

July 24, 2018

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

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

RE: FA Written Submission in regard to the AIRB Draft Reviews of 2017-H2 Industry PPV and CV Experience

Dear Ms. Butler,

Facility Association has reviewed the draft Oliver Wyman (“OW”) reports entitled “*Annual Review of Industry Experience – Preliminary Report as of December 31, 2017 Private Passenger Vehicles*” and “*Annual Review of Industry Experience – Preliminary Report as of December 31, 2017 Commercial Vehicles*”, both dated June 22, 2018.

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<sup>1</sup>. 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 predictive rates.

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 reports. 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 specific targets, caps, or floors with respect to any one particular assumption. This provides an opportunity for insurers to reflect their own assessment of future costs in providing their product / service to the consumer, and set their rates with this and their view of 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 both parties. In

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<sup>1</sup>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 2016 data found in GISA industry data. Further, 75% purchased protection for their vehicle against collision/upset, and 90% 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.

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.

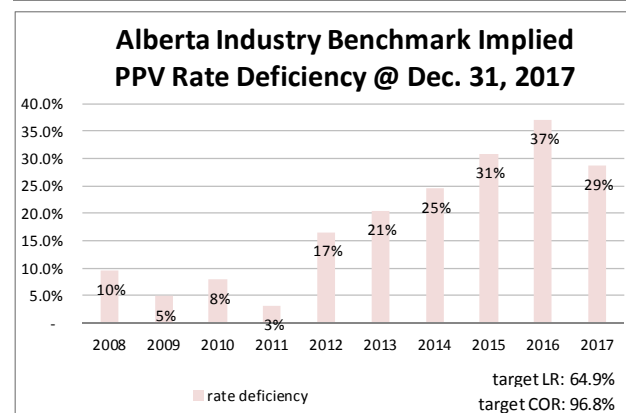
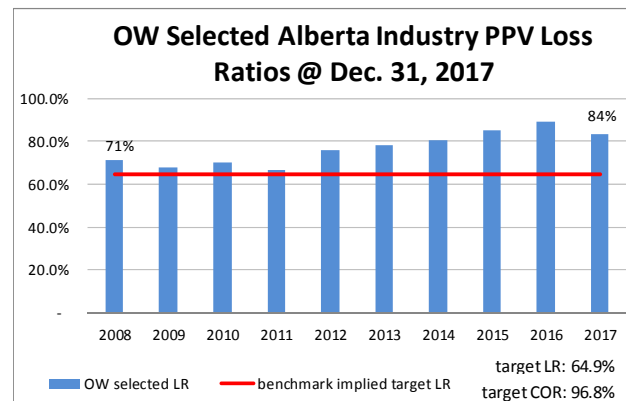
Areas of uncertainty where we believe the AIRB should exercise flexibility in companies selecting assumptions supporting their applications include:

- 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 65%, a level that the OW estimates of ultimate suggest has not been reached in the last 10 accident years (see chart to right). In fact, the individual accident year rate deficiencies relative to this target level (based on the proposed benchmark assumptions) range from 3% (2011) to 37% (2016) as indicated in the chart to the bottom-right, with an average rate deficiency of 20%. This is a significant level of rate deficiency, against a backdrop of a legislative cap on annual rate increases of 5% (which we estimate will just keep up with the proposed claims trends indicated in the OW PPV Report).

Notwithstanding the current 5% cap on annual rate increases and the recent Superintendent’s bulletin 06-2018 for Request for Proposals related to a study of underlying claims costs, 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.

On a more specific note, one element that is missing from the OW reports is 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 don't believe the amendments are sufficient to eliminate the need for industry overall increases in excess of 5% for private passenger, but we hope that they may curtail the unsustainable (from a consumer-paying standpoint) rate of annual increase in bodily injury loss costs.

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 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](mailto: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) reports entitled “*Annual Review of Industry Experience – Preliminary Report as of December 31, 2017 Private Passenger Vehicles*” and “*Annual Review of Industry Experience – Preliminary Report as of December 31, 2017 Commercial Vehicles*”, both dated June 22, 2018. We appreciate the opportunity to provide feedback.

We would like to comment that we find the updated chart formats used in Section 6 of the reports an improvement, adding clarity to the visualization of the results. We were also happy to see the inclusion of the full 40 accident half years of results, rather than the previous approach of including only the most recent 30 accident halves. We believe, particularly for trend analyses, the inclusion of a longer (in terms of time) data set provides better context for changes over time.

