

Completing and Using Schedule P

Prepared by
Sholom Feldblum, FCAS, FSA, CFA, CPCU, AIM, AU
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Abstract

Schedule P is a complex section of the Annual Statement, demanding much expertise to complete and to understand. The cross checks performed by the NAIC compare the Schedule P figures within its various parts, with other pages of the Annual Statement, and with Schedule P data from the preceding year. The NAIC uses Schedule P Summary data for three of the Insurance Regulatory Information System ("IRIS") tests, and it uses the detailed line of business data to determine the reserving risk and the written premium risk charges in the risk-based capital formula. Investment analysts and rating agencies use the schedule to measure the adequacy of a company's held reserves and thereby estimate its financial strength and expected market value. The IRS uses the schedule to determine loss reserve discounts, anticipated salvage and subrogation, and the discounts for anticipated salvage and subrogation. Actuaries and accountants need a thorough understanding of this Schedule, both to complete it for their own company or client and to evaluate the performance of peer companies.

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Preface

by Richard J. Roth, Jr.¹

Few people probably remember what Schedules O and P were like in the 1980s when they contained little more than loss and loss adjustment expense development. The insurance department regulators needed more detailed information by line in order to monitor the solvency of the insurance companies. The information in the Annual Statement is the only information that the regulators have between the on-site financial examinations. Furthermore, the investment community, the rating agencies, agents, and the insurance industry observers wanted more financial disclosure. In the 1980s, the personal computer was coming into common use as a powerful analytical tool.

In the middle 1980's, I decided to make a proposal to combine Schedules O and P into a completely redesigned Schedule P. The intent was to include all of the basic actuarial statistics necessary to make a wide variety of actuarial analyses using the personal computer. There would be no analyses or projections in Schedule P, only the data to make the analyses and projections in a form that could be readily used in a personal computer.

Today, it is difficult to imagine how much opposition I faced, which came mainly from the larger insurance companies. The larger insurance companies did not want any more disclosure in the Annual Statement. They argued that their businesses were so complicated that the additional Schedule P information would be "meaningless." We regulators had to keep reminding the larger companies that the insurance world is really made up of hundreds of small and medium size companies, which require constant monitoring.

Only after the third major effort before the NAIC Blanks Committee was I able to get Schedule P substantially changed, even though I had widespread support among actuaries. Additional features in Schedule P were added in subsequent years, such as Parts 5, 6 and 7.

Even today, any changes to Schedule P in terms of additional reporting usually meet with fierce opposition from the larger insurers and reinsurers.

Schedule P is the actuarial portion of the Annual Statement and is critical to monitoring the solvency of insurers. The Casualty Actuarial (technical) Task Force of the NAIC is charged with maintaining and preserving Schedule P. Only small changes are likely to be made in the future, to reflect changes in the industry or risk based capital. The main concern in the future will be to prevent the NAIC Blanks Committee from weakening Schedule P by eliminating information. Certain large insurers and reinsurers would argue that the NAIC financial reporting should be "modernized" or "simplified" or "deregulated" and that

“unnecessary and wasteful reporting should be eliminated.” These are code words for attempts to eliminate information on reinsurance transactions and claim counts.

As this text by Sholom Feldblum so clearly shows, there is a wealth of information in Schedule P, but most of the information could be easily lost if the NAIC and the actuarial profession are not constantly vigilant to attacks to reduce what has been fought so hard to obtain. This is the constant challenge.

Each year, the information in Schedule P is in wide demand. The NAIC, rating agencies and private companies distribute Schedule P data by CD's shortly after the Annual Statements are filed. This information is used by a wide range of users, including rating agencies, stock analysts in New York, competing companies, and, of course, regulators. Consulting actuaries have developed software programs for sale that will produce analyses of the Schedule P data.

I wish to thank my friend and fellow actuary, Sholom Feldblum, for the extraordinary job that he has done over the years in writing this text and in teaching how to use Schedule P. His efforts are now greatly helping the property/casualty insurance industry in the United States stand apart from the rest of the industries in terms of financial reporting.

– *Richard J. Roth, Jr., June 2002*

COMPLETING AND USING SCHEDULE P

Introduction

PURPOSES OF THE SCHEDULE

Property-casualty insurance is a highly regulated industry. Insurers exchange promises for premiums; their promises are indemnify losses that may not be settled until years after the policy premiums are collected.

Other firm deliver goods, not promises. If a manufacturer becomes insolvent, its owners and creditors lose, but its customer may not even notice; when the wears out and must be replaced, they choose another brand. If an insurer becomes insolvent, its customers – the policyholders – bear the brunt of the loss.

The public relies upon insurers to fulfill their promises, and state regulators are entrusted with safeguarding insurance solvency. Other industries, such as public utilities, may be regulated because – as natural monopolies – they are not sufficiently competitive. Insurers are regulated (in part) because they are extremely competitive – and the rough and tumble of the marketplace may leave their promises unfulfilled.

For some industries, solvency regulation is an accounting task. Regulators audit the company's books to ensure that assets and liabilities are properly accounted for. For property-casualty insurance, solvency regulation is a highly specialized actuarial skill. Solvency risks may be unanticipated by the company, and they may be discerned only by trained analysis of the company's financial statements and historical loss experience.

Schedule P is the regulator's major tool to monitor company solvency and safeguard the public trust. It is designed to measure loss and loss adjustment expense reserve adequacy, both retrospectively and prospectively. It displays historical triangles of losses, claims, and premiums, showing the observed development over the past ten years and enabling the user to estimate future development.

Part 1 of Schedule P is a detailed view of the company's current reserve structure, showing gross and ceded reserves by line of business and type of reserve (loss vs expense and case versus bulk) on an accident year basis.² Part 2 provides a retrospective test, by accident year and line of business, of reserves held in past years. The totals from the one year and two year adverse development exhibits, shown in the Part 2 Summary exhibit, are used for IRIS tests 9, 10, and 11, the NAIC early warning tests of reserve adequacy.

The loss triangles in Parts 2 through 6 provide data for several prospective tests of reserve adequacy. Part 3 displays paid loss triangles, and the difference between Parts 2 and 4 provides reported (or case incurred) loss triangles. Average claim severities, both incurred and paid, may be derived from the claim count figures in Part 5 combined with the loss figures in Parts 2, 3, and 4. Premium triangles are shown in Part 6.

Other Purposes

Schedule P has several other functions as well:

- It shows payments and reserves for losses and loss adjustment expenses by line and by accident year, thereby isolating blocks of business with good or poor experience.
- The accident year figures in Schedule P show the effects of changes in loss reserve margins on the calendar year results reported elsewhere in the *Annual Statement*.
- It provides the loss payment patterns for the federal income tax loss reserve discounting procedure, and it provides the disclosures needed for *grossing up* losses for interest discounts and for anticipated salvage and subrogation.
- It provides the data for computing the reserving risk and the written premium risk charges in the risk-based capital (RBC) formula, and it provides the loss payment patterns for the investment income offsets in the formula.
- It shows the percentage of premiums and losses associated with loss-sensitive contracts for the loss-sensitive contract offset in the risk-based capital formula, and it shows the sensitivity of premiums and of reinsurance commissions to losses on these contracts.
- It separates occurrence from claims-made experience for the risk-based capital claims-made offset.
- It supports the opinion of the Appointed Actuary on loss and loss adjustment expense reserve adequacy.
- It shows the development of exposure year premiums from audits and retrospective adjustments, allowing a more accurate comparison of loss ratios by accident year and providing the information to determine the tax basis earned premium for lines with audits or retrospective adjustments.
- It shows direct plus assumed versus ceded experience, so that the effects of reinsurance on accident year loss ratios can be examined.
- It shows claim count development patterns and changes in average claim severity by year, allowing better analysis of claims department performance.

Schedule P is not limited to solvency regulation and tax filings. It is used extensively by actuaries and financial analysts to estimate a company's net worth. For an experienced reserving actuary, Schedule P provides more information than the SEC's Form 10K.

Schedule P was revised extensively for the 1989 *Annual Statement*, and the first edition of this paper was published in 1990, with subsequent versions after major revisions of the schedule. This paper explains what data are required for the schedule, and how the exhibits should be completed.

Previous editions of this paper had sections on prospective (actuarial) tests of loss reserve adequacy, using a variety of reserving methods, and on the various tax provisions that rely on Schedule P data. These sections have now been separately published; this version of the Schedule P paper focuses on statutory accounting.

Experience

Schedule P shows experience for all lines of business, though the grouping of lines differs from that in the Underwriting and Investment Exhibit. The long-tailed (casualty) lines show the 10 most recent accident years of data plus a prior years row.³

- A. Homeowners/Farmowners
- B. Private Passenger Auto Liability/Medical
- C. Commercial Auto/Truck Liability/Medical
- D. Workers' Compensation
- E. Commercial Multiple Peril
- f. Medical Malpractice (occurrence policies in section 1 and claims-made policies in section 2)
- G. Special Liability (Ocean Marine, Aircraft [All Perils], Boiler and Machinery)
- H. Other Liability (occurrence in section 1 and claims-made in section 2)⁴
- M. International
- R. Products Liability (occurrence in section 1 and claims-made in section 2)

The short-tailed (first party property) lines show the two most recent accident years and a prior years row.

- I. Special Property (Fire, Allied Lines, Inland Marine, Earthquake, Glass, Burglary & Theft)
- J. Auto Physical Damage
- K. Fidelity / Surety
- L. Other (Including Credit, Accident and Health)
- S. Financial Guaranty / Mortgage Guaranty

The data in the prior years row differ among the sections of Schedule P, as explained below.

Summary Exhibits

The Summary exhibits show 10 accident years and a prior years row for all lines of business combined. Ten accident years and a prior years line must be kept for all lines of business.⁵

Illustration: For the 20X9 Annual Statement, Schedule P, Part 1J, "Auto Physical Damage," shows two accident years, 20X8 and 20X9, and a prior years row. To include auto physical damage in the Schedule P, Part 1, Summary exhibit, the company must keep

auto physical damage data for accident years 20X0 through 20X9, along with a prior years row suitable for the 10 year exhibits. The entries in the prior years row in the Part 1J exhibit do *not* equal the data for the prior years row used for the summary exhibit plus the data for accident years 20X0 through 20X7. Separate data must be kept.

IRIS tests 9 and 10, the one-year and two-year retrospective tests of reserve adequacy, are based on the Part 2 Summary exhibit. IRIS test 11, the prospective test of reserve adequacy, uses the one and two-year adverse developments from the Part 2 Summary exhibit.

The Schedule P Exhibits

Part 1 shows cumulative experience by accident year at the Statement date. Most of the figures in Part 1 are audited by an independent CPA, and the *Statement of Actuarial Opinion* should reconcile to the data in Part 1.

Parts 2 through 6 show the supporting historical triangles. Parts 2 through 5 are cumulative *accident year* data. Part 6 is cumulative *exposure year* data, which is the premium equivalent of accident year losses and expenses. The Part 7 *policy year* exhibits are not intended to support the Part 1 information; see the discussion below.

The calendar year premiums in Part 1, columns 1, 2, and 3, are not changed for subsequent earned but unbilled premiums or accrued retrospective premiums. The losses and expenses in the subsequent columns are cumulative accident year figures.

Illustration: In the 20X9 Schedule P, the 20X5 paid loss and expense figures in columns 4 through 10 represent payments from January 1, 20X5, through December 31, 20X9, for accident year 20X5. The 20X5 unpaid loss and expense reserves in columns 13 through 23 are the reserves held on December 31, 20X9.

The treatment of losses and expenses is similar for Parts 2 through 5.

PRIOR YEARS ROWS

The *prior years* row differs among the various Schedule P parts.

- Calendar year earned premiums are not shown for the prior years row in Part 1; the cells are “XXX”ed out. The exposure year earned premiums in the Part 6 prior years row reflect the current calendar year contributions to the old exposure years.
- For the Part 1 prior years row, the loss and expense payments and the salvage and subrogation reimbursements are those made or received in the most recent calendar year; this is not a cumulative amount. This is the same procedure used for the exposure year earned premiums in Part 6.

- For the Part 3 prior years row, the loss and expense payments are those made since January 1 of the *second* calendar year shown along the column headings. For the 20X9 Annual Statement, these are payments made since January 1, 20X1 (not January 1, 20X0.) The top-left corner cell is “XXX”ed out (or has “000”) in these exhibits.
- The unpaid loss and expense reserves in the prior years rows are the reserves for old accident years evaluated at
 - the current statement date for Part 1
 - at each December 31 for Parts 2 and 4
 - at each December 31 for outstanding claims in Part 5.
- The reported claim triangles and closed claim triangles in Part 5 use the Part 3 format, not the Part 1 or Part 6 format.

DATA TYPES

Part 1 shows data separately for *direct and assumed* and for *ceded*, so that readers may judge the effect of reinsurance recoverables on the company’s experience. If the direct and assumed loss ratio is significantly higher than the net loss ratio, the business ceded may be unprofitable. The reinsurers may cancel treaties (or not renew them), raise reinsurance rates, or underwrite facultative business more carefully in future years.

- The *net* loss ratio is influenced by the reinsurance market at the current time: in soft reinsurance markets, the net loss ratio appears better than in hard markets.
- The direct and assumed loss ratio reflects the quality of the primary insurer’s book of business, and it may be a good predictor of both the direct and net loss ratios in future years.⁶

Parts 2, 3, and 4 show historical loss triangles for *net* losses plus defense and cost containment (DCC) expenses; there are no corresponding triangles for direct business.

Part 5 shows historical claim count triangles for direct and assumed business; there are no corresponding triangles for net or ceded business.

Part 6 shows historical development of direct and assumed exposure year earned premium (in section 1) and of ceded exposure year earned premium (in section 2); a net triangle can be formed by subtraction.

Part 7 shows policy year earned premiums, losses, and reinsurance commissions for business written on loss-sensitive contracts. These policy year figures pertain to a portion of the company’s business only; the data cannot be reconciled with other Annual Statement exhibits. Part 7 was designed for the loss-sensitive contract offset in the risk-based capital formula, and it need be completed only by companies seeking this offset.

Before 1998, loss adjustment expenses in Schedule P were divided between allocated and unallocated; allocated loss adjustment expenses are those associated with particular claims, such as legal defense costs and expert medical testimony. For the 1998 and

subsequent *Annual Statements*, loss adjustment expenses were divided between defense and cost containment (DCC) and adjusting and other (AAO); see below. In general, DCC corresponds to ALAE and AAO corresponds to ULAE.

Historical loss triangles for direct and assumed business can be formed by joining the Part 1 exhibits from successive years, though the effort involved usually outweighs the benefits. Changes in intercompany pooling agreements and discrepancies between the Schedule P exhibits of different years distort these triangles and further diminish their value.

Part 1 – Current Valuation

PREMIUMS

Part 1 premiums are recorded by calendar year.⁷ Once entered, they are *frozen*, and they are not adjusted for subsequent earned but unbilled premiums stemming from exposure audits or accrued retrospective premiums stemming from retrospective premium adjustments.

Illustration: An insurance company issues retrospectively rated workers' compensation policies. Worse than expected adverse development on a block of business raises the loss figures and the associated premium figures at subsequent valuations.

- The additional losses are assigned to the appropriate accident years in Parts 1 – 4.
- In Part 1, the additional premiums received are assigned to the current calendar year, not to the years when the policies were issued or the premium was earned.

Part 1 of Schedule P shows overstated loss ratios for the year when the losses occurred and understated loss ratios for the year in which the additional premiums are billed.⁸ The over- and understatement relate to over- and under-estimation of *subsequent* retrospective premium adjustments. The initial estimate of the future retrospective premium adjustment *is* included in the calendar year earned premiums.

More accurate exposure/accident year loss ratios and loss ratio development can be obtained by combining the information in Parts 2 and 6. The illustrations in the discussion below of Part 6 show the difference between the initial estimates of future retrospective adjustments and subsequent revisions of these estimates.

In Part 1 of Schedule P, the prior years row shows payments made or received in the current year, or reserves held on open cases as of the statement date. No figures are shown for premiums on the prior years row, since current calendar year adjustments do not affect previous calendar year premiums.

LOSS AND LOSS EXPENSE PAYMENTS

Columns 4 through 11 show loss and loss expense payments by accident year. For the individual accident years, these are cumulative payments. For accident year 20XX, column 4 shows loss payments on direct and assumed business from January 1, 20XX through the statement date. For the prior years row, the payments are those made in the current calendar year only. For the 20XX *Annual Statement*, these are the payments made from January 1, 20XX through December 31, 20XX.

Salvage and Subrogation Received

Column 4 (direct and assumed loss payments) and column 5 (ceded loss payments) are *net* of salvage and subrogation received.

- **Salvage:** The insurer settles an automobile physical damage claim by paying the \$10,000 blue book value of the car. It sells the damaged car to a repair shop for \$2,000. The company shows \$8,000 as the loss paid in column 4 and \$2,000 as the salvage received in column 10.
- **Subrogation:** The insurer settles an automobile physical damage claim by paying the \$10,000 blue book value of the car. The driver of the other vehicle is negligent and liable for the damages. The company collects the full \$10,000 from the driver of the other vehicle or the driver's insurer. The company shows \$0 as the loss paid in column 4 and \$10,000 as the subrogation received in column 10.

Column 10, salvage and subrogation received, is for information only (termed a memorandum column in the Annual Statement *Instructions*); it is not used to calculate subsequent columns. Column 11, the total net paid column, equals columns 4 – 5 + 6 – 7 + 8 – 9; it does not involve column 10.

Salvage and subrogation is most material for automobile physical damage (Part 1J). Some companies show significant amounts of subrogation for automobile liability (Part 1B) and workers' compensation (Part 1D) as well.

Illustration A: The insurer makes a \$40,000 personal injury protection [PIP] loss payment to its own insured injured in an auto accident in a no-fault state. The driver of the other vehicle was negligent and the damages exceed the tort threshold. The company collects \$25,000 by subrogation from the negligent driver or the negligent driver's auto insurer. The net loss payment in Part 1B, personal auto liability/no-fault, is \$15,000; the subrogation is \$25,000.

Illustration B: The insurer makes a \$40,000 workers' compensation loss payment to its own insured injured in an auto accident while making a business delivery. The driver of the other vehicle was negligent and is liable for the damages. The company collects \$25,000 by subrogation from the negligent driver or the negligent driver's auto insurer. The net loss payment in Part 1B, personal auto liability/no-fault, is \$15,000; the subrogation is \$25,000.

Calendar Year Reconciliation

Schedule P, Part 1, shows cumulative paid losses by accident year. The Underwriting and Investment Exhibit, Part 3, shows paid losses in the most recent calendar year. The Annual Statement cross-checks determine the calendar year paid losses from figures in the current Schedule P and that of the previous year, and they compare these figures with those in the Underwriting and Investment Exhibit.⁹

Illustration: The reconciliation for the 2019 Annual Statement is as follows.

- a. In the 2019 Schedule P, Part 1, column (4) minus column (5), total row (row 12), shows cumulative net loss payments at December 31, 2019, for accident years 2010 through 2019 plus the calendar year 2019 loss payments for accident years prior to 2010.
- b. In the 2018 Schedule P, Part 1, column (4) minus column (5), the sum of rows 3 through 11, shows cumulative net loss payments at December 31, 2018, for accident years 2010 through 2018; we do not include the prior years row or the first accident year (2009).
- c. The difference between (a) and (b) is the calendar year 2019 loss payments.

The calendar year payments for loss plus defense and cost containment (DCC) expenses can be derived from Part 3 of the current year's Schedule P. Part 3 of the Underwriting and Investment Exhibit shows pure loss payments, without the DCC payments.

For the accident year to which losses are assigned, see the discussion below of occurrence versus claims-made business.

LOSS ADJUSTMENT EXPENSES

Before 1998, loss adjustment expenses were divided between allocated loss adjustment expenses (ALAE) and unallocated loss adjustment expenses (ULAE).

- ALAE were adjustment expenses related to particular claims, such as legal defense fees paid to outside counsel.
- ULAE were adjustment expenses that were not related to individual claims, such as claims department rent, utilities, and similar overhead costs.

For pricing insurance policies, most companies include ALAE with losses, using data subdivided by accident year (or policy year), subline, state, and other dimensions; ULAE is generally included as a loading on losses plus ALAE.

The expenses included in ALAE or ULAE differed somewhat by company. A company using outside legal counsel might include the defense costs with ALAE, whereas a company using in-house legal counsel might include the defense costs with ULAE. This presents no problems for individual company ratemaking, though it creates difficulties for bureau ratemaking and for accounting supervision. If some companies code defense costs

as ALAE because they use outside legal counsel and other companies code defense costs as ULAE because they use in-house legal counsel, the aggregate industry data compiled by the rating bureau contains a mixture of definitions and might not be appropriate for any of the companies.

In the 1990's, the rating bureaus, particularly the National Council on Compensation Insurance (NCCI), began standardizing the coding of ALAE vs ULAE. Expenses were classified by type of expense to promote similar coding among companies. Legal defense costs were coded as ALAE, whether inside or outside counsel was used. Companies that used in-house legal counsel allocated the salaries and overhead costs of their attorneys to individual claims.

DCC and AAO: Principles

Some companies were concerned that the rating bureau classification might not be consistent with statutory accounting, which defined ALAE as loss adjustment expenses that were related to particular claims. In 1997, the NAIC Casualty Actuarial (Technical) Task Force (CATF) proposed new definitions of ALAE and ULAE that classified by type of expense; the new definitions were adopted for the 1998 and subsequent Annual Statements. To avoid confusion between the old and new definitions, revised terms were adopted in 1999: defense and cost containment (DCC) for ALAE and adjusting and other (AAO) for ULAE.

Three principles govern the 1998 definitions of loss adjustment expenses:

- The classification is by type of expense, regardless of whether the expense relates to specific claims.¹⁰
- The classification is uniform for all companies. No discretion is permitted for the classification of loss adjustment expenses.¹¹
- The new definitions divide expenses into two groups: expenses that vary with the amount of loss are defense and cost containment, and expenses that vary with the number of claims, or which do not vary with either the amount of loss or the number of claims, are adjusting and other.¹²

The first two principles take precedence if they conflict with the third principle. If an expense is classified by the NAIC as defense and cost containment, the company does not have the option of coding the expense as adjusting and other, even if the company believes that the expense varies with the number of claims and not with the amount of loss.

Schedule P Interrogatory number 2 requires the company to acknowledge that it is using the new definitions:

Interrogatory 2: The definition of allocated loss adjustment expenses (ALAE) and, therefore, unallocated loss adjustment expenses (ULAE), was changed effective 1/1/98. This change in definition applies to both paid and unpaid expenses. Are these

expenses (now reported as “Defense and Cost Containment” and “Adjusting and Other”) reported in compliance with these definitions in the statement?

The expenses classified as defense and cost containment include legal defense fees, the costs of expert witnesses, and fees to professionals working in defense of a claim. The expenses classified as adjusting and other include adjustors’ fees as well as fees to other professionals working as adjustors. General claim department overhead which can not be grouped into a DCC category, such as rent, is classified as adjusting and other.¹³

Illustration: A company uses in-house attorneys for routine claims. For statutory financial statements, the salaries and other employee costs of these attorneys is coded as defense and cost containment and classified by line of business and calendar year. For Schedule P, these costs must also be subdivided by accident year. The legal department allocates the salaries and other employee costs, including the related portions of legal department overhead, to the relevant claims.¹⁴

Declaratory Judgment Actions

The environmental impairment (pollution) liabilities facing the insurance industry are potentially great. The remediation of abandoned toxic waste sites is a major component of pollution liability costs, but the responsibility for these costs is disputed by insurance companies and their policyholders. The primary issue is whether the pre-1986 Commercial General Liability (CGL) policy provided coverage for these liabilities.

