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February 21, 2020

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: OW Draft Review of 2019-06 Industry PPV Experience

Dear Ms. Butler,

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

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.

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

[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 2018 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.

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 or other changes to claims metrics;
- 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).

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.

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.

On the claims experience, we are seeing some evidence that industry AB PPV BI recorded indemnity and ALAE development may be stabilizing, which may reduce cost uncertainty, although claim count development does not yet appear to be stable, creating uncertainty around frequencies and averages.

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.

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

As we indicated in our previous submission, the OW Report does not contain an assessment of the May 17, 2018 amendments to the Minor Injury Regulations that were aimed at addressing (at least partially) the increases in bodily injury claims costs. The impact of these amendments is important in the context of predicting future claims costs. We believe users of the Report would benefit from having OW at least comment how they took the amendment into account, if at all (and if not, why not). FA has incorporated an explicit adjustment in our trend models for this amendment / clarification and would find it of interest to compare our assessment against a benchmark assessment.

On one final note, due to time constraints, we were not able to update all aspects of prior comments we have provided to the AIRB related to prior OW Reports. Part of this is directly due to having to copy by hand the data included in the OW Report, 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) report entitled "*Semi-Annual Review of Industry Experience – Preliminary Report as of June 30, 2019 Private Passenger Vehicles*", ("OW PPV Report" or "OW Report"). We appreciate the opportunity to provide feedback.

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

Section 1: Introduction vs Section 14: Consideration and Limitations

1.1 Data and Reliance

In this section, the OW Report states on page 1 "... *We have not audited, verified, or reviewed the data for reasonableness, accuracy, or consistency, as it is outside the scope of our study*. ..." While we can understand that auditing and verifying the accuracy of the data can be scoped out of the study, we're not sure that it is appropriate to scope out a review of reasonableness and consistency.

The statement quoted above differs from a statement provided in the OW Report in Section 14 (Considerations and Limitations) under "Data Verification", "... *Though we have reviewed the data for reasonableness and consistency, we have not audited or otherwise verified the data*. ..." This statement is more aligned with the activity we would expect the authors would ensure they undertook before analyzing the data.

We recommend that sections 1.1 and 14 be appropriately updated for consistency and clarity of what OW undertook (or didn't undertake) in order to obtain comfort in the quality of the data before they began their study.

The statement provided in the OW Report in Section 14 (Considerations and Limitations) under "Rounding and Accuracy", "... *As a result, there may be rounding differences between the results of calculations presented in the exhibits and replications of those calculations based on displayed underlying amounts*...." To avoid confusion and ease verification, we would suggest to round to the same decimal for both exhibits and calculations.

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

Experience during 1st half of 2019

Before considering the OW PPV Report discussion of selected ultimate claim amounts, we first present some summary information related to the calendar halfs. Per the tables on the bottom of the next page

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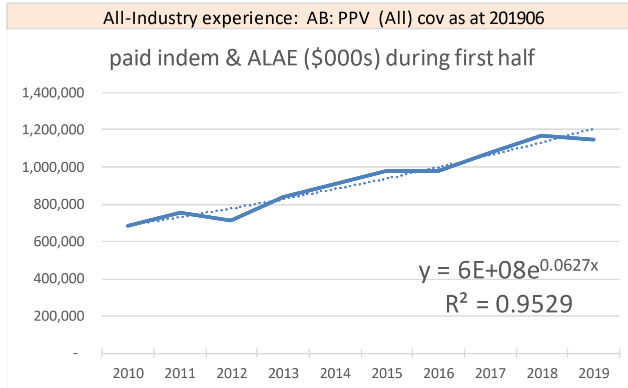
[2]We found this change for each coverage in the "Selection of Loss Trend Rates" section, other than for Bodily Injury where the first paragraph after the bullet list at the top of the page 17 of the OW PPV Report still references "measured" rather than "estimated" trends.

and onto the page thereafter, overall paid indemnity & ALAE in calendar half 2019-1 was down slightly from 2018-1, primarily due to reduced payments for physical damage coverages. Given that there have been year-on-year reductions in the past only to be followed by reversion to increases, we do not believe the 2019-1 calendar half results to be signaling a change in aggregate paids. To 2019, payments during the first half of the calendar year have been increasing annually at approximately 6% (see chart to right). 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 +4.4% for mandatory coverages – this appears in line with the calendar payment trend after adjusting for increases in earned vehicle counts.



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

ALL COVERAGES COMBINED

Cal Yr	1st half of cal year: paid indem & ALAE ($000s)	chg in paid ($000s)	% change
2019	1,149,417	(16,995)	(1.5%)
2018	1,166,412	86,488	8.0%
2017	1,079,924	103,795	10.6%
2016	976,129	(6,242)	(0.6%)
2015	982,371	76,753	8.5%
2014	905,618	64,412	7.7%
2013	841,205	129,933	18.3%
2012	711,272	(43,195)	(5.7%)
2011	754,467	70,609	10.3%
2010	683,858		

annualized to 2019: 5.9%
annualized to 2018: 6.9%

BI, PD, UM

Cal Yr	1st half of cal year: paid indem & ALAE ($000s)	chg in paid ($000s)	% change
2019	621,937	(913)	(0.1%)
2018	622,850	59,794	10.6%
2017	563,056	46,448	9.0%
2016	516,608	11,605	2.3%
2015	505,003	15,885	3.2%
2014	489,118	63,290	14.9%
2013	425,828	25,995	6.5%
2012	399,834	24,543	6.5%
2011	375,291	(5,691)	(1.5%)
2010	380,981		

annualized to 2019: 5.6%
annualized to 2018: 6.3%

AccBen

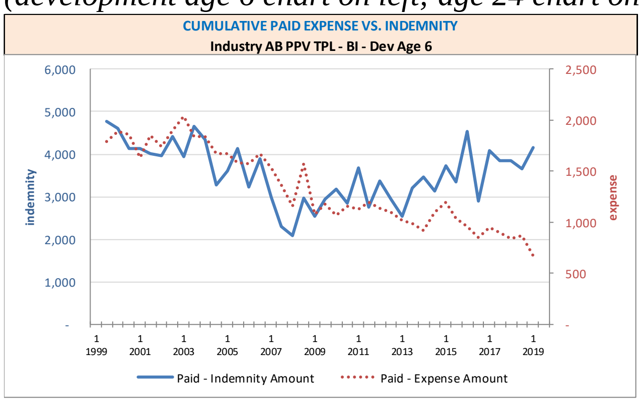
Cal Yr	1st half of cal year: paid indem & ALAE ($000s)	chg in paid ($000s)	% change
2019	80,631	6,237	8.4%
2018	74,394	8,906	13.6%
2017	65,488	7,517	13.0%
2016	57,970	7,225	14.2%
2015	50,746	2,687	5.6%
2014	48,059	4,069	9.2%
2013	43,990	178	0.4%
2012	43,812	1,435	3.4%
2011	42,378	1,586	3.9%
2010	40,792		
		annualized to 2019:	7.9%
		annualized to 2018:	7.8%

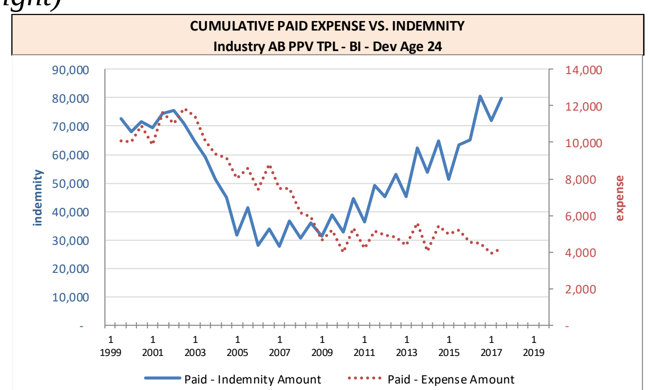
CL, CM, SP, AP

Cal Yr	1st half of cal year: paid indem & ALAE ($000s)	chg in paid ($000s)	% change
2019	446,848	(22,320)	(4.8%)
2018	469,168	17,788	3.9%
2017	451,380	49,829	12.4%
2016	401,551	(25,071)	(5.9%)
2015	426,622	58,181	15.8%
2014	368,441	(2,946)	(0.8%)
2013	371,387	103,761	38.8%
2012	267,627	(69,173)	(20.5%)
2011	336,799	74,714	28.5%
2010	262,085		
		annualized to 2019:	6.1%
		annualized to 2018:	7.6%

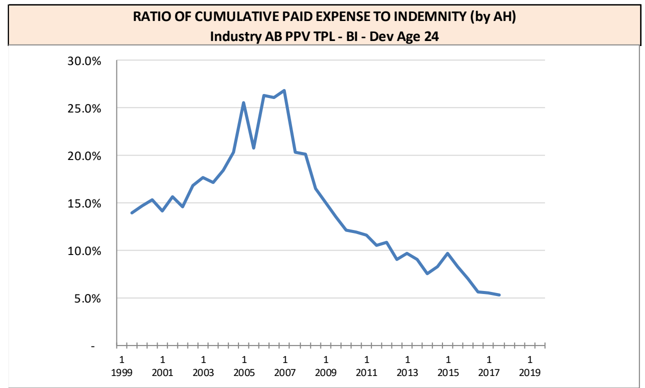
We also note a continuation of the previous pattern we identified and discussed in prior submissions related to the change in relationship between paid indemnity and paid ALAE for bodily injury. Specifically, we have noted that by 24 months, the total dollar amount of paid ALAE has remained steady at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

*Industry Alberta **PPV BI Paid Indemnity** and **Paid ALAE** at Jun. 30, 2019 by accident half (development age 6 chart on left; age 24 chart on right)*





As per the charts 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.

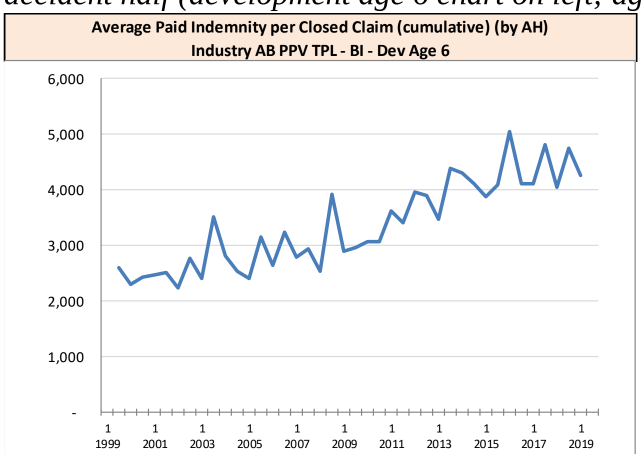


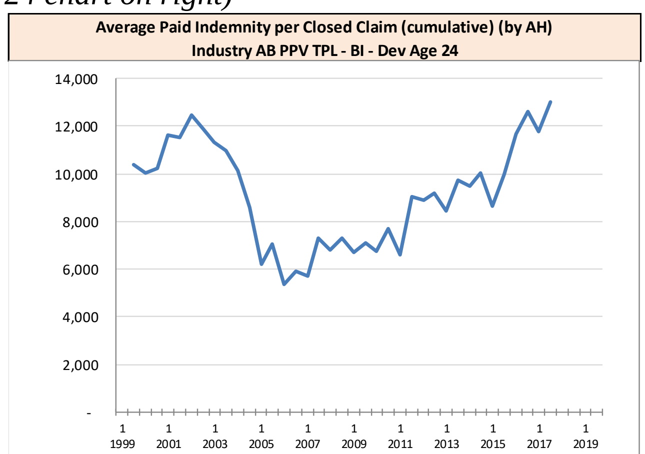
As a result of the differing patterns of paid indemnity and paid ALAE, the ratio of paid ALAE to paid indemnity has been decreasing since its peak in 2006, and the ratio at 24-months of development is at low point of just over 5% (down from over 25% in 2007), as indicated in the chart to the right.

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.

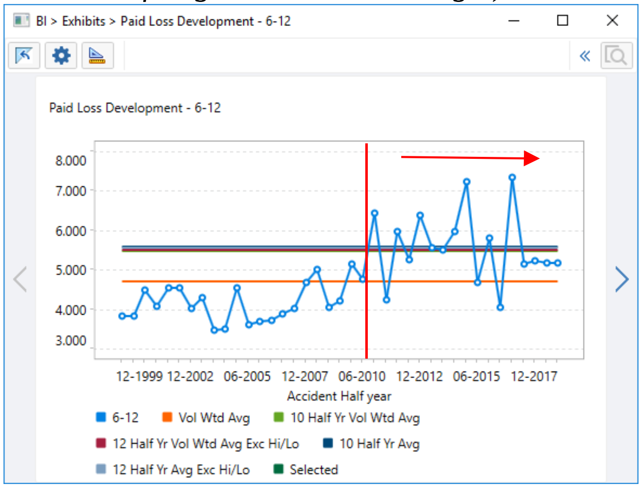
*Industry Alberta **PPV** **BI** **Average Paid Indemnity Only** per closed claim at Jun. 30, 2019 by accident half (development age 6 chart on left; age 24 chart on right)*

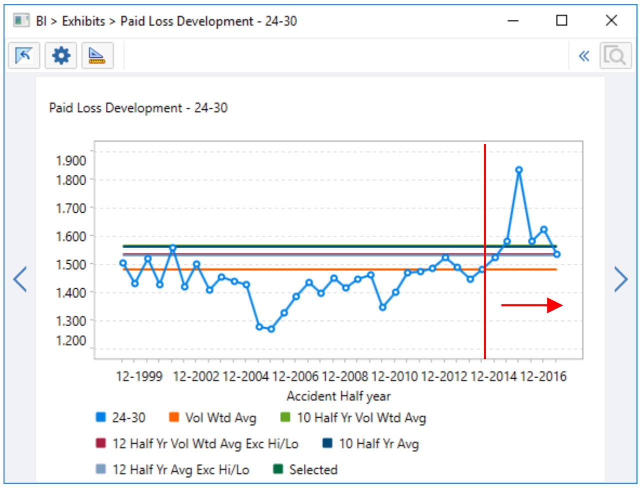




While there appears to be evidence that average paid indemnity at 6-months may be flattening since 2016, this does not seem to hold at older development ages, which may indicate a change in development patterns / settlement patterns, exacerbating uncertaintly challenges already faced in trying to estimate ultimates for this coverage. We have provided paid development factors at age 6-12 and at 24-30 at the top of the next page to show how those recent factors appear to be stable for 6-12, but appear to be changing for 24-30.