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

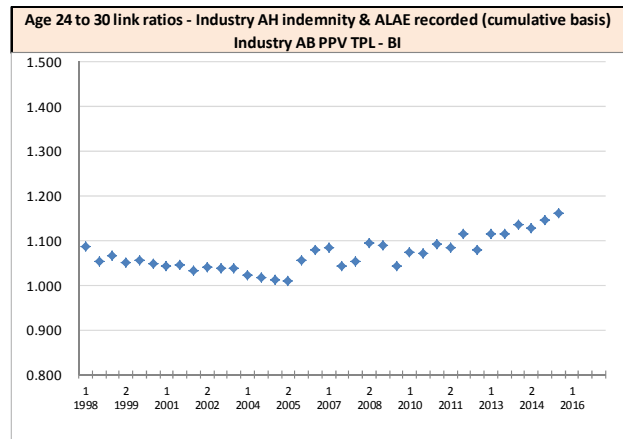
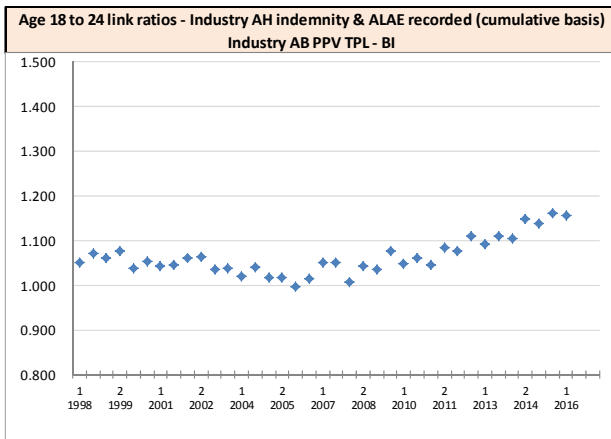
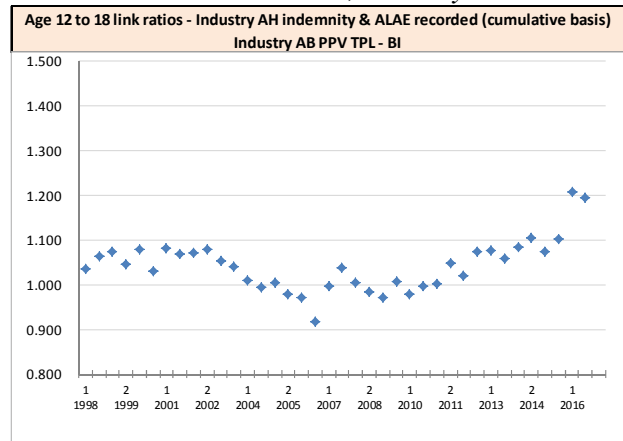
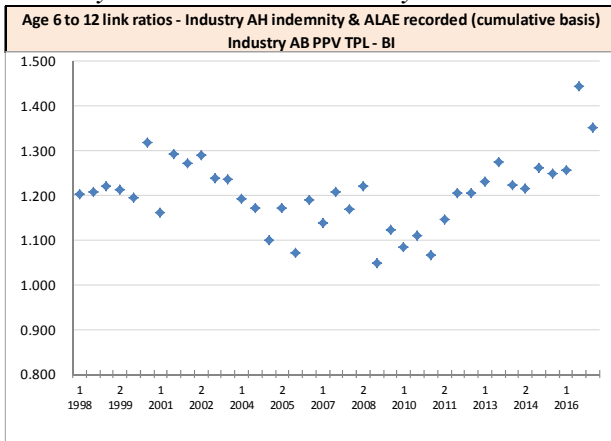
### ***Link Ratio Methodology Challenges***

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 appears 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.

