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Biography:

Sholom Feldblum is an Associate Actuary with the Liberty Mutual Insurance Company in Boston. Massachusetts. He was graduated from Harvard University in 1978 and spent the next two years as a visiting fellow at the Hebrew University in Jerusalem. He became a Fellow of the CAS in 1987, a CPCU in 1986, an Associate of the SOA in 1986, and a member of the American Academy of Actuaries in 1989. In 1988, while working at the Allstate Research and Planning Center in California, he served as President of the Casualty Actuaries of the Bay Area and as Vice President of Research of the Northern California Chapter of the Society of CPCU. In 1989, he served on the CAS Education and Testing Methods Task Force. He is presently a member of the CAS Syllabus Committee, the CAS Committee on Review of Papers, and the Advisory Committee to the NAIC Casualty Actuarial (EX5) Task Force. Previous papers and discussions of his have appeared in *Best's Review*, the *CPCU Journal*, the *Proceedings of the Casualty Actuarial Society*, the *Actuarial Digest*, the *CAS Forum*, and the *CAS Discussion Paper Program*.

Abstract

Schedule P is a complex document, requiring careful preparation for its completion and sophisticated analysis for its use. This paper proceeds step by step through each section of Schedule P, explaining the requirements for each column, showing the cross checks with other Parts of the Schedule and with other exhibits in the Annual Statement, suggesting methods to facilitate the completion of the Schedule, and demonstrating the reserve adequacy analyses that can be performed with these data. This paper should simplify the task of completing your own company's Schedule P and deepen the rewards of analyzing those of your peer companies.**

** I am indebted to Richard Roth and John Bray, each of whom twice reviewed earlier drafts of this paper and suggested numerous corrections and additions. Richard Roth is Assistant Insurance Commissioner of California and the architect of much of the new Schedule P. John Bray has conducted seminars on completing Schedule P, and he prepared many of the Schedule P exhibits for the NAIC Annual Statement Instructions manual. I am also indebted to Jerry Scheibl and Ruth Salzmann, who clarified for me several items regarding extended loss and expense reserves in Part 5 and the distribution by accident year of unallocated loss adjustment expense reserves in Part 1. The remaining errors in this paper, of course, are my own.

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Schedule P is a large and complex section of the Annual Statement, demanding actuarial expertise to complete and to understand. The "cross checks" performed by the National Association of Insurance Commissioners (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 for three of the Insurance Regulatory Information System (IRIS) tests, and investment analysts use the Schedule to measure the adequacy of a carrier's held reserves.¹ Actuaries 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.

Purposes of the Schedule

Schedule P is designed to measure loss and loss adjustment expense reserve adequacy, both retrospectively and prospectively. Part 2 is a retrospective test, by accident year and line of business, of reserves held in prior years. The totals from the one year and two year retrospective tests, shown in the Part 2 Summary exhibit, are used for the IRIS tests 9, 10, and 11.

Several prospective tests of loss reserve adequacy may be done with Schedule P data. Part 3 provides paid loss development triangles, and the difference between Parts 2 and 6 provides case incurred loss development triangles.² Link ratio "tail factors" may be estimated from the Part 2 "prior years" row. Average severities, whether incurred or paid, may be estimated from the claim count figures in Parts 1 and 3, once full histories have been developed.³

Schedule P has numerous other functions as well. It provides data to compute the required excess statutory reserves over statement reserves for four lines of business: Automobile Liability (Personal and Commercial), Other Liability, Medical Malpractice, and Workers' Compensation. It shows both direct and net experience, to evaluate the effects of reinsurance recoveries on accident year loss ratios by line of business. It shows payments and reserves for

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¹ For a description of the IRIS tests, see National Association of Insurance Commissioners, Using the NAIC Insurance Regulatory Information System: Property and Liability Edition (Kansas City, Missouri: NAIC, 1989). For an example of financial analysis using Schedule P data, see Thomas V. Cholnoky and Jeffrey Cohen, Property/Casualty Insurance Industry Loss Reserve Analysis (Goldman Sachs, June 23, 1989).

² "Case incurred losses," or paid losses plus case reserves, are often termed "reported losses." A triangle of case loss reserves, or Part 2 minus Part 6 minus Part 3, may also be formed; see the discussion below in the text.

³ The reporting of claim counts for accident years prior to 1989 is optional, hindering analysis of average claim cost trends. In addition, the lack of claim count data from the Automobile and Workers' Compensation involuntary market reinsurance pools hampered such analysis from the 1989 Annual Statement (this problem is now being resolved).

losses and loss adjustment expenses by accident year, thereby isolating blocks of business with good or poor experience.

Schedule P was extensively revised for the 1989 Annual Statement. This paper explains what data is required for the Schedule, how the exhibits should be completed, and what cross checks are used by the NAIC. It then shows how the Schedule P data allows prospective analyses of loss reserve adequacy, using both paid and incurred loss developments.

Experience Period - Liability and Property Lines

Beginning with the 1989 Annual Statement, all lines of business are included in Schedule P. The liability lines, which were included in the pre-1989 Schedule P, show 10 accident years of data, plus a "prior years" row:

- 1. Homeowners/Farmowners
- 2. Private Passenger Auto Liability/Medical
- 3. Commercial Auto/Truck Liability/Medical
- 4. Workers' Compensation
- 5. Commercial Multi-Peril
- 6. Medical Malpractice
- 7. Special Liability (Ocean Marine, Aircraft [All Perils], Boiler and Machinery)
- 8. Other Liability4
- 9. International.5

The property lines, which were in Schedules G, K, and O before 1989, show 2 accident years of data, plus a "prior years" row:

- 1. Special Property (Fire, Allied Lines, Inland Marine, Earthquake, Glass, Burglary & Theft)
- 2. Auto Physical Damage
- 3. Fidelity, Surety, Financial Guaranty, Mortgage Guaranty6

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⁴ In the 1991 and subsequent Annual Statements, Products Liability, which is now included in Other Liability, will be reported as a separate line of business. Presently, Products Liability experience, with complete Schedule P exhibits, is reported in a supplement to the Annual Statement.

⁵ The "International" line was included in Schedule O prior to 1989, though it now uses a 10 year exhibit, as the liability lines do.

⁶ This is the Schedule P subdivision. In the "Underwriting and Investment Exhibit," pages 8-10 of the Annual Statement, Mortgage Guarantee does not appear as a separate line of business, but may be included as a "write-in" line of business. State regulations for mortgage guarantee coverage vary between guarantees on first and subsequent mortgages. California

4. Other (Including Credit, Accident and Health).

Reinsurance experience that was included in Schedule O (line 30) prior to 1988 is now shown as Reinsurance D, with a "10 year" exhibit format, though data is shown only for accident years 1987 and prior.⁷ Reinsurance for accident years 1988 and subsequent is divided into three parts: nonproportional property, nonproportional liability, and financial lines (Reinsurance A, B, and C in Schedule P).⁸ Proportional reinsurance is shown as assumed or ceded premiums, losses, and expenses in the exhibits for the appropriate lines of business.

The Summary exhibits show 10 accident years of data, plus a "prior years" row. 10 accident years of data must therefore be kept for *all* lines of business, since all ten years for every line are used for the Summary exhibits.⁹

For the individual accident years, the premiums are calendar year but the losses and expenses are cumulative accident year. For instance, the 1985 premiums shown in column 2, 3, and 4 of Part 1 are calendar year earned premiums; they are not changed for subsequent EBNR (Earned

⁷ There is one exception: unearned premium reserves for the reinsurance line in the 1987 Annual Statement, shown in the Underwriting and Investment Exhibit, Part 2A, "Recapitulation of all Premiums," Column 5, line 30 (page 8), are reported as Reinsurance D earned premiums in the 1988 and subsequent Annual Statements. The Schedule P exhibits for Reinsurance D do not contain rows for accident years subsequent to 1987. If 12/31/87 reinsurance unearned premium reserves are reported as Reinsurance D earned premiums in the succeeding years, these premiums must be included in the Part 1 Summary exhibit to ensure consistency with the "Underwriting and Investment Exhibit," page 7, "Part 2 -Premiums Earned," line 32 (Totals), column 4 (Premium Earned During Year).

⁸ Reinsurance A, B, and C correspond to the "2 year," "10 year," and financial lines of business, with the following exceptions: (1) Ocean marine and boiler and machinery, which are part of the "Special Liability" line, are included in reinsurance A. (2) Credit, which is part of the "Other" line, is included in reinsurance C. (3) International is divided among reinsurance A, B, and C according to the type of business reinsured. For a complete listing of the lines, see the NAIC Annual Statement Instructions: Property and Casualty, op. cit., page 59-2.

⁹ See the NAIC Instructions, page 57-1: "Since the Summary of each part contains ten years of development, the information from the "Prior" line in the Property Lines, Sections I through L, must be supplemented for the eight accident years preceding the two most recent years." One widely used Annual Statement software package therefore shows 10 accident years, a "two year prior line," and a "ten year prior line" for the property lines of business Schedule P exhibits.

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statute requires guarantees on first mortgages to be monoline; that is, they can not be issued by an insurer writing other lines of business. Guarantees written on subsequent mortgages may be written by a carrier having "a certificate of authority to transact the business of credit insurance." See the California Legal Code, §12640.10, subsection (a).

But Not Reported) adjustments. The 1985 paid loss and expense figures in columns 5 through 11 of Part 1 are cumulative accident year figures: that is, payments from January 1, 1985, through the Statement date for accident year 1985. The 1985 unpaid loss and expense reserves in columns 13 through 21 are the reserves held on the Statement date. For example, in the 1990 Annual Statement, these are the reserves held on December 31, 1990, for accident year 1985.

