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July 25, 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-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, 2018 Private Passenger Vehicles*" and "*Annual Review of Industry Experience – Preliminary Report as of December 31, 2018 Commercial Vehicles*", both dated June 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 continue to be concerned with the potential availability issues in Alberta at the current time, as per our comments provided with respect to the June 30, 2018 experience review. While the OW estimates of loss ratios (indemnity, ALAE, and ULAE) have been improving (marginally) from their accident year 2016 peak, they remain well above the 67% level we estimate would be consistent with the proposed benchmarks as per the Reports. Further, we estimate the OW future trend selections at the coverage level will translate to an overall loss cost future trend rate over 5% for both private passenger and commercial vehicles.

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

[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.

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 (we discuss this issue in particular in relation to the investment return / discount rate assumption provided in the OW Preliminary Reports). 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 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 associated estimates of trends;
- 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).

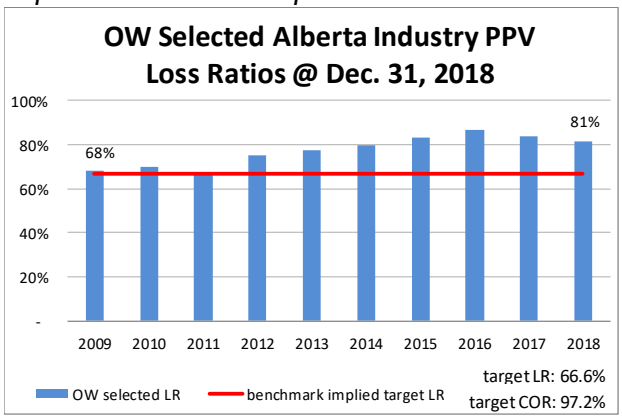
In considering these areas of potential flexibility, it is important to acknowledge the extent of the current estimated rate deficiency in the province. Specifically, based on our interpretation, the proposed benchmarks as provided in the OW Reports would indicate a target indemnity and claims expense ratios of approximately 67% for both PPV and CV. The OW estimates of ultimate suggest a 67% PPV loss ratio has not been reached in the last 10 accident years (left charts on the next page), based on their current selections of ultimate.

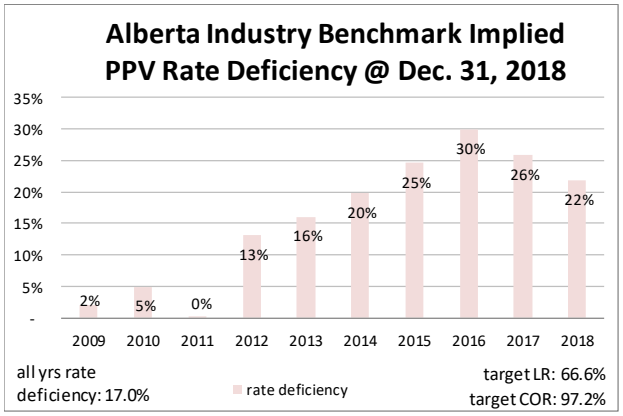
We have also included charts (right charts on the next page) that summarizes estimated accident year rate deficiencies relative to this target level (i.e. based on the proposed benchmark assumptions). For PPV, they range from 0% (2011) to 30% (2016), with a weighted average rate deficiency of 17% or almost $5 billion in premium over that 10-year period. That said, it is important to note that 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 Reports. 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 5% cap on PPV annual rate increases (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%).

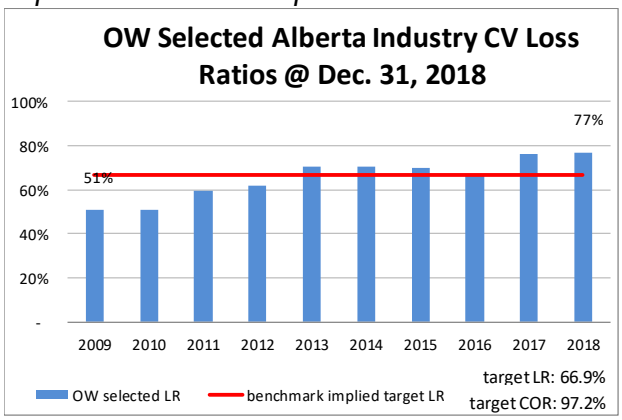
Notwithstanding the current 5% cap on PPV annual rate increases, we believe that it is important to begin laying the foundation for a flexible future system, where insurers are able to include their best estimates of future costs based on their own assumptions, judged by the AIRB on their own merit and the basis of reasonableness giving proper consideration to prediction uncertainty.

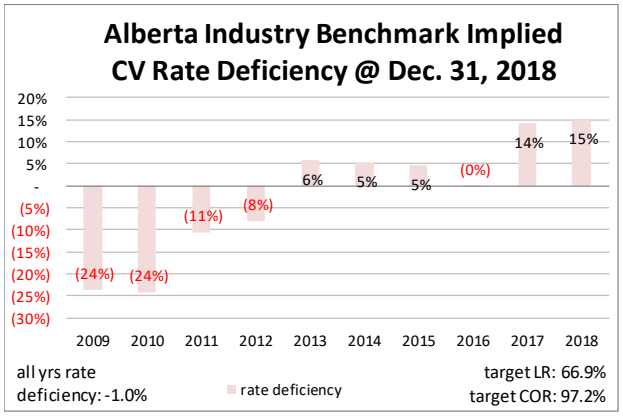
*Industry Alberta **PPV** @ Dec 31, 2018 - OW selected indemnity, ALAE, ULAE LRs and implied rate deficiencies on basis of OW selected current benchmarks*





*Industry Alberta **CV** @ Dec 31, 2018 - OW selected indemnity, ALAE, ULAE LRs and implied rate deficiencies on basis of OW selected current benchmarks*





Further exacerbating this issue, our review suggests that, at least for government of Canada treasury / bond yields over the most recent 60 months (based on data from the Bank of Canada website), the forecasted investment return / discount rate used by OW that we used to calculated the 67% target indemnity and claims expense ratio has been, on average, 114 basis points higher than the actual return available over that period (July 2014 through June 2019 inclusive). Based on the data provided in the Reports, we estimate that a 100 basis point reduction in the discount rate assumption would reduce the target loss ratio (indemnity plus ALAE plus ULAE) by approximately 2 points to 65%, and the rate

deficiency of the last 10 accident years increases to almost 20% ($5.7 billion premium shortfall). Given a target return on premium of 7 points, this variance translates to roughly 1/3 of the allowed profit provision.

From the OW Reports, we understand that OW does not actually perform the forecast, but rather relies on forecasts as obtained from the Alberta Treasury ministry (OW performs a weighting calculation of 3-mth and 3-yr forecasted yields for the AIRB's purposes). We don't have any specific issue with that per se (other than noting that the forecast has tended to be higher than actual for the forecast period it is used for by the AIRB). Where we are concerned, however, is that the AIRB uses the OW forecast as a floor (i.e. the minimum level rate applicants can use), rather than a guideline. We are confident that Alberta Treasury could or already does generate and provide a range around that forecast. We believe that if the AIRB leverages the Alberta Treasury, they should also leverage the forecast range for use in filing guidelines. Further, as a guideline range, the AIRB might instead of considering the resulting range as a rule of "investment assumptions must fall within the range", instead indicate that an assumption that falls in the range is de facto reasonable in the eyes of the AIRB, and should applicants use an alternative assumption that falls outside of the range, the applicant should provide support for the reasonableness of the assumption.

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 basis not been changed.

We recommend that the OW Reports 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 Reports, 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 immediately prior respective Report.

As we indicated in our last submission, the OW Reports do 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 Reports 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.

On one final note, as indicated in our commentary related to trends, we were not able to update all of the commentary from our last submission, due to time constraints. Part of this is directly due to having to copy by hand the data included in the OW Reports, and this can be time consuming. Copying by hand is necessary as the OW Reports are currently released in a portable document format (pdf) with restricted permissions. Because of the encryption and permission restriction, we are unable to copy data directly. We respectfully ask the AIRB to have future OW Reports released in an unencrypted format with the copy content permission lifted to ease the burden of users of the Reports in providing commentary to the AIRB.

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) reports entitled "*Annual Review of Industry Experience – Preliminary Report as of December 31, 2018 Private Passenger Vehicles*", and "*Annual Review of Industry Experience – Preliminary Report as of December 31, 2018 Commercial Vehicles*", both dated June 28, 2019 ("OW PPV Report" and "OW CV Report" respectively, collectively referred to herein as the "OW Reports"). 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. We found that the OW CV Report included reference to "modeled" as opposed to "estimate" trends. While we believe both terms are appropriate, using different terminology in the two reports may lead to unnecessary confusion, and therefore suggest that one of "modeled" or "estimated" be chosen and used in both OW Reports.

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

Experience during 2nd 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 2018-2. Per the tables on the top of the next page, overall paid indemnity & ALAE slowed during the most recent two second halfs (2017-2 and 2018-2), although this was heavy influenced by a slowdown in the first party physical damage coverages – TPL, UM, and AccBen paid indemnity & ALAE increased 23% in 2017-2 and 5% in 2018-2, and at an annualized rate of 7%. Some of this increase may be attributed to increases in earned vehicle counts (we estimate earned vehicle counts for PPV have increased just under 3% over the same period, although growth more recently appears to have slowed to half that level over the last 5 years. Our estimate of the future trend for PPV loss costs is 4.3% for mandatory coverages – this may be low in light of the calendar year payment trend for mandatory coverages.

[2]We found this change for each coverage in the "Selection of Loss Trend Rates" section, other than for Bodily Injury where the first paragraph after the bullet list at the top of the page 17 and in footnote 19 on page 20 of the OW PPV Report still references "measured" rather than "estimated" trends.