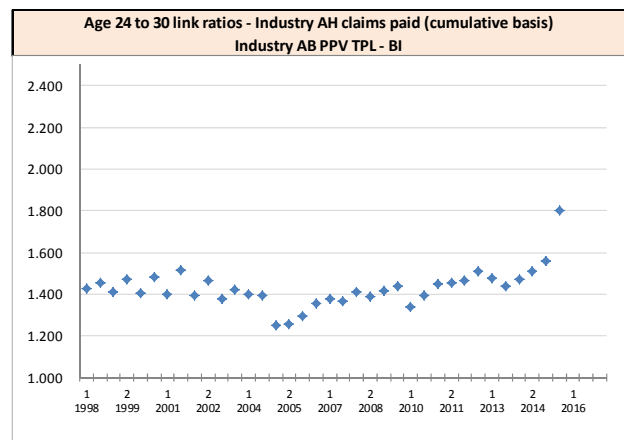
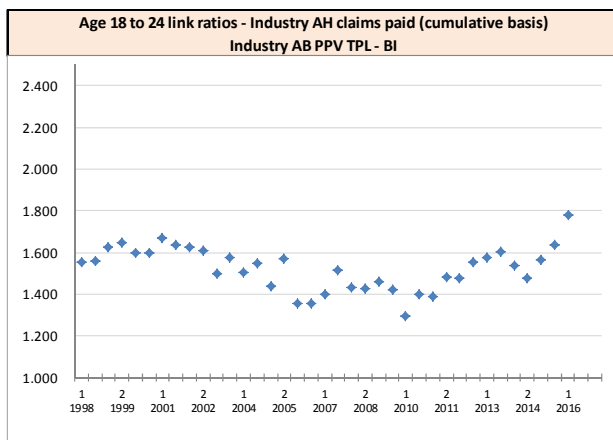
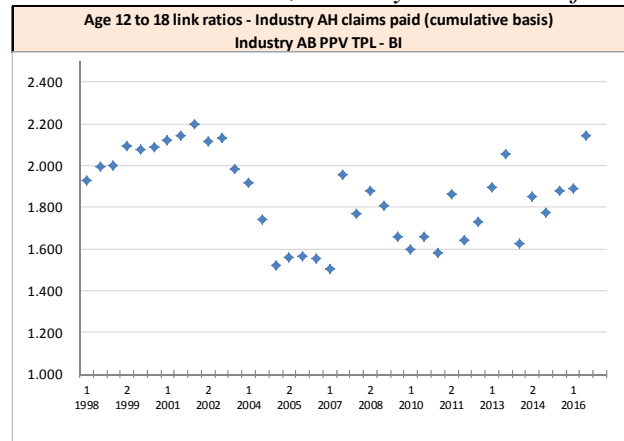
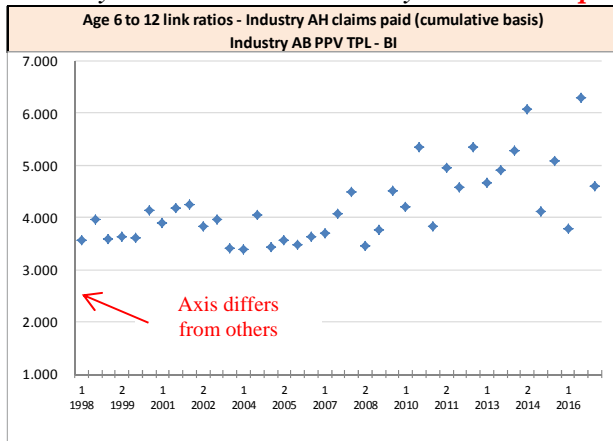
*Industry Alberta PPV indemnity & ALAE BI **recorded** link ratios\* at Dec. 31, 2017 by accident half*



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

Paid link ratios, on a similar basis as above, are provided on the following 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 Dec. 31, 2017 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 for 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  $+6.2\% \pm 0.4\%$ <sup>2</sup>, whereas an alternative model (which we felt was also a strong fit) had a calendar year trend of  $+8.1\% \pm 0.9\%$ . 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 pages 8 and 9) and consideration of indexation (illustrated top of page 10). **Note: due to changes in claim counting methodologies as noted in the OW Reports, averages for paid and case reserves may be impacted in ways that impact “trend” analysis of those averages.**

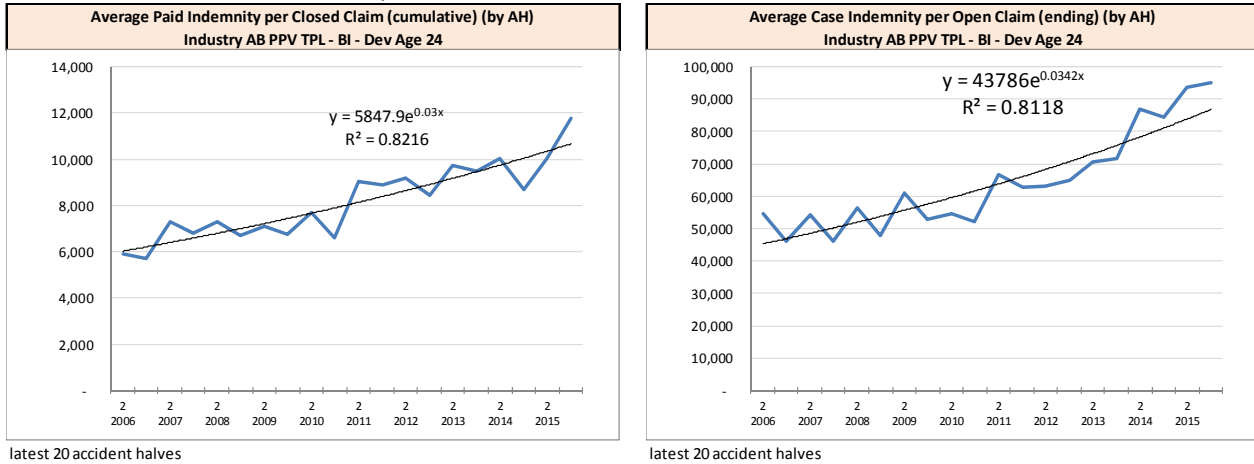
Assuming the impact of count changes as not significant for averages analyses, the regressions generally show both average paid indemnity and average case reserves increasing, but case reserves are now increasing faster after age 6 months than paid. The charts at the top of the next page provide an example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