After the passage of the CERCLA legislation in 1980 by the Congress, insurers and their policyholders turned to the courts for declaratory judgment regarding the incidence of liability. The courts were asked to judge (to “declare”) which party must pay the remediation costs. Most legal defense costs for pollution cases in the 1980’s and early 1990’s related to attorney fees for these declaratory judgment (DJ) actions.

Before codification, there were three views regarding the allocation of these attorney fees:

1. Insurance companies were paying these legal defense costs to absolve themselves of liability. Legal defense costs for both third party and first party claims are coded as ALAE. The same coding should be used for defense costs stemming from DJ actions.
2. The DJ costs are related not to the defense of claims but to the determination of coverage. They are similar to other adjusting costs and should be coded as ULAE.
3. The DJ costs are not related to claims handling but to policy interpretation. They should be coded as general expenses, not as loss adjustment expenses.

Of these three types of expenses – ALAE, ULAE, and general expenses – only ALAE affects the one-year and two-year adverse loss reserves development tests (IRIS tests 9 and 10), since only ALAE is included in the Schedule P, Part 2, Summary exhibit. The declaratory judgment actions were unanticipated costs, and (for some companies) the adverse development was large.

Under the revised NAIC definitions of loss adjustment expenses, DJ legal fees are coded as adjusting and other, not as defense and cost containment. They do not affect the adverse loss development for IRIS tests 9 and 10.¹⁵

DISTRIBUTION OF ADJUSTING AND OTHER EXPENSES

Most defense and cost containment (DCC) expenses are related to specific claims and can be assigned to accident years. Adjusting and other expenses in columns 8 and 9 are claims department overhead and salaries; they are assigned to accident year by formula.

Schedule P contains columns for direct plus assumed and for ceded adjusting and other expenses. In practice, adjusting and similar claims department expenses are rarely ceded in reinsurance contracts, since they can not be easily measured and associated with individual losses, policies, policy years, or underwriting years.

The distinction between direct plus assumed and ceded applies only to accident years 1997 and subsequent. For accident years prior to 1997, the net adjusting and other expenses are shown as direct plus assumed. There was only a single *net* column for unallocated loss adjustment expenses before 1997, and it would have been difficult for companies to restate the old experience into direct plus assumed and ceded portions.

Until 1997, Schedule P had a mandated formula for distributing ULAE to accident years. In 1997, the distribution rules were changed; instead of a single procedure, there is general guidance. Some companies still use the old procedure, which remains permissible; other companies have switched to new methods. Both approaches are explained below.

Previous Statutory Procedure

The old statutory procedure, which governed the distribution of paid ULAE for calendar years before 1997, was defined in the pre-1997 Schedule P Interrogatory #4 as follows:

The unallocated loss expense payments paid during the most recent calendar year should be distributed to the various years in which losses were incurred as follows: (1) 45 percent to the most recent year, (2) 5 percent to the next most recent year, and (3) the balance to all years, including the most recent, in proportion to the amount of loss payments paid for each year during the most recent calendar year. If the distribution in (1) or (2) produces an accumulated distribution to each year in excess of 10 percent of the premiums earned for such year, disregarding all distributions made under (3) such accumulated distribution should be limited to 10 percent of premiums earned and the balance distributed in accordance with (3).

The assumptions underlying this procedure are

- Half of unallocated loss adjustment expenses are incurred when the claim is reported (costs of setting up files and initial investigations), and half are incurred when the claim is settled (costs of issuing checks and final negotiations).
- 90% of claims are reported during the year when the accident occurred, and 10% are reported the following year.

Unallocated expenses related to claim reporting are assigned to the two most recent accident years in a 9 to 1 proportion, and unallocated expenses related to claim settlement are allocated in proportion to loss payments.¹⁶

Illustration: Distribution of AAO Expenses

Suppose the company has the following 2005 experience for a line of business, all of whose claims are settled within five years:

Exhibit 1.1: Prior Method of Distributing Adjusting and Other Expenses by Accident Year (\$000)

Cal/Acc Year	Earned Premium	Losses Paid in 2005	
2001	8,000	200	Calendar year 2005 adjusting and other expenses paid: 600
2002	8,500	500	
2003	9,000	800	
2004	9,000	2,000	
2005	9,500	2,500	

The calendar year 2005 AAO expenses are \$600,000, of which 45% (\$270,000) is allocated to 2005 and 5% (\$30,000) is allocated to 2004. The remaining \$300,000 is allocated in the same proportion as paid losses. Exhibit 1.2 shows the full distribution to accident year.

Exhibit 1.2: Prior Method of Distributing Adjusting and Other Expenses by Accident Year (\$000)

Cal/Acc Year	Losses Paid in 1995	Paid Loss percentage	Adjusting and Other Distribution:		
			Steps 1 & 2	Step 3	Total
2001	200	3%	0	10	10
2002	500	8	0	25	25
2003	800	13	0	40	40
2004	2,000	33	30	100	130
2005	2,500	42	270	125	395
Total:	6,000	100%	300	300	600

Many medical malpractice, products liability, professional liability, and non-proportional reinsurance claims are not reported until years after the accident date, and insurers providing these coverages spend much time negotiating settlements and handling the claims. The old distribution procedure assigned at least 45% of the calendar year AAO expenses to the most recent accident year. This percentage is too high for lines with long reporting lags.

In addition, the old statutory procedure assumed that half of the AAO was proportional to the amount of the loss settlement. Many components of AAO, such as setting up claim files, are more closely related to the number of claims than to the size of the loss.

Illustration: In the late 1990's and early 2000's, hundreds of thousands of asbestos claims have been filed; the associated AAO expenses are large. All of these claims relate to the prior years row in the products liability or other liability exhibits.

Revised Method

The old statutory procedure had long been recognized as arbitrary before the 1997 changes.¹⁷ By the 1980's, some companies were using more sophisticated ULAE reserving procedures, which associated claims department expenses more accurately with policy years or accident years. In 1989, W. Johnson published a reserving method that associated ULAE entirely with claim reporting and settlement patterns, not with loss payment patterns.

The third Schedule P Interrogatory now says:

The adjusting and other expense payments and reserves should be allocated to the years in which the losses were incurred based on the number of claims reported, closed and outstanding in those years. When allocating adjusting and other expense between companies in a group or a pool, the adjusting and other expenses should be allocated in the same percentage used for the loss amounts and the claim counts. For reinsurers, adjusting and other expense assumed should be reported according to the reinsurance contract. For adjusting and other expense incurred by reinsurers, or in those situations where suitable claim count information is not available, adjusting and other expense should be allocated by a reasonable method determined by the company and described in Interrogatory 7, below. Are they so reported in this Statement?

The Interrogatory seems to mandate an allocation method. The *Annual Statement Instructions* clarify that the method alluded to is preferred but not mandatory:

The "Adjusting and Other" expenses can be assigned in any justifiable way among the accident years. The preferred way is to apportion these expenses in proportion to the number of claims reported, closed, or outstanding each year.

The Schedule P Interrogatory cited above gives a general procedure without specifying the specifics, which may differ by line of business and by company. Part 5 of Schedule P provides histories of claim count information by accident year, facilitating the use of claim counts to distribute adjusting and other expense payments by year.

Illustration: Revised Method of AAO Distribution

Suppose the company determines that for other liability claims, the average 20XX adjusting and other expense costs per claim, based on a random sample of claims, were:

- claims reported during the year (initial investigation and setting up files): \$500
- claims settled during the year (final investigation and payment expenses): \$300
- claims closed during the year with no payment (final investigation): \$200
- claims open at year-end but not reported in the year (general expense): \$100

In this sample, all the claims reported during the year remained outstanding at year-end.¹⁸

We distribute the adjusting and other expenses to accident years in three steps.

- The dollar amounts per claim depend on the time period of the sample, and they increase with inflation in subsequent years. We convert the dollar amounts to relativities, which are not affected by inflation.
- We compile the number of claims reported, outstanding, and closed with and without payment by accident year from Schedule P, Part 5.
- We distribute the calendar year adjusting and other expense payments to accident years by the claim count figures and the relativities.

RELATIVITIES

We denote the cost of maintaining an outstanding claim through the end of the year as one unit of adjusting expense. The cost of closing a claim without payment is two units of adjusting expense, and the cost of settling a claim with payment is three units of adjusting expense.

A reported claim either remains open at the end of the year or is closed (with or without payment) during the year. The costs of reported claims in the sample overlaps with the cost of claims open at year end and claims closed during the year. The average AAO cost of a reported claim should be differentiated according to its status at the end of the year. For simplicity, let us assume that all reported claims in the sample were outstanding at the end of the year. The cost of reporting itself is four units of adjusting expense, so the total cost of a claim reported during the year is five units of adjusting expenses.¹⁹

CLAIM HISTORY

Schedule P, Part 5, shows three types of cumulative accident year direct plus assumed claim count triangles: (i) closed with payment, (ii) outstanding, and (iii) reported. A triangle of claims closed without payment may be formed by subtraction:

$$\text{reported} - \text{outstanding at year end} - \text{closed with payment} = \text{closed without payment}.$$

The Schedule P triangles show cumulative claim counts; incremental (calendar year) claim counts are needed for distributing AAO payments. The incremental counts are the difference between the cumulative counts at the current valuation date and the cumulative counts in the preceding column. For the prior years row, the entry in the final column is the incremental amount, not the cumulative amount, so no further calculation is needed.

Suppose we must distribute \$10 million of calendar year 20X9 adjusting and other expense payments by accident year. We calculate the following incremental 20X9 claim count figures:

Exhibit 1.3: Reported, Outstanding, and Closed Claims by Accident Year

<i>Accident Year</i>	<i>Reported</i>	<i>Closed with Payment</i>	<i>Closed w/o Payment</i>	<i>Outstanding</i>	<i>Weighted Claims</i>	<i>Distribution</i>
Prior	0	5	0	5	20	0.0020
20X0	0	10	0	10	40	0.0040
20X1	0	15	0	20	65	0.0065
20X2	0	25	0	30	105	0.0105
20X3	10	40	5	55	225	0.0225
20X4	15	60	10	80	340	0.0340
20X5	25	80	10	120	480	0.0480
20X6	50	100	10	180	700	0.0700
20X7	125	150	15	300	1,280	0.1280
20X8	275	215	50	400	2,245	0.2245
20X9	800	200	100	500	4,500	0.4500
Total	1,300	900	200	1,700	10,000	1.0000

The *weighted claims* for each year is the sum of the entries in the four preceding columns times the relativities for each type of claim. For example, the weighted claims for accident year 20X9 is $800 \times 4 + 200 \times 3 + 100 \times 2 + 500 \times 1 = 4,500$.

DISTRIBUTION

The distribution of adjusting and other payments by accident year is proportional to the distribution of weighted claims by accident year. The total calendar year 20X9 adjusting

and other expense payments is \$10 million, and the total incremental weighted claims for all accident years at December 31, 20XX, is 10,000. The distribution of AAO payments to accident year 20X9 is $\$10,000,000 \times 4,500 / 10,000 = \$4,500,000$.

The \$4,500,000 is the incremental AAO for accident year 20X9 in calendar year 20X9. Similarly, the incremental AAO for accident year 20X8 in calendar year 20X9 is \$2,245,000.

Schedule P requires cumulative figures. The cumulative AAO for accident year 20X8 at statement date December 31, 20X9, equals \$2,245,000 plus the cumulative AAO for accident year 20X8 at statement date December 31, 20X8. Similar computations are done for the other accident years. The prior years row in Schedule P, Part 1, shows the current calendar year activity, so the entry is $0.20\% \times \$10,000,000 = \$20,000$.

From the Schedule P interrogatory, it might seem that the old statutory distribution method is no longer permitted, since it is not based on the number of claims reported, closed and outstanding. This is not the intention. Dick Roth, who drafted the new interrogatory, explains that the old statutory method is indeed based on the number of claims reported, closed and outstanding. However, it also makes assumptions about the way that AAO is paid: 50% when the claim is reported and 50% when the loss is paid. The current procedure no longer requires companies to make this assumption.²⁰

POOLING AND REINSURANCE AAO

When allocating AAO among companies in a pool, one should use the same method used to allocate losses and claims to the participating companies, *not* the number of claims reported, closed and outstanding. Suppose that Companies A and B participate in a pool. If Company A gets 40% of the losses and Company B gets 60% of the losses, then Company A gets 40% of the AAO and Company B gets 60% of the AAO. Companies A and B then allocate their respective percentages of the AAO to accident years according to a claim count method.

The amount of AAO assumed by a reinsurance company depends upon the reinsurance contract. If the contract is a 50% pro-rata treaty, the contract may specify that the reinsurer also assumes 50% of the AAO. If the reinsurer does not have the claim counts of the underlying business it may use another method to distribute AAO to accident years. AAO expenses are generally not ceded in reinsurance treaties, so this issue is rarely material.

CLAIM COUNTS

Column 12 shows the number of claims reported on direct and assumed business. The lines of business may be grouped into three categories with respect to claim count coding:

- Reported claim counts are shown for nine lines of business: homeowners/farmowners, personal auto liability, commercial auto liability, workers' compensation, commercial

multiple peril, other liability, medical malpractice, auto physical damage, and products liability. For these lines, claims outstanding are shown in column 25 and claims closed with and without payment are shown in Schedule P, Part 3.

- The remaining *primary* lines of business show the number of claims outstanding in column 25, but they need not show the reported claims or the number of claims closed with and without payment.²¹
- The non-proportional reinsurance lines (A, B, and C) need not show any claim counts. Claim counts are difficult to assign to non-proportional reinsurance:
 - An explosion in a large factory may reverberate through several excess reinsurance layers and their retrocession agreements. Rules for the percentage of a claim shown by each reinsurer would be arbitrary.
 - An aggregate retention in an excess-of-loss treaty would cause a reinsurance recoverable stemming from the complete book of business. There is no claim count.

Average Claim Severities

Claim count information can be used in several ways. Cumulative losses paid to date divided by cumulative claims closed with payment provides the average paid claim cost. A comparison of a carrier's trend in average claim cost by accident year for a given line of business with either industry averages or inflation indices may help identify deteriorating or improving books of business.

Similar ratios may be formed from other claim count figures. As examples,

- Cumulative losses reported to date divided by the sum of claims closed with payment and outstanding claims shows the average incurred claim cost for non-frivolous claims.
- Outstanding case reserves divided by outstanding claims shows the average size of case reserves. A comparison of trends in this ratio with trends in average paid claim costs may identify strengthening or weakening case reserve adequacy.²²

Claims may be counted either per claim (i.e., per accident) or per claimant. Automobile liability insurance illustrates the difference. If an insured driver causes an accident and injures three other persons, each of whom seeks bodily injury compensation, are there three claims or one claim? Carriers may use either definition, but they must be consistent for all lines. The choice is reported in Schedule P Interrogatory 6:

6. Claim count information is reported (check one): (a) per claim _____
(b) per claimant _____

Direct and Assumed vs Ceded

Claim count information in Schedule P uses direct and assumed business, not ceded or net business. The assumed business on the primary lines of business is assumed

proportional business, whereas the ceded business on the primary lines of business includes ceded non-proportional business.

Assumed claim counts on proportional reinsurance arrangements uses the same proportion as losses. With regard to intercompany pooling agreements, for instance, the Annual Statement *Instructions* say

Claim counts should be reported in accordance with the pooling arrangement and should reflect the company's proportionate share of the total number of claims. If the company's losses are 40% of the pool, then 40% of the claim counts should be reported.

The same procedure is used for proportional reinsurance arrangements between unaffiliated entities.²³ For non-proportional reinsurance, there is no simple way to determine the number of claims ceded or assumed, since the percentage of a claim that is ceded depends on the size of the claim. For this reason, ceded and net claim counts are not shown for any line, and assumed claim counts are not shown for non-proportional reinsurance.

LOSS AND LOSS EXPENSE RESERVES

Columns 13 through 25 show data by accident year on unpaid amounts: losses, loss expenses, anticipated salvage and subrogation, and claims.

Before 1989, Schedule P, Part 1F showed IBNR reserves separately from case reserves. It was unclear whether the development on reported cases should be classified as IBNR or as case reserves, and insurers chose different definitions of IBNR. To avoid inconsistency among companies, Schedule P divides reserves between case reserves and bulk plus IBNR reserves. All actuarial reserves, whether for development on reported cases or emergence of unreported cases, comprise the bulk plus IBNR reserves.²⁴

Actuarial bulk reserves for reported claims are not necessarily a sign of under-reserving, as long as the company sets proper total reserves.

Illustration: A workers' compensation carrier reports 1,000 claims for lower back sprains and strains. Most workers with such injuries return to work within a few weeks, though some are permanently disabled. The insurance company can not identify the claims that will develop into permanent cases. Some companies augment the individual case reserves to fund the claims that develop adversely; other companies use bulk reserves.

Many claims examiners set a single case reserve for both losses and defense and cost containment expenses. For these companies, the case basis direct plus assumed (column

17) and ceded (column 18) reserves for defense and cost containment expenses unpaid are zero, and the appropriate bulk reserves are shown in columns 19 and 20.

Illustration: A claims adjuster sets a \$1 million reserve for a general liability claim. The reserving actuary estimates that 20% of the amount will be used for defense and cost containment expenses. The appropriate entries in Schedule P would be +\$1 million as the case basis losses unpaid, -\$200,000 as the bulk losses unpaid, and +\$200,000 as the bulk defense and cost containment expenses unpaid.²⁵

Retroactive Reinsurance

Prospective reinsurance is the transfer of the risk of losses that have not yet occurred; retroactive reinsurance is the transfer of losses that have already occurred, though they have not yet been settled and some have not even been reported yet. Retroactive reinsurance might be used to circumvent statutory requirements to hold full value (undiscounted) reserves.

Illustration: A block of unpaid losses has an ultimate (full) value of \$100 million and a present value of \$78 million. The primary company transfers the losses to a reinsurer with a payment of \$80 million. The reinsurer gains \$2 million of economic income, and the primary company gains \$20 million of statutory income.

GAAP treats prospective and retroactive reinsurance similarly, except that the gain from prospective reinsurance is recognized over the policy term and the gain from retroactive reinsurance is recognized ratably over the settlement lifetime of the claims.

For statutory accounting, retroactive reinsurance increases total surplus, but it does not immediately affect unassigned surplus. Retroactive reinsurance has no effect on the loss reserves shown on Annual Statement exhibits or schedules (i.e., the Underwriting and Investment Exhibit and Schedule P). The reinsurance is not coded as ceded business in Schedule P, it does not reduce loss reserves on line 1 of page 3, and it does not affect Parts 3 or 3A of the Underwriting and Investment Exhibit. Instead, the reinsurance recoverable is coded as a write-in contra-liability on line 22 of page 3 and an offsetting entry on line 24, "aggregate write-ins for special surplus funds."

RETROACTIVE REINSURANCE ACCOUNTING ILLUSTRATION

On December 31, 20XX, \$100 million of loss reserves are reinsured retrospectively for \$80 million. The accounting entries are as follows:

December 31, 20XX:

	<u>Debit</u>	<u>Credit</u>
Balance sheet: Case loss reserve:		(No change)
Income statement: Other income:		\$20,000,000
Balance sheet: Cash paid:		\$80,000,000
Balance sheet: Contra-liability for reinsurance recoverable:		-\$100,000,000
Balance sheet: Special surplus funds:		\$20,000,000 ²⁶

Note 22F to the *Annual Statement* discloses the following five items, by calendar year, for all retroactive reinsurance agreements “that have already occurred and that will generate special surplus transactions”:

- a. Reserves transferred;
- b. Consideration paid or received;
- c. Paid losses reimbursed or recovered;
- d. Special surplus from retroactive reinsurance; and
- e. The cedants and reinsurers included in items (a) through (d)

For explanation and illustration of this note, see Yoheved and Feldblum [2003: notes].

Anticipated Salvage and Subrogation

Before 1991, statutory accounting required insurers to hold loss reserves gross of anticipated salvage and subrogation, whereas GAAP statements showed reserves net of anticipated salvage and subrogation.²⁷

Illustration: A policyholder’s car is damaged in a collision; the insurer expect to pay the blue book value of \$5,000 and to receive salvage of \$2,000 on the damaged vehicle. For GAAP statements, the company sets up a loss reserve of \$3,000. For pre-1991 statutory statements, the company set up a loss reserve of \$5,000; the salvage was not recognized until it was received.

The Internal Revenue Service bases taxable income on Annual Statement figures. In 1991, the Treasury amended its deduction for incurred losses to permit only reserves *net* of salvage and subrogation anticipated as an offset to taxable income (see Rev. Proc. 91–48 1991–34 I.R.B. 1), just as it allows only discounted reserves as an offset to taxable income. It presumed that Schedule P reserves were gross of anticipated salvage and subrogation, and it reduced these figures to a net basis. The Treasury determines anticipated salvage and subrogation on a formula basis, just as it determines the loss reserve discount on a formula basis.

For many insurers, Schedule P reserves were net of anticipated salvage and subrogation even before 1991, despite the statutory regulation to the contrary.²⁸ To avoid a double reduction for anticipated salvage and subrogation, with the corresponding overstatement of taxable income and of the federal income tax liability, the NAIC allowed insurers to

report reserves net of anticipated salvage and subrogation for the 1991 and subsequent Annual Statements and to gross up the reserves for federal income tax purposes.²⁹

The Treasury allows insurers to gross up their loss reserves for anticipated salvage and subrogation only if the amount of the reduction is disclosed in the Annual Statement.³⁰ Column 23, "salvage and subrogation anticipated," shows this disclosure. It is not used in the Schedule P calculation of the net incurred losses, since loss reserves in columns 13 and 15 are already net of the anticipated salvage and subrogation amounts in column 23, just as the Schedule P paid losses in column 4 are net of salvage and subrogation received in column 10. A similar disclosure of anticipated salvage and subrogation is made in the Statement of Actuarial Opinion Regarding Loss and Loss Adjustment Expense Reserves, paragraph 9(a).³¹

Companies may use either of two methods to report anticipated salvage and subrogation: the case reserves in columns 13 and 14 may be shown net of anticipated salvage and subrogation, or the case reserves may be shown gross of anticipated salvage and subrogation, and the anticipated amounts (for both reported and IBNR claims) may be an offset to the bulk reserves in columns 15 and 16.³²

Distributing Unallocated Expense Reserves

For several reasons, an insurer may place less emphasis on adjusting and other reserves:

1. The AAO reserve is relatively small and not subject to much uncertainty.
2. The AAO reserves are not included in the NAIC retrospective reserve adequacy tests (IRIS tests 9 and 10), and there is no cross-check in the Annual Statement for these reserves.
3. Some companies dispute the need to hold AAO reserves, reasoning as follows:

Losses are an expense when they occur, even if the loss has not yet been paid or even reported. Defense and cost containment expenses (ALAE) are associated with particular claims, so they have the same accounting treatment as those claims. But adjusting and other expenses are claims department overhead. Just as underwriting department overhead flows through income when it is incurred, so claims department overhead should flow through income when it is incurred.

This reasoning is not correct. The underwriting department overhead is incurred for policies written during that time period, so the expense flows through the income statement for that time period. The claims department overhead is incurred (in part) for claims that occurred during previous accounting periods. A reserve is established when the claims occur.^{33 34}

Because AAO reserves are not associated with particular claims or accident years, some companies determine a general reserve that is then distributed to accident years. Before 1997, there were no instructions for this distribution. Some companies used the rationale

for the distribution of unallocated expense payments to accident years and assumed that the bulk plus IBNR reserves consist of pure IBNR, not development on known cases. The unallocated expense reserves were distributed in the same proportion as case reserves plus twice the IBNR reserve. This procedure is still used by many companies.³⁵

These assumptions are not entirely accurate. In particular, much IBNR is development on reported cases, so the second assumption over-weights the proportion of the reserves for AAO expenses associated with IBNR claims.

