April 28, 2022

Oliver Wyman

120 Bremner Boulevard, Suite 800,

Toronto, Ontario

M5J 0A8

Attention: Paula Elliott

RE: FA NL **Taxis and Limousines Rate Application – Category 2** – Response to email April 19, 2022

Dear Ms. Elliott,

Facility Association (FA) received questions in regard to FA Newfoundland and Labrador Taxis and Limousines Rate Filing in 2022. Our responses to the questions are provided on the pages that follow.

Best regards

Liqing Yang, FCIA, FCAS

Pricing Actuary

General

OW Question 1 (consistent of 2 questions) *FA proposes an overall rate level change of +13.3% in this filing. We note FA proposes changes to its conviction surcharges, and estimates the overall rate level impact for this change to be +1.0%.*

1.1. Please confirm the noted +13.3% proposed overall rate level change does not include the approximate rate level impact of conviction surcharge proposed change?

FA Response to OW Question 1.1

We confirm that the +13.3% proposed overall rate level change does not include the impact of the proposed conviction surcharge changes. As stated in the filing, these surcharges and associated rules changes will be applicable to all the individually rated vehicle classes, and the impacts of these rules changes on each vehicle classes will be treated as separate rate level changes by coverage upon NL PUB final decision on these rules changes.

OW Question 1 (continued)

1.2. Is the timing of implementation of the change for conviction surcharges expected to be coincident with the approved overall rate changes as listed above?

FA Response to OW Question 1.2

FA proposes 100 days post approval for the rate changes and the rule changes. We expect the timing of implementation of the conviction surcharges changes to coincide with the rate changes depending on the NL PUB's decision.

OW Question 2 (consists of 2 questions) *With the merger of the two servicing carriers, Intact Group[1] and Royal Sun Alliance (RSA), please confirm if Intact Group now manages (or soon will manage) the renewal of all FA risks previously written by RSA.*

2.1 If yes, confirm if Intact Group is charging (or plans to charge) for the monthly payment plan option.

FA Response to OW Question 2.1

[1] Intact Group, is meant to collectively represent any operating companies writing in Newfoundland and Labrador as a servicing carrier for the FA.

In October 2021, the conversion of RSA Facility renewals to Nordic began for all lines of business with renewal effective dates of January 1, 2022.

Nordic has confirmed that the interest rate for direct bill monthly pay plan will remain at 3% and would be available for the following risk types: Private Passenger Vehicles, Individually Rated Commercial Automobiles (excluding US) and Taxis. Converted policies from RSA would retain their billing preference when renewed with Nordic.

OW Question 2 (continued)

2.2 *If Intact Group is charging (or plans to charge) for the monthly payment plan option, explain how these fees were considered in calculating the rate level change need.*

FA Response to OW Question 2.2

The finance fees are not taken into consideration in the calculation of the rate level change need.

Indeed, as discussed in previous NL filings (PPV and Taxi filings), FA does not directly engage in providing premium financing to policyholders insured through the FARM. Any such arrangements are strictly between the policyholder and the FA Servicing Carrier.

Premium finance fees are charged to reflect returns to capital providers in relation to the risk presented. Returns, by definition, are cash flows after taking into consideration costs, where risks reflect the uncertainty of the cash flows, and the amount of capital to support the service reflects the acceptable level of default of the capital provider, due to losses incurred in providing the service. In this particular case, the service is effectively the provision of a loan to a policyholder in the amount of the insurance policy premium, with loan repayment scheduled over the course of the policy term. The direct costs incurred by the loan provider include the direct costs of administering the program, and the uncertainty of the cash flows reflect the credit risk that is borne by the loan provider (i.e. that the loan is not repaid either on time, or completely), and the investment income opportunity costs of the funds (the investment income that could have been earned on the funds had they not been used in providing a loan on behalf of the policyholder). This is no different than if the insured went to a premium financing company to finance the premium. It is not part of the insurance premium as it is a loan to finance the premium.

OW Question 3 *With the consolidation resulting in Intact Group as sole servicing carrier, does Intact expect to have increased efficiencies and reduced handling costs per FA risk? If not, explain why not.*

FA Response to OW Question 3

In the short term, with the consolidation of RSA and Intact and with the conversion of Cooperators' renewals into Intact's systems, handling costs are expected to increase. Multiple system conversion initiatives were launched for RSA and additional staff was hired to complete manual conversions of renewals from Co-Operators. The conversion of policies from both RSA and Co-Operators is expected to take 12 months to be completed over the course of the policies' lifecycle, as they renew.

In the long term, as policies convert into Intact systems (more than 1 system currently used to handle FA business), Intact plans to invest in consolidating all systems into one (1) and to modernize their platform, which would require considerable investments. Ultimately, this multi-year project would result in efficiency gains and ease of doing business.

Reform Adjustment

OW Question 4 *Explain how (state where) the deductible change associated with the bodily injury reforms is accounted for the in the rate indication calculation. Specifically, how are the accident years prior to 2020 adjusted for the expected reduction in costs? State where in the Excel rate indication model these factors can be found.*

FA Response to OW Question 4

The reform impact on the loss cost at January 1, 2020 has been included in FA selected BI severity trend model by a forced scalar change (-4.0%) at 2020-H1 (see the chart below).

