# Financial Services Commission of Ontario

# Analysis of Reform Cost and Loss Trend Rates for Ontario Private Passenger Automobile Insurance

## Introduction

This document provides information on the analysis of reform cost adjustments and loss trend rates for the Ontario private passenger automobile insurance, as prepared by the Chief Actuary, Automobile Insurance Division, Financial Services Commission of Ontario (FSCO).

The document includes a description of the data, methodology and the loss trend benchmark rates adopted for use in FSCO's review of rate filings. The loss trend benchmarks found in Exhibit 2 of the Technical Notes are provided for reference purposes. Insurers who deviate from the benchmark rates are required to submit their own analysis of loss trend rates as part of the actuarial support in rate filings.

The scope of our review of the loss trend rates includes the following coverage groups:

- Third Party Liability – Bodily Injury
- Direct Compensation – Property Damage
- Medical Benefits, Rehabilitation and Attendant Care
- Disability Income including Income Replacement and Non-Earners
- Uninsured Automobile
- Collision
- Comprehensive
- All Perils

To isolate the effect of the 2015 and 2016 product reforms, our loss trend analysis has considered their effect on coverage costs. Cost data prior to the 2015 and 2016 reforms were adjusted based on a review of actual reform impact on costs. For the product period prior to the 2015 and 2016 reforms, cost data were adjusted for the updated impact of the 2015 and 2016 reforms. The general approach in analysing the cost changes due to the reforms and in updating the 2015 and 2016 reform adjustment factors is outlined as follows:

- Comparing the change in the Accident Benefits ultimate loss cost from pre-reform accident year 2014 to post-reform accident period 2016-2/2017-1 and 2017-2/2018-1 at kind of loss group levels for Medical total, Rehabilitation (including Long-Term Care) total, and Disability Income total. Similarly, changes in the Accident Benefits ultimate loss costs from accident year 2015 to accident years 2016-2/2017-1 and 2017-2/2018-1 have also been compared.

- Considerations were made to the observed 2016-2/2017-1 ultimate losses in which a portion of claims was subject to benefit levels of the pre-reform coverage product and, therefore, the observed costs do not reflect the full cost adjustments due to the 2015/2016 product reforms.

- The observed ultimate loss costs for accident years 2014 and 2015 were projected to the same common average accident date as the 2016-2/2017-1 and 2017-2/2018-1 accident years using FSCO loss trend estimates, adjusted to reflect that claims within each accident year were paid under both pre- and post- reform benefit levels.

- To solve for the reform cost factor estimates, four equations have been derived. Two are based on 2014 projected adjusted loss cost estimate (compared to 2016-2/2017-1 and 2017-2/2018-1); and the other two equations on 2015 (compared to 2016-2/2017-1 and 2017-2/2018-1). Four initial estimates of the reform cost adjustment factors have been determined.

- For Accident Benefits sub-coverages, weights of 12.5%/12.5%/37.5%/37.5% have been assigned to the reform cost factor estimates (based on the comparison of trended loss cost changes from 2014 to 2016-2/2017-1, 2015 to 2016-2/2017-1, 2014 to 2017-2/2018-1 and 2015 to 2017-2/2018-1) to arrive at the updated "reform cost adjustment factors" (RCAFs).

- For Bodily Injury coverage, weights of 50%/50% have been assigned to the reform cost factor estimates (based on the comparison of trended loss cost changes from 2014 to 2017-2/2018-1 and 2015 to 2017-2/2018-1) to arrive at the updated RCAFs.

- The values of the updated RCAFs from each coverage groups are used in the loss trend model as an adjustment to the loss cost experience so cost changes due to reforms are isolated before trending.

- The adjusted loss cost data is then fitted into an exponential loss trend model for analysis. Regression results over a period of four to eight years are reviewed for goodness-of-fit test.

- In selecting the loss trends, the R-squared results and the T-statistics are reviewed to determine the loss trend coefficients that satisfy the statistical tests.

The updated reform benchmarks improve over the previous estimates as they are based on more developed loss cost data and newly emerged post-reform data experiences in 2018.

Insurers are expected to use the most recent data in the ratemaking process. The reform cost adjustment factors will be refined as the post-reform data experiences mature.

## Industry Loss Development Data for Ontario Private Passenger Automobile Insurance and Estimated Loss Costs

We have relied on the most recent industry loss development data from the Automobile Statistical Plan (ASP) that was provided to FSCO in its semi-annual review of the Ontario private passenger automobile insurance experience. This data is included in the General Insurance Statistical Agency's (GISA) Ontario Loss Development Exhibit as of June 30, 2018.