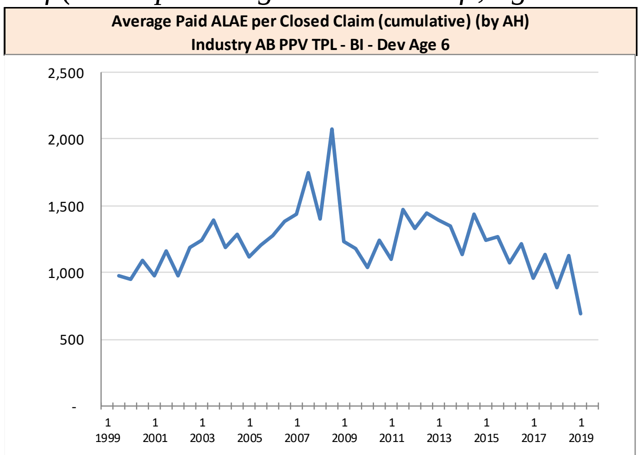
*Industry Alberta **PPV** **BI** **Paid Indemnity Only** link ratios by accident half (development age 6-12 chart on left; age 24-30 chart on right)*

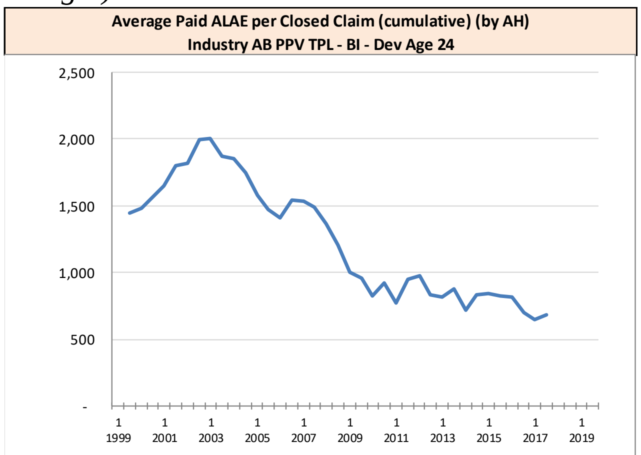




As indicated in the charts below, there is evidence that average paid ALAE has decreased for more recent accident halfs (at around 2% annual per the age 24 data), which may signal an actual change, or may reflect a change in claim counts reported as previously discussed.

*Industry Alberta **PPV** **BI** **Average Paid ALAE Only** per closed claim at Jun. 30, 2019 by accident half (development age 6 chart on left; age 24 chart on right)*

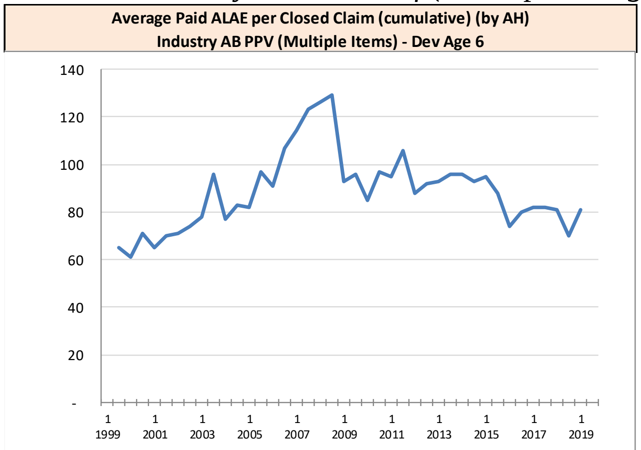


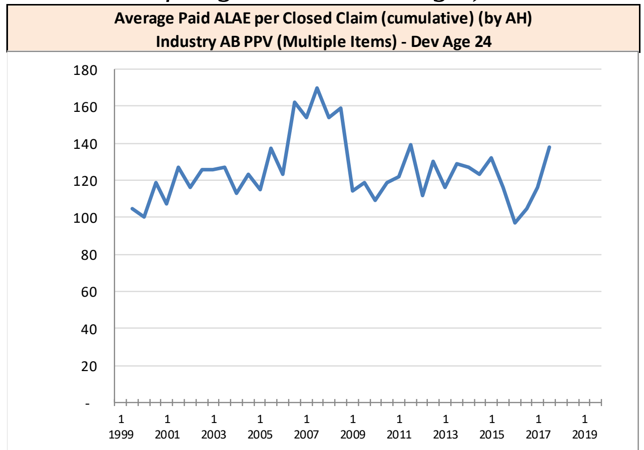


Assuming that this is a signal that average paid ALAE for BI claims is decreasing, we note that this does not appear to be occurring in relation to other coverages on an aggregate basis (see charts on the next page).

One rationale for reductions in average paid ALAE for BI while average paid indemnity continues to rise may be due to insurers bringing more claims management in-house for BI, which would lead to an increase in ULAE per BI claim. If this is the case, it may not be appropriate to apply aggregate ULAE factors across coverages (later, we discuss concerns with applying a calendar year factor to accident period claims in relation to ULAE).

*Industry Alberta **PPV ALL coverages EXCLUDING BI Average Paid ALAE Only** per closed claim at Jun. 30, 2019 by accident half (development age 6 chart on left; age 24 chart on right)*





As per our prior submissions, we have found additional differences in PPV BI average indemnity and ALAE case reserves (again, care must be taken here due to potential inconsistencies in how claim counts are reported).

For AB PPV BI indemnity case reserves as shown in the heat map below, the most recent 8-10 diagonals for accident halfs after 2012 are indicating the highest levels in the triangle.

*Industry Alberta **PPV BI Average Case Reserve Indemnity Only** per open claim at Jun. 30, 2019 by accident half (heat map – green to yellow to red indicates increasing amount for column)*

BI > Exhibits > Case Loss Reserves per Open Claim

Case Loss Reserves per Open Claim

Accident Half year	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102
12-1999	22	34	48	63	79	98	110	131	147	165	178	196	216	245	295	301	498
06-2000	21	31	45	58	77	88	107	128	147	158	167	202	234	254	267	325	260
12-2000	22	33	46	61	72	89	103	119	143	163	187	216	237	254	274	275	318
06-2001	22	31	47	59	76	92	113	132	150	155	166	184	212	252	226	289	313
12-2001	22	34	49	66	81	95	107	119	145	158	167	190	242	215	226	232	283
06-2002	21	32	46	62	81	100	114	146	163	188	211	252	238	289	287	290	341
12-2002	22	35	51	68	86	101	125	143	162	189	204	219	269	280	286	290	284
06-2003	22	34	47	61	78	103	114	128	147	170	191	216	205	218	288	270	355
12-2003	25	39	55	70	97	118	126	144	175	195	228	230	259	257	258	282	352
06-2004	24	38	51	71	85	100	108	131	153	168	171	185	198	215	268	307	272
12-2004	24	36	52	69	84	95	106	121	142	142	158	188	208	249	272	214	295
06-2005	20	30	43	53	68	86	103	121	119	125	123	128	152	165	141	189	203
12-2005	19	30	42	50	63	85	96	106	123	128	147	175	215	185	210	266	293
06-2006	19	28	38	46	69	82	85	97	107	121	134	147	128	164	175	191	242
12-2006	20	32	38	55	75	83	98	107	123	132	148	138	180	194	232	266	328
06-2007	16	23	35	46	58	77	86	96	117	134	128	183	184	198	219	248	250
12-2007	19	30	42	54	73	85	98	117	133	133	168	209	250	283	312	334	369
06-2008	19	27	36	46	59	79	97	111	117	156	172	194	273	300	289	387	507
12-2008	21	31	43	56	84	105	117	132	169	185	188	209	250	297	360	350	452
06-2009	19	28	37	48	67	85	94	130	160	203	240	264	310	313	332	271	269
12-2009	21	30	46	61	84	106	144	175	210	228	250	257	263	327	384	417	374
06-2010	17	27	38	53	72	109	131	153	173	191	213	233	259	322	371	385	349
12-2010	19	29	41	55	93	128	148	168	185	204	229	269	310	391	450	389	516
06-2011	16	24	35	52	82	107	127	153	185	201	246	275	288	340	315	368	390
12-2011	19	29	46	67	106	141	162	197	240	273	310	351	444	418	559	739	
06-2012	18	30	44	63	101	130	148	178	208	254	275	414	408	403	480		
12-2012	19	28	43	63	102	134	147	174	207	227	277	293	382	409			
06-2013	17	28	43	65	108	131	148	181	219	270	281	356	379				
12-2013	19	30	48	71	105	140	158	186	223	251	296	339					
06-2014	18	32	50	72	112	142	165	204	260	287	319						
12-2014	22	36	58	87	127	159	189	233	292	348							
06-2015	21	38	58	85	124	165	200	237	290								
12-2015	26	41	62	94	147	188	217	253									
06-2016	23	38	64	96	135	166	201										
12-2016	24	41	70	99	133	167											
06-2017	23	43	69	96	135												
12-2017	30	48	72	98													
06-2018	28	44	67														
12-2018	30	48															
06-2019	26																
Exponential Curve:																	
Slope %	0.34 %	0.55 %	0.82 %	1.15 %	1.71 %	1.90 %	1.91 %	1.95 %	2.03 %	2.05 %	2.01 %	2.06 %	2.06 %	2.04 %	2.24 %	2.00 %	0.94 %
Y Intercept	20	29	41	52	65	78	90	105	120	133	146	164	184	201	212	233	292
R squared	0.067	0.128	0.216	0.313	0.519	0.594	0.560	0.529	0.495	0.463	0.424	0.385	0.352	0.360	0.317	0.270	0.075
Projected	23	37	56	80	121	154	174	202	232	254	270	302	332	353	386	391	369

Accident Half year	108	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210
12-1999	358	570	575	469	623	413	521	682	216	305	117							
06-2000	339	477	341	291	341	974	835	1,656										
12-2000	293	209	224	169	202	239	136	117	133	27	13							
06-2001	385	394	344	1,024	721	688	826	839	685	686	502	455	644	645				
12-2001	374	402	401	558	679	723	794											
06-2002	322	410	517	507	601	1,369	2,673	2,347	2,053	1,309	809							
12-2002	326	431	360	375	362	225	246	135										
06-2003	457	516	740	677	813	1,304	708	1,351	2,707	1,045	1,032	999	999	999	999	807		
12-2003	327	580	717	864	669	857	1,374	1,302	706	743	743	432	437	1,103	1,106			
06-2004	319	355	285	417	659	421	278	284	284	413	979							
12-2004	244	277	436	526	466	953	799	183	365									
06-2005	297	267	346	330	382	403	567	582	308	231	819	410						
12-2005	361	525	489	558	618	579	588	617	336	733	486							
06-2006	297	281	287	405	411	473	294	111	109	493								
12-2006	421	591	743	677	1,039	1,319	2,049	1,581	840									
06-2007	314	267	361	407	341	371	274	403										
12-2007	302	486	388	614	661	679	661											
06-2008	661	756	686	561	562	626												
12-2008	539	663	648	853	518													
06-2009	312	202	262	313														
12-2009	289	423	469															
06-2010	330	348																
12-2010	560																	
Exponential Curve:																		
Slope %	0.88 %	-0.07 %	0.83 %	1.36 %	1.14 %	0.62 %	0.20 %	-3.28 %	-0.78 %	8.04 %	24.18 %	-1.91 %	-2.39 %	11.39 %	10.71 %			
Y Intercept	320	406	393	424	470	578	595	714	486	230	79	624	776	419	443			
R squared	0.062	0.000	0.020	0.035	0.028	0.004	0.000	0.024	0.001	0.096	0.388	0.023	0.024	1.000	1.000			
Projected	395	400	472	563	589	650	617	405	428	732	1,629	486	580	1,374	1,224			

100%

We see a similar phenomena in relation to average ALAE per open BI claim, although the applicable diagonals appear to be the more recent 5, rather than 8-10 as found for indemnity.

