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February 28, 2019

Alberta Automobile Insurance Rate Board
2440 Canadian Western Bank Place
10303 Jasper Avenue
Edmonton, AB T5J 3N6

Attention: Ms. Charlene Butler, MBA, BSc, BComm, Chair

RE: FA Written Submission in regard to the AIRB Draft Review of 2018-H1 Industry PPV Experience

Dear Ms. Butler,

Facility Association has reviewed the draft Oliver Wyman ("OW") report entitled "*Semi-Annual Review of Industry Experience – Preliminary Report as of June 30, 2018 Private Passenger Vehicles*", dated January 28, 2019.

We are pleased to provide our attached written submission for your consideration. Our comments are focused on the availability of automobile insurance in the voluntary market in Alberta, providing consumers in the province choice both in terms of insurance provider and choice of the type and amount of coverage available[1]. We believe this dovetails with the Alberta Automobile Insurance Rate Board (AIRB) vision of fostering an efficient and effective automobile insurance market with fair and predictable rates.

We are becoming concerned with the potential availability issues in Alberta at the current time. Loss ratios (indemnity, ALAE, and ULAE) have been generally deteriorating, and are well above the 66% level we estimate from the report would be consistent with the proposed benchmarks. Further, we estimate the OW future trend selections at the coverage level will translate to an overall loss cost future trend rate over 5%.

It is challenging to promote both fairness and predictability in automobile insurance rates at a time when the underlying costs of benefits provided by the insurance product are very difficult to predict, as highlighted in several passages of the OW report. In light of this, we believe it is important for the AIRB to promote the use of the benchmarking exercises as one of providing guidance to the AIRB in its deliberations of rate filings, rather than setting specific targets, caps, or floors with respect to any one particular assumption. This provides an opportunity for insurers to reflect their own assessment of

[1]Consumers in Alberta are required to purchase $200,000 of third party liability protection. However, it is clear that consumers see value in broader insurance coverage to protect them and their financial wellbeing, as only 0.1% of individually-rated private passenger vehicles were insured for the required minimum third party liability limit, according to 2017 data found in GISA industry data. Further, 75% purchased protection for their vehicle against collision/upset, and 89% purchased protection for their vehicle against theft and "Acts of God". We believe these statistics show a clear consumer appetite in the province for automobile insurance across many of the perils that owning or operating an automobile exposes consumers to.

future costs in providing their product / service to the consumer, and set their rates with this and their view of the competitive market in which they operate, in mind. This, we believe, will ultimately result in the greatest consumer choice in providers and product, while maintaining fairness to all parties. In contrast, treating benchmark assumptions as set values may adversely impact availability of voluntary automobile insurance in the province, to the extent that capital providers in the voluntary market take an adverse view of their ability to charge rates that they have assessed relative to the future costs and risk of providing insurance.

Areas of uncertainty where we believe the AIRB should exercise flexibility in companies selecting assumptions supporting their applications include:

- selection of industry ultimate claim counts and amounts supporting their analyses (including trend analyses);
- selection of trend models (including the underlying methodology and approach) and trend rates;
- selection of large loss and catastrophe loss loadings and methodologies and reinsurance cost considerations;
- discount rates;
- health cost recovery loadings;
- operational expenses; and
- profit provisions (both in terms of the metric to use, and the level to target).

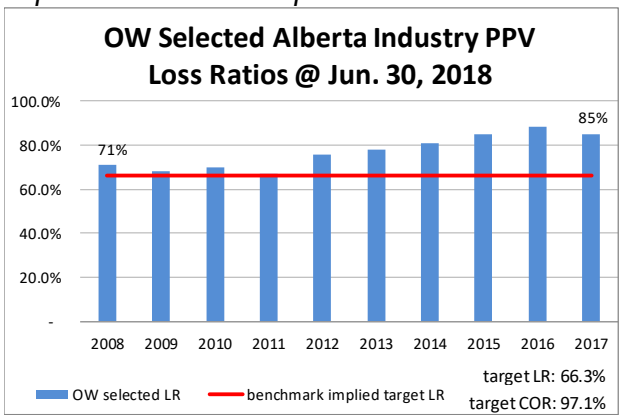
In considering these areas of potential flexibility, it is important to acknowledge the extent of the current estimated rate deficiency in the province. Specifically, based on our interpretation, the proposed benchmarks for private passenger vehicles in the OW PPV Report would indicate a target indemnity and claims expense ratio of approximately 66%, a level that the OW estimates of ultimate suggest has not been reached in the last 10 accident years (see left chart at the top of the next page), based on their current selections of ultimate.

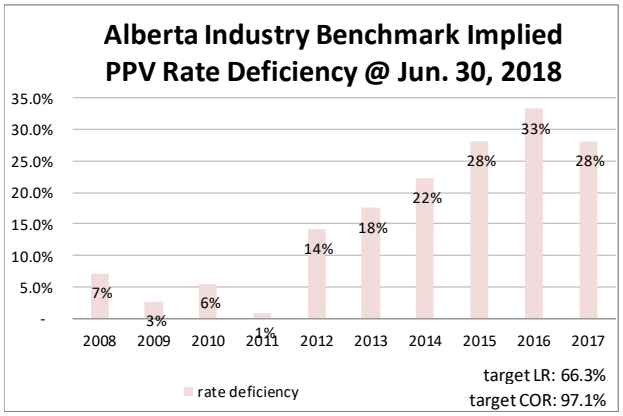
We have also included a chart (top of the next page, to the right) that summarizes estimated accident year rate deficiencies relative to this target level (i.e. based on the proposed benchmark assumptions). They range from 1% (2011) to 33% (2016), with an average rate deficiency of 16%. Note: these are not estimates of actual hindsight rate deficiencies, but rather estimated rate deficiencies for those accident years, applying the OW benchmark assumptions per the current preliminary benchmark report. Further, we have not attempted to put claims or premium amounts "on-level" (i.e. adjusted claims for trends/reforms over time; adjusted premium levels for premium trend and rate changes). Nonetheless, the result suggests significant level of rate deficiency, against a backdrop of a legislative cap on annual rate increases of 5% (which we estimate will not keep up with the proposed claims trends indicated in the OW PPV Report, which we estimate on a weighted basis at over 5%).

Notwithstanding the current 5% cap on annual rate increases, we believe that it is important to begin laying the foundation for a flexible future system, where insurers are able to include their best estimates

of future costs based on their own assumptions, judged by the AIRB on their own merit and the basis of reasonableness giving proper consideration to prediction uncertainty.

Industry Alberta PPV @ Jun 30, 2018 - OW selected indemnity, ALAE, ULAE LRs and implied rate deficiencies on basis of OW selected current benchmarks





Finally, reinsurance costs are a real expense incurred as part of the insurance business model generally, but these expenses are left out of the pricing exercise considered by the AIRB. We believe consideration should be given to their explicit inclusion in the rate review process.

We again note that we believe there is benefit to using additional valuation methodologies rather than reliance on the link ratio method alone (particularly as more recent link ratios by age appear to be diverging from historical levels). That said, one of the benefits of the sole use of the link ratio is that expected emergence is directly a function of selected link ratios. With respect to bodily injury, we note that other than the 2017-H2 accident half, the indemnity & ALAE emerged recorded experience (i.e. payments plus changes in case reserves) during the latest calendar half was broadly "as expected". It therefore was surprising that OW changed the basis they use for selecting link ratios for bodily injury in this iteration, with the result that the selected ratios were lower than they would have been, had the selection basis not changed for the more recent accident halfs. We estimate that the decrease is approximately $112 million (4%) for accident halfs 2016-H1 to 2018-H1 collectively. This has a direct bearing on their trend analysis. Specifically, OW has decided (as per their previous analysis) to select a future loss cost trend for bodily injury that is lower than their past loss cost trend selection (+7.5% vs +8.5%). We believe the basis for their decision would not be supported by their ultimate selections had the link ratio selection bases not been changed.

We recommend that the report be expanded to provide a discussion by OW on the rationale for their change in link ratio basis selection. We also recommend, to aid users of the report, that the link ratio basis selection tables in Appendix A (pages 2 and 4) be updated to highlight cells that differ from the prior report. Finally, we recommend that a formal Actual vs. Expected (AvE) emergence column be added to the exhibit in Appendix D to aid users in assessing changes in ultimate from prior against actual emergence from expected from the last report.

As we indicated in our last submission, the OW report does not contain an assessment of the May 17, 2018 amendments to the Minor Injury Regulations that were aimed at addressing (at least partially) the

increases in bodily injury claims costs. The impact of these amendments is important in the context of predicting future claims costs. We believe users of the report would benefit from having OW at least comment how they took the amendment into account, if at all (and if not, why not). FA has incorporated an explicit adjustment in our trend models for this amendment / clarification and would find it of interest to compare our assessment against a benchmark assessment.

We discuss our views in limited detail over the following pages. Any questions related to this submission may be directed to me either by phone (416-644-4968) or email at sdoherty@facilityassociation.com.

Best regards

Shawn Doherty, FCIA, FCAS
SVP Actuarial & CFO

General Comments

This document represents the Facility Association (FA) written submission to the Alberta Automobile Insurance Rate Board (AIRB) with respect to the Oliver Wyman (OW) report entitled "*Semi-Annual Review of Industry Experience – Preliminary Report as of June 30, 2018 Private Passenger Vehicles*", dated January 28, 2019 ("OW PPV Report"). We appreciate the opportunity to provide feedback.

We would like to comment that we fully support the updated references to "estimated trends" as opposed to "measured trends"[2] as was previous practice. Referencing "estimated trends" more accurately reflects the modeling process undertaken in the analysis, in our view.

Section 5: Selection of Claim Count and Claim Amount Development Factors

Experience during 1st half of 2018

Before considering the OW PPV Report discussion of selected ultimate claim amounts, we first present some summary information related to the calendar half 2018-1. Per the tables below and on the top of the next page, overall paid indemnity & ALAE continues to increase generally over 5% annually, pretty much regardless of the coverage considered.

*Industry Alberta PPV indemnity & ALAE **paid** during the 1st half of calendar years*

ALL COVERAGES COMBINED

All-Industry experience: AB: (All) as at 201806

Cal Yr	1st half of cal year: paid indem & ALAE ($000s)	chg in paid ($000s)	% change
2018	1,167,424	87,357	8.1%
2017	1,080,067	103,968	10.7%
2016	976,099	(6,267)	(0.6%)
2015	982,366	76,582	8.5%
2014	905,784	64,550	7.7%
2013	841,234	129,608	18.2%
2012	711,626	(43,906)	(5.8%)
2011	755,532	70,344	10.3%
2010	685,189	(30,601)	(4.3%)
2009	715,790		
	annualized to 2018:		5.6%
	annualized to 2017:		5.3%

BI, PD, UM

All-Industry experience: AB: BI, PD, UM as at 201806

Cal Yr	1st half of cal year: paid indem & ALAE ($000s)	chg in paid ($000s)	% change
2018	623,864	60,791	10.8%
2017	563,072	46,474	9.0%
2016	516,598	11,595	2.3%
2015	505,004	15,705	3.2%
2014	489,298	63,439	14.9%
2013	425,860	25,662	6.4%
2012	400,197	23,840	6.3%
2011	376,358	(5,949)	(1.6%)
2010	382,307	(710)	(0.2%)
2009	383,016		
	annualized to 2018:		5.6%
	annualized to 2017:		4.9%

[2]We found this change for each coverage in the "Selection of Loss Trend Rates" section, other than for Bodily Injury where the penultimate paragraph on page 17 of the Report still references "measured" rather than "estimated" trends.