Schedule P Interrogatory #3 now requires AAO reserves to be allocated to accident years based on "the number of claims reported, closed, and outstanding."³⁶ Some companies use reserving methods patterned Johnson [1989]. The parameters of the reserving method, such as the percentage of AAO expenses to be ascribed to claim reporting or to claim payment, vary by line of business and by company; there is no standard method.

Claims Outstanding

Column 25 shows the number of claims outstanding on direct and assumed business. Column 25 must be completed for all primary lines of business, though not for the three reinsurance lines.³⁷ The ratio of case reserves in column 13 (or case reserves plus DCC reserves in columns 13 plus 17) to column 25 shows the average value of an outstanding claim. This ratio must be used with caution, for two reasons:

- Workers' compensation, auto no-fault, and accident & health provide periodic payments for the duration of a disability. The case reserves show only the remaining unpaid losses, not the entire benefits, so the ratio of case reserves to claims outstanding understates the value of an outstanding claim. This understatement increases as the claims mature.
- Smaller, simpler cases are settled more rapidly than larger, more complex cases, particularly in the tort liability lines of business.
- Loss development on reported cases is included in the bulk reserves shown in column 15, not in the case reserves of column 13. One can not include column 15 in calculating the average value, since this column includes IBNR reserves, and IBNR claims are not included in column 25. If there is significant loss development on reported cases, then the ratio noted above understates the value of an outstanding claim.

ILLUSTRATION: OUTSTANDING CLAIM SEVERITY

The following illustration shows the difficulties of interpreting average severity patterns.³⁸

Exhibit 1.4: Outstanding Claim Severity

<i>Year</i>	<i>Net Premium</i>	<i>Net Unpaid Loss + LAE</i>	<i>Direct + Assumed Outstanding Claims</i>	<i>Outstanding Claim Severity</i>
Prior		\$800,000	13,650	\$58,608
20X0	\$1,800,000	\$230,000	2,600	\$88,462
20X1	\$2,650,000	\$320,000	3,400	\$94,118
20X2	\$2,800,000	\$330,000	4,400	\$75,000
20X3	\$2,800,000	\$360,000	5,400	\$66,667
20X4	\$2,650,000	\$325,000	6,600	\$49,242
20X5	\$2,500,000	\$530,000	8,800	\$60,227
20X6	\$2,250,000	\$650,000	10,000	\$65,000
20X7	\$2,000,000	\$715,000	14,250	\$50,175
20X8	\$1,650,000	\$750,000	23,000	\$32,609
20X9	\$1,300,000	\$880,000	42,000	\$20,952

- For accident years 20X2 and prior, the outstanding claims are lifetime pension cases. The increasing severities reflect inflation and the weekly payment pattern. The pension claims in the prior years row stem from old years with average claim ages of 15 to 20 years; the severities reflect only the amount still unpaid.
- For accident years 20X2 through 20X4, the pension cases are increasingly mixed with permanent partial cases, and the average outstanding claim severities decrease.
- The company began switching business to large dollar deductible policies in 20X4, as the decline in net earned premium shows. The higher outstanding claim severities in 20X5 and 20X6 reflects the higher average costs of excess claims. (LDD reserves are net of the expected reimbursement from the employer; see Feldblum [2003: WCR, Volume 2, Book 2].)
- The claims in accident years 20X7 through 20X9 are increasingly dominated by temporary cases, and much of the reserves are bulk, not case reserves. The average outstanding claim severities decline, despite the increasing use of large dollar deductible policies.

Loss Ratios

Columns 26 through 31 are calculated figures.

- Column 26, "Total losses and loss expenses incurred, direct and assumed," is the sum of columns 4, 6, 8, 13, 15, 17, 19, and 21.
- Column 27 (ceded) is the sum of columns 5, 7, 9, 14, 16, 18, and 20.
- Column 28 (net) is column 26 minus column 27, or the sum of columns 11 and 24.

- Columns 29 through 31, “Loss and loss expense percentage (Incurred / Premiums Earned)” for direct and assumed, ceded, and net business are the ratios of columns 26 through 28 to columns 1 through 3, respectively.

Industry-wide averages by line of business of column 31 for 1983-1992 were used to determine the written premium charge in the NAIC risk-based capital formula. The average company ratio in column 31 is used for the company adjustment to the written premium risk charge in the risk-based capital submission; see Feldblum [RBC: 1996].

These ratios are gross of non-tabular discount and net of tabular discount. Columns 32 and 33 show the non-tabular discount for losses and loss adjustment expenses, respectively.³⁹ Outside analysts use the ratios to assess the company’s underwriting performance in absolute terms, in comparison with other insurers, and in comparison with past performance.

INTERCOMPANY POOLING

Column 34 shows the company’s participation percentage in an intercompany pooling arrangement, if applicable. Member companies of an insurance group often redistribute premiums, losses, and loss adjustment expenses according to participation formulas.

Intercompany pooling is discussed in Feldblum [2003: Notes] and is not repeated here. The comments below explain the pooling restatements needed for Schedule P.

A change in a company’s pooling percentage may distort the Schedule P development.

Illustration: A member company of an insurance group receives 40% of the pooled business in 20X4. In 20X5, its pooling participation percentage changes to 70%. Leaving the original 40% participation for 20X4 may distort the loss development patterns: its loss payments and reserves were 40% of the group total in 20X4 but 70% of the total in 20X5. Its loss triangles would show jumps in both payments and reserves between 20X4 and 20X5. To facilitate the use of the loss development patterns, the company restates all past figures to a 70% participation percentage.

If the pooling percentage changes, the individual company historical figures in the current Schedule P will not agree with the entries of previous years. Rather, for any accident year, the Schedule P entries divided by the pooling percentage in column 34 should reconcile with the Schedule P entries in previous years divided by the pooling percentage.⁴⁰

The need for loss triangles to forecast accurately future development argues for even more comprehensive restatements of past experience.

Illustration: An insurer incorporates a new subsidiary in 20XX and gives it 40% of its total business. Premiums and losses for this subsidiary were zero before 20XX, as the

company did not yet exist. But if the parent company gets 100% of the business before 20XX, but only 60% in 20XX and subsequent years, its loss development triangles will be distorted. According to Richard Roth, the subsidiary should be given 40% of the business for all years, even when it did not exist, and the parent company should be given 60% of the business for all years.

Treaty commutations affect both the reported and paid loss development patterns. The same logic would dictate that both the ceding and assuming carriers restate their experience after a treaty commutation. Carriers commute individual claims in addition to whole treaties, such as lifetime pension claims in workers' compensation, long term disability claims in accident and health insurance, and structured settlements in other liability. The analyst completing *Schedule P* is not always aware of these commutations and could not restate past figures.

In theory, when a commutation affects the loss development patterns, the effects should at least be disclosed in Question 7 of the *Schedule P* Interrogatories. In practice, a company may note that commutations have occurred, but it would not try to quantify the effects.⁴¹

Similar problems exist for primary companies when their reinsurers become insolvent. Loss reserves are net of reinsurance recoverables in the Schedule P triangles. If a reinsurer becomes insolvent, the ceded reserve drops to \$0 and the net reserve increases. Even if the primary company had been aware of the potential insolvency, the loss reserves are net of the recoverable, and the provision for reinsurance separately adjusts the company's surplus for the expected uncollectible amounts (see Feldblum [2003:SchF]). When reinsurance recoverables are written off, disclosure in Schedule P Interrogatory Number 7 is appropriate.

OCCURRENCE AND CLAIMS-MADE BUSINESS

To facilitate the calculation of the risk-based capital claims-made offset, three lines of business were segmented into occurrence and claims-made portions in 1993, and the disclosure of extended loss and expense reserves was put into a Schedule P interrogatory.

Occurrence policies provide coverage for accidents that occur during the policy period, regardless of when the claims are reported. Claims-made policies provide coverage for accidents that are reported during the policy period. Most claims-made policies limit coverage to accidents that occur after the *retroactive date*, or the date that claims-made coverage was first issued to the policyholder. Claims-made coverage is used primarily for medical malpractice insurance, certain other professional liability insurance, and some products liability insurance.⁴²

Tail Coverage

The coverage restrictions on claims-made policy forms can inhibit movement from one insurance company to another.

Illustration: A physician is covered during 20X4 under a claims-made policy with one insurer. On January 1, 20X5, the physician switches to a claims-made policy with a second insurer. The new claims-made policy has a retroactive date of January 1, 20X5.

The first insurer will not indemnify claims that are reported after the old coverage ends on December 31, 20X4; the second insurer will not indemnify claims that occurred before the retroactive date. To cover claims that occur during the claims-made period with the first insurer but are reported subsequent to its termination, the physician purchases tail coverage from the first insurer. The tail coverage covers claims that occur during the claims-made period but are reported after its termination.⁴³

Tail coverage is also used if the physician leaves his or her practice and longer needs full insurance coverage.

Illustration: A physician leaves private practice to join an HMO. The HMO has medical malpractice coverage for its staff, and the physician no longer needs an individual policy. The physician may still need a tail policy to cover accidents that occurred before the physician joined the HMO.

Extended Tail Coverage

If a physician stops practicing because of retirement, disability, or death, he or she (or the estate) still needs tail coverage for late reported claims. To avoid burdening the retired or disabled physician (or the estate) with the high costs of tail coverage, some insurers spread this cost over the term of the claims-made coverage and provide free (or reduced cost) tail coverage in the event of retirement, disability, or death.

Illustration: The cost of annual claims-made coverage for an obstetrician is \$40,000. The insurer may charge \$48,000, and use the extra \$8,000 a year to build up a reserve for free tail coverage in the event of retirement, disability, or death.

The extended loss and expense reserve is not a loss reserve, since the claims have not yet occurred. It is not shown in the Schedule P exhibits. It is akin to life insurance policy reserves, or to an active life reserve in disability insurance.⁴⁴ It is shown on the insurer's balance sheet as a write-in line on page 3, but there is no exhibit in the property-casualty Annual Statement that discloses it. Instead, the extended loss and expense reserves by accident year and by line of business (for medical malpractice, other liability, and products liability) are shown in the first Schedule P interrogatory.

RBC Underwriting Risk Charges

The separate occurrence and claims-made exhibits for medical malpractice, other liability, and products liability stem from the risk-based capital underwriting risk charges. The paragraphs below provide a brief summary; see Feldblum [1996: RBC] for further explanation.

The reserving risk and written premium risk charges in the risk-based capital formula are determined from Schedule P data. Reserving risk is the risk that unanticipated events may increase the company's obligations for past claims.

Illustration: A company has \$100 million of medical malpractice loss reserves. In a worst case adverse scenario, as defined by the NAIC's risk-based capital formula, the reserves may develop adversely by 56.5% to \$156.5 million. The RBC formula assumes that the present value of medical malpractice loss reserves is 80.8% of the undiscounted value. The company needs $\$156.5 \text{ million} \times 80.8\% = \126.5 million of assets to guard against unanticipated adverse development.

The adverse loss development may result from two causes: (a) the emergence of late reported claims, or pure IBNR loss emergence, and (b) increases in the loss estimates for reported claims, or development on known claims. Claims-made business has no pure IBNR loss emergence. Some companies argued that claims-made business should show less adverse loss development, and it needs a smaller reserving risk charge.

To quantify the difference in adverse loss development between occurrence and claims-made business, the NAIC segmented the Schedule P exhibits for three lines of business into occurrence and claims-made portions in 1993. These three lines – medical malpractice, other liability, and products liability – include almost all the claims-made business written in the property-casualty insurance industry. A 20% offset to the reserving risk charge and the written premium risk charge is given to claims-made medical malpractice business.

Post Codification Tail Coverage Accounting

Tail coverage converts claims-made coverage into occurrence coverage. Like occurrence policies, it covers losses which occur during a certain period, regardless of when they are reported. Tail coverage is appended to claims-made policies, but it is included with the Schedule P occurrence exhibits, not the claims-made exhibits.

Post-codification statutory accounting for tail coverage depends on the duration of the tail.

- If the tail has an indefinite term, the full premium is earned when the policy is issued and a bulk loss reserve is established for the estimated future losses. There is no unearned premium reserve, and all reserves are shown in Schedule P.
- If the tail has a definite (limited) term, the premium is earned over this period. An unearned premium reserve is established on the effective date of the policy and amortized over the policy term. Case loss reserves are set up as the losses are

reported. Bulk loss reserves are needed for adverse development on known claims, not for the emergence of IBNR claims. The only reserves shown in Schedule P are those for known cases.⁴⁵

Illustration: A physician with claims-made medical malpractice coverage switches from Insurer A to Insurer B on January 1, 20X5. To cover liability for accidents occurring before January 1, 20X5, but reported afterwards, the physician purchases tail coverage from Insurer A on December 31, 20X4 for a premium of \$15,000.

If the tail policy has an unlimited duration (an *indefinite term*), the earned premium on December 31, 20X4 is \$15,000. A bulk reserve is established on December 31, 20X4, for the expected future claims, which may be more or less than \$15,000.⁴⁶ The bulk reserve is shown in Schedule P for accident year 20X4.

If the tail policy has a three year term (a *definite term*), the written premium on December 31, 20X4, is \$15,000, the unearned premium reserve is \$15,000, and the 20X4 earned premium is \$0. The unearned premium reserve is amortized over three years, either ratably over the policy term (\$5,000 each year) or in proportion to the expected protection. If the insurer expects the claims over the three years to be *reported* in a 7:5:3 proportion, the amortization schedule may be \$7,000 in 20X5, \$5,000 in 20X6, and \$3,000 in 20X7.

As claims are reported, case loss reserves are established. There is no bulk reserve for claims expected to be reported in the three year period; these claims are covered by the unearned premium reserve. If the insurer believes that the unearned premium reserve for the block of business is inadequate, a premium deficiency reserve (not a loss reserve) is established.⁴⁷ Bulk reserves are needed only for adverse development on known claims.

Under post codification statutory accounting rules, tail coverage with an indefinite term is like occurrence coverage, and tail coverage with a definite term is like claims-made coverage. In theory, tail coverage with an indefinite term should be reported on the occurrence exhibits, and tail coverage with a definite term should be reported on the claims-made exhibits. Tail coverage with a three year term is no different from a three year claims-made policy.

The Schedule P rules stipulate that all tail coverage is reported on the occurrence exhibits. The Schedule P rules pre-date the post codification accounting principles for claims-made coverage: the Schedule P rules were made in 1993, whereas the post codification statutory accounting rules for claims-made policies were not effective until 2001.⁴⁸

Loss Date

The first column caption in Parts 1 through 6 says “years in which premiums were earned and losses were incurred.” Part 7 uses policy year experience, so its caption is “years in which policies were issued.” There is no reference to *accident year* in the column captions, though we speak of Schedule P as an accident year schedule. The date when losses are incurred means the date the insurer incurs the obligation for the loss. This date differs by type of policy:

- For occurrence policies, this is the date that the loss occurs.
- For claims-made policies, this is the date that the loss is reported to the insurer.⁴⁹
- For tail coverage, this is the date that the policy is issued.
- For fidelity and surety, this is the date that the loss is discovered.⁵⁰

Illustration: An accident covered by a medical malpractice policy occurs in 1993 and is reported in 1997.

- If the physician had an occurrence policy in 1993, the occurrence year is 1993.
- If the physician had claims-made coverage from 1993 through 1997, the occurrence year is 1997.
- If the physician had claims-made coverage from 1993 through 1995, and purchased tail coverage on December 31, 1995, the occurrence year is 1995.

EXCESS STATUTORY RESERVES

Until the codification of statutory accounting in 2001, excess of statutory over statement reserves were determined in Schedule P for certain long-tailed lines of business whose reported experience in the most recent accident years seemed overly optimistic. These reserves did not affect statutory income, taxable income, GAAP income, or GAAP equity.

The excess of statutory over statement reserves were eliminated in 2001. The formula used to calculate these reserves was not an accurate measure of reserve adequacy, and use of this formula contravened the recognition principle of post-codification statutory accounting. Instead, the adequacy of Schedule P reserves is monitored in three ways.

- The Statement of Actuarial Opinion requires a qualified *Appointed Actuary* to opine on the reasonableness of the company’s reserves. The report of the Appointed Actuary must reconcile the opinion with Schedule P, Part 1.
- The reserve adequacy tests performed with the historical loss triangles in Schedule P, Parts 2, 3, 4, and 5, provide actuarial tests of reserve adequacy; this reserve adequacy testing is the primary purpose of Schedule P.
- Periodic financial examinations by the state insurance departments provide additional tests of reserve adequacy.

STRUCTURED SETTLEMENTS

Retroactive reinsurance does not affect the Schedule P entries, since it may be misused to discount reserves and circumvent statutory accounting principles. Structured settlements are similar to retroactive reinsurance. However, structured settlements are used primarily for the benefit of claimants, not to implicitly discount the statutory reserves. Structured settlements can distort the Schedule P loss development patterns, reducing the reported loss age-to-age factors and increasing the paid loss age-to-age factors. For GAAP and statutory accounting treatment of structured settlements, see Feldblum [2003: Notes].

Commutations are the reverse of retroactive reinsurance. They have the opposite effect on Schedule P observed loss development as structured settlements have.

Auxiliary Exhibits

SCHEDULE P TRIANGLES

For each line of business, Schedule P has three loss triangles; for most lines, it also has three claim count triangles and two premium triangles.

- Part 2: net incurred losses and defense and cost containment (DCC) expenses.
- Part 3: net paid losses and DCC expenses.
- Part 4: net bulk and IBNR reserves for losses and DCC expenses.
- Part 5: direct and assumed claims closed with payment (section 1), claims outstanding (section 2), and claims reported (section 3).
- Part 6: earned premiums by exposure year, direct and assumed (section 1) and ceded (section 2).

Schedule P, Part 7, shows triangles of policy year premiums and losses and of reinsurance commissions. These triangles show transactions on loss sensitive business only. They are designed for the risk-based capital submission, not for monitoring reserve adequacy.

Derived Triangles

Other loss exhibits can also be formed. The incurred losses in Part 2 are the sum of paid losses, case reserves, and bulk reserves. A triangle of reported losses (also termed case incurred losses, or paid losses plus case reserves) can be formed as Part 2 minus Part 4. A triangle of outstanding case reserves can be formed as Part 2 minus Part 4 minus the Part 3. Other commonly used triangles for monitoring loss reserve adequacy are the following:

- *Net* exposure year earned premium formed as the Part 6 direct plus assumed exposure year earned premium minus the ceded exposure year earned premium.

- Net loss ratios formed in one of two fashions: (a) Part 2 net incurred losses divided by Part 1 net earned premium, or (b) Part 2 net incurred losses divided by net exposure year earned premium derived from Part 6.
- Total direct plus assumed claims closed (both with and without payment) as Part 5 direct plus assumed reported claims minus Part 5 direct plus assumed outstanding claims.

Average severity triangles are also frequently used in loss reserve adequacy testing:

- Average paid loss severity formed as the Part 3 net paid losses divided by the Part 5 direct plus assumed closed claims, either in total or closed with payment only.
- Average reported claim severity formed as the net reported losses (Part 2 minus Part 4 triangles) divided by the Part 5 direct plus assumed reported claims.
- Average outstanding case reserves formed as the net outstanding case reserves (Part 2 minus Part 4 minus Part 3) divided by the Part 5 direct plus assumed outstanding claims.⁵¹

LOSS ADJUSTMENT EXPENSES

Each loss triangle includes defense and cost containment expenses, but not adjusting and other expense.⁵² The Underwriting and Investment Exhibit shows all unpaid loss adjustment expenses by line of business in Part 3A, page 11, column 9. The division between unpaid DCC and AAO loss adjustment expenses by line can also be found in the Insurance Expense Exhibit, columns 15 and 17, in both Part 2 (net business) and Part 3 (gross business).

Before 1998 the NAIC differentiated between allocated loss adjustment expenses (ALAE) and unallocated loss adjustment expenses (ULAE). In general, ALAE became DCC and ULAE became AAO. The adoption of the new expense classification in 1998 could be by calendar year or by accident year, at the company's option.

- If calendar year adoption is used, the historical triangles contain allocated loss adjustment expenses for the pre-1998 *calendar year columns* and defense and cost containment expenses for the 1998 and subsequent calendar year columns.
- If accident year adoption is used, the historical triangles contain allocated loss adjustment expenses for the pre-1998 *accident year rows* and defense and cost containment expenses for the 1998 and subsequent accident year rows.

Net vs Direct Experience

The historical loss triangles are net experience; triangles of direct plus assumed business can be formed by combining Annual Statements of successive years, using figures from Part 1.

The claim count triangles in Part 5, as well as the claim count columns in Part 3, show direct plus assumed experience; net claim counts are not shown in Schedule P. The Part

5 claim count triangles are shown for eight lines of business. These are the nine lines for which claim counts are shown in Part 1, minus auto physical damage, which has only a two year exhibit.

The exposure year earned premium triangles in Part 6 show direct plus assumed experience and ceded experience separately. Net experience is the difference between these triangles.⁵³

Several other items are shown in the Schedule P auxiliary exhibits. Part 2 shows one and two year loss developments in columns 11 and 12. Part 3 shows the number of claims closed, with and without loss payments, for nine lines of business, in columns 11 and 12.

The paid loss triangles in Part 3 are easier to compile than the loss triangles in Part 2. They are also less affected by changes in company claims department practices (such as changes in case reserve adequacy). They are commonly used by outsiders to analyze reserve adequacy. We begin the discussion with Part 3.

Part 3 – Paid Losses

Part 3 shows cumulative paid losses and DCC expenses by accident year and development period. The same accident years are shown as in Part 1: ten years for the long-tailed (liability and assumed non-proportional reinsurance) lines of business, and two years for the short-tailed property lines. Ten years of data must be gathered for all lines of business, since they are all included in the ten year Part 3 Summary exhibit (see the discussion of Part 1).

The paid loss figures for the current year's Part 3 exhibits can be derived from the Part 3 exhibits of the prior year's Schedule P and Part 1 of the current year's Schedule P.

- Historical data for individual accident years — that is, all figures except those in the first row (prior years) and the right-most column (the current valuation) — are unchanged from those in the previous year's Part 3 exhibit.
- The figures in the right-most column of the Part 3 exhibits are the current valuation. These entries should equal columns 4 – 5 + 6 – 7 (net paid losses plus net paid DCC expenses) in Part 1. This computation is equal to columns 11 – (8 – 9), or total paid loss and loss adjustment expenses minus paid AAO expenses.

The prior years row must be handled separately, as explained below.

THE PRIOR YEARS ROW

The Part 3 prior years entries can be obtained from the previous year's Schedule P, after a suitable modification of the figures. The cell in the upper left hand corner of Schedule

P, Part 3, which is the first calendar year column for the prior years row, always contains a zero entry.

Illustration: In the 2010 Annual Statement, the 2001 accident year row begins with loss payments in calendar year 2001. The prior years row, which includes accident years 2000 and prior, begins with loss payments in calendar year 2002. The rationale for this format is that the prior years row shows the development on the year-end (December 31) 2001 reserve. This development begins with payments in calendar year 2002.

When computing the entries for the prior years row for the 20XX Annual Statement based on the entries in the 20XX–1 Annual Statement, one must consider the different accident years included in the prior years row and the different starting date for the cumulative loss payments.

- The 20XX Schedule P, Part 3, prior years line shows the cumulative loss and DCC payments after calendar year 20XX–9 for accident years before 20XX–9.
- The 20XX–1 Schedule P, Part 3, prior years line shows the cumulative loss and DCC payments after calendar year 20XX–10 for accident years before 20XX–10.
- In the 20XX–1 Schedule P, the 20XX–10 accident year row shows the cumulative payments for that accident year starting in 20XX–10.