FSCO reviews loss cost data from the ASP on a regular basis and will continue to monitor the rate of changes in loss costs for each major coverage. FSCO's loss trend benchmarks are subject to change based on updated loss cost data as it becomes available through the ASP.

As noted in the GISA actuary's Incurred Loss Development Factor report for Ontario private passenger automobile insurance business as of June 30, 2018, several reporting data issues from different accident year periods could have an impact on loss development changes. In particular, a major insurer's data was excluded in the past (prior to 2014-2) due to its impact on actual loss development changes. However, the GISA actuary concluded that exclusion of this major insurer's data is no longer required. As a result, FSCO's loss trend benchmarks are based on the same loss development information that is published as part of the GISA Loss Development Exhibit. Certifying actuaries who are responsible for filings may want to conduct their own loss development factor analysis and include proper actuarial documentation per rate filing guidelines.

Table 1 summarizes the estimated loss costs for the Ontario private passenger automobile insurance business as of June 30, 2018, as a result of FSCO's loss development review process. These estimated loss costs are used as the basis for the development of FSCO's loss trend benchmarks.

## Reform Loss Cost Adjustments

We had previously analyzed the cost impact of the 2010 regulatory reforms by comparing industry loss cost data available from the ASP before and after the 2010 reforms. No further analysis has been conducted as the actual cost impact from the 2010 post-reform is now fully reflected in the data.

We applied the estimated 2015 and 2016 reform cost adjustments to the cost data prior to 2015, in order to bring all the cost data onto a common basis before analyzing the loss trend rates.

## Loss Trend Benchmarks

Loss trend rate assumptions are part of the actuarial support required in Ontario rate filings. The development of FSCO's loss trend benchmarks is based on actuarial standards of practice. However, filing actuaries may undertake various approaches in their independent analysis of loss trends and provide support for their own loss trend assumptions in filings.

In general, development of our loss trend benchmarks is based on a review of changes in loss costs, claim frequencies and claim severities over a period of five to eight years. We perform statistical regression analysis on estimated loss costs at semi-annual intervals, separately for claim frequencies and claim severities. Due to the interdependency of the results, consideration is given to the changes in both claim frequency and claim severity in our loss trend estimates. To isolate the effect of product reforms, reform adjustment factors are determined to adjust historical costs to a common cost level before performing statistical regressions. For Accident Benefits, we have relied significantly on six years of data experience.

We reviewed the statistical significance of the variables such as time and seasonality, as well as the goodness of fit from the regression results in our selection process.

The following table is a summary of the various reform factors and loss trend results for the Bodily Injury and Accident Benefits sub-coverages.

| Coverage | 2010 Reform Cost Adjustment Factor | 2015/2016 FSCO's Reform Factor | Past Trend* | Future Trend* |
|---|---|---|---|---|
| TPL - Bodily Injury | 0.93 | 0.77 | 2.3% | 2.3% |
| | | | | |
| AB- Medical Benefits | 0.39 | 0.83 | 5.5% | 5.5% |
| AB- Rehab/AC | 0.72 | 0.58 | 6.0% | 6.0% |
| AB- Disability Income | 0.58 | 0.86 | 4.5% | 4.5% |
| AB - Total | 0.49 | 0.78 | 5.4% | 5.4% |

* Cut-off date for the past and future trends is April 1, 2018.

We provide additional commentary on the selected loss trend benchmark rates for the major coverages in Appendix A.

