1992, Volume IA, page 338).*

## **The Measurement of Profitability**

The previous sections of this paper have dealt with the statutory procedures for the allocation of policyholders' surplus and of investment income to lines of business in the Insurance Expense Exhibit. These statutory procedures, when combined with premium, loss, and expense data, enable regulators and companies to quantify the total return earned on each line of business.

The procedures embodied in the Insurance Expense Exhibit are one of many potential techniques for measuring total returns. The profitability of insurance operations is a widely debated public concern, and casualty actuaries have repeatedly been called upon to testify on behalf of various positions. It is important that actuaries understand the pros and cons of the major procedures, so that they may be better able to judge the appropriateness of each of them.

The issues in the measurement of insurance profitability may be grouped into the following categories:

- Prospective versus retrospective measurement of profitability
- The allocation of policyholders' surplus
- Run-off of past business versus writing of new business
- Insurance returns versus investment returns

This section deals only with methods of measuring insurance profitability. It does not touch upon how much profit, or what rate of return, is appropriate. Other actuarial papers have dealt with this last issue, and the interested reader is referred to them.<sup>9</sup>

### **Prospective versus Retrospective**

Much of the actuarial literature on profitability measurement deals with the pricing of insurance products. Pricing is fundamentally a prospective task. The Insurance Expense Exhibit, in contrast, is a retrospective measure of insurance profitability.

This difference pervades each of the other issues dealt with below. Actuarial procedures for prospective pricing are not necessarily appropriate for retrospective profitability measurement. The prospective versus retrospective dichotomy runs through many of the comments below.

### **Allocation of Surplus**

The allocation of policyholders' surplus is the first step in the IEE allocation of investment income. The allocation of surplus is also an essential component of financial pricing models for

---

<sup>9</sup> See, for instance, Feldblum [1990], which discusses five commonly used methods of setting profit targets by line of business, and the discussion by Bault [1995], which compares the methods in Feldblum's paper to those used by other actuaries.

insurance products, such as discounted cash flow models and internal rate of return models.<sup>10</sup> But the meaning of this phrase, the “allocation of surplus,” differs radically in these two contexts.

The Insurance Expense Exhibit is allocating the company’s actual policyholders’ surplus to lines of business. If a company has more surplus than its peers, more surplus is allocated to each line. Conversely, a “capital-poor” company would have less surplus allocated to each line.

The pricing actuary using an internal rate of return model or a discounted cash flow model does *not* allocate the company’s actual surplus to line of business. In fact, the pricing actuary may never even ask how much surplus the company has. Rather, the pricing actuary uses various “surplus assumptions.” For instance, the pricing actuary may *assume* that each \$1,000 of business that is written is “supported” by \$500 of surplus.

The surplus *assumptions* used in pricing models may be compared with the *allocation procedures* in profitability measures. For instance, the most common surplus assumptions in pricing models are leverage ratios to premiums or to reserves. Similarly, the most common surplus allocation procedures in profitability measures are based on the premiums or reserves associated with each line of business. Let us examine more closely the relationship between the surplus assumptions and the allocation procedures.

The *retrospective surplus allocation* procedure begins with the company’s actual surplus and proceeds to subdivide it by line of business. One of two methods is used for this allocation:

- A. Allocation by leverage ratios, such as “premium to surplus” ratios or “reserves to surplus ratios,” or
- B. Allocation by the relative risk of each line of business, where risk may be quantified by the volatility of each line’s loss ratio.<sup>11</sup>

The IEE uses leverage ratios, both premium to surplus and reserves to surplus. Some analysts have opined that reserve leverage ratios might serve as a proxy for risk. That is, the slow-paying lines, such as Products Liability and Medical Malpractice, are also the more risky lines. These more risky lines of business therefore have higher reserves to surplus ratios. Thus, an allocation of capital by reserves to surplus ratios is a method of allocating capital according to relative risk.

This reasoning is specious. Products Liability and Medical Malpractice are high risk lines and are also slow paying lines. But there are high risk lines which are fast paying lines, and there are slow paying lines that are low risk lines. Property insurance in regions prone to natural catastrophes, such as Homeowners insurance in the Gulf Coast states or earthquake insurance in

---

<sup>10</sup> For a full discussion of the allocation of surplus in insurance pricing models, see Derrig [1991] and Feldblum [1993: IRR], and the references cited therein.

<sup>11</sup> Compare Feldblum [1990], and the reviews by Philbrick [1991] and Todd [1995], as well as Meyers [1991].

California, are high risk lines, but their loss payout is rapid. Conversely, annuity payments, such as long-term disability coverage or workers' compensation pension claims, have slow payouts, but their risk is relatively small.<sup>12</sup>

The *prospective surplus assumptions* used for pricing purposes generally proceeds in one of two manners:

- A. The needed surplus is determined for each line of business independently of the surplus required for other lines of business or of the overall surplus needs of the insurance enterprise. This needed surplus is calculated by consideration of the line's volatility in conjunction with selected calibration yardsticks, such as a "probability of ruin" yardstick or an "expected policyholder deficit" yardstick.<sup>13</sup>
- B. The insurance industry as a whole is assumed to be neither over-capitalized nor under-capitalized. This assumption is justified by the efficiency of capital markets and the competitiveness of the insurance product markets. If the insurance industry were overcapitalized, returns on capital would be insufficient, and capital would leave the industry. Conversely, if the insurance industry were undercapitalized, returns on capital would be excessive, and additional capital would enter the industry.<sup>14</sup>

The overall industry capital would be allocated to lines of business, by means of leverage ratios or relative risk measures. This procedure differs from the former one in that the leverage ratios or the relative risk measures would be calibrated to achieve the existing industry surplus for all lines of business combined.