FITTED TREND STRUCTURE REGRESSION STATISTICS						
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.5353	0.2866	0.2458	0.2321	38	2	3

Runs-Test Result:	0.8077	RESIDUALS RUNS RANDOM		#NUM!
# 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	(40.970)	13.048	(3.140)	0.3%	(67.459)	(14.480)	(40.970)
Season	-	-	-	n/a	-	-	-
All Years	0.026	0.006	3.968	0.0%	0.013	0.039	0.026
Scalar 1	-	-	-	100.0%	-	-	(0.041)
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	-	-	-

Scalar 1 to get reform impact (-4% per OW report)

The indication Exhibit D-5b calculates Loss Cost Projection Factors from the accident year to the average accident date of the projection period (31-Mar-2024) and this calculation reflects how the accident years prior to 2020 experience has been adjusted for the expected loss cost reduction due to the reform.

The table below shows the comparison of the BI Loss Cost Projection Factors with and without forced reform coefficient at 2020H1 to the average accident date.

AY	FA Selected Loss Cost With Reform Impact at 2020H1	Projection Factor With Reform Impact	FA Selected Loss Cost Without Reform Impact at 2020H1	Projection Factor Without Reform Impact	Reform Adjustments
2011	278.33	0.7483	278.33	0.7795	-4.0%
2012	279.07	0.7463	279.07	0.7774	-4.0%
2013	279.81	0.7444	279.81	0.7754	-4.0%
2014	280.56	0.7424	280.56	0.7733	-4.0%
2015	281.32	0.7404	281.32	0.7712	-4.0%
2016	212.50	0.9801	212.50	1.0210	-4.0%
2017	213.07	0.9775	213.07	1.0183	-4.0%
2018	213.65	0.9749	213.65	1.0155	-4.0%
2019	214.21	0.9723	214.21	1.0128	-4.0%
2020	206.20	1.0101	214.80	1.0101	0.0%
March 31, 2024	208.28	1.0000	216.96	1.0000	0.0%

Without forced -4.0% scalar 1 coefficient (reform impact) at 2020H1 for NL CV BI severity, the NL taxi overall rate change would increase to +13.9% from +13.3%.

Loss Development

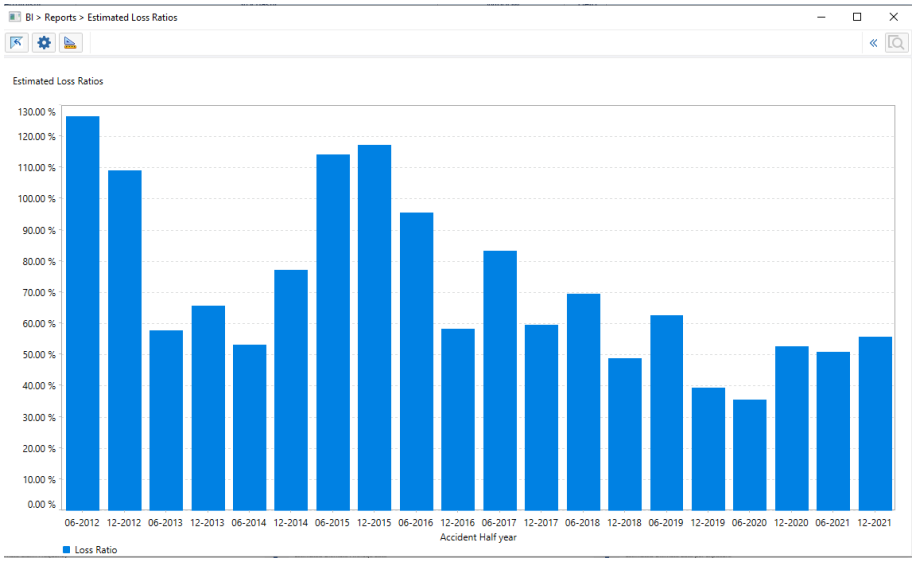
OW Question 5 (consists of 2 questions) *In the case of bodily injury, for the accident half year 2020-2, FA presents Incurred Method, Expected Loss Ratio Method and B-F Method ultimate loss amount estimates of $1.13 million, $1.78 million, and $1.20 million, respectively; all evaluated as of September 30, 2021. Three other estimates are presented, all less than $1.27 million?*

5.1 Given this range, explain why FA selected the Expected Loss Ratio Method, the highest value, at $1.78 million?

FA Response to OW Question 5.1

FA's selected nominal ultimate indemnity amounts from the FARM valuation as at September 30, 2021 are best estimates of the expected ultimate losses, based on estimates derived from multiple valuation methodologies. Final selection of ultimate is at the discretion of the Appointed Actuary, based on their analysis and review of the results, consideration of the estimates by method, and with consideration of the relative strengths and weaknesses of the methodologies. There are no biases in the selections and the overarching approach is consistent with prior valuations. In the particular case of 2020-H2, this accident period corresponds to a period affected by the Covid-19 pandemic, which creates significant uncertainty in the claims development pattern, especially for long tail coverages such as bodily injury. The main weakness of the incurred development methodology is its limited ability to "respond" to changes in development patterns. It is generally believed among our subject matter experts that the Covid pandemic and subsequent restrictions on public mobility and economic activity have likely created delays in the process of claims development.