Dennis Chan, FCIA, FCAS, FSA
Chief Actuary
Automobile Insurance Division

## Table 1. Estimated Loss Costs for Ontario Private Passenger Automobile Insurance

| Accident Half-Year | BI | DCPD | Med | Reh/LTC | Med/Reh | Disability | Death | Funeral | Quebec XS | UA | Coll. | Comp. | AP | SP | OPCF44 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2011-1 | 227.4 | 132.3 | 165.4 | 58.9 | 224.3 | 63.7 | 1.3 | 0.4 | 0.0 | 14.2 | 145.8 | 61.0 | 221.5 | 26.8 | 7.1 |
| 2011-2 | 256.9 | 134.9 | 162.1 | 67.0 | 229.1 | 66.2 | 1.7 | 0.5 | 0.0 | 15.0 | 141.8 | 56.9 | 219.7 | 20.8 | 6.5 |
| 2012-1 | 222.9 | 123.1 | 148.6 | 59.7 | 208.3 | 60.8 | 1.5 | 0.4 | 0.0 | 10.0 | 134.3 | 45.9 | 192.4 | 11.8 | 4.9 |
| 2012-2 | 254.6 | 136.2 | 172.8 | 73.7 | 246.5 | 72.8 | 1.6 | 0.5 | 0.0 | 11.6 | 143.6 | 68.6 | 230.6 | 33.2 | 5.1 |
| 2013-1 | 222.6 | 134.5 | 165.7 | 62.7 | 228.4 | 64.9 | 1.3 | 0.4 | 0.0 | 11.0 | 145.4 | 45.6 | 208.6 | 25.1 | 5.1 |
| 2013-2 | 267.5 | 154.0 | 197.6 | 74.0 | 271.6 | 76.8 | 1.6 | 0.5 | 0.0 | 12.8 | 161.7 | 72.2 | 264.8 | 46.3 | 6.0 |
| 2014-1 | 225.5 | 155.1 | 172.2 | 64.7 | 236.9 | 68.4 | 1.2 | 0.3 | 0.0 | 10.7 | 167.3 | 51.2 | 246.2 | 51.7 | 6.6 |
| 2014-2 | 257.6 | 153.5 | 191.2 | 79.7 | 270.9 | 75.6 | 1.7 | 0.5 | 0.3 | 12.7 | 157.3 | 57.5 | 255.0 | 37.6 | 4.0 |
| 2015-1 | 230.7 | 166.6 | 186.2 | 66.2 | 252.4 | 72.4 | 1.2 | 0.3 | 0.0 | 11.0 | 171.8 | 49.2 | 253.0 | 20.4 | 7.1 |
| 2015-2 | 271.0 | 170.6 | 210.8 | 85.1 | 295.9 | 82.8 | 1.5 | 0.4 | 0.0 | 12.5 | 164.6 | 60.3 | 260.3 | 21.3 | 7.0 |
| 2016-1 | 222.1 | 171.3 | 189.9 | 76.1 | 266.0 | 75.7 | 1.2 | 0.4 | 0.0 | 12.5 | 179.0 | 55.4 | 266.7 | 48.0 | 7.1 |
| 2016-2 | 270.3 | 196.0 | 207.2 | 77.3 | 284.5 | 79.4 | 1.6 | 0.5 | 0.0 | 11.6 | 199.3 | 68.4 | 315.5 | 60.7 | 9.5 |
| 2017-1 | 195.8 | 183.2 | 172.1 | 49.2 | 221.3 | 66.2 | 1.3 | 0.4 | 0.0 | 10.4 | 189.8 | 57.5 | 290.7 | 74.6 | 8.0 |
| 2017-2 | 225.9 | 216.6 | 195.9 | 57.9 | 253.8 | 76.9 | 1.9 | 0.5 | 0.0 | 11.3 | 222.1 | 69.7 | 343.3 | 142.1 | 7.9 |
| 2018-1 | 179.2 | 204.0 | 176.3 | 44.6 | 220.9 | 71.5 | 1.4 | 0.4 | 0.1 | 11.3 | 219.9 | 75.1 | 346.2 | 131.4 | 7.7 |
| **Past Loss Trend** | 2.3% | 8.8% | 5.5% | 6.0% | 5.7% | 4.5% | 0.4% | -0.2% | 0.0% | -2.5% | 8.5% | 3.8% | 8.7% | 26.5% | 10.7% |
| **Future Loss Trend** | 2.3% | 7.2% | 5.5% | 6.0% | 5.7% | 4.5% | 0.0% | 0.0% | 0.0% | -2.5% | 6.6% | 3.8% | 7.2% | 26.5% | 10.7% |