*Industry Alberta PPV indemnity & ALAE **paid** during the 2nd half of calendar years*

ALL COVERAGES COMBINED

All-Industry experience: AB: (All) as at 201812

Cal Yr	2nd half of cal year paid indem & ALAE ($000s)	chg in paid ($000s)	% change
2018	1,167,660	20,157	1.8%
2017	1,147,503	(3,164)	(0.3%)
2016	1,150,667	107,234	10.3%
2015	1,043,433	59,020	6.0%
2014	984,413	60,381	6.5%
2013	924,032	117,967	14.6%
2012	806,065	102,226	14.5%
2011	703,839	(71,568)	(9.2%)
2010	775,407	101,074	15.0%
2009	674,332		

annualized to 2018: 6.3%
annualized to 2017: 6.9%

BI, PD, UM

All-Industry experience: AB: BI, PD, UM as at 201812

Cal Yr	2nd half of cal year paid indem & ALAE ($000s)	chg in paid ($000s)	% change
2018	655,055	28,579	4.6%
2017	626,476	121,459	24.1%
2016	505,017	(5,145)	(1.0%)
2015	510,162	41,907	8.9%
2014	468,255	27,730	6.3%
2013	440,525	51,245	13.2%
2012	389,280	21,844	5.9%
2011	367,436	27,380	8.1%
2010	340,055	(18,857)	(5.3%)
2009	358,913		

annualized to 2018: 6.9%
annualized to 2017: 7.2%

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

AccBen

All-Industry experience: AB: AccBen as at 201812

Cal Yr	2nd half of cal year paid indem & ALAE ($000s)	chg in paid ($000s)	% change
2018	71,123	7,213	11.3%
2017	63,910	6,779	11.9%
2016	57,131	6,356	12.5%
2015	50,775	3,030	6.3%
2014	47,745	3,615	8.2%
2013	44,130	4,855	12.4%
2012	39,275	9	-
2011	39,265	1,684	4.5%
2010	37,582	778	2.1%
2009	36,804		

annualized to 2018: 7.6%
annualized to 2017: 7.1%

CL, CM, SP, AP

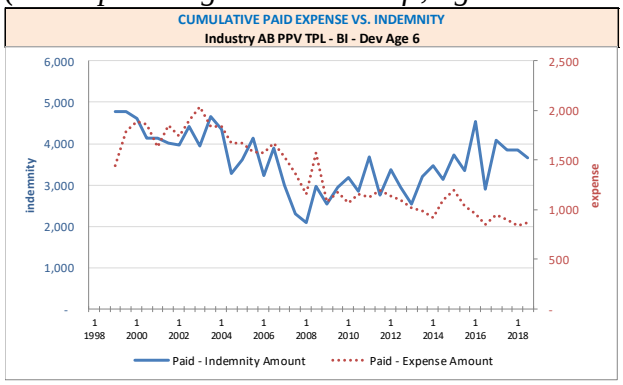
All-Industry experience: AB: CL, CM, SP, AP as at 201812

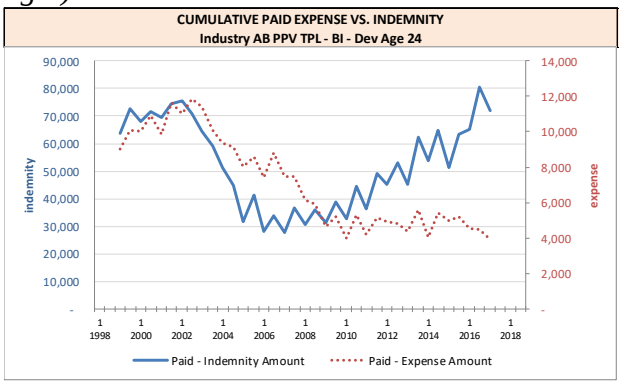
Cal Yr	2nd half of cal year paid indem & ALAE ($000s)	chg in paid ($000s)	% change
2018	441,482	(15,635)	(3.4%)
2017	457,117	(131,402)	(22.3%)
2016	588,518	106,022	22.0%
2015	482,496	14,084	3.0%
2014	468,412	29,035	6.6%
2013	439,378	61,868	16.4%
2012	377,510	80,372	27.0%
2011	297,138	(100,632)	(25.3%)
2010	397,770	119,154	42.8%
2009	278,616		

annualized to 2018: 5.2%
annualized to 2017: 6.4%

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).

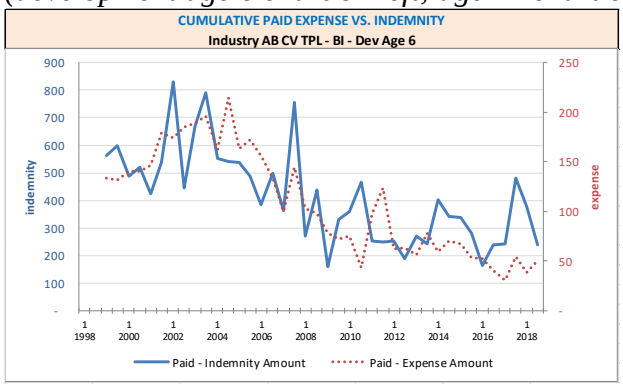
*Industry Alberta **PPV** **BI** **Paid Indemnity** and **Paid ALAE** at Dec. 31, 2018 by accident half (development age 6 chart on left; age 24 chart on right)*

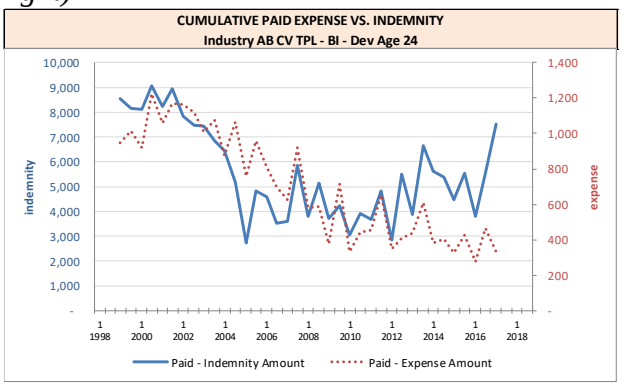




As per above, at 6 months, indemnity paid started increasing at around 2008 whereas ALAE paid has continued to decrease (both may be leveling out recently). At 24 months, while ALAE paid may be leveling out, indemnity paid continues to increase. The same patterns do not appear in CV to the same extent (see below).

*Industry Alberta **CV** **BI** **Paid Indemnity** and **Paid ALAE** at Dec. 31, 2018 by accident half (development age 6 chart on left; age 24 chart on right)*

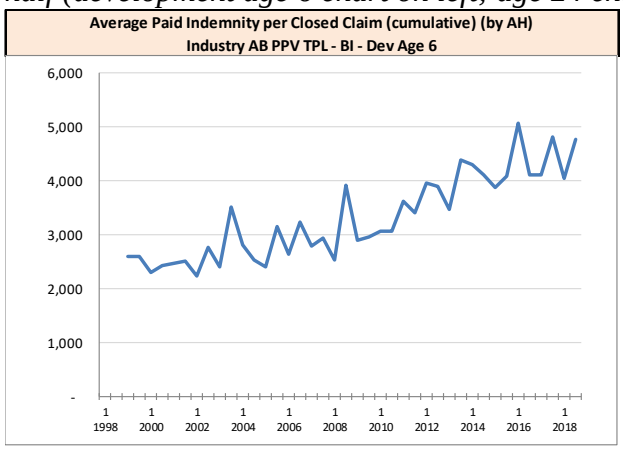


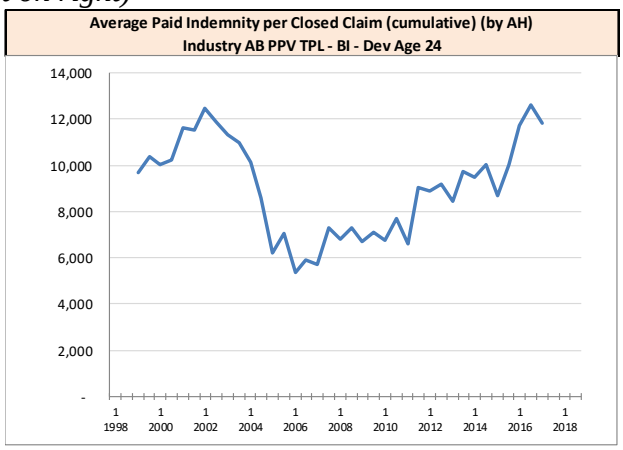


Ideally, the above results could then be normalized (as we have in prior commentaries and below) in an attempt to understand what is happening on an average claim basis. Unfortunately, **claim counts themselves may be less reliable**, as there is evidence and documentation that individual insurers have changed the way they report claim counts. **This significantly deteriorates the information and insight that can be gained by considering averages as discussed below**.

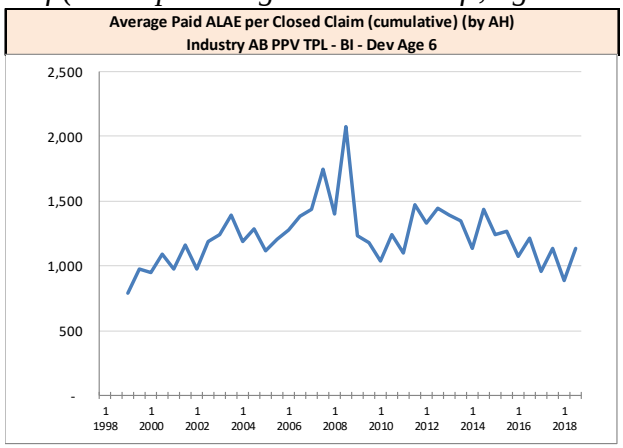
With the issue of potential inconsistency in claim count acknowledged, average paid indemnity has been increasing whereas average ALAE paid has been generally flat since around 2009 (see charts on the next page). Average ALAE paid has decreased for more recent accident halfs, which may signal an actual change, or may reflect a change in claim counts reported as previously discussed.