As a result of this, we believe it is most reasonable to select the expected loss ratio estimate which is based on the actual earned premium and a trended long-term average loss ratio estimate as illustrated in the A Priori LR Calculation exhibit in Appendix A. The resulting selected loss ratio appears reasonable in comparison with ultimate loss ratio selections from other periods:



OW Question 5 (continued)

5.2 In contrast, in the concurrent Miscellaneous Vehicle filing, using private passenger data, for the same 2020-2 bodily injury ultimate loss estimate, FA selects the B-F Method, which is the higher of the B-F and Expected Loss Ratio Methods. Explain why there is a difference in the selection approach.

FA Response to OW Question 5.2

For the private passenger 2020-2 bodily injury ultimate loss estimate, the expected loss ratio method indicated an ultimate loss significantly below the incurred claims development method ($4.9M vs. $5.7M). As discussed in our response to question 5.1, we generally expect claims development for periods affected by Covid-19 to be slower to emerge. Given our expected loss ratio estimate is below the incurred development method, and the uncertainty surrounding the development patterns for these pandemic periods, we believe that the BF method ($5.5M) is a more reasonable estimate.

OW Question 6 *In the case of accident benefits, for the accident half year 2020-2, FA presents Incurred Method, Expected Loss Ratio Method and B-F Method ultimate loss amount estimates of $86 thousand, $156 thousand, and $89 thousand, respectively; all evaluated as of September 30, 2021. Given this range, explain why FA selected the Expected Loss Ratio Method, the highest value?*

FA Response to OW Question 6

FA's selected nominal ultimate indemnity amounts from the FARM valuation as at September 30, 2021 are best estimates of the expected ultimate losses, based on estimates derived from multiple valuation methodologies. Final selection of ultimate is at the discretion of the Appointed Actuary, based on their analysis and review of the results, consideration of the estimates by method, and with consideration of the relative strengths and weaknesses of the methodologies. There are no biases in the selections and the overarching approach is consistent with prior valuations. In the particular case of 2020-H2, this accident period corresponds to a period affected by the Covid-19 pandemic, which creates significant uncertainty in the claims development pattern, especially for long tail coverages such as accident benefits. The main weakness of the incurred development methodology is its limited ability to "respond" to changes in development patterns. It is generally believed among our subject matter experts that the Covid pandemic and subsequent restrictions on public mobility and economic activity have likely created delays in the process of claims development.

As a result of this, we believe it is most reasonable to select the expected loss ratio estimate which is based on the actual earned premium and a trended long-term average loss ratio estimate as illustrated in the A Priori LR Calculation exhibit in Appendix A.

OW Question 7 *As a sensitivity test, provide the rate indications by selecting the B-F Method results for 2020-2 for bodily injury and accident benefits, and no other changes in assumptions.*

FA Response to OW Question 7

The table below compares the FA selected ultimate and the alternative ultimate for BI and AccBen.

	BI				AccBen			
AY	Loss Ratio	B-F	FA Selected	Alternative	Loss Ratio	B-F	FA Selected	Alternative
2020/1	1,404,852	1,027,622	1,027,622	1,027,622	120,407	95,853	95,853	95,853
2020/2	1,778,735	1,200,113	1,778,735	1,200,113	157,292	99,352	157,292	99,352
2020	3,183,587	2,227,735	2,806,357	2,227,735	277,699	195,205	253,145	195,205

The table at the top of the next page shows the alternative rate indications by selecting the B-F Method results for 2020-2 for bodily injury and accident benefits, no other changes.

NL PPV alternative indications with B-F Method for BI and AccBen, no other change

	Per Submitted Filing - TX			OW Question 9
Coverage	mgmt assumps @ 12% ROE & 2.8% RoI [1]	mgmt assumps @ 6% ROP & 2.8% RoI [2]	mgmt assumps & @ 6% ROP & 2.8% RoI Proposed Rate Change [3]	mgmt assumps & @ 6% ROP & 2.8% RoI + alternative BI & AccBen Ultimates [4]
Bodily Injury	16.0%	14.1%	14.1%	13.2%
Property Damage	16.0%	14.1%	14.1%	13.2%
DCPD	16.0%	14.1%	14.1%	13.2%
Third Party Liability				
Accident Benefits	13.0%	11.1%	11.1%	10.6%
Uninsured Automobile	16.1%	14.2%	14.2%	14.2%
Underinsured Motorist	-	-	-	-
Collision	11.3%	9.5%	9.5%	9.5%
Comp	22.2%	20.2%	20.2%	20.3%
Specified Perils	(32.2%)	(33.3%)	(33.3%)	(33.3%)
All Perils	n/a	n/a	n/a	n/a
Total	**15.1%**	**13.3%**	**13.3%**	**12.5%**

