CLRS Presentation
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Theoretical and Practical Implications in the World of Increasing Settlements

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Overview

- Settlements cause distortion to the Paid Loss Development Factor method
  - First, there is an overstatement of ultimate reserves
  - Then there is an understatement of ultimate reserves
  - Eventually Paid LDF method corrects for the biases

- Industry reaction to increased settlements
  - Industry did not deteriorate ultimate losses as much as raw Paid LDF method would suggest

- Settlements of lifetime claims reduced the tabular reserve discount
  - Tabular discount is on the Lost Wages portion of lifetime claims

Explanation of the Bias To Ultimate Losses Caused by Settlements

- 5 claims pay 20 per year for 5 years.

Cumulative Paid

AY	Dev 12	24	36	48	60	72	84	96
1	100	200	300	400	500	500	500	500
2	100	200	300	400	500	500	500	500
3	100	200	300	400	500	500	500	
4	100	200	300	400	500	500		
5	100	200	300	400	500			
6	100	200	300	400				
7	100	200	300					
8	100	200						
9	100							

- Paid LDF Method yields 500 of ultimate loss each year.

Ultimate Losses

AY	Last Diag	CDF	Ultimate
1	500	1.00	500
2	500	1.00	500
3	500	1.00	500
4	500	1.00	500
5	500	1.00	500
6	400	1.25	500
7	300	1.67	500
8	200	2.50	500
9	100	5.00	500

Explanation of Bias Cont.

- In AY 8, one claim with 60 of future payments settles in CY 10 with a 50 lump-sum payment (the present value of the future cash flows).

Incremental Development

	Dev							
AY	12	24	36	48	60	72	84	96
2	100	100	100	100	100	0	0	0
3	100	100	100	100	100	0	0	0
4	100	100	100	100	100	0	0	
5	100	100	100	100	100	0		
6	100	100	100	100	100			
7	100	100	100	100				
8	100	100	130					
9	100	100						
10	100							

Cumulative Development

	Dev							
AY	12	24	36	48	60	72	84	96
2	100	200	300	400	500	500	500	500
3	100	200	300	400	500	500	500	500
4	100	200	300	400	500	500	500	
5	100	200	300	400	500	500		
6	100	200	300	400	500			
7	100	200	300	400				
8	100	200	330					
9	100	200						
10	100							

Explanation of Bias Cont.

Paid Loss Development Factors

AY	Dev 12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-
2	2.00	1.50	1.33	1.25	1.00	1.00	1.00	
3	2.00	1.50	1.33	1.25	1.00	1.00	1.00	
4	2.00	1.50	1.33	1.25	1.00	1.00		
5	2.00	1.50	1.33	1.25	1.00			
6	2.00	1.50	1.33	1.25				
7	2.00	1.50	1.33					
8	2.00	**1.65**						
9	2.00							
10								
5 Year Average	2.00	1.53	1.33	1.25	1.00	1.00	1.00	
CDF	5.10	2.55	1.67	1.25	1.00	1.00	1.00	

- The PLDF method overprojects AY 8 due to the additional payments and overprojects AY9 and AY10 due to the higher 24-36 link ratio.

Ultimate Losses

AY	Last Diag	CDF	Ultimate
2	500	1.00	500
3	500	1.00	500
4	500	1.00	500
5	500	1.00	500
6	500	1.00	500
7	400	1.25	500
8	330	1.67	**550**
9	200	2.55	**510**
10	100	5.10	**510**

Explanation of Bias Cont.

- The following year, no claims settle. AY's 7,9,10, &11 pay 100, and AY 8 pays 80 because the claim that settled in the previous year has 0 payments.

Incremental Dev

AY	Dev 12	24	36	48	60	72	84	96
3	100	100	100	100	100	0	0	0
4	100	100	100	100	100	0	0	0
5	100	100	100	100	100	0	0	
6	100	100	100	100	100	0		
7	100	100	100	100	100			
8	100	100	**130**	**80**				
9	100	100	100					
10	100	100						
11	100							

Cumulative Dev

AY	Dev 12	24	36	48	60	72	84	96
3	100	200	300	400	500	500	500	500
4	100	200	300	400	500	500	500	500
5	100	200	300	400	500	500	500	
6	100	200	300	400	500	500		
7	100	200	300	400	500			
8	100	200	**330**	**410**				
9	100	200	300					
10	100	200						
11	100							

Explanation of Bias Cont.