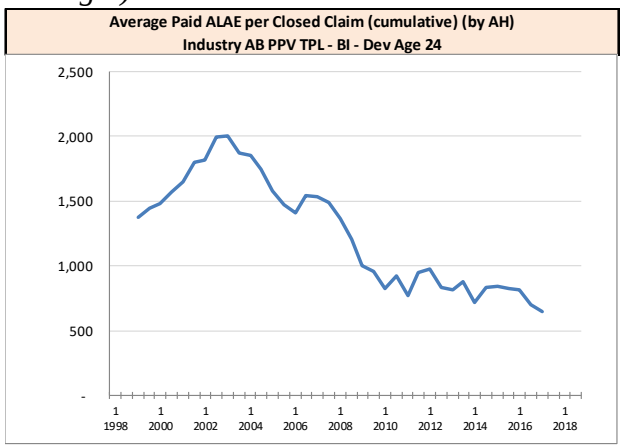
*Industry Alberta **PPV** **BI** **Average Paid Indemnity Only** per closed claim at Dec. 31, 2018 by accident half (development age 6 chart on left; age 24 chart on right)*





*Industry Alberta **PPV** **BI** **Average Paid ALAE Only** per closed claim at Dec. 31, 2018 by accident half (development age 6 chart on left; age 24 chart on right)*

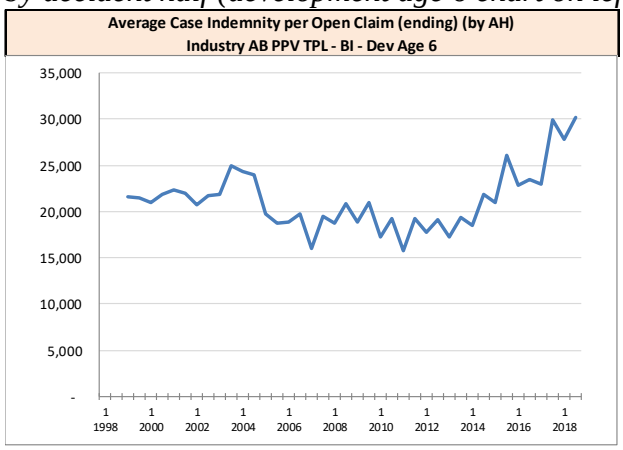


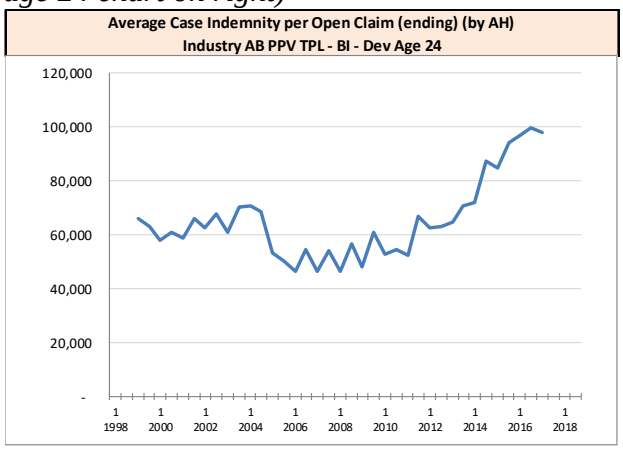


(CV BI average paid indemnity since 2007 has increased at an annualized rate lower than PPV; CV BI average ALAE paid since 2007 has also seen annual declines like PPV.)

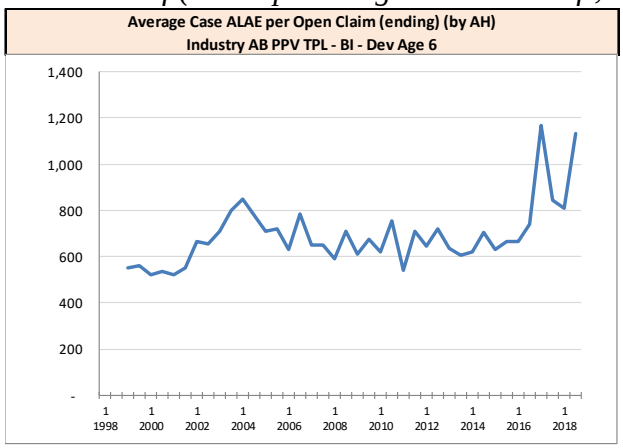
As per our prior submission, we have found additional differences in PPV average indemnity and ALAE case reserves (again, care must be taken here due to potential inconsistencies in how claim counts are reported). In particular, as shown in the charts on the next page, while average case reserves for 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 our previous submission in relation to whether recorded claims activity was due to case reserve strengthening). What we noted in our prior submission was that, while average paid ALAE has been relatively flat, there appears to be a dramatic increase in average ALAE case reserves, and what may appear to be an indication of a change in ALAE case reserve practices at around 2016. This change doesn't impact our trend analyses (as FA trends indemnity only), but these changes may impact OW (as trending indemnity & ALAE & ULAE). Similar changes are evident in CV BI as well.

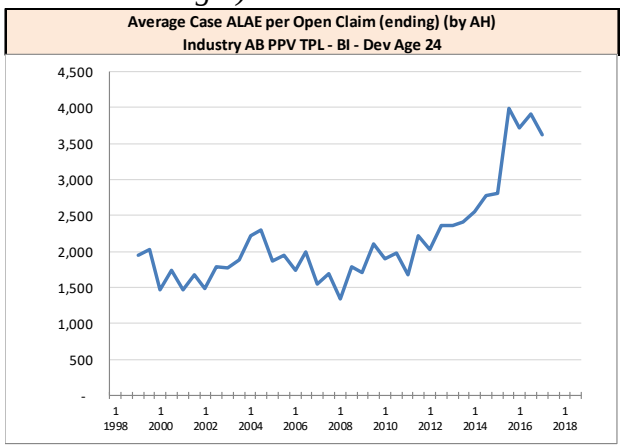
*Industry Alberta PPV **All Coverages** **Average Case Indemnity Only** per open claim at Dec. 31, 2018 by accident half (development age 6 chart on left; age 24 chart on right)*





*Industry Alberta PPV **All Coverages** **Average Case ALAE Only** per open claim at Dec. 31, 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. On page 10 of the OW PPV Report, OW states "*We find the emerged losses during the second half of 2018 to be generally consistent with our expectations based on our prior selected loss development factors*." For PPV BI, we would largely agree with this statement. Given this statement, one might expect that the estimates of ultimate for the prior accident periods to experience minor changes, exhibiting perhaps a random pattern (some increasing, some decreasing). That was not the case for the OW updates for PPV BI, where the overall ultimate change (favourable by $226 million or 1.8% of the June 30, 2018 OW estimated ultimates or 5.7% of the June 30, 2018 OW estimated unpaid) appeared random for ages beyond 60, but for ages 60 and younger, the ultimate changes were skewed favourable (only 2 of the 20 were unfavourable, where we would expect 6 or more).

In the table below, 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"). The table also includes the changes in their selected ultimates per Appendix C[3] (page 1) of their current report (column "ult chg").

*Industry Alberta PPV **BI** **Changes in OW Selected Ultimate** indemnity & ALAE and **"Actual vs Expected" (AvE)** incremental recorded indemnity & ALAE at Dec. 31, 2018 by accident half*

AB PPV BI OW Ult. Indemnity & ALAE ($000s)					OW prior est. (indem & alae)	
Acc Yr	half	ult chg	due to AvE	x AvE	ultimate	unpaid
2014	1	(13,015)	(6,038)	(6,977)	343,332	148,466
2014	2	(20,812)	(8,482)	(12,330)	474,324	251,764
2015	1	(21,667)	(7,325)	(14,342)	422,471	264,576
2015	2	(34,698)	(12,631)	(22,067)	542,011	371,139
2016	1	(26,811)	(4,316)	(22,495)	464,569	354,974
2016	2	(23,934)	2,166	(26,100)	576,526	491,447
2017	1	(13,872)	1,429	(15,301)	508,708	465,925
2017	2	(15,051)	(2,893)	(12,158)	588,843	566,614
2018	1	(17,126)	(9,040)	(8,086)	534,103	529,430
		(186,986)	(47,130)	(139,856)	4,454,887	3,444,335
	as % prior ult	(4.2%)	(1.1%)	(3.1%)		
	as % prior unpaid	(5.4%)	(1.4%)	(4.1%)		

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 decreases for all accident halfs totaling $187 million or 4.2% of the prior selected ultimate / 5.4% of the prior estimated unpaid for those accident halfs as per the prior OW PPV Report.

The second column is derived as the actual incremental recorded activity less the expected incremental recorded activity (as derived from the prior OW PPV Report's link ratios). This column indicates that actual recorded experience was $47 million lower than expected, accounting for approximately 25% of the total decrease in selected ultimates. The remaining $140 million (or 75% of the total reduction) is not directly attributed to the lower actual favourable emergence, but instead would be related to changes in link ratios (some of which would be indirectly related to the lower development during the half, but not all). We believe this is largely related to changes in link ratios selected for ages 60 and older, and highlights the leverage these tail factors can have in the link ratio valuation methodology.

The table on the next page 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 changes in the OW selected ultimates and the AvE variances

[3]We believe Appendix C and D are an important exhibits and appreciate its inclusion. We suggest an additional column be added to both showing the percentage difference so that the reader can easily see the relative change in estimates of ultimate.