*Industry Alberta **PPV** **BI** **Average Case Reserve ALAE Only** per open claim at Jun. 30, 2019 by accident half (heat map – green to yellow to red indicates increasing amount for column)*

BI > Exhibits > Case ALAE Reserves per Open Claim

Case ALAE Reserves per Open Claim

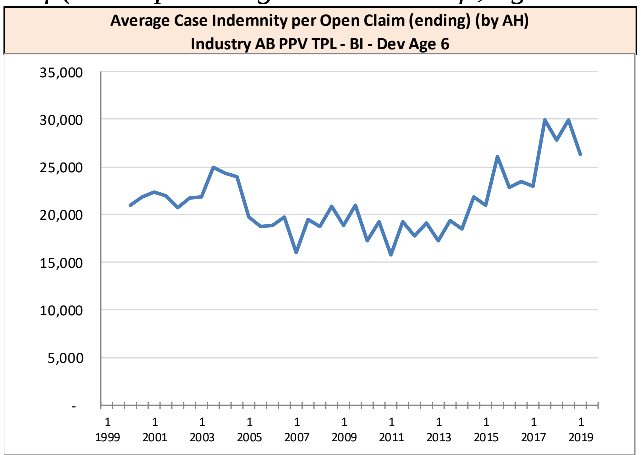
Accident Half year	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96
12-1999	1	1	1	2	2	4	4	6	7	7	8	8	10	14	16	18
06-2000	1	1	1	1	3	3	4	5	6	7	8	9	11	17	19	19
12-2000	1	1	1	2	2	3	4	5	6	7	9	13	12	12	15	14
06-2001	1	1	1	1	2	3	4	5	6	7	8	10	13	14	16	17
12-2001	1	1	1	2	2	3	4	5	6	6	8	8	12	9	11	11
06-2002	1	1	1	1	2	3	4	6	7	9	11	13	13	15	15	15
12-2002	1	1	1	2	3	3	5	6	8	10	11	12	15	17	14	15
06-2003	1	1	1	2	3	4	5	6	8	9	10	13	11	11	13	12
12-2003	1	1	1	2	3	4	5	6	8	8	9	9	12	12	11	15
06-2004	1	1	1	2	3	5	6	8	8	9	9	10	10	11	13	13
12-2004	1	1	2	2	3	4	5	6	7	7	8	9	10	12	14	10
06-2005	1	1	2	2	3	4	5	6	6	6	7	7	8	10	8	10
12-2005	1	1	2	2	3	4	5	5	6	7	8	9	11	9	12	14
06-2006	1	1	1	2	3	4	4	5	5	7	7	8	7	9	9	9
12-2006	1	1	1	2	3	3	4	5	6	7	7	8	10	11	13	15
06-2007	1	1	1	2	2	3	4	4	5	6	5	8	9	9	9	13
12-2007	1	1	1	2	2	3	4	5	6	7	8	10	12	15	16	17
06-2008	1	1	1	1	2	3	4	5	5	7	9	11	14	16	16	19
12-2008	1	1	1	2	3	4	5	6	8	9	9	11	12	14	16	19
06-2009	1	1	1	2	3	4	5	6	8	10	11	12	11	14	15	14
12-2009	1	1	2	2	3	5	6	7	9	10	11	12	13	15	19	22
06-2010	1	1	1	2	3	5	6	7	8	10	11	13	15	18	24	25
12-2010	1	1	2	2	4	6	7	8	9	10	12	14	14	20	27	24
06-2011	1	1	1	2	3	5	6	8	10	11	14	15	17	21	21	22
12-2011	1	1	2	2	4	6	7	9	11	13	16	21	26	27	29	29
06-2012	1	1	1	2	4	5	7	8	10	13	16	24	21	22	28	
12-2012	1	1	2	2	4	6	7	9	11	14	17	18	22	23		
06-2013	1	1	2	2	4	6	8	9	14	16	17	23	22			
12-2013	1	1	2	2	4	6	8	11	13	14	17	20				
06-2014	1	1	2	3	5	7	10	10	14	15	18					
12-2014	1	1	2	3	5	9	10	12	15	17						
06-2015	1	1	2	3	7	8	10	11	14							
12-2015	1	1	2	4	6	8	9	12								
06-2016	1	1	3	4	6	7	9									
12-2016	1	2	3	4	5	7										
06-2017	1	2	3	4	5											
12-2017	1	2	2	3												
06-2018	1	1	2													
12-2018	1	2														
06-2019	1															
Exponential Curve:																
Slope %	0.84 %	1.28 %	1.68 %	2.07 %	2.64 %	2.72 %	2.65 %	2.56 %	2.69 %	2.69 %	2.59 %	2.68 %	2.31 %	2.13 %	2.28 %	1.99 %
Y Intercept	1	1	1	1	2	3	4	4	5	6	7	8	9	10	11	12
R squared	0.276	0.401	0.493	0.601	0.749	0.761	0.743	0.675	0.632	0.596	0.500	0.432	0.363	0.288	0.255	0.244
Projected	1	1	2	3	5	7	9	10	12	14	15	17	18	19	21	20

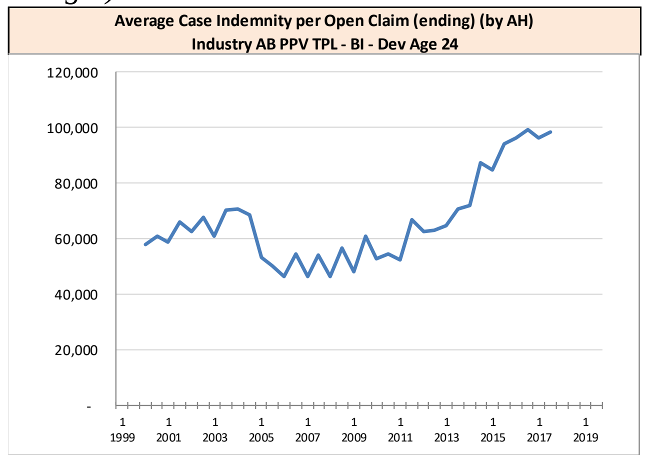
Accident Half year	102	108	114	120	126	132	138	144	150	156	162	168	174	180	186	192
12-1999	28	21	32	32	29	26	15	19	23	18	26	11				
06-2000	12	16	22	18	23	30	81	46	140							
12-2000	17	21	15	17	13	17	19	16	12	25	51	11				
06-2001	16	21	26	29	103	74	44	57	49	28	28	26	19	51	38	
12-2001	17	23	25	20	25	25	26	23								
06-2002	17	18	28	27	24	34	45	81	127	137	70	51				
12-2002	14	17	27	23	27	16	60	31	26							
06-2003	18	21	24	31	25	31	96	53	51	114	81	76	145	115	112	83
12-2003	12	15	23	22	31	11	8	25	18	24	48	49	30	27	51	47
06-2004	11	13	23	33	48	64	22	18	23	28	28	47				
12-2004	17	16	20	32	52	45	90	67	4	26						
06-2005	11	23	12	13	15	15	19	31	37	26	17	57	27			
12-2005	16	18	36	42	26	37	30	48	67	33	79	54				
06-2006	14	16	14	14	16	23	33	22	26	8	58					
12-2006	17	23	28	37	25	36	35	53	94	81						
06-2007	13	12	19	16	15	14	16	15	44							
12-2007	17	13	16	16	28	36	72	52								
06-2008	26	35	37	46	31	27	27									
12-2008	23	31	42	42	61	41										
06-2009	21	23	14	9	11											
12-2009	16	15	19	15												
06-2010	26	27	24													
12-2010	23	27														
06-2011	26															
Exponential Curve:																
Slope %	1.49 %	0.92 %	-0.50 %	-0.93 %	-1.23 %	0.28 %	-0.18 %	0.86 %	-0.39 %	-0.50 %	2.06 %	15.30 %	3.33 %	-3.05 %	12.66 %	-43.37 %
Y Intercept	14	17	24	26	31	27	34	31	36	35	36	12	29	67	26	7,851
R squared	0.144	0.048	0.010	0.017	0.018	0.001	0.000	0.006	0.000	0.001	0.027	0.669	0.014	0.013	0.319	1.000
Projected	21	22	21	21	24	29	32	36	34	32	49	91	45	47	97	27

100%

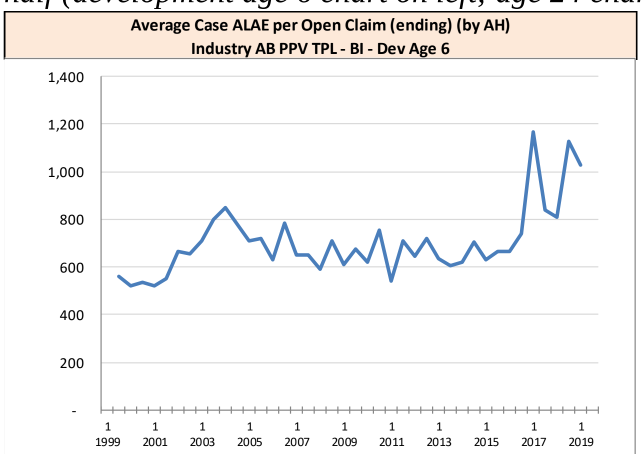
We show this another way in the charts on the next page, focusing on individual ages (columns in the preceding triangles). Average case reserves for indemnity have been increasing from around 2011/2012 at rates which would allow for a catch-up to average paids in terms of overall change since 2011 (we've 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).

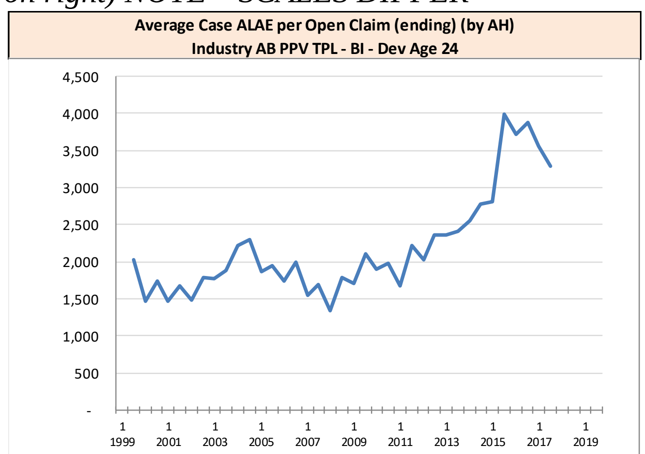
*Industry Alberta PPV **BI** **Average Case Indemnity Only** per open claim at Jun. 30, 2019 by accident half (development age 6 chart on left; age 24 chart on right) NOTE – SCALES DIFFER*





*Industry Alberta PPV **BI** **Average Case ALAE Only** per open claim at Jun. 30, 2019 by accident half (development age 6 chart on left; age 24 chart on right) NOTE – SCALES DIFFER*





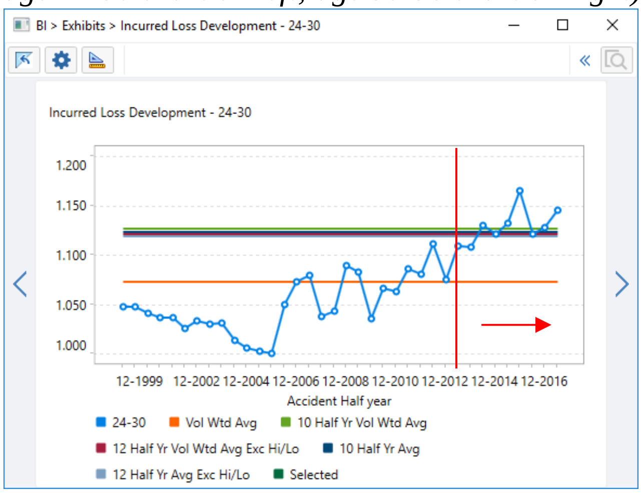
OW Selections of BI Ultimate Indemnity & ALAE – Link Ratio Selections

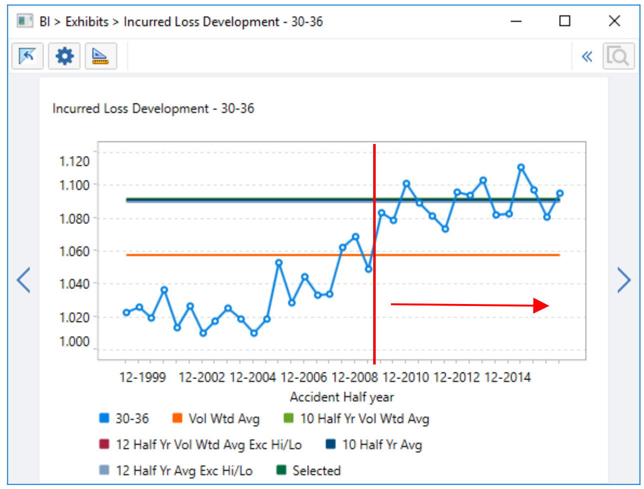
OW provides their default approaches to selecting link ratios. The defaults are generally on a weighted volume basis, using the most recent 6 accident halfs, or 3 rolling accident years of data.

The table that starts at the bottom of the next page compares the selection bases, and the incremental link ratios based on each basis. We highlighted where the selection basis has changed from one review to the next (note that only the first row indicates a selection basis change from the last report).

We have also highlighted in particular 2 rows in the middle of the table where changes in selection basis wasn't changed from the last report, and is not on a consistent basis as the default, although the link ratio selected is within 0.001 points of the default level. As such, it would seem like the default ought to be used. The reason stems from what appears to be a stabilizing of the factors over a longer period, after a period of change. In particular, the 30-36 link ratios for the most recent 6 seem to have stabilized, and for 30-36, the stabilized period is arguably over the last 14 data points. This is also true to later development ages, where the factors seem to be reasonably stable over a much larger data set than just the most recent 6. Given that a larger sample size will provide a better (i.e. more stable) estimate, it may be worthwhile considering an expansion of the default length from 6 to 14 or more for the older development ages, perhaps adopting a trimmed mean approach (i.e. exclude high/low values).