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<sup>2</sup>The model was on a half year and log-link basis, resulting in a calendar-half period trend coefficient estimate of  $+3.0\% \pm 0.2\%$ , which translates to  $6.2\% \pm 0.4\%$  on an annualized basis. Similarly, the alternative model’s calendar-half period trend coefficient of  $+3.9\% \pm 0.4\%$ , which translates to  $+8.1\% \pm 0.9\%$  on an annualized basis.

average paid is 6.2% vs 7.1%<sup>3</sup> for average case reserves, but each of the last 4 accident halves 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 Dec 31, 2017, at development Age 24 months (latest 20 accident halves only)*

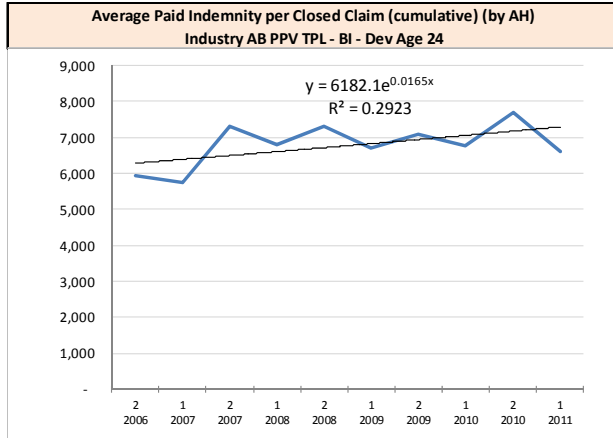


Both the paid and case averages above seem to suggest a possible change at around 2011-H1 and 2011-H2. If the above 20 accident half periods are split into pre and post 2011-H2, the resulting regressions suggest that the underlying trend related to average paid has increased only slightly (and, if a more rigorous analysis is completed, there may not be a statistical difference between the trends for the 2 periods modeled – however, there may be a “step” change that would apply, if one were to model both periods at the same time), whereas average case went from a relatively minor trend (and a more rigorous analysis may find that the trend is in fact not statistically different from 0%) to a more significant level of +10.6%, suggesting again that at least part (but not all) of the adverse development of late may relate to case reserve strengthening.

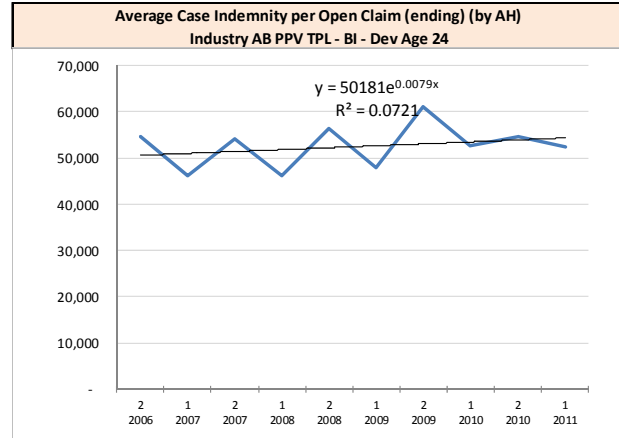
<sup>3</sup>These are crude measures of accident period trends, and compare with the FA indemnity only BI trend selected model loss cost trend of +10.1% +/-1.0% standard error, and the OW trend selection of +8.5%; as per OW’s practice, a standard error for their trend is not provided. Note that the regression 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.



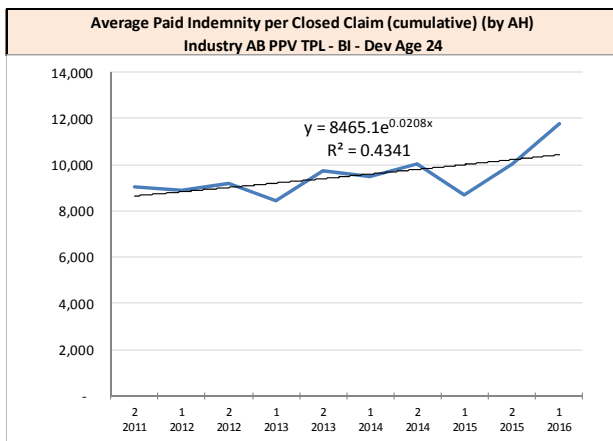
Industry Alberta Private Passenger Accident Half *indemnity only* BI Average Paid (left chart) and Average Case Reserve (right chart) as at Dec 31, 2017, at development Age 24 months (latest 20 accident halves only)