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-H2 BI basis	OW 2018-H1 BI basis	OW 2017-H2 BI Basis
6-12	Wght Avg: 6 factors (adjusted for seasonality where appropriate) (1.309 x seasonality; 1.287 w seasonality)	last 4 Semesters ending in 12 (1.352)	last 4 Semesters ending in 6 (1.273)	last 4 Semesters ending in 12 (excluding 2016.2) (1.236)
12-18	Wght Avg: 6 factors (1.141)	Wght Avg: 6 Semesters (1.141)	Wght Avg: 10 Semesters (1.118)	Wght Avg: 4 Semester (1.145)
18-24	Wght Avg: 6 factors (1.146)	Wght Avg: 6 Semesters (1.146)	Wght Avg: 10 Semesters (1.128)	Wght Avg: 4 Semester (1.152)
24-30	Wght Avg: 6 factors (1.134)	Wght Avg: 4 Semesters (1.140)	Wght Avg: 10 Semesters (1.123)	Wght Avg: 4 Semester (1.143)
30-36	Wght Avg: 6 factors (1.093)	Wght Avg: 4 Semester (1.097)	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	Wght Avg: 4 Semester
138-144 to 210-216	Wght Avg: 6 factors	Wght Avg: 4 Semester	Wght Avg: 4 Semester	1.000

factor id	OW default basis	OW 2018-H2 BI basis	OW 2018-H1 BI basis	OW 2017-H2 BI Basis
222-228 and beyond	Wght Avg: 6 factors	1.000	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 with the prior report, and now from 10 to 6 Semesters for the first 2, and to 4 Semesters for the last.

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, and relative to both prior selected ultimate and prior estimated unpaid) 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

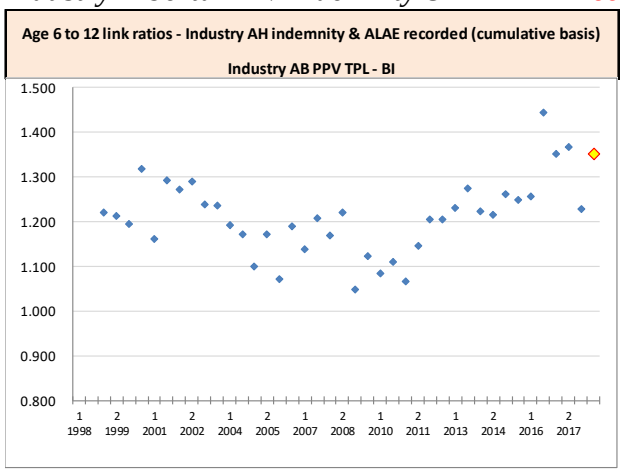
The link ratio methodology is commonly used in Canada for the valuation of claims liabilities (i.e. ultimate estimation). In fact, a 2016 international survey by ASTIN (for "Actuarial Studies in Non-Life Insurance", a section of the International Actuarial Association) found that the link ratio method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

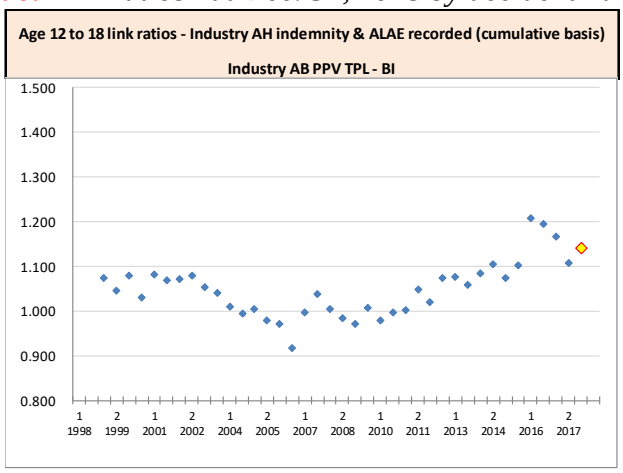
For Alberta Private Passenger experience, historical link ratios have not been particularly stable, making it challenging to estimate ultimates successfully using this methodology, as is discussed in the OW PPV Report. To provide some context, we've included charts at the top of the next page related 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).

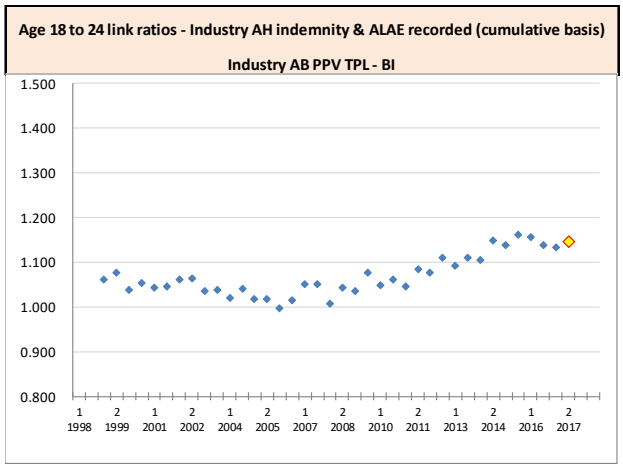
*Industry Alberta PPV indemnity & ALAE BI **recorded** link ratios* at Dec. 31, 2018 by accident half*



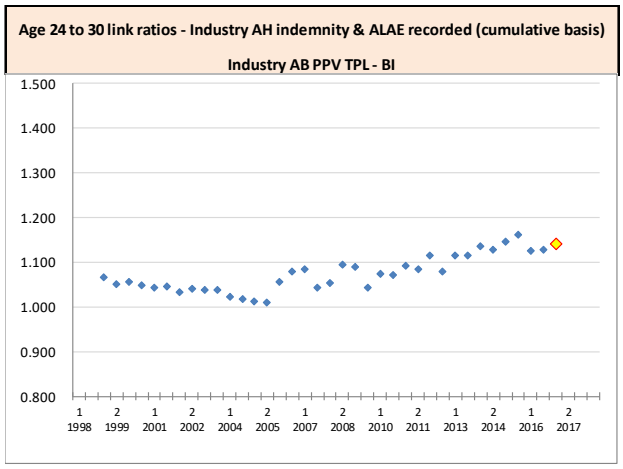
OW selected: **1.352** (2018-1 selected: 1.272)



OW selected: **1.141** (2018-1 selected: 1.118)



OW selected: **1.146** (2018-1 selected: 1.128)

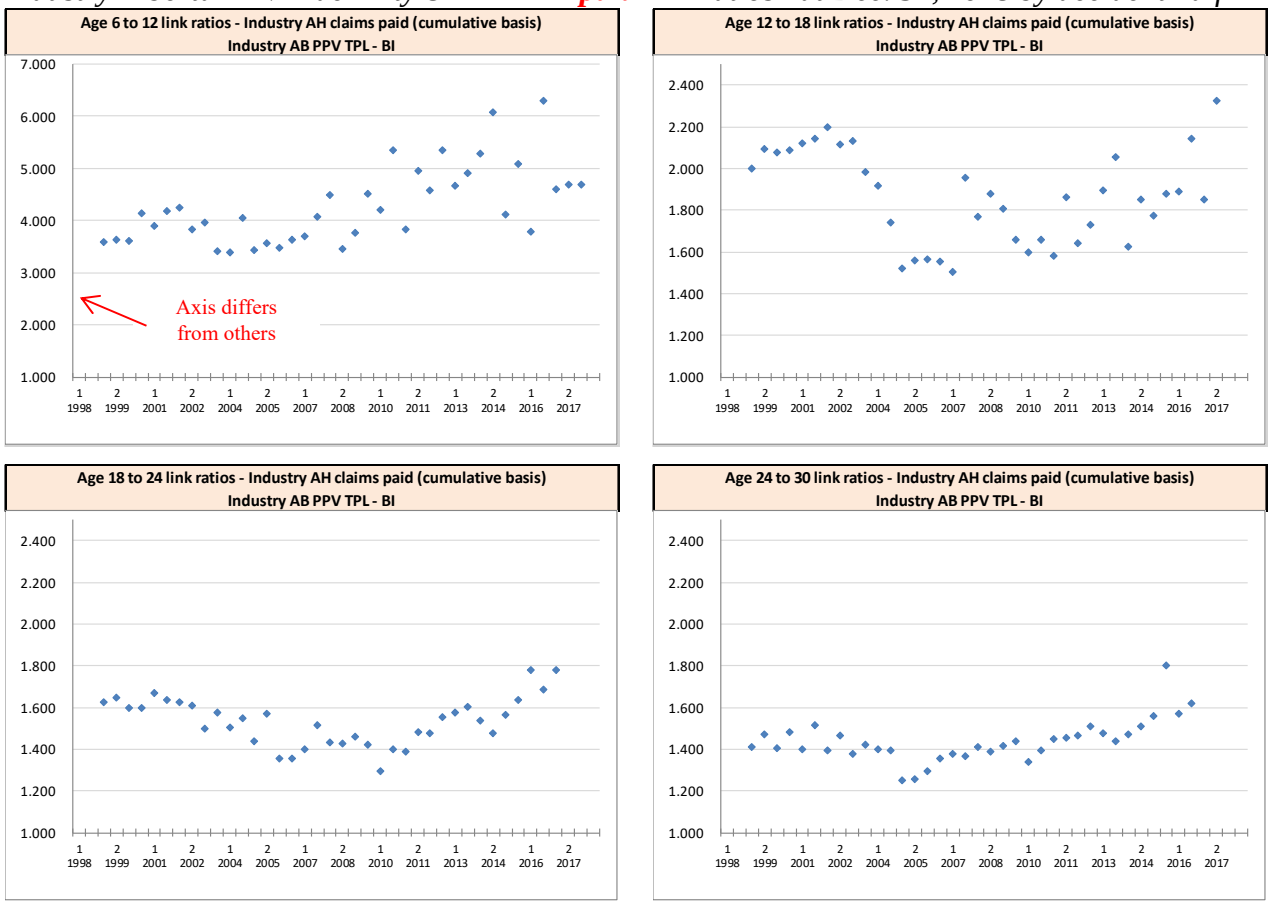


OW selected: **1.140** (2018-1 selected: 1.123)

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

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 Dec. 31, 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%[4], 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 19). **Note: due to <u>changes in claim counting</u> methodologies as noted in the OW Report[5] averages for paids and case reserves may be impacted in ways that impact "trend" analysis of those averages.**