Paid Loss Development Factors

AY	Dev 12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-
3	2.00	1.50	1.33	1.25	1.00	1.00	1.00	
4	2.00	1.50	1.33	1.25	1.00	1.00	1.00	
5	2.00	1.50	1.33	1.25	1.00	1.00		
6	2.00	1.50	1.33	1.25	1.00			
7	2.00	1.50	1.33	1.25				
8	2.00	**1.65**	**1.24**					
9	2.00	1.50						
10	2.00							
11								

5 Year Average	2.00	1.53	1.32	1.25	1.00	1.00	1.00
CDF	5.03	2.52	1.64	1.25	1.00	1.00	1.00

- The PLDF method still overprojects AY 8 due to the additional payments, however the subsequent AY's will have LDFs that are both biased high and biased low.

Ultimate Losses

AY	Last Diag	CDF	Ultimate
3	500	1.00	500
4	500	1.00	500
5	500	1.00	500
6	500	1.00	500
7	500	1.00	500
8	410	1.25	**513**
9	300	1.64	**493**
10	200	2.52	**503**
11	100	5.03	**503**

Explanation of Bias Cont.

- Over time, the bias caused by the settlement gets smaller as the accident year gets more mature.

	Calendar Year								
AY	9	10	11	12	13	14	15	16	17
1	500	500	500	500	500	500	500	500	500
2	500	500	500	500	500	500	500	500	500
3	500	500	500	500	500	500	500	500	500
4	500	500	500	500	500	500	500	500	500
5	500	500	500	500	500	500	500	500	500
6	500	500	500	500	500	500	500	500	500
7	500	500	500	500	500	500	500	500	500
8	500	550	513	490	490	490	490	490	490
9	500	510	493	496	500	500	500	500	500
10		510	503	489	496	500	500	500	500
11			503	499	489	496	500	500	500
12				499	499	489	496	500	500
13					499	499	489	496	500
14						499	489	496	500
15							489	496	500
16								496	500
17									500

- AY 8 is correct after CY 12, but the effects of the settlement on the CDFs last until CY 17.

Analysts Use Paid LDF Methods to Comment on the Adequacy of Company Loss Reserves

ANNUAL STATEMENT FOR THE December 31, 2016 OF THE P&C Combined Industry

SCHEDULE P - PART 3 - Workers' Compensation

Years in Which Losses Were Incurred	1	2	3	4	5	6	7	8	9	10
	CUMULATIVE PAID NET LOSSES AND DEFENSE AND COST CONTAINMENT EXPENSES REPORTED AT YEAR END ($000 OMITTED)									
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1 Prior	0	16,835,028	26,098,710	33,104,296	39,039,056	44,388,311	49,859,799	53,847,896	57,446,369	61,042,985
2 2007	5,707,085	12,530,977	16,392,455	18,793,708	20,484,145	21,650,065	22,652,827	23,337,822	24,084,750	24,358,475
3 2008	XXX	5,783,476	12,552,708	16,513,093	19,104,299	20,788,754	22,060,224	23,001,596	23,674,709	24,267,570
4 2009	XXX	XXX	5,259,234	11,409,914	15,022,272	17,272,136	18,947,179	20,112,712	20,878,085	21,539,465
5 2010	XXX	XXX	XXX	5,380,991	11,739,092	15,501,813	17,918,864	19,585,194	20,582,816	21,456,482
6 2011	XXX	XXX	XXX	XXX	5,579,340	12,003,760	15,847,520	18,266,248	19,856,919	21,061,831
7 2012	XXX	XXX	XXX	XXX	XXX	5,425,436	11,808,582	15,390,984	17,636,851	19,267,113
8 2013	XXX	XXX	XXX	XXX	XXX	XXX	5,284,341	11,573,316	15,191,628	17,586,350
9 2014	XXX	XXX	XXX	XXX	XXX	XXX	XXX	5,321,192	11,634,625	15,440,136
10 2015	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	5,165,808	11,725,599
11 2016	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	5,190,358