*Industry Alberta PPV indemnity & ALAE **paid** during the 1st half of calendar years*

AccBen

All-Industry experience: AB: AccBen as at 201806

Cal Yr	1st half of cal year: paid indem & ALAE ($000s)	chg in paid ($000s)	% change
2018	74,297	8,793	13.4%
2017	65,504	7,847	13.6%
2016	57,657	7,121	14.1%
2015	50,536	2,727	5.7%
2014	47,809	3,911	8.9%
2013	43,898	1,671	4.0%
2012	42,227	276	0.7%
2011	41,951	1,185	2.9%
2010	40,765	2,421	6.3%
2009	38,344		

annualized to 2018: 7.6%
annualized to 2017: 6.9%

CL, CM, SP, AP

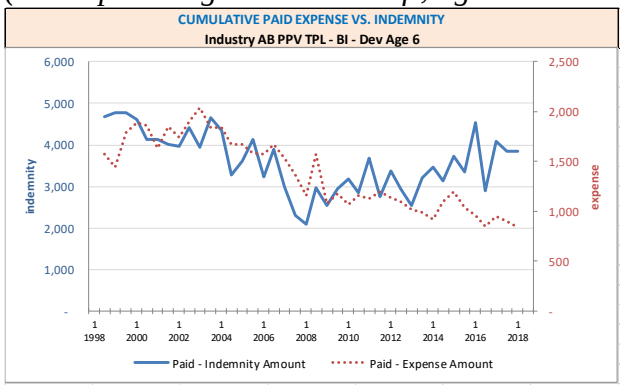
All-Industry experience: AB: CL, CM, SP, AP as at 201806

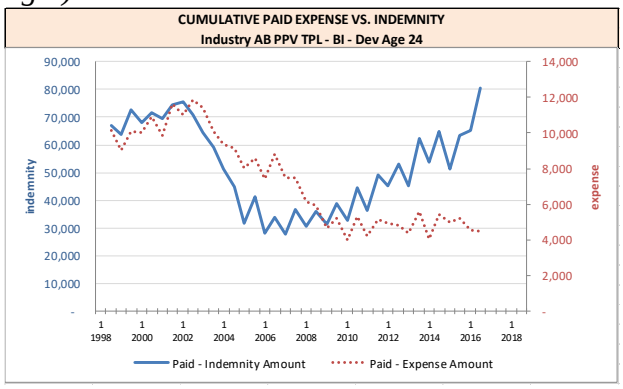
Cal Yr	1st half of cal year: paid indem & ALAE ($000s)	chg in paid ($000s)	% change
2018	469,166	17,659	3.9%
2017	451,507	49,976	12.4%
2016	401,531	(25,087)	(5.9%)
2015	426,617	58,189	15.8%
2014	368,429	(2,955)	(0.8%)
2013	371,384	103,768	38.8%
2012	267,616	(69,181)	(20.5%)
2011	336,797	74,713	28.5%
2010	262,084	(32,301)	(11.0%)
2009	294,385		

annualized to 2018: 5.3%
annualized to 2017: 5.5%

We also note a continuation of the previous pattern we identified and discussed in prior submissions related to the change in relationship between paid indemnity and paid ALAE for bodily injury. Specifically, we have noted that by 24 months, the total dollar amount of paid ALAE has remained steady at around $5 million per accident half, while paid indemnity has increased annually over the same period (close to 8% annually).

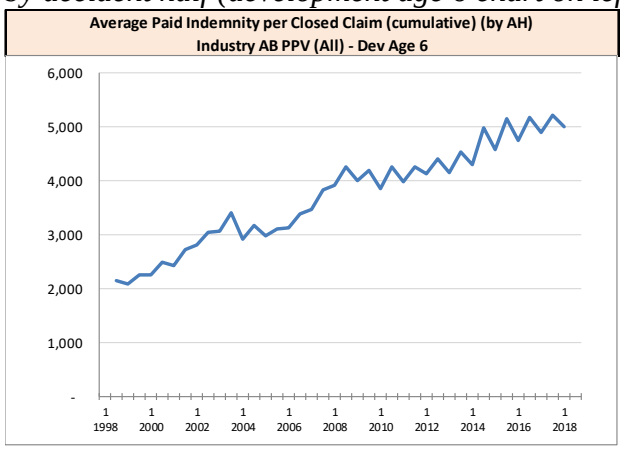
*Industry Alberta PPV **BI** **Paid Indemnity** and **Paid ALAE** at Jun. 30, 2018 by accident half (development age 6 chart on left; age 24 chart on right)*

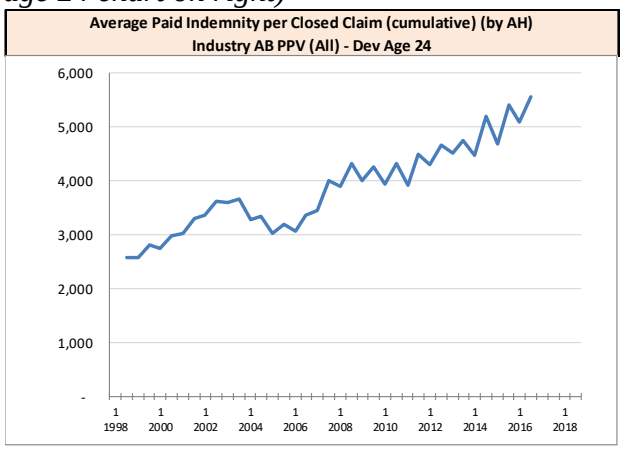




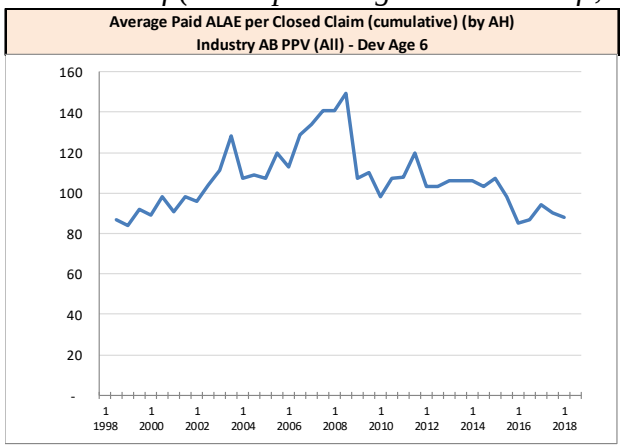
If the above results are normalized by taking averages (i.e. per closed claim count), this would further highlight this divergence, as average paid indemnity has been increasing whereas average ALAE paid has been generally flat since around 2009 (see charts on the next page). Average ALAE paid has decreased for more recent accident halfs, which may signal an actual change, or may reflect a change in claim counts reported as previously discussed.

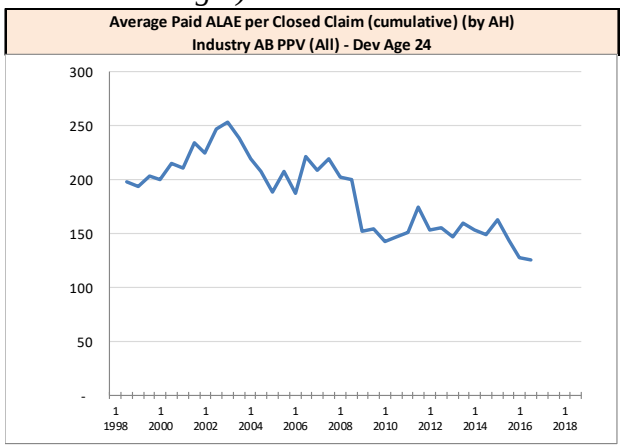
*Industry Alberta PPV **All Coverages** **Average Paid Indemnity Only** per closed claim at Jun. 30, 2018 by accident half (development age 6 chart on left; age 24 chart on right)*





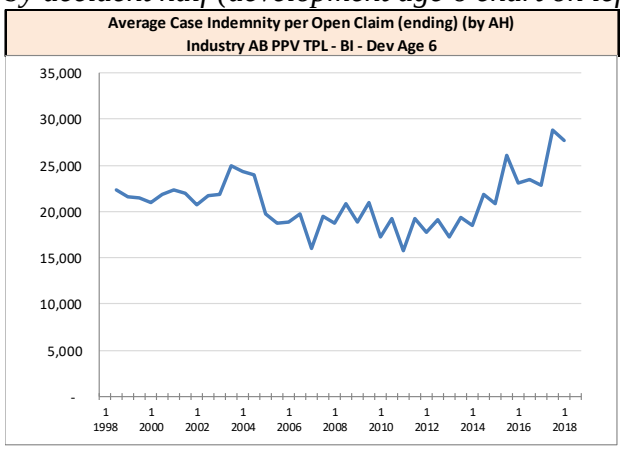
*Industry Alberta PPV **All Coverages** **Average Paid ALAE Only** per closed claim at Jun. 30, 2018 by accident half (development age 6 chart on left; age 24 chart on right)*

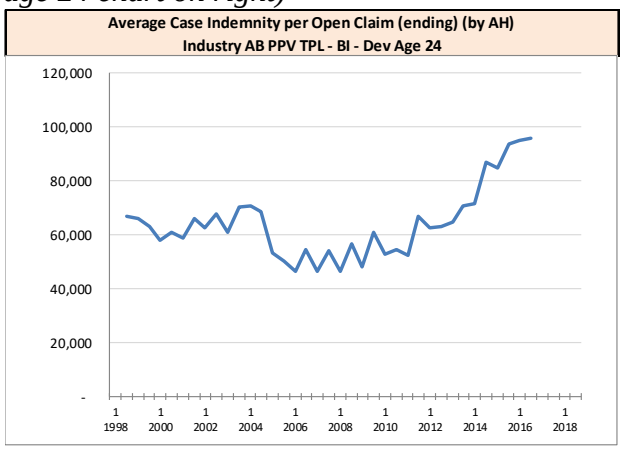




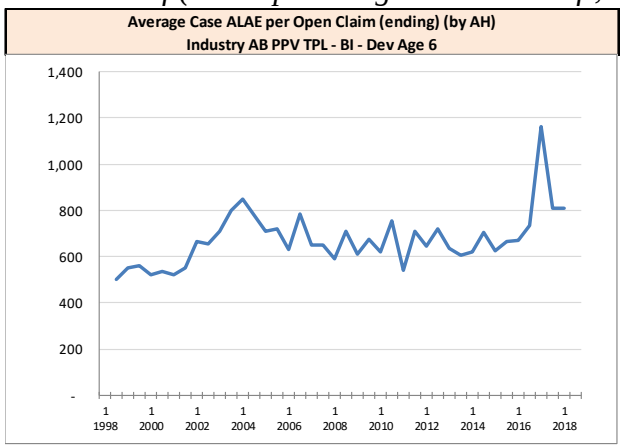
While the above is not "new" information, we have found additional differences in average indemnity and ALAE case reserves. In particular, as shown in the charts on the next page, while average case reserves for indemnity have been increasing from around 2011/2012 at rates which would allow for a catch-up to average paids in terms of overall change since 2011 (we've discussed this in previous submission in relation to whether recorded claims activity was due to case reserve strengthening). What we note in addition with this submission is that, while average paid ALAE has been relatively flat, there appears to be a dramatic increase in average ALAE case reserves (doubling since 2011). This change doesn't impact our trend analyses (as FA trends indemnity only), but these changes may impact OW (as trending indemnity & ALAE & ULAE).