*Industry Alberta **PPV BI Recorded Indemnity and ALAE** link ratios by accident half (development age 24-30 chart on left; age 30-36 chart on right)*





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

factor id	OW default basis	OW 2019-H1 BI Basis	OW 2018-H2 BI basis	OW 2018-H1 BI basis
6-12	Wght Avg: 6 factors (adjusted for seasonality where appropriate) (1.339 x seasonality; 1.259 w seasonality)	Wght Avg last 4 Semesters ending in 6 (1.272)	last 4 Semesters ending in 12 (1.352)	last 4 Semesters ending in 6 (1.273)
12-18	Wght Avg: 6 factors (1.151)	Wght Avg: 6 Semester (1.151)	Wght Avg: 6 Semester (1.141)	Wght Avg: 10 Semester (1.118)

factor id	OW default basis	OW 2019-H1 BI Basis	OW 2018-H2 BI basis	OW 2018-H1 BI basis
18-24	Wght Avg: 6 factors (1.147)	Wght Avg: 6 Semester (1.147)	Wght Avg: 6 Semester (1.146)	Wght Avg: 10 Semester (1.128)
24-30	Wght Avg: 6 factors (1.140)	Wght Avg: 4 Semester (1.141)	Wght Avg: 4 Semester (1.140)	Wght Avg: 10 Semester (1.123)
30-36	Wght Avg: 6 factors (1.097)	Wght Avg: 4 Semester (1.098)	Wght Avg: 4 Semester (1.097)	Wght Avg: 4 Semester (1.099)
36-42 to 210-216	Wght Avg: 6 factors	Wght Avg: 4 Semester	Wght Avg: 4 Semester	Wght Avg: 4 Semester
216-222 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

As we have recommended in the past, 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.

As we have recommended in the past, we continue to 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.

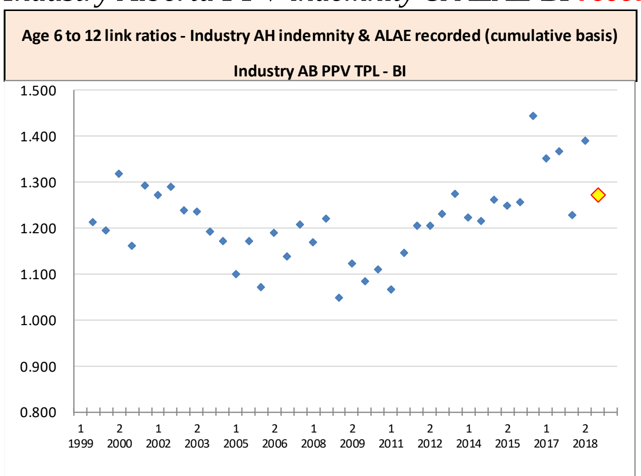
Link Ratio Methodology Challenges

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).

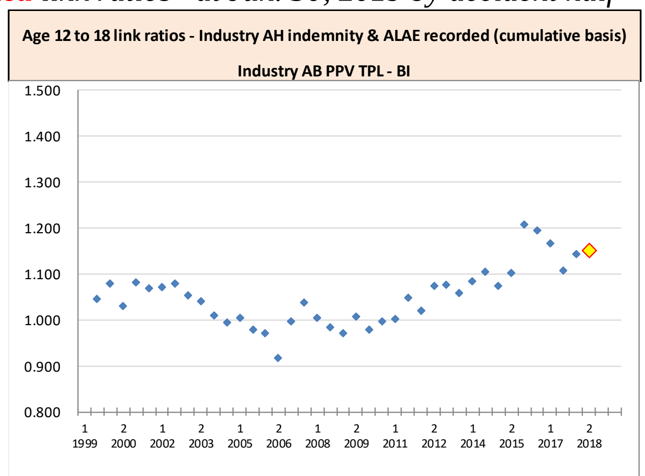
One of the primary assumptions to support the use of the link ratio methodology is that the historical experience is predictive of future experience, and therefore "link ratios" derived from the historical experience can be used to estimate future experience.

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. This suggests that alternative valuation methodologies should be considered to augment the analysis. To provide some context, we provide some BI recorded indemnity + ALAE link ratio charts below, which include the OW selected link ratios for those first 4 periods (shown in the charts as a yellow marker with a red border – the furthest right on each chart).

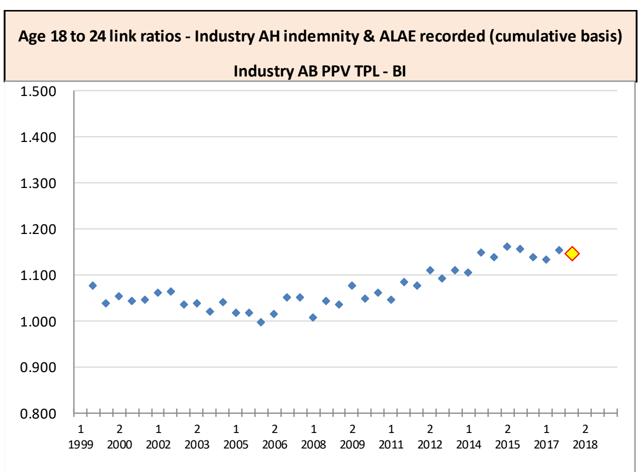
*Industry Alberta PPV indemnity & ALAE BI **recorded** link ratios* at Jun. 30, 2019 by accident half*



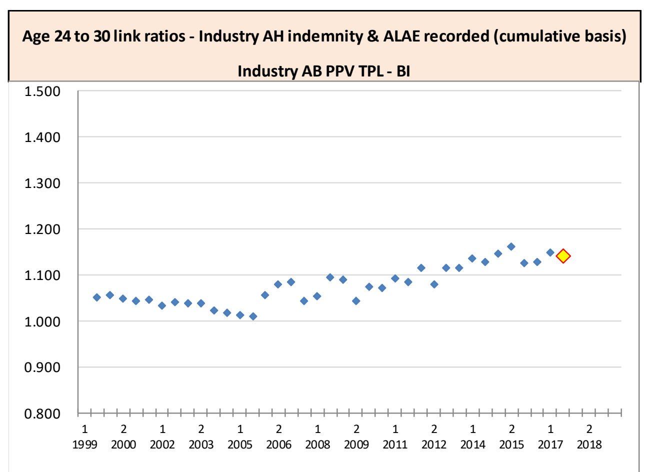
OW selected: **1.272** (2018-2 selected: 1.352)



OW selected: **1.151** (2018-2 selected: 1.141)



OW selected: **1.147** (2018-2 selected: 1.146)



OW selected: **1.141** (2018-2 selected: 1.140)

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

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

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

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

If this methodology does turn out to have a stronger predictive capability than the link ratio methodology generally employed now (by OW as the primary methodology and by FA alongside a B/F methodology), the implication seems to be for a continuation of adverse development for the near future

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

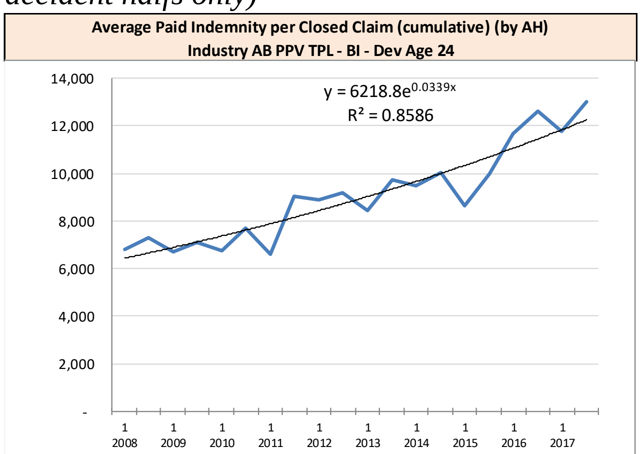
However, we have not performed a similar analysis on more recent AIX data, due to resource and time constraints.

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.

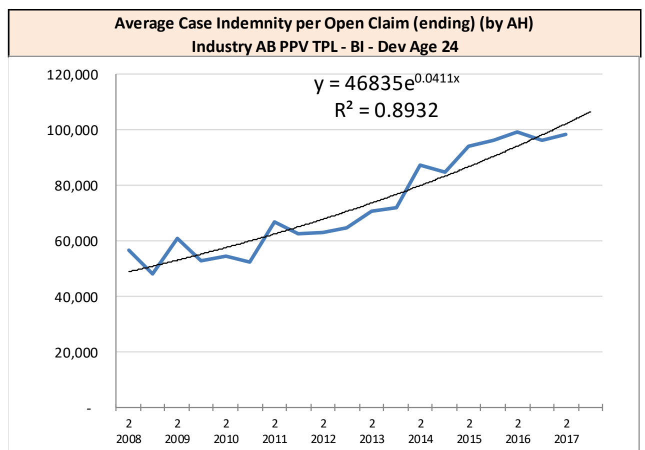
Another general concern we have is that bodily injury relative case reserve adequacy might increase as claims settlements show case inadequacy and with general industry concern with bodily injury trends. To consider this item further, we took several different approaches, including performing regression 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). **Note: due to changes in claim counting methodologies as noted in the OW Report[4] averages for paids and case reserves may be impacted in ways that impact trend analysis of those averages.**

Assuming the impact of company changes in reporting counts as not significant for averages analyses, the regressions generally show both average paid indemnity and average case reserves increasing, but case reserves are now increasing faster after age 6 months than paids. The charts below provide an example (using development age 24 months, and indemnity only), where the annualized trend for average paid is 6.5% vs 8.2%[5] 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 Jun. 30, 2019, at development Age 24 months (latest 20 accident halfs only)*



latest 20 accident halves



latest 20 accident halves

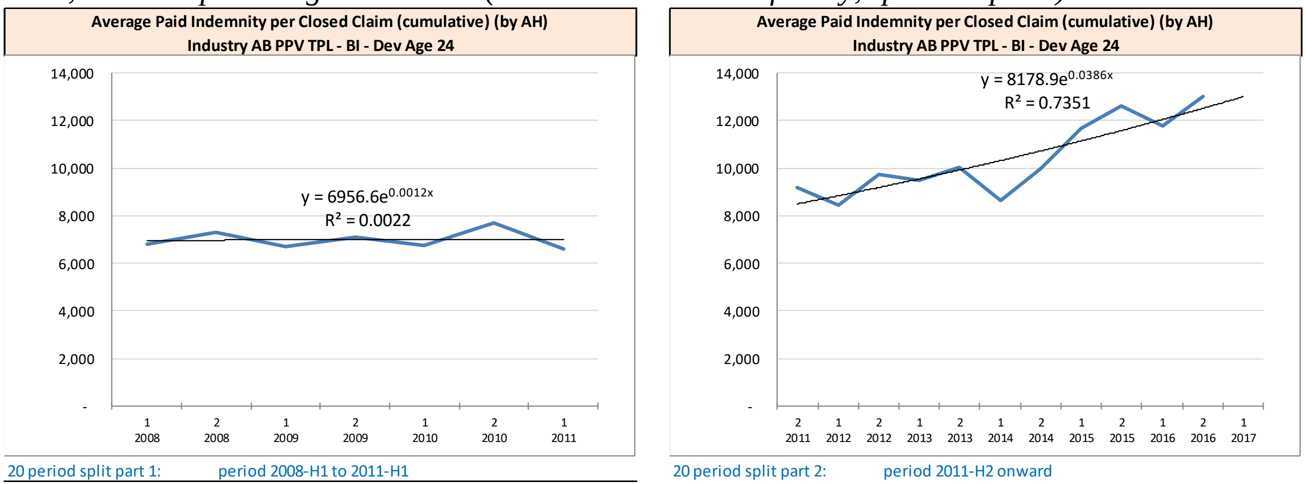
Both the paid and case averages above seem to suggest a possible change at around 2011-H1 and 2011-H2. If the above 20 accident half periods are split into pre and post 2011-H2, the resulting regressions suggest that the underlying trends have changed for both metrics and there may also be step

[4]See footnote 19 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.

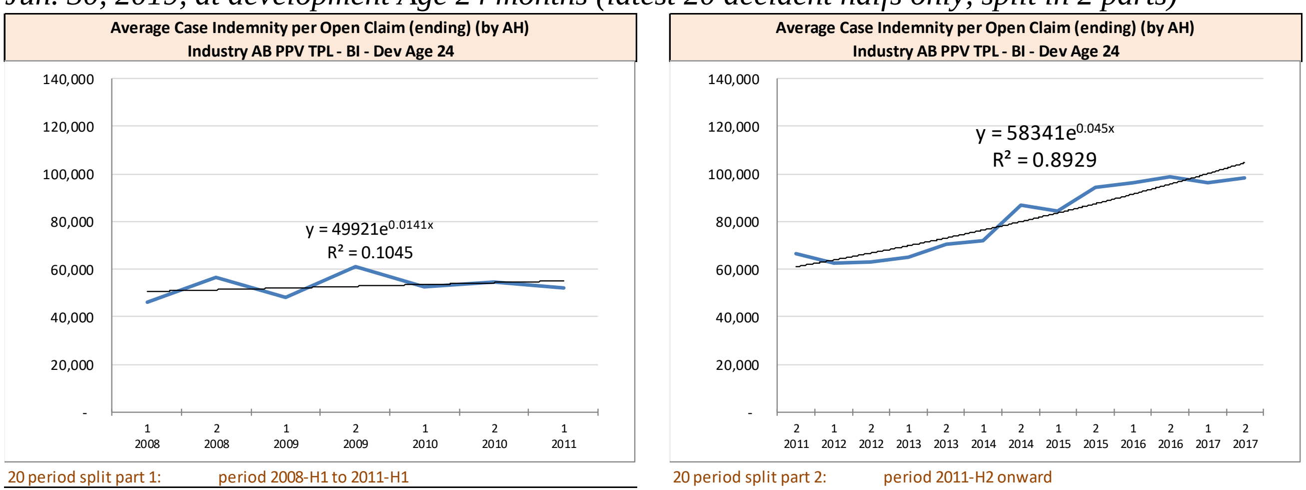
[5]These are crude measures of accident period trends, and compare with the FA indemnity only BI selected model loss cost past trend of +10.9% +/-0.8% (reducing to +4.8% post 2018-H1), and the OW trend selection of +8.5% (as per OW's practice, a standard error for their trend estimate is not provided). 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.

changes that would apply. We believe these results do not clearly indicate an adverse impact related to "case reserve strengthening".