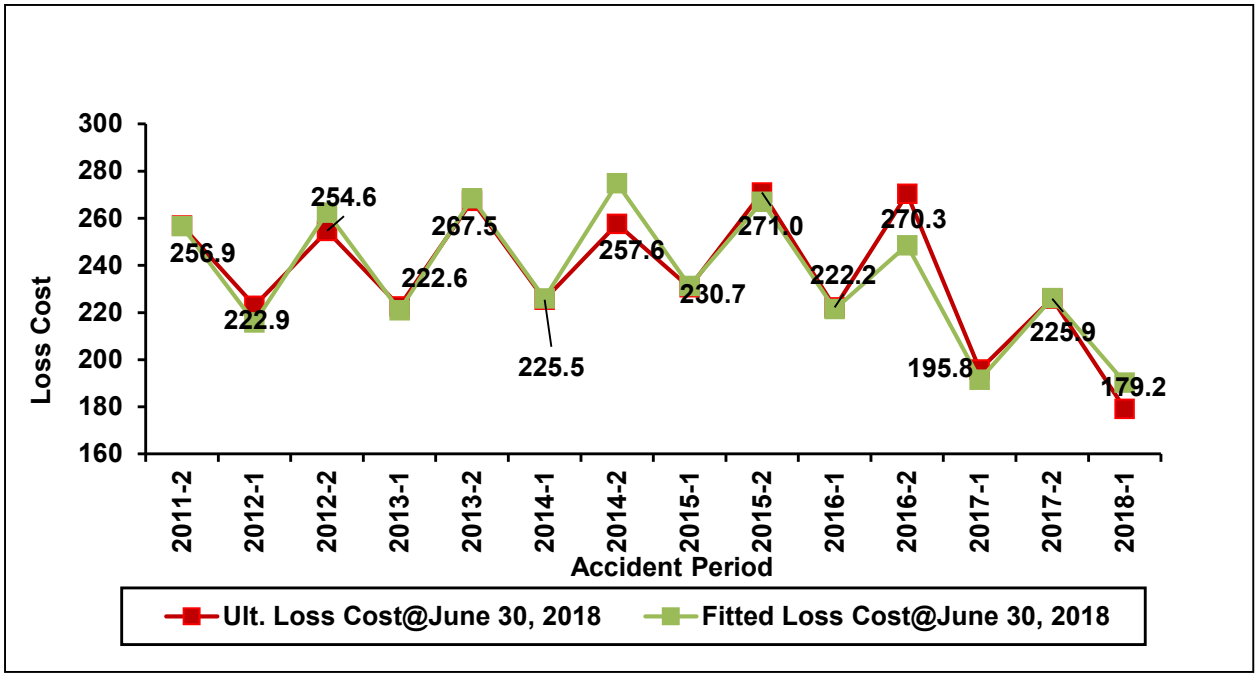
* Cut-off date for the past and future trends is April 1, 2018.

# Commentary on Loss Trend Estimates and Benchmarks by Sub-Coverages for Ontario Filings

## Third Party Liability – Bodily Injury

We selected a past and future loss trend rate of 2.3 per cent for the Bodily Injury sub-coverage. Our loss trend estimates fall in the range of 1.8 per cent to 2.7 per cent based on a review of five to eight years of data. Our regression analysis indicates that both the time and seasonality variables are statistically significant based on seven years of data. The R-squared value indicates a good and reasonable fit of the model.

The following graph displays our estimates of the ultimate loss costs and the fitted values over the accident periods of 2011-2 to 2018-1 in semi-annual intervals.