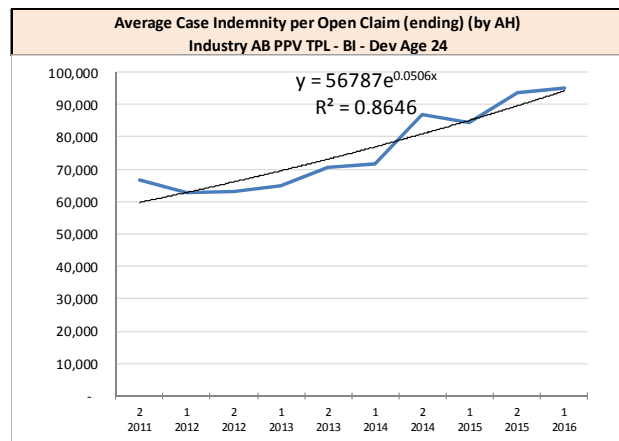
20 period split part 1: period 2006-H2 to 2011-H1



20 period split part 1: period 2006-H2 to 2011-H1



20 period split part 2: period 2011-H2 onward

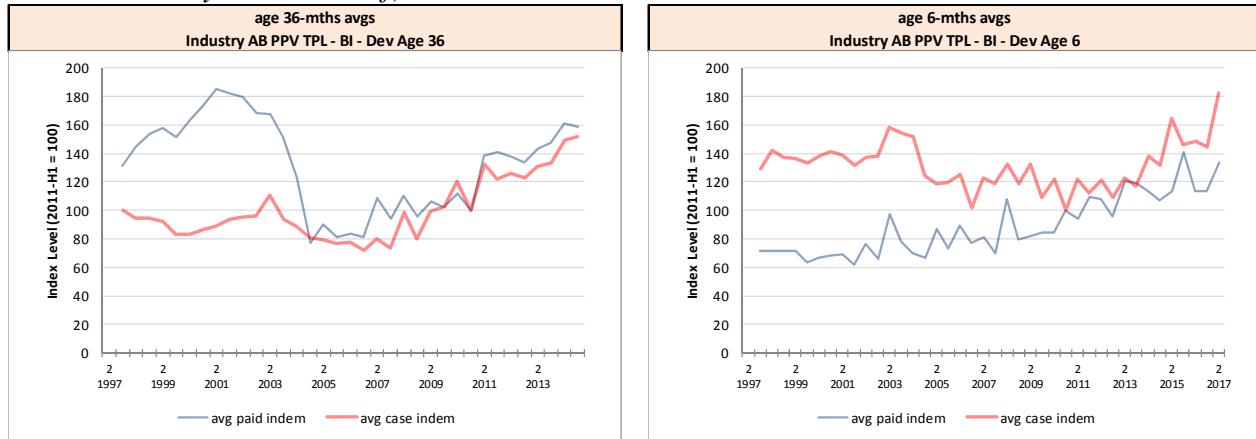


20 period split part 2: period 2011-H2 onward

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 36** months, **indexed** to their levels at 2011-H1, which indicate that post 2011-H1, **average paid has increased faster than average case reserves**. However, at **age 6** months (chart on the right), **case reserve growth post 2011-H1 has outpaced that of average paid**. This may be signaling case reserve strengthening over-and-above the growth in payments. Without adjustment, this may lead to an overstatement of ultimate estimate based on the link ratio methodology. (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 Dec 31, 2017 by accident half), **indexed** to 2011-H1 level*



As presented in our last submission, we noted that there may have been some evidence that the “calendar period” inflation of average paid indemnity may be changing – in particular, that it may have been slowing. However, significant payment activity occurred during calendar year 2017, and, in particular, during the second half (see table below). More specifically, total bodily injury payments (indemnity and ALAE) paid during calendar year 2017 were almost double what was paid during calendar year 2008 (exposures increased roughly 25% over the same period).

*Industry Alberta PPV indemnity & ALAE **BI** Calendar Year Paid at Dec 31, 2017*