---

<sup>12</sup> For a more complete discussion of reserve duration, pricing risk, and reserving risk by line of business, see Feldblum [reply to Philbrick: 1993]. Hodes, Feldblum, and Blumsohn [1996] provide a detailed analysis of workers' compensation reserve volatility. Although compensation reserves have a long average duration, the steady payment pattern, which results from the mandated (statutory) benefits, causes the volatility of the reserves to be extremely low (on a discounted basis).

<sup>13</sup> On the "probability of ruin" yardstick, see Pentikäinen, Bonsdorff, Pesonen Rantala, and Ruohonen [1989] or Daykin, Pentikäinen, and Pesonen [1994]. On the "expected policyholder deficit" yardstick, see Butsic [1994] or Hodes, Feldblum, and Blumsohn [1996], Appendix B. Compare also the NAIC's risk-based capital formula, which determines capital requirements to guard against the underwriting risks in each line of business (see Feldblum [1996: RBC]). Although the NAIC explicitly counsels against use of the risk-based capital results for pricing purposes, there is no theoretical reason why they could not be used for this purpose.

<sup>14</sup> See, however, Joskow [1973], who objects to this reasoning, arguing that cartelization of the property-casualty insurance industry by means of rating bureaus has led to excessive prices along with overcapitalization, resulting in "normal" returns on capital and therefore equilibrium in the capital and product markets.

Once the appropriate leverage ratio is determined for any given line of business, any particular company's needed capital is determined from this leverage ratio. These are surplus assumptions. For any particular company, of course, the assumed surplus requirements for all lines of business combined will not equal its actual (held) surplus. [As mentioned earlier, this differentiates the prospective surplus assumptions from the retrospective surplus allocation procedure.]

In sum, the prospective surplus assumptions and the retrospective surplus allocation procedures often look similar. However, they serve different functions, and a procedure that is appropriate for one function may not be applicable to the other function.

### **Reserve Run-Off versus New Business**

Actuarial pricing is concerned with setting premium rates for new business. To accurately set rates, the pricing actuary must estimate the amount of investment income to be earned for each dollar of new business.

Investment income is earned on assets supporting reserves (both unearned premium reserves and loss reserves), as well as on the capital and surplus funds supporting the policy. But the "reserves" considered by the pricing actuary are not the reserves held by the company. Rather, they are the anticipated reserves that will be held in the future for each dollar of new business. This is the essence of prospective ratemaking.

The Insurance Expense Exhibit, in contrast, has a retrospective measurement of profitability. The investment income that is allocated is the investment income that is actually earned on the assets supporting the held reserves in each line of business.

The difference between the two approaches is clearest when the company grows or declines in a line of business.<sup>15</sup> Suppose a company is setting rates for workers' compensation insurance, and the pricing actuary expects that losses will be paid out on average about four years after the accident date. If the actuary assumes an expected loss ratio of 75%, then (in a steady state) there will be about three dollars of reserves for each dollar of annual premium.

Similarly, for a steady state company, the Insurance Expense Exhibit will show about three dollars of reserves for each dollar of workers' compensation premium. For the steady state company, the IEE information can be used in rate setting.

Suppose, however, that the company first began writing workers' compensation in the current calendar year. To the pricing actuary, the past history of the company is irrelevant. The pricing actuary still assumes that there will be three "dollar-years" of reserves for each

---

<sup>15</sup> For a complete discussion of the effects of business expansion on statutory measures of total return, see Feldblum [1993].

dollar of premium earned during the year, and the future rates are determined accordingly.<sup>16</sup>

The actual held reserves of the company at the end of the year for each dollar of annual premium earned is probably only about 65¢. [There are 75¢ of incurred loss for each dollar of earned premium, and some of the losses have already been paid out by the end of the year.]

In other words, the IEE shows very little investment income earned on the workers' compensation line of business. One is tempted to say that the IEE and the pricing actuary are addressing different questions and therefore they come up with different answers. The pricing actuary wants to ascertain the expected profitability of a new policy, so he or she considers the expected investment income on the assets supporting the future reserves of this policy. The IEE seeks to measure the retrospective profitability of a given line of business, so it considers the investment income earned during the past year on the held reserves.

This explanation is incorrect. The IEE aims to compute the "total profit or loss" in each line of business. In theory, one should compute this figure by using discounted reserves. For prospective ratemaking, one would use anticipated losses discounted at an expected interest rate or investment yield. For retrospective profitability measurement, one would use actual losses discounted at market interest rates or current investment yields.

The Insurance Expense Exhibit is wedded to statutory accounting. Accordingly, it uses undiscounted loss reserves, not discounted reserves, for computing the underwriting profit margin. This figure, shown in column 17 of Part II ("Pre-tax profit or loss excluding all investment gain"), uses the current calendar year earned premiums, incurred losses, and incurred expenses.

In theory, column 19 of Part II ("Profit or loss excluding investment gain attributable to capital and surplus"), should be computed by using discounted loss costs. In practice, the IEE uses "investment income on funds attributable to insurance transactions" as a proxy for the amount of the discount. This procedure is reasonable for companies in a steady state. It is misleading when a company grows or declines significantly in a particular line of business.

### **Insurance Returns and Investment Returns**

A traditional insurance industry trade practice is to divide a company's operational results into "underwriting income" and "investment income." Underwriting income is defined as earned premiums minus incurred losses minus incurred expenses. Investment income consists of interest, dividends, and rents earned on the company's invested assets. Capital gains, either realized capital gains or all capital gains, are generally included in investment income as well.

---

<sup>16</sup> Note carefully the units of each insurance element. Reserves are a "stock," or a balance sheet item existing at a given valuation date. Earned premium is a "flow," or an income statement item, whose magnitude depends on the length of time in the valuation period. When pricing actuaries compare these two elements, they generally assume a one-year time period. In other words, they are comparing *reserve-years* and *annual earned premium*. Because this convention is so common, it is rarely stated explicitly, and one generally reads of a comparison of reserves with earned premium.