For the "prior years" row, no earned premiums are shown. In Part 1, the loss and expense payments, and the salvage and subrogation reimbursements, are only those *made or received in the most recent calendar year.*¹⁰ In part 3, the loss and expense payments are those made since January 1 of the *second* calendar year shown along the column headings. (Thus, for the 1990 Annual Statement, these are payments made since January 1, *1982*.) The unpaid loss and expense reserves are the reserves evaluated at the Statement date for Part 1, and at each December 31 for Parts 2 and 6.¹¹

Part 1 - Current Valuation

Part 1 shows cumulative experience by accident year at the Statement date. Premiums, losses, and allocated expenses are shown separately for "direct and assumed" and for "ceded," so that the user may determine the effects of reinsurance recoverables on reported loss ratios (columns 27, 28, and 29).¹² ¹³ If the direct and assumed loss ratio is significantly higher than the net loss ratio, the business ceded may be poor. If so, the reinsurance treaties, raise reinsurance rates, or underwrite facultative business more carefully. Thus, the *net* loss ratio is influenced by the reinsurance market at the current time. The *direct and assumed* loss ratio of business, and it may be a good predictor of both the direct and net loss ratios in *future* years.¹⁴

¹² Member allocations from intercompany pooled business are reported in the "direct and assumed" column. The NAIC *Instructions*, page 59-1, consider such business to be "assumed," though not "ceded" (since the cession is from a pool, not from an individual company). See also the "sample situation" on page 59-4 of the *Instructions*.

¹³ The assumed business is *proportional* reinsurance only; non-proportional assumptions are reported separately in the reinsurance lines. Thus, the assumed business is similar to the direct, in that it is not subject to the fluctuations of excess of loss treaties.

14 Note Richard Roth's remarks at the 1989 Casualty Loss Reserve Seminar: "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....

¹⁰ See the NAIC Instructions, page 57-1.

¹¹ See the exhibits at the end of the "Schedule P" section of the NAIC Instructions.

Parts 2, 3, and 6 show historical loss triangles for net losses and ALAE only; there are no corresponding triangles for direct business. However, historical loss triangles for direct and assumed business can be formed by joining Annual Statements from several years. For instance, by March 1, 1994, a five year historical loss triangle of direct and assumed business can be developed from the Schedule P, Parts 1, of the 1989 through 1993 Annual Statements.

Most insurers keep direct premium and loss statistics by calendar year. Ceded and assumed statistics are often available only by fiscal year or contract year. Involuntary market reinsurance pools in Workers' Compensation and Commercial Automobile use fiscal years ending August 31 or September 30.15 To complete Schedule P, you must take the fiscal year experience - assumed and ceded premiums and losses - add estimated figures for the remainder of the current calendar year, and subtract the amounts added the previous year.

The estimates must be divided by accident year. Voluntary market statistics may be a poor base for the involuntary market division by accident year if these markets are growing at different rates. In Workers' Compensation, for instance, the involuntary pools are expanding in 1989 and 1990, though there is little growth in the voluntary market. Thus, involuntary market losses are now more heavily weighted in recent accident years than are voluntary market losses. To properly allocate the estimates of involuntary market reinsurance pool premiums and losses by accident year, you must adjust the distributions for differing growth rates by calendar year and market.

Premiums

Premiums are recorded by calendar year. Once entered, they are "frozen," and are not adjusted for subsequent EBNR (Earned But Not Reported) developments. Suppose a carrier issues Workers' Compensation retrospectively rated policies. Poor experience on one block of business will raise the loss figures at subsequent valuations for the appropriate accident years. The additional premiums received are coded to the *current* calendar year, not to the years when the policies were issued.¹⁶ Schedule P would show overstated loss ratios for the year of policy

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" (Richard J. Roth, Jr., "Changes to Schedules O and P," *1989 Casualty Loss Reserve Seminar Transcript*, page 86).

¹⁵ The Commonwealth Automobile Reinsurance (CAR) facility in Massachusetts also handles Personal Automobile business, with a fiscal year ending September 30.

¹⁶ That is, the additional premiums in excess of the estimated EBNR reserve calculated at the end of the accounting period when the premiums were earned. This EBNR reserve is shown in the "Underwriting and Investment Exhibit," page 8, Part 2A, "Recapitulation of All

issuance and understated loss ratios for the current year.¹⁷

In Part 1 of Schedule P, the "prior years" row is used only for 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 no matching to losses is possible.

The latest calendar year net earned premium shown in Schedule P, Part 1, column 4, row 11, for each line of business must equal the net earned premium shown on page 7, "Underwriting and Investment Exhibit," Part 2, "Premiums Earned," column 4. Premium figures from earlier years must agree with the figures in the preceding years' Annual Statements.¹⁸

Loss and Loss Expense Payments

Columns 5 through 11 show loss and loss expense payments by accident year. For the individual accident years listed in column 1, these are *cumulative* payments. For instance, for accident year 1985, column 5 shows loss payments on direct and assumed business from January 1, 1985, through the Statement date. For the "prior years" row, the payments are only those made in the *current* calendar year. Thus, for the 1990 Annual Statement, these are the payments made from January 1, 1990, through December 31, 1990.

Columns 5 and 6 are *net* of salvage and subrogation received.¹⁹ Column 9 is for information only; it is not used to calculate subsequent columns. (Note that column 11 equals columns 5-6+7-8+10; it does not involve column 9.) Salvage and subrogation is generally small for all lines of business except automobile physical damage (Part 1J).

¹⁸ If there is an intercompany pooling agreement which has changed over time, then the comparison with prior Annual Statements can be done only on a consolidated basis. See the discussion in the text on intercompany pooling.

¹⁹ See the NAIC *Instructions*, page 59-1: "Loss payments are to be reported net of salvage and subrogation received in Schedule P." Outstanding losses, however, are gross of salvage and subrogation expected. The same procedures are used in the "Underwriting and Investment Exhibit," Parts 3 and 3A, pages 9 and 10.

Premiums," column 4, "Reserve for Rate Credits and Retrospective Adjustments Based on Experience."

¹⁷ Upon reviewing an earlier 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." Richard is correct. EBNR reserve analyses can be as complex as loss reserve analyses, and they require full historical triangles for accurate projections.

Distribution of Unallocated Expenses

Allocated loss expense payments, such as defense counsel fees, are related to specific claims and can therefore be assigned to accident years. Unallocated expenses in column 10 are claims department overhead and salaries; they are assigned to accident year by formula. Item #4 of the Schedule P Interrogatories describes the procedure:

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% to the most recent year, (2) 5% 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% of the premiums earned for such year, disregarding all distributions made under (3) such accumulated distribution should be limited to 10% of premiums earned and the balance distributed in accordance with (3).

The assumptions underlying this procedure are that (1) 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), and (2) 90% of claims are reported during the year when the accident occurred, and 10% are reported the following year. Thus, unallocated expenses related to claim reporting are assigned to the most recent two accident years in a 9 to 1 (or 45 to 5) allocation, and unallocated expenses related to claim settlement are allocated in proportion to loss payments.

No fixed procedure is suitable for all lines of business. Many Products Liability claims are not reported until years after the accident date, and insurers providing this coverage spend much time negotiating settlements and handling the claims. The statutory distribution procedure assigns too much unallocated expenses to the most recent years. Workers' Compensation permanent disability cases may have weekly indemnity payments extending over the victim's lifetime, though most unallocated expenses are incurred when the claim is first reported and investigated. The statutory distribution procedure assigns too little unallocated expenses to the most recent years. Nevertheless, it is difficult to determine the proper assignment of unallocated expenses to accident year, so the simple statutory procedure has endured.²⁰

The Annual Statement instructions do not say whether *direct* or *net* loss payments should be used to distribute the unallocated loss expense payments to accident year. On the one hand, the unallocated expenses are related to direct loss payments. The reinsurance compensation for the ceding insurer's expenses appears as an offset to *commissions*, not to loss adjustment expenses.

²⁰ See Ruth Salzmann, "Estimated Liabilities for Losses and Loss Adjustment Expenses," in Robert W. Strain, (ed.), *Property-Liability Insurance Accounting*, Fourth Edition (1988), page 83.

Thus, logic dictates that *direct* loss payments be used to distribute unallocated adjustment expenses.²¹

On the other hand, column 10 contains *net* unallocated expense payments; no direct figures are shown.²² Moreover, only net loss payments were shown in Schedule P before 1989. The same distribution procedure for unallocated loss expense payments was used prior to 1989. Thus, past practice dictates that we continue to use *net* loss payments to distribute unallocated expenses.

Suppose the company has the following 1990 experience for a line of business all of whose claims are settled within 5 years:

| Exhibit 1 | | - | Loss Expenses by Accident Year ands of dollars) |
|-----------------|-------------------|------------------------|----------------------------------------------------|
| Cal/Acc Year | Earned Premium | Losses Paid in 1990 | |
| 1986 | 8,000 | 200 | Calendar year 1990 unallocated |
| 1987 | 8,500 | 500 | loss adjustment expenses paid: 600 |
| 1988 | 9,000 | 800 | |
| 1989 | 9,000 | 2,000 | |
| 1990 | 9,500 | 2,500 | |
| | | | |

45% of \$600,000, or \$270,000, is allocated to 1990, and 5% of \$600,000, or \$30,000, is allocated to 1989. The remaining \$300,000 is allocated in the same proportion as paid losses:

²¹ According to Richard Roth, this was the intention of the NAIC. Furthermore, as John Bray has pointed out to me, most companies include all the unallocated loss adjustment expenses in columns 10 and 21 in the "direct and assumed" totals in column 24, implying that all or almost all of these expenses are direct.

²² See the NAIC *Instructions*, page 59-1: "In Part 1, salvage and subrogation received and unallocated loss expenses paid and unpaid should be reported net of reinsurance, if any." As Richard Roth points out, though, there will be little if any reinsurance recoveries for unallocated loss adjustment expenses.

| Exhibit | | Unallocated L jures in thousa | | ses by Accident ars) | Year |
|-------------|-------------|----------------------------------|---------|-------------------------|-----------|
| Cal/Acc | Losses Paid | Paid Loss | Unalloc | ated Expense Dist | ribution: |
| Year | in 1990 | Percentage | Step 3 | Steps 1 & 2 | Total |
| 1986 | 200 | 3% | 10 | 0 | 10 |
| 1987 | 500 | 8 | 25 | 0 | 25 |
| 1988 | 800 | 13 | 40 | 0 | 40 |
| 1989 | 2,000 | 34 | 100 | 30 | 130 |
| 1990 | 2,500 | 42 | 125 | 270 | 395 |
| Total: | 6,000 | 100% | 300 | 300 | 600 |

Claim Count

Column 12 shows the number of claims reported on direct and assumed business. The losses incurred to date (that is, paid losses plus case reserves) on direct and assumed business divided by the number of claims reported provides the average claim cost. A comparison of (i) a carrier's trend in average claim cost by accident year for a given line of business with (ii) either industry averages or appropriate monetary inflation indices may help identify deteriorating or improving books of business.

