

Large Account Pricing

Presenter: Joshua Taub, FCAS

CAS Ratemaking and Product Management Seminar
March 30, 2014
Washington, D.C.

CAS Antitrust Notice

- The Casualty Actuarial Society is committed to adhering strictly to the letter and spirit of the antitrust laws. Seminars conducted under the auspices of the CAS are designed solely to provide a forum for the expression of various points of view on topics described in the programs or agendas for such meetings.
- Under no circumstances shall CAS seminars be used as a means for competing companies or firms to reach any understanding - expressed or implied - that restricts competition or in any way impairs the ability of members to exercise independent business judgment regarding matters affecting competition.
- It is the responsibility of all seminar participants to be aware of antitrust regulations, to prevent any written or verbal discussions that appear to violate these laws, and to adhere in every respect to the CAS antitrust compliance policy.

Agenda

- 1 Who I am
- 2 Intro to Large Accounts
- 3 Experience Rating
- 4 Schedule Rating
- 5 Retrospective Rating



- Teaching CAS Exams 5 & 8 for The Infinite Actuary
- Ratemaking experience in personal and commercial lines
- Also managed a claims actuarial group for several years
- Passion for sharing learning
- Obtained FCAS in 2008
- Graduated from UCSB, now on Actuarial Advisory Board
- I also love to travel!

Definition of a Large Account

So what exactly do we mean by "Large Account"?



Photo Credit: www.dts-nachrichtenagentur.de

- Insuring this \$4.5M car?
- Insuring this \$85M house?
- A personal umbrella policy for Bill Gates?

In our case, none of these

So...the answer is?

A "Large Account" for our purposes is considered to be a **commercial lines** policy with a **significant** amount of premium.

Why only **commercial lines**?

- Exposure to loss varies more from risk to risk
- Limited data, high exposure

What does **significant** mean?

- Big enough for an insured's own loss experience to have some credibility in predicting their own future losses.
- Generally: the more premium, the more credibility

Why Treat Large Accounts Different?

- Unique risks: classification plans insufficient
- Credibility of experience
- Scale allows for higher level of service (i.e., loss control)
- Varying degrees of risk aversion

Options for Large Account Insurance

- Self-Insurance Mechanisms
 - Captives
 - Self-insurance with an Excess policy
 - Large Dollar Deductible (LDD) Policy (i.e., \$100k+ deductible)
- Retrospective Rating
- Loss-Rated Risks
- Conventional Policy
 - Experience Rating
 - Schedule Rating

Question #1

You are the Chief Risk Officer for a large corporation, and you are deciding on how to manage the risks your company faces. You have 2 goals:

- 1 You want to retain a moderate amount of risk.
- 2 You want an insurer to handle all claims.

Which option do you choose?

- 1 LDD - This meets both criteria
- 2 Excess - Not this because of requirement #2
- 3 Retro - This meets both criteria
- 4 Conventional Policy - Not this because of requirement #1

Choice between 1 and 3 depends on the plan parameters of each.

Experience Rating

Experience Rating

Use an insured's claims history on **prior** policy terms in determining their current policy premium.

Differentiates between risks within a classification for things not captured by the classification plan.

Goals of Experience Rating:

- 1 **Predictive Accuracy:** Use past losses to the extent that they are predictive of future losses. This makes the plan fair.
- 2 **Safety Incentive:** A financial incentive to prevent and mitigate accidents.
- 3 **Enhance Competition:** More insurers willing to write business if better chance of profit.

Personal vs Commercial Lines

Experience rating does exist in personal lines in the form of accident surcharges.

They are administered by individual insurers, and only focus on claim frequency, and not claim severity (based on what I've seen).

In commercial lines, experience rating may be administered by a statistical bureau, and considers both claim frequency and severity.

Experience rating credibility is inversely related to the strength of the classification plan.

Question #2

Two insurers are competitors in writing personal auto insurance.

- Insurer #1 only has rating factors for age of driver, miles driven, and # of prior claims.
- Insurer #2 only has rating factors for age of driver, miles driven, territory, credit score, and # of prior claims.

Which insurer's prior claim surcharges are likely to be larger?