The insurance trade press often says that "underwriting operations" were not profitable, because underwriting income was negative, and that the insurance industry was "saved" only by its investment income. Such a view, of course, is primarily for public consumption. Underwriting income that takes no account of the time value of money does not properly measure the profitability of insurance operations.

The Insurance Expense Exhibit rectifies this problem by allocating the investment income earned by the company to lines of business. In doing so, it must consider what investment income to allocate.

There are three interlocking components of this issue.

- ① "What portion of the company's investment income should be considered when measuring the return on insurance operations?" The IEE procedure addresses this question by considering separately (a) the investment income on funds attributable to insurance transactions and (b) the investment income attributable to capital and surplus. One may take either of the two common views – all investment income or only investment income attributable to insurance transactions – and find the appropriate figures in the IEE.<sup>17</sup>
- ② "Which investable assets should be associated with funds attributable to insurance transactions and which investable assets should be associated with capital and surplus?" There is a common view that loss reserves and unearned premium reserves should be supported by fixed income securities, such as bonds and mortgages, because of the relative safety of these instruments. Capital and surplus, however, may be supported by common stock and other equities (such as real estate), because of the higher yields afforded by these financial instruments (cf. Noris [1985]).

The pre-1992 Insurance Expense Exhibit differentiated between the returns on funds attributable to insurance transactions and the returns on capital and surplus. Bond coupon payments, for instance, were more likely to be associated with the former, whereas common stock dividends were more likely to be associated with the latter.

The current IEE did away with this differentiation. The "common view" mentioned above is but one investment strategy among many, and it is not necessarily the optimal one. It is not the place of the IEE to implicitly prescribe or even to presume the investment strategies of individual companies.

- ③ "What investment returns should be allocated to the insurance operations?" That is, "What investment income should be considered a part of insurance operations, and what investment income should be considered separately, either as unanticipated gains or losses or as attributable to the superior or inferior skills of the investment department?"

To clarify this question, suppose that the insurance company's investment portfolio consists

---

<sup>17</sup> "Investment income attributable to insurance transaction" is also called "investment income on the insurance cash flow" or "investment income on policyholder funds."

of Treasury bonds yielding 8% per annum, investment grade corporate bonds yielding 10% per annum, lower grade corporate bonds, some of which are yielding between 12% and 15% per annum and some of which have defaulted, common stocks with various dividend yields, some realized capital gains, and some unrealized capital losses. What parts of this investment income should be allocated to lines of business?

One may answer this question in several ways.

*A. Allocate all investment income:* One view says that the regulator should not decide what investment returns are normal and what returns are extraordinary. Roth [1992] champions this view, arguing that all investment income should be taken into account.

*B. Differentiate by type of investment income:* The IEE allocates net investment income earned (i.e., interest, dividends, and rents) and realized capital gains and losses to the lines of business (i.e., to the insurance operations). Unrealized capital gains and losses are not included in the IEE allocation of investment income.

The theoretical justification for the distinction between realized and unrealized capital gains is that unrealized capital gains represent unanticipated and random market movements that do not reflect the company's investment strategy. Moreover, unrealized capital gains are often reversed as the market turns, unlike the steady receipt of interest, dividends, and rents. For these reasons, unrealized capital gains and losses should not be included in the company's investment income.

Accounting conventions, unless theoretically justified, are a hindrance to proper measurement of profitability. The justification above is particularly dubious. The realization of capital gains is often driven by federal income tax considerations or by short-term needs for cash. In fact, the inclusion of only realized capital gains in investment income often distorts profitability measurement. Two examples should clarify this:

a. *Federal Income Taxes:* Suppose that companies ABC and XYZ have the same investment portfolios, each having a large common stock component with substantial unrealized capital gains. Company ABC has an underwriting gain during the year. To avoid incurring additional income tax liabilities, it leaves the capital gains unrealized. Company XYZ has a large underwriting loss during the year. To compensate for the operating loss, it sells stocks and realizes the capital gains.

In truth, the investment returns of the two companies are identical, and they should be treated in identical fashions for the purpose of profitability measurement. Tax considerations determined whether the capital gains would be realized. This should not be allowed to distort the measurement of profitability.

b. *Cash Needs:* Suppose that companies ABC and XYZ differ mainly in their need for cash. Company ABC is "cash poor," so it invests primarily in short- and medium-term Treasury securities and mortgage backed securities with consistent coupon payments. Company XYZ has no immediate need for cash, so it invests heavily in a diversified portfolio of aggressive, growth stocks, with low dividend payments but high expected

capital gains. Its investment strategy calls for keeping the stocks for the long-term.

In this example, company ABC is trading expected long-term return for immediate cash. Yet the IEE sees the opposite: it shows higher investment returns for company ABC than for company XYZ.

The reason for the exclusion of unrealized capital gains from the allocation of investment income in the IEE is that unrealized capital gains and losses are a direct credit or charge to surplus (see Feldblum [1995: DCCS]). They do not flow through the statutory income statement, just as they do not flow through the GAAP income statement and they are not included in taxable income. Unfortunately, this accounting attribute of unrealized capital gains distorts the actuarial measurement of profitability.

*C. Allocate "risk-free" investment income:* An approach that is gaining significant acceptance in the actuarial community is that only a "risk-free" investment return should be ascribed to underwriting operations. The remaining investment income – that is, the difference between the risk-free return and the actual return – is the reward either for the assumption of investment risk by the company or for the superior (or inferior) expertise of the investment department (see, for example Woll [1987] or Lowe [1988]). In this approach, the investment income allocated to lines of business does not depend on the type of assets owned by the company or on the investment performance of the company's securities. Rather, all investable assets would be assigned a risk-free rate of return for the purpose of allocating investment income to lines of business. The remaining investment income stems from the performance of the investment department; it has nothing to do with the total return associated with the insurance operations.