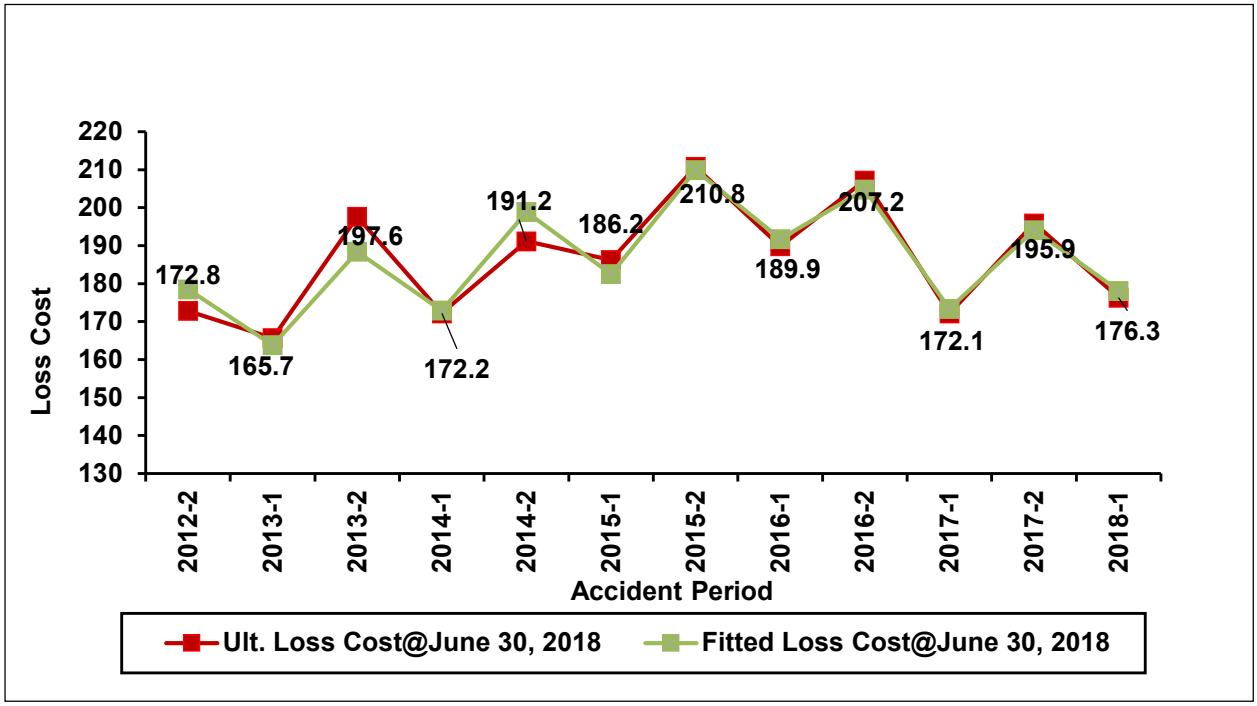



As compared to our previous estimates (as of December 31, 2017) of the Bodily Injury loss trend rates, our current loss trend estimates incorporate the post-reform loss costs in 2018-1, which continue to show better than expected reform cost savings.

## Accident Benefits – Medical Benefits

We selected a loss trend rate of 5.5 per cent for both past and future periods. Our loss trend estimates fall in the range of 5.2 per cent to 6.1 per cent based on a review of five to seven years of data. Our regression analysis indicates that both the time and seasonality variables are statistically significant based on 6 years of data. The R-squared value indicates a very good fit.

The following graph displays our estimates of the ultimate loss costs and the fitted values over the accident periods of 2012-2 to 2018-1 in semi-annual intervals.

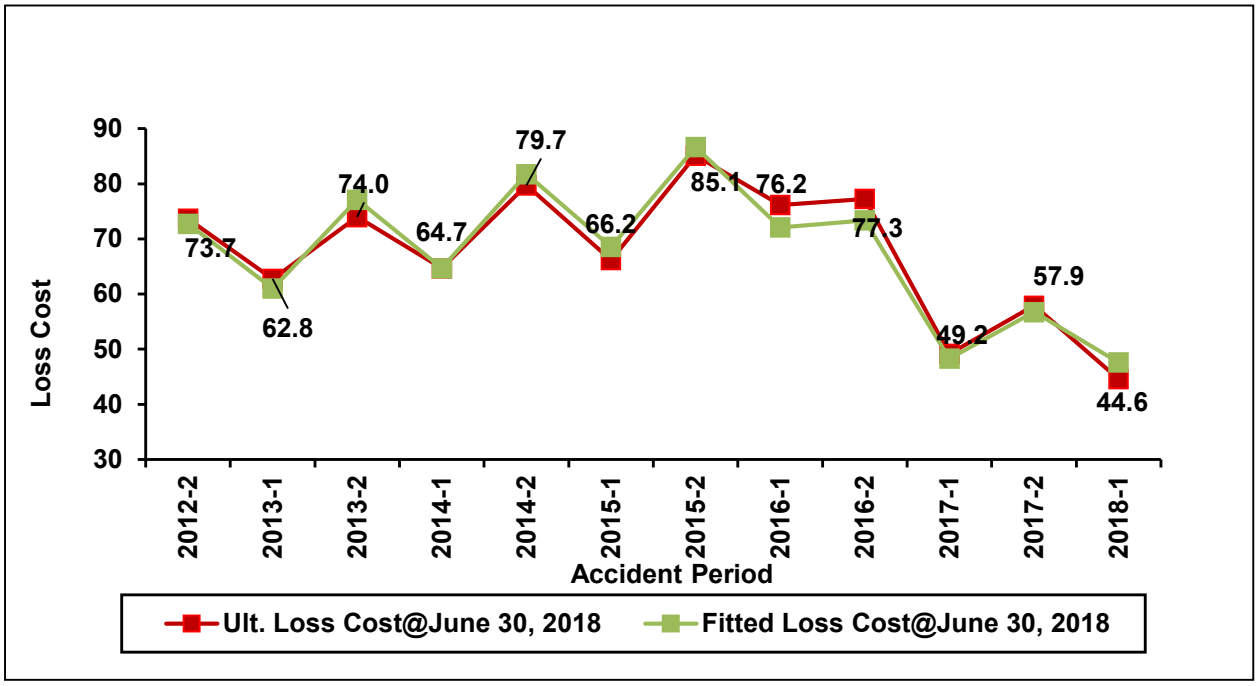



The Medical loss costs in the post-reform period were lower, generally in line with the original estimated reform cost savings. Medical claim frequency has increased in this period but the claims severity has decreased, resulting in lower Medical loss cost in post-reform period. The estimated 2015/2016 reform cost factor for Medical Benefits coverage is 0.83.