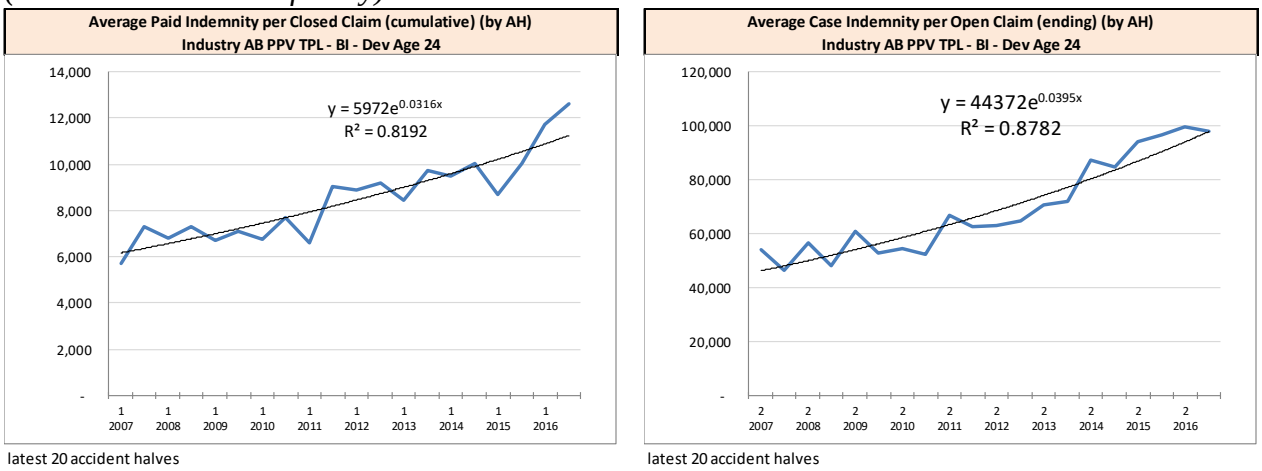
Assuming the impact of company changes in reporting counts as not significant for averages analyses, the regressions generally show both average paid indemnity and average case reserves increasing, but case reserves are now increasing faster after age 6 months than paids. The charts at the top of the next

[4]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.

[5]See footnote 18 on page 17 of the OW PPV Report, commenting that GISA describes several claim count reporting issues in its introduction to the exhibit containing the data used in the OW PPV Report analysis.

page provide an example (using development age 24 months, and indemnity only), where the annualized trend for average paid is 6.5% vs 8.2%[6] for average case reserves.

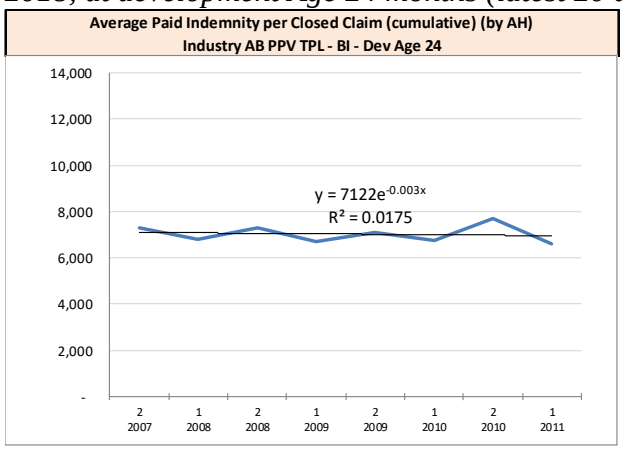
*Industry Alberta Private Passenger Accident Half indemnity only BI **Average Paid** (left chart) and **Average Case Reserve** (right chart) as at Dec. 31, 2018, at development Age 24 months (latest 20 accident halfs only)*



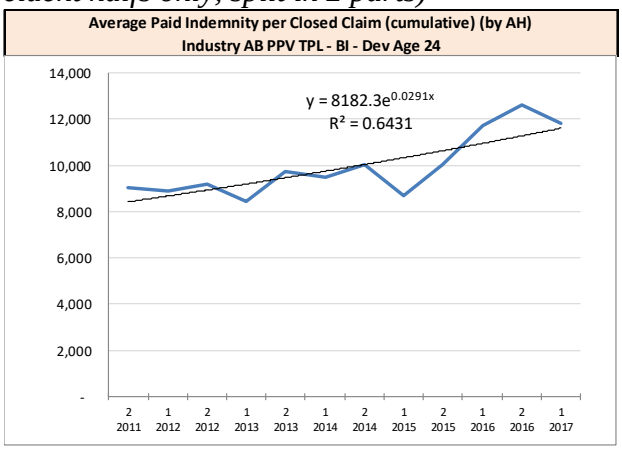
Both the paid and case averages above seem to suggest a possible change at around 2011-H1 and 2011-H2. If the above 20 accident half periods are split into pre and post 2011-H2, the resulting regressions suggest that the underlying trends have changed for both metrics and there may also be step changes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

[6]These are crude measures of accident period trends, and compare with the FA indemnity only BI selected model loss cost past trend of +10.9% +/-0.8% (reducing to +4.8% post 2018-H1), and the OW trend selection of +8.5% (as per OW's practice, a standard error for their trend estimate is not provided). Note that the regression trend estimates based on average paid indemnity and average case reserve at 24 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 Dec. 31, 2018, at development Age 24 months (latest 20 accident halfs only, split in 2 parts)*

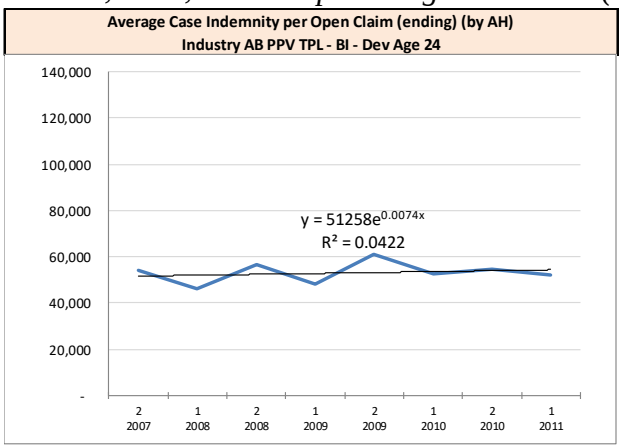


20 period split part 1: period 2007-H2 to 2011-H1

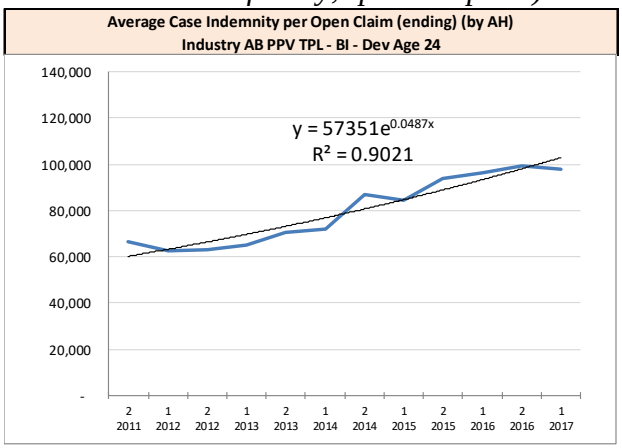


20 period split part 2: period 2011-H2 onward

*Industry Alberta Private Passenger Accident Half indemnity only BI Average **Case Reserve** as at Dec. 31, 2018, at development Age 24 months (latest 20 accident halfs only, split in 2 parts)*



20 period split part 1: period 2007-H2 to 2011-H1



20 period split part 2: period 2011-H2 onward

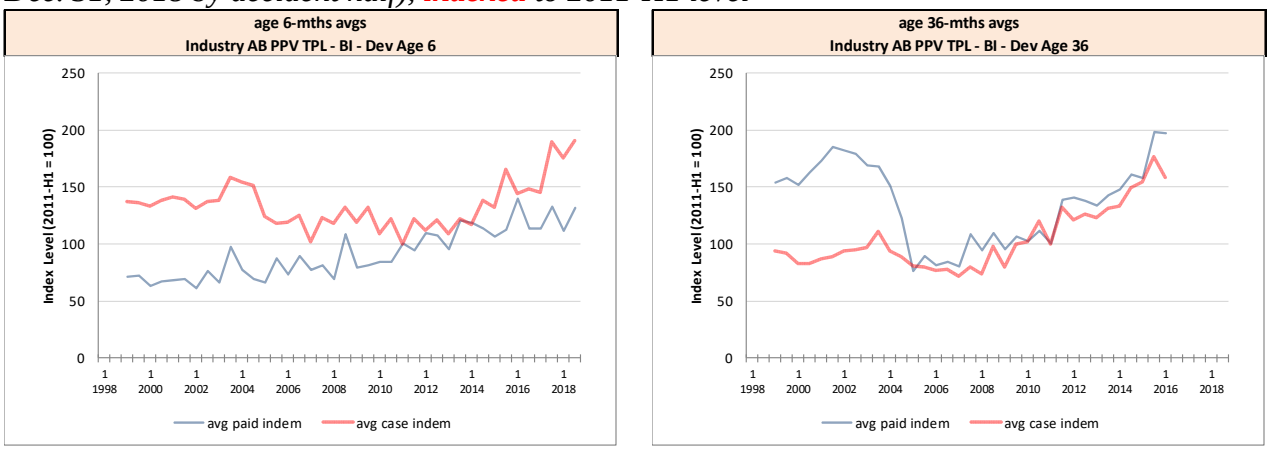
The preceding may indicate that the underlying indemnity payment activity is growing at a consistent pace (around 6% per year) whereas there may have been a change in indemnity reserving practices, the above (age 24 month analysis) suggests this change may have occurred during calendar period 2013-H2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

Again, all of the preceding ignores the potential impact of changes in claim count reporting – if claim counts are now reported at a lower level than before for the same activity, what is being shown as increasing average paids / case reserves may instead simply reflect the claim count change.