## Perspectives on the IEE Procedures

The previous section discussed the theoretical underpinnings of the IEE procedure for the measurement of profitability, though with few normative comments on the general appropriateness of this procedure. The primary purpose of this paper is to describe the IEE procedure and to place it within the broader context of profitability measurement procedures. It is not the purpose of this paper to defend or to criticize the statutory procedures.

The method used in the Insurance Expense Exhibit and discussed in this paper may be viewed as an "official" NAIC method. Casualty actuaries must understand this method well, both for completing the statutory financial statements and for evaluating the reasonableness of the statutory figures.

However, the IEE allocation procedures must be treated with caution: they are useful for some purposes but not for others. The following comments by two actuaries who have worked extensively in state regulation (and particularly with the measurement of insurance profitability) should make this clear.

Mr. Martin Rosenberg, formerly with the New Jersey Insurance Department, writes [Rosenberg: 1993]:

*The allocation of surplus to the various lines of business [in the Insurance Expense Exhibit] can (and will) cause much confusion because the allocation is arbitrary.*

*. . . both from the regulator's point of view as well as the insurance company's point of view, the financial results shown in the IEE for the various lines of business can not and should not be used to measure whether the premium rates are adequate or excessive. Nor should the IEE figures be used to determine if the capital used to support a line of business is earning a satisfactory return. . . .*

*. . . a regulated enterprise has a right to the opportunity to earn an adequate rate of return. However, the right to an adequate rate of return does not extend to all individual services provided by the regulated entity but rather applies to the enterprise as a whole. . . .*

*. . . This principle was applied to a 1992 case in which an insurer wanted to increase personal auto rates to recoup assessments to support the personal auto residual market. An Administrative Law Judge in New Jersey decided in that case that a multi line insurer's right to a fair rate of return pertains to the enterprise as a whole and does not extend to each line of insurance. Thus, the relevant measure of the insurer's rate of return was the rate of return of all lines of business combined and not just personal auto insurance.*

*Insurance companies often price lines of business such as homeowners and personal auto in tandem. For example, typically one consideration in deciding whether to sell personal auto at a discount is whether the policyholder also has a homeowners policy with the same company. . . .*

*The point is that from the company's point of view, surplus is not allocated on a line by line basis. An independent measure of the return of personal auto and homeowners is not useful to the company because the financial results of personal auto and homeowners are dependent on each other.*

*The rate of return for the entire enterprise is the appropriate consideration from both the regulator's and company's point of view in many important applications. Therefore, it must be recognized that an allocation of surplus to the various lines of business may be arbitrary.*

Mr. Richard Roth, Assistant Commissioner in the California Department of Insurance, made a tongue-in-cheek observation regarding the IEE allocation procedures during a recent panel presentation [Roth: 1993]:

*. . . according to the new IEE, since the underwriting and investment income is allocated based on national surplus, the loss of surplus caused by Hurricane Andrew will cause the profitability of automobile insurance in Massachusetts to improve.*

These comments underscore the need for casualty actuaries to carefully analyze the profitability results that may be inferred from the Insurance Expense Exhibit.

## Appendix A: The Part II Entries

Appendix A describes, column by column, the entries in Part II of the Insurance Expense Exhibit. The phrase in italics at the start of each subsection gives the column number and the column caption. The description notes the cross-checks to other statutory exhibits, the type of allocation to line of business, and sundry differences between the entries in the IEE and those in the Annual Statement.

Readers interested only in the theoretical aspects of the allocation of investment income to line of business do not need the information in this appendix, though they may find it a useful reference. Readers who must complete an actual IEE will find this information essential.

### Premiums

1. *Premiums written*: The written premium entries correspond by line of business to the "Underwriting and Investment Exhibit," Part 2B (page 9), "Premiums Written," column 4, "Net premiums written."<sup>18</sup>

2. *Premiums earned*: These entries correspond by line of business to page 7, "Underwriting and Investment Exhibit," Part 2, "Premiums Earned," column 4, "Premiums earned during year."<sup>19</sup>

Accrued retrospective premiums are reported in two ways in the Annual Statement:

- They may be reported as a separate asset and not as an offset to the unearned premium reserve. This is the treatment on the statutory balance sheet, where an asset for accrued retrospective premiums is shown on line 10.3. The unearned premium reserve on line 9 of page 3 does **not** have an offset for accrued retrospective premiums, since it is taken from Part 2A of the "Underwriting and Investment Exhibit," page 8, column 5, line 34, not line 32. [The line of business offsets in column 4, lines 1 through 31, are removed in column 5, line 33.]
- They may be reported as an offset to the unearned premium reserve and thereby included in earned premiums. This is the treatment in Part 2 of the Underwriting and Investment Exhibit (page 7) and in the earnings statement (page 4).

---

<sup>18</sup> These Annual Statement entries are carried to Part 2 of the "Underwriting and Investment Exhibit" (page 7), "Premiums Earned," column 1, "Net premiums written." The total for all lines combined is also carried to page 14, "Exhibit 2 – Reconciliation of Ledger Assets," line 1, "Net premiums written." This figure should agree with line 32 of the IEE.

<sup>19</sup> In addition, the aggregate amount for all lines combined on line 32 of the IEE ("Total") should correspond to the entry on page 4, "Statement of Income," line 1, "Premiums earned."

