


Tech-Us-Out (TUO)

Post-Catastrophe Analysis

Sigma Squad

Euichan "Daniel" Kim, Derrik Lu, Olivier Zhou, Nguyen Duc Cuong



Executive Summary (High-level Findings)

- Ultimate Loss Estimate: **\$1.93B** (reported & paid LDFs ≈ 1.00)
- Outstanding Reserve Needed: **\$267M**
- Catastrophe Adjustment: Removing AY 2012 yields stable, representative LDFs
- Cross-Check: Frequency-severity confirms final selections



Data and Methodology Overview

Data

- Reported & paid loss triangles for indemnity and medical
- Catastrophe Adjustment and Analysis
- Claim count triangles and frequency data for cross-validation

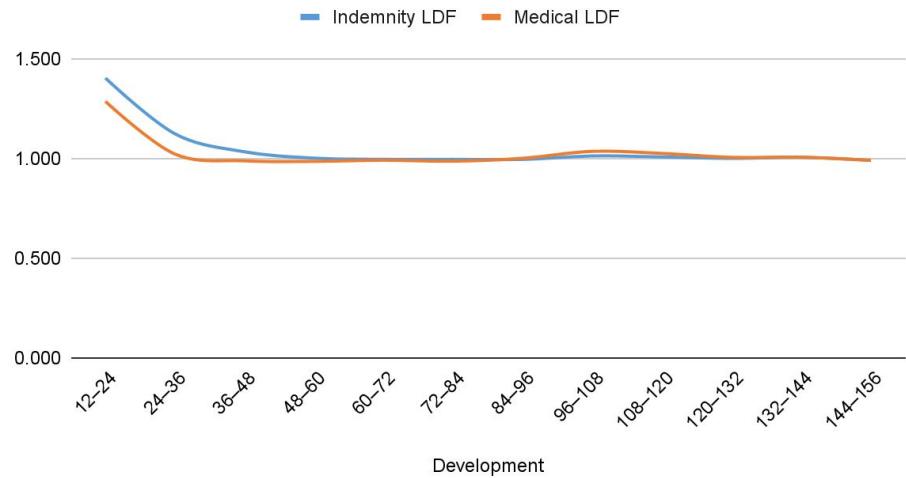
Methodology

- Reported Loss Development Factor (LDF) Method with Component Analysis (Ultimate Loss Estimate)
- Separate LDF development for indemnity and medical using multi-year averages
- Frequency-Severity Method for cross-validation and reasonableness testing

Reported LDFs

- Indemnity develops more slowly due to the long-tailed nature of workers' compensation benefits, resulting in higher early LDFs that remain >1.00 for more periods.
- Medical reported losses settle earlier because treatment begins immediately, producing smoother, lower LDFs that converge quickly toward 1.00.
- Given TUO's 20 years of consistent reserving practices, multi-year averages provide stable and credible selected reported LDFs.

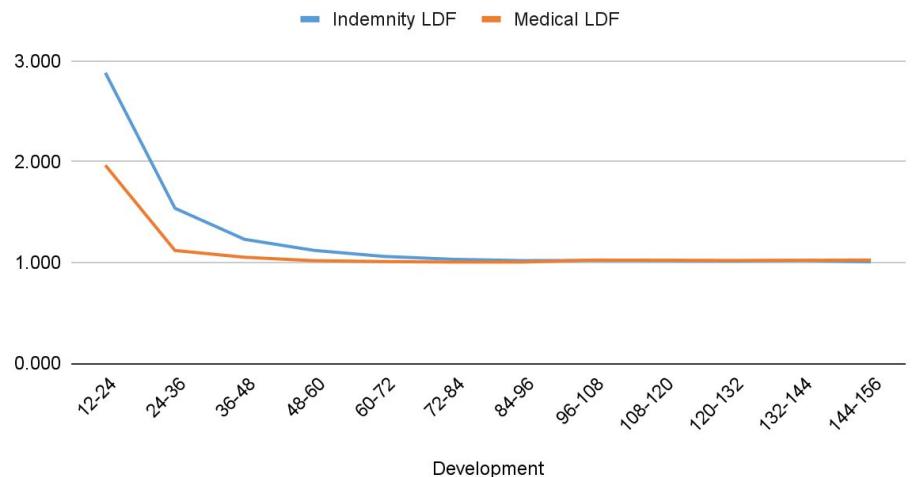
Average Indemnity and Medical LDF (Reported)