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 Dec. 31, 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 a 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

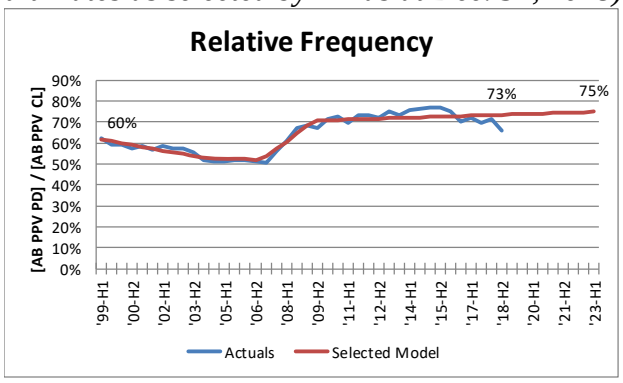
Generally, the OW PPV Report trends are statistically different from the loss cost trends estimated for indemnity as per FA's own modeling of the Alberta industry private passenger experience as at Dec. 31, 2018. That is, the OW trend rates as selected are generally NOT within 1 standard error of the trend estimates from the FA selected loss cost models. However, they are not consistently higher or lower by

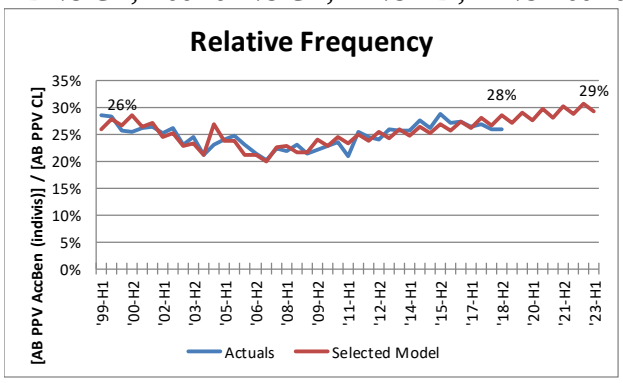
coverage (i.e. OW is higher for some coverages, lower for others – collision is the only coverage were the OW trend is within a standard error of FA's estimate).

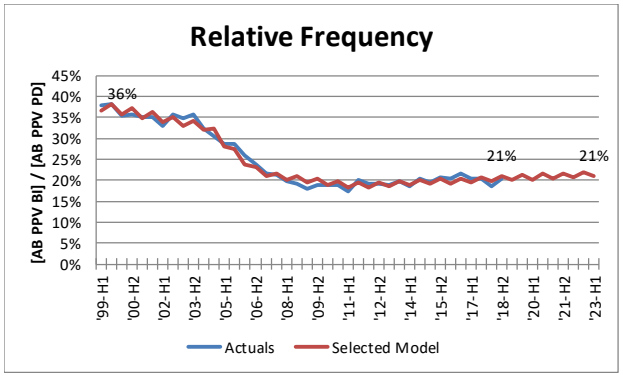
FA approaches its analysis of results differently than OW, although both leverage linear regression models applied to transformed (log) data. FA also considers correlation between and among coverages when selecting period structures, whereas there is little discussion of this in the PPV Report. For example, 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.

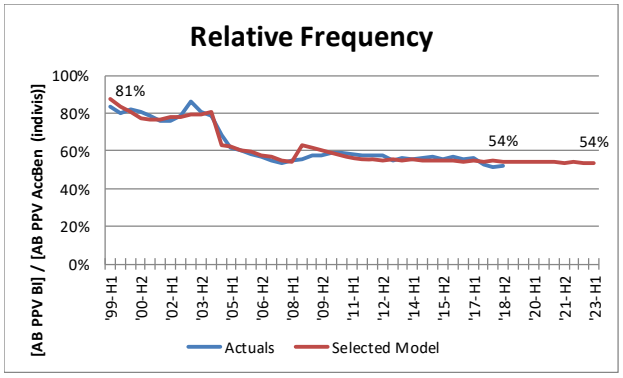
That is not to say that the relationships cannot or do not change over time (it is clear that they do) – we are simply stating that taking this into consideration will likely result in more consistent models. This is shown in the charts below, where we show relative frequencies for various coverages, 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 Dec. 31, 2018) – PD vs CL, AccBen vs CL, BI vs PD, BI vs AccBen



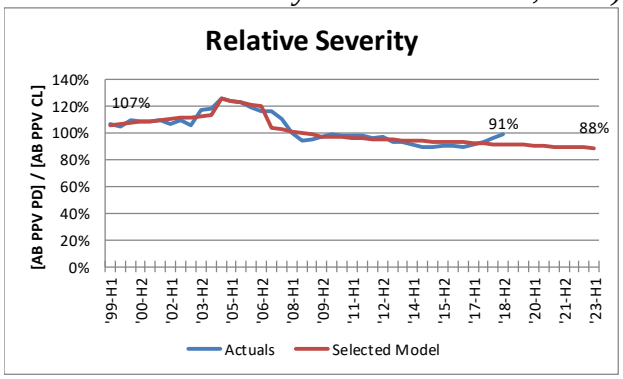


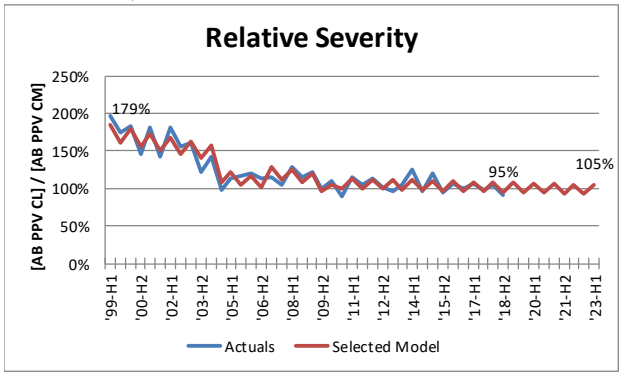




We also show a severity comparison below between collision and pd-tort (left chart), and collision and comprehensive (right chart), as these coverages relate to the cost of vehicles.

Industry Alberta PPV – ratios of select coverage severities (both "actual" and "modeled"; ultimates as selected by FA as at Dec. 31, 2018) – PD vs CL, CM vs CL



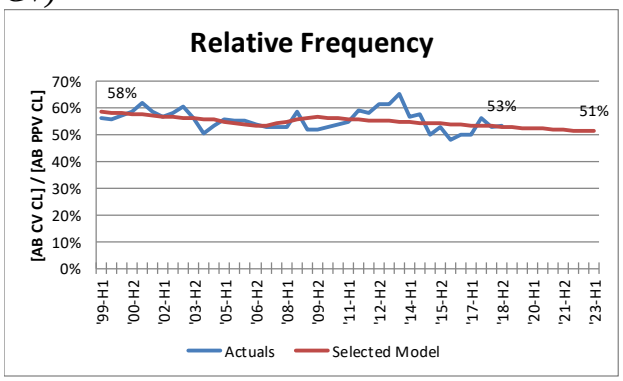


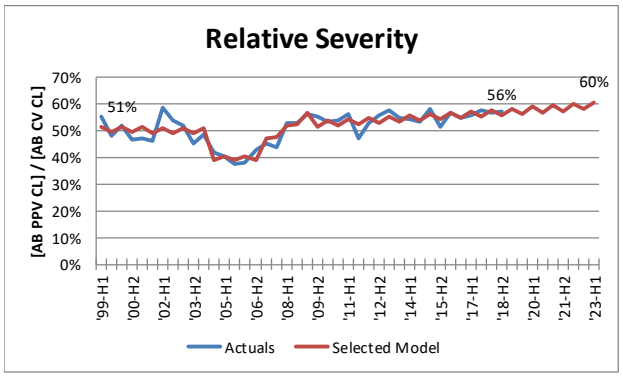
As indicated above, the pd-tort severity appears to be decreasing relative to collision severity, whereas comprehensive severity appears to be rising relative to collision.

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.

In our internal deliberations, we also consider correlations between private passenger vehicles and commercial vehicles for like coverages (as they share the same roads, weather and economic conditions etc.). This too helps inform our modeling and raise questions (particularly where relationships appear to be changing). We provide collision as an example below.

Industry Alberta CL CV vs PPV – ratios of select coverage severities (both "actual" and "modeled"; ultimates as selected by FA as at Dec. 31, 2018) – freq (CV vs PPV), sev (PPV vs CV)





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, and 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	2007-1	2011-2
PD	2008-2	2012-2	2006-1
AccBen	2008-2	2008-1	
UM			1998-1
CL	2009-1	2010-1	
CM			2002-1? (not clear)

Coverage	Severity	Frequency	Loss Cost
SP	1999-1	1999-1	
AP			1999-1

(**The remainder of the section is unchanged from our last submission, and therefore uses the June 30, 2018 OW PPV Preliminary Report as its reference. This is due to time constraints. In part, this reflects the time required to copy data by hand from the OW Reports in order analyze the results – this has to be done by hand as the Reports are produced in a portable document format (pdf) that is encrypted with restricted copy content permissions. If it were not encrypted, we would be able to copy data directly, speeding up our review process considerable. We respectfully ask the AIRB to consider having OW release future Reports in an unencrypted pdf format.**)

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 1999-H1 through 2018-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-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***[7]

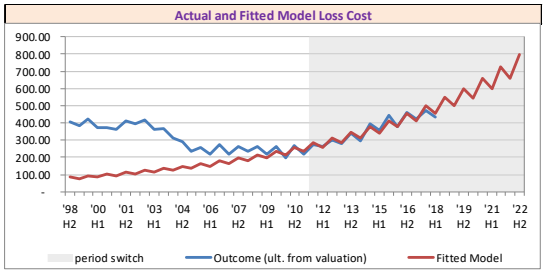
OW Single Period Approach Model

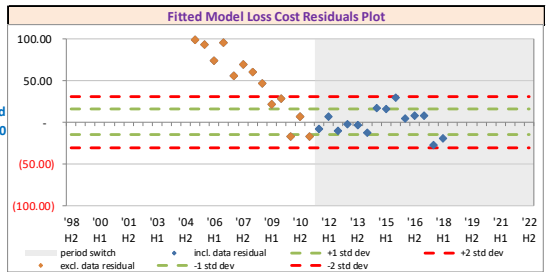
FITTED TREND STRUCTURE REGRESSION STATISTICS						
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9821	0.9645	0.9580	0.0418	14	26	3