An illustration should help clarify this. Suppose an insurer has the following accounting entries for written premium, unearned premium reserves, and accrued retrospective premium reserves:

- Written premium during the year = \$20,000,000.
- Unearned premium reserve (liability):
  - Beginning of year = \$6,000,000.
  - End of year = \$8,000,000.
- Accrued retrospective premium reserve (asset):
  - Beginning of year = \$1,000,000.
  - End of year = \$2,000,000.

To determine earned premiums, the Underwriting and Investment Exhibit, on pages 7 and 8 of the Annual Statement, treats accrued retrospective premiums as an offset to unearned premiums. In this example, the net unearned premium reserve at the beginning of the year is \$5 million and at the end of the year it is \$6 million. Earned premium for the year is \$19 million [= written premium minus the change in reserve].

For the balance sheet, the full unearned premium reserve of \$8 million is shown on page 3, line 9, column 1. The \$2 million of accrued retrospective premiums are carried to page 2, line 10.3, column 2, a non-admitted portion is deducted in column 3, and the net admitted portion, is shown in column 4.

The IEE uses the accounting procedure in the Underwriting and Investment Exhibit. Accrued retrospective premiums are reflected in the unearned premium reserves and in premium earned (columns 2 and 10), not in agents' balances (column 11). [See also the discussion below of column 11.]

The earned premium entries should also equal the figures in Schedule P, Part 1, column 4, line 11: "net earned premiums in the current year," according to the Schedule P subdivision of lines of insurance. In most instances, Schedule P does not have as fine a breakdown by line of business as the IEE has. For example, Schedule P combines "Fire," "Allied lines," "Inland Marine," "Earthquake," "Glass," and "Burglary and Theft" into a single "Special Property" category, though these are separate lines of business in the IEE. In a few instances, however, both Schedule P and the IEE have a finer breakdown by line of business than other Annual Statement exhibits have.

*10. Unearned Premium Reserves:* The unearned premium reserves correspond by line of business to page 7, "Underwriting and Investment Exhibit," Part 2, "Premiums Earned," column 4, "Unearned Premiums." These unearned premium reserves reflect accrued retrospective premiums; see also the discussions of column 2 and of column 11.

## Dividends

3. *Dividends to policyholders:* Dividends to policyholders on *net* business is reported in aggregate (all lines combined) on page 4, "Statement of Income," line 14a, "Dividends to policyholders." The "allocation" to lines of business in the IEE is a direct allocation, not a formula allocation. That is, the insurer knows which policies received the dividends and therefore to which lines of business they should be allocated.<sup>20</sup>

Dividends to policyholders on *direct* business are reported

- by line of business in the IEE, Part III;
- by state in the Annual Statement, Schedule T, "Exhibit of Premiums Written," Column 4, "Dividends paid or credited to policyholders on direct business"; and
- by line and by state on page 15, column 4, of the Annual Statement, "Dividends paid or credited to policyholders on direct business."<sup>21</sup>

*Paid* dividends to policyholders are shown on page 14 of the Annual Statement, "Exhibit 2 – Reconciliation of Ledger Assets," line 16, "Dividends to policyholder on direct business less \$\_\_\_\_ dividends on reinsurance assumed or ceded (net)." Paid dividends may be reconciled to incurred dividends by adding the change in reserves:

Paid dividends – beginning of year reserve + end of year reserve = incurred dividends.

The required reserve figures are shown on page 3 of the Annual Statement, "Liabilities, Surplus and Other Funds," line 10(b): "Dividends to policyholders declared and unpaid," column 1 (current year) and column 2 (previous year). In other words

Page 4, line 14a (incurred dividends)  
= Page 14, line 16 (paid dividends)  
– Page 3, line 10(b), column 2 (beginning of year reserve)  
+ Page 3, line 10(b), column 1 (end of year reserve).

Note that *statutory* accounting requires reserves only for declared dividends to policyholders, not for projected (but undeclared) dividends to policyholders. *GAAP* requires dividend reserves for projected dividends as well. For instance, suppose that on each March 1 the insurer's board of directors declares dividends to policyholders based on the previous calendar year's experience. For *GAAP* financial statements, the company must project expected dividends

---

<sup>20</sup> In some cases, the policy form does not correspond to Annual Statement lines of business. For instance, a policy may cover both "Other Liability" and "Products Liability," and the dividend may not differentiate between them. In such instances, the insurer must make a formula allocation of the dividend.

<sup>21</sup> Dividends to policyholders is more closely related to direct business than to net business. Most reinsurance arrangement reimburse the primary insurer for losses paid to policyholders, not for dividends paid to policyholders.

relating to the experience of the current accounting period and book these as a liability, even though the company will have no legal obligation to policyholders until the declaration by the board of directors on March 1. For statutory financial statements, no estimate need be made and no reserve need be booked for undeclared dividends.<sup>22</sup>

### Losses and Loss Adjustment Expenses

4. *Incurred Loss:* The incurred losses correspond by line of business to page 10 of the Annual Statement, "Underwriting and Investment Exhibit," Part 3 – Losses paid and incurred," column 7, "Losses incurred, current year."

These are *calendar year* incurred losses. The incurred losses in Schedule P are *accident year* incurred losses. The supporting exhibits in Schedule P (Parts 2, 3, and 5) show losses combined with allocated loss adjustment expenses. Losses are shown separately from allocated loss adjustment expenses only in Part 1 of Schedule P. To determine calendar year incurred losses from Schedule P, one must use Annual Statements of successive years and subtract the incurred losses (for all accident years combined) in the previous statement from the corresponding incurred losses in the current statement.<sup>23</sup>

Paid losses by line of business are shown on page 10 of the Annual Statement, "Underwriting and Investment Exhibit," Part 3, column 4, "net losses paid." Net loss reserves by line of business are shown in column 5 for the current year and column 6 for the previous year. Incurred losses are therefore columns 4 + 5 – 6, or

Paid losses – beginning of year reserve + end of year reserve = incurred losses.