Claims may be counted either "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 just one? Carriers may use either definition, and the choice must be reported in Question 7 of the Schedule P Interrogatories:

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

Column 12 asks for number of reported claims on direct and assumed business. The assumed business includes experience assumed from the involuntary market reinsurance pools: Workers' Compensation, Commercial Automobile, and Massachusetts (Commonwealth Automobile Reinsurance, or CAR) Personal Automobile.

In past years, the involuntary market reinsurance pools did not request claim counts from servicing carriers, and they were unable to report the required claim count information to member companies for the 1989 Annual Statement. The NAIC recognized this problem and postponed the requirement for involuntary market assumed claim counts until the 1990 Annual Statement - at which time assumed claim counts must be included in column 12. The Automobile Insurance Plans Services Office (AIPSO), the National Council on Compensation Insurance (NCCI), and the Commonwealth Automobile Reinsurance (CAR) are gathering the

needed data by accident year, and they expect to report the allocations to member companies by the end of 1990.23

Loss and Loss Expense Reserves

Columns 13 through 22 show loss and loss expense reserves by accident year, valued as of the Statement date, separately for case and bulk reserves. 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 carriers, the Annual Statement divided reserves between (i) case and (ii) bulk + IBNR. All formula reserves, whether for development on reported cases or emergence of unreported cases, comprise the "bulk + IBNR" reserves.²⁴

Although Schedule P makes no distinction between true IBNR and other bulk reserves, the Underwriting and Investment Exhibit, Part 3A, Unpaid Losses and Loss Adjustment Expense, on page 10, shows separate numbers for each component. Page 10, columns 1a, 1b, 2, and 3, show reserves for reported cases ("Adjusted or in Process of Adjustment"), for direct, assumed, ceded, and net business. Columns 4a, 4b, and 4c show IBNR reserves, for direct, assumed, and ceded business.²⁵ The cross checks between Schedule P, Part 1, and Page 10 are as follows: The

The Part 3 instructions say "The number of claims closed with and without loss payment must be reported for 1990 and subsequent years in which losses are incurred" (page 75-1). The term "1990" is an error; it should read "1989." (I am told that the *Instructions* will be revised to substitute 1989 for 1990 in this sentence.)

²⁴ The NAIC *Instructions* list four categories of bulk reserves: "The bulk and IBNR reserves for losses and allocated loss expenses are intended to include 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" (page 80-1).

²³ The NAIC *Instructions* for claim count reporting in Part 1 say: "The number of claims reported is to be cumulative by accident year. The number of claims reported in each accident year is equal to the number of open claims at the end of the current year plus cumulative claims closed with and without payment for current and prior calendar years" (page 59 thru 71-1), and "For each year, . . . Column [12] should include the cumulative number of claims reported through the annual statement date for pooled and non-pooled business." In other words, *cumulative* reported claims must be shown for each accident year.

²⁵ Some insurers, however, show all bulk reserves in columns 4a, 4b, and 4c on page 10, consistent with the reporting in Schedule P. The NAIC *Instructions* provide very brief guidance. For columns 1a and 1b, "Adjusted or in the Process of Adjustment," the *Instructions* say: "Include: All losses which have been reported in any way to the Home Office of the company

sum of columns 13 and 15 in Schedule P, Part 1, row 12, should equal the sum of columns 1a, 1b, 4a, and 4b on page 10. The sum of columns 14 and 16 in Schedule P, Part 1, row 12, should equal the sum of columns 2 and 4c on page 10. Columns 17 - 18 + 19 - 20 + 21 in Schedule P, Part 1, row 12, should equal column 6 on page 10.2^{6}

Many claims examiners set a single case reserve for a claim, used to pay both losses and allocated loss adjustment expenses. Columns 17 and 18, case basis reserves for allocated adjustment expenses unpaid, would be zero for these insurers. Zero entries in columns 17 or 18 are acceptable to the NAIC, as long as the appropriate reserves are recorded in columns 19 and 20.

Distributing Unallocated Expense Reserves

Schedule P contains no instructions for distributing unpaid unallocated loss adjustment expenses to accident year, as required for column 21. A simple procedure is (i) to use the rationale for the distribution of unallocated expense payments, (ii) to assume that IBNR claims are reported in the year that they are paid, and (iii) to assume that the "bulk + IBNR" reserves consist of true IBNR, not development on known cases. If so, the unallocated expense reserves should be distributed in the same proportion as case reserves plus twice the IBNR reserves.²⁷

²⁶ If your company uses the same split between "case" and "IBNR" reserves on page 10 as in Schedule P, then the cross checks are simpler: column 13 in Schedule P, Part 1, row 12, should equal the sum of columns 1a and 1b on page 10, and so forth.

²⁷ Ruth Salzmann, "Estimated Liabilities for Losses and Loss Adjustment Expenses," in Robert W. Strain, (ed.), *Property-Liability Insurance Accounting*, Fourth Edition (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%.

"These two calculations can be reduced to one:

"Unallocated LAE flability = .5 paid/paid ratio x (Total loss liability + IBNR liability)."

[Before 1989, the procedure for distributing unallocated loss adjustment expense payments to

on or before December 31 of the current year. Provision for losses of the current or prior years, if any, reported after that date would be made in Columns 4a and 4b as Incurred But Not Reported" (page 10-1). For columns 4a, 4b, and 4c, "Incurred but not Reported," the *Instructions* conclude: "Incurred but not reported reserve estimates should be sufficient to cover claims which may be reopened in future periods." The *Instructions* do not explicitly state where development on case reserves is to be included.

Neither of the latter two assumptions noted above are completely accurate: IBNR claims often have a long lag between report date and settlement date, so assumption (ii) assigns too little unallocated expense reserves to recent years. Most carriers have case reserve development on reported cases, so assumption (iii) also assigns too little unallocated expense reserves to recent years. Since there is no statutory prescription for this distribution, you should choose a procedure that seems most appropriate for the line of business.²⁸

²⁸ Richard Roth has informed me "the ULAE reserve can be determined from claim count data." A prescribed procedure must wait until claim counts are available for a sufficient number of accident years, since only claim counts for accident years 1989 and subsequent are required. The New York Insurance Department is presently working on a procedure to distribute ULAE reserves to accident year. Richard has added that the statutory formula for distributing paid ULAE is also "an open topic for research."

Ruth Salzmann notes that the statutory distribution of paid unallocated expenses by accident year assumes that 90% of claims reported are incurred in the current accident year, and 10% of these claims are incurred in the previous accident year. In truth, these percentages vary by line: in lines with rapid claim emergence, such as Homeowners', a higher percentage of reported claims are incurred in the current accident year than in lines with slow claim emergence, such as Other Liability. The actual claim emergence pattern by line may eventually supercede the 90%-10% split in the statutory formula.

accident years was described in a footnote to Schedule P, Part 1, not in the Annual Statement instructions. Salzmann's *paid/paid ratio* is the ratio of "unallocated loss adjustment expense paid to losses paid for the most recent calendar year(s)."]

As Ruth Salzmann 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. Thus, the method does no more than anticipate future *formula* allocations." Claim reporting and settlement patterns allow a better distribution of both paid and unpaid unallocated expenses by accident year; see the following footnote.

Wendy Johnson, in "Determination of Outstanding Liabilities for Unallocated Loss Adjustment Expenses," *Evaluating Insurance Company Liabilities* (Casualty Actuarial Society 1988 Discussion Paper Program), pages 301-314, suggests another means of using claim emergence and settlement patterns to estimate the unallocated loss adjustment expense liability. She assumes that unallocated expenses are incurred over the life of the claim, with a double weighting during the year when the claim file is set up (though no heavier weighting when the claim is paid). Under this assumption, the distribution of unallocated expense reserves by accident year would give less weight to IBNR loss reserves, with the exact weight depending on the average duration of claims in the given line of business. Moreover, the appropriate distribution would depend on the relative trends for loss costs and unallocated expenses, as Johnson discusses in her paper.

Claims Outstanding

Column 23 shows the number of claims outstanding on direct and assumed business. If there are few partial payments on open cases, then the ratio of (column 13 minus column 14) to column 23 shows the average value of an outstanding claim. This ratio may be misleading, since (a) loss development on reported cases is included in the bulk reserves shown in columns 15 and 16, but (b) one can not include columns 15 and 16 in calculating the average value - since these columns include IBNR reserves, and IBNR claims are not included in column 23. In lines of business with periodic payments on open cases, such as Workers' Compensation and Automobile No-Fault benefits, the average value of an open case can not be determined from Schedule P.

Columns 24 through 29 are calculated figures. Column 24 equals the sum of columns 5, 7, 10, 13, 15, 17, 19, and 21. Column 25 equals the sum of columns 6, 8, 14, 16, 18, and 20. Column 26 equals the difference between columns 24 and 25, or the sum of columns 11 and 22. Columns 27 through 29 are the ratios of columns 24 through 26 to columns 2 through 4.

Interest Discount

Columns 30 and 31 show the "discount for the time value of money." All loss and expense reserves in Schedule P are *undiscounted*, except for Workers' Compensation pension cases, where the tabular discount may be shown.²⁹ If the loss and expense reserves on Page 3 of the Annual Statement are *discounted*, these columns are needed to facilitate a reconciliation with the undiscounted values shown in Schedule P. The statutory discount in Workers' Compensation tabular reserves is included in both Schedule P and Page 3, so no entry in column 30 is needed.³⁰

Intercompany Pooling

Column 32 shows the intercompany pooling arrangements. Member companies of an insurance group often redistribute premiums, losses, and expenses according to participation formulas. Column 32 shows the company's share of the group figures.

The instructions to the Annual Statement say, "The pooling percentage is to reflect the Company's participation in the pool as of year-end." If an insurance group modifies the pooling arrangement, there may be an apparent change in the incurred or paid loss development due to the intercompany agreement, not to changes in claims handling or reserving patterns.

²⁹ See the NAIC *Instructions*, page 57-1: "A discount implicit in tabular reserves may be included in Schedule P. Otherwise, Schedule P is to be presented on a non-discounted basis."