All-Industry experience: AB: TPL - BI as at 201712

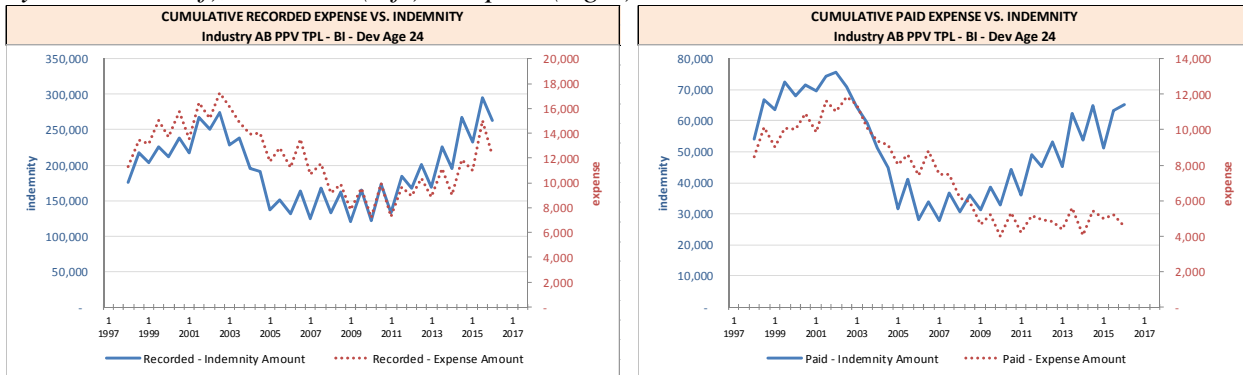
Cal Yr	1st half of cal year			2nd half of cal year			cal year		
	paid indem & ALAE (\$000s)	chg in paid (\$000s)	% change	paid indem & ALAE (\$000s)	chg in paid (\$000s)	% change	paid indem & ALAE (\$000s)	chg in paid (\$000s)	% change
2017	324,334	28,427	9.6%	426,627	105,040	32.7%	750,961	133,467	21.6%
2016	295,907	9,446	3.3%	321,587	11,888	3.8%	617,494	21,334	3.6%
2015	286,461	16,887	6.3%	309,699	17,166	5.9%	596,160	34,053	6.1%
2014	269,575	31,963	13.5%	292,533	21,375	7.9%	562,108	53,337	10.5%
2013	237,612	13,530	6.0%	271,159	15,220	5.9%	508,771	28,749	6.0%
2012	224,082	22,787	11.3%	255,939	36,346	16.6%	480,021	59,134	14.0%
2011	201,295	(8,970)	(4.3%)	219,592	9,954	4.7%	420,888	984	0.2%
2010	210,265	19,087	10.0%	209,639	(298)	(0.1%)	419,904	18,789	4.7%
2009	191,178	15,098	8.6%	209,937	7,283	3.6%	401,115	22,381	5.9%
2008	176,080	176,080		202,654	202,654		378,734	378,734	
	annualized to 2017:		7.0%			8.6%			7.9%
	annualized to 2016:		6.7%			5.9%			6.3%

All of the above suggests that the traditional link ratio methodology may not capture the underlying claims recording processes that are occurring for bodily injury, and a GLM methodology (or other methodologies that attempt to directly account for changes in calendar period trends) may be able to at least provide some additional insight.

One further area of uncertainty is the relationship between indemnity and ALAE for bodily injury, and whether that relationship may be changing, which may also have an impact (although perhaps not significant) on development patterns for indemnity and ALAE combined. The charts at the top of the next page compare recorded indemnity and ALAE by accident half at age 24 months against payments

on the same basis and age. Specifically, while ALAE recorded has tended to be correlated with indemnity over the last several accident periods, this is not the case for payments, where paid ALAE at 24 months has remained flat while indemnity paid levels have been increasing.

*Industry Alberta PPV BI ALAE (expense) and Indemnity at age 24 months, (as at Dec 31, 2017 by accident half), recorded (left) and paid (right)*



### *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 “wrong” model, or having the “right” model, but having selected the “wrong” parameterization of the model).