OW Question 8 *What reasons can FA provide to explain why the PD/DCPD and accident benefits loss development factors between PPV and non-PPV (used for taxi) are so different for accident year 2020. Specifically, the PD/DCPD 2020 accident year factors are 1.05 and 1.40 for PPV and non-PPV, respectively. And for accident benefits, the 2020 accident year factors are 1.18 and 2.44 for PPV and non-PPV, respectively.*

FA Response to OW Question 8

For PD/DCPD, this difference arises from the fact that the filing uses the ratio of ultimate claims estimates selected at the 2021-Q3 valuation to reported claims as at 2020-Q4 to derive the implied loss development factors[2]. If we instead examine ratio of ultimate claims to reported claims as of the 2020-Q4 valuation, the implied development factors are more similar. For non-PPV these coverages experienced adverse development in the reported claims amounts between the 2020-Q4 and 2021-Q3 valuations. When we compare using reported claims amounts as at 2020-Q4, the implied development factors are similar (1.193 and 1.142) – as we would expect for short-tailed lines like PD.

Accident Year 2020	**PD/DCPD**	
	Non-PPV	**PPV**
Filing Ultimate Claims Selection (2021-Q3)	785,312	1,721,437
Filing Reported Claims (2020-Q4)	562,918	1,644,548
Valuation Reported Claims (2021-Q3)	762,650	1,687,566
Valuation Ultimate Claims Selection at 2020-Q4	671,533	1,878,640
Valuation Actual Ultimate to Reported Ratio 12-Ult	1.193	1.142

[2] The filing Section 4.b.1 describes how the implied LDFs have been estimated.

Filing Ultimate to Reported Ratio 12-Ult	1.395	1.047

For Accident Benefits, this difference arises from the volatility of reported claims for small portfolios of long-tailed claims. The ultimate claim amounts for this period are set using the expected loss ratio method, due to the immaturity of the data as well as uncertainty in the loss development pattern – particularly true during the Covid-19 pandemic period. We expect more volatility in the reported claims as at 12 months, and it is not surprising to see a higher degree of variation in the 12-ultimate implied LDF at this claims age for a small portfolio of accident benefits claims.

There is also more uncertainty in the expected loss ratio (ELR) estimates during the Covid period, which is a contributing factor in the difference noted above. For example, there is a judgmentally selected "Covid-19 ELR reduction" factor applied in these ELR estimates which assumes a larger reduction to PPV loss ratios than Non-PPV loss ratios, which is based on examining nation-wide industry loss data that indicates Covid drove a bigger reduction in PPV claims frequency compared to Non-PPV. However, the degree of this difference is subject to variability. FA will strive to refine these ultimate loss estimates as time goes on and more mature data becomes available.

Loss Trend

OW Question 9 *As a sensitivity measure, provide the rate indications based on the Board's guideline loss trend rates (as of December 31, 2020), and no other changes in assumptions.*

FA Response to OW Question 9

The table at the top of the next page shows the rate indications based on the Board's guideline loss trend rates (as of December 31, 2020), no other changes.

NL PPV alternative indications with Board's guideline loss trend rates, no other change

	Per Submitted Filing - TX			OW Question 9
Coverage	mgmt assumps @ 12% ROE & 2.8% RoI [1]	mgmt assumps @ 6% ROP & 2.8% RoI [2]	mgmt assumps & @ 6% ROP & 2.8% RoI Proposed Rate Change [3]	mgmt assumps @ 6% ROP & 2.8% RoI + alternative PUB Benchmark Trends at 2020H2 [4]
Bodily Injury	16.0%	14.1%	14.1%	0.3%
Property Damage	16.0%	14.1%	14.1%	0.3%
DCPD	16.0%	14.1%	14.1%	0.3%
Third Party Liability				
Accident Benefits	13.0%	11.1%	11.1%	40.1%
Uninsured Automobile	16.1%	14.2%	14.2%	40.2%
Underinsured Motorist	-	-	-	-
Collision	11.3%	9.5%	9.5%	11.9%
Comp	22.2%	20.2%	20.2%	22.0%
Specified Perils	(32.2%)	(33.3%)	(33.3%)	(26.9%)
All Perils	n/a	n/a	n/a	n/a
Total	**15.1%**	**13.3%**	**13.3%**	**4.8%**

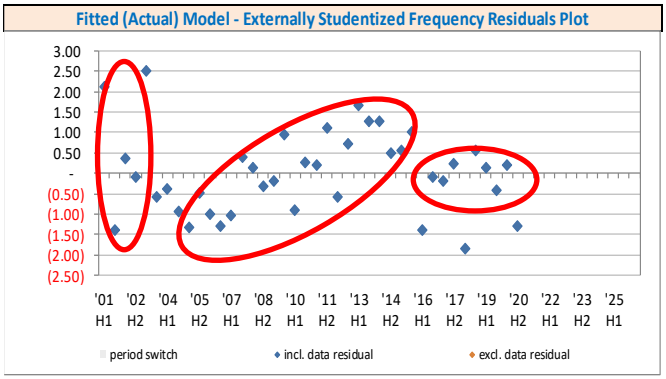
OW Question 10 (consists of 3 questions) *In the bodily injury frequency model, FA includes a scalar parameter at 2016-1.*

10.1 Can FA provide an intuitive reason for the scalar parameter at 2016-1?

FA Response to OW Question 10.1

Based on the FA's standard trend analysis process, we would stay with a previous selected model structure to stabilize the FA selected trends, unless there was compelling reasons to change the previous model structure.