- 1 Insurer #1 - This one has more experience rating credibility
- 2 Insurer #2 - This has the stronger class plan

Experience Rating Plans

There are 2 main categories of Experience Rating Plans:

- 1 **No-Split Plans:** There is no subdivision of losses.

$$Mod = \frac{ZA + (1-Z)E}{E}$$

- 2 **Split Plans:** Losses are split into primary and excess.

$$Mod = \frac{Z_p A_p + (1-Z_p)E_p + Z_e A_e + (1-Z_e)E_e}{E_p + E_e}$$

- **Single-Split:** $A_p = \begin{cases} A & \text{if } A \leq C \\ C & \text{if } A > C \end{cases} \quad A_e = \hat{A} - A_p$

- **Multi-Split:**

$$A_p = I + (1-d)I + (1-d)^2 I + \dots + (1-d)^N (A - N * I)$$

$$A_e = \hat{A} - A_p$$

NCCI Experience Rating

The NCCI uses a single-split plan for Work Comp. Generally 3 years of loss experience is used.

Split plan formula is re-written:

$$Mod = \frac{A_p + WA_e + (1-W)E_e + B}{E+B} \quad Z_p = \frac{E}{E+B} \text{ and } Z_e = WZ_p$$

NCCI calculates Expected Loss Rates (ELRs) and D-Ratios for each class.

ELR_i = Expected Losses per \$100 of payroll for class i

$$D_i = \frac{\text{Expected Loss below split point for class } i}{\text{Expected Total Loss for class } i}$$

$$E_i = (\text{Payroll}_i / 100) * ELR_i$$

$$E = \sum E_i$$

$$E_p = \sum D_i * E_i$$

$$E_e = E - E_p$$

NCCI Loss Adjustments

In addition to the split point, there are some restrictions on actual losses:

- Medical-Only losses only included at 30% of loss amount (after split point applied)
- Cap on large individual claims
- Cap on multi-claim accidents
- Caps for disease losses

The ELRs and D-ratios are adjusted for these, so expected losses are on same basis as actual losses used.

Exam 8 - 2007 Q25(a)

For a given risk, the losses entering the workers compensation experience rating formula are as follows.

Claim Number	Indemnity Loss	Medical Loss	Total Loss	A_p	A_e
1	\$2,000	\$4,000	\$6,000	\$5,000	\$1,000
2	\$0	\$2,800	\$2,800	\$840	\$0
3	\$10,000	\$8,000	\$18,000	\$5,000	\$13,000
4	\$0	\$12,000	\$12,000	\$1,500	\$2,100
Total:				\$12,340	\$16,100

Additionally, the following information is given for this risk.

Expected Primary Losses:	\$13,000	$Mod = \frac{A_p + WA_e + (1-W)E_e + B}{E + B}$
Expected Excess Losses:	\$50,000	
Ballast:	100,000	$Mod = \frac{12,340 + 0.20(16,100) + (1-0.20)(50,000) + 100,000}{(13,000 + 50,000) + 100,000}$
Weight:	0.20	$Mod = 0.95$

Assume that there is a single split point of \$5,000 between primary and excess.

Calculate the risk's experience modification factor.

ISO Experience Rating

ISO uses a no-split plan for General Liability. Like NCCI, 3 years of loss experience is generally used.

The plan uses basic limits loss data, which limits impact of severity.

The plan also caps the basic limits Loss + ALAE for each historical claim at a Maximum Single Loss (MSL).

No-Split plan formula is re-written:

$$\text{Mod} = Z * \frac{\text{AER} - \text{EER}}{\text{EER}}$$

AER = Actual Experience Ratio

EER = Expected Experience Ratio

ISO Experience Ratios

$$\text{Mod} = Z * \frac{AER - EER}{EER}$$

$$EER = \frac{\text{Expected ultimate basic limits losses and ALAE limited by the MSL}}{\text{Expected ultimate basic limits losses and ALAE NOT limited by the MSL}}$$

Note that the EER is conceptually similar to the NCCI's D-Ratio.

$$AER = \frac{\text{Actual basic limits losses and ALAE to date limited by the MSL} + \text{Expected Development}}{\text{Expected ultimate basic limits losses and ALAE NOT limited by the MSL}}$$

Same denominator for AER and EER.

The denominator is known as the Company Subject Loss Cost (CSLC).

ISO CSLC Standard Method

First calculated for each year of experience and each subline (Premises/Operations and Products/Completed Ops).

Basic Limits Expected Losses_{sl} = company ELR * annual basic limits company premium_{sl}

Once we have the Basic Limits Expected Losses (BLEL) by subline, we need to make 3 initial adjustments to make these expected losses more comparable with the actual losses from the experience period.