Industry Alberta Private Passenger Accident Half indemnity only BI Average ***Paid*** *as at Jun. 30, 2019, at development Age 24 months (latest 20 accident halfs only, split in 2 parts)*



Industry Alberta Private Passenger Accident Half indemnity only BI Average ***Case Reserve*** *as at Jun. 30, 2019, at development Age 24 months (latest 20 accident halfs only, split in 2 parts)*



The preceding may indicate that the underlying indemnity payment and case reserving on an average level have aligned. This may help support the stabilization of the recorded link ratios for claims amounts. However, there is still evidence that BI claim count development patterns have not yet stabilized, challenging the ability to determine claims frequencies and average amounts with a high degree of certainty.

Closing remarks with respect to Section 5

We believe there is evidence for AB PPV BI that some level of stability may be coming about across the relationship of indemnity and ALAE and paid and case. We believe these may be helping to stabilize recorded amount link ratios for BI. However, we are still seeing instability in recorded claim count development.

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

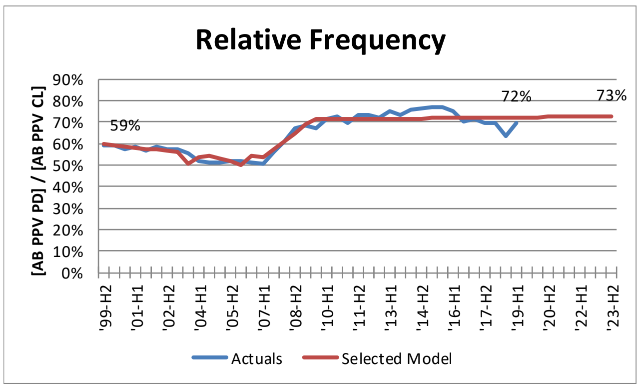
Generally, the OW PPV Report trends are statistically different from the loss cost trends estimated for indemnity as per FA's own modeling of the Alberta industry private passenger experience as at Jun. 30, 2019. That is, the OW trend rates as selected are generally NOT within 1 standard error of the 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 OW 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 and the related modeled frequencies.

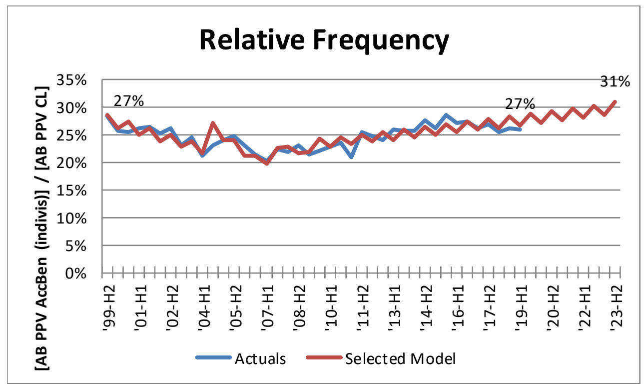
That is not to say that the relationships cannot or do not change over time (it is clear that they do) – we are simply stating that taking this into consideration will likely result in more consistent models. This is shown in the charts at the top of the next page, where we show relative frequencies 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, and that accident benefits claims frequency appears to be rising even more relative to collision claims (this may help explain the rise in accident benefits payments relative to other coverages). The lower 2 charts show that bodily injury frequency appears to be increasing relative to PD-tort frequency, but appears to be decreasing (slightly) relative to accident benefits.

Industry Alberta PPV – ratios of select coverage frequencies (both "actual" and "modeled"; ultimates as selected by FA as at Jun. 30, 2019)

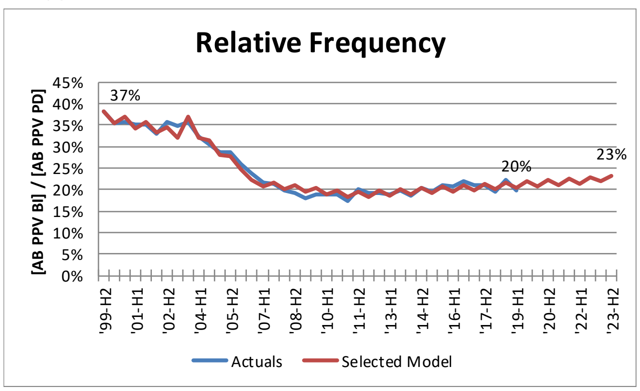
PD vs CL



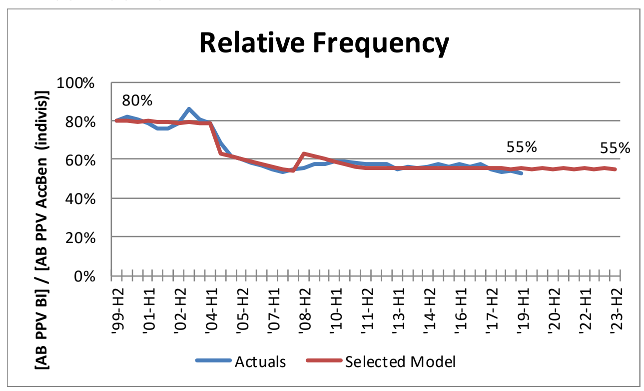
AccBen vs CL



BI vs PD



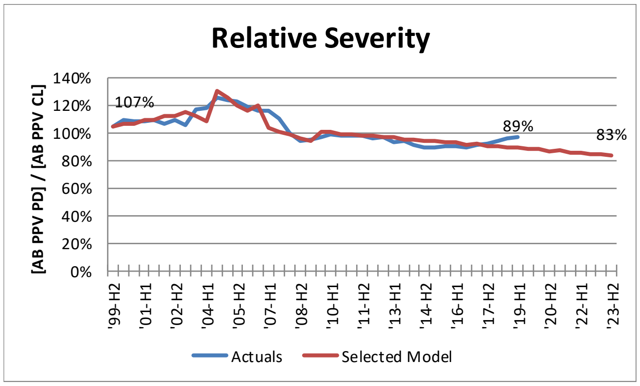
BI vs AccBen



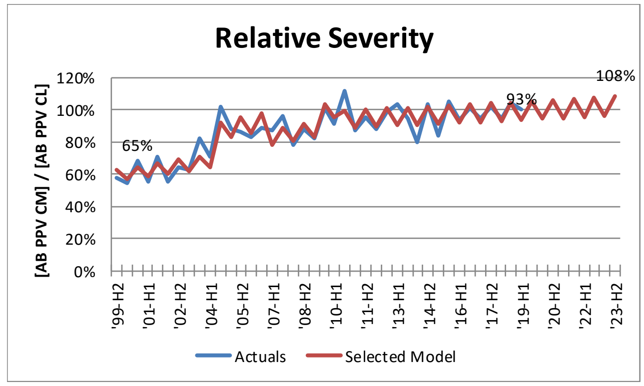
We also show in the next set of charts a severity comparison at the top of the next page between collision and PD-tort (left chart), and collision and comprehensive (right chart), as these coverages relate to the cost of vehicles.

Industry Alberta PPV – ratios of select coverage severities (both "actual" and "modeled"; ultimates as selected by FA as at Jun. 30, 2019)

PD vs CL



CM vs CL



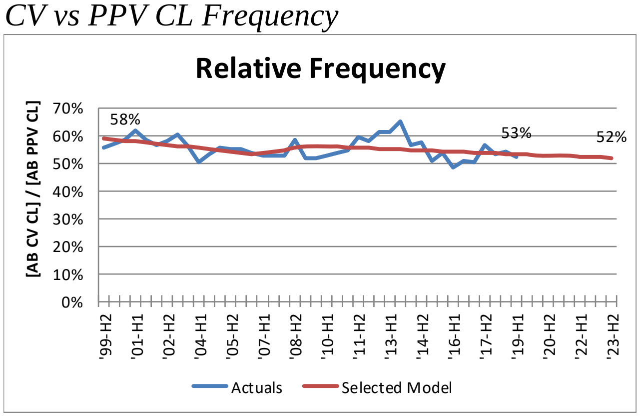
As indicated above, the PD-tort severity appears to be decreasing relative to collision severity, whereas comprehensive severity appears to be rising relative to collision.

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.

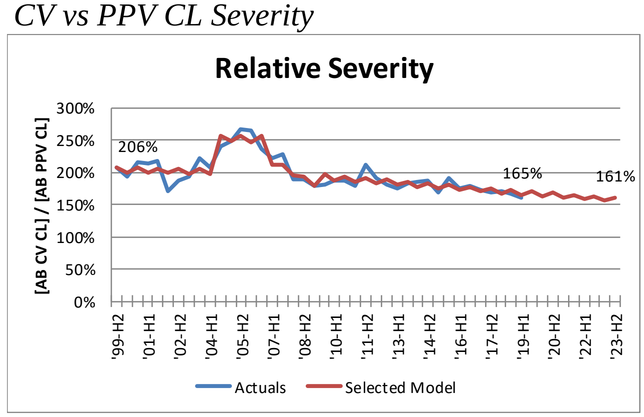
In our internal deliberations, we also consider correlations between private passenger vehicles and commercial vehicles for like coverages (as they share the same roads, weather and economic conditions etc.). This too helps inform our modeling and raise questions (particularly where relationships appear 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 Jun. 30, 2019) – freq (CV vs PPV), sev (CV vs PPV)

CV vs PPV CL Frequency



CV vs PPV CL Severity



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.

Single Period vs Multi-Period Approaches

As we have discussed in past submissions, 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	2006-2
AccBen	2007-1	2007-1	2010-1
UM			1999-2
CL	2009-1	2010-1	

Coverage	Severity	Frequency	Loss Cost
CM			2011-1
SP	1999-2	1999-2	
AP			1999-2

Specifically, where both frequency and severity are modeled by OW, no modeled coverages had a consistent data start point. We believe a better approach would have been to always include the data 1999-H2 through 2019-H1, and create competing alternative models based on various period structures. Where differing period starts are used, we would expect there to be some sort of explanation on why (that is, what drives their decisions on period breaks?). Further, if the goal is to identify possible changes in trend rates over the 20-year period under consideration, a better approach, in our opinion, is to always start at 1999-H2, then formally test different periods.

An example is shown at the top of the next page. Here, we model the OW selected ultimates for Industry Alberta PPV Bodily Injury (BI) at June 30, 2019 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). We then also model 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 for the two models are **not** directly comparable. If, instead, all models developed included all data points, then fit metrics would be directly comparable, helping to compare models and their respective fit measures.

*AB PPV **BI Loss Cost** (OW estimates of ultimate, including ALAE & ULAE) @ Jun 30, 2019*

OW Single Period Approach Model

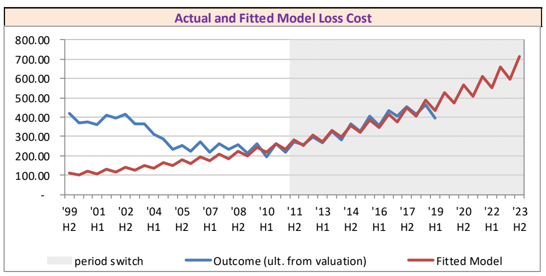
FITTED TREND STRUCTURE REGRESSION STATISTICS

Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9738	0.9483	0.9403	0.0479	16	24	3

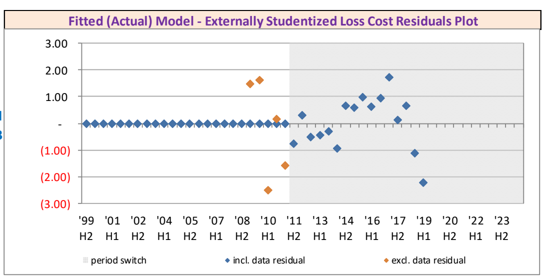
Runs-Test Result: 4.0780 RESIDUALS RUNS NOT RANDOM ; residuals normal

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

	Coefficients	S.E.	t-Stat	p-value	C.I. 95% Lower	C.I. 95% Upper	Selected Coeff.
	1	2					
Intercept	(149.810)	10.539	(14.215)	0.0%	(172.578)	(127.042)	(149.810)
Season	0.146	0.024	6.074	0.0%	0.094	0.198	0.146
All Years	0.077	0.005	14.766	0.0%	0.066	0.088	0.077
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	-	-	-



axis forced at +/-3



Cumulative Trends (summed coefficients)	fitted coeff	S.E.	t-Stat	p-value	C.I. 95% Lower	C.I. 95% Upper
All Yrs or AY	0.077	0.005	14.766	0.0%	0.066	0.088
AY+1	n/a	n/a	n/a	n/a	n/a	n/a
AY+1+2	n/a	n/a	n/a	n/a	n/a	n/a
AY+1+2+3	n/a	n/a	n/a	n/a	n/a	n/a
AY+1+2+3+4	n/a	n/a	n/a	n/a	n/a	n/a