³⁰ John Bray has pointed out to me that columns 33 and 34 show the discounted values at the statement date only. Undiscounted values at prior year ends are reported in the appropriate columns of Part 2. Discounted values at prior year ends, or the figures that would correspond to the balance sheets in previous Annual Statements, can not be obtained from the current year's Schedule P.

Therefore, "any retroactive change in pooling participation will require appropriate restatement of Schedule P."31

The individual company historical figures in the 1990 Schedule P will not necessarily agree with the entries of previous years. For instance, suppose a member company of an insurance group received 40% of the entire group's revenues and paid 40% of the group's losses and expenses in 1988. In 1990, its pooling participation changed to 70%. Leaving the original 40% participation figures for 1988-1989 would distort the loss development patterns: its loss payments and reserves were 40% of the group total in 1988 and 1989, but its payments and reserves were 70% of the total in 1990. Its loss triangles would show large jumps in both payments and reserves between 1989 and 1990. To facilitate the use of the loss development patterns, the company should restate all past figures to a 70% participation percentage.

Columns 33 and 34 show the effect of the discount for the time value of money on the loss and expense reserves. If no discount is used, column 33 equals columns 13 - 14 + 15 - 16, and column 34 equals columns 17 - 18 + 19 - 20 + 21. If a discount is used, then these sums should be multiplied by the discount factor to obtain columns 33 and 34.

Excess Statutory Reserves

It is difficult to estimate required reserves for immature accident years in long tailed lines of business. Paid loss ratios remain low for several years after the policy period, and optimistic reserving may underestimate ultimate losses. The NAIC therefore requires additional reserves for immature accident years in certain lines of business when the statement reserves seem low.

The excess statutory reserves are determined by formula. Two procedures are used: one for the long tailed liability lines of business, and one for credit insurance.

Excess Reserves - Long Tailed Lines

Excess statutory reserves are calculated for four long-tailed lines: Automobile Liability (Personal plus Commercial), Workers' Compensation, General Liability, and Medical Malpractice.³² The formula uses net earned premium from Part 1, Column 4, and net loss ratios from Part 1, Column 29, for the most recent eight years. If the most recent three accident years do not meet a minimum loss ratio criterion, additional reserves must be held by the company. These reserves are shown in the Schedule P interrogatories (page 82) and on the

³¹ See Instructions, page 59-3. I am indebted to Richard Roth for clarification of these statements.

³² Before 1989, Personal and Commercial Automobile liability were combined on Schedule P, so the excess statutory reserves were determined from the combined loss ratio. Although Personal and Commercial Automobile liability are now shown separately in Schedule P, the procedure for calculating the excess statutory reserve has not changed. Some insurers, however, calculate the required excess reserves for Personal and Commercial Automobile liability separate and add the final figures.

"Liabilities, Surplus and Other Funds" balance sheet, page 3, line 15: "Excess of statutory reserves over statement reserves."

The minimum loss ratio criterion is determined by a combination of historical experience and statute. The net loss ratios in column 29 for the five accident years immediately preceding the three most recent accident years are examined. Accident years that have less than \$1 million in net earned premium (column 4) are discarded. If at least three accident years remain, then the lowest one is the minimum loss ratio criterion. The minimum loss ratio is capped between 60% (or 65% for Workers' Compensation) and 75%. If fewer than three accident years have at least \$1 million in net earned premium, then 60% (or 65% for Workers' Compensation) is the minimum loss ratio.

If the *reported* net loss ratios in the three most recent accident years are at least as great as the minimum loss ratio, no excess reserves are needed.³³ Otherwise, additional reserves must be carried by the company to bring the net loss ratios in the three most recent years up to the minimum loss ratio.³⁴

Excess Reserves - Credit Insurance

The excess statutory reserves for credit insurance do not depend on historical experience. The credit insurance data is divided into three parts: (a) policies in force on the statement date; (b) policies that expired in the fourth quarter of the most recent year; and (c) all other policies.

(a) For policies in force on the statement date, the excess statutory reserve equals 50% of the premiums *earned* on these policies minus the losses incurred (both payments and reserves); the excess reserves may not be less than zero.

(b) For policies that expired in the fourth quarter of the most recent year, the excess statutory reserve equals 50% of the premiums *written* on these policies minus the losses incurred (both payments and reserves); the excess reserves may not be less than zero.

³³ The *reported* loss ratio here means the loss ratio *reported* in Schedule P, not the loss ratio for *reported* claims.

³⁴ The NAIC *Instructions* add: "If the company has permission from its state of domicile to discount loss and loss expense reserves, the Company should compute the excess of statutory reserves over statement reserves using its discounted loss and loss expense reserves rather than the undiscounted reserves" (page 83-1). This is particularly important for Medical Malpractice, where permission to discount is often granted.

(c) No excess statutory reserves are needed for other credit insurance policies.35

Auxiliary Exhibits

Schedule P provides three loss triangles for each line of business. Part 2 shows *incurred losses*; Part 3 shows *paid losses*, and Part 6 shows *bulk reserves*. The incurred losses in Part 2 are the sum of paid losses, case reserves, and bulk reserves. A triangle of *case incurred losses*, or paid losses plus case reserves (often termed *reported losses*), can be formed as the Part 2 triangle minus the Part 6 triangle. A triangle of *outstanding case reserves* can be formed as the Part 2 triangle minus the Part 6 triangle minus the Part 3 triangle.

Each triangle includes allocated loss adjustment expenses.³⁶ Thus, Part 3 includes paid allocated expenses, Part 2 includes incurred allocated expenses, and Part 6 includes bulk reserves for allocated expenses. Before 1989, Parts 2 and 3 of Schedule P included *all* loss adjustment expenses, not just *allocated* loss adjustment expenses.

The historical triangles show *net* experience, or direct plus assumed business minus ceded business. Historical triangles of direct plus assumed business only can be formed by combining Annual Statements of successive years, using exhibits from Schedule P, Part 1. For instance, in 1993 one can compile historical exhibits of direct plus assumed business for four accident years from the 1989 through 1992 Schedule P's, using columns 5, 7, 13, 15, 17, and 19 of Part 1.³⁷

Several other items are shown in the Schedule P auxiliary exhibits. Part 2 shows one and two year loss developments for all lines of business. Part 3 shows the number of claims closed, with and without loss payments, for eight lines of business. Part 4 shows loss portfolio transfers, or portfolio reinsurance ceded and assumed. Part 5 shows experience under claims made policies for three lines of business. All figures are shown by accident year.

³⁶ In the discussions below of Parts 2, 3, and 6, the term "loss" refers to both loss and allocated loss adjustment expense.

³⁷ After four or five years, loss development patterns should not differ that greatly between direct and net business. Complete 10 year historical triangles for direct plus assumed business may not be worth the effort needed to compile them.

³⁵ I have heard conflicting opinions about the relationship between Mortgage Guarantee insurance and credit insurance excess statutory reserves. One view is that Mortgage Guarantee insurance is never included with credit insurance. In Schedule P it is included with Fidelity, Surety, and Financial Guarantee, and in the "Underwriting and Investment Exhibit" it is a "write-in" line. The other view is that Mortgage Guarantee insurance should be included with credit insurance on line 28 of the "Underwriting and Investment Exhibit" and its experience should be used in the calculation of the credit insurance excess statutory reserve [Schedule P Interrogatories, question 1(e)]. See also footnote 6, which cites the California statute linking mortgage guaranty and credit insurance.

The paid loss triangles in Part 3 are the easiest to compile, so we begin the discussion with these exhibits.

Part 3 - Paid Losses

Part 3 shows *cumulative paid losses and allocated loss adjustment expenses* by accident year and evaluation date. The same accident years are shown as in Part 1: 10 years for the liability lines of business, two years for the property lines, and the appropriate segmentation for reinsurance business. Nevertheless, 10 years of data must be gathered for all lines of business, since they are included in the 10 year Part 3 Summary exhibit.

The paid loss figures can be derived from the prior Annual Statement and Part 1 of the current Annual Statement. Historical data for individual accident years - that is, all figures except those in the first row ("prior years") and the right-most column ("current valuation") - are unchanged from those in the previous year's Part 3. The figures in the right-most column must equal the difference between Columns 10 and 11 in Part 1, except for the prior line entries. Note that Part 1, Column 11, includes *all* loss and *loss* expense payments, whereas Part 3 shows only loss and *allocated* LAE payments. Thus, unallocated LAE payments, or Part 1, Column 10, must be subtracted from Part 1, Column 11.

The "Prior" Line

The Part 3 "prior years" entries can be obtained from the previous year's Annual Statement, after a suitable modification of the figures. Suppose you are completing the 1990 Schedule P, using data (when appropriate) from the previous year. Take the "prior" and "1980" rows from the 1989 Schedule P, subtract from each figure in these two rows the cumulative paid losses and ALAE through 1981, then add the two rows. Discard the cumulative paid losses and ALAE through 1980 (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, add the calendar year 1990 paid losses and ALAE for accident years prior to 1981 to the last cumulative total. The calendar year 1990 paid losses and ALAE for accident years prior to 1981 are shown in the 1990 Schedule P, Part 1, column 11 minus column 10, "prior" row.

An illustration should clarify this procedure. Suppose the 1989 Schedule P, Part 3, contains the following entries for one line of business:

| | | | Exhibi | 3: 1981 | Schedu | ile P, Pa | rt 3, Fir | st Two F | lows | | |
|-----|-------|------|----------|---------|--------|-----------|-----------|----------|------|------|-------|
| L. | I | 1980 | .1981.1_ | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
| - Î | Prior | 0 | 220 | 350 | 400 | 425 | 450 | 460 | 470 | 475 | 480 |
| I. | 1980 | 375 | 600 j | 650 J | 700 | 750 | 775 j | 800) | 840 | 860 | 875 i |
| | | | | | | | | | | | |

Assume that in the 1990 Part 1 exhibit for this line of business, the "prior years" row shows \$22 thousand in column 11 ("Total net paid") and \$2 thousand in column 10 ("Unallocated loss expense payments").