5, 6, 8, and 9: *Loss adjustment expenses:* Unpaid loss adjustment expenses are shown by line of business separately for allocated and unallocated expenses in columns 8 and 9 in the IEE. Total (i.e., allocated plus unallocated) unpaid loss adjustment expenses by line of business are shown on page 11 of the Annual Statement, "Underwriting and Investment Exhibit," Part 3A, column 6, "Unpaid loss adjustment expenses." Thus, the sum of columns 8 and 9 in the IEE should equal column 6 of page 11 of the Annual Statement.

---

<sup>22</sup> Compare AICPA's *Audits of Property and Liability Insurance Companies* (New York: American Institute of Certified Public Accountants, 1993): "GAAP requires policyholder dividends that are undeclared as of the balance sheet date to be estimated and accrued. Under SAP, however, policyholder dividends are not recorded as liabilities until declared." See also David L. Holman and Chris C. Stroup, "Generally Accepted Accounting Principles," in Insurance Accounting and Systems Association, Inc., *Property-Liability Insurance Accounting*, Sixth Edition (Durham, NC: 1994), page 14–7: "Under SAP, dividends to policyholders generally are not recorded as liabilities until they are declared by the company's board of directors. GAAP requires that all undeclared policyholder dividends be accrued at the balance sheet date, using an estimate of the amount to be paid."

<sup>23</sup> Care must be taken in the treatment of the "prior years" lines in Schedule P. See the discussion below regarding loss adjustment expenses.

Incurred loss adjustment expenses are shown by line of business separately for allocated and unallocated expenses in columns 5 and 6 of the IEE. Calendar year incurred loss adjustment expenses are *not* shown by line of business in the Annual Statement. The aggregate loss adjustment expenses incurred for all lines combined is shown on page 4, "Statement of Income," line 3, "Loss expenses incurred," and on page 12, "Underwriting and Investment Exhibit," Part 4, "Expenses," line 22, column 1, "Total loss adjustment expenses incurred."

Schedule P shows cumulative paid loss adjustment expenses by line of business and by accident year in Part 1, columns 7 and 8 for allocated expenses and in column 10 for unallocated expenses. The loss adjustment expenses paid in the current calendar year can be derived from successive Annual Statements. For instance, the unallocated loss adjustment expenses paid in the current calendar year equals

- Part 1, column 10, line 12 ("total") of the current year's Schedule P
- • Part 1, column 10, line 12 – line 2 – line 1 (= "total" – "oldest accident year" – "prior years") of the previous year's Schedule P.<sup>24</sup>

The previous year's unpaid loss adjustment expense is found on page 11, "Underwriting and Investment Exhibit," Part 3A, column 6, of the previous year's Annual Statement. As is true for losses (see above), the current calendar year's incurred loss adjustment expenses, as reported in the IEE, equals the current calendar year's payments plus the change in reserve.

7. *Unpaid losses:* Unpaid losses by line of business should agree with the entries on page 11 of the Annual Statement, "Underwriting and Investment Exhibit," Part 3A, column 5, "Net losses unpaid excluding loss adjustment expenses." The aggregate figure for all lines combined is also shown on page 3, "Liabilities, Surplus and Other Funds," line 1, "Losses," column 1 (current year).

## **Agents' Balances**

11. *Agents' balances:* The aggregate total for all lines combined should equal the sum of

- line 10.1, "Premiums and agents' balances in the course of collection," and
- line 10.2, "Premium, agents' balances and installments booked but deferred and not yet due."

Line 10.3, "Accrued retrospective premiums," is *not* included in the IEE definition of agents' balances, since they are already deducted from unearned premium reserves (see above). On page 8 of the Annual Statement, "Underwriting and Investment Exhibit," Part 2A,

---

<sup>24</sup> The "oldest accident year" in the previous year's Schedule P is no longer separately recorded in the current year's Schedule P, so it is removed from the calculation. The "prior years" line in Part 1 of Schedule P shows the paid amount in the current calendar year, not a cumulative paid amount. Since one wants the amount paid in the current calendar year for this cross-check, one wants the current statement's figure for the "prior years" line, not the change from last year's figure to this year's figure.

"Recapitulation of all Premiums," accrued retrospective premiums are entered as negative amounts in column 4, "Reserve for rate credits and retrospective adjustments based on experience." The "total reserve for unearned premiums" in column 5 is the sum of columns 1 through 4, where columns 1 through 3 are

- Column 1: Amount unearned, running one year or less from date of policy
- Column 2: Amount unearned, running more than one year from date of policy
- Column 3: Advance premiums

Earned premium is defined as written premium minus the change in the unearned premium reserve, or

$$\begin{aligned} & \text{Earned premium} \\ = & \text{Written premium} \\ + & \text{Beginning of year unearned premium reserve} \\ - & \text{End of year unearned premium reserve.} \end{aligned}$$

A decrease in the end of year unearned premium reserve causes a corresponding increase in the year's earned premium. The accrued retrospective premium asset decreases the end of year unearned premium reserve on page 8, so it increases the earned premium on page 7, column 4, of the Annual Statement. The "profit or loss" in column 17 of the IEE begins with the earned premium in column 2. Thus, accrued retrospective premiums are already included in the "profit or loss" figure, and they need not be entered again in "agents' balances" (column 10).<sup>25</sup>

In most cases, the allocation of agents' balances to line of business is a direct allocation, not a formula allocation. The allocation shown in column 10, as well as the allocation for the previous year end, is used in the allocation of investment income by line of business (see below).