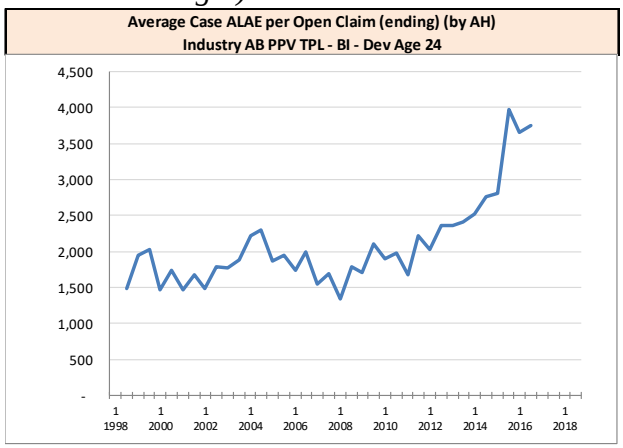
*Industry Alberta PPV **All Coverages** **Average Case Indemnity Only** per open claim at Jun. 30, 2018 by accident half (development age 6 chart on left; age 24 chart on right)*





*Industry Alberta PPV **All Coverages** **Average Case ALAE Only** per open claim at Jun. 30, 2018 by accident half (development age 6 chart on left; age 24 chart on right)*





OW Selections of BI Ultimate Indemnity & ALAE – Changes in Ultimate and Actual vs. Expected

We discuss in the next sub-section the challenges related to reliance only on the link ratio methodology for valuation as OW does for its selections of ultimate. One benefit of reliance on a single valuation methodology is that "expected" levels of future recorded indemnity & ALAE are readily determined. In the table at the top of the next page, we compare the "expected" level of Industry AB PPV BI recorded indemnity & ALAE for the more recent accident years based on the prior OW PPV selections and report with the "actual" emerged experience (see column "due to AvE"). On page 11 of the report, OW states "*We find the emerged loss during the first half of 2018 to be generally consistent with our expectations based on our prior selected loss development factors*." For BI, we would largely agree with this statement, other than for 2017-2 where emerged experience was substantially higher than implied by their factor selection. The table also includes the changes in their selected ultimates per Appendix C (page 1) of their current report (column "ult chg").

*Industry Alberta PPV **BI** **Changes in OW Selected Ultimate** indemnity & ALAE, compared with **"Actual vs Expected" (AvE)** incremental recorded indemnity & ALAE at Jun. 30, 2018 by accident half*

AB PPV BI OW Ult. Indemnity & ALAE ($000s)

Acc Yr	half	ult chg	due to AvE	x AvE
2014	1	1,416	(498)	1,914
2014	2	5,423	2,690	2,733
2015	1	399	(3,315)	3,714
2015	2	1,852	(1,183)	3,035
2016	1	(7,460)	(5,463)	(1,997)
2016	2	(16,961)	(4,126)	(12,835)
2017	1	(9,704)	4,702	(14,406)
2017	2	22,208	24,236	(2,028)
		(2,827)	17,044	(19,871)

As previously stated, the values in the "ult chg" column of the table above are taken directly from the OW PPV Report, Appendix C page 1, column (8) (being the change in their selection of ultimate indemnity & ALAE for BI). For the accident halfs in the table, the overall OW selected ultimates have shown a modest overall decrease of $2.8 million (relative to the $3.2 billion in ultimate selected for those accident halfs with the prior report).

In comparing the first two columns, a general divergence appears between accident halfs 2014-H1 to 2015-H2 and 2016-H1 to 2017-H2.

Specifically, for 2014-H1 to 2015-H2, the "due to AvE" column shows $2.3 million "favourable" change overall, with 3 halfs showing "favourable" and 1 half showing "unfavourable" change. We would suggest this is not an unusual pattern, and, as a result, would generally expect the overall selected ultimates to change in a similar fashion, all else equal. Given the OW finding that "... *emerged loss ... consistent with our expectations*...", one would reasonably expect that changes in ultimate for those accident halfs would be consistent with the comparison of Actual versus Expected ("AvE") emerged experience. However, rather than decreasing (or not changing), the OW ultimate selections for those accident halfs increased by $9.1 million, with an $11.4 million divergence from the AvE result (as indicated in the "x AvE" column in the table). This implies a change in the applicable assumptions used for ages beyond the current age for 2014-H1. We believe additional information on these changes should be provided (particularly where emergence was "as expected").

The opposite happened in relation to the 2016-H1 to 2017-H2 period. Here, AvE indicated an overall unfavourable AvE variance ($19.3 million), but changes in selected ultimates for 3 of 4 accident halfs were favourable, and 1 were unfavourable. Further, the 2017-H2 result could reasonably be attributed to the decision by OW to exclude a data point in their assumption selection process – had they not excluded that data point, the 2017-H2 variance would have been $12 million, not $24 million. We would understand the 2016-H1 reduction in ultimate being in excess of the AvE favourable level – this makes sense in leveraging a "new" reality of recorded activity. However, the 2016-H2 ultimate was reduced by a factor of 4 relative to the AvE difference, the 2017-H1 ultimate is favourable, even as the

AvE was unfavourable, and the 2017-H2 unfavourable ultimate change was less in magnitude than the AvE unfavourable variance. In particular, the AvE would have led us, all else equal, to conclude that the link ratio selection basis employed previously produced reasonable results, but for 2017-H2 (where the decision to exclude a data point we would suggest would need reconsideration). However, it is obvious to us that this was not the same conclusion reached by OW (nor discussed in the report).Again, we believe such a discussion is warranted so that users can understand the OW selection process.

Because of these results, we reviewed in more detail the basis of OW's link ratio selections.

In the Section 5 description provided, it is noted that the OW default selection of link ratios is the weighted average of the last six development factors. We estimate that the default selections for BI would have resulted in higher link ratios for each of these periods. The OW PPV Report does state on page 11 "*Some minor exceptions to our default selections are for smoothing or recognition of a changing pattern over the more recent time periods*." However, there is no explanation provided where exceptions were applied. We believe it would be beneficial for users of the OW PPV Report to understand more clearly the rationale of the prior exceptions and for changing the basis of the exceptions, so that users can properly assess those changes, and the potential impact of those decisions on selections of ultimate, and potentially on trend estimation. That is, what changed from the prior report to this one that has caused what appears to be a significant change in the selections?

The table below compares the selection bases, and the incremental link ratios based on each basis. We highlighted in particular 3 rows in the middle of the table where changes in selection basis would directly have a bearing on the unusual results we found in the changes in the OW selected ultimates and the AvE variances experienced based on the prior OW link ratio selections. (Values in parentheses are the incremental link ratios for the factor considered leveraging the basis indicated.)

*Industry Alberta PPV indemnity & ALAE BI **recorded** link ratios – OW Selection Bases*

factor id	OW default basis	OW 2018-H1 BI basis	OW 2017-H2 BI Basis
6-12	Wght Avg: 6 factors (adjusted for seasonality where appropriate) (1.322 x seasonality; 1.259 w seasonality)	last 4 Semesters ending in 6 (1.272)	last 4 Semesters ending in 12 (excluding 2016.2) (1.236)
12-18	Wght Avg: 6 factors (1.142)	Wght Avg: 10 Semesters (1.118)	Wght Avg: 4 Semester (1.145)
18-24	Wght Avg: 6 factors (1.143)	Wght Avg: 10 Semesters (1.128)	Wght Avg: 4 Semester (1.152)

factor id	OW default basis	OW 2018-H1 BI basis	OW 2017-H2 BI Basis
24-30	Wght Avg: 6 factors (1.136)	Wght Avg: 10 Semesters (1.123)	Wght Avg: 4 Semester (1.143)
30-36	Wght Avg: 6 factors (1.101)	Wght Avg: 4 Semester (1.099)	Wght Avg: 4 Semester (1.101)
36-42 to 138-144	Wght Avg: 6 factors	Wght Avg: 4 Semester	Wght Avg: 4 Semester
138-144 to 210-216	Wght Avg: 6 factors	Wght Avg: 4 Semester	1.000
222-228 and beyond	Wght Avg: 6 factors	1.000	1.000

Source: OW PPV Report, Exhibit A; link ratio estimates based on basis indicated were calculated by FA

We believe it would be of interest to readers to understand the rationale for the departure from the default basis for link ratios for 36-42 and beyond, and why the basis of selection for 12-18 to 24-30 were moved from 4 Semester to 10 Semester weighted averages. We believe it is clear that in general, the new exception basis for the 12-18 to 24-30 factors results in lower selections than under either the previous basis or the default basis. The impact would be a reduction in the estimate of ultimate for each of 2018-H1, 2017-H2, 2017-H1, and 2016-H2. For example, we estimate OW BI ultimate selections are lower on the new selection basis from either the default, the 2017-H2 basis, or the prior selected factors:

- 7% lower for 2018-H1 accident half
- 7% lower for 2017-H2 accident half
- 3% lower for 2017-H1 accident half
- 1% lower for 2016-H2 accident half

As these selections directly affect the estimates of severity and loss costs for BI for these more recent accident halfs, additional information supporting the changes in selection basis would be helpful for users of the report in understanding the rationale for the selections, as well as the potential impact of the decision to change selection bases.

Selection basis for Accident Benefits was also changed for the 12-18 and 18-24 periods and there were other selection basis changes generally across coverages that would benefit from additional discussion in the report as well.

In the next two sets of tables, we have summarized the OW AB PPV BI selections of ultimates for indemnity & ALAE and for claim counts over time, out to age 60 months:

*Industry Alberta PPV indemnity & ALAE and counts - BI OW **Selected Ultimates** through time*

Values	Acc Yr	Acc Half	Acc Period 6	12	18	24	30	36	42	48	54	60
Sum of OW ult indem & ALAE ($000s)	2009	2										277,941
	2010	1									209,426	199,823
		2								303,532	281,994	275,382
	2011	1							240,738	227,078	229,083	226,839
		2						325,783	303,214	301,093	301,567	294,033
	2012	1					307,498	285,852	277,392	271,369	270,326	278,163
		2				362,115	336,292	333,194	331,278	323,377	331,653	336,417
	2013	1			298,967	283,849	283,956	283,289	284,907	298,456	300,325	309,337
		2		389,562	371,661	373,234	375,625	374,615	392,315	397,687	395,971	391,236
	2014	1	328,307	312,588	319,660	316,635	323,033	335,699	337,356	341,915	343,332	
		2	408,504	408,438	417,298	428,968	461,553	464,499	468,901	474,324		
	2015	1	356,951	373,211	370,642	401,426	413,858	422,072	422,471			
		2	446,968	450,101	495,046	513,817	540,159	542,011				
	2016	1	357,696	399,570	445,938	472,029	464,569					
		2	477,223	520,686	593,487	576,526						
	2017	1	447,854	518,411	508,708							
		2	566,635	588,843								
	2018	1	534,103									
Sum of OW ult count	2009	2										6,910
	2010	1									6,037	6,117
		2								7,233	7,329	7,353
	2011	1							6,749	6,862	6,880	6,915
		2						6,723	6,854	6,869	6,892	6,916
	2012	1					6,344	6,493	6,504	6,540	6,566	6,569
		2				7,293	7,484	7,545	7,604	7,626	7,626	7,693
	2013	1			6,284	6,491	6,521	6,604	6,645	6,635	6,706	7,103
		2		7,649	7,805	7,813	7,953	7,989	7,979	8,047	8,537	8,603
	2014	1	6,550	6,744	6,832	6,961	7,062	7,019	7,086	7,465	7,529	
		2	7,905	7,783	7,889	8,053	8,139	8,280	8,724	8,796		
	2015	1	6,975	7,305	7,259	7,321	7,617	7,957	8,029			
		2	7,977	7,845	7,831	8,334	8,635	8,790				
	2016	1	6,589	6,556	7,315	7,483	7,722					
		2	7,383	8,743	8,709	8,987						
	2017	1	7,352	8,041	8,365							
		2	8,191	8,548								
	2018	1	7,997									

The above tables are triangles of the OW selections of ultimates for indemnity & ALAE (upper triangle) and claim counts (lower triangle) based on valuations performed from the June 30, 2014 data set to the June 30, 2018 data set, limited to age 60 months.

The tables at the top of the next page show triangles of the changes in ultimate selection with each valuation, as well as a summary across the "diagonals" and counts of "unfavourable" (i.e. change in ultimate greater than 0) and "no change / favourable" (i.e. change in ultimate less than or equal to 0). These metrics can help assess magnitude of changes as well as suggest areas where "bias" may be present in the resulting selections. We typically assume that changes will be "unfavourable" approximately 1/3 of the time, and we look for $0 change in ultimate selections on average over time as well. In this case, approximately 60% of accident periods were unfavourable for ultimate indemnity & ALAE over the period reviewed (compared with our expected level of 33%), and the total dollar change was $404 million (expected $0). Counts ultimate changes were unfavourable 86% of the time (again, compared with our expected level of 33%) and the total change in count ultimates was 10,800 (expected 0).