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	-	-	-





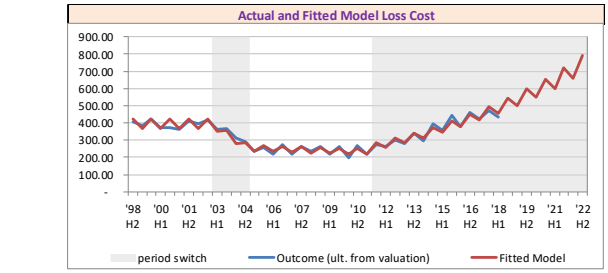
Multiple Period Model

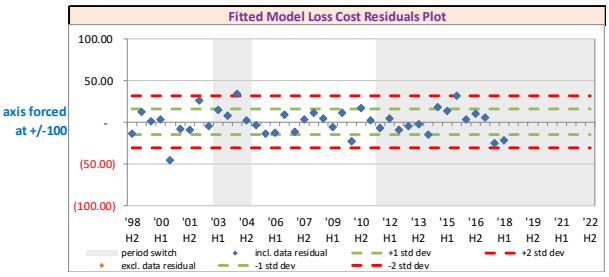
FITTED TREND STRUCTURE REGRESSION STATISTICS						
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9814	0.9631	0.9577	0.0510	40	-	6

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[8] 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*

[7]Due to time constraints, we were not able to update to reflect the December 31, 2018 data.

[8]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.

of moderation to the steep increases in loss costs...". We would agree that the loss cost model on the 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 at the top of the next page 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 experienced a 12.7% (annualized) one-time increase at 2014-H2, but the underlying trend both before and after 2014-H2 is +7.0%[9] +/-1.2%.

[9]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.

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.

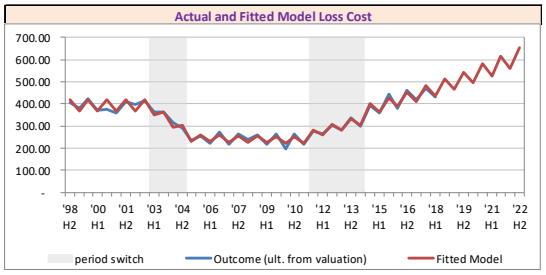
FITTED TREND STRUCTURE REGRESSION STATISTICS

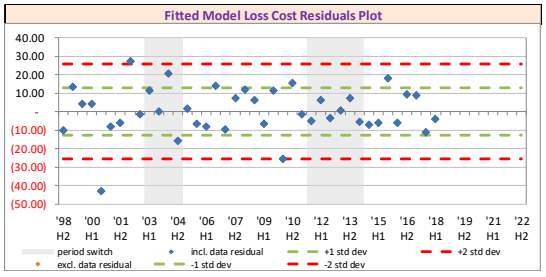
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9862	0.9727	0.9656	0.0460	40	-	9

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.

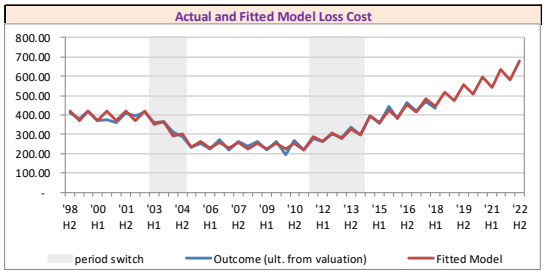
FITTED TREND STRUCTURE REGRESSION STATISTICS

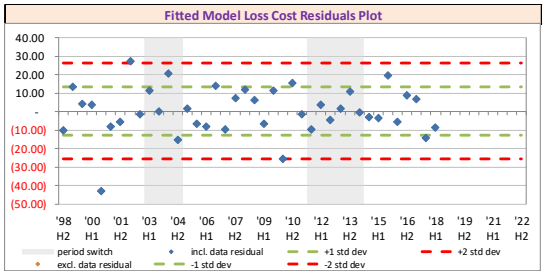
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9860	0.9721	0.9661	0.0457	40	-	8

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	-	-	-





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 at the top of the next page 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.

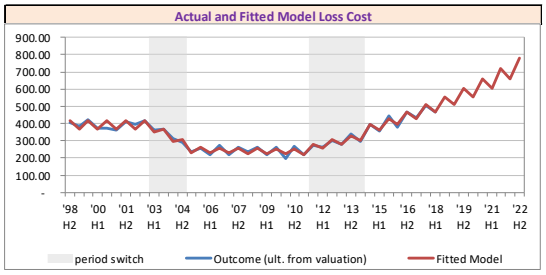
FITTED TREND STRUCTURE REGRESSION STATISTICS

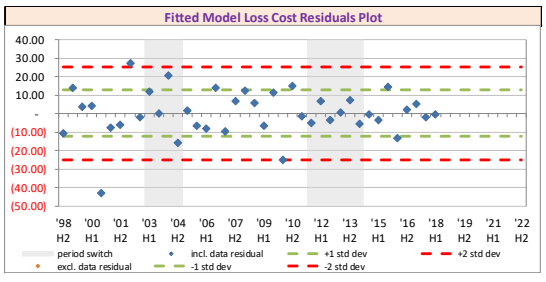
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9873	0.9748	0.9682	0.0455	40	-	9

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.

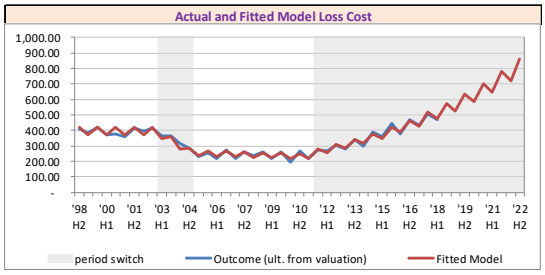
FITTED TREND STRUCTURE REGRESSION STATISTICS

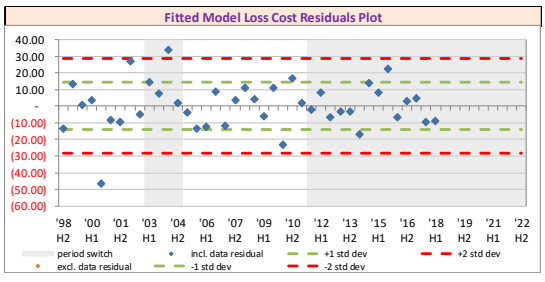
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9843	0.9688	0.9642	0.0483	40	-	6

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 28 of the OW PPV Report and page 25 of the OW CV Report refer only to 2003 and later, missing the factors for 1999 through to 2002. 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, per past comments provided, 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.

While we believe it is general good practice to forecast residuals / errors in any analysis where prior forecasts were provided, we believe it is that much more important to provide such when the forecast is used as a means to determine what is viewed as reasonable by the AIRB. To provide some context, we have attempted a review along these lines as follows. To provide perspective, we have also considered

the FA's own forecast approach and forecast variance. As the AIRB only considers 2 maturities on the yield curve (3 month and 3 year), we have focused our attention on those forecasts (note that the FA forecast approach forecasts a broader range of maturities on the yield curve). The AIRB historical forecasts were taken from historical OW PPV Reports.

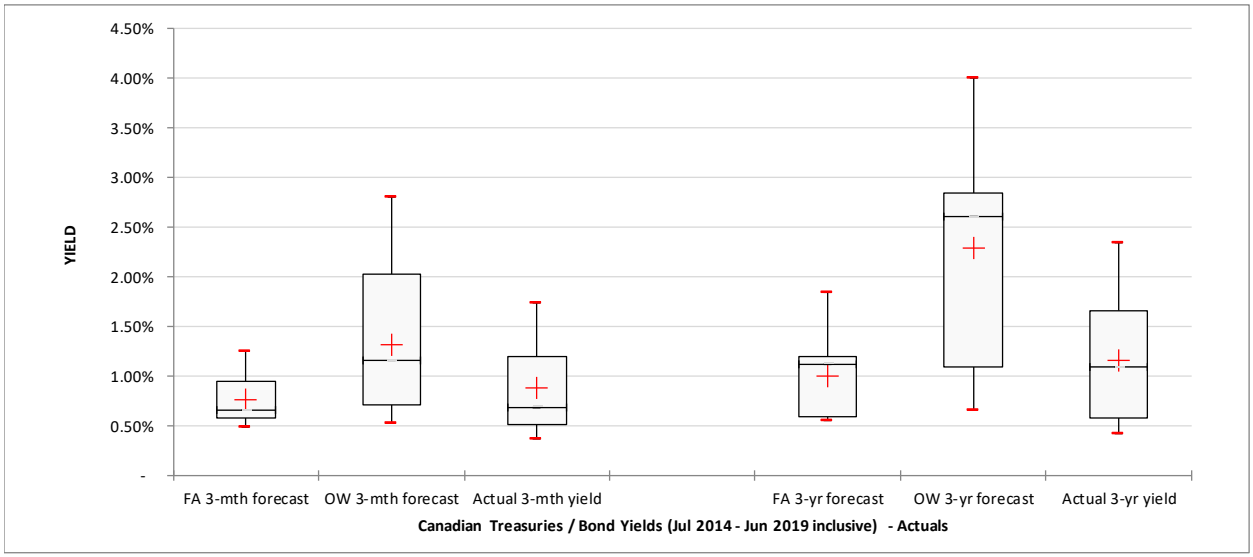
A summary of the forecasts for the most recent 60-months is provided below.