Illustration: Completing the Prior Years Row

To complete the prior years row in the 2019 Schedule P, we follow the steps outlined below.

- From the prior years row and the 2009 row in the 2018 Schedule P, we subtract the cumulative paid losses and DCC through 2010, and combine the two rows.
- We discard the cumulative paid losses and DCC through 2009 (which is now negative), keep the next entry (a zero) as the first figure in the new prior line, and enter the remaining figures in the rest of the row.
- For the last figure in the row, we add the calendar year 2019 paid losses and DCC for accident years prior to 2010 to the last cumulative total. The calendar year 2019 paid losses and DCC for accident years prior to 2010 are shown in the 2019 Schedule P, Part 1, column 11 minus column 9 plus column 8, prior row.

Illustration: The 2018 Schedule P, Part 3, contains the entries shown in Exhibit 3.1. Figures are in thousands of dollars.

Exhibit 3.1: 2018 Schedule P, Part 3, First Two Rows (\$000)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Prior	0	220	350	400	425	450	460	470	475	480
2009	375	600	650	700	750	775	800	840	860	875

The prior years row in the 2019 Part 1 exhibit shows \$23,000 in column 11 (total net paid), \$2,000 in column 8 (adjusting and other payments, direct and assumed), and \$0 in column 9 (adjusting and other payments, ceded).

To complete the 2019 Part 3 exhibit, the cumulative payments through 2010 are subtracted from the first two rows in the 2018 Part 3 exhibit. In the example, \$220 thousand is subtracted from the 2018 prior row and \$600 thousand is subtracted from the second row (accident year 2009) giving the following entries (Exhibit 3.2):

Exhibit 3.2: Adjustments to the 2018 Part 3, Prior Line (\$000)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Prior	-220	0	130	180	205	230	240	250	255	260
2009	-225	0	50	100	150	175	200	240	260	275

We add the two rows and drop the (calendar year) 2009 column, as shown in Exhibit 3.3:

Exhibit 3.3: Completing the 2019 Part 3 Prior Line (\$000)

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Prior	0	180	280	355	405	440	490	515	535

The 2019 payment is the amount in Part 1, columns 4 – 5 + 6 – 7 (= columns 11 – 8 + 9). For the prior row, this is \$23,000 – \$2,000 + \$0, or \$21,000. This figure is added to the cumulative payments through 2018 in Part 3 to give the cumulative payments through 20X9, or \$535,000 + \$21,000 = \$556,000.

Part 2 - Incurred Losses

Part 2 is a triangle of net incurred losses and defense and cost containment expenses (DCC) by accident year and evaluation date. The Part 2 entries are the sum of paid amounts, case reserves, and bulk + IBNR reserves for both losses and DCC. Each entry in Part 2 equals the corresponding entry in Part 3 plus the loss and DCC reserves at that date.

Part 2 is designed as a retrospective test of loss reserve adequacy. If the insurer sets adequate reserves, the incurred losses for each accident year should show neither upward nor downward development.⁵⁴ The NAIC uses the Part 2 Summary exhibit for the loss reserve development tests in the Insurance Regulatory Information System (IRIS).

IRIS LOSS DEVELOPMENT TESTS

For any accident year, column 10 of Part 2 shows incurred losses valued at the statement date, and column 9 shows the corresponding valuation one year earlier. If the insurer has reserved adequately, payments during the year are offset by a reduction of reserves, and there should be no change in incurred losses between valuation dates. Column 11 shows the latest year's change in incurred losses for each accident year except the most recent one (there is no previous valuation for the most recent accident year). Column 12 shows the change over the last two years in incurred losses for each accident year except the most recent two years.

IRIS Retrospective Tests 9 and 10

IRIS Tests 9 and 10 compare the one and two year development to policyholders' surplus at the start of the development. Test 9 divides the one year reserve development from row 12 of the Summary exhibit by the policyholders' surplus at the end of the prior year, and Test 10 divides the two year reserve development by surplus at the end of the second prior year.

A ratio of 20% or greater on either test is an exceptional score. Four or more exceptional IRIS scores may trigger a financial examination. An exceptional score on any of the three loss reserve adequacy tests (IRIS tests 9, 10, and 11) must be commented upon in the Statement of Actuarial Opinion.

The *Five Year Historical Data* exhibit of the Annual Statement, shows the one and two year developments and the ratios for tests 9 and 10 for the five most recent Annual Statements.

Exhibit 2.1: One and Two Year Loss Development

One Year Loss Development	20XX	20XX-1	20XX-2	20XX-3	20XX-4
Development in estimated losses and loss expense incurred prior to current year					
Percent of development of loss and loss expense incurred to policyholders' surplus of prior year end					
Two Year Loss Development					
Development in estimated losses and loss expense incurred two years before the current year and prior year					
Percent of development of loss and loss expense incurred to reported policyholders' surplus of second prior year end					

IRIS Prospective Test 11

IRIS Test 11 compares the outstanding loss ratios of three years. The *outstanding loss ratio* is the ratio of outstanding losses and loss adjustment expenses at a given statement date to the earned premium in that statement year. IRIS Test 11 updates the outstanding loss ratios from the past two years by means of the one- and two-year reserve developments, and compares these ratios with the current year's outstanding loss ratio.

The losses and premiums in this ratio are not matched, since the numerator is unpaid loss and loss adjustment expenses for all accident years and the denominator is earned premium for the current calendar year. This mismatch lessens the usefulness of IRIS Test 11, since business volume growth or decline, changes in the mix of business between property and liability lines, and changes in the types of policies issued distort the outstanding loss ratio.⁵⁵

Unpaid losses and loss adjustment expenses are taken from page 3, "Liabilities, Surplus and Other Funds," lines 1 and 3. Line 1 shows total net loss reserves, including reinsurance payable on assumed unpaid losses and reduced for reinsurance recoverables on ceded unpaid losses. Line 3 shows reserves for unpaid loss adjustment expenses (both DCC and AAO). Earned premium is taken from page 4, Statement of Income, line 1, column 1.

TEST 11 OVERVIEW

To test reserve adequacy in 20XX, IRIS Test 11 examines the outstanding loss ratios in 20XX-1 and 20XX-2. An outstanding loss ratio in 20XX that is lower than the average of the outstanding loss ratios in the two preceding years may be a symptom of under-reserving.

Illustration: The outstanding loss ratios in 20XX, 20XX+1, and 20XX+2 are 125%, 120%, and 105%. The 20XX+2 outstanding loss ratio of 105% is well below the average 122.5% outstanding loss ratio of the preceding two years, possibly reflecting reserve weakening.

The computation above may uncover reserve weakening, but not persistently weak reserves. The prior two years' outstanding loss ratios are therefor adjusted for the one and two-year adverse loss development in the current year's Schedule P to determine *restated* outstanding loss ratios.

- The one year reserve development plus the unpaid losses and loss adjustment expenses for the prior year are divided by the prior year's earned premium.
- The two year reserve development plus the unpaid losses and loss adjustment expenses for the second prior year are divided by the second prior year's earned premium.

The average of the restated outstanding loss ratios times the current year's earned premium (page 4, line 1) gives the indicated outstanding losses and loss adjustment expenses. This figure, minus the reported unpaid losses and loss adjustment expenses (page 3, column 1, lines 1 + 3), is the indicated reserve deficiency. A deficiency greater than 25 percent of policyholders' surplus (page 3, line 32, or page 4, line 20) indicates an exceptional score.

Illustration: IRIS Test 11

The 20X5 Schedule P, Part 2, Summary, shows a one year adverse loss development of \$3 million and a two year adverse loss development of \$4 million. The following data are taken from the current and the two previous Annual Statements to compute the IRIS Test 11 result.

Exhibit 2.2: IRIS Test 11: Input Data (\$000)

	<u>20X3</u>	<u>20X4</u>	<u>20X5</u>
Earned premium	\$12,000	\$12,500	\$19,000
Loss reserves	9,500	11,000	18,500
Loss adjustment expense reserves	2,500	4,000	4,500
Policyholders' surplus	\$7,850	\$8,900	\$12,150

The restated outstanding loss ratios are the loss and LAE reserves plus the Schedule P Summary adverse loss development divided by the earned premiums for the years. For 20X3, (\$9 million + \$0.5 million + \$2.5 million + \$4 million) ÷ \$12 million = 133.3%. For 20X4, (\$10 million + \$1 million + \$4 million + \$3 million) ÷ \$12.5 million = 144.0%.

The average restated outstanding loss ratio is (1.333 + 1.440) ÷ 2 = 1.387. The 20X5 earned premiums are \$19 million, so the indicated unpaid losses are 1.387 x \$19 million

= \$26.353 million. The held reserves at year-end 20X5 are \$23 million [= \$18.5 million + \$4.5 million]. The reserve deficiency is \$26.353 million – \$23 million = \$3.353 million, and policyholders' surplus in 20X5 is \$12.150 million. The ratio of \$3.353 million to \$12.15 million is 27.66%, which constitutes an exceptional score for IRIS Test 11. The figures are summarized below.

Table 2.3: IRIS Test 11: Estimated Reserve Deficiency (\$000)

Statement date	<u>20X3</u>	<u>20X4</u>	<u>20X5</u>
Loss reserves	9,500	11,000	18,500
Loss adjustment expense reserves	2,500	4,000	4,500
Adverse loss development	4,000	3,000	—
Restated loss reserves	16,000	18,000	
Earned premium	12,000	12,500	
Restated outstanding loss ratio	1.333	1.440	
Average restated O/S loss ratio			1.387
Earned premium, current year			\$19,000
Indicated loss reserves			\$26,353
Held reserves at December 31, 20X5			\$23,000
Indicated reserve deficiency			\$3,353

Growth, Mix by Line, and Policy Type

IRIS Test 11 uses all lines combined data. The test results may be distorted by (i) company growth, (ii) changes in the mix of business by line, and (iii) changes in policy types.

Rapid growth in the long-tailed lines of business after a period of stability may indicate a reserve deficiency even if reserves are adequate. In the illustration above, the company grew rapidly in 20X5, increasing its premium volume by \$6.5 million (from \$12.5 million to \$19.0 million) versus a 20X4 increase of \$12.5 million – \$12.0 million = \$0.5 million. Loss reserves increased in 20X5 by \$23 million – \$18 million = \$5 million (after restatement for adverse loss development), as one might expect for an additional \$6.5 million of earned premium. Nevertheless, the company shows an exceptional score on IRIS Test 11.⁵⁶

A change in the mix of business from long-tailed liability lines to short-tailed property lines may lead to an exceptional score on IRIS Test 11, even if reserves are adequate. Conversely, a change in the mix of business from short-tailed property lines to long-tailed liability lines may prevent an exceptional score on IRIS Test 11, even if reserves are deficient.

Illustration: Suppose the expected outstanding loss ratio is 250% for workers' compensation and 20% for commercial fire. With a 50%–50% mix of business, the overall expected outstanding loss ratio is $50\% \times 250\% + 50\% \times 20\% = 135\%$. With 60% workers' compensation and 40% commercial fire, the overall expected outstanding loss ratio is $60\% \times 250\% + 40\% \times 20\% = 158\%$.⁵⁷ With 40% workers' compensation and 60% commercial fire, the overall expected outstanding loss ratio is $40\% \times 250\% + 60\% \times 20\% = 112\%$. A 10% shift in the mix of business leads to a 23% difference in the expected outstanding loss ratio.

If the company shifts from short-tailed property lines to long-tailed liability lines, a steady outstanding loss ratio may mask a reserve deficiency problem. Conversely, if the company shifts from long-tailed liability lines to short-tailed property lines, a decreasing outstanding loss ratio is expected, and it does not necessarily indicate a reserve deficiency problem.⁵⁸

A shift in the mix of policy type may have an effect similar to a shift in the mix of business by line. A shift from first dollar workers' compensation policies to large dollar deductible (LDD) policies may prevent an exceptional score on IRIS Test 11, even if reserves are deficient. A book of LDD policies has a high outstanding loss ratio, since the losses are paid many years after the premium is collected; see the discussion above regarding mix of business.⁵⁹

UPDATING THE PART 2 EXHIBITS

The entries for individual accident years in Part 2, except for those in the right-most column, are copied from the previous Annual Statement. For the prior years row:

- The entries in the previous year's Schedule P for the prior row and for the first accident year are divided between reserves and paid losses: paid losses are in Part 3 and reserves equal Part 2 minus Part 3.
- The reserves from the first two rows in the previous year's Schedule P plus the current Schedule P payments (from Part 3) are the current year's prior years row on Part 2.

Illustration: We are completing the prior years row for the 2010 Schedule P. We illustrate the derivation of the 2007 statement date entry: that is, accident years 2000 and prior as of December 31, 2007. Assume the following figures are given in the 2009 Schedule P, Parts 2 and 3, and in the 2010 Schedule P, Part 3, for the December 31, 2007, valuation date.

- 2009 Schedule P, Part 2: \$35 million in prior years row and \$15 million in 2000.
- 2009 Schedule P, Part 3: \$10 million in prior years row and \$8 million in 2000.
- 2010 Schedule P, Part 3, prior years row: \$12 million.

We derive the figures for the 2010 Schedule P, Part 2 prior years row as follows:

The 2009 Schedule P reserves are \$35 million – \$10 million = \$25 million for the prior years row and \$15 million – \$8 million = \$7 million for 2000. The entry for the 2010 Schedule P, Part 2, prior years row, is \$25 million + \$7 million + \$12 million = \$44 million.

The entries for the right-most column can be copied from Part 1. For each accident year, Part 2, column 10 equals columns 11 – 8 + 9 + 24 – 21 + 22 from Part 1. Columns 11 and 24 in Part 1 show total paid and unpaid losses plus loss adjustment expenses. Since Part 2 does not include AAO adjustment expenses, one must subtract the net AAO expenses. Columns 8 – 9 equal the net AAO paid (direct plus assumed minus ceded) and columns 21 – 2 equal the net AAO unpaid.

If the Part 1, column 24 entries are net of tabular discounts, one must add the tabular discounts by accident year to obtain the Part 2, column 10 entries. The tabular discounts are shown in Note 28 to the Annual Statement.

UPDATING THE TWO-YEAR LINES

We illustrate updating procedures for the Part 2 and Part 3 of the two year lines of business, such as auto physical damage. Suppose the 20X3 Schedule P has the following data.

<i>Exhibit §.x: Auto Physical Damage Incurred and Paid Losses and DCC (\$000)</i>						
<i>Year Loss Incurred</i>	<i>Incurred Loss/DCC Reported at Year End</i>			<i>Cumulative Paid Loss/DCC at Year End</i>		
	20X1	20X2	20X3	20X1	20X2	20X3
Prior	400	380	370	0	300	330
20X2	XXX	1,000	1,020	XXX	780	960
20X3	XXX	XXX	800	XXX	XXX	580

During 20X4, the insurer (Parent) establishes a subsidiary (Sub) with an intercompany pooling arrangement whereby the companies share equally in the combined business (each gets 50% of the premiums and losses). In calendar year 20X4, the companies record the following:

<i>Exhibit §.x: Auto Physical Damage Incurred and Paid Losses and DCC (\$000): Calendar Year 20X4</i>				
<i>Year Loss Incurred</i>	<i>Loss and DCC Paid in 20X4</i>		<i>Loss and DCC Reserves at 12/31/X4</i>	
	Parent	Sub	Parent	Sub
Prior	16	0	10	0
20X2	40	0	20	0
20X3	200	0	50	0
20X4	400	300	150	100

We construct Part 2J and Part 3J for the 20X4 Schedule P. We form the pooled Schedule P, of which each company gets 50%. Although the subsidiary did not exist in 20X2 and 20X3, the exhibits are restated to reflect the current intercompany pooling even in these past years.

We begin with the prior years row in Part 3J, the paid loss triangle. In the two year exhibits, the prior years row has one cell with "000" followed by two cells with figures. The entries begin in the same calendar year as the entries for the oldest individual accident year (20X3 here).

In the ten year exhibits, the prior years row has one cell with "000" followed by *nine* cells with figures; the oldest *individual* accident year has *ten* cells with figures. The prior years entries begin one year *after* the entries for the oldest accident year. The same is true for the loss reserves. For the two year exhibits, the prior years row in Parts 2 and 4 begins with reserves two years before the current statement date; for the ten year exhibits, the prior years row begins with reserves *nine* (not *ten*) years before the current statement date.

The reason for this difference is that we need two years of entries to show the two year development for IRIS Test 10. For the ten year lines of business, the entries needed for the two year development test are available without extending the development back one year.⁶⁰

The 20X3 Part 3J prior years row for accident years 20X1 and prior shows that \$300 was paid in calendar year 20X2 and $\$330 - \$300 = \$30$ in calendar year 20X3; for accident year 20X2, $\$960 - \$780 = \$180$ was paid in calendar year 20X3. The payments in 20X3 for accident years 20X2 and prior are $\$30 + \$180 = \$210$; this is the middle entry for the 20X4 Part 3J. The amount paid in calendar year 20X4 for accident years 20X2 and prior is $\$16 + \$40 = \$56$; $\$56 + \$210 = \$266$ is the final entry in the prior years row in the 20X4 Part 3J.

The calendar year 20X3 payments for accident year 20X3 are \$580 (20X3 Part 3J). The 20X4 data show that \$200 was paid for accident year 20X3, for a cumulative payment of $\$580 + \$200 = \$780$. For accident year 20X4, the pooled payments are $\$400 + \$300 = \$700$.

Exhibit 2.14: Pooled Companies Cumulative Paid Losses

Years	<u>Cumulative Paid Losses/DCC at Year End (\$000)</u>		
<u>Losses Incurred</u>	<u>20X2</u>	<u>20X3</u>	<u>20X4</u>
Prior	000	210	266
20X3	XXX	580	780
20X4	XXX	XXX	700

Since the current pooling arrangement is 50% for each company, the 20X4 Part 3J for each company is half the combined Part 3J.

To form the 20X4 Part 2J, we add the loss reserves to the loss payments. From the 20X3 Parts 2J and 3J we form a triangle of loss reserves only (Part 2 – Part 3):

Exhibit 2.16: Pooled Companies Loss Reserves

Year in which <u>Losses were Incurred</u>	<u>Loss Reserves at Year End (\$000)</u>		
	<u>20X1</u>	<u>20X2</u>	<u>20X3</u>
Prior	400	80	40
20X2	XXX	220	60
20X3	XXX	XXX	220

For the 20X4 Part 2J, the entry in the upper-left corner is the loss reserves at 12/31/20X2 for accident years 20X2 and prior. From the triangle directly above, this is \$80 + \$220 = \$300. Similarly, 40 + 60 = 100 is the entry for the prior years row at year end 20X3. The 12/31/20X4 reserves are the combined (Parent + Sub) reserves from the 20X4 data.

Exhibit 2.17: Pooled Companies Loss Reserves, Updated

Year in which <u>Losses were Incurred</u>	<u>Loss Reserves at Year End (\$000)</u>		
	<u>20X2</u>	<u>20X3</u>	<u>20X4</u>
Prior	300	100	30
20X3	XXX	220	50
20X4	XXX	XXX	250

We add the reserves to the 20X4 Part 3J paid losses to get the pooled 20X4 Part 2J.

Exhibit 2.18: Pooled Companies Incurred Losses

Years in which <u>Losses were Incurred</u>	<u>Incurred Losses/DCC at Year End (\$000)</u>		
	<u>20X2</u>	<u>20X3</u>	<u>20X4</u>
Prior	300	310	296
20X3	XXX	800	830
20X4	XXX	XXX	950

We allocate this triangle 50% to ABC and 50% to XYZ.

PART 4 - BULK + IBNR RESERVES

Part 4 shows bulk + IBNR (actuarial) reserves, by accident year and evaluation date. These are reserves “for incurred but not reported claims, for reopened claims, for development on case reserves of reported claims, and for aggregate reserves on newly

reported claims without specific case reserves” (Annual Statement *Instructions*). The use of Part 4 to derive case incurred (or reported) loss figures is described above.

Part 5 – Claim Counts

Part 5 has three sections: Section 1 shows cumulative claims closed with loss payment; section 2 shows claims outstanding; and section 3 shows cumulative reported claims.

Section 1 of Part 5 is similar to Part 3 for the individual accident years: Part 5 shows cumulative claims and Part 3 shows cumulative loss payments. The entries for the prior years row are different. In Part 3, the individual accident years show cumulative figures, and the prior years row shows cumulative loss payment beginning with the *second* calendar year shown along the top of the exhibit. For example, the prior years row in the 2010 Schedule P, Part 3, shows cumulative loss payments beginning 1/1/2002 for accident years before 2001.

Column 11 of Part 3, “number of claims closed with loss payment,” shows the cumulative number of claims through the statement date for the individual accident years. Column 12 shows the corresponding number of claims closed without loss payment. For example, the prior years row in the 2010 Schedule P, Part 3, column 11, shows the cumulative number of claims closed with payment from January 1, 2002, through December 31, 2010, for accident years before 2001.

Section 1 of Part 5 shows the cumulative number of claims closed with loss payment for the individual accident years at each December 31. For the individual accident years, column 10 of Part 5, Section 1 equals column 11 of Part 3. For the prior years row, Section 1 of Part 5 shows *incremental closings* in each calendar year, not the cumulative total. For the prior years row, column 10 of Section 1 of Part 5 does *not* equal column 11 of Part 3.⁶¹

Illustration: For accident year 2001, there are 5,000 claims closed with payment in each calendar year from 2001 through 2010. For accident years 2000 and prior, there are 10,000 claims closed with payment in each calendar year from 2001 through 2010.

For accident year 2001 in Part 5, Section 1, the counts are cumulative, so the company reports 5,000 in the 2001 column (column 1), 10,000 in the 2002 column (column 2), 15,000 in the 2003 column (column 3), and so forth, ending with 50,000 in the 2010 column (column 10). For the prior years row, the counts are incremental, so the company reports 10,000 claims in each column.

For accident year 2001, Part 3, column 11, shows the cumulative count at the current statement date, or 50,000, as in Part 5, Section 1, column 10. For the prior years row, column 11 shows the cumulative claims closed since January 1, 2002, or 90,000, which differs from the entry in Part 5, Section 1, column 10 (which is 10,000).

Part 5, Section 2 shows claims outstanding at each year end. This figure is affected by the company's procedure for handling small claims. Some companies do not set up claim files for small claims that are settled quickly, such as personal automobile comprehensive claims.

Part 5, Section 3, is similar to Part 5, Section 1. The individual accident years show the cumulative claims reported. The prior years row shows the incremental claims reported in each calendar year. The relationship that *cumulative reported claims = cumulative paid claims plus outstanding claims* holds for the individual accident years, but not for the prior years row.

For *claims-made* coverage, the Schedule P incurral date is the report date. Year 20XX in the left-most column means claims reported in 20XX, not claims with accident dates in 20XX. For the individual years shown in the left-most column, the figures in the initial diagonal are carried unchanged along each row. The entries in the prior years row should all be zero.

Claims in transit are an exception to these rules. A claim that is reported to the company on December 28, 2004, may not be entered into the company's electronic files until January 20X5. If the company prepares Schedule P immediately after the end of the year, the claim belongs in the year 2004 row but it may not show up until the year 20X5 column. Electronic data processing files are now prevalent, and claims in transit for so long that they are not entered in time to the company's files are rare.

Part 6 – Premium Development

Exposure year premium figures are important for lines of business with exposure audits, retrospective rating adjustments, or accounting lags in booking premiums; these are workers' compensation, other liability, products liability, commercial automobile, and reinsurance.

Part 6 shows the development of earned premium by exposure year, similar to the development of incurred losses by accident year in Part 2.⁶² As background, Appendix B explains the post-codification statutory and tax accounting rules relevant to Part 6.

