Consumers' Association of Canada (Manitoba) (CAC)
Responses to 2023 GRA Intervener Evidence Information Requests
Submitted by the Public Utilities Board (PUB)

October 14, 2022

PUB (CAC)-1

Part and Chapter:	**CAC Manitoba Intervener (Oliver Wyman) Evidence**	**Page No.:**	**7**
PUB Approved Issue No:	**9. Claims Forecasting**		
Topic:	**Claims Trends**		
Sub Topic:			

Preamble to IR (If Any):

As shown in Figure 1 of PUB (MPI) 2-32, MPI fits a linear model to the observed frequencies for nine of the coverages.

Oliver Wyman states in its evidence that it is more common to fit log-linear models as frequency changes tend to occur on a percentage basis rather than an amount basis. A linear model could potentially produce a negative frequency in a limiting case.

Question:

a) Can Oliver Wyman quote any studies that demonstrate that frequency changes tend to occur on a percentage basis rather than an amount basis?

b) Would Oliver Wyman consider the use of log linear models for frequency changes to be common practice, and the standard approach seen by Oliver Wyman when reviewing company rate filings on behalf of regulators in Canada?

Rationale for Question:

To get further understanding into the trending models

RESPONSE:

a) Log-linear regression models percentage changes over time, while linear regression considers changes on an amount basis. This is analogous to the difference between compound interest and simple interest. For example, over a three year period, under a linear (simple interest) model, $100 would grow to $130 with a $10 growth factor. Under a log-linear model, $100 would grow to $133 with a 10% growth factor. The term log-linear is a reference such models appearing as a line when the axis is on a logarithmic scale.

The following is a quote from Barclay, indicating that log-linear regression is commonly used for trend analyses.

“Since the inflationary spiral of the 1970s, the exponential curve has replaced the straight line as the regression model of choice. The exponential model is now commonly accepted even by regulators. By fitting an exponential curve, we actuaries can avoid the underestimation of losses that often results from the decreasing rate of change that is characteristic of the linear regression model.” (D. Lee Barclay, "A Statistical Note on Trend Factors: The Meaning of R-Squared")

b) Yes, we find it is common practice in the industry to use log-linear regression models. Industry benchmarking exercises in Alberta, Ontario, Newfoundland and Labrador, and Nova Scotia use log-linear (exponential) regression models to determine frequency, severity, and loss cost trend benchmarks. Additionally, in our review of rate filings, we have observed

that it is common practice for insurers to use log linear models in their rate filings.

RATIONALE FOR REFUSAL TO FULLY ANSWER THE QUESTION:

CAC to insert rationale for refusal here.

PUB (CAC)-2

Part and Chapter:	**CAC Manitoba Intervener (Oliver Wyman) Evidence**	**Page No.:**	
PUB Approved Issue No:	**9. Claims Forecasting**		
Topic:	**Claims Trends**		
Sub Topic:			

Preamble to IR (If Any):

Oliver Wyman has proposed the use of log-linear models instead of linear models for several of MPI's claims frequency trend models.

Question:

For each of the models that Oliver Wyman has proposed a log-linear model for the frequency changes,

i) could Oliver Wyman please provide the indicated log-linear trend, using the MPI selected accident years, in order to show the difference that would occur in the MPI indicated trend due to the use of a log-linear trend model instead of a linear trend model?

ii) Would Oliver Wyman agree that any residual difference from the log-linear model fitted to the MPI accident year selection, and the log-linear model fitted to the Oliver Wyman accident year selection, would be due to the difference in the selection of applicable accident years?

Rationale for Question:

To understand the impact of the use of a log-linear model instead of a linear model for frequency, and also understand the impact of different accident year selection.