To complete the 1990 Part 3 exhibit, the cumulative payments through 1981 are subtracted from the first two rows in the 1989 Part 3 exhibit. In the example, \$220 thousand is subtracted from the 1989 "prior years" row and \$600 thousand is subtracted from the second row, giving the following:

| | | | Exhibit | 4: Adjus | itments i | to the 19 | 89 Part | 3 "Prior' | ' Line | | |
|---|-------|------|---------|----------|-----------|-----------|---------|-----------|--------|-------|------|
| 1 | | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1.988 | 1989 |
| ł | Prior | 0 | 0 | 130 | 180 | 205 | 230 | 240 | 250 | 255 | 260 |
| { | 1980 | -225 | 0 | 50 (| 100 | 150 | 175 ; | 200 | 240 | 260 | 275 |

The two rows are summed, and the 1980 column is dropped:

| <u> 1981 1982 1983 1984 1985 1986 1987 1988 1989 </u> | | | Exhib | it 5: Co | mpleting | the 1990 | Part 3 | "Prior" | Line | | |
|------------------------------------------------------------------------|-------|------|-------|----------|----------|----------|--------|---------|-------|--------|--|
| | LL | 1981 | 1982 | 1983_ _ | 1984 | 1985 | 1986 | 1987_1 | 1988_ | 1989_1 | |
| Prior 0 180 280 355 405 440 490 515 530 | Prior | 0 | 180 | 280 } | 355 | 405 | 440 | 490 | 515 | 530 | |

The 1990 payment is the difference between column 11 and 10 in Part 1. For the "prior years" row, this is \$22,000 - \$2,000, or \$20 thousand. This figure is added to the cumulative payments through 1989 in Part 3 to give the cumulative payments through 1990, or \$550 thousand.

Loss Reserve Adequacy - Prospective Valuation

Part 3 is particularly useful for *prospective* evaluations of loss reserve adequacy, since it is not dependent upon company reserving policies. It is most effective for short and medium tailed lines, where there are substantial loss payments in the first year or two and claims settlement rates are stable; examples are Personal Automobile Liability and Workers' Compensation. It is less useful for extremely long tailed lines, when the proportion of loss payments is small in the first year or two, and claim settlement rates may fluctuate; examples are Other Liability and Nonproportional Reinsurance. Financial analysts often evaluate an insure's reserve adequacy by means of a paid loss development of data from Schedule P, Part 3.³⁸

The format of a paid loss development analysis is as follows:39 Link ratios, or the ratios of

³⁸ See, for instance, Thomas V. Cholnoky and Jeffrey Cohen, *Property/Casualty Insurance Industry Loss Reserve Analysis* (Goldman Sachs, June 23, 1989).

³⁹ Good introductory treatments of paid loss development reserving procedures are Ronald F. Wiser, "Loss Reserving," in Matthew Rodermund, et al., *Foundations of Casualty Actuarial Science* (New York: Casualty Actuarial Society, 1990), pages 178-187, and Timothy M. Peterson, Loss Reserving - Property/Casualty Insurance (Ernst & Whinney, 1981), pages

cumulative paid losses at one valuation to cumulative paid losses at the preceding valuation, are calculated for each accident year and valuation date. A prospective link ratio is determined from the historical link ratios in each column.

No uniform procedure for determining prospective link ratios is appropriate for all lines and companies. One common approach is to use the average of the most recent three to five link ratios, adjusted for random outliers and known or suspected trends. These prospective link ratios show the expected development between adjoining valuation points. Development factors from each valuation point to 10 years of maturity are the cumulative products of the adjoining link ratios. For example, the development factor from 6 to 10 years is the product of the link ratios (a) from 6 to 7 years, (b) from 7 to 8 years, (c) from 8 to 9 years, and (d) from 9 to 10 years.

We illustrate this procedure with simulated data for a long-tailed line of business. The exhibit below shows the Part 3 entries as they would appear in the 1990 Schedule P, for accident years 1981 through 1990.

| | | | E | xhibit 6: | 1990 | Schedule | P, Part | 3 (\$000) | | | |
|---|------|------------|------|-----------|------|----------|---------|-----------|------------|----------|--------|
| L | | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 1_ | 1989 | 1990 1 |
| | 1981 | 103 | 226 | 294 | 334 | 363 | 384 | 398 | 412 | 422 | 433 |
| 1 | 1982 | 01 | 111 | 238 | 309 | 356 | 387 (| 409 | 428 | 442 | 454 (|
| | 1983 | 0 | 0 | 108 | 221 | 286 | 328 | 354 | 375 | 391 | 403 |
| 1 | 1984 | 0 | 0 | 0 | 111 | 238 | 311 | 357 | 392 | 416 | 434 |
| 1 | 1985 | 0 (| 0 (| 01 | 0 | 135 | 299 (| 394 (| 458 | 504 | 534 |
| | 1986 | 0 j | 0 (| 0 | 0 | 0 | 146 | 314 | 418 | 490 I | 542 |
| ł | 1987 | 0 | 0 | 0 | 0 | 0 | 0 | 159 | 343 | 463 | 546 |
| ł | 1988 | 0 | 01 | 0 | 0 | 0 | 0 } | 0 | 146 | 353 | 485 |
| 1 | 1989 | 0 | 0 | 0 | 0 | 0 | 0 | 0 j | 0 | 152 | 406 |
| L | 1990 | <u>0</u> j | 0 | <u> </u> | 0 | 01 | | Q | 0 i | <u> </u> | 156 1 |
| | | | | | | | | | | | |

Paid Loss Link Ratios

Paid loss link ratios are the ratios of (i) cumulative paid losses at a given valuation date for a specific accident year to (ii) cumulative paid losses for the same accident year at a valuation date one year earlier. For instance, the paid loss link ratio from 2 years to 3 years for accident year 1987 is \$463 thousand divided by \$343 thousand, or 1.35. The complete set of link ratios is shown in the table below.

^{181-196.} A method for estimating loss development "tail factors" (among other matters) is presented by Richard Sherman, "Extrapolating, Smoothing, and Interpolating Development Factors," *Proceedings of the Casualty Actuarial Society*, Volume 71 (1984), pages 122-192.

| L | | 1 to 21 | 2 to 3 | 3 to 4 | 4 to 5 | 5 to 6 | 6 to 7 | _7 to 8 | 8 to 91 | 9 to 10 |
|---|------|---------|--------|--------|--------|--------|--------|---------|---------|---------|
| 1 | 1981 | 2.19 | 1.30 | 1.14 | 1.09 | 1.06 | 1.04 | 1.03 | 1.03 | 1.02 |
| E | 1982 | 2.14 | 1.30 | 1.15 | 1.09 | 1.06 | 1.05 | 1.03 | 1.03 | • |
| | 1983 | 2.04 | 1.29 | 1.15 | 1.08 | 1.06 | 1.04 | 1.03 | - | - 1 |
| 1 | 1984 | 2.14 | 1.31 | 1.15 | 1.10 | 1.06 | 1.04 | • 1 | - | - |
| 1 | 1985 | 2.21 | 1.32 | 1.16 | 1.10 | 1.06 | - | - 1 | • | - |
| L | 1986 | 2.15 | 1.33 | 1.17 | 1.11 | - | - | • | • | • |
| 1 | 1987 | 2.16 | 1.35 | 1.18 | - } | • | - 1 | - } | - 1 | •) |
| ł | 1988 | 2.42 | 1.37 | - | - | •] | -] | - | - 1 | • { |
| 1 | 1989 | 2.67 | - 1 | 1 | | - } | - 1 | - 1 | - 1 | - 1 |

Exhibit 7: 1990 Schedule P, Paid Loss Link Ratios

Note that we have rotated the triangle, turning diagonals into columns. The second column in Exhibit 6 shows cumulative paid amounts on December 31, 1982. The second column in Exhibit 7 shows paid loss development from 1 year after the inception of the accident year to 2 years after the inception of the accident year. In other words, each *column* of Exhibit 7 is the ratio of two *diagonals* in Exhibit 6.

No link ratio is calculated for the 1990 accident year, since we have only one valuation. No link ratios are shown for the "prior years" row, since the time since inception of the accident year differs depending on the policy.

We determine averages of the most recent 3 and the most recent 5 link ratios, and select prospective factors from the historical figures and expectations about changing future conditions. In this illustration, the selected link ratios lie between the three and five year averages.

| | _1 to 2 | 2 to 3 | 3 to 4 [| 4 to 5 | 5 to 6 | 6 to 7 | 7 to 8 | 8 to 9 | 9 to 10 |
|--------------|---------|--------|----------|--------|--------|--------|--------|--------|---------|
| Averages | ł | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Зyr | 2.42 | 1.35 | 1.17 | 1.10 | 1.06 | 1.04 | 1.03 | Í | |
| 5 yr | 2.32 | 1.34 | 1.16 | 1.09 | 1.06 | | 1 | | |
| Select | 2.35) | 1.34 | 1.17 | 1.10 j | 1.06 | 1.04 | 1.03 | 1.03 | 1.02 |
| | 1 | 1 | i. | 1 | 1 | 1 | 1 | 1 | |
| Cumulative | 4.83 | 2.06 | 1.54 | 1.31 | 1.19 | 1.13 | 1.08 | 1.05 | 1.02 |
| Paid to date | 156 | 406 | 485 | 546 | 542 | 534 | 434 | 403 | 454 |
| Developed | 754 | 836 | 744 | 716 | 647 | 601 | 469 | 424 | 463 |
| | Ì | Ì | İ | i | | Í | Í | 1 | |
| Ultimate | 830 | 920 | 819 | 788 | 712 | 662 | 516 | 466 | 510 |
| Incurred | 898 1 | 866 I | 802 | 787 | 707.1 | 667.1 | 522 | 475 | 520 |

Paid Loss Development Factors

The cumulative link ratios, or paid loss development factors, are the cumulative products of the appropriate "one year" link ratios. For instance, the cumulative link ratio from 7 to 10 years, or 1.08, is the product of 1.03, 1.03, and 1.02, which are the link ratios from 7 to 8, 8 to 9, and 9 to 10 years.

The losses paid to date are taken from the last column of Exhibit 6: \$156 thousand is the accident year 1990 paid losses, \$406 thousand is the accident year 1989 paid losses, and so forth. The 1990 paid losses are at one year of maturity and are therefore placed below the development factor for one to ten years. (Similar placement is used for paid losses of other accident years.) The next row in Exhibit 8 shows losses developed to ten years of maturity.