The chart at right shows the residual plot of NL CV BI frequency model with only All Years parameter based on the industry data as of December 31, 2020. It indicates what appears to be 3 periods of influence (the three periods had been identified at 2019-2 trend analysis) at 2004-2 and 2016-1 (we have cycled those periods in the externally-studentized residual plot provided on the right).



OW Question 10 (continued)

10.2 Provide the frequency trend rate using the same model as selected by FA, but without the scalar parameter at 2016-1.

FA Response to OW Question 10.2

The charts below compare the FA selected BI frequency model and the alternative BI frequency model as requested without the scalar 2 at 2016-1, the Scalar 1 at 2004-1 is removed as it is not statistical significant with p-value > 5.0%.

Industry NL CV December 31, 2020 – BI Frequency

BI Freq (FA f0a) – basis of FA selection

Final period trend: -2.3% +/-0.7%

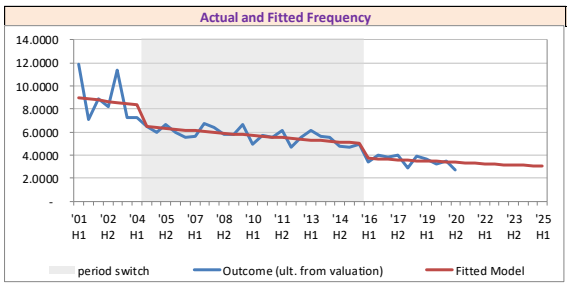
FITTED TREND STRUCTURE REGRESSION STATISTICS

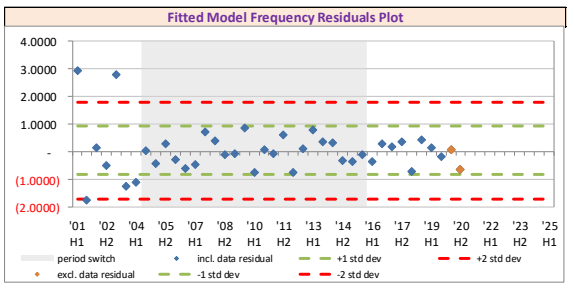
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.9270	0.8593	0.8469	0.1214	38	2	4

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	48.365	14.787	3.271	0.2%	18.315	78.415	48.365
Season	-	-	-	n/a	-	-	-
All Years	(0.023)	0.007	(3.125)	0.4%	(0.038)	(0.008)	(0.023)
Scalar 1	(0.245)	0.076	(3.220)	0.3%	(0.400)	(0.091)	(0.245)
Trend 1	-	-	-	n/a	-	-	-
Scalar 2	(0.283)	0.076	(3.732)	0.1%	(0.437)	(0.129)	(0.283)
Trend 2	-	-	-	n/a	-	-	-
Scalar 3	-	-	-	n/a	-	-	-
Trend 3	-	-	-	n/a	-	-	-
Scalar 4	-	-	-	n/a	-	-	-
Trend 4	-	-	-	n/a	-	-	-





BI Freq (FA f0a – OW Q10.2) – alternative

Final period trend: -4.8% +/-0.4%

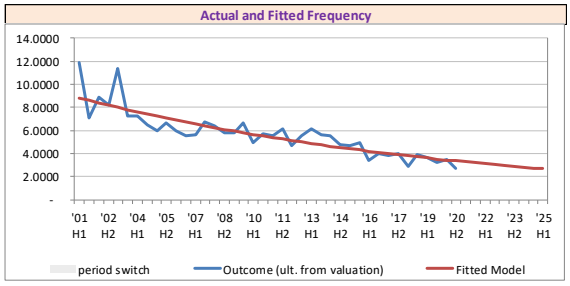
FITTED TREND STRUCTURE REGRESSION STATISTICS

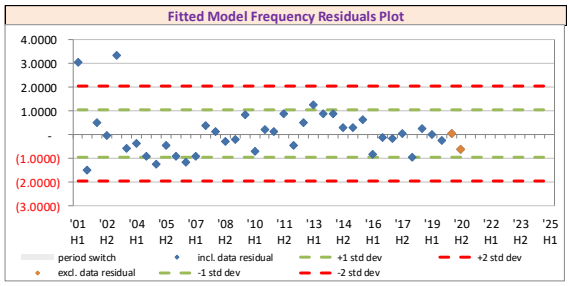
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.8881	0.7888	0.7829	0.1446	38	2	2

Runs-Test Result: 0.4932 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	101.447	8.601	11.794	0.0%	84.003	118.892	101.447
Season	-	-	-	n/a	-	-	-
All Years	(0.050)	0.004	(11.594)	0.0%	(0.058)	(0.041)	(0.050)
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	-	-	-



