RATEMAKING FOR THE PERSONAL AUTOMOBILE

PHYSICAL DAMAGE COVERAGES

by JOHN J. KOLLAR

Reviewed by GALEN BARNES

Introduction

When I was asked to participate in the call paper program by reviewing a paper, I approached the idea with some apprehension. I have never been involved in this side of the Society's endeavors. Rather, I have been a benefactor of the quality submissions of my colleagues and their reviewers in the past. That is not to say that I have not had the opportunity to study in fine detail some of the worthier papers as a student and examiner, but I have until now kept counsel only with myself.

My compliments go to John Kollar for the careful deliberation given and the time spent in the active role of providing us with a paper for discussion. In all honesty, however, I expected a paper much different in scope. When I was asked to review this paper I expected to receive a recipe guide for a beginning student in my office to use and read before he or she began asking the imponderable questions that I will never be able to answer.

Given that I am not reviewing the paper I expected to review, does that detract from my opinion of its value? Absolutely not. The paper will, I believe, foster the type of discussion for which this call paper program is intended. In addition, I believe it is particularly significant that John represents a rating organization and the reviewer an independent direct writer for automobile

insurance. With different perspectives, surely the author and reviewer will identify some diverging opinions that will increase the level of discussion.

Deductibles

The paper is divided into various sections which I will abide by for ease of presentation. The first section addresses deductibles.

The theme of this section is that a significant shift in the exposure distribution by deductible during the experience period under review may lead to an improper matching of premiums and losses. An improper marriage will result in an inappropriate base upon which projections to the future are applied, (e.g. trend) for statewide rate indications, etc.

The distortion is to be eliminated by use of accident year results as of 15 months or the use of 12 months of presumably calendar year results adjusted to a common deductible. But we are to be wary if the premium conversion relativities and the loss elimination relativities are out of synchronization.

In this case it is stated that the actual rate level need may be much greater than a superficial review of the overall data would indicate. I believe that this statement needs to be made more precise as I feel that what has been shown is that the rate level for the higher deductible is relatively more inadequate than the

lower deductible. When both deductibles are considered together, the overall rate level for the two combined may indeed be equivalent to the example when loss elimination ratios and premium relativities are more appropriately aligned.

For several years the reviewer has used a calendar year incurred loss approach for all deductibles combined and until recently this approach has worked reasonably well. With the advent of deductible roll-ups other approaches such as those suggested by the author have become more important. They have not, however, replaced the use of calendar year ratemaking based on incurred loss estimates.

Calendar year incurred losses are equivalent to accident year losses if required and carried reserves are the same. The usually small size of physical damage loss reserves relative to paid losses will generally ensure only small distortion of results if the required and carried reserves are not exactly the same. But periodic checking of loss reserve developments to assure reasonable accuracy is advised.

The use of total collision results will avoid some of the problems of exactly determining the price for each deductible if financial health is one of the main objectives and a balance of experience indications and reasonability is needed to price some of the infrequently used deductibles. The reviewer agrees with the author that it is essential to rate each deductible appropriately particularly if there is a shift occurring.

In addition to the methods for accomplishing appropriate deductible rating suggested by the author, the reviewer has used the technique of reviewing the trend in loss elimination ratios for judgmental selection purposes. For example, an LER for calendar year n of .12 and an LER for calendar year n +1 of .09 will produce an intuitive feeling if a judgmental selection is appropriate.

The deductible section of the author's paper also speaks briefly to the impact of deductible shifts on trend. The reviewer will speak to this issue in the section on trend. One facetious parenthetical comment is in order, however, in regard to the comments about the impact of deductible shifts on property damage liability. An actuary working for only one independent company always assumes that third party claimants will pursue claims, if only for $5.

The Insured

The theme of this section is that demographic shifts of insureds and changing vehicle population characteristics may impact trend and possibly the matching of premiums and losses.

The author has pinpointed some of the societal effects that may have an impact on both trends and the experience base. There are other societal, demographic, and vehicle changes that also come to mind which are likely impacting these actuarial measures.

While the list is not exhaustive, it includes the following:

a) Greater metropolitan density on average. While there are more suburbanites, they are clogging the urban streets and to a greater extent than in the past, the suburban streets.

b) Greater claims consciousness fueled by the perceived decline of affordability.

c) More damageable and expensive to repair vehicles than existed in the past.

d) More small cars being hit by big cars.

The reviewer agrees that the societal changes considered by the author will likely result in a small declining effect on average rates and loss trend for all coverages. There are other factors though that conceivably have a counterbalancing effect.

Trend

The theme of this section is to describe the strengths and weaknesses of various bases for selection of trends for physical damage coverages. Distortions caused by deductible shifts; comprehensive catastrophes; the use of first dollar PDL severity trends; and the use of PDL frequency trends to estimate physical damage frequency trends are explored among other considerations. Also considerations of premium trends are addressed.