These results suggest that either the valuation methodology has trouble predicting results, or the parameters selected for the methodology were in hindsight sub-optimal, or a combination of the two. Given these challenges, we believe it would be advantageous again, for additional information to be

provided in the report around the changes to the link ratio selection basis and how those changes relate to the historical ultimate selection accuracy.

*Industry Alberta PPV indemnity & ALAE and counts - BI OW **Selected Ultimates Chgs** through time*

			Acc Period Age										
Values	Acc Yr	Acc Half	12	18	24	30	36	42	48	54	60	diag sum	
Chg in OW ult indem & ALAE ($000s)	2009	2											
	2010	1									(9,603)	(163,577)	val 2014-1
		2								(21,538)	(6,612)	(9,600)	val 2014-2
	2011	1							(13,660)	2,005	(2,244)	14,110	val 2015-1
		2						(22,569)	(2,121)	474	(7,534)	2,762	val 2015-2
	2012	1					(21,646)	(8,460)	(6,023)	(1,043)	7,837	210,216	val 2016-1
		2				(25,823)	(3,098)	(1,916)	(7,901)	8,276	4,764	137,642	val 2016-2
	2013	1			(15,118)	107	(667)	1,618	13,549	1,869	9,012	220,262	val 2017-1
		2		(17,901)	1,573	2,391	(1,010)	17,700	5,372	(1,716)	(4,735)	(7,560)	val 2017-2
	2014	1	(15,719)	7,072	(3,025)	6,398	12,666	1,657	4,559	1,417			
		2	(66)	8,860	11,670	32,585	2,946	4,402	5,423			chg counts	
	2015	1	16,260	(2,569)	30,784	12,432	8,214	399				>0	43
		2	3,133	44,945	18,771	26,342	1,852					<=0	29
	2016	1	41,874	46,368	26,091	(7,460)							72
		2	43,463	72,801	(16,961)								
	2017	1	70,557	(9,703)									
		2	22,208										
	2018	1											
Chg in OW ult count	2009	2											
	2010	1									80	1,317	val 2014-1
		2								96	24	133	val 2014-2
	2011	1							113	18	35	941	val 2015-1
		2						131	15	23	24	236	val 2015-2
	2012	1					149	11	36	26	3	41	val 2016-1
		2				191	61	59	22	-	67	3,332	val 2016-2
	2013	1			207	30	83	41	(10)	71	397	3,174	val 2017-1
		2		156	8	140	36	(10)	68	490	66	1,627	val 2017-2
	2014	1	194	88	129	101	(43)	67	379	64			
		2	(122)	106	164	86	141	444	72			chg counts	
	2015	1	330	(46)	62	296	340	72				>0	62
		2	(132)	(14)	503	301	155					<=0	10
	2016	1	(33)	759	168	239							72
		2	1,360	(34)	278								
	2017	1	689	324									
		2	357										
	2018	1											

Our estimates suggests that had the previous link ratio selection basis been used for the current analysis, rather than a favourable $7.6 million change in ultimate for accident halfs 2014-H1 through 2017-H2, the result would have been approximately $63 million unfavourable.

We recommend that the tables in Appendix A showing the bases for link ratio selection be updated so that changes in the selections from the prior analysis are highlighted. This will allow users of the report to quickly identify where changes have been made, and can then make an assessment as to whether the change requires further review by them.

We also recommend that the exhibits in Appendix D be expanded to include expected and actual emergence (and the difference, preferably both in amount and percentage) since the last report. This will allow users to assess changes in ultimate selection against variances in actual and expected emergence.

Link Ratio Methodology Challenges

The link ratio methodology is commonly used in Canada for the valuation of claims liabilities (i.e. ultimate estimation). In fact, a 2016 international survey by ASTIN (for "Actuarial Studies in Non-Life Insurance", a section of the International Actuarial Association) found that the link ratio method is used

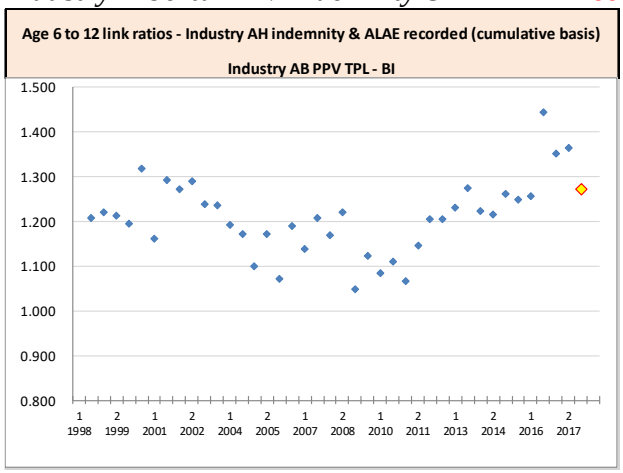
by 79% of Canadian respondents as one of their main methods (Bornhuetter-Ferguson was used as a main method by 88% of Canadian respondents, and 58% of Canadian respondents indicated that they also use a loss ratio method as one of their main methods).

One of the primary assumptions to support the use of the link ratio methodology is that the historical experience is predictive of future experience, and therefore "link ratios" derived from the historical experience can be used to estimate future experience.

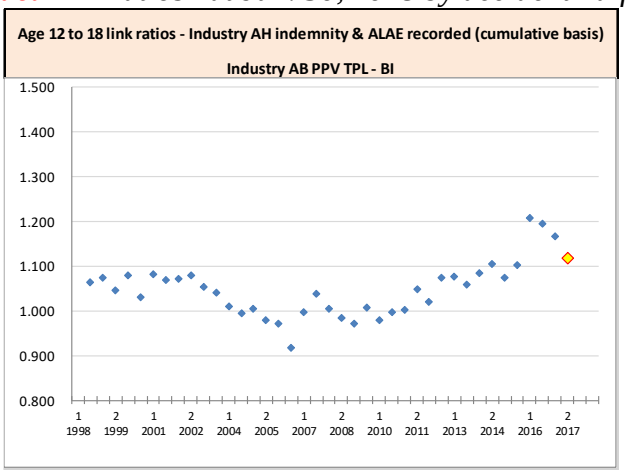
For Alberta Private Passenger experience, historical link ratios have not been particularly stable, making it challenging to estimate ultimates successfully using this methodology, as is discussed in the OW PPV Report. To provide some context, we've included charts at the top of the next page related to industry PPV BI link ratios for the first 4 development periods (for these charts, we've fixed the horizontal axis range at 0.800 to 1.500 to allow easier comparisons) – the link ratio methodology relies on these ratios being randomly spread around an average level, whereas the history shows ratios that seem to exhibit non-random patterns (specifically, there appear to be trends evident in the link ratios over time, rather than random variation around an average level). This suggests that alternative valuation methodologies should be considered to augment the analysis.

We have also included the OW selected link ratios for those first 4 periods (shown in the charts as a yellow marker with a red border – the furthest left on each chart).

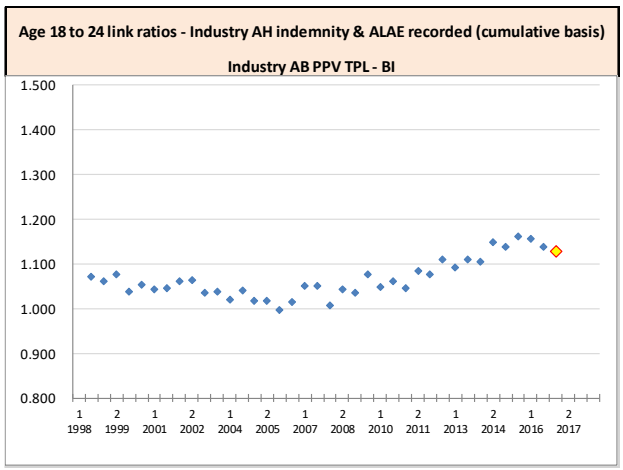
*Industry Alberta PPV indemnity & ALAE BI **recorded** link ratios* at Jun. 30, 2018 by accident half*



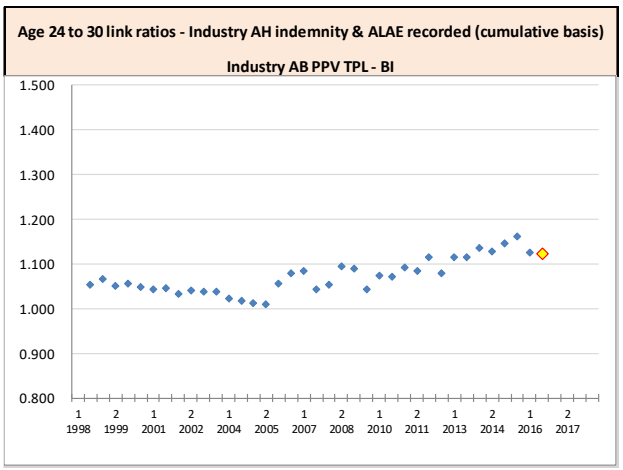
OW selected: **1.272** (2017-2 selected: 1.236)



OW selected: **1.118** (2017-2 selected: 1.145)



OW selected: **1.128** (2017-2 selected: 1.152)



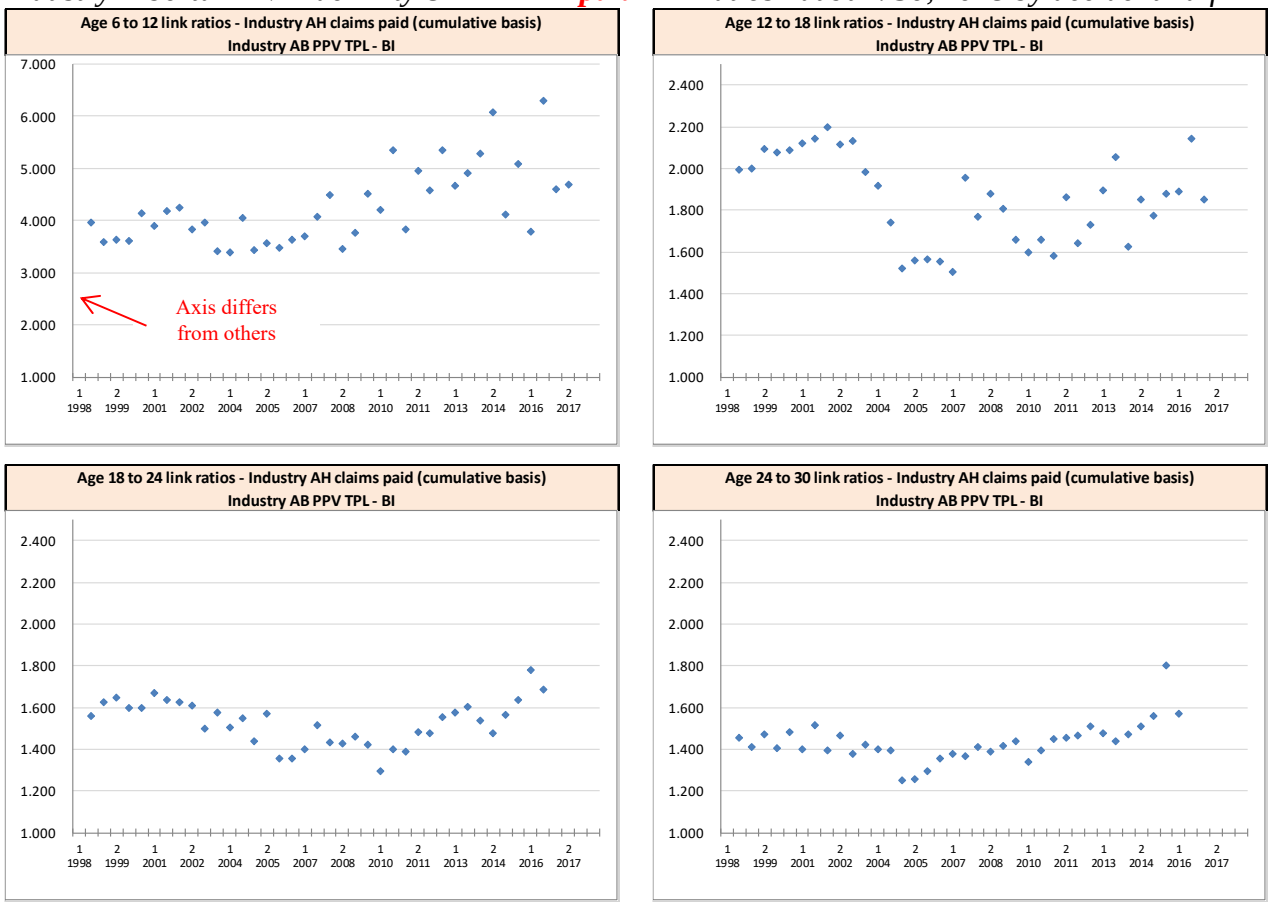
OW selected: **1.123** (2017-2 selected: 1.143)

link ratios are on a "recorded**" or "incurred" basis – i.e. life-to-date paid plus current case*

It is interesting to note that the OW selected link ratios for each of the last 3 development periods above are lower than their previous selection, and are all lower than the latest actual link ratios.