The distribution of the current calendar year's earned premium to exposure years is shown in the right-most column (column 11), along with a reconciliation of the earned premium figures to those in Part 1 of Schedule P. Reconciliation to calendar year earned premium of earlier years uses the entries on the bottom row of Part 6; see below.

Part 7 of Schedule P shows policy year triangles of premiums and losses on loss sensitive contracts. The concepts discussed here for Part 6 apply to Part 7 as well. To avoid repetition, we discuss exposure year and policy year premiums together.

PRINCIPLES

For personal insurance policies, the premium is fixed at policy inception based on a known exposure base, such as car-years (auto insurance) or house-years (Homeowners). For commercial insurance policies, the premium depends on the activity of the insured during the policy period. Workers' compensation premium depends on the payroll during the policy term; products liability premium depends on sales during the policy term.

For retrospectively rated policies, the premium depends on the losses, which are not final until they are settled. The written premium at policy inception is only a deposit premium, which may differ from the insurer's estimated ultimate premium. For policies subject to audits, the underwriter may use a low premium for competitive reasons, knowing that the proper premium will be determined at the audit. For retrospectively rated policies, the insurer expects to return premium to the insured at the first retrospective adjustment and to collect additional premiums at second and subsequent adjustments; the actual cash flow patterns and premium billing patterns differ by company and by policy.

If the estimated ultimate premium differs from the premium actually billed, the insurer accrues the difference as a return premium (a retro debit) or as expected additional premium (a retro credit).⁶³ The premium triangles in Part 6 of Schedule P reflect the combined effects of exposure audits, retrospective rating, insurer accruals of return or additional premiums, and changes over time in these accruals.

Illustration: Retrospective Rating

A retrospectively rated workers' compensation policy issued on January 1, 20X4, has a premium rate of \$1 per \$100 of payroll. On January 1, the insured estimates \$200,000,000 of payroll for the coming year, so the initial written premium is \$2,000,000. The rating formula is *net premium = 20% × standard premium + 1.10 × reported losses*.

On February 15, 20X5, after the policy has expired, the insurer audits the insured's payroll records. The true payroll for 20X5 was \$250,000,000, and the insurer bills the insured for an additional \$500,000 of premium. The standard premium is \$2.5 million.⁶⁴

On July 1, 20X5, the first retro adjustment is processed. The retrospective rating formula uses reported losses (paid losses and case reserves), not IBNR losses. At the first retro adjustment, losses are still immature. The indicated retrospective premium is generally less than the estimated ultimate premium, resulting in a return premium to the insured.⁶⁵

At 18 months after policy inception (July 1, 20X5), the reported losses are \$1,200,000, giving a retrospective premium of $20\% \times \$2.5 \text{ million} + 1.1 \times \$1.2 \text{ million} = \$1.82 \text{ million}$. The insurer returns $\$2,500,000 - \$1,820,000 = \$680,000$ to the insured.

At second and subsequent adjustments, the reported losses increase as they develop to maturity, and the insurer collects additional premium from the insured. At 30 months after

policy inception (July 1, 20X6), the reported losses may be \$1,500,000, giving a retrospective premium of $20\% \times \$2.5 \text{ million} + 1.1 \times \$1.5 \text{ million} = \$2.15 \text{ million}$. The insurer bills the insured for an additional $\$2,150,000 - \$1,820,000 = \$330,000$ of premium.

CALENDAR YEAR, EXPOSURE/ACCIDENT YEAR, AND POLICY YEAR

Earned premium may be recorded by calendar year, exposure year, or policy year, and incurred losses may be recorded by calendar year, accident year, report year, or policy year. The Annual Statement reporting procedures are as follows:

Earned Premium

- The income statement; Underwriting and Investment Exhibit, Part 2; page 15 state exhibits; Schedule F; Schedule P, Part 1; Schedule T; and the Insurance Expense Exhibit use calendar year premiums.
- Schedule P, Part 6, has exposure year earned premium. The reconciliation of Schedule P, Part 6 to Schedule P, Part 1 is shown in the last line and the right-most column of Part 6.
- Schedule P, Part 7, has policy year earned premium for loss-sensitive contracts only.

Incurred losses

- The income statement; Underwriting and Investment Exhibit, Part 3; page 15 state exhibits; Schedule F; Schedule T; and the Insurance Expense Exhibit use calendar year losses.
- Schedule P, Parts 1 through 4, uses accident year incurred losses for occurrence policies and report year losses for claims-made policies. The reconciliation of accident year incurred losses to calendar year incurred losses is not shown explicitly, but it can be derived in the same manner as for the exposure year earned premiums.⁶⁶
- Schedule P, Part 7, has policy year incurred losses for loss-sensitive contracts only.

AUDIENCES

The four data types – calendar year, policy year, exposure/accident year, and report year – serve different audiences.

- A. Policy year data are used by underwriters and actuaries for pricing or profitability studies.
- B. Accident year data are used for loss reserving, since accident year losses are the most homogeneous in the age since the accident.
- C. Report year data are used by claims personnel. Claims department practices may vary by report year, and claims department efficiency is measured by report year.
- D. Calendar year data, which is complete at year-end, is used for accounting statements. Calendar year data are secondary; they rely upon non-ledger assets and liabilities, such as loss reserves and premium reserves, that are estimated from policy year, accident

year, or report year aggregates. Calendar year data may eliminate biases caused by consistent over- or under-estimation of non-ledger assets and liabilities.

ILLUSTRATION: DATA TYPES

The Part 6 triangles include estimate of accrued retrospective premium and the changes over time in these estimates. If these estimates were not included, the premium development patterns would reflect the progression of billed premiums; since the estimates *are* included, the patterns reflect the progression of estimated ultimate premiums.

This distinction is clearer in Part 7, which shows both earned premium triangles and premium reserve triangles; Part 6 shows only the earned premium triangles. Exposure year earned premiums are like accident year incurred losses, so Schedule P, Part 6, is the premium equivalent of the losses in Part 2. Accrued retrospective premium reserves and earned but unbilled premium reserves are bulk reserves, like the loss reserves in Schedule P, Part 4. The earned premiums minus the premium reserves equal the billed premiums, which are similar to the reported losses shown as the difference between Part 2 and Part 4.

To clarify the effects of premium reserve estimates, we show the illustration in two parts. Part A assumes no estimates of IBNR losses, future audits, or accrued retrospective premiums; Part B includes these estimates. Part 6 shows exposure year triangles; Part 7 shows policy year triangles. The illustration in this section shows the derivation of both exposure year and policy year premiums.

ILLUSTRATION PART A: DATA TYPES

A retrospectively rated workers' compensation policy is issued on October 1, 20X3, for a \$10,000 premium, with a maximum premium equal to 150% of standard premium. The company makes no estimate of future audits.

- One loss occurs on March 1, 20X4, with an initial reserve of \$8,000.
- On December 15, 20X4, the payroll audit calls for an additional \$1,000 of premium. The standard premium is now \$11,000, and the maximum premium is \$16,500.
- On July 1, 20X5, the first retrospective adjustment shows no additional or return premium.
- On November 1, 20X5, the case reserve is revised to \$25,000.
- On July 1, 20X6, the second retrospective adjustment calls for an additional premium of \$5,500. The \$17,000 increase in losses results in only a \$5,500 increase in premium because of the premium maximum in the policy.
- On August 1, 20X6, the loss is settled for \$20,000.

CALENDAR YEAR ACCOUNTING

Calendar year incurred losses, or paid losses plus the change in reserves, are zero for 20X3, \$8,000 for 20X4, \$17,000 for 20X5, and -\$5,000 for 20X6.

Calendar year earned premiums equals written premium minus the change in the unearned premium reserves and plus the changes in the earned but unbilled premium reserve and the accrued retrospective premium reserve.

- By December 31, 20X3, only one quarter of the policy has expired, and the year-end unearned premium reserve is $\frac{3}{4} \times \$10,000 = \$7,500$. The calendar year 20X3 earned premium is $\$10,000 - (\$7,500 - \$0) = \$2,500$.
- The audit premium of \$1,000 is recorded as 20X4 earned premium when it is billed.
- The retrospective premium of \$5,500 is recorded as 20X6 earned premium when it is billed.⁶⁷

POLICY YEAR ACCOUNTING

Policy year incurred losses and premiums are allocated to the year the policy is written. The policy year 20X3 incurred losses are zero at December 31, 20X3; \$8,000 at December 31, 20X4; \$25,000 at December 31, 20X5; and \$20,000 at December 31, 20X6.

- At December 31, 20X3, only one quarter of the premium has been earned, so the policy year 20X3 earned premium is \$2,500.
- At December 31, 20X4, the revised 20X3 earned premiums are \$11,000 (written premium plus audit), and the policy year 20X3 earned premium is \$11,000.
- At December 31, 20X6, the revised 20X3 earned premiums are \$16,500 (written premium plus audit plus retrospective premium).

ACCIDENT/EXPOSURE YEAR ACCOUNTING

Accident year incurred losses are coded to the date the loss occurs.⁶⁸ The accident year 20X3 incurred losses are zero at 12/31/20X3. The accident year 20X4 incurred losses are \$8,000 at 12/31/20X4; \$25,000 at 12/31/20X5; and \$20,000 at 12/31/20X6.

Exposure year earned premiums are similar to accident year incurred losses. The earned premium is allocated by year based on the exposures in each year.

- At December 31, 20X3, exposure year 20X3 earned premium is \$2,500.
- At September 31, 20X4, exposure year 20X3 earned premium is \$2,500 and exposure year 20X4 earned premium is \$7,500. The December 15, 20X4, audit is distributed over the policy term, so on December 31, 20X4, the exposure year 20X3 earned premium is \$2,750, and the exposure year 20X4 earned premium is \$8,250.
- The retrospective premiums are allocated to exposure years in proportion to the coverage period: \$1,375 to 20X3 and \$4,125 to 20X4.⁶⁹

We incorporate premium and loss reserves after explaining the statutory accounting rules for exposure year premiums.

ACCOUNTING FOR EXPOSURE YEAR PREMIUMS

Part 6 shows premium development triangles for direct plus assumed business (Section 1) and for ceded business (Section 2); net premium is direct plus assumed minus ceded.⁷⁰ The historical loss triangles in Parts 2, 3, and 4 show *net* losses. For companies with significant reinsurance transactions, one must take care to compare net losses with net premiums.

The accounting rules for Schedule P, Part 6 are as follows:

1. The individual exposure years show cumulative earned premiums. The earned premiums include (i) collected premiums, (ii) billed but uncollected premiums, (iii) earned but unbilled premiums, and (iv) accrued retrospective premiums. Only the earned portion of these components is included in the Part 6 exhibits.

Illustration: A policy is written on July 1, 20X4 for a \$10,000 premium. On December 31, 20XX, the actuary expects an audit premium to be billed in September 20X5 for \$2,000. The 20XX earned premium is $50\% \times \$10,000 + 50\% \times \$2,000 = \$6,000$.

2. The *prior years* row shows *incremental calendar year changes* to the earned premium for the prior exposure years (like the Part 5 exhibits, not like the Part 3 exhibits).

Illustration: The cumulative earned premiums at December 31, 2009, are \$20 million apiece for exposure years 2000 and 2001. In 2010, there is an unanticipated retrospective adjustment of +\$20,000 for an annual policy effective on July 1, 2000. No other calendar year 2010 retrospective adjustments affect exposure years 2001 and prior.

For the 2010 Schedule P, column 10 of Part 6 shows (i) the cumulative total for the individual exposure years 2001 through 2010 and (ii) the calendar year transactions for exposure years 2000 and prior. The +\$20,000 retrospective adjustment is divided evenly between exposure year 2000 and exposure year 2001, since the policy was in force from July 1, 2000 through June 30, 2001. Exposure year 2001 shows \$20,010,000 in row 2, column 10, of Part 6. The prior year figure in row 1, column 10, is \$10,000.

3. To facilitate the reconciliation with calendar year earned premiums, column 11 shows the distribution of the current calendar year's earned premiums to all exposure years (including the "prior years" row). The entries in this column are incremental figures, not cumulative figures. The reconciliation procedure is explained below.

4. The final row of the Part 6 exhibits shows the Schedule P, Part 1, calendar year earned premiums to facilitate the reconciliation with calendar year earned premiums.

Illustration: A company issues a retrospectively rated policy with a deposit premium of \$100,000 on January 1, 20X4. Several large losses occur in 20X4. On December 31, 20X4, the company expects to collect an additional \$40,000 in future retrospective adjustments, and it puts up an accrued retrospective premium asset of \$40,000.

At the first retrospective adjustment on July 1, 20X5, the company collects \$30,000 from the insured and reduces the accrued retrospective premium reserve to \$10,000.⁷¹ During the third quarter of 20X5, there is high development on the reported claims. By December 31, 20X5, the company raises the accrued retrospective premium reserve to \$20,000.

The reporting in Parts 6 and 7 of Schedule P is as follows:

- The 20X4 exposure year earned premium in Part 6, as well as the 20X4 policy year earned premium in Part 7, Section 4, is the written premium minus the change in the unearned premium reserve. The accrued retrospective premium reserve is a contra-liability, which went from \$0 on January 1 to \$40,000 on December 31. The 20X4 earned premium is $\$100,000 - (-\$40,000 - \$0) = \$140,000$.
- The “net reserve for premium adjustments and accrued retrospective premiums at year end” in Section 5 of Schedule P, Part 7, shows the contra-liabilities as positive figures. The figure for policy year 20X4 is \$40,000 at December 31, 20X4.
- In calendar year 20X5, Parts 6 and 7 of Schedule P show cumulative figures. The cumulative 20XX earned premium is the \$130,000 paid plus the \$20,000 remaining reserve, or \$150,000. An alternative view shows the reconciliation with calendar year earned premium. The 20X5 calendar year earned premium is the written premium minus the change in reserves, or $\$30,000 - [-\$20,000 - (-\$40,000)] = \$10,000$. This \$10,000 is added to the \$140,000 exposure year 20X4 earned premium at December 31, 20X4, to give a cumulative amount of \$150,000 at December 31, 20X5.
- The net reserve for premium adjustments and accrued retrospective premiums at year end in Schedule P, Part 7, Section 5, for policy year 20X4 at December 31, 20X5, is \$20,000.

ILLUSTRATION PART B: ACTUARIAL ESTIMATES

We rework the illustration assuming the company estimates its earned but unbilled premiums and accrued retrospective premiums.⁷² Suppose that

- On 12/31/20X3, the actuary estimates that the payroll audit will add \$2,000 of premium.
- On 12/31/20X4, the reserving actuary estimates bulk reserves of \$6,000 and an accrued retrospective premium reserve of \$4,000.
- On 12/31/20X5, the accrued retrospective premium reserve is changed to \$12,000.

We show the component pieces of paid amounts, case reserves, and bulk reserves to clarify the accounting principles. In practice, these reserves are bulk estimates; they are not allocated to policy. The accrued retrospective premium reserve of December 31, 20X5, is an example of this. The reserving actuary used an aggregate reserving method, whereby the premium reserve is about two thirds of the bulk loss reserve. Had the actuary used a per policy reserving method, the premium reserve would have been capped at \$5,500.

Estimated Payroll Audit

The actuary's estimate of the earned but unbilled premium is included in the earned premium for the year. At December 31, 20X3, the estimated earned premium for the policy is \$10,000 deposit premium + \$2,000 audit premium = \$12,000. One quarter of the policy has been earned by December 31, so the 20X3 earned premium is \$3,000. The expected earned premium for 20X4, as of December 31, 20X3, is \$9,000.

On September 30, 20X4, the policy expires. The additional \$9,000 of earned premium is charged to 20X4 earned premium, whether calendar year or exposure year.

On December 15, 20X4, the payroll audit yields only \$1,000, not \$2,000. The net earned premium from the payroll audit is the billed premium plus the change in reserve,⁷³ or $\$1,000 + (\$0 - \$2,000) = -\$1,000$. The net earned premium from the payroll audit of $-\$1,000$ is allocated to calendar year 20X4 and policy year 20X3; for exposure year earned premiums, $\frac{1}{4}$ to 20X3 and $\frac{3}{4}$ to 20X4.

ESTIMATED RETROSPECTIVE PREMIUMS

The same procedure is used for all bulk reserves. On December 31, 20X4, the bulk reserves for this policy are \$6,000 for losses and \$4,000 for premiums.

- Calendar year: the bulk reserves for both losses and premiums are assigned to 20X4.
- Policy year: the bulk reserves for both losses and premiums are assigned to 20X3.
- Accident year: the bulk reserves for losses are assigned to 20X4.
- Exposure year: $\frac{1}{4}$ of the bulk reserve for premiums is assigned to 20X3 and $\frac{3}{4}$ is assigned to 20X4.

On December 31, 20X5, the bulk reserve for premiums is revised to \$12,000. The change in the bulk reserve of $\$12,000 - \$4,000 = \$8,000$ is assigned to calendar year 20X5 and to policy year 20X3. For exposure year, $\frac{1}{4}$ is assigned to 20X3 and $\frac{3}{4}$ is assigned to 20X4.

On July 1, 20X6, the bulk reserve for premiums is changed to a billed premium of \$5,500. The net earned premium resulting from the retrospective adjustment is $\$5,500 + (\$0 - \$12,000) = -\$6,500$. This net earned premium is assigned to calendar year 20X6 and to policy year 20X3. For exposure year accounting, $\frac{1}{4}$ is assigned to 20X3 and $\frac{3}{4}$ is assigned to 20X4.

COMPLETING THE PART 6 EXHIBITS

We show the reconciliation of Part 6 exposure year Premiums with Part 1 calendar year premiums by illustration. Since the exposure year premiums include the earned but unbilled premiums and accrued retrospective premiums, a company which sets reserves accurately should show little development along the rows. Upward development indicates conservatism; downward development indicates over-optimistic reserves.

Exhibit 6.1: 20X9 Schedule P, Part 6 (\$000's)

Part 6	20X0	20X1	20X2	20X3	20X4	20X5	20X6	20X7	20X8	20X9	(A)*
prior	25	15	10	8	6	5	4	4	3	3	3
20X0	500	480	485	488	490	495	495	497	498	499	1
20X1		520	525	523	520	530	540	538	540	542	2
20X2			550	555	555	560	555	550	552	555	3
20X3				580	585	590	592	595	595	597	2
20X4					620	630	700	690	700	700	0
20X5						700	710	720	720	730	10
20X6							750	750	740	760	20
20X7								800	820	810	-10
20X8									850	860	10
20X9										900	900
(B)**	525	515	570	594	630	740	841	802	878	941	941

* A = Current Year Premiums Earned

** B = Earned premiums, Schedule P, Part 1

The bottom row in Part 6 shows the calendar year earned premiums from Part 1, column 2 (direct plus assumed premiums). Consider calendar year 20X4. Of the \$630,000 in earned premium, \$620,000 is allocated to exposure year 20X4. \$5,000 is allocated to exposure year 20X3, which is the difference between the cumulative figures of \$585,000 and \$580,000. A negative \$3,000 is allocated to exposure year 20X1; the return premiums and the reserve decreases for exposure year 20X1 between in 20X4 exceeded the additional premiums and reserve increases by \$3,000.

For the prior years row, the entries are the incremental values. The reconciliation is as follows:

- calendar year X earned premium =
- the sum of the calendar year X column entries for individual exposure years
- the sum of the calendar year X–1 column entries for individual exposure years

+ the calendar year X entry for the prior years row.

Part 6 is similar to Part 2; both show development of incurred amounts. The Part 2 payments and case reserves are for particular losses, associated with specific accident years. Even the bulk reserves are generally determined by the development of accident year paid losses or reported losses, so bulk reserves also relate to specific accident years.

Return premiums and additional premiums are associated with policies. The earned but unbilled premiums and the accrued retrospective premiums are determined from policy year triangles, not exposure year triangles. Most companies must convert the return premiums, additional premium collections, and reserve changes from a policy year basis to an exposure year basis. Nevertheless, since the purpose of Part 6 is to allow the computation of exposure-accident year loss ratios, Part 6 uses exposure years, not policy years.

Part 7 – Loss Sensitive Contracts

Parts 1 through 6 of Schedule P were designed to monitor loss reserve adequacy. Part 7 was designed by the American Academy of Actuaries Task Force on Risk-Based Capital (RBC). It has two purposes: (i) to determine the company's percentage of written premium and of reserves related to loss-sensitive contracts, and (ii) to determine the sensitivity of premiums and of reinsurance commissions to losses on these contracts.

- Parts 1 through 6 show experience on the company's entire book of business; Part 7 shows experience on loss sensitive contracts only.
- Part 7 is optional. It is completed only if the company claims a reduction for loss sensitive contracts in its risk-based capital reserving risk charge or written premium risk charge. All other exhibits in Schedule P must be completed by all companies.
- Parts 1 through 6 show data by line of business. Section 1 of Parts 7A and 7B use the same lines of business. Sections 2 through 5 of Part 7A and 2 through 7 of Part 7B are for all lines combined. Loss sensitive contracts sold to large accounts often combine several lines of business, and it might be difficult to analyze the premium sensitivity by line.
- The losses and claim counts in Parts 1 through 5 are shown by accident year, and the premiums in Part 6 are shown by exposure year. The losses and premiums in Part 7 are shown by policy year. No other exhibit in the Annual Statement uses policy years.
- Part 7A shows net experience on primary loss-sensitive contracts, and Part 7B shows net experience on reinsurance loss-sensitive contracts. Direct business is shown separately from the reinsured business because the RBC loss sensitive contract offset

is 30% for primary policies and 15% for reinsurance treaties. The rationale is that retrospectively rated policies have wider swings than sliding scale commissions have.

RBC UNDERWRITING RISK CHARGES

For most companies, the reserving risk charge (R_4) and the written premium risk charge (R_5) contribute the largest portions of total capital requirements. The risk-based capital formula provides a reduction in these charges for business written on loss sensitive contracts.

The reserving risk charge is the amount of capital needed to guard against unanticipated adverse development on existing reserves in a worst case scenario. The capital needed is reduced for the expected investment income on the assets backing the loss reserves.

Illustration: Based on historical industry-wide Schedule P data from 1983 through 1992, the risk-based capital formula estimates that workers' compensation loss reserves may develop adversely by 27.3% in a worst case scenario. The discount factor for workers' compensation loss reserves in the risk-based capital formula is 87.2%. In a worst case scenario, \$100 of workers' compensation loss reserves may develop into \$127.30 of paid losses. The assets needed now to fund \$127.30 of paid losses are $\$127.30 \times 87.2\% = \111.01 . The workers' compensation reserving risk charge is 11.0% of the held reserves.

Premium Sensitivity

If the workers' compensation policy is retrospectively rated – that is, the policy is a loss sensitive contract – the adverse development on loss reserves is at least partially offset by additional premium. Less capital is needed to guard against a worst case scenario.

Illustration: Suppose that for each dollar of additional loss, the insurer expects 40¢ of additional premium (retrospective premium credits). If \$100 of loss reserves develops into \$127.30 of paid losses, the insurer expects to collect additional premium of $\$27.30 \times 40\% = \10.92 . The insurer needs $(\$127.30 - \$10.92) \times 87.2\% = \$1.48$ of capital for adverse development on a hundred dollars of held reserves.

The sensitivity of retrospective premiums to losses varies by type of policy. The retrospective rating formula itself has a sensitivity of at least unity. A dollar of loss may lead to a \$1.10 or \$1.15 of retrospective premium, where the extra ten or fifteen cents covers loss adjustment expenses and other charges, such as state premium taxes and involuntary market burdens.

But losses are capped in most plans, and retrospective premiums are limited by a maximum. The actual premium sensitivity depends on the parameters of the retrospective rating plan, the shape of the insured's size-of-loss distribution, and the amount of the standard premium.