Multiple Period Model

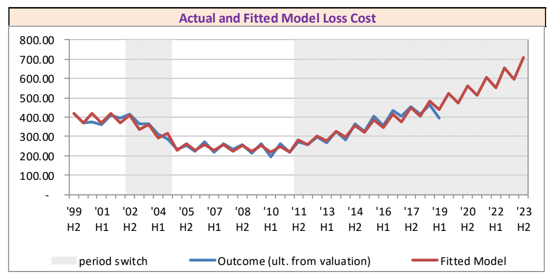
FITTED TREND STRUCTURE REGRESSION STATISTICS

Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9782	0.9569	0.9490	0.0551	40	-	7

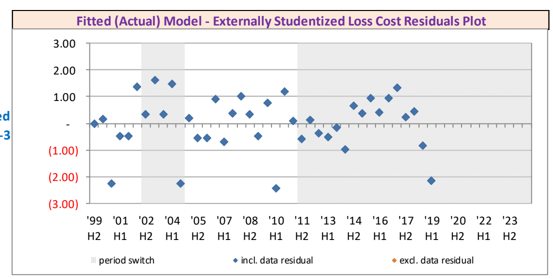
Runs-Test Result: 0.3536 RESIDUALS RUNS RANDOM ; resids NOT normal

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	5.911	0.022	263.430	0.0%	5.865	5.957	5.911
Season	0.134	0.018	7.651	0.0%	0.098	0.170	0.134
All Years	-	-	-	n/a	-	-	-
Scalar 1	-	-	-	n/a	-	-	-
Trend 1	(0.129)	0.021	(6.098)	0.0%	(0.173)	(0.086)	(0.129)
Scalar 2	(0.143)	0.054	(2.652)	1.2%	(0.253)	(0.033)	(0.143)
Trend 2	0.119	0.023	5.247	0.0%	0.073	0.166	0.119
Scalar 3	0.109	0.041	2.628	1.3%	0.025	0.193	0.109
Trend 3	0.087	0.010	8.583	0.0%	0.066	0.108	0.087
Scalar 4	-	-	-	n/a	-	-	-
Trend 4	-	-	-	n/a	-	-	-



axis forced at +/-3



Cumulative Trends (summed coefficients)	fitted coeff	S.E.	t-Stat	p-value	C.I. 95% Lower	C.I. 95% Upper
All Yrs or AY	n/a	n/a	n/a	n/a	n/a	n/a
AY+1	(0.129)	0.021	(6.098)	0.0%	(0.173)	(0.086)
AY+1+2	(0.010)	0.008	(1.234)	22.6%	(0.027)	0.007
AY+1+2+3	0.077	0.006	12.831	0.0%	0.065	0.089
AY+1+2+3+4	n/a	n/a	n/a	n/a	n/a	n/a

As indicated in the cumulative trends tables above, the All Years trend estimate of the single period model (with the earlier data excluded) at +7.7% +/-0.5% (+8.0% annualized) is not different from the All Years plus trend 1 plus trend 2 plus trend 3 estimate of the multiple period model that leverages all of the available data (+7.7% +/-0.6% or +8.0% annualized). What may be of more interest in the multiple period model's residual plot are the four externally studentized residuals below -2%. The model is based on correlation, not causation, but such residuals may point to areas where investigation into potential causation may be interesting.

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

Bodily Injury – Differing Future Trend

In the OW bodily injury section, they described their rationale for selecting a lower future loss cost trend rate (+7.0%) than their selected past trend rate (+8.0%) as being in part due to finding "*... some evidence of moderation to the steep increases in loss costs...*".

Going back to the OW PPV Report based on June 30, 2017 AIX data, OW commented in summarizing their selection of BI loss cost trends:

> *If the data as of December 31, 2017 supports the ultimate claim count and claim amount estimates and the 2017-2 semester severities continue to remain flat, then we will consider a somewhat higher past trend and a flatter future loss cost trend beginning 2015-2.*

We appreciated this comment, particularly as it specified the point at which they would look for a change in the trend estimate in future analyses.

In their December 31, 2017 PPV Report, OW did decide to act upon evidence of a change in trend, but rather than an explicit period break introduced at 2015-H2, they instead made the break at 2018-H1 as being a change applicable to future loss costs (i.e. differentiating between past and future trends). At the time, the OW selections were +8.5% for the past trend, and +7.5% for the future trend, with the change via application of judgment, where they gave more weight to lower loss costs indicated for the 2014-H1 to 2017-H2 period (again, a different period than suggested in the 2017-06 report). In our submission related to that report, we did not explicitly comment on OW's decision on a differing future trend.

We have provided comparison model output on the next page related to industry AB PPV BI Loss Costs based on the OW estimates of ultimate from the Dec 31, 2017 AIX report, and the Jun 30, 2019 AIX report (i.e. the current OW PPV Report). The two models have the same period structure, so the only difference is the data being modeled.

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

AB PPV ***BI Loss Cost*** *(OW estimates of ultimate, including ALAE & ULAE)*

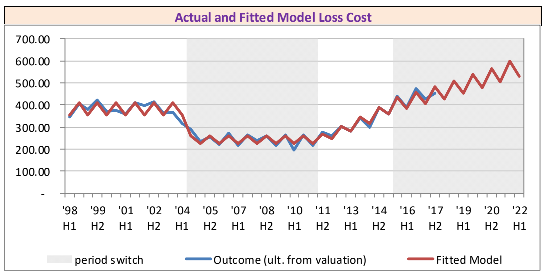
Dec 31, 2017 AIX Basis

Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9746	0.9499	0.9441	0.0576	40	-	5

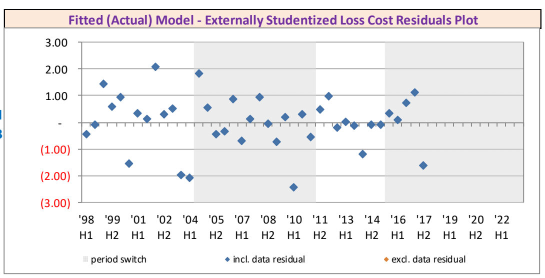
Runs-Test Result: 0.2326 RESIDUALS RUNS RANDOM ; residuals normal

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

	Coefficients	S.E.	t-Stat	p-value	C.I. Lower	95% Upper	Selected Coeff.
	1	2					
Intercept	5.867	0.018	324.545	0.0%	5.830	5.904	5.867
Season	0.146	0.018	7.958	0.0%	0.108	0.183	0.146
All Years	-	-	-	n/a	-	-	-
Scalar 1	(0.446)	0.021	(20.753)	0.0%	(0.490)	(0.402)	(0.446)
Trend 1	-	-	-	n/a	-	-	-
Scalar 2	-	-	-	n/a	-	-	-
Trend 2	0.123	0.009	14.032	0.0%	0.105	0.141	0.123
Scalar 3	-	-	-	n/a	-	-	-
Trend 3	(0.070)	0.032	(2.192)	3.5%	(0.135)	(0.005)	(0.070)
Scalar 4	-	-	-	n/a	-	-	-
Trend 4	-	-	-	n/a	-	-	-



axis forced to +/-3



Cumulative Trends (summed coefficients)	fitted coeff	S.E.	t-Stat	p-value	C.I. Lower	95% Upper
All Yrs or AY	n/a	n/a	n/a	n/a	n/a	n/a
AY+1	n/a	n/a	n/a	n/a	n/a	n/a
AY+1+2	0.123	0.009	14.032	0.0%	0.105	0.141
AY+1+2+3	0.053	0.025	2.091	4.4%	0.002	0.105
AY+1+2+3+4	n/a	n/a	n/a	n/a	n/a	n/a

Jun 30, 2019 AIX Basis

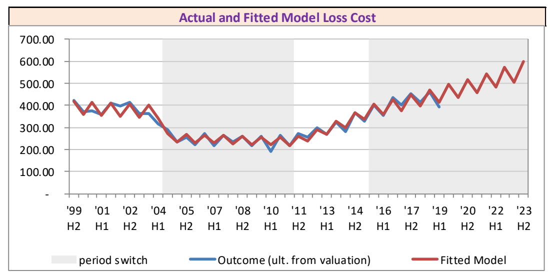
FITTED TREND STRUCTURE REGRESSION STATISTICS

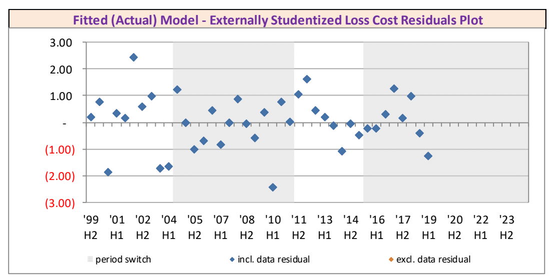
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9780	0.9565	0.9502	0.0545	40	-	6

Runs-Test Result: 1.4670 RESIDUALS RUNS RANDOM ; residuals normal

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

	Coefficients	S.E.	t-Stat	p-value	C.I. Lower	95% Upper	Selected Coeff.
	1	2					
Intercept	28.307	10.869	2.604	1.4%	6.219	50.396	28.307
Season	0.149	0.017	8.592	0.0%	0.114	0.184	0.149
All Years	(0.011)	0.005	(2.065)	4.7%	(0.022)	(0.000)	(0.011)
Scalar 1	(0.373)	0.041	(8.979)	0.0%	(0.457)	(0.288)	(0.373)
Trend 1	-	-	-	n/a	-	-	-
Scalar 2	-	-	-	n/a	-	-	-
Trend 2	0.128	0.013	9.718	0.0%	0.101	0.155	0.128
Scalar 3	-	-	-	n/a	-	-	-
Trend 3	(0.069)	0.020	(3.399)	0.2%	(0.110)	(0.028)	(0.069)
Scalar 4	-	-	-	n/a	-	-	-
Trend 4	-	-	-	n/a	-	-	-





Cumulative Trends (summed coefficients)	fitted coeff	S.E.	t-Stat	p-value	C.I. Lower	95% Upper
All Yrs or AY	(0.011)	0.005	(2.065)	4.7%	(0.022)	(0.000)
AY+1	n/a	n/a	n/a	n/a	n/a	n/a
AY+1+2	0.117	0.009	12.534	0.0%	0.098	0.136
AY+1+2+3	0.048	0.013	3.745	0.1%	0.022	0.075
AY+1+2+3+4	n/a	n/a	n/a	n/a	n/a	n/a

What may be of interest is that for the two data sets (2017-12 AIX on the left, 2019-06 AIX on the right), the models result in coefficient estimates for the 2019-06 data that are not statistically different from the 2017-12 data set, with the sole exception of the All Years trend. (This trend was not statistically significant for the 2017-12 data set but is statistically significant with the 2019-06 data set.) Importantly, the loss cost trend estimate for the '15H2 and beyond period is statistically significant, and the current cumulative estimate of +4.8% +/-1.3% (5.0% annualized) is not statistically different from the estimate using the 2017-12 AIX data set (+5.3% +/-2.5% or +5.5% annualized).

Rather than taking this more specific approach, OW has continued to move-the-goal-posts, by effectively changing the period at which they view the loss cost trend to have changed (from ‘18H1 with the 2017-12 AIX data set, to ‘18H2 with the 2018-06 AIX data set, to ’19H1 with the 2018-12 AIX data set, to ‘19H2 with the current 2019-06 AIX data set).

(The Board may find it of interest to understand why OW did not pursue the ‘15H2 break point, as they commented they would in their 2017-06 Report.)

In general, we believe a better approach than assuming a different starting point for future trends with each analysis would be to explicitly pick a point at which the trend is viewed as having changed, then take that forward, in a way akin to what we did in the preceding. The benefit is that future analysis may provide support for or against the original hypothesis, leading to improved decision making.

In our own modeling of AB PPV BI loss costs, we have explicitly assumed that the minor injury clarification would result in a reversion to the severity trend that was exhibited prior to the change we model at ‘11H2. If the same approach were taken with the OW selections of ultimate (i.e. using the FA models for frequency and severity, but applied to OW ultimates), the combined loss cost model has the final period trend (‘18H2 and beyond) of +4.7%, which is in line with the estimate assuming a final period at ‘15H2.

Accident Benefits

We note that OW has dropped formally providing an estimate of the scalar for the period ‘15H2 and beyond, and, instead, estimate their trend considering only data from ‘15H2 and beyond. This effectively means that using the benchmark information (were an insurer to do so) would not allow for on-leveling of experience for periods prior to ‘15H2. That is, were an insurer to use AIX data as at December 31, 2018 or June 30, 2019, they would not be able to on-level the most recent 5 accident years in the experience period. We recommend the scalar estimate be included in the Report.

We use this as an opportunity to discuss two modeling issues:

(i) using residuals to identify potential period breaks; and

(ii) testing for outlier influence.

We discuss these two issues below.

(i) using residuals to identify potential period breaks

In their prior review, OW estimated a loss cost trend for AccBen of +0.5% up to ‘15H1, estimated a scalar of 15% at ‘15H2, and a trend estimate of +9.5% for the period ‘15H2 and beyond.

For the current review, OW estimated only the trend for the ‘15H2 and beyond period.

We have replicated the current approach using loss costs directly, and by excluding all data prior to ‘15H2. The result is indicated at the top of the next page.