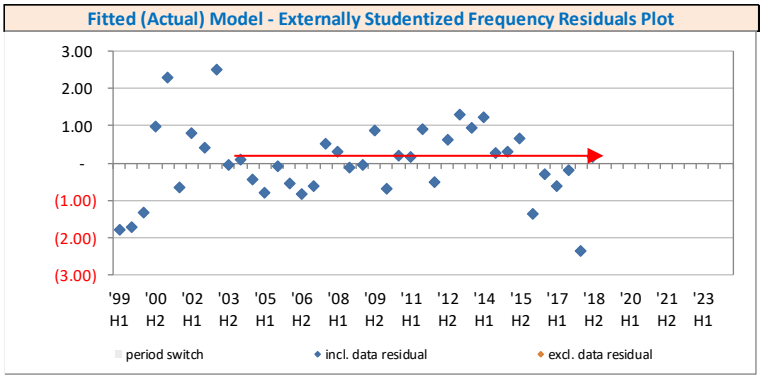


OW Question 10 (continued)

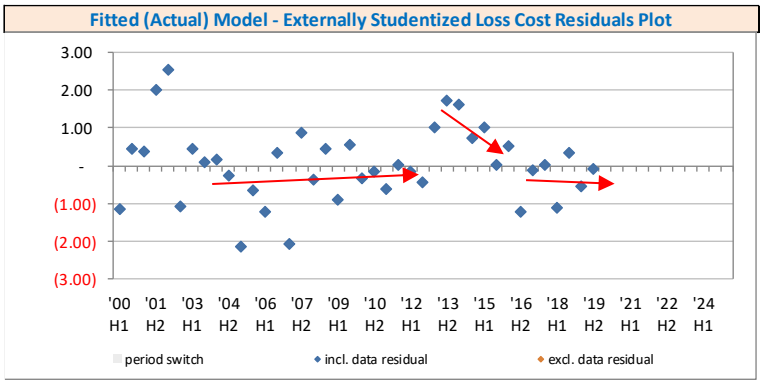
10.3 In the prior (September 2019 submission) filing, FA did not include a scalar parameter at 2016-1. Explain why this change was made.

FA Response to OW Question 10.3

The prior filing (September 2019 submission) was based on industry data as of December 31, 2018. At that time, there was no clear evidence for the frequency change at 2016-1. Our trend analysis process would suggest to closely monitor the frequency change and would change the model structure if more evidence emerged.



The FA 2019H2 trend analysis based on industry data as of December 31, 2019 had identified frequency changes at those data points and the new model structure with the frequency change at those data points had been tested and adopted.



The current filing is based on FA 2020H2 trend analysis with industry data as of December 31, 2020, and FA 2020H2 selected model structure for BI frequency has been consistent with the previous (2019H2) FA selected model structure.

OW Question 11 (consists of 2 questions) *We observe an accident benefits severity trend model that would benefit from a trend parameter rather than a scalar.*

11.1 Did FA consider using a trend parameter beginning 2011-2 instead of the scalar parameter utilized in the selected model?

FA Response to OW Question 11.1

Based on the FA's standard trend analysis process, we would stay with a previous selected model structure to avoid significant change of the selected trends coefficients from year to year, unless there was a compelling reason to change the model structure.

FA did consider the model using a trend parameter beginning 2011-2, the model with trend parameter beginning 2011-2 indicated significant severity trend coefficient of +12.9% (annual trend of +13.8%), this was significant higher than FA previous selected model indicated annual trend of 0.0%. As both

models are statistical significant and valid, we would stay with the previous selected model structure for now, until we have more evidence for the higher trend in the future.

OW Question 11 (continued)

11.2 Provide the indicated trends and all relevant statistics for an accident benefits severity model with a trend parameter at 2011-2 (with no scalar parameters).

FA Response to OW Question 11.2

The charts on the next page compare the FA selected accident benefits severity and the alternative accident benefits severity model as requested with a trend parameter at 2011-2 (with no scalar parameters).

Industry NL CV December 31, 2020 – AccBen Severity

AccBen Sev (FA s0a) – basis of FA selection

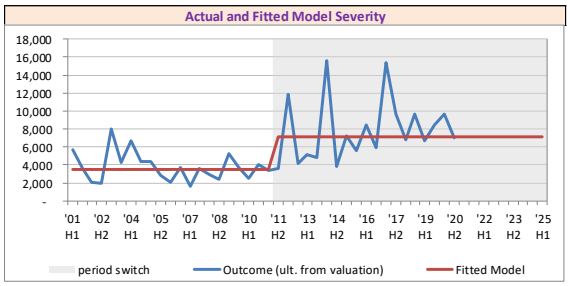
Final period trend: 0.0% +/-0.0%

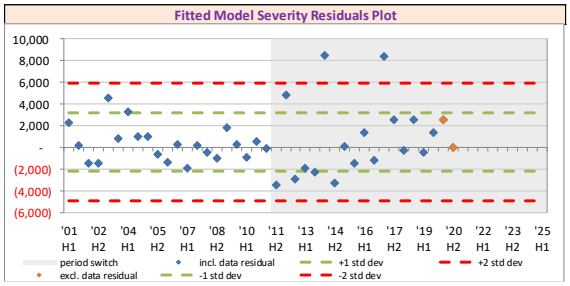
FITTED TREND STRUCTURE REGRESSION STATISTICS						
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.6454	0.4166	0.4004	0.4343	38	2	2