### **Underwriting Expenses**

*12, 13, 14, and 15. Expenses:* The expense items for all lines of business combined should equal the corresponding amounts in Part I of the IEE, as follows:

- IEE, Part II, column 12, "Commission and brokerage expenses incurred," line 32 (total) should equal IEE, Part I, column 2, "Acquisition, field supervision and collection expenses," line 2h, "Net commission and brokerage." The allocation to line of business is generally a direct allocation.
- IEE, Part II, column 13, "Taxes, licenses and fees incurred," line 32 (total) should equal IEE, Part I, column 4, "Taxes, licenses and fees," line 22, "Total." The allocation to line of business is a combination of direct allocation and formula allocation.

---

<sup>25</sup> Compare the *NAIC Proceedings*, 1991 Volume IIA, "Insurance Expense Exhibit Working Group of the Blanks (EX4) Task Force," March 22, 1991, Attachment Four-B, page 450: "Unearned premium reserves will be net of retrospective premiums, therefore line 9.3 will no longer be subtracted from reserves." [The 1991 line 9.3 is the current line 10.3.]

- IEE, Part II, column 14, "Other acquisition, field supervision and collection expenses incurred," line 32 (total) should equal IEE, Part I, column 2, "Acquisition, field supervision and collection expenses," line 22, "Total," minus line 2h, "Net commission and brokerage." The allocation to line of business is generally a formula allocation (see New York Regulation 30).
- IEE, Part II, column 15, "General expenses incurred" line 32 (total) should equal IEE, Part I, column 3, "General expenses," line 22, "Total." The allocation to line of business is generally a formula allocation (see New York Regulation 30).

*16. Other Income less Other Expenses:* The aggregate amount for all lines of business combined in this column should equal page 4 of the Annual Statement, line 13 minus line 5. Page 4, line 13 is "total other income," and it may be a positive or negative amount. Page 4, line 5 is "aggregate write-ins for underwriting deductions," and it is generally a positive amount.

Do not confuse the "other expenses" in column 16 of the IEE, Part II, with "other underwriting expenses" on page 4, line 4, of the Annual Statement. The "other underwriting expenses" on page 4, line 4, equals the sum of columns 12, 13, 14, and 15 in Part II of the IEE.

Also, note that the "net gain or loss from agents' or premium balances charged off," which appears on line 10 of page 4 of the Annual Statement, shows up on Part II of the IEE in column 16, "other income less other expenses," not in column 11, "agents' balances." The column 11 shows the currently admitted portion of agents' balances. Recoveries of amounts previously not admitted, as well as charge-offs of amounts previously admitted, show up in column 16.

## Appendix B: The Part III Entries

Appendix B describes, column by column, the entries in Part III of the Insurance Expense Exhibit. The phrase in italics at the start of each subsection gives the column number and the column caption. The description notes the cross-checks to other statutory exhibits, the type of allocation to line of business, and sundry differences between the entries in the IEE and those in the Annual Statement.

Most readers will not need the information in Appendix B, since there is no allocation of investment income in Part III of the IEE. Readers who must complete an actual IEE, however, will find this information essential.

*1. Premiums written:* Direct premiums written by line of business are shown in the Underwriting and Investment Exhibit, page 9, Part 2B, "Premiums written," column 1, "direct business."

*2. Premiums earned and 3. Dividends to policyholders:* Direct premiums earned and dividends to policyholders on direct business are shown in the Annual Statement in Schedule T by state (columns 3 and 4) and on page 15 by line of business and by state (columns 3 and 4). The column headings in the IEE note the cross-check to Schedule T, not to page 15. The cross-check to Schedule T applies to the all lines combined row, not to the individual line of business amounts.

*4. Incurred loss and 7. Unpaid losses:* Direct unpaid losses are shown in the Annual Statement by line of business in the Underwriting and Investment Exhibit, page 11, Part 3A, "Unpaid losses and loss adjustment expenses," column 1a, "Adjusted or in process of adjustment: direct," plus column 4a, "Incurred but not reported: direct"; in Schedule T by state (column 7); and on page 15 by line of business and by state (column 8). The column headings in the IEE note the cross-check to Schedule T, not to the Underwriting and Investment Exhibit or to page 15. The cross-check to Schedule T applies to the all lines combined row, not to the individual line of business amounts.

Direct losses incurred are shown in Schedule T and on page 15, but not in the Underwriting and Investment Exhibit. Direct paid losses are shown in all three places. Direct incurred losses by line of business can be derived from the Underwriting and Investment Exhibits of successive Annual Statements, since incurred losses equal paid losses plus the change in reserves. In any case, the column headings in the IEE note the cross-check to Schedule T, not to page 15 or to the Underwriting and Investment Exhibits of successive Annual Statements. The cross-check to Schedule T applies to the all lines combined row, not to the individual line of business amounts.

*5, 6, 8, and 9. Loss adjustment expenses:* Loss adjustment expenses are not reported in Schedule T, and direct loss adjustment expenses are not shown in the Underwriting and Investment Exhibit. The only cross-check listed in the IEE instructions or the NAIC *Proceedings* says:

*IEE Part III, Columns 5, 6, 8 and 9 must agree with IEE Part II, Columns 5,6, 8 and 9,*

*respectively, excluding expense relating to reinsurance assumed and ceded.*

However, direct allocated loss adjustment expenses incurred and unpaid are shown on page 15 by line of business and by state (columns 10 and 11), so a cross-check is available to columns 5 and 8 of Part III of the IEE.