Paid Loss Tail Factors

In several long-tailed lines of business, payments continue after ten years. The percent of losses still unpaid after ten years may be estimated either (a) by a comparison of Parts 2 and 3 or (b) from aggregate industry data:

(a) Compare Part 2, row 2, column 11 (incurred losses for the first listed accident year at the latest valuation) with Part 3, row 2, column 11 (cumulative paid losses for the first listed accident year at the latest valuation). This procedure is extremely sensitive to random loss fluctuations, since it uses one ratio from a single company to determine the development factor with the greatest influence on the total estimate. This ratio may be heavily influenced by the mix of open claims after 10 years in a particular block of business, and it may not be indicative of future payments.

(b) Use an *expected* ratio of ultimate losses to cumulative paid losses, based upon both industry averages and the characteristics of the insurer's business. For this illustration, we have selected a final link ratio of 1.10.

The "ultimate" losses in Exhibit 8 are the developed losses increased by 10%. These may be compared with the final incurred losses shown in Part 2, column 11, reported as the final row in Exhibit 8. The ultimate paid losses total \$6,221 million, and the incurred losses shown on Part 2 total \$6,244. The Part 3 prospective test therefore shows adequate reserves.⁴⁰

This prospective test of loss reserves assumes that incurred loss estimates after 10 years of maturity are adequate. If reserves are adequate for cases 10 or more years old, we would find little adverse development for the "prior years" row in Part 2. If reserves are deficient even after 10 years of maturity, we would find significant adverse development for the "prior years" row.

⁴⁰ Numerous variations of paid loss development analyses may be performed on Schedule P data. For a comprehensive treatment of an alternative method, which emphasizes average payment lags and a more sophisticated treatment of ultimate link ratios, see Richard G. Woll, "Insurance Profits: Keeping Score," *Financial Analysis of Insurance Companies*, (Casualty Actuarial Society 1987 Discussion Paper Program), pages 446-533.

The converse of these statements, however, is not true: adverse development on the Part 2 "prior years" row does not necessarily indicate that similar development should be expected in the future. In some lines of business, insurers have changed policy forms to mitigate late development; the switch from occurrence to claims-made policies in Medical Malpractice is one example. And in some cases, the adverse development on the "prior years" row may be unrelated to reserve adequacy. In Workers' Compensation, for instance, an apparent "adverse development" on the "prior years" row is often the unwinding of the tabular interest discount on lifetime pension cases. In sum, loss development "tail factors" estimated from Schedule P data must be used with caution.

Closed Claim Counts

Columns 12 and 13 show the number of claims closed with and without loss payments. These claim counts are required for 1989 and subsequent accident years for eight lines of business (Homeowners'/Farmowners', Personal Auto liability, Commercial Auto liability, Workers' Compensation, Commercial Multi-Peril, Medical Malpractice, Other Liability, and Automobile Physical Damage).⁴¹ Claim count entries are optional for other accident years in these lines of business. No claim counts should be entered for other lines.

For the 1989 Annual Statement, insurers used different methods for reporting historical claim counts. Many carriers reported only claims closed in 1989 for the 1989 accident year, adhering to the minimum NAIC requirements. Some carriers reported claims *closed in 1989* for all accident years. Other carriers reported cumulative claim counts for all accident years; this is the procedure which all carriers will be using by the end of the century.⁴²

If the carrier shows cumulative closed claims for each accident year, the ratio of column 11 to column 12 shows the average cost of a closed claim. Among mature years, this ratio should increase as the accident years move forward by the loss cost trend rate. Among immature years, this ratio may decrease as the accident years move forward, since small claims are generally settled more quickly than large claims are.

No historical claim count triangles are shown in Schedule P. Rather, claim count triangles must be compiled from successive Annual Statements (see the discussion above on loss triangles for direct and assumed business). Claim counts have much shorter development patterns than losses do. Most claims are reported within two or three years and settled within four or five. By the mid-1990's, there should be sufficient Schedule P data to analyze loss cost trends.

⁴¹ See the NAIC *Instructions*, page 75-1. Claim counts were not required for Homeowners'/Farmowners' in 1989, and even the 1990 *Instructions* do not mention this line. Note, however, that the claim count columns for Homeowners'/Farmowners' are no longer X-ed out, since now claim counts are required. Note also that the reference to accident year 1990 on page 75-1 of the *Instructions* is in error; it will be revised to 1989.

⁴² The involuntary market reinsurance pools will be using this procedure for the 1990 and subsequent Annual Statements.

Part 2 - Incurred Losses

Part 2 shows net incurred losses and allocated loss adjustment expenses (ALAE) by accident year and evaluation date. The Part 2 entries are the sum of paid amounts, case reserves, and bulk reserves for both losses and ALAE. Each entry in Part 2 equals the corresponding entry in Part 3 plus the loss and ALAE reserves at that date.

Part 2 is designed as a retrospective test of loss reserve adequacy.⁴³ If the insurer sets perfectly adequate reserves, the incurred losses for each accident year will show neither upward nor downward development. The NAIC uses Part 2 of Schedule P for the loss reserve development tests in the insurance Regulatory Information System (IRIS).

IRIS Loss Development Tests

For any accident year, column 11 of Part 2 shows incurred losses valued at the Statement date, and column 10 shows the corresponding valuation one year earlier. If the insurer has reserved adequately, an increase in payments would be offset by a take down of reserves, and there should be no change in incurred losses between valuation dates. Column 12 shows the latest year's change in incurred losses for all accident years except the most recent one (there is no "previous" valuation for the most recent accident years). Column 13 shows the change over the last *two* years in incurred losses for all accident years except the two most recent ones.

These reserve developments are summed over all lines of business and shown in the Part 2 Summary exhibit. The total reserve development shown on row 12 of the Part 2 Summary is compared with policyholders' surplus for the NAIC IRIS tests 9 and 10, which are retrospective tests of reserve adequacy. IRIS test 11, a prospective test of reserve adequacy, 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.

IRIS Tests 9 and 10

IRIS test 9 divides the one year reserve development by the policyholders' surplus at the end of the prior year, as shown on page 3, line 26, "prior year" column, or page 4, line 17, "current year" column. The resultant ratio is entered on page 22, line 61: "Percent of Development of Loss and Loss Expenses Incurred to Policyholders' Surplus of Previous Year End." A ratio above 25% indicates a failure of test 9.

IRIS test 10 divides the two year reserve development by the policyholders' surplus at the end of the second prior year, as shown on page 4, line 17, "prior year" column. The resultant ratio is entered on page 22, line 63: "Percent of Development of Loss and Loss Expenses incurred to Policyholders' Surplus of Second Previous Year End." A ratio above 25% indicates a failure of test 10.

⁴³ See the NAIC *Instructions*, page 72-1: "The schedule format provides a loss and allocated expense development overview to test the adequacy of the insurer's reserves."

The "Five Year Historical Data" exhibit on page 22 of the Annual Statement show the one and two year developments and the ratios for tests 9 and 10 for the most recent five years.

IRIS Test 11

IRIS test 11 evaluates the adequacy of the "outstanding" loss ratio. The outstanding loss ratio is the ratio of outstanding losses and loss adjustment expenses to the current year's earned premium. The losses and premiums in this ratio are not matched: the numerator is unpaid losses and loss adjustment expenses for all accident years, whereas the denominator is earned premium for the current calendar year. This mismatch obstructs the usefulness of IRIS test 11, since business volume growth or decline, or changes in the mix of business between property and liability lines, distort the "outstanding" loss ratio.

Unpaid losses and loss adjustment expenses are reported on page 3, "Liabilities, Surplus and Other Funds," lines 1. 1A, and 2. Line 1 shows total loss reserves, including reinsurance payable on *unpaid* losses. Line 1A adds reinsurance payable on *paid* losses, and line 2 adds reserves for unpaid loss adjustment expenses (both allocated and unallocated). Earned premium is shown on page 4, "Underwriting and Investment Exhibit: Statement of Income," line 1.

IRIS test 11 adds the Schedule P, Part 2 Summary, reserve developments to determine updated outstanding loss ratios. The one year reserve development is added to the unpaid losses and loss adjustment expenses for the prior year. This sum is then divided by the prior year's earned premium. The necessary figures are taken from the "previous year" column in the current Annual Statement, pages 3 and 4 (see the paragraph above). The two year reserve development is added to the unpaid losses and loss adjustment expenses for the second prior year, and divides this sum by the second prior year's earned premium. The necessary figures are taken from the "previous year" column in the previous year's Annual Statement, pages 3 and 4.

The two updated outstanding loss ratios are averaged, and then multiplied by the current year's earned premium (from page 4, column 1, line 1, of the current year's Annual Statement) to derive the indicated outstanding losses and loss adjustment expenses. This figure, minus the reported unpaid losses and loss adjustment expenses (from page 3, column 1, lines 1+1A+2), is the indicated reserve deficiency. A deficiency greater than 25% of policyholders' surplus (page 3, line 26) indicates a failure of IRIS test 11.

The NAIC is aware that changes in premium volume or mix of business may distort the results. Business growth overstates the reserve deficiency, though the NAIC 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."⁴⁴ A change in product mix from property to liability lines will understate the reserve deficiency, so the NAIC recommends that "For companies which have had major shifts in product mix, the estimated reserve deficiency or

⁴⁴ National Association of Insurance Commissioners, *Using the NAIC Insurance Regulatory Information System: Property and Liability Edition* (Kansas City, Missouri: NAIC, 1989), page 27.

redundancy should be calculated separately for the major product groups. . . . "⁴⁵ A decline in business volume, and a shift in product mix from liability to property lines, have the opposite effects from those mentioned above, though these changes are less common.