However, for our purposes, we'll assume that all policies are occurrence policies, and not claims-made, so the only adjustment remaining is to de-trend the expected losses to be on the same trend level as the actual losses from the experience period.

$$CSLC_{y,sl} = BLEL_{sl} * DeTrend_{y,sl}$$

$$CSLC = \sum_{y=1}^3 \sum_{sl} CSLC_{y,sl}$$

ISO Mod Calculation

$$AER = \frac{\text{Actual basic limits losses and ALAE to date limited by the MSL} + \text{Expected Development}}{CSLC}$$

First term in numerator obtained from actual loss and ALAE. Need to first cap losses at basic limits, then cap (basic limits loss + ALAE) by MSL.

$$ExpectedDevelopment_{y,sl} = CSLC_{y,sl} * EER * LDF_{y,sl}$$

LDFs can be from ISO or company, and EER is from ISO tables.

$$ExpectedDevelopment = \sum_{y=1}^3 \sum_{sl} ExpectedDevelopment_{y,sl}$$

Exam 5 - 2006 Q49

Given the following information for a commercial general liability risk, calculate the experience (Credit)/Debit based on the ISO CGL Experience Rating Plan. Show all work.

Actual Losses in the experience period valued as of March 31, 2006:

Claim	Loss	ALAE	Basic Loss	Min(Basic Loss+ALAE,MSL)
1	\$1,000	\$200	1,000	1,200
2	1,500	200	1,500	1,700
3	5,000	800	5,000	5,800
4	6,000	1,000	6,000	7,000
5	12,000	1,800	12,000	13,800
6	23,000	2,200	23,000	25,200
7	120,000	40,000	100,000	140,000
			Total	194,700

Expected Unreported Losses and ALAE @ March 31, 2006 = \$45,000
Company Subject Basic Limits Loss and ALAE costs = \$250,000

Basic Limit = \$100,000

MSL = \$150,000

Expected Experience Ratio = 0.9

Credibility = 0.6

$$\text{Mod} = Z * \frac{\text{AER} - \text{EER}}{\text{EER}} = 0.6 * \frac{0.9588 - 0.9}{0.9} = 0.0392$$

$$\text{AER} = \frac{194,700 + 45,000}{250,000} = 0.9588$$

Component	ISO Experience Rating Plan	NCCI Experience Rating Plan
Experience period	Typically 3 years, lagged 1 year	Same as ISO
Experience Mod	Add 1 to get a factor	Already in factor form
Credibility	Up to 100% (of limited loss experience)	Less than 100%
Plan type	No-split plan	Single-split plan
ALAE	Included in Mod calculation	Not included in mod calculation
Trending of losses	No trending of actual loss, de-trend expected loss	Same as ISO
Loss development	Compares ultimate losses	Compares undeveloped losses
Loss limits	Basic limits and MSL	SAL

Schedule Rating

Schedule Rating

Allows underwriters to subjectively adjust premium for individual risks based on risk characteristics not otherwise reflected in rate calculation.

Schedule rating plans are filed with a set list of risk characteristics that will be considered, along with the maximum credits and debits by each category and in total.

Some carriers now implement predictive models through schedule rating.

Schedule rating should avoid considering any risks characteristics that are already fully reflect in experience rating.

ISO CGL Schedule Rating Plan

ISO Commercial General Liability Plan categories:

- **Location:** Exposure inside and outside. Up to 10% credit or debit.
- **Premises:** Condition and care. Up to 10% credit or debit.
- **Equipment:** Type, condition, and care. Up to 10% credit or debit.
- **Classification:** Peculiarities. Up to 10% credit or debit.
- **Employees:** Selection, training, supervision, experience. Up to 6% credit or debit.
- **Cooperation:** Medical facilities and safety program: Up to 4% credit or debit.

The credits and debits by risk characteristic are summed, and then capped at $\pm 25\%$, so the maximum schedule debit is 1.25, and the maximum schedule credit is 0.75.

Exam 5 - 2010 Q34

An insurer has been tracking the claims experience of a very large construction company for the three years the construction company has been insured by this insurer. The construction company will implement a new safety program starting in the upcoming year.

- (a) Determine whether the insurer should use experience rating, schedule rating, or both to rate the construction company for the upcoming policy period. Briefly explain your answer.

BOTH. Experience rating will reflect the actual experience over the last few years, and schedule rating will reflect the expected impact of the new safety program.

- (b) Assuming no additional changes, determine whether the insurer should use experience rating, schedule rating, or both to rate the construction company five years from now. Briefly explain your answer.

Only experience rating. Since the safety program would now be fully reflected in the insured's experience, the experience rating will pick up the impact of the safety program. Using schedule rating to reflect the safety program would double count the impact of the program.