Runs-Test Result: 1.5000 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	8.149	0.095	85.990	0.0%	7.957	8.341	8.149
Season	-	-	-	n/a	-	-	-
All Years	-	-	-	n/a	-	-	-
Scalar 1	0.718	0.142	5.070	0.0%	0.431	1.006	0.718
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	-	-	-





AccBen Sev (FA s0a – OW Q11.2) – alternative

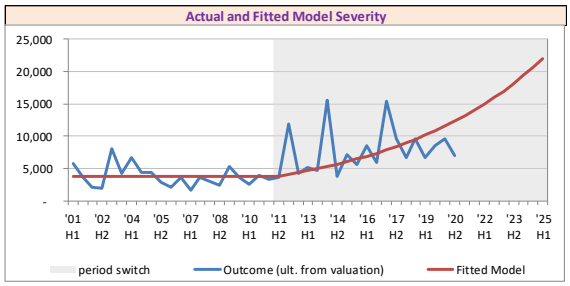
Final period trend: +13.8% +/-2.7%

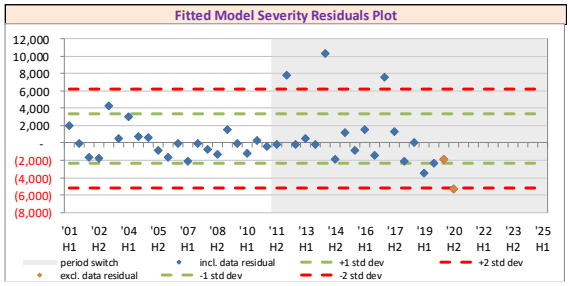
FITTED TREND STRUCTURE REGRESSION STATISTICS						
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.6239	0.3892	0.3722	0.4443	38	2	2

Runs-Test Result: 1.1328 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	8.225	0.088	92.993	0.0%	8.045	8.404	8.225
Season	-	-	-	n/a	-	-	-
All Years	-	-	-	n/a	-	-	-
Scalar 1	-	-	-	n/a	-	-	-
Trend 1	0.129	0.027	4.790	0.0%	0.074	0.184	0.129
Scalar 2	-	-	-	n/a	-	-	-
Trend 2	-	-	-	n/a	-	-	-
Scalar 3	-	-	-	n/a	-	-	-
Trend 3	-	-	-	n/a	-	-	-
Scalar 4	-	-	-	n/a	-	-	-
Trend 4	-	-	-	n/a	-	-	-





Both models are statistical valid and reasonable; but to avoid significant trend change (form 0.0% to +13.8%) we decided to keep the current model structure for now.

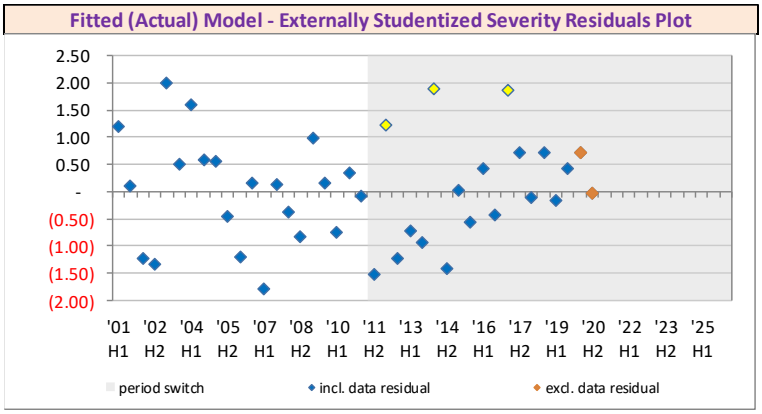
OW Question 12 (consists of 2 questions) *We observe three unusually high accident benefits severity observations: 2012-1, 2014-1 and 2017-2.*

12.1 Does FA consider these observations potential outliers?

FA Response to OW Question 12.1

Our trend analysis includes residual analysis to identify outliers for testing for influence. We identify such data points based on the absolute size of the externally-studentized residuals, and define outliers as data points where the externally-studentized residual is more than two standard errors. Outlier influence is assessed by comparing the trend coefficient estimates (one standard error) range with the same parameter's coefficient estimate for the model with the outlier data point included. If the later estimate is not within the range from the model where the data point was excluded, the data point is viewed as influential and a decision is made on how to handle (we generally would select the model that is excluding it – in certain circumstances we do not). Where a data point's exclusion is not viewed as influential, we would select the model that is including it. This process is complete sequentially. Specifically, we would test the largest outlier first, then test the largest outlier based on the model with the first outlier removed and so on. We do not identify, for example, two outliers from a single model and then test their exclusions' impacts at the same time – we would do one, and if the other was the largest outlier from that model, we would then test it from that model.