BI Paid link ratios are provided on the next page to highlight that the issue (changing patterns of development) is not simply due to case reserve strengthening. This too, suggests that a link ratio methodology based on paid development would not model the historical experience, and hence is unlikely to accurately predict future experience.

*Industry Alberta PPV indemnity & ALAE BI **paid** link ratios* at Jun. 30, 2018 by accident half*



link ratios are on a life-to-date "paid**" basis*

With respect to other valuation methodologies, the Bornhuetter-Ferguson methodology was considered for bodily injury claims amounts in the OW Preliminary 2016 Annual Review PPV Report, but it was apparently dropped from consideration in the Final 2016 Annual Review PPV Report, although it is not clear why. There is no discussion in the current OW PPV Report specifically related to the shortcomings of reliance on the link ratio methodology when the underlying link ratios themselves are suggesting the fundamental principle upon which the methodology is based is being violated (i.e. that historical development can be used to estimate future development). We believe it would be beneficial to formally acknowledge this in the report and discuss in more detail why other alternative valuation methodologies were not considered (or if they were considered, why they were not used), particularly in light of the results of OW's own investigation into reserving and reporting changes. **We also believe the AIRB would be well served to be provided with a range of ultimate estimates for BI by accident half based on a range of valuation methodologies, particularly those that are specifically geared to situations where historical development patterns are unstable**.

We believe that there is evidence of calendar period (or "settlement period") trends imposing themselves on the results (that is, evidence of inflation on a settlement year basis, where all claims settled one year are inflated relative to similar claims settled in the previous year). The standard link ratio methodology

cannot handle this situation, and its predictive power suffers as a result. Generalized Linear Modeling (GLM) methodologies can test for calendar period trends and incorporate them where appropriate. In its 2015 AR PPV Report, OW discussion of the estimate of ultimate for bodily injury included consideration of a GLM valuation methodology and as suggested in prior responses, we believe there is merit in looking at this family of alternate valuation methodologies. The OW March 31 2017 PPV Report in relation to June 30, 2016 Private Passenger experience stated, in response to our suggestion, "*We considered such an approach in our 2015 AR study, but for practical and other reasons, have not since done so. We may consider doing so again for the 2017 AR.*" We would have been very interested in the result, had OW been able to provide an update.

FA has been investigating the use of a valuation methodology that incorporates calendar period trends (akin to, but not formally a GLM methodology), and, while we have not yet used it for ultimate selection, our review of the Alberta industry PPV data at December 31, 2017 suggested a relatively large statistically significant calendar period trend for at least some coverages. For example, our BI analysis resulted in two final models that we considered. In our selected bodily injury model, the calendar year trend was +6.5% +/-0.4%[3], whereas an alternative model (which we felt was also a strong fit) had a calendar year trend of +8.1% +/- 0.9%. These are very significant calendar year trends, and the standard link ratio methodology does **not** properly account for such trends.

If this methodology does turn out to have a stronger predictive capability than the link ratio methodology generally employed now (by OW as the primary methodology and by FA alongside a B/F methodology), the implication seems to be for a continuation of adverse development for the near future at least. If OW's GLM analysis is identifying a similar trend (assuming OW is continuing to pursue this alternative approach), it may be worthwhile to investigate these results in more detail.

Another general concern we have is that bodily injury relative case reserve adequacy might increase as claims settlements show case inadequacy and with general industry concern with bodily injury trends. To consider this item further, we took several different approaches, including performing regression analysis on accident period age average paid indemnity over time, and accident period age average case indemnity over time (illustrated on the next two pages) and consideration of indexation (illustrated top of page 20). **Note: due to <u>changes in claim counting</u> methodologies as noted in the OW Report[4] averages for paids and case reserves may be impacted in ways that impact "trend" analysis of those averages.**

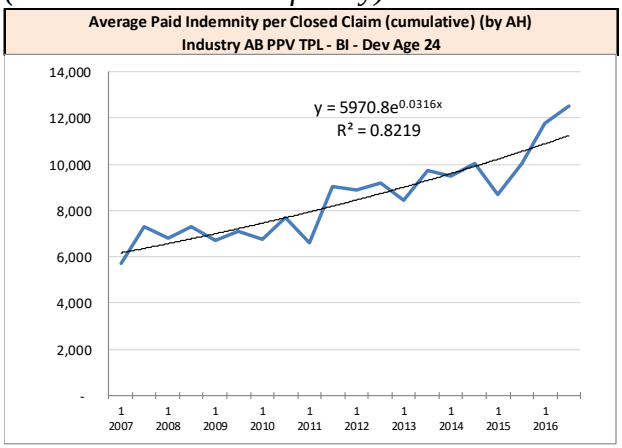
Assuming the impact of company changes in reporting counts as not significant for averages analyses, the regressions generally show both average paid indemnity and average case reserves increasing, but case reserves are now increasing faster after age 6 months than paids. The charts at the top of the next page provide an example (using development age 24 months, and indemnity only), where the annualized

[3]The model was on a half year and log-link basis, resulting in a calendar-half period trend coefficient estimate of +3.0% +/-0.2%, which translates to 6.2% +/-0.4% on an annualized basis. Similarly, the alternative model's calendar-half period trend coefficient of +3.9% +/-0.4%, which translates to +8.1% +/-0.9% on an annualized basis.

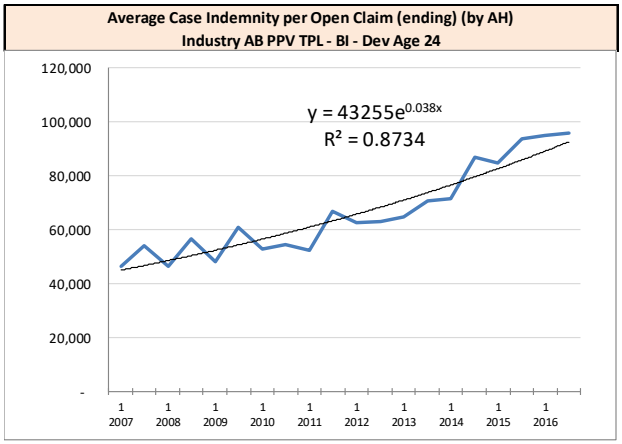
[4]See footnote 19 on page 18 of the report, commenting that GISA describes several claim count reporting issues in its introduction to the exhibit containing the data used in the OW Report analysis.

trend for average paid is 6.5% vs 7.9%[5] for average case reserves, but each of the last 4 accident halfs have average case reserves higher than the regression line.

*Industry Alberta Private Passenger Accident Half indemnity only BI **Average Paid** (left chart) and **Average Case Reserve** (right chart) as at Jun. 30, 2018, at development Age 24 months (latest 20 accident halfs only)*



latest 20 accident halves

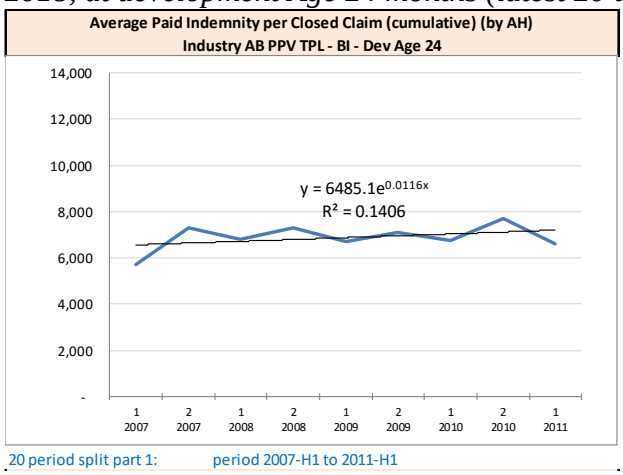


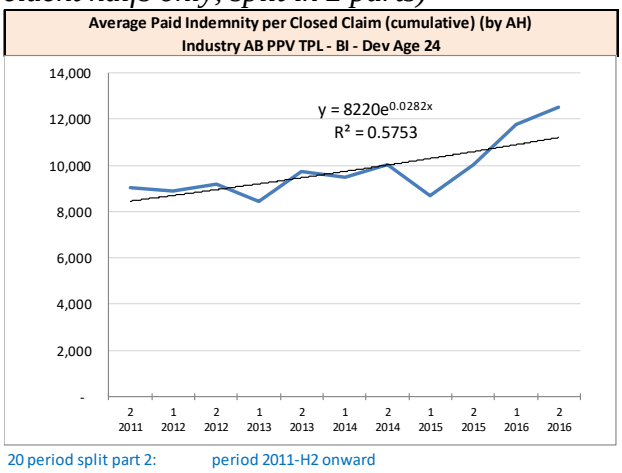
latest 20 accident halves

Both the paid and case averages above seem to suggest a possible change at around 2011-H1 and 2011-H2. If the above 20 accident half periods are split into pre and post 2011-H2, the resulting regressions suggest that the underlying trends have changed for both metrics and there may also be step changes that would apply. We believe these results do not clearly indicate an adverse impact related to "case reserve strengthening".

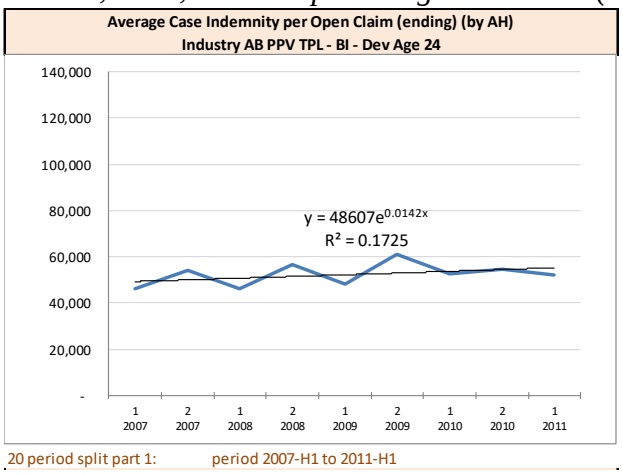
[5]These are crude measures of accident period trends, and compare with the FA indemnity only BI selected model loss cost past trend of +11.7% +/-0.9% standard error, and the OW trend selection of +8.5%; as per OW's practice, a standard error for their trend is not provided. Note that the regression trend estimates based on average paid indemnity and average case reserve at 12 months are not within a standard error of the FA loss cost model selection, indicating trends that are statistically different from the FA selections.