### **Section 6: Selection of Loss Trend Rates**

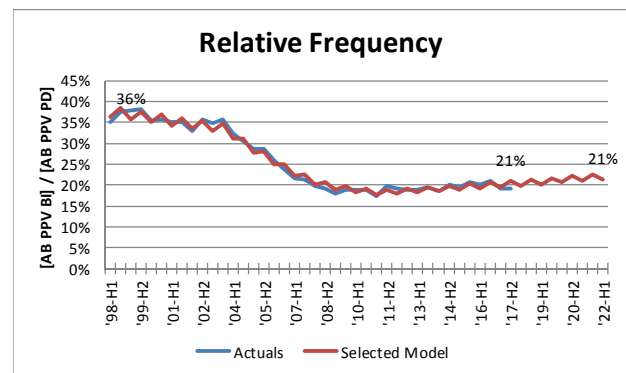
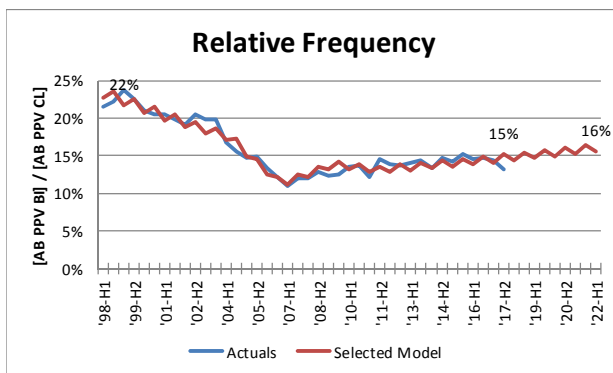
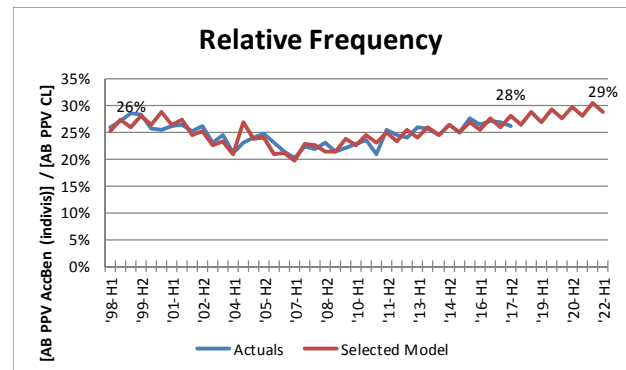
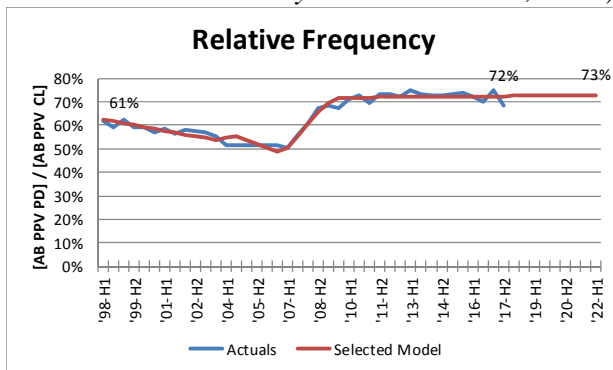
Generally, the PPV Report trends are not statistically different from the loss cost trends estimated for indemnity as per FA’s own modeling of the Alberta industry private passenger experience as at December 31, 2017. That is, the OW trend rates as selected are generally within 1 standard error of the trend estimates from the FA selected loss cost models.

We are happy to see the new chart formats included in this section – we believe the new formats offer a better visualization of the results over time. We are also happy to see that the full 40 accident halves of data are included in the analysis.

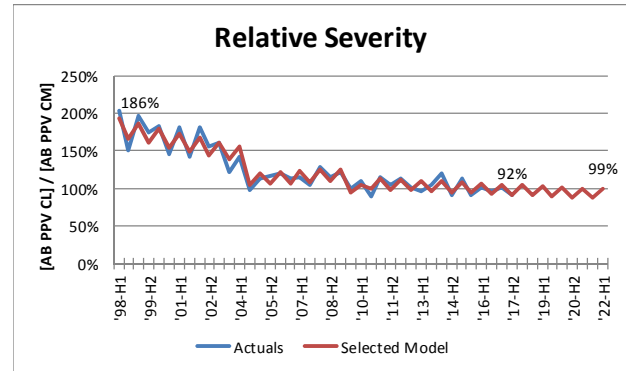
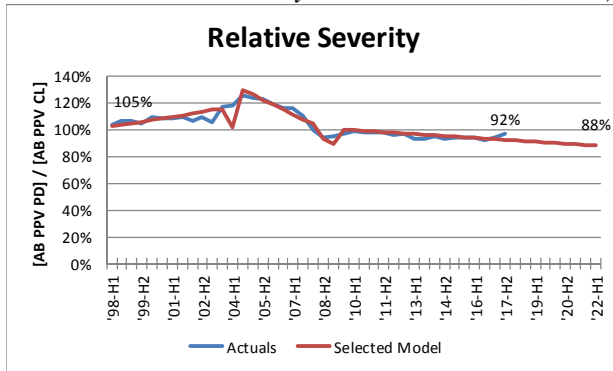
FA does approach its analysis of results differently than OW, although both leverage linear regression models applied to transformed (log) data. FA also considers correlation between and among coverages when selecting period structures, whereas there is little discussion of this in the PPV Report. For example, CL, PD, BI, ME, DI, DB, and FE 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. We also show a severity comparison on the next page between collision and comprehensive (as both coverages relate to the cost of vehicles).

*Industry Alberta PPV – ratios of select coverage frequencies (both “actual” and “modeled”; ultimates as selected by FA as at Dec 31, 2017)*



*Industry Alberta PPV – ratios of select coverage severities (both “actual” and “modeled”; ultimates as selected by FA as at Dec 31, 2017)*



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 uncertainty 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 – differing fits are not necessarily comparable under these circumstances).