The premium sensitivity also depends on the maturity of the losses. The first losses reported are rarely capped, and the insured generally has not reached the maximum premium; the premium sensitivity is about unity. Later loss development generally occurs on large losses, which may have already been capped by the loss limit. In a worst case scenario, the insured may also have reached the maximum premium. The premium sensitivity may be only 10¢ or 20¢ for each dollar of loss.⁷⁴

In 1993, the NAIC Working Group on Risk-Based Capital decided on conservative levels of premium sensitivity: 30% for primary contracts and 15% for reinsurance contracts. Companies which write for large accounts policies argued that the premium sensitivity on their business is much greater.⁷⁵ Sections 2 through 5 of Part 7A and 2 through 7 of Part 7B are designed to provide data to estimate premium sensitivity.

LOSS RESERVE ADEQUACY AND RBC OFFSETS

The loss sensitive contracts exhibits are included in Schedule P because the risk-based capital underwriting risk charges use the Schedule P line division, and premium sensitivity relates to loss and premium development. In addition, the NAIC feared that companies would be less likely to mis-classify a contract as loss sensitive if the reporting were in Schedule P, which most companies treat with more diligence.⁷⁶

Loss sensitive contracts are of three types:

- The premium on retrospectively rated primary contracts depends on the losses incurred, subject to loss limits and premium maximums and minimums.
- A sliding scale reinsurance commission depends on the loss ratio on the assumed book of business, subject to a maximum and minimum.
- Policyholder dividends may depend on the policyholder's loss ratio (or a class loss ratio).

The risk-based capital principles are as follows:

- If the premium is sufficiently responsive to losses, the policy is loss sensitive.
- Contingent commissions do not make a primary policy loss sensitive. Contingent commissions on direct business have narrow swings, so the sensitivity to losses is limited. In addition, the contingent commission is generally one sided: it is paid for good business, but the agent does not return money to the insurer for poor business.
- Sliding scale reinsurance commissions (and similar profit commissions) make a contract loss sensitive. The average responsiveness of reinsurance commissions differs from that of primary premiums, so separate RBC offsets are used for direct vs assumed business, and separate Part 7 exhibits are used for primary business vs reinsurance contracts.
- Policyholder dividends do not make a policy loss sensitive, since they are optional, not contractual.

DEFINITION OF LOSS-SENSITIVE CONTRACTS

The risk-based capital loss sensitive offsets are applied to loss reserves and to written premium, so Section 1 of Parts 7A and 7B determines the percentage of loss reserves and of written premium by line of business from loss-sensitive business. Since the risk-based capital charges are lower for loss-sensitive business, distressed companies have an incentive to classify their business as loss-sensitive, even if the loss-sensitivity is minimal. To prevent such abuse, a contract must fulfill the following six criteria to be classified as loss-sensitive:

1. An increase in losses leads to an increase in net payment. If the loss sensitive item is not a monetary transaction, the contract is not loss sensitive.
2. The loss sensitivity must be at least 75% on primary business and 50% on reinsurance treaties before the application of any limits. In other words, if losses on a retrospectively rated policy increase by \$10,000, the premium must increase by at least \$7,500 before the application of loss limits or maximum premiums.
3. Maximum and minimum premiums, loss limits, and bounds on the reinsurance commission may constrain an otherwise loss sensitive contract. The swing of the plan must be at least 20% for primary business and 10% for reinsurance treaties; that is, the maximum amount payable must be at least 20% greater than the minimum premium. *Illustration:* A retrospectively rated policy with a minimum premium of \$9,000 and a maximum premium of \$10,000 is not loss sensitive.
4. The maximum net payment must be at least 15% greater than the expected net payment for primary business and 7.5% greater for reinsurance treaties. *Illustration:* A retrospectively rated policy with a minimum premium of \$5,000, an expected premium of \$10,000, and a maximum premium of \$11,000 is not loss sensitive.
5. The loss sensitive payments must be either premiums or reinsurance commissions; a policy with loss sensitive policyholder dividends is not loss sensitive.
6. The losses and the loss sensitive payments must flow through the income statement. On a large dollar deductible workers' compensation policy, the insurance company settles all claims and pays all benefits, but the insured reimburses the insurer for these payments. Even if the policy satisfies the other criteria, it is not loss sensitive, since neither the losses below the deductible nor the reimbursements flow through the income statement.⁷⁷

PART 7 HISTORICAL EXHIBITS

Sections 2 through 5 for primary contracts and 2 through 7 for reinsurance contracts provide data to estimate the sensitivity of premiums and reinsurance commissions to losses.⁷⁸ The premium, loss, and commission triangles show cumulative values.⁷⁹

- Sections 2 and 3 show incurred losses and bulk + IBNR loss reserves. They are similar to Parts 2 and 4, except that the losses is subdivided by policy year, not by accident year.

- Section 4 shows earned premiums. It is similar to Part 6, except that policy year premium is shown, not exposure year premium. For the prior years row, see below.
- Section 5 shows bulk premium reserves; most companies do not hold premium reserves for specific policies.⁸⁰ Bulk premium reserves are the equivalent of the Section 3 bulk loss reserves, reflecting additional premiums (positive or negative) anticipated from audits and retrospective adjustments.
- Sections 6 and 7 of Part 7B show reinsurance commission exhibits, similar to the premium exhibits in Sections 4 and 5.

The risk-based capital reserving risk charge is applied to the loss reserves – both case reserves and bulk + IBNR reserves – in Schedule P, Part 2 minus Part 3. The reserving risk charge reflects loss development in a worst-case scenario. The loss sensitive contract offset reflects the additional premium expected in this worst-case scenario.

Illustration – Premium Sensitivity

Illustration: The exhibits below show extracts from Schedule P, Part 7A, sections 2 through 5 (figures are in thousands of dollars). The actual exhibits contain ten policy years by ten development periods, but these extracts suffice to illustrate the quantification techniques. We quantify the premium responsiveness from 24 to 36 months and from 36 to 48 months.

Exhibit 7.1: Incurred Loss/DCC and Reserves on Loss-Sensitive Contracts

	<i>Incurred Loss and DCC</i>				<i>IBNR plus bulk Loss and DCC</i>			
	<i>20X4</i>	<i>20X5</i>	<i>20X6</i>	<i>20X7</i>	<i>20X4</i>	<i>20X5</i>	<i>20X6</i>	<i>20X7</i>
<i>20X4</i>	1,000	2,200	2,400	2,500	350	550	300	200
<i>20X5</i>		1,100	2,500	2,650		400	600	450
<i>20X6</i>			1,200	3,000			450	650
<i>20X7</i>				1,500				500

Exhibit 7.2: Earned and Accrued Premiums on Loss-Sensitive Contracts

	<i>Earned Premium</i>				<i>Accrued Retrospective Premiums</i>			
	<i>20X4</i>	<i>20X5</i>	<i>20X6</i>	<i>20X7</i>	<i>20X4</i>	<i>20X5</i>	<i>20X6</i>	<i>20X7</i>
<i>20X4</i>	1,500	3,150	3,300	3,350	0	200	150	110
<i>20X5</i>		1,650	3,600	3,700		0	210	155
<i>20X6</i>			1,800	4,200			0	220
<i>20X7</i>				2,000				0

PART 7 DATA

These exhibits show policy year data, not accident year losses (as in Parts 2, 3, and 4 of Schedule P) or exposure year premiums (as in Part 6 of Schedule P).

For each policy year in Section 2, the incurred losses at 24 months are about twice the incurred losses at 12 months. For example, the policy year 20X4 incurred losses at 12 months are losses occurring in 20X4 on policies written in 20X4. If policies are written evenly over the year, these are half the policy year 20X4 losses. By December 31, 20X5, all the policy year 20X4 losses have occurred, so the 24 month figure is about twice the 12 month figure.⁸¹ The same is true for the earned premiums in Section 4: the 24 month figures are about twice the 12 month figures.

INITIAL DEPOSITS

The illustration assumes that the written premiums are the estimated ultimate net premiums. This is not always true, for several reasons:

- *Payroll and sales estimates:* Some insureds understate payroll or sales projections to lower the deposit premiums.
- *Competition:* Insurers may accept understated exposure estimates to keep their deposit premiums competitive. To complete Part 7 of Schedule P, the reporting company should use the estimated ultimate premium, not the premium in the policy.
- *Taxes:* Companies may book a low written premium to defer state premium taxes or federal income taxes.⁸² State premium taxes are not incurred until the company books the (direct) written premium.

If the written premium is the estimated ultimate premium, there is no retrospective premium reserve at policy inception. At the first retrospective adjustment, some premiums are returned to policyholders, since not all losses have yet been recorded, and the accrued retrospective premium asset turns positive. If the company charges initial premiums below the estimated ultimate premium, the accrued retrospective premium asset is positive from policy inception.

QUANTIFYING THE SENSITIVITY

Policy years 20X4 and 20X5 show the premium sensitivity from 24 to 36 months. For policy year 20X4, losses develop from \$2.20 million at 24 months to \$2.40 million at 36 months, for a change of \$0.20 million. Premiums develop from \$3.15 million at 24 months to \$3.30 million at 36 months, for a change of \$0.15 million. The premium sensitivity is $\$0.15 \text{ million} / \$0.20 \text{ million} = 75\%$. For policy year 20X5, losses develop from \$2.50 million at 24 months to \$2.65 million at 36 months, for a change of \$0.15 million. Premiums develop from \$3.60 million at 24 months to \$3.70 million at 36 months, for a change of \$0.10 million. The premium sensitivity is $\$0.10 \text{ million} / \$0.15 \text{ million} = 67\%$.

As the projected premium sensitivity from 24 to 36 months, we might use the average or we might give more weight to the 20X5 year, particularly if the plan parameters had changed.⁸³

For the premium sensitivity from 36 months to 48 months, the policy year 20X4 losses develop from \$2.40 million at 36 months to \$2.50 million at 48 months, for a change of \$0.10 million. Premiums develop from \$3.30 million at 36 months to \$3.35 million at 48 months, for a change of \$0.05 million. The premium sensitivity is \$0.05 million / \$0.10 million = 50%. As reserves mature, premium sensitivity declines, since more losses are censored by the loss limit and more premiums are capped by the maximum premium.

In this illustration, the incurred losses develop smoothly upward, and the premiums follow them equally smoothly. A company which is well reserved should show flat incurred losses along the rows and similarly flat earned premiums. The incurred losses include IBNR and bulk reserves, and the earned premiums include accrued retrospective premiums. The changes in incurred losses from period to period would be sometimes small and sometimes large, sometimes positive and sometimes negative, stemming from random loss fluctuations. The changes in earned premiums would be equally variable, stemming from random loss fluctuations as well as censoring by loss limits and capping by the premium maximums.

A well-reserved company would have two series of variable figures with means of zero, since favorable and adverse development are equally likely. The ratios of these series will be even more variable – sometimes high, sometimes low, sometimes positive, sometimes negative – and they do not reveal much about premium sensitivity.

Reported Losses and Billed Premium

Premium sensitivity is more accurately the change in *billed premium* (not earned premium) in response to changes in *reported losses* (not incurred losses).

- Section 2 (incurred losses) minus Section 3 (IBNR and bulk reserves) = reported losses.
- Section 4 (earned premiums) minus Section 5 (accrued premiums) = billed premiums.

We re-calculate the premium sensitivity from 24 months to 36 months. For policy year 20X4, reported losses develop from (\$2.2 million – \$0.55 million) = \$1.65 million at 24 months to (\$2.4 million – \$0.3 million) = \$2.1 million at 36 months, for a change of \$0.45 million. Billed premium develops from (\$3.15 million – \$0.2 million) = \$2.95 million at 24 months to (\$3.3 million – 0.15 million) = \$3.15 million at 36 months, for a change of \$0.20 million. Premium sensitivity from 24 to 36 months is \$0.20 million / \$0.45 million = 44.4%. For policy year 20X5, reported losses develop from (\$2.50 million – \$0.60 million) = \$1.90 million at 24 months to (\$2.65 million – 0.45 million) = \$2.20 million at 36 months, for a change of \$0.30 million. Billed premium develops from (\$3.6 million – \$0.21 million) = \$3.39 million at 24 months to (\$3.70 million – \$0.155 million) = \$3.545 million at 36 months,

for a change of \$0.155 million. Premium sensitivity from 24 to 36 months is \$0.155 million / \$0.30 million = 51.7%.

The RBC reserving risk charge is the capital needed to guard against unanticipated loss development. The premium sensitivity to unexpected development may be lower than the sensitivity to normal development. Unexpected development comprises changes of temporary total claims to permanent total disability or judicial decisions regarding compensability of occupational illnesses. These losses are often above loss limits or maximum premiums. The figures derived from the Part 7 triangles may not address the risk-based capital concerns.

Premium Billing Lags

Retrospective adjustments are done annually, and the premium is billed about three months later; this implies that the premium billing lags the loss occurrence by 3 to 15 months. For example, a policy effective on January 1, 20X4, has adjustments on July 1, 20X5, and annually thereafter, and the premium is billed around October 1. Each retrospective premium is driven by losses reported from July 1 to June 30, or 15 months to 3 months before the premium billing. If one does not properly match premiums and losses, the results are distorted.

Illustration: Suppose that the premium billing is done on July 1, all losses occur on July 1, there is 100% premium responsiveness, and the incurred losses alternate between \$1,000 and \$0 in succeeding years. A simple test of premium sensitivity would show the following:

Exhibit 7.3: Premium Sensitivity and Reporting/Billing Lags

Year	1	2	3	4	5	6
Change in incurred losses	\$1,000	\$0	\$1,000	\$0	\$1,000	\$0
Change in billed premium	\$0	\$1,000	\$0	\$1,000	\$0	\$1,000

The premium billing shows up a year after the loss occurs. The 100% premium sensitivity shows up as a -100% premium sensitivity. Simplistic tests of premium sensitivity may yield negative regression coefficients or seemingly random regression coefficients.

Prior Years Row

The Annual Statement *Instructions* comment on the data for the prior years rows in Sections 2, 3, 4, and 5 of Parts 7A and Part 7B as follows:

[losses:] The "prior" row should display the reported estimate of ultimate losses and defense and cost containment expense on a policy year basis for all policy years ten or more years older than the current policy year.

[premiums:] The “prior” row should display the reported estimate of net earned premium on a policy year basis for all policy years ten or more years older than the current policy year.

These instructions do not make sense; companies do not keep records of premiums and losses on loss sensitive contracts written years ago. None of the Schedule P prior years rows asks for such data. The prior years rows use one of three types of data:

- Current reserves for all old years (the reserves in Part 2, Part 4, and Part 1).
- Current year payments related to old years (payments in Part 1; Parts 5 and 6).
- Cumulative payments since the second calendar year in the triangle (Part 3).

The only procedure which makes sense for the incurred and earned triangles in Part 7 is the one used for Part 2 – a combination of the first method for reserves and the third method for payments. But this method is not appropriate for quantifying premium sensitivity, which requires matched premiums and losses. The prior years rows is not used, since the premiums and losses stem from different policy years.⁸⁴

REINSURANCE EXPERIENCE

Proportional reinsurance, or pro-rata reinsurance (quota share and surplus share), is shown as assumed or ceded premiums, losses, and loss adjustment expenses in the exhibits for the primary lines of business. A 50% quota share treaty for personal automobile liability business is reflected in the assumed and ceded columns of Parts 1B, 2B, etc.

Assumed non-proportional reinsurance, or excess-of-loss reinsurance, is split into three categories and shown separately from the primary lines of business: non-proportional property, non-proportional casualty, and financial lines (exhibit categories N, O, and P).⁸⁵ All three reinsurance lines use the 10-year casualty format, since even property excess-of-loss reinsurance has a long development period.

Ceded non-proportional reinsurance is reported in the same exhibit as the underlying business. A primary company which cedes part of its workers' compensation business on an excess-of-loss treaty records the experience in the ceded columns of Part 1D, and the reinsurer who assumes the business includes it in Part 1O (Part *one-oh*, not Part *ten*). A reinsurance company which retrocedes part of the assumed non-proportional workers' compensation business shows the retrocession in Part 1O as well.

If a reinsurance treaty contains both proportional and non-proportional sections, the premiums and losses for the sections are divided and reported on the appropriate lines: the proportional parts for both the ceding company and the assuming company and the non-proportional parts for the ceding company in the exhibits for the underlying lines of

business, and the non-proportional parts for the assuming company in the reinsurance exhibits. This is analogous to the treatment of reinsurance treaties that are part prospective and part retroactive: the premiums and losses should be divided and treated separately for each part.⁸⁶

Prospective vs Retroactive Reinsurance

Only prospective reinsurance – not retroactive reinsurance – affects Schedule P. Retroactive reinsurance “reinsurance in which a reinsurer agrees to reimburse a ceding entity for liabilities incurred as a result of past insurable events covered under contracts subject to the reinsurance” (SSAP 62, paragraph 21). The NAIC *Instructions to the Statement of Actuarial Opinion* (section 11) provide a three-fold definition:

For the purpose of this instruction, “retroactive reinsurance” refers to any agreement which increases the transferring insurer’s Surplus to Policyholders as a result of the transferee undertaking any loss obligation already incurred and for which the consideration paid by the transferring insurer is derived from present value or discounting concepts.

Retroactive reinsurance affects the special surplus entry on the liability side of the statutory balance sheet (page 3 of the *Annual Statement*), but it is not reflected in the *Annual Statement* exhibits and schedules, such as Schedule P.⁸⁷ It affects statutory income in the same fashion as prospective reinsurance does, except that it is coded as *other income* on the statutory statement of earnings (SSAP 62, paragraph 28i). It affects policyholders’ surplus, though not the unassigned portion of surplus. It affects GAAP income, GAAP equity, and taxable income.

Reinsurance and Risk-Based Capital

Risk-based capital adjusted surplus includes special surplus funds; that is, adjusted surplus does not depend on whether the reinsurance is prospective or retroactive.

The risk-based capital *ratio* is slightly reduced if the reinsurance is retroactive instead of prospective. The RBC ratio is adjusted surplus divided by the risk-based capital requirements. The RBC reserving risk charge is greater than the charge for reinsurance recoverables, particularly after the covariance adjustment. *Prospective* reinsurance reduces risk-based capital requirements and decreases the denominator of the risk-based capital ratio. *Retroactive* reinsurance does not have this effect.

Illustration: Companies A and B have the same initial surplus and capital requirements. Company A prospectively reinsures a book of general liability business; company B retroactively reinsures an identical book of business. Companies A and B have the same ending surplus, though some of company B’s surplus is coded as special surplus funds. Company B has more loss reserves shown on the balance sheet, in the Underwriting and Investment Exhibit, and in Schedule P than Company A has; company A has a write-in

contra-liability for reinsurance recoverables which Company B does not have. Company B has greater RBC requirements than Company A has, since the reserving risk charge is greater than the credit risk charge (over 30% versus 10%) and the margin effect of the reserving risk charge is greater than the marginal effect of the credit risk charge.⁸⁸

Reinsurance and Surplus Relief

The statutory treatment of retroactive reinsurance is more conservative than the GAAP treatment in that it does not allow a reduction of statement reserves. It is more liberal than the GAAP treatment in that it allows full (up-front) surplus relief, whereas GAAP recognizes the profit from retroactive reinsurance ratably over the lifetime of the claims.

Illustration: On December 31, 20X4, an insurer has \$100 million of loss reserves which it retroactively reinsures for \$80 million. Both its policyholders' surplus and its GAAP equity are \$200 million before the reinsurance. By December 31, 20X5, \$25 million of the original loss reserves have been settled.

The statutory financial statements show \$20 million of other income on December 31, 20X4, \$20 million of special surplus funds, and no change in unassigned surplus. During 20X5, the insurer shows a \$25 million reduction in loss reserves and a \$25 million reduction in the write-in contra-liability for recoverables from retroactive reinsurance.

The GAAP financial statements show no income on December 31, 20X4, and no change in GAAP equity. During 20X5, ABC shows income of $\$25/\$100 \times \$20$ million = \$5 million and a \$5 million increase in GAAP equity.

Schedule P Interrogatories

The Schedule P Interrogatories contain seven questions. Five of these have been discussed above along with the relevant Schedule P exhibits:

- *Interrogatory 1* shows a ten year exhibit of extended loss and expense reserves on claims-made policies for medical malpractice, other liability, and products liability. The caption for the first column says: "years in which premiums were earned and losses were incurred." The extended loss and expense reserves are policy reserves. They do not relate to earned premiums or incurred losses. It is unclear how the extended loss and expense reserves should be distributed by year in this exhibit.
- *Interrogatory 2* discloses whether the company has followed the revised NAIC definitions of defense and cost containment and adjusting and other adjustment expenses.
- *Interrogatory 3* relates to the distribution of adjusting and other adjustment expenses payments and reserves by accident year.

- *Interrogatory 4* discloses loss reserve discounting and the resulting difference between the Underwriting and Investment Exhibit and Schedule P.
- *Interrogatory 5* discloses the net premiums in force for fidelity and surety business. Some companies use premiums in force to estimate the reserves for these lines of business.
- *Interrogatory 6* discloses whether claim counts are per claim or per claimant.

The seventh interrogatory relates to estimates of reserve adequacy:

Interrogatory 7: The information provided in Schedule P will be used by many persons to estimate the adequacy of the current loss and expense reserves, among other things. Are there any especially significant events, coverage, retention or accounting changes which have occurred which must be considered when making such analyses?

The NAIC left this question quite general, so that companies would describe freely any changes in their experience. The Annual Statement *Instructions* list several items that should be described in this interrogatory:

- A change in the method of counting claims.
- The intercompany pooling of only a portion of the business.
- Changes in the intercompany pooling arrangement.

Other material changes should also be noted. For example, if a company revises its tabular discount for permanent disability indemnity benefits on workers' compensation claims, either by changing the interest rate or by discounting different blocks of claims, this should be noted.

Reserve Margins

Calendar year underwriting results for the long-tailed lines of business are influenced by the adequacy of reserve margins for previously reported claims and by the strength of case and bulk reserves for newly reported claims.

- If the held reserves at the beginning of the calendar year were inadequate, the adverse loss development will dampen the current year's reported results.
- If inadequate reserves are set up for newly reported claims, the calendar year reported results will look better than they actually are.

Ultimate claim costs in the liability lines of business are difficult to predict, since they are influenced by numerous external factors, such as unexpected judicial decisions, new

causes of action, and social developments affecting claims consciousness and jury awards. Moreover, insurance underwriting cycles may lead company managements to smooth reported earnings by alternately strengthening and weakening loss reserves.

Schedule P allows one to compare reported calendar year results with actual accident year results. Calendar year results are shown in the Underwriting and Investment Exhibits for net earned premiums on Part 2, column 4, and net losses incurred on Part 3, column 7. The calendar year loss ratio is shown in Part 3, column 8.

The corresponding calendar/accident year figures are shown in Schedule P, Part 1, columns 3 and 28. A triangle of accident year / exposure year loss ratios may be formed from the Part 2 and Part 6 triangles. As noted earlier, one should adjust the Part 6 triangles to a net of reinsurance basis.

RESERVE MARGIN CONTROVERSY

Reserve margins have long been a controversial topic among casualty actuaries. Some actuaries maintain that discretionary reserve margins are improper, since they hamper accurate analysis of reserve adequacy. Other actuaries believe that reserve margins are sometimes appropriate or unavoidable.

Illustration: A company may change its bulk reserves gradually from quarter to quarter, reducing the volatility in the actuarial reserve estimates. The smooth progression of liabilities over time may better reflect management's reserving philosophy than the actuary's statistical estimates. As long as the held reserves exceed the minimum reserves considered to be reasonable, management's actions are not necessarily improper.