Retrospective Rating

Retrospective Rating

Use an insured's claims on **current** policy term in determining their current policy premium.

Initial premium is collected at start of policy term.

Adjustments to premium starting around 6 months after term, and every 12 months thereafter as losses develop.

May be many years before policy premium is finalized.

Retro Value Proposition

Extreme hypothetical - Premium fully dependent on actual loss:

Actual Premium = Actual Loss + Expected Expenses

Expected Expenses \leq Actual Premium $\leq \infty$

Expected Premium = Expected Loss + Expected Expenses

Value proposition for insured (example numbers):

Pay an extra \$1,000 and guarantee your premium \leq \$10,000.

$\$1,000 + \text{Expected Expenses} \leq \text{Actual Premium} \leq \$10,000$

Now, insured is protected if Actual Loss + Expenses $>$ \$10,000.

Retros have **maximum** and **minimum** premiums.

The cost to have max/min premium is the **net insurance charge**.

Retro Loss Limits

With a maximum premium of \$10,000:

Actual Premium = $\text{Min}(\text{Actual Loss} + \text{Insurance Charge} + \text{Expected Expenses}; \$10,000)$

Note that maximum and minimum premiums are equivalent to aggregate limits on losses used to determine the premium.

Max Prem = $\text{Max Loss} + \text{Insurance Charge} + \text{Expected Expenses}$

Retros can also have limits on individual accident impact on premium.

Separate charge needed for accident limits. Charge should consider overlap with aggregate limit!

Note these are **NOT** coverage limits!

Work Comp Retro Rating

Case 1: No per occurrence limit in retro premium calculation.

- NCCI Retro premium formula $R = (b + CA)T$
- **Actual Prem = (Non-LAE Expenses + Expected LAE to Loss * Actual Loss) * Taxes**
 - b = Basic premium. Covers non-LAE expenses (excluding taxes), profit, and net insurance charge.
 - A = Actual incurred loss. May or may not include ALAE.
 - C = Loss Conversion Factor. Covers LAE not included in A .
 - P = Standard Premium. Includes manual premium, experience mod, and schedule mod.
 - T = Tax Multiplier. Covers premium taxes and assessments/fees.
 - In a balanced plan, $b = e - (C - 1)E[A] + CI$
 - e = Total expenses (excluding taxes) and profit
 - I = Net insurance charge for max/min premiums
- R is capped between maximum premium (G) and minimum premium (H).
- Sometimes G , H , $E[A]$, I , e and b given as ratios to P .

Case 2: With per occurrence limit in retro premium calculation (Table L approach).

- Replace A with actual limited loss
- Replace I with net insurance charge including occurrence limit charge

Exam 5 - Spring 2013 Q15

An employer negotiated a workers compensation retrospective policy with an insurer, effective from January 1, 2011 to December 31, 2011. The first adjustment of the retrospective premium occurs six months after the end of the policy period and annually thereafter until the tenth adjustment.

The reported losses during the policy period evaluated as of June 30, 2012 are as follows:

<u>Claim</u>	<u>Reported Losses</u>	<u>Actual Limited Losses</u>
#1	\$300,000	\$150,000
#2	\$200,000	\$150,000
#3	\$100,000	\$100,000
		\$400,000

The provisions for this retrospective rating plan are as follows:

$$R = (b + CA)T$$

Minimum retrospective premium ratio	50%
Maximum retrospective premium ratio	150%
Loss Conversion Factor	1.2
Per Accident Loss Limitation	\$150,000
Expense Allowance Excluding Tax Multiplier	25%
Expected Loss Ratio	60%
Tax Multiplier	1.05
Net Insurance Charge	44.6%
Standard Premium	\$540,000

$$b = e - (C - 1)E[A] + CI$$

$$(b/P) = 25\% - (1.2 - 1)60\% + (1.2)(44.6\%)$$

$$(b/P) = 0.6652$$

$$b = 0.6652 * \$540,000 = \$359,208$$

$$R = [\$359,208 + (1.2)(\$400,000)] * 1.05$$

$$R = \$881,168$$

$$\text{Min Premium} = 50\% * \$540,000 = \$270,000$$

$$\text{Max Premium} = 150\% * \$540,000 = \$810,000$$

- (a) Calculate the retrospective premium as of June 30, 2012. **Answer = \$810,000**
- (b) Discuss what could cause the retrospective premium in part (a) above to change for the insured between June 30, 2012 and the tenth adjustment. **Can only go down since already at max. Only way: reduction in case reserves.**

Thank you!

THANK YOU!