Paid LDFs

- Indemnity paid LDFs show higher volatility at early maturities, reflecting delayed and irregular benefit payments typical for long-tailed WC indemnity claims.
- Medical paid LDFs are smoother and lower because medical bills are incurred and paid quickly, producing more predictable development.
- Consistent with TUO's historical practices, early paid indemnity LDFs were smoothed using multi-year averages, with later maturities selected near 1.00 as claims fully develop.

Average Indemnity and Medical LDF (Paid)



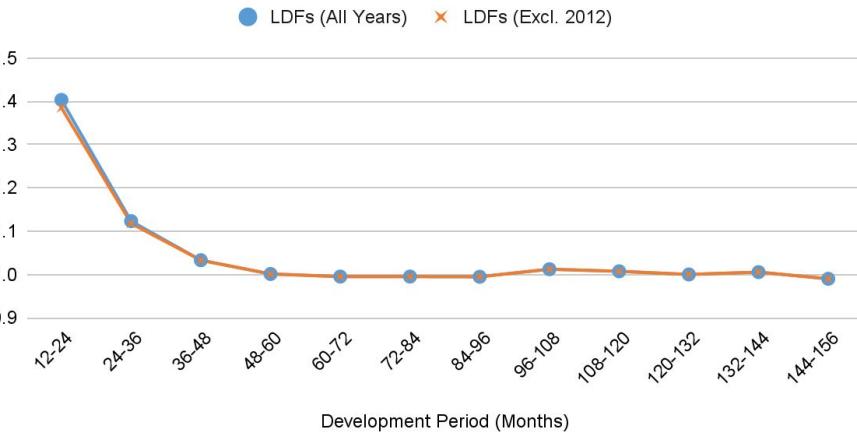


Catastrophe/Outlier Analysis

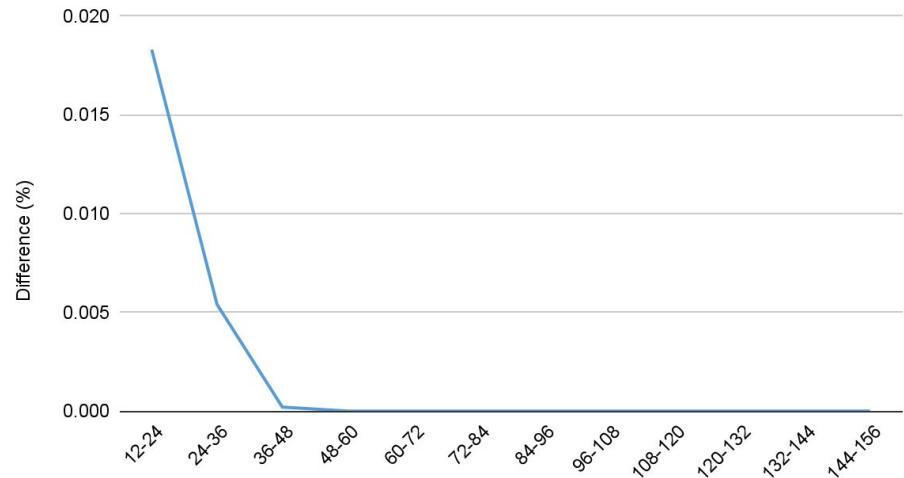
Development Period (Months)	LDFs (All Years)	LDFs (Excl. 2012)	Difference (%)
12-24	1.4031	1.3848	0.0183
24-36	1.1232	1.1178	0.0054
36-48	1.033	1.0328	0.0002
48-60	1.0012	1.0012	0
60-72	0.9952	0.9952	0
72-84	0.9952	0.9952	0
84-96	0.9948	0.9948	0
96-108	1.0122	1.0122	0
108-120	1.0074	1.0074	0
120-132	1.0001	1.0001	0
132-144	1.0055	1.0055	0
144-156	0.9901	0.9901	0