## Accident Benefits – Rehabilitation and Attendant Care

We selected a loss trend rate of 6.0 per cent for both past and future periods based on six-year regression results. Our loss trend estimates fall in the range of 6.0 per cent to 6.7 per cent based on a review of five to seven years of data. Our regression analysis indicates that both the Time and Seasonality variables are statistically significant based on six years of data.

The following graph displays our estimates of the actual loss costs and the fitted values over the accident periods of 2012-2 to 2018-1 in semi-annual intervals.

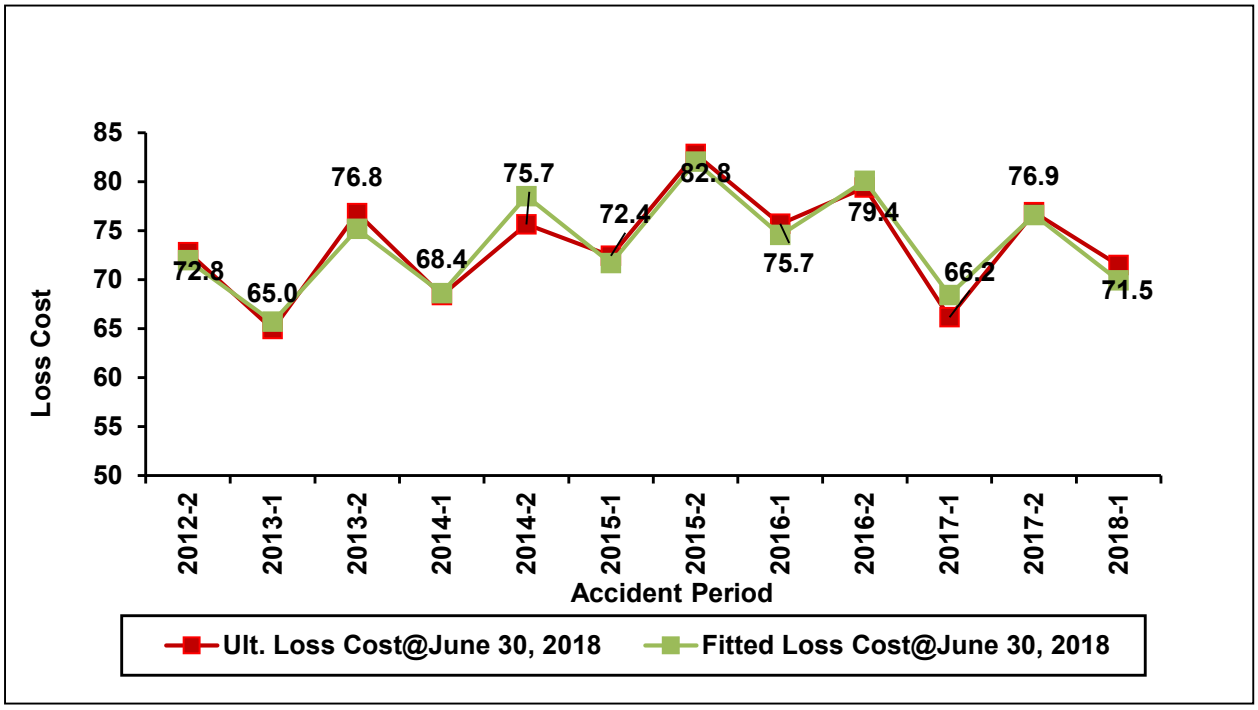



The Rehabilitation and Attendant care loss costs in the post-reform period were lower, as compared to 2015/2016 reform period loss costs. While Rehabilitation claim frequency was relatively stable, claims severity had decreased, resulting in lower Rehabilitation and Attendant care loss cost in post-reform period. The estimated 2015/2016 reform cost factor for Rehabilitation/Attendant Care coverage is 0.58.