AB PPV ***AccBen Loss Cost*** *(OW estimates of ultimate, including ALAE & ULAE) @ Jun 30, 2019*

Model 0 *Summary Table*

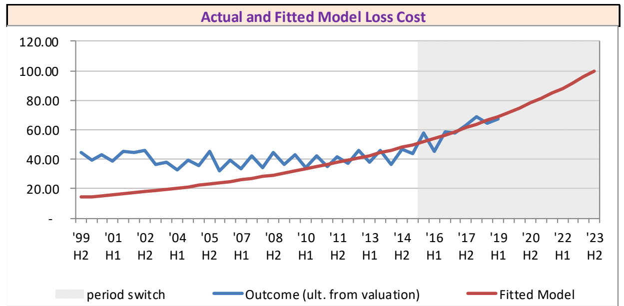
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.7490	0.5611	0.4879	0.0949	8	32	2

Runs-Test Result: 3.7940 RESIDUALS RUNS NOT RANDOM ; residuals normal
parameters with p-value >5%: 0 (intercept specifically not included)

	Coefficients	S.E.	t-Stat	p-value	C.I. Lower	95% Upper	Implied Coeff.
	1	2					
Intercept	(159.594)	59.107	(2.700)	3.6%	(304.225)	(14.964)	(160.490)
Season	-	-	-	n/a	-	-	-
All Years	0.081	0.029	2.769	3.2%	0.009	0.153	0.082
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	-	-	-

all yrs to match rpt trend; intercept to match avg over period

Actual vs ***Model 0*** *Fitted Loss Cost Chart*



Based on the above, the OW selected trend estimate (+8.5% annualized which translates to +8.2% trend coefficient for the log-link model) is not statistically different than the coefficient estimate of +8.1% +/-2.9% as indicated in the table above.

As an alternative, and in order to leverage all of the data available, we modeled loss costs in two periods, effectively repeating the above, but without the data exclusions. This is summarized below.

AB PPV ***AccBen Loss Cost*** *(OW estimates of ultimate, including ALAE & ULAE) @ Jun 30, 2019*

Model Alt 1a *Summary Table*

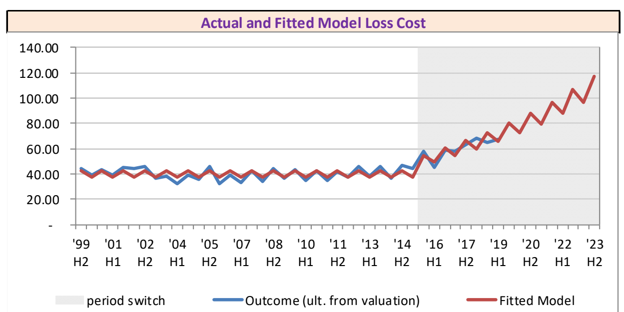
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9207	0.8478	0.8351	0.0821	40	-	4

Runs-Test Result: 1.1508 RESIDUALS RUNS RANDOM ; residuals normal
parameters with p-value >5%: 0 (intercept specifically not included)

	Coefficients	S.E.	t-Stat	p-value	C.I. Lower	95% Upper	Selected Coeff.
	1	2					
Intercept	3.613	0.020	185.249	0.0%	3.573	3.653	3.613
Season	0.149	0.026	5.695	0.0%	0.096	0.201	0.149
All Years	-	-	-	n/a	-	-	-
Scalar 1	0.217	0.060	3.594	0.1%	0.094	0.339	0.217
Trend 1	0.095	0.025	3.744	0.1%	0.044	0.147	0.095
Scalar 2	-	-	-	n/a	-	-	-
Trend 2	-	-	-	n/a	-	-	-
Scalar 3	-	-	-	n/a	-	-	-
Trend 3	-	-	-	n/a	-	-	-
Scalar 4	-	-	-	n/a	-	-	-
Trend 4	-	-	-	n/a	-	-	-

Cumulative Trends (summed coefficients)	fitted coeff	S.E.	t-Stat	p-value	C.I. Lower	95% Upper
All Yrs or AY	n/a	n/a	n/a	n/a	n/a	n/a
AY+1	0.095	0.025	3.744	0.1%	0.044	0.147
AY+1+2	n/a	n/a	n/a	n/a	n/a	n/a
AY+1+2+3	n/a	n/a	n/a	n/a	n/a	n/a
AY+1+2+3+4	n/a	n/a	n/a	n/a	n/a	n/a

Actual vs ***Model Alt 1a*** *Fitted Loss Cost Chart*

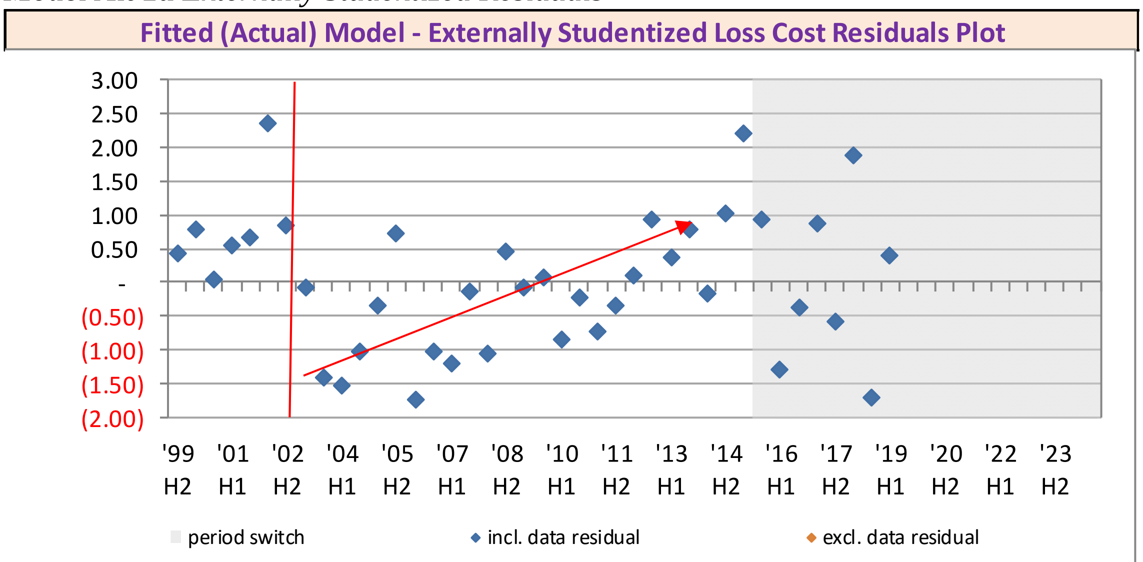


In the preceding model, we initially included an all years trend, but it was removed as being not statistically significant at the 5% level. In this case, the model estimates no trend for the period prior to '15H2, a scalar coefficient estimate of +21.7% +/-6.0% (annualized coefficient of +24.2%), and a final period trend estimate of +9.5% +/-2.5% (annualized coefficient of +10.0%). While the trend coefficient estimate (annualized) is higher than the OW selected level of +8.5%, the OW estimate is not statistically different from the model's estimate (the lower 1 standard error estimate is +7.2% annualized). However, this model's scalar coefficient is statistically different from the OW prior selected level of +15.0% annualized (the lower 1 standard error estimate for the scalar is +16.9% annualized).

However, this may be due to missing parameters in the model. To assess this, we can look to the residuals plot per below, looking for evidence of heteroskedasticity (that is, non-random spread of the residuals, or more specifically in this case, evidence of trend in the residuals). We see such evidence, as there appears to be a trend in the model's residuals, starting at '03H2, suggesting adding an additional period parameter at that point may improve the model.

*AB PPV **AccBen Loss Cost** (OW estimates of ultimate, including ALAE & ULAE) @ Jun 30, 2019*

***Model Alt 1a** Externally Studentized Residuals*



In alternative model 2a, we have added an additional period parameter at '03H2 as suggested by the residual plot above. Once added, we re-set all period parameters (i.e. we included both scalars and trend parameters for each of the 3 periods we are now modeling), then removed any that were not statistically significant at the 5% level, removing them in order of their p-value, until only statistically significant parameters remained. The results are summarized on the next page.

*AB PPV **AccBen Loss Cost** (OW estimates of ultimate, including ALAE & ULAE) @ Jun 30, 2019*

***Model Alt 2a** Summary Table*

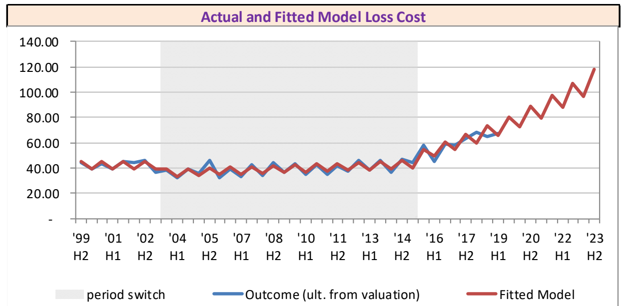
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9541	0.9103	0.8972	0.0648	40	-	6

Runs-Test Result: 0.5649 RESIDUALS RUNS RANDOM ; residuals normal

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

	Coefficients	S.E.	t-Stat	p-value	C.I. Lower	95% Upper	Selected Coeff.
	1	2					
Intercept	3.666	0.025	145.898	0.0%	3.615	3.717	3.666
Season	0.153	0.021	7.426	0.0%	0.111	0.195	0.153
All Years	-	-	-	n/a	-	-	-
Scalar 1	(0.165)	0.035	(4.717)	0.0%	(0.236)	(0.094)	(0.165)
Trend 1	0.015	0.004	4.009	0.0%	0.008	0.023	0.015
Scalar 2	0.142	0.053	2.662	1.2%	0.034	0.251	0.142
Trend 2	0.080	0.020	3.933	0.0%	0.039	0.122	0.080
Scalar 3	-	-	-	n/a	-	-	-
Trend 3	-	-	-	n/a	-	-	-
Scalar 4	-	-	-	n/a	-	-	-
Trend 4	-	-	-	n/a	-	-	-

*Actual vs **Model Alt 2a** Fitted Loss Cost Chart*



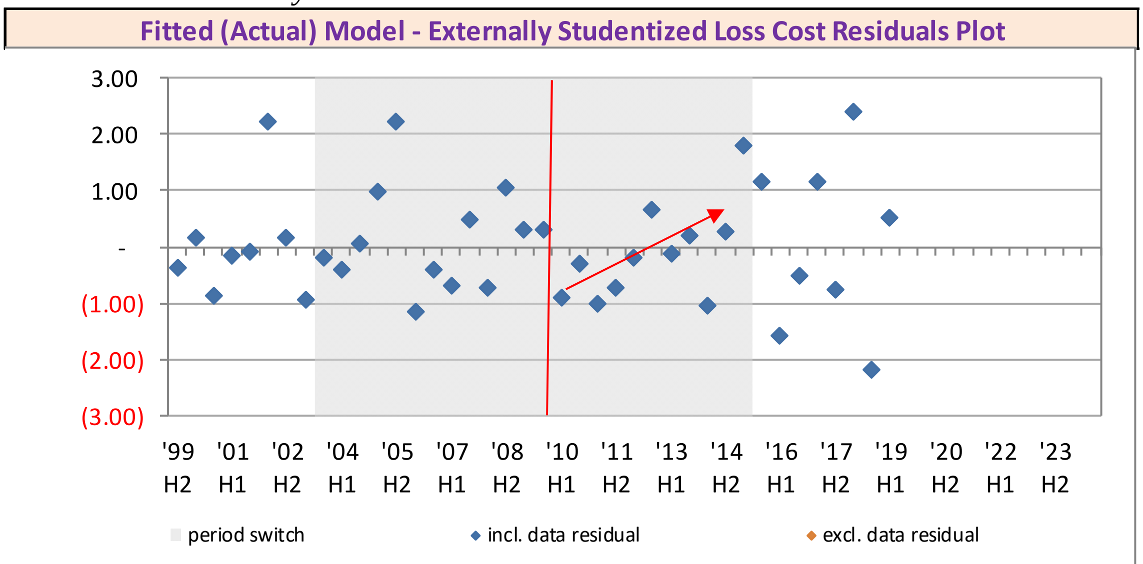
Cumulative Trends (summed coefficients)					C.I.	95%
	fitted coeff	S.E.	t-Stat	p-value	Lower	Upper
All Yrs or AY	n/a	n/a	n/a	n/a	n/a	n/a
AY+1	0.015	0.004	4.009	0.0%	0.008	0.023
AY+1+2	0.096	0.020	4.764	0.0%	0.055	0.137
AY+1+2+3	n/a	n/a	n/a	n/a	n/a	n/a
AY+1+2+3+4	n/a	n/a	n/a	n/a	n/a	n/a

With the additional period, the scalar 2 (associated with the final period) is now +14.2% +/-5.3% or +15.3% annualized, which is in line with the OW prior selected of +15.0%. In the model, the final period coefficient is +8.0% +/-2.0%, but as an additive model (i.e. we constructed the model so that subsequent coefficients "add to" earlier coefficients), so to get the final period trend, we would add the Trend 1 and Trend 2 coefficient estimates together, getting +9.6% (rounding difference), but the standard error estimate of the combined requires a bit of additional work, and results in a standard error of 2.0% for the combined trend. The result is a +10.0% annualized trend, with a lower 1-standard error band level of +7.9%, so the OW selected estimated of +8.5% is not statistically different from the model estimate (note – model 2a estimates a 1 standard error band of +7.9% to +12.3% for the final period trend estimate on a cumulative basis).

A residual analysis of this model is then undertaken, as indicated at the top of the next page.