Illustration: The statutory full-value reserves depend on the inflation rate between the accident date and the payment date of the losses. As the inflation rate changes, the full-value reserves should change as well, though the present value of the reserves does not necessarily change if the discount rate moves in tandem with the inflation rate. The company may use a long-term average inflation rate in its reserve estimates, and it may not revise the estimates with quarterly or yearly changes in the inflation rate.⁸⁹

Changes in reserve margins may also stem from smoothing of calendar year results over underwriting cycles. The Schedule P, Part 2 triangles allow an analysis of reserve margin changes over calendar years. Casualty actuaries have used these triangles to examine three commonly held propositions about reserve margins.

- Companies tend to move together. Some years, many companies are strengthening reserves; in other years, many companies exhibit reserve weakening.
- Lines of business tend to move together. A company may seek to smooth overall operating results, not line of business results.

- Reserve margin changes tend to offset earnings volatility over the course of the underwriting cycle.

None of these propositions is universally accepted. Schedule P allows regulators and financial analysts to examine the industry's response to underwriting cycles, interest rate changes, and inflation rate changes.

Statement of Actuarial Opinion

UNDER-RESERVING

Loss reserves may be inadequate for various reasons:

- Unforeseeable future developments cause mis-estimation of reserve indications. The surge in asbestos claims in 1999 and 2000 is an example of severe adverse development that was not expected by insurance industry actuaries or lawyers.
- Companies in financial distress may hide their weakness by reducing the bulk reserves for long-tailed lines of business.
- Companies writing long-tailed lines of business may value their reserves at a non-zero valuation rate.

This paper takes no position on the general adequacy of industry reserves. Several studies, however, have seen under-reserving as a contributing factor to many insurance insolvencies (Best's [1991]; AAA [1991], page 166; Hartman [1992]).

ACTUARIAL OPINION

Schedule P reflects the company's estimates of indicated reserves, which is not necessarily the same as the reserving actuary's estimate. To shift the onus of ensuring accurate reserve estimates, the NAIC requires that a "Statement of Actuarial Opinion Regarding Loss and Loss Adjustment Expense Reserves" accompany the Annual Statement.

The Statement of Actuarial Opinion is signed by a qualified actuary appointed by the company's Board of Directors. Each year, the actuary presents a report to the Board of Directors explaining the procedures used to arrive at the opinion and the conclusions embodied in it (NAIC Blanks Task Force, Attachment N of October 1991 meeting; Lamb [1991; 1992]; Witcraft [1992]). The American Academy of Actuaries Committee on Property-Liability Financial Reporting publishes a *Practice Note* each year providing guidance to actuaries in completing the Statement of Actuarial Opinion.

The Statement of Actuarial Opinion must comment on the reasonableness of the reserves for six items, three of which are taken from Schedule P (paragraph 8 of the NAIC *Instructions*):

- A. Reserve for unpaid losses (page 3, line 1)
- B. Reserve for unpaid loss adjustment expenses (page 3, line 3)
- C. Reserve for unpaid losses – direct and assumed (Schedule P, Part 1, Summary exhibit, totals from columns 13 and 15)
- D. Reserve for unpaid loss adjustment expenses – direct and assumed (Schedule P, Part 1, Summary exhibit, totals from columns 17, 19, and 21)
- E. The extended loss and expense reserves (Schedule P Interrogatory 1)
- F. The Page 3 write-in item reserve, “Retroactive reinsurance reserve ceded or assumed.”

If the company writes certain types of property-casualty policies with durations of 13 months or longer, the actuary must also opine on the unearned premium reserves for these policies. This requirement relates to product warranty and mechanical breakdown policies; see SSAP No. 65, “Property and Casualty Contracts,” paragraphs 21-31. The unearned premium reserves for these contracts depends on actuarial estimates of future losses and expenses.

Schedule P contains management’s best estimate of the indicated reserves. The Statement of Actuarial Opinion does not contain the Appointed Actuary’s estimate. Rather, it contains the Appointed Actuary’s opinion whether management’s estimate is reasonable.

Illustration: Management’s best estimate of the indicated reserves is \$8 billion; this is the amount shown on page 3, line 1. The Appointed Actuary believes that the best estimate of the indicated reserves is \$8.5 billion. However, the actuary considers the range of reasonableness to be \$7.5 billion to \$9.5 billion. The actuary would issue an unqualified opinion.⁹⁰

SCOPE OF THE STATEMENT

Annual Statement *Instruction* 12, paragraph (11), describes the scope of the statement:

The actuary should comment in the scope section on each of the following topics, describing the effect of each on loss or loss expense reserves: retroactive reinsurance, financial reinsurance, and reinsurance collectibility, asbestos exposures and environmental exposures. The actuary should also comment on and describe the effects of any additional topics, such as discounting, salvage/subrogation, and underwriting pools and associations which in the actuary’s judgment materially affect loss or loss expense reserves. If the company reserves will create exceptional values using the NAIC IRIS tests 9 (One Year Reserve Development to Surplus), 10 (Two Year Reserve Development to Surplus) and 11 (Estimated Current Reserve Deficiency to Surplus), the actuary should include an explanation.

The following topics relate to the Schedule P entries:

Anticipated salvage and subrogation: Management's estimate of the anticipated salvage and subrogation is shown in column 23 of Part 1. The Appointed Actuary should comment on the reasonableness of this estimate if it affects reserve adequacy.

Discounts: Non-tabular loss reserve discounts are shown in Part 1, columns 32 and 33. Tabular discounts are disclosed in Note 28 to the Annual Statement. In the Statement of Actuarial Opinion, the actuary should comment on both tabular discounts, which may affect workers' compensation and accident & health loss reserves and non-tabular discounts, which might be used for all lines of business.

Pools and Associations: The ceded and assumed entries in Schedule P include amounts for voluntary and involuntary pools. Some of these ceded and assumed entries may be large, such as those for workers' compensation residual market pools in the late 1980's and early 1990's. The Appointed Actuary must comment whether the company uses the pool's estimates of required or booked reserves, or whether the company independently estimates the needed reserves.

Retroactive reinsurance denotes the transfer of financial obligation with the following three attributes:

- the losses have already occurred
- the primary company's surplus is increased and
- the consideration paid to the reinsurer is determined by present value techniques.⁹¹

Retroactive reinsurance is not reflected in the Schedule P exhibits, though it affects policyholders' surplus and statutory income (see Feldblum [2002: SchF]).

Financial reinsurance refers to arrangements in which the reinsurance company does not incur timing and underwriting risk; see SSAP No. 62, "Property and Casualty Reinsurance." A lack of timing risk or underwriting risk precludes a transaction from being considered reinsurance in statutory reports.

Reinsurance Collectibility: Part 1 of Schedule P shows both gross and net loss reserves, but it does not indicate the expected collectibility of reinsurance recoverables. Schedule F imposes statutory penalties for unauthorized and slow-paying reinsurers and for overdue reinsurance (Simon and Visner [1992]; Feldblum [2002]). The Statement of Actuarial Opinion should comment on any anticipated collection problems on reinsurance recoverables.⁹² The actuary completing Schedule P should be familiar with the provision for reinsurance from Schedule F and with other information about reinsurance collectibility.

Paragraph 10 of the NAIC *Instructions* to the Statement of Actuarial Opinion require the opinion actuary to write that

In forming my opinion on the loss and loss adjustment expense reserves, I relied upon data prepared by the responsible officers or employees of the company or group to

which it belongs. I evaluated that data for reasonableness and consistency. I also reconciled that data to Schedule P Part 1 of the company's current annual statement.

The Practice Note issued by the Committee on Property-Liability Financial Reporting explains the reconciliation to Schedule P as follows:

- A. *each of the following types of data, if relied on significantly in forming the actuarial opinion (on a net or direct plus assumed basis), were reconciled to Schedule P: paid losses, incurred (case basis) losses, paid defense and cost containment expenses, incurred (case basis) defense and cost containment expenses, paid adjusting and other expenses, and earned premiums;*
- B. *the reconciliation consisted of comparing the changes from the prior year-end values (e.g., current calendar year paid losses and changes in case basis loss reserves), in detail by line of business and year in which losses were incurred to the extent that such detail was relied upon significantly and is provided in Schedule P; . . .*

The Appointed Actuary keeps work papers showing the reconciliation to Schedule P for seven years from the date of the opinion.

Appendix A: Accounting for Audits and Retrospective Adjustments

Schedule P, Part 6, may be used by the IRS to ensure that companies book the estimated ultimate premiums on the policy effective date. An understanding of both statutory and tax accounting for audits and retrospective adjustments is essential for tax compliance. This appendix is background information on the accounting rules.

General Principles

- A. For statutory statements, companies have a choice of two methods to record written premium for policies with audits or retrospective adjustments, (1) through written premium or (2) as an adjustment to earned premium; for tax purposes, companies must use the first method.⁹³
- B. One can report unearned premium reserves either gross or net of earned but unbilled and accrued retrospective premiums. The statutory income statement derives the earned premium from net unearned premium reserves; the statutory balance sheet uses gross accounting.
- C. There are two ways to determine the non-admitted portion of the accrued retrospective premiums (SSAP No. 66, "Retrospectively Rated Contracts," paragraph 9).

A. ACCOUNTING METHODS

The two method of recording written premium are in SSAP Number 53, "Property-casualty Contracts – Premiums," paragraph 9; we have added underlining:

Adjustments to the premium charged for changes in the level of exposure to insurance risk (e.g., audit premiums on workers' compensation policies) are generally determined based upon audits conducted after the policy has expired. Reporting entities shall estimate audit premiums, the amount generally referred to as earned but unbilled (EBUB) premium, and shall record the amounts as an adjustment to premium, either through written premium or as an adjustment to earned premium. The estimate for EBUB may be determined using actuarially or statistically supported aggregate calculations using historical company unearned premium data, or per policy calculations.

Method 1 adds the unbilled premium to written premium; Method 2 adds the earned part of unbilled premium to earned premium.

Illustration: A workers' compensation policy with a written premium of \$10,000 is issued on July 1, 20XX. On December 31, 20XX, the company anticipates that an additional \$2,000 of premium will be billed at the final audit.

The estimated earned premium in 20XX is \$6,000. The statutory earned premium is the written premium minus the change in the unearned premium reserve; the tax-basis earned premium is the written premium minus 80% of the change in the unearned premium reserve.

Method 1: The \$2,000 expected audit premium is coded as 20XX written premium, giving a total written premium of \$12,000. Half of the premium has been earned by December 31, and the unearned premium reserve at the end of the year is \$6,000. The statutory earned premium is the written premium minus the change in the reserve, or $\$12,000 - (\$6,000 - \$0) = \$6,000$. The tax-basis earned premium is the written premium minus 80% of the change in the reserve, or $\$12,000 - 80\% \times (\$6,000 - \$0) = \$7,200$.

Method 2: The 20XX written premium remains \$10,000. The earned but unbilled premium equals \$1,000, since only 50% of the audit premium is earned. This \$1,000 is treated as a negative unearned premium reserve. The traditional unearned premium reserve at the end of the year from the \$10,000 deposit premium is \$5,000. The net unearned premium reserve is $\$5,000 - \$1,000 = \$4,000$. The statutory earned premium is the written premium minus the change in reserve, or $\$10,000 - (\$4,000 - \$0) = \$6,000$. The tax-basis earned premium is the written premium minus 80% of the change in the reserve, or $\$10,000 - 80\% \times (\$4,000 - \$0) = \$6,800$.⁹⁴

Companies may use Method 1 for some policies and Method 2 for other policies. The two methods produce different written premiums and unearned premium reserves, but these differences offset each other, and the earned premiums are the same.

B. STATUTORY VS TAX ACCOUNTING

In the illustration above, taxable income is \$400 greater in Method 1.⁹⁵ Method 2 defers some of the written premium until the audit is billed or the retrospective adjustment is processed; taxes and assessments based on written premiums are similarly deferred.

Method 1 shows a higher written premium than Method 2 and a correspondingly higher unearned premium reserve. Since only 80% of the unearned premium reserve is an offset to taxable income (by the revenue offset provision), Method 1 speeds up the income tax liability. Until January 2000, this was an additional incentive to use Method 2. The tax regulations of January 5, 2000, require companies to use Method 1 to compute the unearned premium reserve; Method 2 is not acceptable.⁹⁶

C. FINANCIAL STATEMENT REPORTING PROCEDURES

The statutory income statement shows earned premiums, for which there is no difference between Method 1 and Method 2. The statutory balance sheet uses gross accounting: the earned but unbilled and accrued retrospective premiums are assets, not offsets to the unearned premium reserve.

The only difference between Method 1 and Method 2 is in the Underwriting and Investment Exhibit, Part 2A. The unearned premium reserves by line of business are net of the earned but unbilled and accrued retrospective premiums; these figures are used with the written premiums by line of business to give the earned premiums that together form the earned premium on the statutory income statement.

The statutory balance sheet shows the unearned premium reserve *gross* of earned but unbilled premiums and accrued retrospective premiums, and it shows separate assets for earned but unbilled and accrued retrospective premiums, to allow the computation of the non-admitted portion of the earned but unbilled premium and accrued retrospective premium assets.⁹⁷

ILLUSTRATION – INCOME STATEMENT AND BALANCE SHEET

We continue use the previous illustration. A workers' compensation policy with a written premium of \$10,000 is issued on July 1, 20XX. On December 31, 20XX, the company anticipates that an additional \$2,000 of premium will be billed at the final audit.

For the income statement, the unearned premium reserve is $\$5,000 - \$1,000 = \$4,000$ and the earned premium is $\$10,000 - \$4,000 = \$6,000$. The balance sheet shows the earned but unbilled premiums as a separate asset, so that the non-admitted portion may be deducted. The gross asset is added to the net unearned premium reserve for the balance sheet liability. The entries for this illustration are as follows:

- Earned but unbilled premiums, gross (page 2, line 10.2, column 1): \$1,000
- Earned but unbilled premiums, non-admitted (page 2, line 10.2, column 2): \$100
- Earned but unbilled premiums, net (page 2, line 10.2, column 3): \$900

- Unearned premium reserves (page 3, line 10): \$4,000

D. NON-ADMITTED ASSET

There are two methods of computing the non-admitted portion of the accrued retrospective premium asset:⁹⁸

1. Ten percent of the unsecured accrued retrospective premium asset is not admitted.
2. The non-admitted portion varies by policy, depending on the credit rating of the insured.

Companies must use the same method for all policies. A company may not use the second method for insureds with high credit ratings and the first for those with low credit ratings.

ACCRUED RETROSPECTIVE PREMIUM RESERVES

For tax purposes, companies must establish reserves for audit premiums and accrued retrospective premiums; they generally show the reserves on their statutory statements as well. The Annual Statement has three terms for such premium reserves.⁹⁹

- *Earned but unbilled* (EBUB) premiums are audit premiums for past exposures that have not yet been billed by the insurer.¹⁰⁰ They are shown (in total) on the balance sheet, page 2, line 10.2, and by line of business in the Underwriting and Investment Exhibit, Part 2A, "Recapitulation of All Premiums," page 8, column 3.
- *Accrued retrospective premiums based on experience* (ARP's) are the net additional premiums expected from future retrospective adjustments on retrospectively rated contracts (SSAP, Number 66, "Retrospectively Rated Contracts"). Net additional premiums means expected additional premiums minus expected return premiums. They are shown in total on the balance sheet, page 2, line 10.3, and in the Underwriting and Investment Exhibit, Part 2A, "Recapitulation of All Premiums," page 8, line 35, column 5.
- *Reserve for rate credits and retrospective premiums based on experience* is the accrued retrospective premiums plus rate credits given on group accident and health insurance. It is shown by line of business in the Underwriting and Investment Exhibit, Part 2A, "Recapitulation of All Premiums," page 8, column 4.¹⁰¹

If the company expects to return premium to the insured at the retrospective adjustment, the premium reserve is a liability. If the company expects to collect premium from the insured, the premium reserve is an asset. Generally, expected premium collections exceed expected premium returns. The premium reserve here refers to the net asset; this is the usage in the Annual Statement.

Statutory Accounting Principles

The statutory accounting principles are as follows:

If accounting method 1 is used for earned but unbilled premiums (see above), the earned but unbilled premium affects the written premium and the unearned premium reserves. The earned but unbilled premiums are included in columns 1 and 2 of the Underwriting and Investment Exhibit, Part 2A, "Recapitulation of All Premiums," page 8. They are not included in column 3, "earned but unbilled premium."

If accounting method 2 is used for earned but unbilled premiums (see above), the earned but unbilled premium do affect the written premium or the unearned premium reserves. The earned but unbilled premiums are included in column 3 of the Underwriting and Investment Exhibit, Part 2A, "Recapitulation of All Premiums," page 8. These entries are negative amounts; they offset the unearned premium reserves shown in columns 1 and 2.

The reserve for rate credits or retrospective adjustments based on experience are negative amounts showing the net accrued retrospective premiums and the accident and health insurance rate credits in column 4 of the Underwriting and Investment Exhibit, Part 2A, "Recapitulation of All Premiums," page 8. These entries are also negative amounts; they offset the unearned premium reserves shown in columns 1 and 2.

The net unearned premium reserves shown in column 5 of the Underwriting and Investment Exhibit, Part 2A, are the sum of columns 1 through 4. These adjusted unearned premium reserves are used to calculate the earned premiums in Part 2 of the Underwriting and Investment Exhibit ("Premiums Earned" on page 7). The total earned premiums for all lines of business combined is carried to line 1 of the statutory income statement (page 4).

The "accrued retrospective premium based on experience" for all lines of business combined is removed from the unearned premium reserve on line 35 of Part 2A of the Underwriting and Investment Exhibit, and the net amount (the "balance") is shown on line 37. Since the "accrued retrospective premium" is a contra-liability, though it shown as a positive figure in the Annual Statement, line 37 should equal line 34 plus line 35. [In contrast, the "reserves for rate credits or retrospective adjustments based on experience" shown in column 4 of Part 2A are shown as negative figures when they are contra-liabilities.]

The line 37 unearned premium reserve is carried to the liability side of the balance sheet, page 3, line 9: "unearned premium reserves." The accrued retrospective premiums on line 35 of Part 2A are carried to the asset side of the balance sheet, page 2, column 1, line 10.3. The non-admitted portion is deducted in column 2, and the net admitted portion is shown in column 3.¹⁰²

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1. Richard J. Roth, Jr., former Chief Casualty Actuary of the California Insurance Department and Chair of the NAIC Casualty Actuarial Task Force, was the architect of the new Schedule P in 1989.

2. The term *loss* in this paper, when applied to the Schedule P triangles, denotes both loss and allocated loss adjustment expenses (called *defense and cost containment expenses* in Schedule P).

3. Homeowners, Farmowners, commercial multi-peril, and international, which have both property and casualty coverages, are included with the ten year lines of business.

4. According to the Annual Statement *Instructions*, "Business reported on the Aggregate write-ins for other lines of business of the Underwriting and Investment Exhibit and the State Page should be included in the Other Liability sections of Schedule P." For example, workers' compensation excess coverage is treated as other liability for state premium taxes.

5. The Schedule P *Instructions* say: "Since the Summary of each part contains ten years of historical data, the information from the "prior" line for the Property Lines, Sections I through L, and Financial Guaranty/Mortgage Guaranty, Section S, must be supplemented for the eight accident years preceding the two most recent years."

6. Richard Roth, who designed the current Schedule P, writes [1989], page 86: "Surprisingly, very few companies – particularly small companies – have any idea how profitable or whether they are making money or whether the business being ceded is profitable or not profitable. Once they pay that reinsurance premium they don't care, it's just gone. . . . Well, what happens is if the business that is being ceded is consistently unprofitable, we know that two or three years down the line they're not going to have any reinsurance. Also, it says that the business that they're writing is probably underpriced and that they will soon have problems."

7. The latest calendar year net earned premium shown in Schedule P, Part 1, column 3, row 11 (total for all accident years), for each line of business should equal the net earned premium shown on page 7, "Underwriting and Investment Exhibit," Part 2, "Premiums Earned," column 4. Premium figures from earlier years should agree with the figures in the preceding years' Annual Statements. If there is an intercompany pooling agreement that has changed over time, the comparison with earlier Annual Statements can be done only on a consolidated basis. See the discussion in the text on intercompany pooling.

8. Salzmann [1967], pages 120-121, notes that "calendar/accident year loss ratios are theoretically less accurate than policy year loss ratios," but she adds that "the primary purpose of Schedule P is to assist in the determination of adequate reserve levels — not the precise measurement of loss ratios." This is correct for the chain ladder loss reserving techniques, which do not rely on premium figures. It is less true for other reserving techniques, such as the Stanard-Bühlmann expected loss technique or the Brosius least squares technique; see the discussions of Parts 2 and 3 below.

Upon reviewing an earlier (pre-1996) draft of this paper, Richard Roth commented: "An acknowledged weakness of Schedule P is the mismatch between losses and premiums

by year, especially for reinsurance and workers' compensation. Early drafts of Schedule P addressed this problem; however, the problem is not that easy to solve. It is not enough just to add a column for policy year premiums. Whole triangles of premiums must be reported." These triangles are now shown in Part 6 of Schedule P.

9.A cross-check reconciles entries in different exhibits of the Annual Statement or in Annual Statements of different years. These are computer cross-checks performed on the electronic submission; they are not done by pencil and paper.

10.The Annual Statement *Instructions* say that "it is the character of the expenses that is most important, not whether the expenses were internal or external to the insurer."

11.The statutory accounting principles *Statement of Concepts*, paragraph 31, says: "The regulators' need for meaningful, comparable financial information to determine an insurer's financial condition requires consistency in the development and application of statutory accounting principles." The consistency principle was a dominant stimulus for the new definitions of DCC and AAO.

12.The Annual Statement Instructions say: *The loss adjustment expenses are separated with the intent of identifying the "Defense and Cost Containment" expenses as those which are correlated with the loss amounts, and the "Adjusting and Other" as those expenses which are correlated with claim count or are general loss adjustment expenses.*

13.The formal definitions are as follows (SSAP No. 55, "Unpaid Claims, Losses, and Loss Adjustment Expenses," paragraph 5(c): "Defense and cost containment includes

1. Surveillance expenses;
2. Fixed amounts for cost containment expenses;
3. Litigation management expenses;
4. Lost adjustment expenses for participation in voluntary and involuntary market pools if reported by accident year;
5. Fees or salaries for appraisers, private investigators, reinspectors and fraud investigators, if working in defense of a claim, and fees or salaries for rehabilitation nurses, if such cost is not included in losses;
6. Attorney fees incurred owing to a duty to defend, even when other coverage does not exist; and
7. The cost of engaging experts.

Adjusting and other includes

- A. Fees of adjusters and settling agents (but not if engaged in a contentious defense);
- B. Loss adjustment expenses for participation in voluntary and involuntary market pools if reported by calendar year;

- C. Attorney fees incurred in the determination of coverage, including litigation between the insurer and the policyholder; and
- D. Fees or salaries for appraisers, private investigators, hearing representatives, reinspectors and fraud investigators, if working in the capacity of an adjuster.”

14. Allocation of legal department overhead costs to individual claims or accident years is explicitly required by the Annual Statement *Instructions*: “The fees charged for insurer employees should include overhead, just as an outside firm’s charges would include.” The company may *not* classify the salaries as DCC and the related employee expense costs as AAO.

15. The Annual Statement *Instructions* say that DCC expenses “exclude expenses incurred in the determination of coverage” (i.e., declaratory judgment action expenses). These expenses are explicitly included in AAO, which include “attorney fees incurred in the determination of coverage, including litigation between the insurer and the policyholder.”

16. This distribution also assumes that the dollar amount of closed claims equals the dollar amount of reported claims. See Kittel [1991] and Bill [1991] for the effects of exposure growth and inflation on the distribution of ULAE by accident year.