This section of the author's paper is filled with items for discussion and thought. But to add emphasis to the author's remarks or rather to put them in perspective I attach Exhibits 1 and 2 which are rough calculations of the effect of deductible shifts on comprehensive and collision trends. The deductible shift effect on comprehensive is seen to be negligible on frequency, severity and pure premiums. For collision the effect is negligible on severity but noteworthy on frequency and pure premiums.

The point of these exhibits is to caution that the valuable information to be gained from reviewing physical damage trend data should not be ignored to the exclusive use of PDL data. Comprehensive and collision trends are subject to distortions as is the PDL data but as John states "all factors impacting premium or loss trends must be considered...judgmental modifications should be made as necessary."

Informed judgment is the actuary's best tool and I believe this is particularly true in the choice of trends.

Rating System

The theme of this section is to describe a new rating system to reflect vehicle series and model year rating. The new system is a clear example of the continued improvement in actuarial technology

and the ability to handle complex information systems. The author's description is concise, well done, and highly recommended to those who have not been living with VIN for the past several years.

The only comments that I feel are in order are as follows:

1) It is my hope that we soon can support a differentiation in symbols for comprehensive and collision to reflect the likely expected loss difference between the two coverages by vehicle series.

2) I also hope that first party injury coverage differences by vehicle series can be reviewed.

3) I can testify to the large task of obtaining accurate VINs in computer records for resymboling needs.

Statistical Implications

The theme of this section is that statistical implications of rating plans or changes thereto should be considered. The author has identified several points to bear in mind as the ratemaker designs statistical plans and formats reports.

The reviewer would only add that in order for information to be valuable in managing a company that it must be understandable and significant to non-actuaries. Data that produces actions is the key and not actuarial full employment.

Summary

John's paper is a well written exposition on some of the perplexing problems to be faced by a ratemaker for personal automobile physical damage insurance.

While my perspective as an actuary for an independent company differs somewhat from John's, I believe that we both agree that the perplexing problems must be dealt with. Furthermore, I believe we also agree that actuarial judgment continues to be very important and that various ways of approaching the problems must be considered.

John deserves commendation for his excellent treatment of the subject. My review hopefully does not detract from the significance of the paper for it is meant only to facilitate open discussion. As a result the differences of opinion are highlighted rather than the agreements. The agreements far outweigh the differences but they have not been emphasized.

Company: ABC Insurance Company
State: X
Coverage: Collision
Effect of Deductible Shift

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Exposure Distribution		Calendar Year 1975 Estimated Claims Statistics			1975 Col. 2 x Col. 5	1978 Col. 3 x Col. 5	1975 Col. 2 x Col. 6	1978 Col. 3 x Col. 6
Deductible	Cal. Yr. 75	Cal. Yr. 78	Severity	Frequency	Pure Premium				
$80/20	60	30	$305	.155	$47.28	9.30	4.65	$ 2,837	$ 1,418
50	2,300	1,370	428	.093	39.80	213.90	127.41	91,540	54,526
100	7,560	8,040	419	.087	36.45	657.72	699.48	275,562	293,058
150	-	20	411	.083	34.11	-	1.66	-	682
200	-	80	418	.076	31.77	-	6.08	-	2,542
250	80	440	428	.069	29.53	5.52	30.36	2,362	12,993
500	-	20	481	.045	21.65	-	.90	-	433
Total	10,000	10,000				$86.44	$70.54	$372,301	$365,652

Notes: (1) Col. 4 $80/20 Actual 1975 average incurred cost (AIC)
50 Actual 1975 average incurred cost (AIC)
100 50 Ded. AIC x 100 Ded. LER = 428 x [(1032665 - 89448) ÷ (1835 - 121) ÷ (1032665 ÷ 1835)]
150 100 Ded. AIC x 150 Ded. LER = 419 x [(5831339 - 397451) ÷ (8108 - 403) ÷ (5831339 ÷ 8108)]
200 100 Ded. AIC x 200 Ded. LER = 419 x [(5831339 - 767562) ÷ (8108 - 1052) ÷ (5831339 ÷ 8108)]
250 100 Ded. AIC x 250 Ded. LER = 419 x [(5831339 - 1104772) ÷ (8108 - 1673) ÷ (5831339 ÷ 8108)]
500 100 Ded. AIC x 500 Ded. LER = 419 x [(5831339 - 2400635) ÷ (8108 - 3952) ÷ (5831339 ÷ 8108)]

(2) Col. 5 $80/20 Actual 1975 frequency
50 Actual 1975 frequency
100 50 Ded. Frequency x 100 Ded. LER = [.093 x (1835 - 121) ÷ 1835]
150 100 Ded. Frequency x 150 Ded. LER = [.087 x (8108 - 403) ÷ 8108]
200 100 Ded. Frequency x 200 Ded. LER = [.087 x (8108 - 1052) ÷ 8108]
250 100 Ded. Frequency x 250 Ded. LER = [.087 x (8108 - 1673) ÷ 8108]
500 100 Ded. Frequency x 500 Ded. LER = [.087 x (8108 - 3952) ÷ 8108]