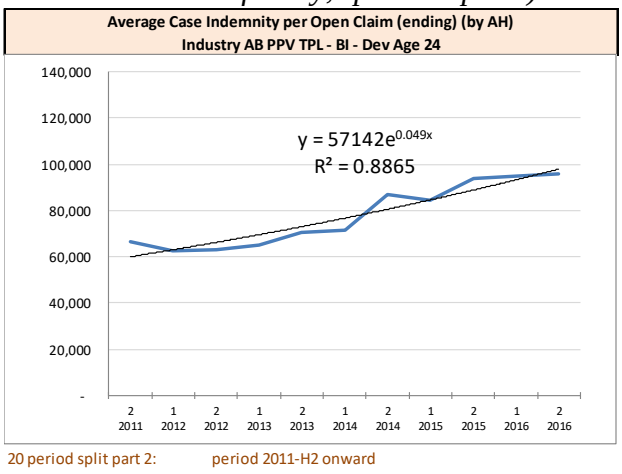
*Industry Alberta Private Passenger Accident Half indemnity only BI Average **Paid** as at Jun. 30, 2018, at development Age 24 months (latest 20 accident halfs only, split in 2 parts)*





*Industry Alberta Private Passenger Accident Half indemnity only BI Average **Case Reserve** as at Jun. 30, 2018, at development Age 24 months (latest 20 accident halfs only, split in 2 parts)*



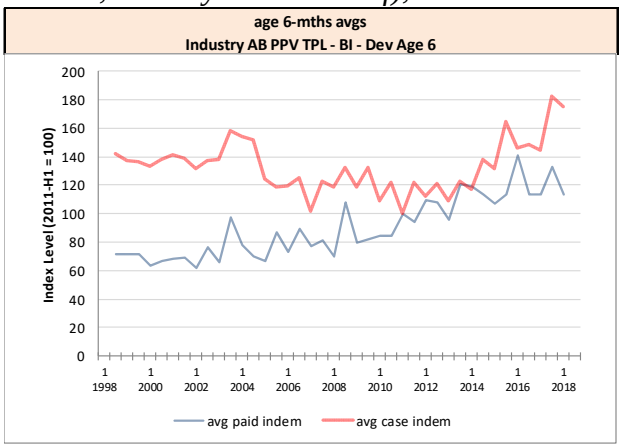


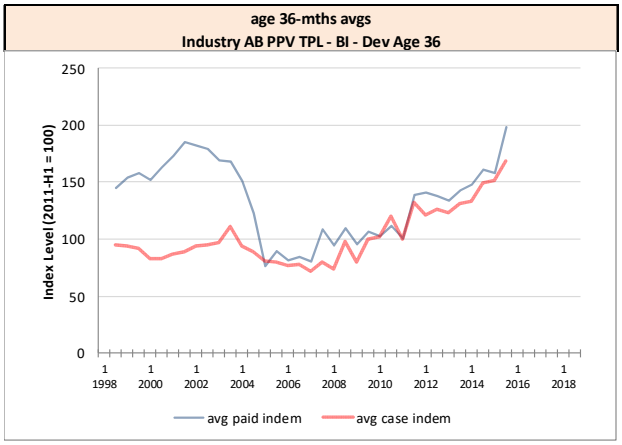
The preceding may indicate that the underlying indemnity payment activity is growing at a consistent pace (around 6% per year) whereas there may have been a change in indemnity reserving practices, the above (age 24 month analysis) suggests this change may have occurred during calendar period 2013-H2 (other development age changes suggest case reserve strengthening may have occurred in any calendar period from 2013-H1 to 2014-H2 inclusive).

The charts at the top of the next page focus on indexed levels. The chart on the left is average paid and average case (indemnity only) as at development **age 6** months, **indexed** to their levels at 2011-H1, which indicate that post 2011-H1, **average case reserves have increased faster than average paids**. However, at **age 36** months (chart on the right), **case reserve growth post 2011-H1 appears to be generally tracking that of average paids**. This may be signaling case reserve strengthening over-and-above the growth in payments. This apparent divergence of average case vs average paid at age 6

months again suggests challenges with leveraging the link ratio methodology, particularly for the earlier ages. (There are valuation methodologies available specifically for these types of situations.)

*Industry Alberta PPV indemnity only BI Average Paid Indemnity vs Average Case Reserve (as at Jun. 30, 2018 by accident half), **indexed** to 2011-H1 level*





Closing remarks with respect to Section 5

We believe the uncertainty in estimating ultimates for Alberta Private Passenger experience (industry and individual filing insurer experience) should be formally acknowledged by the AIRB and taken into consideration in judging the reasonableness of insurer's filing support. Specifically, we believe the AIRB should recognize that a "range of reasonable estimates" is **wide**, given the volatility of reporting patterns, the increases in average paid amounts, the increased catastrophic event activity, and the increase in apparent theft frequency, to name but a few indicators.

We also believe that additional historical data could be provided on changes in ultimate selections over time. As the AIRB's vision is for fair and predictable rates, the accuracy of the predictions used for setting benchmarks should be assessed as part of the annual process. It is relatively easy to provide historical actual vs. predicted levels and we suggest that this be done focused on loss costs, showing variances in both dollar terms and percentage terms and suggest that a "triangle" format might be a strong visualization tool to aid in the assessment. It might also be possible to estimate the variances that can be attributed to process variance (that is, randomness inherent in the underlying process), and parameter variance (that is, due to either having the sub-optimal model, or having the optimal model, but having selected a sub-optimal parameterization of the model).

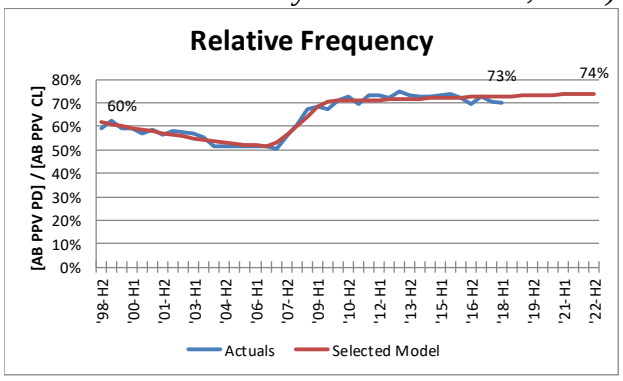
Section 6: Selection of Loss Trend Rates

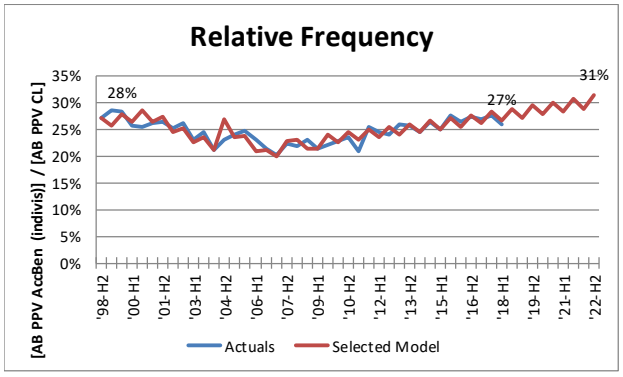
Generally, the PPV Report trends are statistically different from the loss cost trends estimated for indemnity as per FA's own modeling of the Alberta industry private passenger experience as at June 30, 2018. That is, the OW trend rates as selected are generally NOT within 1 standard error of the trend estimates from the FA selected loss cost models. However, they are not consistently higher or lower by coverage (i.e. OW is higher for some coverages, lower for others).

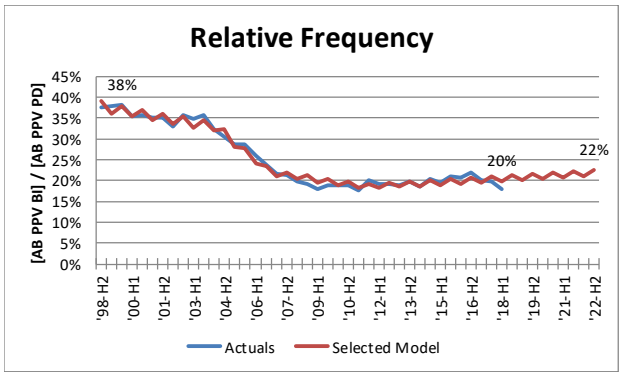
FA approaches its analysis of results differently than OW, although both leverage linear regression models applied to transformed (log) data. FA also considers correlation between and among coverages when selecting period structures, whereas there is little discussion of this in the PPV Report. For example, CL, AccBen, PD, and BI coverages are all generally triggered by automobile collisions, and the primary vehicles on Alberta roads exposed to collisions are private passenger vehicles insured within Alberta (i.e. vehicles considered in the "Alberta Private Passenger" cohort). As such, we expect to see correlation between and among these coverages for claims frequency, and we take this into account in our modeling and in our final model selections. This ensures consistency between and among the coverages, reducing the likelihood of inconsistencies in modeled frequencies.

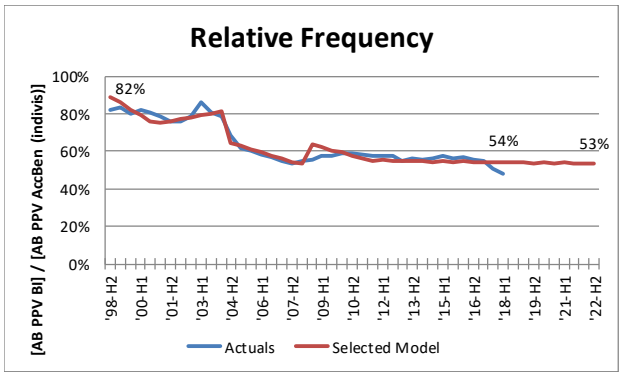
That is not to say that the relationships cannot or do not change over time (it is clear that they do) – we are simply stating that taking this into consideration will likely result in more consistent models. This is shown in the charts below, where we show relative frequencies for various coverages, with the blue lines as actuals, and the red lines based on the FA selected models for each coverage being compared. For example, the upper 2 charts show that the frequency of pd-tort claims may be rising in relation to collisions claims, but that accident benefits claims frequency appears to be rising even more relative to collision claims. The lower 2 charts show that bodily injury frequency appears to be increasing relative to pd-tort frequency, but appears to be decreasing (slightly) relative to accident benefits.

Industry Alberta PPV – ratios of select coverage frequencies (both "actual" and "modeled"; ultimates as selected by FA as at Jun. 30, 2018)



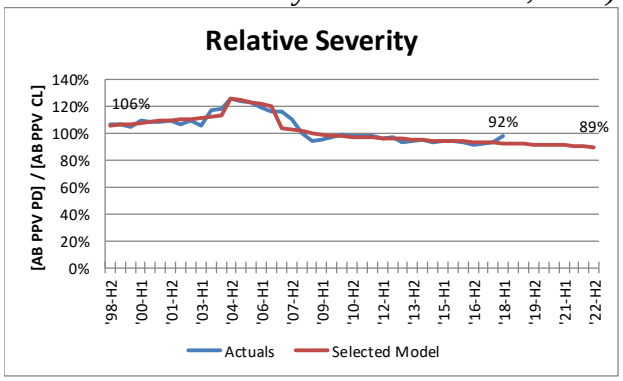


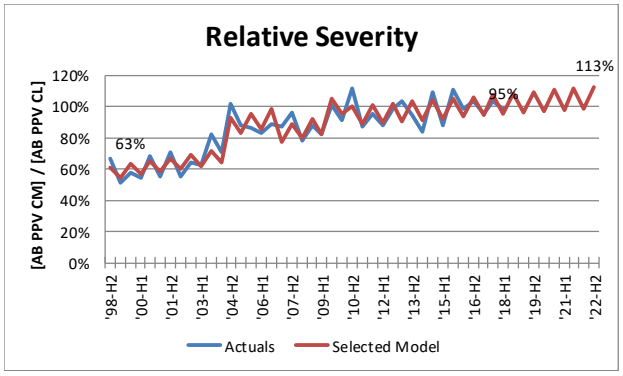




We also show a severity comparison on the next page between collision and pd-tort (left chart), and collision and comprehensive (right chart), as these coverages relate to the cost of vehicles.

Industry Alberta PPV – ratios of select coverage severities (both "actual" and "modeled"; ultimates as selected by FA as at Jun. 30, 2018)





As indicated above, the pd-tort severity appears to be decreasing relative to collision severity, whereas comprehensive severity appears to be rising relative to collision.

Further, larger bodies of claims increase the precision of the models as the samples being used are larger. As such, the coverage that has the most claims annually (collision) will result in generally more precise model coefficient estimates than the other coverages – this can help in determining period structures for other coverages where there is more uncertainly due to randomness / process variance related to lower claims volumes.