17. Troxel and Breslin [1983], page 130, comment: “. . . the unpaid ULAE for a workers’ compensation claim will probably be less than 50 percent since a large reserve is often established for related monthly payments which incur little ULAE.” See also Salzmann [1967], page 125: “The present percentages used to distribute unallocated claims expense . . . in Schedule P are arbitrary. Industry studies might be undertaken to determine unallocated claims expense distributions by size of claim and by age of claim.” For further explanation of the prior procedure, see Salzmann [1988], page 83.

18. This expense study is simplistic, and it may easily be refined. For example:
- a. Some adjusting and other expense depends on the amount of loss. Large claims receive more attention from claims department personnel than small claims receive.
 - b. The adjusting and other expenses vary by characteristics of the claims. More complex claims require more investigative work and incur more AAO expenses.

19. A more rigorous analysis would determine the distribution of reported claims by their status at the end of the year. This distribution, along with the average AAO costs, might be as follows:

● reported during the year and still outstanding at the end of the year:		50%	\$450
● reported during the year and closed without payment:	25%		\$500
● reported during the year and closed with payment:	25%		\$600

This distribution would be used to further refine the analysis in the text.

20. The Annual Statement *Instructions* say: "The "Adjusting and Other" expenses can be assigned in any justifiable way among the accident years. The preferred way is to apportion these expenses in proportion to the number of claims reported, closed, or outstanding each year." Any distribution method may be used, as long as it can be justified.

21. Reported claim counts are not shown for lines combining different types of coverage, such as special liability, special property, international, and non-proportional reinsurance.

22. Actuarial expertise is essential in such analyses. Average claim cost ratios (paid, reported, and outstanding) depend on the maturity of the data. All three ratios increase with the development period, though they increase at different rates. See Salzmann [1984] on the importance of using data at the same maturity when comparing accident years.

23. In past years, the NAIC *Instructions* were unclear regarding assumptions from non-affiliated ceding companies. The previous version of this paper, written in 1996, cited the Annual Statement Instructions then applicable and noted Richard Roth's recommendations for completing the exhibit. The issues have since been resolved as stated in the text, and the Annual Statement *Instructions* have been changed to accord with Mr Roth's recommendations. Companies that are still using the old claim count method for non-affiliated proportional reinsurance should switch to the procedure outlined in this paper.

24. See SSAP No. 55, "Unpaid Claims, Losses, and Loss Adjustment Expenses," paragraph 5(b): "Bulk provisions are reserves included with other IBNR reserves to reflect deficiencies in known case reserves."

25. In practice, the entries for this claim would be mixed with the entries of other claims, and the negative loss reserve would not be noticeable.

26. The \$20,000,000 in the special surplus line is a segregation of surplus, not an accounting entry.

27. See page 22 for definitions of these terms and for the statutory accounting treatment of salvage and subrogation received.

28. A survey of 14 major property-casualty insurance companies in 1990 found that 13 were offsetting their reserves, either partially or fully, for anticipated salvage and subrogation.

29. For statutory financial statements, the reporting entity may choose not to reduce loss reserves for anticipated salvage and subrogation. For GAAP financial statements and

for tax purposes, the reduction for anticipated salvage and subrogation is required.

As Ruth Salzmann has pointed out to me, the major purpose of Part 2 of Schedule P is to show favorable or adverse loss development. If reserves are gross of anticipated salvage and subrogation, but payments are net of salvage and subrogation received, the Part 2 triangles show apparent favorable development, because salvage and subrogation is not recognized until it is received. Reporting reserves net of anticipated salvage and subrogation improves the accuracy of the Schedule P retrospective tests of reserve adequacy.

30. See Treasury regulations 2001FED 26,153, §1.832-4, paragraph 14.D(2): "A company . . . is allowed to increase the unpaid losses shown on its annual statement only if the company . . . discloses on its annual statement, by line of business and accident year, the extent to which estimated salvage recoverable is taken into account in computing the unpaid losses shown on the annual statement filed by the company for the calendar year ending with or within the taxable year of the company." Alternatively, a separate disclosure statement may be filed with regulatory authorities.

31. The wording of the Statement of Actuarial Opinion is *Anticipated salvage and subrogation included as a reduction to loss reserves as reported in Schedule P – Analysis of Losses and Loss Expenses, Underwriting and Investment Exhibit – Part 3A and on Page 3 – Liabilities, Surplus, and Other Funds, Line 1, \$_____.*

32. For tax purposes, the anticipated salvage and subrogation is discounted just as the gross loss reserves are discounted.

33. Both GAAP and statutory accounting allocate all loss adjustment expenses to the period when the claims occurred. SFAS 60, paragraph 20, says: *A liability for all costs expected to be incurred in connection with the settlement of unpaid claims (claim adjustment expenses) shall be accrued when the related liability for unpaid claims is accrued. Claim adjustment expenses include costs associated directly with specific claims paid or in the process of settlement, such as legal and adjusters' fees. Claim adjustment expenses also include other costs that cannot be associated with specific claims but are related to claims paid or in the process of settlement, such as internal costs of the claims function.* Statutory accounting (SSAP 55) has the same rule.

34. Total loss adjustment expense reserves in Schedule P, Part 1, line 12 (total for all accident years), columns 17 – 18 + 19 – 20 + 21 – 22 should equal the corresponding line of business entries in Part 3A of the Underwriting and Investment Exhibit, column 9, "unpaid loss adjustment expenses." The Underwriting and Investment Exhibit does not divide the unpaid loss adjustment expenses between DCC and AAO.

35. Salzmann [1988], pages 83–84, describes this procedure in more detail: "By combining the intent and arithmetic of the footnote to the schedules, the total unallocated LAE liability is the sum of two products: (1) the liability for reported losses

times the paid/paid ratio @ 50%, and (2) the IBNR liability times the paid/paid ratio @ 100%, or unallocated LAE liability = $\frac{1}{2} \times \text{paid/paid ratio} \times (\text{Total loss liability} + \text{IBNR liability})$."

As Ruth Salzmänn has explained to me, "The method is not put forward on its own merits; rather, it is appropriate only because it is consistent with the *assumption* underlying the formula allocation of paid unallocated loss expenses by accident year. The method does no more than anticipate future *formula* allocations"; see also Kittle [1981]. Claim reporting and settlement patterns allow a better distribution of both paid and unpaid unallocated expenses by accident year; see the text. [Before 1989, the procedure for distributing unallocated loss adjustment expense payments to accident years was described in a footnote to Schedule P, Part 1 and not in the Annual Statement instructions. Salzmänn's *paid/paid ratio* is the ratio of "unallocated loss adjustment expense paid to losses paid for the most recent calendar year(s)."]

36. As true for adjusting and other payments, this is a recommendation, not as a requirement.

37. These exhibits show assumed non-proportional business. Since the reinsurer is assuming a layer of loss, not the entire loss, the number of outstanding claims is not a meaningful figure.

38. The years and figures have been changed, but the patterns reflect actual workers' compensation data.

39. These columns provide a reconciliation of the Schedule P figures with the entries in the Underwriting and Investment Exhibit, which are reproduced in columns 35 and 36 of Schedule P.

40. The text follows Richard Roth's explanations. Mr. Roth designed the current Schedule P, and he was chairman of the NAIC Casualty Actuarial (Technical) Task Force until his retirement in 2001. The Annual Statement *Instructions* themselves are ambiguous.

- The *Instructions* say that any *retroactive* change in pooling participation will require appropriate restatement of Schedule P; according to Mr. Roth, *any* change in pooling participation requires restatement.
- Schedule P provides separate column 34 entries (intercompany pooling participation percentage) for each year; according to Mr. Roth, the percentage for each year should be the current participation percentage.
- If the pooling percentages change on a calendar year basis or a policy year basis (and include the development from past accident years), the accident year loss development patterns would be distorted. If the pooling percentages change on an accident year basis, the accident year loss development patterns would not necessarily be distorted.

41. On the statutory accounting treatment of commutations, see Feldblum [2003: Notes].

42. Statutory accounting principles for claims-made policies is covered in SSAP Number 65, "Property and Casualty Contracts," paragraphs 4 through 9.

43. For an additional premium, some companies offer coverage of accidents that occur before the retroactive date; this is less common than tail coverage.

44. See SSAP #65, "Property and Casualty Contracts," paragraph 8: "Some claims made policies provide extended reporting coverage at no additional charge in the event of death, disability, or retirement of a natural person insured. In such instance, a policy reserve is required to assure that premiums are not earned prematurely. The amount of the reserve should be adequate to pay for all future claims arising from these coverage features, after recognition of future premiums to be paid by current insureds for these benefits. The reserve, entitled 'extended reporting endorsement policy reserve' shall be classified as a component part of the unearned premium reserve considered to run more than one year from the date of the policy." Before this rule became effective (in 2001), the extended loss and expense reserves could be placed in either the loss reserves or the unearned premium reserves, at the option of the company.

45. Medical malpractice claims-made coverage is generally definite term; indefinite term is more commonly used for products liability tail coverage.

46. Since the average medical malpractice loss may be paid several years in the future, the present value of the losses may be 50% or less of the nominal value. If the discount factor is 50%, the \$15,000 premium may cover \$25,000 of undiscounted losses plus \$2,500 of underwriting expenses and profit. A premium of \$15,000 coupled with a loss reserve of \$25,000 may indicate a long tail, not under-pricing.

47. See SSAP #65, "Property and Casualty Contracts," paragraph 9: "When the anticipated losses, loss adjustment expenses, and maintenance costs anticipated to be reported during the extended reporting period exceed the recorded unearned premium reserve for a claims made policy, a premium deficiency reserve shall be recognized."

48. Early tail coverage was mostly indefinite term; the accounting distinction between definite and indefinite term came later.

49. See SSAP Number 55, "Unpaid Claims, Losses, and Loss Adjustment Expenses," paragraph 4: "For claims made type policies, the covered or insured event is the reporting to the entity of the incident that gives rise to a claim."

50. A fidelity policy covers a firm for losses resulting from embezzlement by its employees. Common fidelity loss scenarios involve (i) employees with check writing privileges, such as claims adjusters and procurement officers, who might embezzle

funds by writing checks to friends or relatives or (ii) members of accounting or investment departments who might divert funds to their own accounts. The embezzlement may continue for years before the employer becomes aware of it; much embezzlement is never discovered. If the occurrence of the theft were the date of accident, it would be time-consuming and perhaps impossible to ascertain whether the accidents were covered by a given policy. If the date of report were the date of report, firms may delay reporting the embezzlement until they had purchased or upgraded their fidelity insurance coverage. Instead, the accident date is the date of discovery, or the date the embezzlement is assumed to have been discovered.

51. The average severity triangles may be distorted if much reinsurance is used. A 20% pro rata reinsurance treaty would reduce all the severities by 20%.

52. Before 1989, the *Schedule P* historical triangles included all loss adjustment expenses. This format was criticized on the grounds that the statutory distribution of unallocated loss adjustment expenses (now adjusting and other expenses) to accident year is arbitrary and lessens the usefulness of the historical loss triangles; see Otteson [1967].

53. For the rationale of showing separate direct plus assumed triangles and ceded triangles instead of net triangles, see the discussion of the Part 6 triangles below.

54. This generalization assumes that the reserves are not discounted. It is also true if any discounts on the statement reserves are disclosed, so that Schedule P, Part 2 shows the undiscounted amounts. The generalization is not correct if the reserves contain an implicit interest discount, since the unwinding of the discount, or the amortization of the discount, shows up as apparent adverse development.

55. (Salzmann [1981], page 175)

56. The NAIC realizes that business growth may overstate the reserve deficiency, but it believes the effect is not great: "Within the normal range of variations in premium from year to year, the distortion from changes in premium is not significant" (NAIC *IRIS Manual*, Test 11).

57. This is the steady-state expected outstanding loss ratio. The change in the observed outstanding loss ratio after a change in the mix of business is gradual, extending over several years.

58. The NAIC realizes that changes in the mix by line may distort the results. The NAIC recommends that "For companies which have had major shifts in product mix, the estimated reserve deficiency or redundancy should be calculated separately for the major product groups. . . ." (*ibid.*).

59. IRIS Test 11 is a simplistic formula requiring no judgment in selecting or smoothing factors. The outstanding loss ratio does not properly match losses with premiums. It is

a holdover from days when insurance departments did not have actuarial or financial staff to perform reserve adequacy tests and when reserving software was not available. The Annual Statements are now filed electronically (in addition to the hardbound copies), and reserving software is readily available. It is hard to justify the continued use of IRIS Test 11.

60. We do not construct the Summary exhibits using the data in the reported two year exhibits, since we need data for eight more accident years. The adverse development figures, however, are the sum of the reported figures for each line of business.

61. Neither the NAIC *Instructions* nor the Schedule P exhibits mention this difference, though the formatting of the exhibits alludes to it. The upper left hand cell of the Part 3 exhibits contains "000," indicating that the cumulative payments begin with the second column. These are the payments from the reserves held at the year-end date corresponding to the first column. The prior years closed claims shown in columns 11 and 12 of Part 3 correspond to the cumulative paid losses at the current statement date in column 11. In Section 1 of Part 5, the first cell in the prior years row does *not* contain "000," indicating that this row shows incremental closed claims, not cumulative closed claims. [I am indebted to Richard Roth for explaining this to me.]

62. Exposure year premium is not used elsewhere in the *Annual Statement*, and not all companies compile these data. Accrued retrospective premiums and earned but unbilled premiums are more commonly analyzed by policy period, not by exposure year. Policyholders are concerned with the experience on their own contracts; the segmentation by exposure year is of little concern to them. Insurers are concerned with the effects of retrospective rating provisions and competitive conditions; they use policy period data, not exposure year data.

63. The accrual rules were revised in 2002 for statutory accounting and in 2000 for tax accounting. The company's tax department may use the actuarial worksheets for Schedule P, Part 6 for the tax filing; see the appendix on accounting for audits and retrospective premium adjustments.

64. Insurers sometimes use low estimates for the coming year's payroll as competitive tools to produce low initial premium estimates. The final premium is increased when the payroll audit is done. The insurer loses the investment income on the premium that is not collected until the end-of-year audit, but it retains the policy.

65. See Berry [1980], Teng and Perkins [1996], Feldblum [1998: TP].

66. The reconciliation is complicated by the differing treatments of loss adjustment expenses. In the historical triangles of Schedule P (Parts 2, 3, and 4), defense and cost containment adjustment expenses are combined with losses, and adjusting and other adjustment expenses are not shown. In the Underwriting and Investment Exhibit, loss adjustment expenses are shown only in total (i.e., DCC + AAO), separate from losses. In addition, Schedule P is gross of reserve discounts, whereas the other

statutory exhibits are net of discounts.

67. Reserves for earned but unbilled premiums and accrued retrospective premiums are generally bulk reserves set in aggregate; the individual reserves in this illustration are heuristic.

68. For claims-made policies, the accident date is the date the loss is reported. Claims-made forms are not used for the workers' compensation policy in this illustration.

69. The \$5,500 retrospective premium stems from a March 20X4 loss, and one might presume that it should be coded to exposure year 20X4. In practice, it is too complex to allocate retrospective premiums to exposure years based on the accidents which led to the premiums. In addition, the maximum premium caps the full policy year retrospective premium; it would be difficult to spread this cap by exposure year.

70. Direct plus assumed business is shown separately from ceded business since audit premiums and accrued retrospective premiums are more accurately recorded for direct premiums than for ceded premiums.

71. The company collects premium only for reported losses, not for IBNR losses or for expected development on known claims, so the initial adjustment is less than the expected ultimate amount.

72. The illustration shows reserve indications for a single policy. In practice, reserves are usually estimated policy years, not for individual policies.

73. We refer to the premium asset as the reserve, as is common practice in the industry. Were we to speak of the premium *liability* as the reserve, as unearned premium reserves are called, the earned premium would be the billed premium *minus* the change in the reserve.

74. For discussions of premium sensitivity and its determinants, see Bender [1994], Mahler [1996], Teng and Perkins [1996], and Feldblum [1998: PDL D].

75. The premium sensitivity depends on the plans sold by the insurance company. For wide-swing workers' compensation plans sold to large accounts, the sensitivity may be 80% to 85% for written premium risk and 60% to 65% for reserving risk. (Reserves are more mature and less sensitive than incurred losses.) For narrow swing plans sold to small risks, the offsets are smaller. For an analysis of premium sensitivity on plans sold to small accounts, see Bender [1994] and Mahler [1996].

76. The inability to reconcile the Part 7 data with other statutory exhibits make regulators especially uneasy. Vincent Laurenzano, in particular, advocated the inclusion of these exhibits in Schedule P to ensure the accuracy of the figures.

77. The loss reserves on a large dollar deductible workers' compensation policy are net of the deductible, so no risk-based capital reserving risk charge is applied to the reserves that are reimbursed by the insured; see SSAP No. 65, "Property and Casualty Contracts."

78. The term *premium sensitivity* as used here stems from the term *loss-sensitive contracts*. Other actuaries use *premium responsiveness* instead.

79. Some analysts have construed the Annual Statement *Instructions* to imply that the commission triangles show incremental values. For earned premiums, the *Instructions* say: *Each reported estimate should be the estimate of the net earned premium as of each year-end, not the incremental amounts earned during each calendar year.* For the commission triangles (Part 7B, Sections 6 and 7), the *Instructions* say: *An entry denoting the expectation of future additional commissions to be paid should be displayed as a negative value. An entry denoting the expectation of future earned commissions should be displayed as a positive value.*

The NAIC intended no difference between the premium and commission triangles. The *Instructions* mean that an *expectation of future additional commissions to be paid should be displayed as a negative value* in the bulk commission reserve, just as *expectation of future premiums to be returned* are displayed as negative values in the bulk premium reserve. The full text of the Annual Statement *Instructions* makes this clear:

In Part 7B of Schedule P, for all reinsurance contracts where the commission paid to the cedant varies with losses, display the development of that commission in Section 6 and display any assets or liabilities accrued with respect to that commission in Section 7. An entry denoting the expectation of future additional commissions to be paid should be displayed as a negative value. An entry denoting the expectation of future earned commissions should be displayed as a positive value. An entry denoting the expectation of future return commissions should be displayed as a positive value.

80. To avoid the non-admitted asset charge, some companies do hold premium reserves by policy that are secured by letters of credit or other collateral.

81. The actual distribution of effective dates for large commercial accounts is skewed. Many insured align the policy years on insurance contracts with their fiscal years, so they can close their accounts at the end of one fiscal year and begin new accounts at the start of a new fiscal year. Their insurance policies tend to have effective dates of January 1 (or another quarter beginning date). At times, an insured requests a December 31 effective date if it wishes to allocate the premium to a previous tax year.

82. Even if the company reports its best estimate of ultimate earned premium, a low written premium lowers taxable income through the revenue offset provision. As of the

January 5, 2000, Treasury regulations, this manner of reducing taxable income is no longer permissible. Not all underwriters are aware of this change, and they may provide low written premium estimates. This is acceptable for statutory accounting, as long as the earned premiums are correct; see SSAP No. 53, "Property-Casualty Contracts – Premiums." The company's tax officer, mindful of tax avoidance penalties, will gross-up the written premium, using the estimates of earned but unbilled premiums and accrued retrospective premiums.

83. The manner of selecting projected factors differs between loss reserving and premium sensitivity. Link ratios for loss emergence are largely beyond the insurer's control. The analyst may use a straight average or a weighted average of the observed link ratios. The premium sensitivity depends on the plan parameters. If the lower sensitivity for the 20X5 policy year stems from a change in the plan parameters, it should be used alone.

84. The format of the Part 7 exhibits is taken directly from the other parts of Schedule P. The designers of Schedule P, Part 7, had no intentions for the prior years row. This row is not used for quantifying premium sensitivity. Companies should ignore this row.

85. Lines of business with both property and casualty components, such as homeowners, commercial multiple peril, and aircraft, are included in Reinsurance B (liability reinsurance). Financial reinsurance includes reinsurance on fidelity and surety contracts. The Annual Statement *Instructions* list the elements of each reinsurance line in more detail.

86. See SFAS 113, paragraph 25: "When practicable, prospective and retroactive provisions included within a single contract shall be accounted for separately"; SSAP 62, paragraph 24: "Prospective and retroactive provisions included within a single agreement shall be accounted for separately."

87. SSAP No. 62, "Reinsurance," paragraph 28, says with regard to retroactive reinsurance agreements:

1. The ceding entity shall record, without recognition of the retroactive reinsurance, loss and loss expense reserves on a gross basis on the balance sheet and in all schedules and exhibits.
2. The assuming entity shall exclude the retroactive reinsurance from loss and loss expense reserves and from all schedules and exhibits.

88. See Feldblum [1996: RBC] for the RBC risk charges and Feldblum [2002: Comm] for estimating the effects of retroactive reinsurance on RBC requirements.

89. The risk-based capital formula uses a flat 5% discount rate for its investment income offset. Since it uses a fixed discount rate, it should use a fixed long-term average inflation rate for the losses well.

90. The American Academy of Actuaries Committee on Property-Liability Financial Reporting defines the range of reasonable estimates as the “range of estimates that would be produced by alternative sets of assumptions that the actuary judges to be reasonable, considering all information reviewed by the actuary. . . The range of reasonable estimates is narrower, perhaps considerably, than the range of possible outcomes of the ultimate settlement value of the reserve.”

91. The NAIC *Instructions* to the Statement of Actuarial Opinion (section 11) provide this three-fold definition: “For the purpose of this instruction, “retroactive reinsurance” refers to any agreement which increases the transferring insurer’s Surplus to Policyholders as a result of the transferee undertaking any loss obligation already incurred and for which the consideration paid by the transferring insurer is derived from present value or discounting concepts.” See also SSAP No. 62, “Property and Casualty Reinsurance,” paragraph 22.

92. The NAIC *Instructions* to the Statement of Actuarial Opinion say: “Before commenting on reinsurance collectibility, the actuary should solicit information from management on any collectibility problems, review ratings given to reinsurers by a recognized rating service, and examine Schedule F for the current year for indications of regulatory action or reinsurance recoverable on paid losses over 90 days past due. The comment should also reflect any other information the actuary has received from management or which is publicly available about the capability or willingness of reinsurers to pay claims. The actuary’s comments do not imply an opinion on the financial condition of any reinsurer.”

93. The methods are shown in SSAP Number 53, “Property-Casualty Contracts – Premiums,” paragraphs 9-12, and SSAP Number 66, “Retrospectively Rated Contracts,” paragraphs 6-8.

94. Before codification, Method 1 was called the Eastern Method and Method 2 was called the Western Method, based on statutory accounting practice in certain Eastern vs Western U.S. states.

95. In actuality, Method 2 makes more sense for tax accounting, since acquisition costs have generally not been paid on the unbilled premium.

96. The January 2000 tax regulations were proposed in January 1997, but they were not put into final form until January 2000.

97. This is true regardless of the method used to calculate the earned premiums.

98. The gross accrued retrospective premium asset is shown on page 2, column 1, line 10.3. The non-admitted portion is shown in column 2 of line 10.3, and the net admitted portion is shown in column 3. The statutory surplus shown on the liability side of the balance sheet is based on the net asset. The change from the previous year to the current year in the non-admitted portion of the accrued retrospective premium asset is a

direct charge to surplus on page 4, line 25.

99. Some actuaries use the term *earned but not reported* (EBNR) premiums, based on the acronym for incurred but not reported (IBNR) losses.

100. SSAP Number 53, "Property-Casualty Contracts – Premiums," paragraph 9, says that *reporting entities shall estimate audit premiums, the amount generally referred to as earned but unbilled (EBUB) premium.*

101. Not all companies agree on the definitions of these terms, and this paper makes no attempt to clarify the differences of opinion.

102. For most other items, the incurred amount on the income statement equals the paid or received amount on the cash flow statement plus or minus the change in reserves on the balance sheet. For premiums, this relationship does not hold, since there are different treatments of accrued retrospective premiums in the income statement and on the balance sheet.