## Accident Benefits – Disability Income

We selected a loss trend rate of 4.5 per cent for both past and future periods for the Disability Income sub-coverage. Our loss trend estimates fall in the range of 4.5 per cent to 4.9 per cent based on a review of five to seven years of data. Our regression analysis indicates that both the time and seasonality variables are statistically significant based on six years of data. The R-squared value indicates a very good fit.

The following graph displays our estimates of the ultimate loss costs and the fitted values over the accident periods of 2012-2 to 2018-1 in semi-annual intervals.

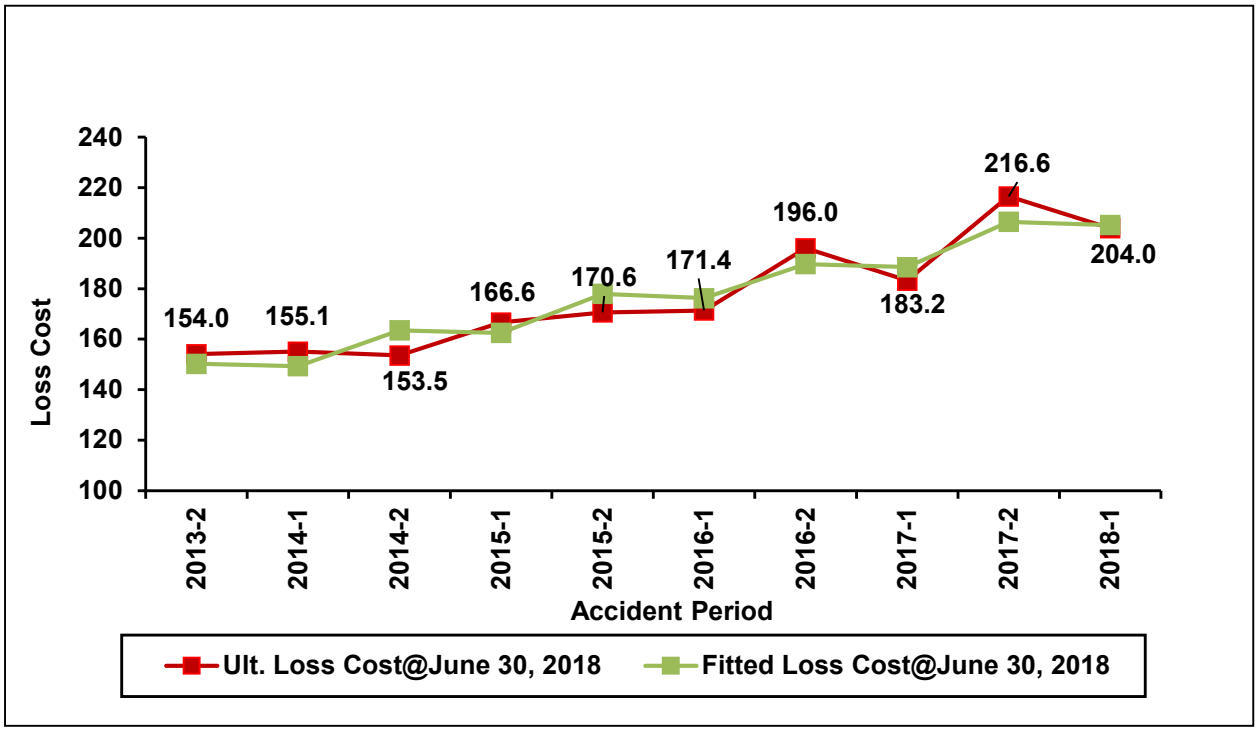



The Disability Income loss cost in the post-reform period was slightly lower, as compared to 2015/2016 reform period loss costs. While the Disability Income claim frequency was relatively stable, claims severity had somewhat decreased, resulting in slightly lower Disability Income loss cost in post-reform period. The estimated 2015/2016 reform cost factor for Disability Income coverage is 0.86.

## Direct Compensation – Property Damage

We selected a past loss trend rate of 8.8 per cent for the Direct Compensation – Property Damage coverage, based on a five-year regression fit. A future loss trend rate of 7.2 per cent is selected, based on a long term eight-year regression fit line. Our selected past loss trend rate was higher than our previous estimate due to the relative higher increase in loss cost in 2018-1. We note that the frequency trend is seasonal and appears to be affected by weather in certain accident periods. In the long run, such as a period of five to seven years, the frequency trend is approximately 2.4 per cent. The loss cost trend rate is largely driven by increase in average claim severity.