OW selected trend coefficients are not necessarily BLUE

As per usual practice, the OW trend estimation process leverages regression analysis. When certain specific assumptions are met, ordinary least squares regression (the type employed by OW) will produce "BLUE" coefficient estimates, that is:

- Best (in the sense that they result in the lowest average squared difference between the actual values and the associated fitted values)
- Linear
- Unbiased (in that the expected value of the coefficient estimate is equal to the underlying, unknown parameter it represents)
- Estimates

In general, the OW selected trend coefficients are not taken directly from a single selected regression model, but rather after consideration of coefficient estimates from a variety of models, where model design differences are largely based on reducing the period length (without then including the "dropped" periods explicitly as part of an implied "earlier" period). As a result, the OW selection process, while *based* on ordinary least squares, is ultimately *not strictly* ordinary least squares, and may not result in a "best" or "unbiased" estimator of the underlying (and unknown and unknowable) population trend rate.

We believe a better approach would be for OW to select a period structure that they believe best describes the historical results, then accept (i.e. "select") the coefficient estimates from that model.

Further, while we have no issue with applying different model structures to the data, we believe it would be better to model a consistent set of data, rather than modeling subsets of data and attempting to compare model results of the data subsets. In general, using regression, directly comparing fit measures of models of different subsets from a data set, requires careful interpretation, as the fits are in relation to different data sets; and differing fits are not necessarily comparable under these circumstances.

As an example, the periods are not necessarily considered in a consistent fashion, as indicated in the table below (summarizing the various "starting periods" considered by OW by coverage and metric), and these periods may have changed from their previous analysis.

OW Industry Alberta PPV Report Period Starts

Coverage	Severity	Frequency	Loss Cost
BI	2005-1	2005-1	2011-2
PD	2008-2	2012-2	
AccBen	2007-2	2008-1	
UM			1998-1
CL	2009-1	2010-1	
CM			2002-1? (not clear)
SP	1998-2	1998-2	
AP			1998-2

Specifically, where both frequency and severity are modeled by OW, only two modeled coverages had a consistent data start point (BI and SP). We believe a better approach would have been to always include the data 1998-H2 through 2018-H1, and create competing alternative models based on various period structures. Where differing period starts are used, we would expect there to be some sort of explanation on why (that is, what drives their decisions on period breaks?). Further, if the goal is to identify possible changes in trend rates over the 20-year period under consideration, a better approach, in our opinion, is to always start at 1998-H2, then formally test different periods. An example is shown at the top of the next page where we model the OW selected ultimates for Industry Alberta PPV Bodily Injury (BI) at June 30, 2018 using a single period model approach (left) but where the earlier "period" simply reflects data exclusions (to model the latter period only, per the OW standard approach) and a multiple period model (right), where the multiple periods were identified based on the residuals from the single period model. As the left model does **not** use the entire 40 data points, fit metrics are **not** directly comparable. If, instead, all models developed included all data points, then fit metrics would be directly comparable, helping to compare models.

Competing BI Loss Cost Models using OW selections of Ultimate for Alberta PPV Jun. 30, 2018

OW Single Period Approach Model

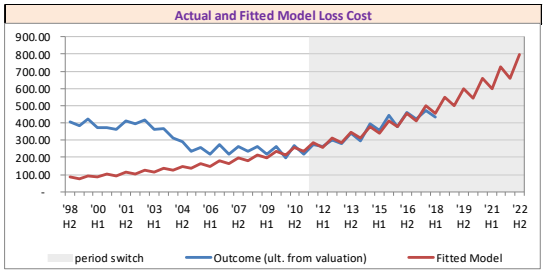
FITTED TREND STRUCTURE REGRESSION STATISTICS

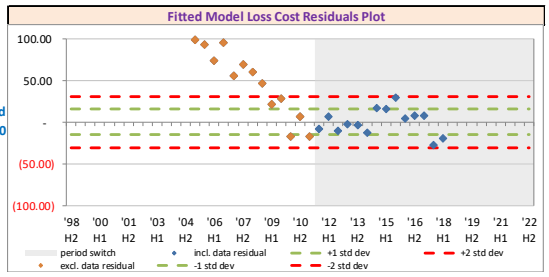
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9821	0.9645	0.9580	0.0418	14	26	3

Runs-Test Result: 4.0780 RESIDUALS RUNS NOT RANDOM ; residuals normal

parameters with p-value >5%: 0 (intercept specifically not included)

	Coefficients	S.E.	t-Stat	p-value	95% C.I. Lower	95% C.I. Upper	Selected Coeff.
	1	2					
Intercept	(182.606)	11.249	(16.233)	0.0%	(207.365)	(157.847)	(182.606)
Season	0.142	0.023	6.293	0.0%	0.092	0.191	0.142
All Years	0.094	0.006	16.752	0.0%	0.081	0.106	0.094
Scalar 1	-	-	-	n/a	-	-	-
Trend 1	-	-	-	n/a	-	-	-
Scalar 2	-	-	-	n/a	-	-	-
Trend 2	-	-	-	n/a	-	-	-
Scalar 3	-	-	-	n/a	-	-	-
Trend 3	-	-	-	n/a	-	-	-
Scalar 4	-	-	-	n/a	-	-	-
Trend 4	-	-	-	n/a	-	-	-





Multiple Period Model

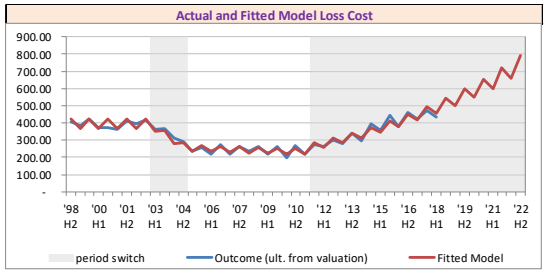
FITTED TREND STRUCTURE REGRESSION STATISTICS

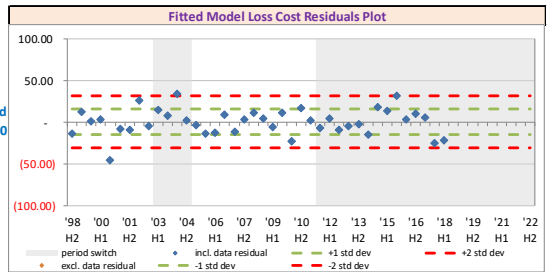
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9814	0.9631	0.9577	0.0510	40	-	6

Runs-Test Result: 0.4320 RESIDUALS RUNS RANDOM ; residuals normal

parameters with p-value >5%: 0 (intercept specifically not included)

	Coefficients	S.E.	t-Stat	p-value	95% C.I. Lower	95% C.I. Upper	Selected Coeff.
	1	2					
Intercept	5.910	0.018	327.173	0.0%	5.873	5.947	5.910
Season	0.132	0.016	8.160	0.0%	0.099	0.165	0.132
All Years	-	-	-	n/a	-	-	-
Scalar 1	-	-	-	n/a	-	-	-
Trend 1	(0.219)	0.015	(14.515)	0.0%	(0.249)	(0.188)	(0.219)
Scalar 2	-	-	-	n/a	-	-	-
Trend 2	0.204	0.020	10.013	0.0%	0.163	0.245	0.204
Scalar 3	0.115	0.039	2.969	0.5%	0.036	0.194	0.115
Trend 3	0.108	0.010	11.342	0.0%	0.089	0.127	0.108
Scalar 4	-	-	-	n/a	-	-	-
Trend 4	-	-	-	n/a	-	-	-





Another benefit of this approach is that forecasts[6] can be directly provided as output from the model, which we believe would be of direct benefit to the AIRB in its semi-annual and annual review processes, as frequency, severity, and resulting loss cost estimates by future accident halfs would be directly provided (and prediction intervals could be provided as well). Further, these forecasts could then be used by OW as part of their next review, in developing "a priori" count and claim levels for inclusion in loss ratio and Bornhuetter-Ferguson valuation methodologies.

In the OW bodily injury section, they described their rationale for selecting a lower future loss cost trend rate (+7.5%) than their selected past trend rate (+8.5%) as being in part due to finding "... *some evidence of moderation to the steep increases in loss costs...*". We would agree that the loss cost model on the

[6]Where model results are determined using variable values that are "within" the scope of the model itself, they are generally referred to as "predicted" values. When variable values reflect "future" values (and necessarily outside of the scope of the model), they are generally referred to as "forecasted" values. These two terms could be used interchangeably.

right at the top of the previous page suggests a change occurred at around 2014-H2 (the residual plot at the bottom indicates a potential "downward" trend in the residuals, indicating a sub-optimal model). We have set out an alternative model below on the left. This model does result in a "past" trend estimate of +8.5% (up to 2014-H1) and a "future" trend estimate of +6.4% (for 2014-H2 and beyond). However, the trend estimate for the latter period is not statistically significant (i.e. the p-value of the estimate is greater than 5%) – and therefore, we've removed it from the model on the right. This model suggests that, rather than a change in trend, loss costs have experience a 12.7% (annualized) one-time increase at 2014-H2, but the underlying trend both before and after 2014-H2 is +7.0%[7] +/-1.2%.

Competing BI Loss Cost Models using OW selections of Ultimate for Alberta PPV Jun. 30, 2018, with "new" period at 2014-H2

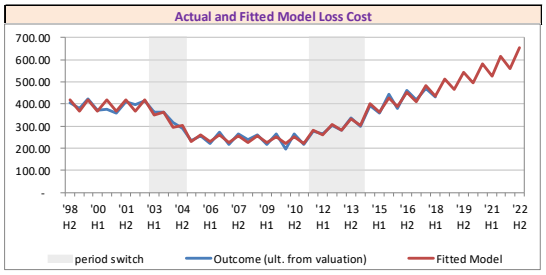
Multiple Period Model with no p-value adj.

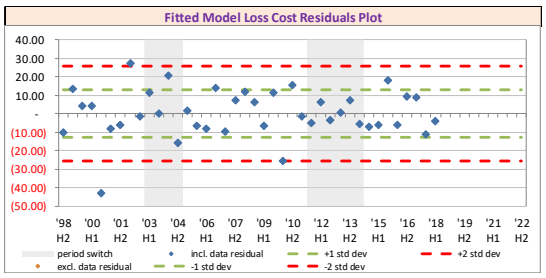
FITTED TREND STRUCTURE REGRESSION STATISTICS						
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9862	0.9727	0.9656	0.0460	40	-	9

Runs-Test Result: 1.4796 RESIDUALS RUNS RANDOM ; resids NOT normal

parameters with p-value >5%: 1 (intercept specifically not included)

	Coefficients	S.E.	t-Stat	p-value	C.I. 95% Lower	C.I. 95% Upper	Selected Coeff.
	1	2					
Intercept	5.909	0.016	359.811	0.0%	5.875	5.942	5.909
Season	0.126	0.015	8.540	0.0%	0.096	0.156	0.126
All Years	-	-	-	n/a	-	-	-
Scalar 1	-	-	-	n/a	-	-	-
Trend 1	(0.181)	0.023	(7.862)	0.0%	(0.228)	(0.134)	(0.181)
Scalar 2	(0.100)	0.048	(2.063)	4.8%	(0.198)	(0.001)	(0.100)
Trend 2	0.172	0.024	7.182	0.0%	0.123	0.221	0.172
Scalar 3	0.101	0.046	2.197	3.6%	0.007	0.195	0.101
Trend 3	0.090	0.023	3.896	0.0%	0.043	0.137	0.090
Scalar 4	0.111	0.051	2.191	3.6%	0.008	0.214	0.111
Trend 4	(0.020)	0.026	(0.760)	45.3%	(0.073)	0.034	(0.020)





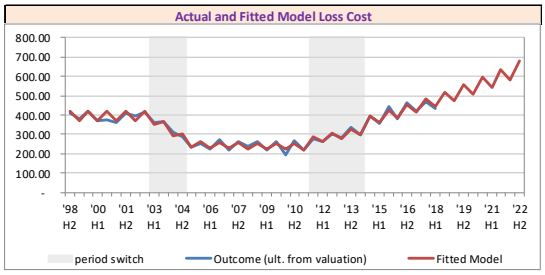
Multiple Period Model with p-value adj.