*AB PPV **AccBen Loss Cost** (OW estimates of ultimate, including ALAE & ULAE) @ Jun 30, 2019*

***Model Alt 2a** Externally Studentized Residuals*

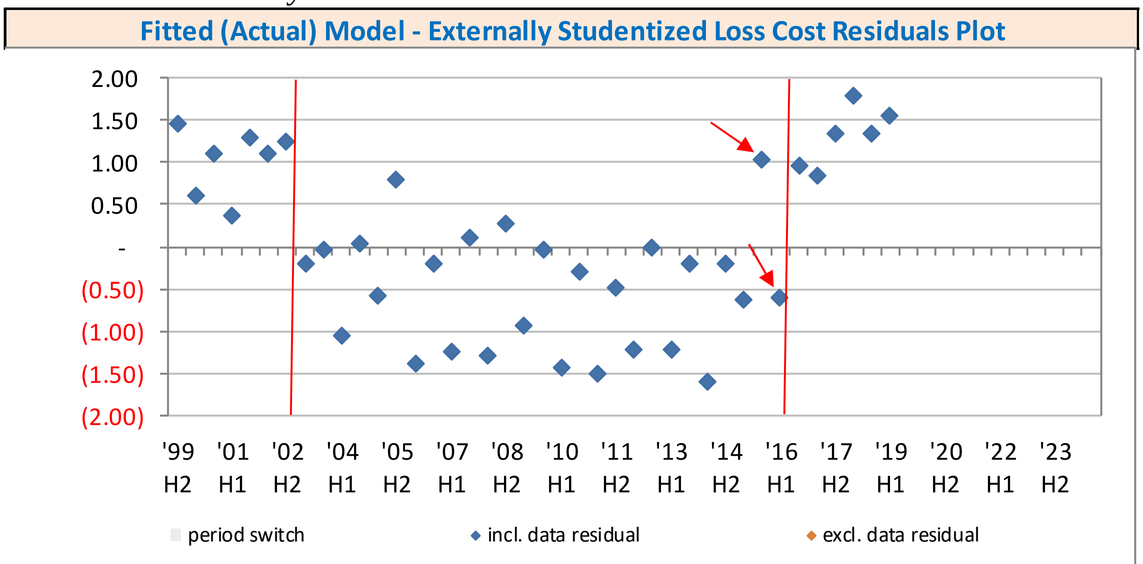


While the initial review of the residual plot for Model Alt 2a did not provide strong evidence of heteroskedasticity, one might wish to test the period we indicated in the preceding residual plot. We did test a model with that additional period, but it was not statistically significant.

Through this process, however, we started with the OW initial model, with a period break at '15H2. What if we instead started with a single period model, and considered its residual plot. This is indicated in the chart at the top of the next page (what we refer to as our standard 1 model), suggesting 3 periods. The earlier break is at '03H1 as per the Alt 2a model, but the break for the latter period is unclear – is it '15H2 (so the two data points we have arrows pointing to would be in the last period, unlike our line), or is it '16H2 (as we have identified)?

*AB PPV **AccBen Loss Cost** (OW estimates of ultimate, including ALAE & ULAE) @ Jun 30, 2019*

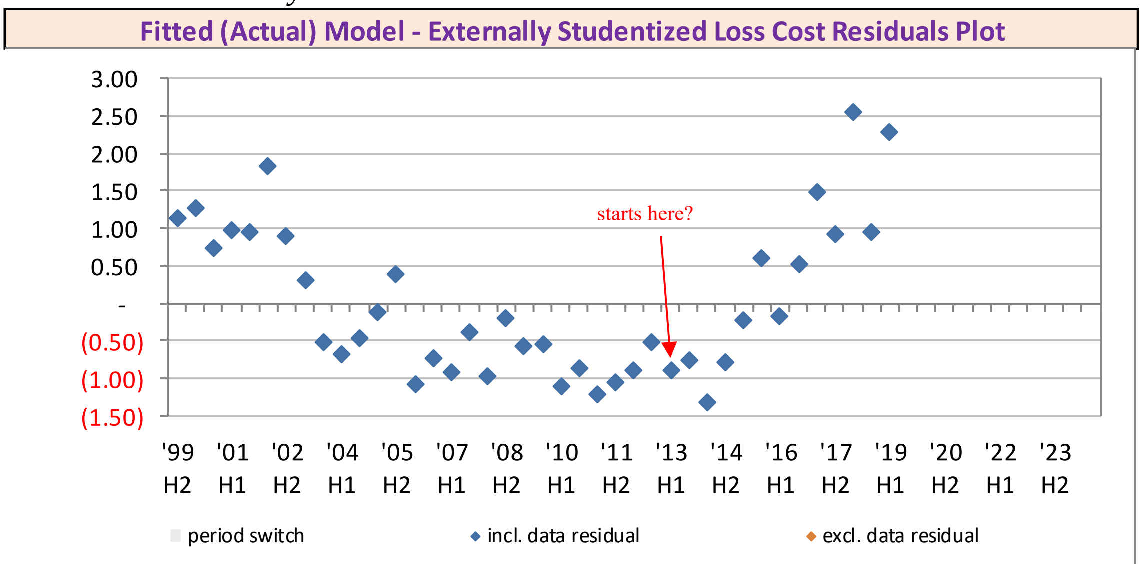
***Model Std 1** Externally Studentized Residuals*



In the above model, seasonality was not included, but it is statistically significant. If we do the same as above, but include seasonality in the model (which is our standard 2 model), we get the residual plot shown at the top of the next page. This residual plot appears more interesting, and perhaps suggests additional options for the final period break – perhaps '15H1 or earlier (in fact, even as early as '13H1 may be where the final period starts). This suggests that the AIRB should be open to multiple interpretations of appropriate models for AccBen loss costs.

*AB PPV **AccBen Loss Cost** (OW estimates of ultimate, including ALAE & ULAE) @ Jun 30, 2019*

***Model Std 2** Externally Studentized Residuals*



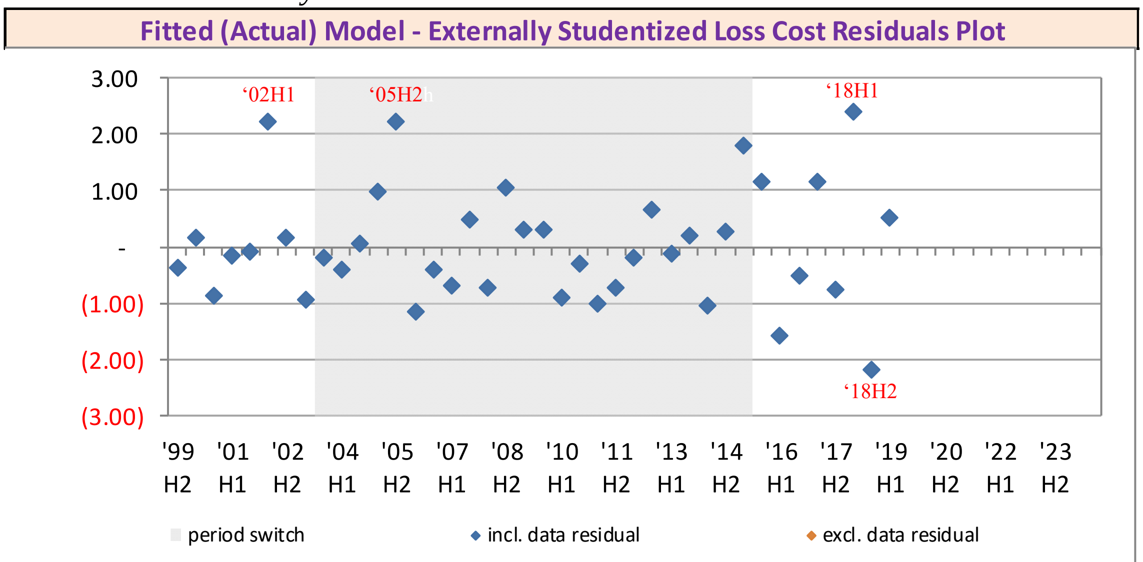
(ii) testing for outlier influence

We also thought that, given the level of standard errors in Model Alt 2a above, it was an opportunity to provide some insight into how FA approaches outlier influence testing. We again start with the residual plot (repeated from earlier). However, instead of looking for evidence of heteroskedasticity, we are now looking to identify outliers. We use a close-to 5% significance test[7] for this, identifying residuals that have an absolute value greater than 2, of which there are 4 as identified on the next page.

[7]Externally-studentized residuals follow a Student's T-Distribution. Our model has 34 degrees of freedom (the number of data points less the number of parameters in the model, including the intercept). The probability of an absolute value greater than 2 given a Student's T-Distribution with 34 degrees is 5.4% (greater than 2.035 is the 5% significance level). As a simplification, we use 2 as being a proxy for the 5% significance.

*AB PPV **AccBen Loss Cost** (OW estimates of ultimate, including ALAE & ULAE) @ Jun 30, 2019*

***Model Alt 2a** Externally Studentized Residuals*



The residual with the largest absolute value is '18H1, with a value of 2.4138. This is the first outlier we will test for influence.

In this particular case, we are interested primarily in the scalar and trend coefficient estimates associated with the final period ('15H2 and beyond). The test we are going to perform is to answer the question of whether the coefficient estimates for the final period are statistically different in our current model (Alt 2a) from our model where '18H1 is excluded (Alt 2b). Model Alt 2b results are shown at the top of the next page.

AB PPV ***AccBen Loss Cost*** *(OW estimates of ultimate, including ALAE & ULAE) @ Jun 30, 2019*

Model Alt 2b *Summary Table (excludes '18H1)*

Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9557	0.9134	0.9003	0.0601	39	1	6

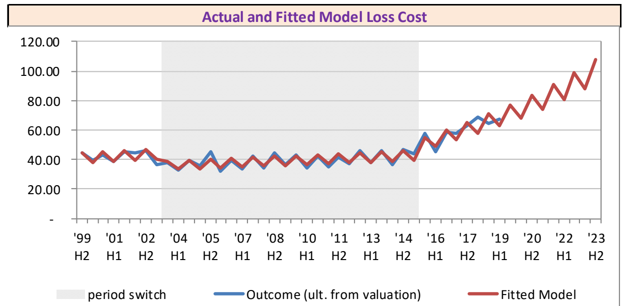
Runs-Test Result: 0.1030 RESIDUALS RUNS RANDOM ; residuals normal

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	(26.717)	6.989	(3.823)	0.1%	(40.937)	(12.497)	(26.717)
Season	0.162	0.019	8.366	0.0%	0.123	0.201	0.162
All Years	0.015	0.003	4.347	0.0%	0.008	0.022	0.015
Scalar 1	(0.195)	0.037	(5.234)	0.0%	(0.270)	(0.119)	(0.195)
Trend 1	-	-	-	n/a	-	-	-
Scalar 2	0.145	0.049	2.926	0.6%	0.044	0.245	0.145
Trend 2	0.069	0.019	3.549	0.1%	0.029	0.109	0.069
Scalar 3	-	-	-	n/a	-	-	-
Trend 3	-	-	-	n/a	-	-	-
Scalar 4	-	-	-	n/a	-	-	-
Trend 4	-	-	-	n/a	-	-	-

Cumulative Trends (summed coefficients)	fitted coeff	S.E.	t-Stat	p-value	C.I. 95% Lower	C.I. 95% Upper
All Yrs or AY	0.015	0.003	4.347	0.0%	0.008	0.022
AY+1	n/a	n/a	n/a	n/a	n/a	n/a
AY+1+2	0.084	0.019	4.396	0.0%	0.045	0.123
AY+1+2+3	n/a	n/a	n/a	n/a	n/a	n/a
AY+1+2+3+4	n/a	n/a	n/a	n/a	n/a	n/a

Actual vs ***Model Alt 2b*** *Fitted Loss Cost Chart*



To answer our question of influence, we start with the model above and consider its Scalar 2 estimate (+14.5% +/-4.9%) and check if the Scalar 2 estimate from Model Alt 2a (where '18H1 was NOT excluded) falls within that band. If it does (and at +14.2%, it does), we would say that '18H1 is not influential on Scalar 2 (as the estimate when it is included is not statistically different from the model where it is excluded). Where an outlier is determined not to be influential, then it should NOT be excluded (as more data is better).

Similarly, we consider Model Alt 2b's Trend 2 cumulative coefficient estimated of +8.4% +/-1.9%, and the Model Alt 2a's cumulative coefficient estimate of +9.6%. In this case, while the coefficient estimates may be viewed by some as practically significant (Alt 2a's estimate is 1.2 points higher), it is not statistically different, due to the inherent volatility in the data. As a result, we would conclude that '18H1 is not an influential outlier, and, as such, should be left in the data set.

Trend Summary

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 do not 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 in Section 7 (Loss Adjustment Expenses) as the two tables provided on page 28 of the OW PPV 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).

Given the importance of catastrophe results in Alberta, the Board may wish to exert its influence on GISA to release its annual report on a more timely basis.

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 support the Board's move to focus on individual insurer's forecasts, although it is not clear in the OW Report whether the Board is looking for support against historical yields, or forecasted yields. We support the latter.

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).

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. We view the issue of not including reinsurance in the rate determination akin to the debate about the nature of employee options before they were formally accounted for as operating expenses. This debate was best laid bare, in our view, by Warren Buffet in his 1998 Letter to Investors, reproduced below:

> *If options aren't a form of compensation, what are they? If compensation isn't an expense, what is it? And, if expenses shouldn't go into the calculation of earnings, where in the world should they go?*

Similar questions can be asked in relation to reinsurance:

(i) If reinsurance is not insurance, what is it?

(ii) If insurance is not an expense, what is it?

(iii) And, if expenses shouldn't go into the calculation of insurance rates, where should they go?

Other forms of insurance are purchased by insurers (D&O, E&O, commercial property, commercial liability, cyber etc.). These purchases are included in their general expenses, and therefore included in the calculation of insurance rates. Yet reinsurance, arguably the most important form of insurance purchased by insurers, is not.

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 (including insurers) and consumers. To ignore the cost (and it is a cost) as part of an insurer's expense structure (while including the benefit in terms of capital level) 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.