Case Incurred Losses

Part 2 includes bulk reserves, in addition to case reserves and paid losses. Actuaries project indicated reserves from historical experience, such as loss payments and reserves set by claims examiners, not from previous actuarial forecasts. Part 6 of Schedule P shows the bulk reserves carried by the company in past years in the same format as in Part 2. Thus, the *difference* between Parts 2 and 6 reflects the historical claims experience of the company. The *case incurred* (or *reported*) loss development patterns derived from this experience can be used to prospectively estimate reserve adequacy.⁴⁶

Once again, we illustrate the analysis with figures as they would appear in parts 2 and 6 of the 1990 Schedule P.

| | | | E | xhibit 9: | 1990 | Schedule | P, Part | 2 (\$000) | | | |
|----|--------|--------|------|-----------|--------|----------|---------|-----------|------|---------------|-------|
| i | 1 | 1981 L | 1982 | 1983 | 1984 🛛 | 1985 | 1986 | 1987 | 1988 | <u>1989 </u> | 1990 |
| 1 | 1981 | 563 | 524 | 514 | 501 | 494 | 482 | 485 | 486 | 486 | 486 1 |
| i | 1982 | oj | 578 | 554 | 528 | 526 | 519 | 518 | 518 | 521 | 520 |
| i. | 1983 | 0 | oj | 487 | 495 | 486 | 478 | 478 | 476 | 475 | 475 |
| 1 | 1984 | 0 | 0 | 0 | 523 | 519 | 520 (| 517 | 520 | 522 | 522 |
| 1 | 1985 | 0 | 0 | 0 | 0 | 603 | 637 | 649 | 661 | 666 | 667 ; |
| Ì. | 1986 | oj | οj | 0 | 0 | 0 | 708 | 708 | 700 | 708 | 707 |
| 1 | 1987 | 0 | 0 | 0 | 0 | 0 | 0 | 740 | 761 | 786 | 787 |
| ł | 1988 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 800 | 800 | 802 j |
| 1 | 1989 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 860 | 866 |
| L | 1990 i | 0 | 01 | 0 | 0 | O İ | 0 1 | 0 | 0 | 01 | 898 |

For a well reserved company, Part 2 should show little upward or downward development along the rows. This illustration shows no significant development for accident years 1982, 1983, 1985, and 1987; slight downward development for accident years 1980 and 1981; and slight upward development for accident years 1984 and 1986. For all accident years combined, there

45 Ibid.

⁴⁶ Good introductory treatments of incurred loss development reserving procedures are Ruth E. Salzmann, *Estimated Liabilities for Losses and Loss Adjustment Expenses* (West Nyack, NY: Prentice-Hall, 1984), pages 31-34; Ronald F. Wiser, "Loss Reserving," in Matthew Rodermund, et al., *Foundations of Casualty Actuarial Science* (New York: Casualty Actuarial Society, 1990), pages 187-189; and Timothy M. Peterson, *Loss Reserving -Property/Casualty Insurance* (Ernst & Whinney, 1981), pages 196-224. I am indebted to Roy Morell, who first pointed out to me this use of Parts 2 and 6 for a prospective test of reserve adequacy. is an 0.5% decline in incurred losses from the first report to the statement date, indicating accurate reserving.

Part 6 shows bulk and IBNR reserves. Since bulk reserves are replaced by case reserves and payments as claims are reported and settled, we expect a steady decline along the rows.

| | | E | xhibit 10 | : 1990 | Schedule | P, Part | 6 (\$000) | | | |
|--------|------|-----------------|---------------|--------|----------|---------|-----------|------|-------|------|
| L | 1981 | <u>. 1982 </u> | <u>1983 (</u> | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
| 1981 | 348 | 177 | 114 | 82 | 61 | 41 | 36 | 26 | 20 | 12 |
| 1982 | 0 | 326 | 190 | 119 | 85 | 62 | 47 | 35 | 28 j | 20 |
| 1983 | 0 | 0 | 265 | 166 | 113 | 76 | 60 | 46 | 40 | 31 |
| 1984 | 0 | 0 (| 01 | 296 | 167 | 114 | 81 | 60 | 50 | 38 |
| 1985 | 0 | 0 | 0 } | 0 | 328 | 194 | 131 | 95 | 74 | 58 |
| 1986 | 0 | 0 | 0 | 0 | 0 | 410 | 231 (| 142 | 100 | 62 |
| 1987 | 0 | 0 | 0 | 0 | 0 | 0 j | 438 | 246 | 170 | 118 |
| 1988 | oj | 0 | 01 | 0 | 0 | 0 | 0 | 462 | 246 | 146 |
| 1989 | oj | 0 1 | 0 | 0 | i oi | 0 | 0 | oj | 515 j | 238 |
| 1990 i | oi | Qi | o i | 0 | i oi | o i | 0 | oi | 0 | 560 |

The difference between Parts 2 and 6 shows case incurred (or reported) losses plus ALAE, and may be used for prospective loss reserve adequacy tests.

| | | Exhibit | 11: 1990 | Schedule | P, Pari | 2 minu | s Part (| 6 (\$000) | | |
|--------|--------|---------|----------|----------|---------|--------|----------|-----------|------|------|
| | 1981 (| 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
| 1981 | 215 | 347 | 399 | 419 | 433 | 442 j | 449 | 460 | 466 | 474 |
| 1982 | 0 | 252 | 363 | 409 | 441 | 457 | 471 | 483 | 493 | 500 |
| 1983 | 0 | 0 (| 222 | 329 | 373 | 402 | 418 | 430 | 435 | 444 |
| 1984 | oj | 0 | 0 | 227 | 352 | 406 | 436 | 460 | 471 | 484 |
| 1985 | 0 | 0 | 0 | 0 | 275 | 443 | 518 | 566 | 592 | 609 |
| 1986 | oj | 0 | 0 | 0 | 0 | 298 | 477 | 558 | 608 | 645 |
| 1987 | oj | 0 | 0 | 0 | 0 j | 0 | 302 | 515 | 616 | 670 |
| 1988 | oj | 0 | 0 j | oj | οj | 0 | 0 | 338 | 554 | 656 |
| 1989 | oj | 0 | oj | oj | 0 | 0 | 0 | 0 | 345 | 628 |
| 1990 i | oi | 0 1 | oi | oi | 0 1 | 0.1. | 0 | 0 1 | 0 | 338 |

Link Ratios and Development Factors

Incurred loss link ratios shown below are formed in the same manner as paid loss link ratios.

| | 1 to 2 i | 2 to 3 ! | 3 to 4 ! | 4 to 5 | <u>5 to 6 </u> | 6 to 7.1 | 7 to 8 | 8 to 9 ! | 9 to 10 |
|--------|----------|----------|----------|--------|-----------------|----------|--------|----------|---------|
| 1981 j | 1.61 | 1.15 | 1.05 | 1.03 | 1.02 | 1.02 | 1.02 | 1.01 | 1.02 |
| 1982 | 1.44 | 1.13 | 1.08 | 1.04 | 1.03 | 1.03 | 1.02 | 1.01 | |
| 1983 | 1.48 | i.13 | 1.08 | 1.04 | 1.03 | 1.01 | 1.02 | 1 | |
| 1984 | 1.55 | 1.15 | 1.07 | 1.06 | 1.02 | 1.03 | 1 | ļ | |
| 1985 | 1.61 | 1.17 | 1.09 | 1.05 | 1.03 | 1 | | ł | |
| 1986 | 1.60 | 1.17 | 1.09 | 1.06 | Í | 1 | 1 | 1 | |
| 1987 | 1.70] | 1.20 | 1.09 | 1 | l. | i i | 1 | 1 | |
| 1988 | 1.64 | 1.18 | Í. | i i | i | i | 1 | 1 | |
| 1989.1 | 1.82 | i. | i i | i | i | i | i. | i. | |

Loss reserve projections that rely on incurred loss development patterns are aided by knowledge of the insurer's case reserving practices - and of changes in these practices during the experience period. The three year average incurred loss link ratios are higher than the corresponding five year averages for the first three maturities, so we have selected the three year averages as estimates for the future.

| | Exhibit | 13: | Case | Incurred | Loss | Develo | opment | Test of | Reserve | Adequacy | |
|---------------|---------|-----|-----------------|----------|---------|--------|----------|---------|---------|----------|------------------|
| | 1 to 2 | 1 | 2 <u>to</u> 3 i | 3 to 4 | l. 4 to | 51 5 | 5 to 6 i | 6 to 7 | 7 to 8 | 8 to 9 | <u>9 to 10 j</u> |
| Averages | | 1 | 1 | | l | 1 | Í | | 1 | F F | 1 |
| 3 yr | 1.72 | 1 | 1.18 | 1.09 | 1.0 | 5 | 1.03 | 1.02 | 1.02 | 1 1 | 1 |
| 5 yr | 1.68 | L | 1.17 | 1.08 | 1.0 | 5 | 1.03 | | i | 1 1 | 1 |
| Select | 1.72 | ł. | 1.18 | 1.09 | 1.0 | 05 | 1.03 | 1.02 | 1.02 | 1.01 | 1.01 |
| | | ł | 1 | | I | i i | Í | | 1 | F 1 | 1 |
| Cumulative | 2.54 | İ. | 1.48 | 1.25 | 1,1 | 5 | 1.09 | 1.06 | 1.04 | 1.02 | 1.01 |
| Case Incurre | d 338 | ł | 628 | 656 | 67 | 70 j | 645 | 609 | 484 | 444 | 500 |
| Ult. Incurred | 859 | 1 | 927 | 821 | 76 | 59 j | 705 | 646 | 504 | 453 | 505 |
| Tot. Reporte | d 898 | L | 866 | 802 | 78 | 37 İ | 707 i | 667 | 522 | 1 475 | 520 |

For all accident years combined, the estimated ultimate incurred loss plus ALAE is \$6,188 thousand, and the reported incurred amounts on Part 2 are \$6,244 thousand. The difference of less than 1% indicates accurate reserving.

Updating the Part 2 Exhibits

The figures for individual accident years in Part 2, except for those in the right-most column, may be copied from the corresponding entries in the previous Annual Statement. The entries for the right-most column can be copied from Part 1. For each accident year, Part 2, column 11, equals (column 11 - column 10 + column 22 - column 21) from Part 1. Columns 11 and 22 in Part 1 show total paid and unpaid losses plus loss adjustment expense. Since Part 2 does not

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include unallocated loss adjustment expense, one must subtract columns 10 and 21 from Part 1,47

For the "prior years" row, a slight modification is required. The entries in the previous Schedule P for the "prior" row and for the first accident year should be 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 are added together and posted directly to the current Schedule P. The current Schedule P payments can be taken from Part 3. The sum of the reserves and the payments is the current year's "prior years" row on Part 2.48

Incurred loss development reserve procedures are important particularly for long tailed lines of business whose loss payments are small at early maturities, such as Other Liability and Excess of Loss Reinsurance.