RESPONSE:

i) We have proposed alternative frequency models for weekly indemnity, collision total loss, comprehensive hail, and comprehensive vandalism

We provide the weekly indemnity frequency statistics using the MPI selected accident years below. The indicated trend rate is -1%.

```
summary(ow_model$model)

##
## Call:
## lm(formula = as.formula(model_string), data = data)
##
## Residuals:
##        1        2        3        4        5
## -0.02154 -0.01389  0.04804  0.03172 -0.04434
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)   21.73289   28.37265   0.766    0.499
## accident_year -0.01041    0.01407  -0.740    0.513
##
## Residual standard error: 0.04448 on 3 degrees of freedom
## Multiple R-squared:  0.1543, Adjusted R-squared:  -0.1276
## F-statistic: 0.5472 on 1 and 3 DF,  p-value: 0.5131
```

We provide the regression statistics for the collision total loss frequency model using the MPI selected accident years below. The indicated trend rate is -0.3%.

```
summary(ow_model$model)

##
## Call:
## lm(formula = as.formula(model_string), data = data)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.077858 -0.044320  0.007152  0.044178  0.063955
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    8.483728  12.315963   0.689    0.510
## accident_year -0.002569   0.006114  -0.420    0.685
##
## Residual standard error: 0.05553 on 8 degrees of freedom
## Multiple R-squared:  0.0216, Adjusted R-squared:  -0.1007
## F-statistic: 0.1766 on 1 and 8 DF,  p-value: 0.6854
```

MPI does not select a regression model for comprehensive hail or comprehensive vandalism frequency, therefore the stated condition does not exist.

ii) We agree with the conclusion, given the stated condition. As noted above, the stated condition does not exist for comprehensive hail or comprehensive vandalism.

RATIONALE FOR REFUSAL TO FULLY ANSWER THE QUESTION:

PUB (CAC)-3

Part and Chapter:	**CAC Manitoba Intervener (Oliver Wyman) Evidence**	**Page No.:**	**6**
PUB Approved Issue No:	**9. Claims Forecasting**		
Topic:	**Claims Trends**		
Sub Topic:			

Preamble to IR (If Any):

Oliver Wyman has selected a trend period from accident year 2012 to 2019 for Weekly Indemnity claim frequency.

Question:

a) Reviewing CI-14, would Oliver Wyman agree that the 2012 accident year is a relative high point for claim counts, and hence likely to generate a higher trend and R2 than the use of less data points?

b) Oliver Wyman indicates that their model explains a significantly higher percentage of the variation of the data. Does it fit the accident year 2015 to 2019 year data better than the MPI model?

Rationale for Question:

To better understand OW selection of accident years for Weekly Indemnity.

RESPONSE:

a) The inclusion of a high 2012 value of the left side of the regression line will result in a lower (more negative) trend. We can not comment on the effect on R^2 as that metric is measured over the data underlying the model. As such, dropping 2012 produces a model with a R^2 measured over a different period. We expect R^2 values to rise when excluding points with higher residuals (such as 2012 in our model) and when there are fewer data points relative to the number of parameters. As such, from visual inspection, we would expect that a model fit to 2013-2019 to have a higher R^2 than a model fit to 2012-2019. (Note that our comment here refers to the R^2 metric and not the adjusted R^2 metric.)

b) A model fit only to 2015-2019 will always produce a better fit to the data for 2015-2019 than a model fit to 2012-2019.

RATIONALE FOR REFUSAL TO FULLY ANSWER THE QUESTION:

CAC to insert rationale for refusal here.

PUB (CAC)-4

Part and Chapter:	**CAC Manitoba Intervener (Oliver Wyman) Evidence**	**Page No.:**	**2 and 13**
PUB Approved Issue No:	**9. Claims Forecasting**		
Topic:	**Claims Trending**		
Sub Topic:			

Preamble to IR (If Any):

Oliver Wyman states on page 2-3:

Work from home – MPI applies a 5% reduction to claim frequency for collision, property damage, weekly indemnity, and ABO-Indexed in consideration of a change in post-pandemic driving behavior as additional insureds work from home. We have reviewed the effects of the pandemic in other contexts and consider a 5% adjustment to be reasonable.

Oliver Wyman states on page 13:

Potential Larger Impact of WFH Adjustment on Collision– Although we do not take direct issue with MPI's WFH adjustment due to the significant uncertainty associated with this estimate, it has been our experience that the collision frequency has generally been impacted more by the pandemic relative to other coverages. We observe a similar effect in the MPI data. It follows that a larger WFH adjustment may be appropriate in this case. We observe MPI's current projection is slightly greater than the actual level observed in 2019/20 (pre-pandemic).