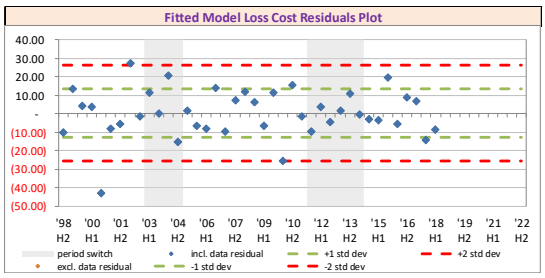
FITTED TREND STRUCTURE REGRESSION STATISTICS						
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9860	0.9721	0.9661	0.0457	40	-	8

Runs-Test Result: 1.4796 RESIDUALS RUNS RANDOM ; residuals normal

parameters with p-value >5%: 0 (intercept specifically not included)

	Coefficients	S.E.	t-Stat	p-value	C.I. 95% Lower	C.I. 95% Upper	Selected Coeff.
	1	2					
Intercept	5.909	0.016	362.300	0.0%	5.876	5.942	5.909
Season	0.126	0.015	8.572	0.0%	0.096	0.155	0.126
All Years	-	-	-	n/a	-	-	-
Scalar 1	-	-	-	n/a	-	-	-
Trend 1	(0.181)	0.023	(7.913)	0.0%	(0.227)	(0.134)	(0.181)
Scalar 2	(0.100)	0.048	(2.079)	4.6%	(0.198)	(0.002)	(0.100)
Trend 2	0.172	0.024	7.228	0.0%	0.124	0.221	0.172
Scalar 3	0.122	0.036	3.364	0.2%	0.048	0.196	0.122
Trend 3	0.076	0.014	5.536	0.0%	0.048	0.104	0.076
Scalar 4	0.120	0.049	2.474	1.9%	0.021	0.219	0.120
Trend 4	-	-	-	n/a	-	-	-





[7]Due to the construction of the model, the +7.0% annualized trend is the result of the sum of the "trend" coefficients (-18.1% + 17.2% +7.6% or +6.7%, annualized to +7.0%). This estimate and its standard error are not shown directly in the tables provided here.

The above uses the OW selections of ultimate. However, using an alternative selection of ultimate, based on link ratio selections for more recent ages in a consistent manner with the selection bases used for the prior report (see model output below on the left), we find that the 2014-H2 period is no longer statistically significant (p-values for the coefficient estimates are greater than 5%) and so can be removed from the model, as we have in the model on the right.

Competing BI Loss Cost Models using alternative OW selections of Ultimate for Alberta PPV Jun. 30, 2018, where link ratios are selected consistent with the prior basis

Multiple Period Model with no p-value adj.

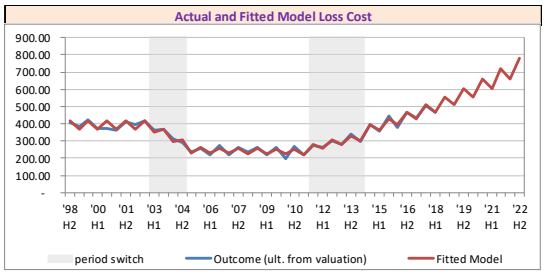
FITTED TREND STRUCTURE REGRESSION STATISTICS

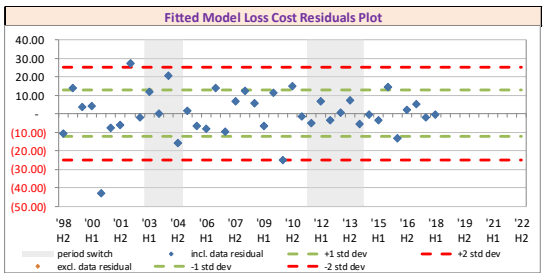
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9873	0.9748	0.9682	0.0455	40	-	9

Runs-Test Result: 2.1593 RESIDUALS RUNS NOT RANDOM; resids NOT normal

parameters with p-value >5%: 2 (intercept specifically not included)

	Coefficients	S.E.	t-Stat	p-value	C.I. 95% Lower	C.I. 95% Upper	Selected Coeff.
	1	2					
Intercept	5.908	0.016	363.577	0.0%	5.875	5.941	5.908
Season	0.128	0.015	8.738	0.0%	0.098	0.157	0.128
All Years	-	-	-	n/a	-	-	-
Scalar 1	-	-	-	n/a	-	-	-
Trend 1	(0.181)	0.023	(7.951)	0.0%	(0.227)	(0.134)	(0.181)
Scalar 2	(0.099)	0.048	(2.077)	4.6%	(0.197)	(0.002)	(0.099)
Trend 2	0.172	0.024	7.264	0.0%	0.124	0.221	0.172
Scalar 3	0.101	0.045	2.215	3.4%	0.008	0.194	0.101
Trend 3	0.090	0.023	3.939	0.0%	0.044	0.137	0.090
Scalar 4	0.087	0.050	1.740	9.2%	(0.015)	0.189	0.087
Trend 4	0.004	0.026	0.166	87.0%	(0.049)	0.057	0.004





Multiple Period Model with p-value adj.

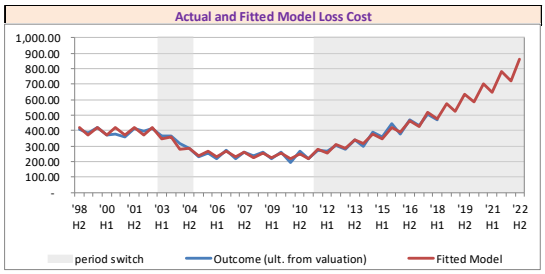
FITTED TREND STRUCTURE REGRESSION STATISTICS

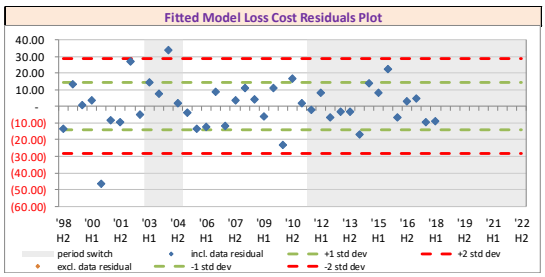
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9843	0.9688	0.9642	0.0483	40	-	6

Runs-Test Result: 0.1813 RESIDUALS RUNS RANDOM ; residuals normal

parameters with p-value >5%: 0 (intercept specifically not included)

	Coefficients	S.E.	t-Stat	p-value	C.I. 95% Lower	C.I. 95% Upper	Selected Coeff.
	1	2					
Intercept	5.910	0.017	345.126	0.0%	5.875	5.945	5.910
Season	0.133	0.015	8.662	0.0%	0.102	0.164	0.133
All Years	-	-	-	n/a	-	-	-
Scalar 1	-	-	-	n/a	-	-	-
Trend 1	(0.219)	0.014	(15.312)	0.0%	(0.248)	(0.190)	(0.219)
Scalar 2	-	-	-	n/a	-	-	-
Trend 2	0.204	0.019	10.564	0.0%	0.165	0.243	0.204
Scalar 3	0.095	0.037	2.590	1.4%	0.020	0.170	0.095
Trend 3	0.118	0.009	13.034	0.0%	0.099	0.136	0.118
Scalar 4	-	-	-	n/a	-	-	-
Trend 4	-	-	-	n/a	-	-	-





In the model above to the right, the past trend estimate is +10.8% +/-0.6%, indicating statistically significant differences from both the past and future loss cost trends selected by OW.

There are many possible models for frequency, severity, and loss costs for each coverage that are valid and reasonable, and the ultimate selection of models by insurers in developing their rates is a matter of judgment and interpretation that can differ among actuaries even when modeling the same data. (For example, the examples provided indicate trends in excess of 10% annually, being higher than

recommended in the OW PPV Report). We put forward that differences like this in general should be viewed as both "okay" and healthy in a competitive environment.

Specifically, we feel it is important for the Board to consider that valid differences in actuarial judgment and opinion can lead to differing selections of ultimates, and differing "trend" results, as differing models can fit actual results equally well even to the same data, and yet, due to their structure (i.e. the selected parameters included in each), result in divergent forecasts.

We also believe the Board should allow the filing insurer to "bet their prices and market share" on their views of ultimates and their selections of models describing frequency/severity/loss costs over time and as projected into the future. The rate review process should focus on whether the filing insurer's process to arrive at their forecast was reasonable (and consistent with the insurer's previous views / process / approach unless an explanation is provided as to what has changed and why). If so satisfied, we believe the Board should accept the filing insurer's view, even if it differs from the view of the Board's actuary. Forcing all participants in the insurance market place to adopt a single view introduces systemic risk and potentially detracts from the competitive marketplace should certain participants reduce their risk appetite where they don't agree with the imposed view.

Section 7: Loss Adjustment Expenses

We are happy to see that the ULAE factors provided in Appendix B reflect the full period of the review data; however, we note that the complete list of factors is not included Section 7 (Loss Adjustment Expenses) as the two tables provided on page 31 refer only to 2002 and later, missing the factors for 1998 through to 2001. For completeness, we suggest the additional factors be added to the tables.

We believe the Reports should be augmented to make it clear that the ULAE factors are, in fact, calendar year factors that are being applied to accident half data, and this may result in misalignment of the two, increasing the level of uncertainty in the industry trend estimation process.

We assume that companies file their internally-consistent ULAE levels and these are judged on their internal merit.

Section 8: Catastrophe Provision

We look forward to the update. We suggest this section would benefit by being augmented by a discussion of reinsurance (the benefits in terms of stabilizing results over time, but at a cost in terms of expense).

We assume that companies file their own estimates for catastrophic provisions, and the AIRB takes their assumptions into consideration.

Section 9: Investment Income on Cash Flow

We believe discounting policyholder provided cash flows on a risk-free yield basis is appropriate. However, we believe this section should be augmented with a historical variance discussion. That is, it should explicitly reference historical predictions from prior Reports for the Government of Canada 3-month and 3-year bond yields and the actual yields over matching periods. For example, the 2017 Annual PPV Report was meant to reflect benchmarks for use in rate filings submitted between Oct 1

2017 and Mar 31, 2018. If one assumes 90 days for a decision and another 90 days for implementation, this would suggest that the selected benchmarks should be compared with actual yields over the period Apr 1, 2018 to Sep 30, 2018, at least some of which are now available for comparison (we suggest going back several years for the comparison).

The level of discount rate is an important consideration – for the current benchmark assumption set, it appears to account for all of the "7% return on premium". If the benchmark selection turns out to be "high" in retrospect, the associated target loss ratios are set too high and will prevent insurers from generating a proper return on policyholder cash flows.

We believe the AIRB should consider alternative discount rates and approaches to yield curve determinations (the OW approach is very specific, an assumption related to duration and the forecasted yield curve, and considers only 2 points on the yield curve).

Section 10: Health Cost Recovery

We believe this section could be improved by providing a bit more context on the nature of the "factor" that is referenced in the section (we understand that it is meant to apply only to TPL, but it would be advantageous to have that clearly laid out in the text).

Similar to our comment related to the discount rate / investment return assumption, we believe a historical variance analysis should be included in this section. This would provide proper context for the historical accuracy of the benchmarks in relation to actual costs incurred by the industry.

Section 11: Operating Expenses

The one primary operating expense that is not included is for reinsurance. While we understand the historical context for rates being established on a "direct" basis, it does not reflect the underlying economic reality of insurance. Reinsurance imposes a real cost (for a tangible benefit in the form of reduced volatility in performance and balance sheet protection), much like insurance does for businesses and consumers. To ignore the cost (and it is a cost) as part of an insurer's expense structure leaves out a potentially important component of their cost structure.

Section 12: Profit

Alternative profit metrics (for example, return on equity) may better reflect the risk-reward aspect of insurance, and may be a preferable profit metric than the return on premium (revenue) currently used. We also recommend that rather than a hard and set level (7%), companies be allowed to submit, with support, alternative levels that they believe are appropriate and reflect their individual circumstances.