Average Values of Outstanding Claims

Part 1, column 23, "Number of Claims Outstanding," allows us to determine the average value of an outstanding claim. Case reserves by accident year equal Part 2, column 11, minus Part 3, column 11, minus Part 6, column 11. The case reserves divided by the number of claims outstanding is the average value of an open case.⁴⁹

Unfortunately, there are two problems with this approach. (1) Part 1, column 23, shows the number of claims outstanding for *direct and assumed* business. The auxiliary schedules, Parts 2, 3, and 6, show *net* loss dollars. Changing reinsurance programs and retentions by accident year would distort trends in the observed average values.

(2) Part 1, column 23, shows outstanding claim counts at the Statement date; there is no claim count history in Schedule P. Larger claims take longer to settle. Since the outstanding claim counts are at different maturities, the average value of outstanding cases will decline steadily as the accident years increase. The analysis of average values is valid only if outstanding claims are examined at equivalent maturities. Once again, an accurate analysis requires Annual Statements of successive years.

⁴⁹ For a discussion of outstanding claim counts and average values, and their use in loss reserve estimates, see Timothy M. Peterson, *Loss Reserving - Property/Casualty Insurance* (Ernst & Whinney, 1981), chapters 8 and 9.

 $^{4^{7}}$ Alternatively, column 11 of Part 2 equals (columns 5 + 7 + 13 + 15 + 17 + 19 - 6 - 8 - 14 - 16 - 18 - 20) of Part 1.

⁴⁸ Note the NAIC *Instructions*, page 72-1: "Part 2 'Prior' is equal to Part 3 'Prior' plus the reserves outstanding at the end of the respective reporting years for all accident years prior to 1981.

Part 6 - Bulk Reserves

Part 6 shows bulk, or "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."⁵⁰ The use of Part 6 to derive case incurred (or reported) loss figures is described above.

Part 5 - Claims-Made Policies

Part 5 shows experience on claims made policies for three lines of business: Commercial Multi-Peril, Medical Malpractice, and Other Liability. Each line's exhibit must be completed only if claims-made earned premium for that line in the current year exceed (a) \$100,000 and (b) 15% of total current year earned premium in that line.

The Part 5 entries are similar to those in Part 1, though only "direct plus assumed" figures are reported. There is almost no "true IBNR" on claims-made policies, though there are other bulk reserves, such as development on known cases. Unpaid losses are divided between "case basis" and "bulk" in column 7 and 8 of Part 5, though all unpaid allocated loss adjustment expenses are combined in column 10. Since claims-made experience is not shown elsewhere in the Annual Statement, there is no need for a "discount for time value of money" column to reconcile this exhibit with other pages of the Statement.

Extended Loss and Expense Reserves

"Extended loss and expense reserves" (column 9) are characteristic of certain claims-made policies. Suppose an insurer issues a one year claims-made Medical Malpractice policy to a physician on January 1, 1990. Claims are covered only if they are reported during the policy term - that is, in 1990.

Suppose the insured ceases to practice medicine on December 31, 1990. Even though he is no longer practicing as a physician, malpractice claims relating to prior accidents may be reported in future years. To obtain insurance coverage for such claims, he must purchase "tail coverage" (or an "extended reporting endorsement") from the carrier that wrote the claims-made policy.

Insurers sometimes promise to provide this "tail" coverage at reduced cost.⁵¹ For instance, the insurer may provide free "tail coverage" to physicians who become disabled during the claimsmade policy term. Similarly, free or reduced cost tail coverage may be provided to physicians

⁵⁰ NAIC Instructions, page 80-1.

⁵¹ Frequently, there is no contractual guarantee for such free or reduced cost tail coverage in the claims-made policy. However, if the insurer intended to provide the coverage and priced for it when setting rates, conservative accounting may suggest that a liability should be set up - despite the lack of contractual guarantees.

who retire or to the estates of physicians who die.⁵² The anticipated future cost of this coverage must be included in column 9.

These are neither unearned premium nor loss reserves; rather, they are similar to life insurance policy reserves. Thus, footnote (2) on Part 5 reads: "Such a liability [i.e., the extended loss and expense reserve] is to be reported here even if it was not reported elsewhere in Schedule P, but otherwise reported as a liability item on Page 3." Except for column 9, all the figures in Part 5 are included in Parts 1E, 1F, or 1H. The extended loss and expense reserves, however, may be shown as a write-in liability on line 21 of Page 3.

No procedures for estimating the extended loss and expense reserves have yet been promulgated by the NAIC, nor are any suggested here.⁵³ The anticipated reserves for death and permanent disability are small, because of the rarity of these occurrences during the insured's lifetime, and because of limitations on the time that suits may be brought against the decedent's estate. The costs for tail coverage after retirement depend on whether the physician ceases work abruptly or slowly curtails his practice, as well as on the benefits provided by the carrier.⁵⁴ The reserve estimation procedures will probably be addressed by the NAIC during the coming years. Until then, carriers must independently formulate the proper reserves.

Part 4 - Loss Portfolio Transfers

Part 4 shows loss portfolio transfers. Suppose an insurer wrote policies for a block of business in policy year 1988. By December 31, 1989, all the policies had expired and the premiums had been earned, though outstanding loss and expense reserves remained. On July 1, 1990, the insurer transferred the outstanding reserves on this block of business to another carrier, the reinsurer. In exchange for the reinsurer's acceptance of these reserves, the insurer pays a consideration, which is reported as premium in Part 4.

⁵² Compare footnote (2) on Part 5: "An example of an extended loss and expense reserve is the actuarial reserve for the free tail coverage arising upon death, disability, or retirement in most medical malpractice policies."

⁵³ Charles L. McClenahan, in "Liabilities for Extended Reporting Endorsement Guarantees Under Claims-Made Policies," *Evaluating Insurance Company Liabilities* (Casualty Actuarial Society 1988 Discussion Paper Program), pages 345-363, provides both an estimation procedure as well as a perceptive discussion of the influences on the reserve. Note particularly his comments on anti-selection (insureds aware of potential claims are more likely to seek extended tail coverage) and changes of limits (insureds nearing retirement may seek higher limits to ensure sufficient coverage during the tail period).

⁵⁴ Note, however, McClenahan's observation: "The difference between the occurrencebased pure premium and the claims-made pure premium for any year can be expressed in terms of the required accrual for the extended reporting exposure." In other words, if the tail coverage after retirement is free, and the insured will indeed receive the coverage, the extended loss and expense reserve equals the difference between the accumulated occurrence-based pure premiums to date and the corresponding accumulated claims-made pure premiums.

For a transaction to be considered a loss portfolio transfer, the premiums must already have been earned. If the insurer transfers its obligations on a policy for which premiums are still unearned, the transaction is a standard reinsurance arrangement.

Loss portfolio transfers may be effected for both operational and financial reasons. An example of the former is an insurer leaving a line of business who wishes to transfer all its remaining obligations to another carrier. An example of the latter is an insurer who transfers its undiscounted loss reserves at their present (or market) values to a reinsurer, thereby strengthening its statutory policyholders' surplus.⁵⁵

Accounting for Loss Portfolio Transfers

There are two acceptable methods of accounting for loss portfolio transfers. Suppose an insurer has \$10 million in outstanding loss reserves, and it pays a reinsurer \$8 million to accept these future obligations. One accounting method is to code the \$8 million as a paid loss and take down the reserves by \$10 million. The other method is to code the \$8 million as reinsurance premium ceded, and code a reinsurance loss recoverable of \$10 million.⁵⁶

The latter accounting method must be used for Part 4. The footnote to this exhibit says, "Show the consideration paid for losses ceded or consideration received for losses assumed in the premiums earned (ceded or assumed, respectively) columns regardless of how the transaction was actually reported in Parts 1, 2, and 3."

The format of the exhibit is similar to the Part 1 format, though there are several differences:

 Part 1 is a *cumulative* exhibit: losses, expenses, and reserves for any accident year are the cumulative values at the Statement date. Part 4 is a "current year" exhibit: loss portfolio transfers are reported only if they were effected in the current year.

For instance, suppose an insurer underwrote business during policy year 1987, incurring outstanding losses and expenses for accident years 1987 and 1988. During 1989, it transferred part of its unpaid losses to another carrier, and in 1990 it transferred the remaining reserves. In the 1990 Annual Statement, only the 1990 loss reserve transfer would be reported in Schedule P, Part 4, in the accident year 1987 and 1988 rows. The 1989 transaction, of course, would still be reflected as assumed and ceded business in Schedule P, Part 1, and will affect the net amounts in Parts 2, 3, and 6.

2. Loss portfolio transfers are all reinsurance transactions. The "direct and assumed" headings

⁵⁵ See, for instance, Stephen P. Lowe and Stephen W. Philbrick, "Issues Associated with the Discounting of Property/Casualty Loss Reserves," *Journal of Insurance Regulation*, Volume 4, No. 4 (June 1986), pages 72-102.

⁵⁶ See Lee R. Steeneck, "Loss Portfolios: Financial Reinsurance," *Financial Solvency* (Casualty Actuarial Society 1984 Discussion Paper Program), pages 31-50.

in the premium, loss, and allocated expense columns of Part 1 are replaced by "assumed" in Part 4.

3. There is no subdivision by line of business in Schedule P, Part 4. However, the insurer must keep records by line, since the loss portfolio transfers affect the line of business figures in Parts 1, 2, 3, and 6.

Schedule P assists regulators in evaluating an insurance company's solvency. Parts 1, 2, 3, and 6 show underwriting experience by accident year and thereby help ascertain the adequacy of loss reserves. For these purposes, cumulative experience by line of business is essential. Part 4 examines transactions that provide surplus relief, in addition to their operational functions. Loss portfolio transfers effected in past years are of little importance, since the investment income generated by the assets supported loss reserves provides the same "relief" without the portfolio transfer, though much more slowly. Loss portfolio transfers effected in the current year, however, regardless of line of business, affect statutory policyholders' surplus. These are the arrangements that are shown in Schedule P, Part 4.

Conclusion

Schedule P is a complex document, requiring careful preparation for its completion and sophisticated analysis for its understanding. Working with Schedule P can be a satisfying experience, if you understand its intricacies and the interrelationships of its parts. Conversely, this experience can be frustrating, if you are unprepared, if your data do not match those in previous years or elsewhere in the Annual Statement, or if you do not systematically check your entries as you complete the form. A careful reading of this article before you begin completing or analyzing Schedule P should smooth your task and help you avoid needless pitfalls.