(3) Col. 6 = Col. 4 x Col. 5

Conclusions: a.) Frequency Based on 1975 Distribution = .0886
Based on 1978 Distribution = .0871 .0871 ÷ .0886 = .983 $(.983)^{1/3}$ ≐ .994

b.) Severity Based on 1975 Distribution = $420.00 = 372301 ÷ 886.44
Based on 1978 Distribution = 420.03 = 365652 ÷ 870.54 $420.03 ÷ $420.00 = 1.000

c.) Pure Premium Based on 1975 Distribution = $37.23
Based on 1978 Distribution = 36.57 $36.57 ÷ $37.23 = .982 $(.982)^{1/3}$ ≐ .994

Exhibit 1
Sheet 1

Company: ABC Insurance Company

State: X

Loss Elimination Study

Collision

$ 50 Deductible Size of Loss Study

Ded.	Amount of Settlement	No. of Claims	Total Settlement	Total Losses Eliminated
$100	$1 - 50	121	3,748	3,748
	Over 50	1,714	1,028,917	85,700
	Total	1,835	1,032,665	89,448

$100 Deductible Size of Loss Study

$150	$1 - 50	403	12,201	12,201
	Over 50	7,705	5,819,138	385,250
	Total	8,108	5,831,339	397,451
$200	$1 - 100	1,052	61,962	61,962
	Over 100	7,056	5,769,377	705,600
	Total	8,108	5,831,339	767,562
$250	$1 - 150	1,673	139,522	139,522
	Over 150	6,435	5,691,817	965,250
	Total	8,108	5,831,339	1,104,772
$500	$1 - 400	3,952	738,235	738,235
	Over 400	4,156	5,093,104	1,662,400
	Total	8,108	5,831,339	2,400,635

Company: ABC Insurance Company
State: X
Comprehensive
Effect of Deductible Shift

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Exposure Distribution		Calendar Year 1975 Estimated Claims Statistics			1975 Col. 2 x Col. 5	1978 Col. 3 x Col. 5	1975 Col. 2 x Col. 6	1978 Col. 3 x Col. 6
Deductible	Cal. Yr. 75	Cal. Yr. 78	Severity	Frequency	Pure Premium				
Full	9,920	9,860	$144	.072	$10.37	714.24	709.92	$102,870	$102,248
$ 50	80	130	157	.056	8.79	4.48	7.28	703	1,143
100	-	10	187	.041	7.67	-	.41	-	77
Total	10,000	10,000				718.72	717.61	103,573	103,468

Notes: (1) Severity — Full Coverage: Calendar Year 1975 actual average incurred cost (AIC)
$ 50 Ded.: Full Coverage AIC x 50 Ded. LER = 144 x [(2310689 - 342747) ÷ (7525 - 1631) ÷ (2310689 ÷ 7525)]
100 Ded.: Full Coverage AIC x 100 Ded. LER = 144 x [(2310689 - 596055) ÷ (7525 - 3236) ÷ (2310689 ÷ 7525)]

(2) Frequency — Full Coverage: Calendar Year 1975 actual frequency
$ 50 Ded.: Full Coverage Frequency x 50 Ded. LER = .072 x [(7525 - 1631) ÷ (7525)]
100 Ded.: Full Coverage Frequency x 100 Ded. LER = .072 x [(7525 - 3236) ÷ (7525)]

Conclusions: a.) Frequency — Based on 1975 Distribution = .0719
Based on 1978 Distribution = .0718 — .0718 ÷ .0719 = .999 — $(.999)^{1/3} \triangleq 1.000$

b.) Severity — Based on 1975 Distribution = $144.11
Based on 1978 Distribution = 144.18 — $144.18 ÷ $144.11 = 1.000

c.) Pure Premium — Based on 1975 Distribution = $ 10.36
Based on 1978 Distribution = 10.35 — $10.35 ÷ $10.36 = .999 — $(.999)^{1/3} \triangleq 1.000$

Company: ABC Insurance Company
State: X

Loss Elimination Study

Comprehensive
Full Coverage Size of Loss Study

Ded.	(1) Amt. of Settlement	(2) No. of Claims	(3) Total Settlement	(4) Total Losses Eliminated
$ 50	$1 - 50	1,631	48,047	48,047
	Over $50	5,894	2,262,642	294,700
	Total	7,525	2,310,689	342,747
$100	$1 - 100	3,236	167,155	167,155
	Over $100	4,289	2,143,534	428,900
	Total	7,525	2,310,689	596,055
$250	$1 - 250	5,864	566,295	566,295
	Over $250	1,661	1,744,394	415,250
	Total	7,525	2,310,689	981,545
$500	$1 - 500	6,576	818,350	818,350
	Over $500	949	1,492,339	474,500
	Total	7,525	2,310,689	1,292,850