Catastrophe/Outlier Analysis

Comparison of Reported Loss Development Factors (LDFs)
With and Without the 2012 Catastrophe Year



Absolute Difference Between LDFs





Ultimate Loss Estimates (Reported vs. Paid)

Analysis Component	Amount	Method/Description
Ultimate Estimate	\$1.93B	Loss Development Factor (reported)
Paid to Date	\$1.66B	Historical payments through 2015
Outstanding Reserve	\$267M	Ultimate minus Paid (13.9%)



What is Frequency – Severity?

Reported Claim Development
Reported Claims

Accident Year	Reported Claims	Selected LDFs	Ultimate Claims
2003	4,353	1.00	4,353
2004	4,175	1.00	4,175
2005	4,020	1.00	4,020
2006	3,755	1.00	3,755
2007	3,586	1.00	3,586
2008	3,507	1.00	3,507
2009	3,356	1.00	3,356
2010	3,192	1.00	3,192
2011	3,307	1.00	3,307
2012	3,279	1.00	3,279
2013	3,085	1.00	3,085
2014	2,934	1.00	2,934
2015	2,538	1.00	2,538

Paid Loss Development
Indemnity Severity

Accident Year	Paid Severity	Selected LDFs	Ultimate Severity
2003	16,513	1.00	16,513
2004	17,420	1.00	17,420
2005	16,878	1.00	16,878
2006	17,124	1.00	17,124
2007	17,980	1.00	17,980
2008	18,742	1.00	18,742
2009	20,295	1.00	20,295
2010	19,576	1.00	19,576
2011	18,449	1.00	18,449
2012	18,921	1.00	18,921
2013	13,342	1.00	13,342
2014	9,030	1.00	9,030
2015	3,800	1.00	3,800

Paid Loss Development
Medical Severity

Accident Year	Paid Severity	Selected LDFs	Ultimate Severity
2003	17,187	1.00	17,187
2004	17,814	1.00	17,814
2005	18,672	1.00	18,672
2006	19,656	1.00	19,656
2007	20,530	1.00	20,530
2008	20,507	1.00	20,507
2009	22,502	1.00	22,502
2010	23,178	1.00	23,178
2011	22,972	1.00	22,972
2012	27,142	1.00	27,142
2013	22,488	1.00	22,488
2014	21,952	1.00	21,952
2015	12,954	1.00	12,954

Reported Loss Development
Indemnity Severity

Accident Year	Reported Severity	Selected LDFs	Ultimate Severity
2003	16,513	1.00	16,513
2004	17,717	1.00	17,717
2005	17,421	1.00	17,421
2006	17,933	1.00	17,933
2007	19,062	1.00	19,062
2008	20,119	1.00	20,119
2009	22,335	1.00	22,335
2010	22,279	1.00	22,279
2011	22,341	1.00	22,341
2012	24,716	1.00	24,716
2013	21,328	1.00	21,328
2014	19,900	1.00	19,900
2015	16,948	1.00	16,948

Reported Loss Development
Medical Severity

Accident Year	Reported Severity	Selected LDFs	Ultimate Severity
2003	17,187	1.00	17,187
2004	18,441	1.00	18,441
2005	19,640	1.00	19,640
2006	20,958	1.00	20,958
2007	21,793	1.00	21,793
2008	21,602	1.00	21,602
2009	23,829	1.00	23,829
2010	24,991	1.00	24,991
2011	25,252	1.00	25,252
2012	30,317	1.00	30,317
2013	26,817	1.00	26,817
2014	28,908	1.00	28,908
2015	26,050	1.00	26,050



Additional Considerations

- Inflation and Wage Inflation in Workers' Compensation
- Tail Factor Uncertainty
- Reopened Claims
- Case Reserve Adequacy and Exposure Growth

Thank you - Questions?