Question:

a. Could Oliver Wyman please indicate whether their conclusion on page 2-3 with regards to the 5% work from home adjustment is applicable to collision?

b. What would be the range of work from home adjustments that Oliver Wyman has seen, in its experience?

c. Has Oliver Wyman seen any work from home adjustments for severity for any coverage?

Rationale for Question:

To better understand Oliver Wyman's perspective on work from home adjustments.

RESPONSE:

a) Given the high degree of uncertainty associated with this assumption, we do not take direct issue the 5% work from home adjustment for collision. We believe the PUB should consider both the reasonableness of the selected model and projected outcome in their review. We offer the additional comments included in the preamble for the PUB's consideration in determining the reasonableness of MPI's projected frequency outcome for collision.

b) It is common for insurers to assume the pandemic will have either no impact or a small impact on future claim costs in other Provinces. This has been supported by recent increases in traffic and mobility metrics.

c) It is our experience that the pandemic has had minimal impact on severity in other Provinces.

RATIONALE FOR REFUSAL TO FULLY ANSWER THE QUESTION:

CAC to insert rationale for refusal here.

PUB (CAC)-5

Part and Chapter:	**CAC Manitoba Intervener (Oliver Wyman) Evidence**	**Page No.:**	**14**
PUB Approved Issue No:	**9. Claims Forecasting**		
Topic:	**Claims Trends**		
Sub Topic:			

Preamble to IR (If Any):

For Collision Total claim frequency, Oliver Wyman has selected a shorter trend period than MPI, whereas Oliver Wyman had selected a longer trend period than MPI for Weekly Indemnity.

Question :

a. Would Oliver Wyman agree that the adjusted R-squared of both the MPI model and the Oliver Wyman model are negative?

b. Would Oliver Wyman agree, from looking at historical monthly collision frequencies (as shown in CAC (MPI) 1-43 for 2015-2021 and in PUB (MPI) 1-79 in the 2022 GRA) that variation in winter driving conditions by year could explain much of the year to year variation in Collision Total Loss frequency, and the favorable 2019 accident year may be due primarily to a relatively benign winter?

c. Given the impact of variations in winter driving conditions by year, would Oliver Wyman agree that a longer time frame for trending would reduce the impact of these variations on the indicated trend?

Rationale for Question :

To understand the selection of a shorter time frame for trending.

RESPONSE :

a) Yes, we find this is caused by the volatile and somewhat flat historical observations. We note it has been shown that a low or zero trend, by its nature, has a low R2 value. (D. Lee Barclay, “A Statistical Note on Trend Factors: The Meaning of R-Squared”).

b) Yes, we agree that variation in winter driving conditions by year could explain *part* of the year to year variation in Collision Total Loss frequency. We have not attempted to determine what portion of the variation of the frequency is attributed to variation in the weather.

c) We believe that a longer time period would reduce the impact of impact on variations on indicated trend assuming i) the period has a representative mix of weather conditions and ii) there is no systemic trend in weather conditions.

RATIONALE FOR REFUSAL TO FULLY ANSWER THE QUESTION:

CAC to insert rationale for refusal here.

PUB (CAC)-6

Part and Chapter:	**CAC Manitoba Intervener (Oliver Wyman) Evidence**	**Page No.:**	**15-16**
PUB Approved Issue No:	**9. Claims Forecasting**		
Topic:	**Claims Trends**		
Sub Topic:			

Preamble to IR (If Any):

Oliver Wyman considers the use of accident years 2018-2020 to be too short a time period for trend measurement for Collision Total Loss severity, and too volatile given the effect of the COVID-19 pandemic.