Based on the AccBen Studentized Severity Residuals plot (right chart) of the model FA s0a, the 2003H1 was tested as outlier first by the model FA s0b which excluded 2003H1, as its residual was the largest. Based on the residual of FA s0b, we would test the next outlier if there was any. In fact, there was no data point identified as outlier based on the model FA s0b, as such 2012H1, 2014H1, and 2017H1 (should not be 2017H2) were not tested as outliers.



OW Question 12 (continued)

12.2 Provide the indicated trends and all relevant statistics for an accident benefits severity model with a trend parameter at 2011-2 (with no scalar parameters) fit to data excluding 2012-1, 2014-1 and 2017-1.

FA Response to OW Question 12.2

The charts on the next page compare the FA selected accident benefits severity and the alternative accident benefits severity model as requested with a trend parameter at 2011-2 (with no scalar parameters) fit to data excluding 2012-1, 2014-1 and 2017-1.

Industry NL CV December 31, 2020 – AccBen Severity

AccBen Sev (FA s0a) – basis of FA selection

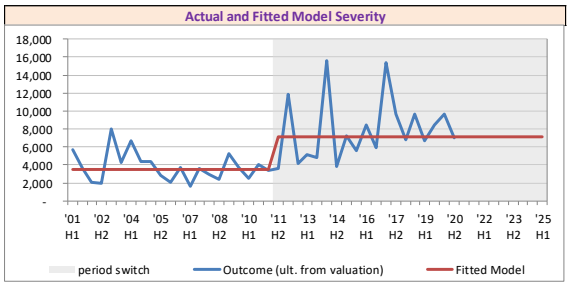
Final period trend: 0.0% +/-0.0%

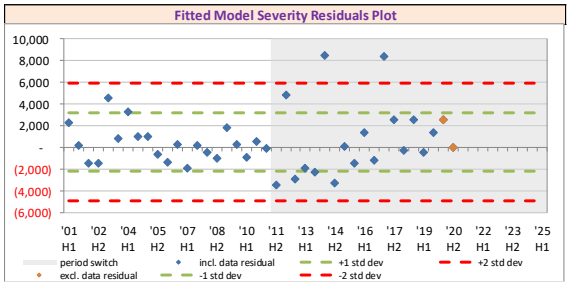
FITTED TREND STRUCTURE REGRESSION STATISTICS						
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.6454	0.4166	0.4004	0.4343	38	2	2

Runs-Test Result: 1.5000 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	8.149	0.095	85.990	0.0%	7.957	8.341	8.149
Season	-	-	-	n/a	-	-	-
All Years	-	-	-	n/a	-	-	-
Scalar 1	0.718	0.142	5.070	0.0%	0.431	1.006	0.718
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	-	-	-





AccBen Sev (FA s0a – OW Q12.2) – alternative

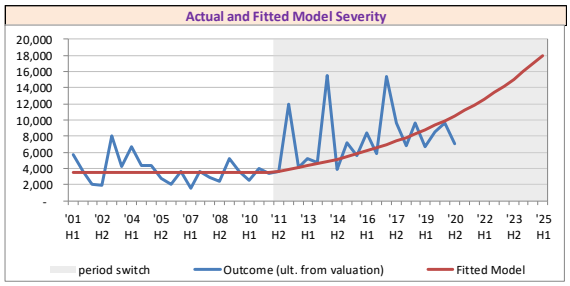
Final period trend: +12.6% +/-2.2%

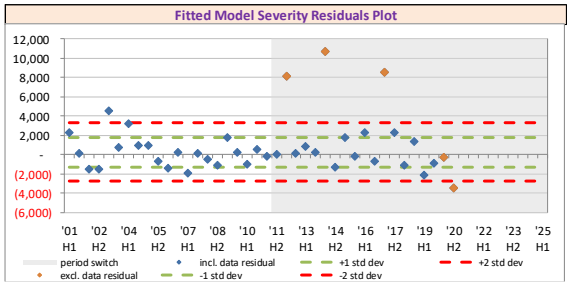
FITTED TREND STRUCTURE REGRESSION STATISTICS						
Multiple R	R^2	Adjusted R^2	S.E. of Estimate	# of Obs. n	# of Obs. Excluded	# parameters p
0.6833	0.4669	0.4508	0.3531	35	5	2

Runs-Test Result: 0.9935 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	8.163	0.072	113.751	0.0%	8.017	8.309	8.163
Season	-	-	-	n/a	-	-	-
All Years	-	-	-	n/a	-	-	-
Scalar 1	-	-	-	n/a	-	-	-
Trend 1	0.119	0.022	5.376	0.0%	0.074	0.164	0.119
Scalar 2	-	-	-	n/a	-	-	-
Trend 2	-	-	-	n/a	-	-	-
Scalar 3	-	-	-	n/a	-	-	-
Trend 3	-	-	-	n/a	-	-	-
Scalar 4	-	-	-	n/a	-	-	-
Trend 4	-	-	-	n/a	-	-	-





Both models are statistical valid and reasonable, but they are not directly comparable as they based on different data set.