As an example, the periods considered are not necessarily 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	2011-1	2005-2	
PD	2008-2	2012-2	
AccBen	2008-2	2007-2	
UM			1998-H1
CL	2010-1	2010-1	
CM			2002-1? (not clear)
SP	1998-H1	1998-H1	
AP			1998-H1

Specifically, where both frequency and severity are modeled by OW, only two modeled coverages had a consistent data start point (CL and SP). We believe a better approach would have been to always include the data 1998-H1 through 2017-H2, 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-H1, 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 December 31, 2017 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 Dec. 31, 2017

### OW Single Period Approach Model

FITTED TREND STRUCTURE REGRESSION STATISTICS						
Multiple R	R <sup>2</sup>	Adjusted R <sup>2</sup>	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9341	<b>0.8725</b>	<b>0.8619</b>	0.0877	14	26	2

Runs-Test Result: 0.2172 **RESIDUALS RUNS RANDOM**; residuals normal

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

Coefficients	S.E.	t-Stat	p-value	C.I.		Selected Coeff.	
				Lower	Upper		
Intercept	(206.500)	23.433	(8.812)	0.0%	(257.556)	(155.445)	(206.500)
Season	-	-	-	n/a	-	-	-
All Years	0.105	0.012	9.061	0.0%	0.080	0.131	0.105
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	-	-	-

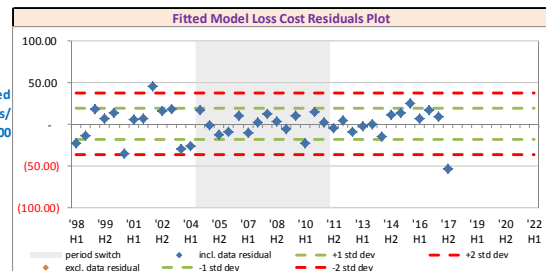
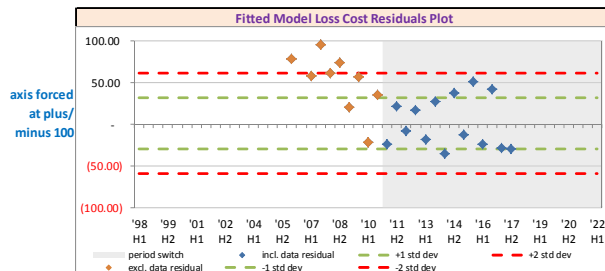
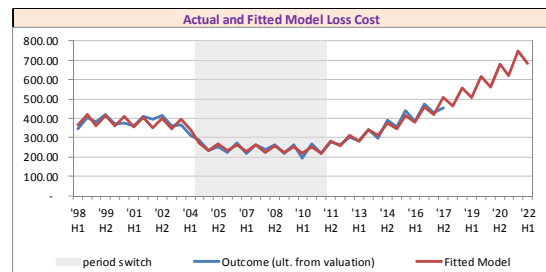
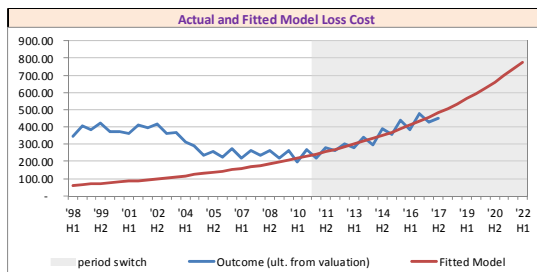
### Multiple Period Model

FITTED TREND STRUCTURE REGRESSION STATISTICS						
Multiple R	R <sup>2</sup>	Adjusted R <sup>2</sup>	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9766	<b>0.9538</b>	<b>0.9470</b>	0.0562	40	-	6

Runs-Test Result: 0.4462 **RESIDUALS RUNS RANDOM**; residuals normal

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

Coefficients	S.E.	t-Stat	p-value	C.I.		Selected Coeff.	
				Lower	Upper		
Intercept	31.652	11.126	2.845	0.7%	9.041	54.263	31.652
Season	0.140	0.018	7.879	0.0%	0.104	0.177	0.140
All Years	(0.013)	0.006	(2.317)	2.7%	(0.024)	(0.002)	(0.013)
Scalar 1	(0.361)	0.043	(8.337)	0.0%	(0.450)	(0.273)	(0.361)
Trend 1	-	-	-	n/a	-	-	-
Scalar 2	0.100	0.040	2.528	1.6%	0.020	0.181	0.100
Trend 2	0.110	0.010	11.025	0.0%	0.090	0.131	0.110
Scalar 3	-	-	-	n/a	-	-	-
Trend 3	-	-	-	n/a	-	-	-
Scalar 4	-	-	-	n/a	-	-	-
Trend 4	-	-	-	n/a	-	-	-



Another benefit of this approach is that forecasts<sup>4</sup> 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 halves 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.

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

<sup>4</sup>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.

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 reflect the full period of the review data.

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 last 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.