Forecasted 3-mth Canadian Treasury / 3-yr Government of Canada Bond yields vs Actual yields

Actuals and Forecasts - 3 mth & 3 yr Canadian Treasuries / Bond Yields (Jul 2014 - Jun 2019 inclusive) - Actuals and Forecasts - 3 mth & 3 yr

by issued term	FA 3-mth forecast	OW 3-mth forecast	Actual 3-mth yield	FA 3-yr forecast	OW 3-yr forecast	Actual 3-yr yield
count	60	60	60	60	60	60
max	1.25%	2.80%	1.73%	1.84%	4.00%	2.34%
3rd Q + 1.5 x IQR*	1.25%	2.80%	1.73%	1.84%	4.00%	2.34%
3rd Q	0.95%	2.03%	1.20%	1.20%	2.84%	1.66%
median	**0.65%**	**1.16%**	**0.69%**	**1.12%**	**2.60%**	**1.09%**
1st Q	0.58%	0.71%	0.51%	0.59%	1.09%	0.58%
1st Q - 1.5 x IQR*	0.49%	0.53%	0.37%	0.55%	0.66%	0.42%
min	0.49%	0.53%	0.37%	0.55%	0.66%	0.42%
average	**0.76%**	**1.31%**	**0.88%**	**1.00%**	**2.29%**	**1.15%**
std dev	0.25%	0.72%	0.45%	0.40%	1.05%	0.60%
coeff var	**32.9%**	**55.0%**	**51.1%**	**40.0%**	**45.9%**	**52.2%**

*subject to being less than the max and more than the min



The preceding box-and-whisker plot provides a visual summary of the 60 forecasts made by FA and OW along with the actual results. The lower "whisker" shows the minimum value, the bottom of the box is the the 25th percentile (i.e. 25% of the data was at or below), the line in the middle of the box is the median or 50th percentile, the top of the box is the 75th percentile (i.e. 75% of the data was at or below this level), and the upper "whisker" shows the maximum value. Finally, the red cross is the average value.

FA employs a simple forecast approach to the investment return. Our hypothesis is that yields are subject to a "random walk" statistical phenomenon in the short to medium term (that is, movements in

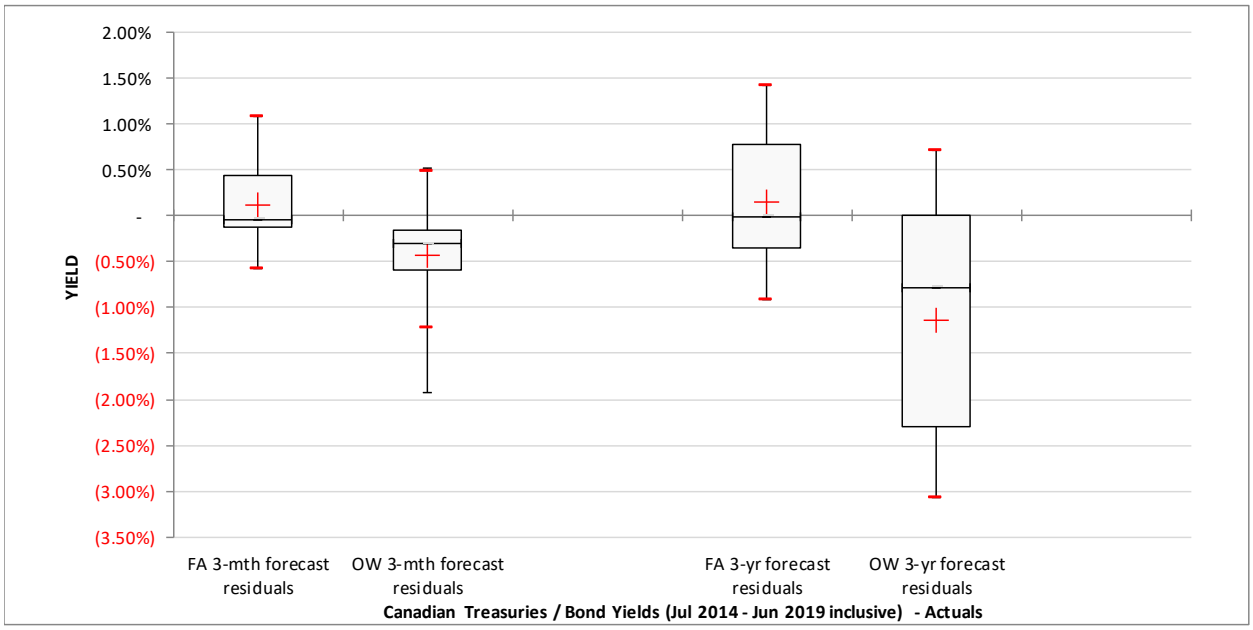
yields curves follow no discernible trend but rather move in random). Under this hypothesis, the best forecast for the short to medium term yield curve is the current yield curve. While simple, this forecast approach has been effective over the 60 months to June 2019 (see below).

Forecasted 3-mth Canadian Treasury / 3-yr Government of Canada Bond yields vs Actual yields

Canadian Treasuries / Bond Yields (Jul 2014 - Jun 2019 inclusive) - Forecast residuals - 3 mth & 3 yr

by issued term	FA 3-mth forecast residuals	OW 3-mth forecast residuals	FA 3-yr forecast residuals	OW 3-yr forecast residuals
count	60	60	60	60
max	1.08%	0.52%	1.41%	0.71%
3rd Q + 1.5 x IQR*	1.08%	0.48%	1.41%	0.71%
3rd Q	0.44%	(0.16%)	0.78%	0.01%
median	**(0.04%)**	**(0.31%)**	**(0.01%)**	**(0.78%)**
1st Q	(0.13%)	(0.59%)	(0.35%)	(2.30%)
1st Q - 1.5 x IQR*	(0.58%)	(1.22%)	(0.92%)	(3.07%)
min	(0.58%)	(1.92%)	(0.92%)	(3.07%)
average	**0.12%**	**(0.43%)**	**0.15%**	**(1.14%)**
std dev	0.46%	0.56%	0.65%	1.25%
coeff var	**383.3%**	**(130.2%)**	**433.3%**	**(109.6%)**

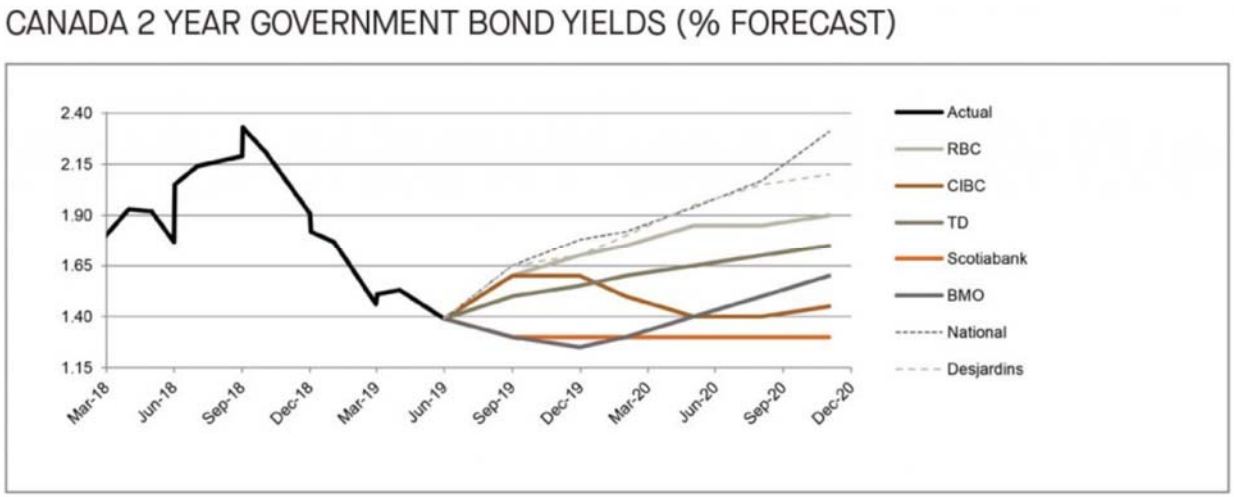
*subject to being less than the max and more than the min



(We would also point out that FA only forecasts investment returns for Alberta annually, as opposed to the AIRB's semi-annual forecasts – the FA forecast error would narrow with more frequent forecasts.)

In contrast to the FA forecast, the AIRB/OW forecast (which relies on the Alberta Treasury forecast) has had a higher forecast residual ("error") than the FA forecast, as summarized in the preceding table and chart.

To highlight that reasonable model / forecasts can result in a significant range of forecasts, we've reproduced the results from Richter's semi-annual economic forecast update, which includes summarizing 2-year yields for Canadian bonds. As indicated, the forecasts yields at September 2019 range from 1.25% to 1.65% (a range of 40 basis points) and at December 2020 range from 1.25% to 2.30% (over 100 basis points). This level of forecast variance alone should help inform the AIRB's choice on what a reasonable range around the Alberta Treasury forecast might be (notwithstanding that a 2-year forecast was not provided).



Source: https://www.richter.ca/survey-of-bank-forecasts-june-2019/

Another consideration for a reasonable range might be the historical range of yields for 3-months (which had a standard deviation of 45 basis points) and 3-year (which had a standard deviation of 60 basis points) – we would suggest a range using one to two-times the standard deviation as a reasonable to reflect not just the historical process variance as indicated by the standard deviation, but to also incorporate forecast risk.

The OW point estimate for the investment return is a reasonable approach, but again, there are other reasonable approaches (including but not limited to forecasting a more complete yield curve, and applying it by an applicant to their own forecasted policyholder cash flow expectations reflecting their policyholder portfolio).

To summarize, we are not advocating for the AIRB to adopt any particular alternative forecasting approach or model, but are instead advocating that the use of the AIRB's forecast for rate application purposes be changed to reflect that there are many reasonable approaches for yield curve forecasting, and that all forecasts inherently have forecast error. To this end, we recommend the current floor approach be updated to reflect an assumption range that the AIRB views as de facto reasonable (in this case, perhaps 2.84% +/-1.00%) and should applicants wish to use an assumption outside of this range, they simply be required to provide support that their forecast is also reasonable.

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.

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.