Question:

a. Has Oliver Wyman seen increases in collision severity during the pandemic, due to different road volumes?

b. Would Oliver Wyman agree that the use of only three data points would generate a very high amount of parameter risk, which increases with reductions in volume of data?

c. Given the volatility in claims frequency by month, and the variations in winter driving conditions, would Oliver Wyman agree strengthens their view that it is advisable to use more than three data points for collision total loss severity trending, not rely only on the last data point as a starting point.

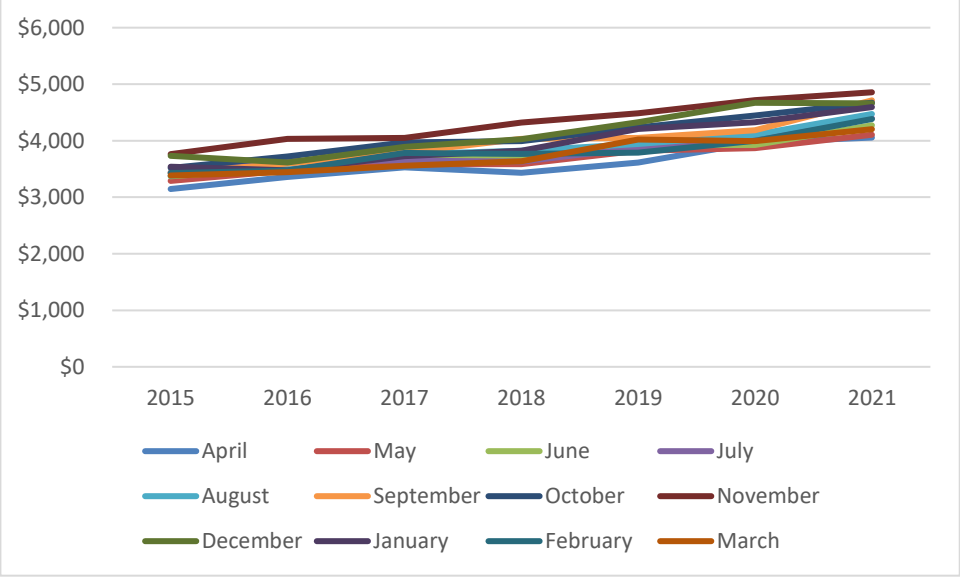
d. Given the high inflation currently seen around the world, how would Oliver Wyman suggest the severity trending model be adjusted to reflect this environment?

Rationale for Question:

To better understand OW's view on potential shortcomings of the MPI collision total loss severity model.

RESPONSE:

a) It is our experience that the pandemic has had minimal impact on collision severity in other Provinces. Additionally, we observe minimal impact on MPI's monthly severity for collision as shown by the following graph:



b) Yes, we agree the use of only three data points increases parameter risk relative to more data points that do not include outliers.

c) Yes, we agree with statement.

d) We would suggest MPI consider the correlation of each coverage's losses to the inflation shock, as measured by the observed and expected change in CPI. With this modelling, future projections of claims incurred could be a function of future CPI projections.

RATIONALE FOR REFUSAL TO FULLY ANSWER THE QUESTION:

CAC to insert rationale for refusal here.

PUB (CAC)-7

Part and Chapter:	**CAC Manitoba Intervener (Oliver Wyman) Evidence**	**Page No.:**	**32**
PUB Approved Issue No:	**9. Claims Forecasting**		
Topic:	**Claims Trending**		
Sub Topic:			

Preamble to IR (If Any):

MPI has selected a 0.25% severity trend rate plus a $125 increase for CERP for Property Damage Third Party Deductible Transfer.

Oliver Wyman has selected a 0.18% severity trend rate applied to CERP adjusted prior years.

The standard deductible under CERP is $750, and was $500 prior to CERP.

Question:

Could Oliver Wyman please explain why it expects a non-zero trend on a fixed deductible?

Rationale for Question:

To better understand the OW selected severity trend for PD TP deductible transfer.

RESPONSE:

Our indicated trend rate is based on the regression model that we present. We observe a slight increase in the observed severity data over time. We find a 0% is also reasonable given the insignificant *p*-value of our model.

RATIONALE FOR REFUSAL TO FULLY ANSWER THE QUESTION:

CAC to insert rationale for refusal here.