**10. Unearned premium reserves:** Unearned premium reserves are not shown in Schedule T, and direct unearned premium reserves are not shown in the Underwriting and Investment Exhibit. For this column, however, the IEE instructions do reference the cross-check to page 15:

*Column 10 must agree with the sum of Page 15, Column 5 totals for all states plus any alien business.*

**11. Agents' balances, 14. Other acquisition, field supervision, and collection expenses incurred, 15. General expenses incurred, and 16. Other income less other expenses:** There are no direct cross checks to any of these columns. The IEE instructions say that these figures should agree with the Part II entries after exclusion of balances or expenses related to reinsurance assumed or ceded.<sup>26</sup>

**12. Commissions and brokerage expenses incurred:** In Part I of the IEE, as well as on Part 4 of the Underwriting and Investment Exhibit in the Annual Statement, commissions and brokerage expenses are divided into seven categories:

- 2a. Direct excluding contingent
- 2b. Reinsurance assumed excluding contingent
- 2c. Reinsurance ceded excluding contingent
- 2d. Contingent – direct
- 2e. Contingent – reinsurance assumed
- 2f. Contingent – reinsurance ceded
- 2g. Policy and membership fees

Commission and brokerage expenses should appear in column 2 of Part I: "Acquisition, field supervision and collection expenses."

The column heading in Part III of the IEE notes that the total for column 12 for all lines of business combined should equal the sum of rows 2a and 2d, column 2, from Part I. Commissions and brokerage expenses were added to the Page 15 exhibits in 1992 (column 12), so a cross-check by line of business is now available as well.

**13. Taxes, licenses and fees incurred:** The IEE instructions list no explicit cross-check. Taxes, licenses, and fees were also added to the Page 15 exhibits in 1992, so a cross-check by line of business is available.

---

<sup>26</sup> Agents' balances related to reinsurance ceded are disclosed on page 2, lines 10.1 and 10.2 (in the parenthetical phrase in the line label), though there is no corresponding disclosure for amounts related to reinsurance assumed.

## References

- [X] Butsic, Robert P., "Solvency Measurement for Property-Liability Risk-Based Capital Applications," *Journal of Risk and Insurance*, Volume 61, Number 4 (December 1994), pages 656-690.
- [X] Daykin, Chris D., Teivo Pentikäinen, and M. Pesonen, *Practical Risk Theory for Actuaries*, First Edition (Chapman and Hall, 1994).
- [X] Derrig, Richard A., "The Development of Property-Liability Insurance Pricing Models in the United States," *Casualty Actuarial Society Forum* (Fall 1991), pages 19-46.
- [X] Feldblum, Sholom, "Completing and Using Schedule P," Third Edition, CAS Part 7 Examination Study Note (1996), forthcoming in *Regulation and the Casualty Actuary* (NAIC, 1997).
- [X] Feldblum, Sholom, "Direct Charges and Credits to Surplus" (CAS Part 7 Examination Study Note, 1995).
- [X] Feldblum, Sholom, "Pricing Insurance Policies: The Internal Rate of Return Model," Second Edition (Casualty Actuarial Society Part 10A Examination Study Note, May 1993).
- [X] Feldblum, Sholom, "Risk-Based Capital Requirements" (Casualty Actuarial Society Part 10 Examination Study Note, Third Edition, November 1996), forthcoming in the *Proceedings of the Casualty Actuarial Society* (1996).
- [X] Feldblum, Sholom, "Risk Loads for Insurers," *Proceedings of the Casualty Actuarial Society*, Volume 77 (1990), pages 160-195; discussion by Stephen W. Philbrick, Volume 78 (1991), pages 56-53; author's reply to discussion, Volume 80 (1993), pages 366-379; discussion by Todd Bault, Volume 82 (1995); author's reply to discussion, Volume 82 (1995).
- [X] Feldblum, Sholom, "Statutory Returns on Surplus and the Cost of Equity Capital," *Casualty Actuarial Society Forum* (Spring 1993), pages 203-224.
- [X] Hodes, Douglas M., Sholom Feldblum, and Gary Blumsohn, "Workers' Compensation Reserve Uncertainty," Casualty Loss Reserve Seminar Discussion Paper Program, *CAS Forum* (Summer 1996), pages 61-149.
- [X] Joskow, Paul L., "Cartels, Competition, and Regulation in the Property-Liability Insurance Industry," *The Bell Journal of Economics and Management Science*, Volume 4, No. 2 (Autumn 1973) pages 375-427; reprinted in Georges Dionne and Scott E. Harrington (eds.), *Foundations of Insurance Economics: Readings in Economics and Finance* (Boston: Kluwer Academic Publishers, 1992), pages 468-520.
- [X] Lowe, Stephen P., "A New Performance Measure For P/C Insurers," *Emphasis*, Summer

1988, pages 8-11.

- [X] Meyers, Glenn G., "The Competitive Market Equilibrium Risk Load Formula for Increased Limits Ratemaking," *Proceedings of the Casualty Actuarial Society*, Volume 78 (1991), pages 163-200.
- [X] Noris, P. D., *Asset/Liability Management Strategies for Property and Casualty Companies*, (Morgan Stanley, May 1985).
- [X] Pentikäinen, Teivo, Heikki Bonsdorff, Martti Pesonen, Jukka Rantala, and Matti Ruohonen, *Insurance Solvency and Financial Strength* (Helsinki, Finland: Finnish Insurance Training and Publishing Co., 1989).
- [X] Rosenberg, Martin, "The Insurance Expense Exhibit and the Allocation of Investment Income," letter to Sholom Feldblum, November 23, 1993.
- [X] Roth, Richard J., Jr., "Analysis of Surplus and Rate of Return Without Using Leverage Ratios," *Insurer Financial Solvency* (Casualty Actuarial Society 1992 Discussion Paper Program), Volume I, pages 439-464.
- [X] Roth, Richard J., Jr., "Infamous IEE," letter to Sholom Feldblum, November 19, 1993.
- [X] Woll, Richard G., "Insurance Profits: Keeping Score," *Financial Analysis of Insurance Companies*, (Casualty Actuarial Society 1987 Discussion Paper Program), pages 446-533.