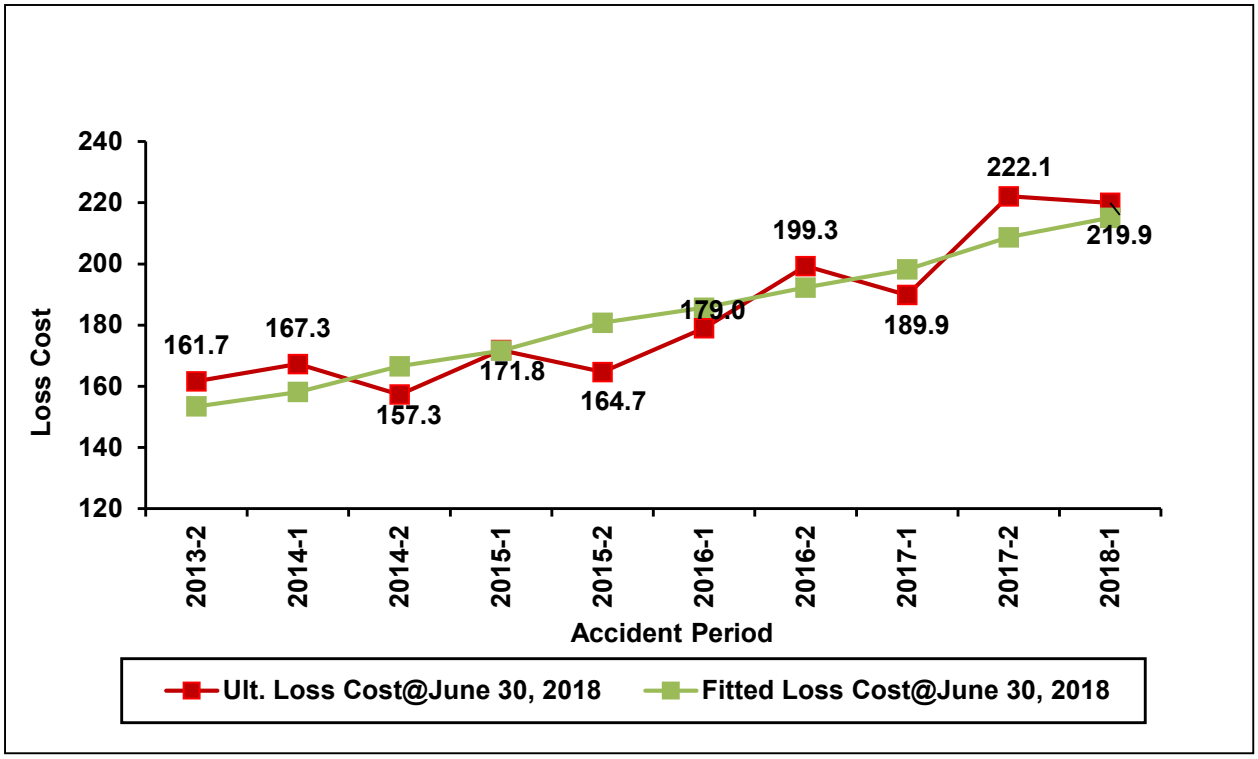
The following graph displays our estimates of the ultimate loss costs and the fitted values over the accident periods of 2013-2 to 2018-1 in semi-annual intervals.



## Collision

We selected a past loss trend rate of 8.5 per cent for the Collision coverage, based on a five-year regression fit. A future loss trend rate of 6.6 per cent is selected, based on a long term eight-year regression fit line. Our selected past loss trend rate was higher than our previous estimate due to the relative high increase in loss cost in 2018-1. We note that the frequency trend is seasonal and appears to be affected by weather in certain accident periods. In the long run, such as a period of five to seven years, the frequency trend is approximately 3.0 per cent. The loss cost trend rate is largely driven by increase in average claim severity.

The following graph displays our estimates of the ultimate loss costs and the fitted values over the accident periods of 2013-2 to 2018-1 in semi-annual intervals.



## Comprehensive

We selected a loss trend rate of 3.8 per cent for both past and future periods for the comprehensive coverage, based on data excluding 2018-1. The 2018-1 loss cost was excluded due to unusually high seasonal loss cost. We note that the claim severity trend fits well in the range of 6.5 per cent to 7.5 per cent over the five to seven-year data period, while the number of claims has generally decreased at the rate of 1.7 per cent in the past five years.

The following graph displays our estimates of the ultimate loss costs and the fitted values over the accident periods of 2013-1 to 2017-2 in semi-annual intervals.