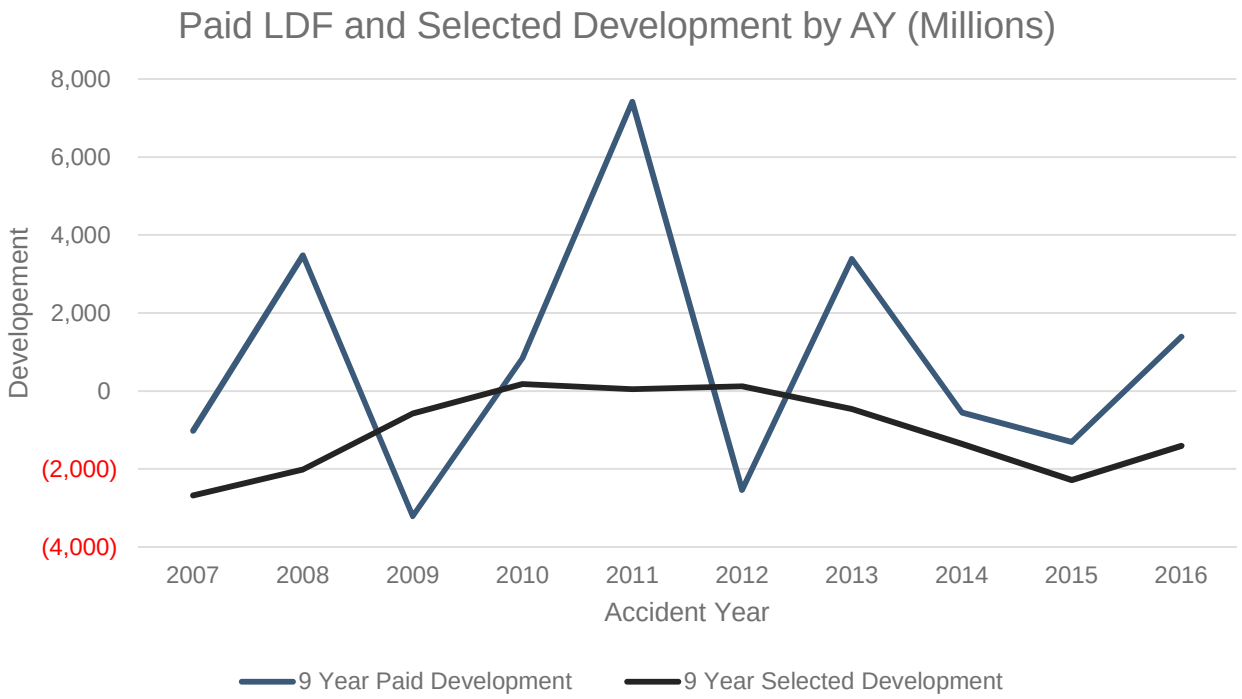
- The Schedule P Part 3 paid triangle can be developed to ultimate using the Paid LDF method.
- The 10 year to ultimate “Tail Factor” can be derived by taking the most recent evaluation of the 10th prior year (2007) and comparing it to the selected ultimate on Part 2. This is 1.203 in the 2016 evaluation.
- To reduce the impact of the tail changing each year, 1.2 was selected for each evaluation.

Industry Paid LDF Example

AY	Paid (1,000's)	LDF	Paid LDF Ultimate	Selected From Part 2	Redundancy	% of Ultimate	Previous Paid Ultimate	Adj	Adj Ult	Paid Development	
2007	24,358	1.203	29,311	29,311	0	0.0%	29,094	0.6%	29,274	37	Adverse
2008	24,268	1.217	29,533	29,862	329	1.1%	29,513	0.5%	29,670	(137)	Favorable
2009	21,539	1.252	26,961	26,962	1	0.0%	26,891	0.5%	27,029	(68)	Favorable
2010	21,456	1.290	27,673	27,483	(190)	-0.7%	27,618	0.5%	27,752	(79)	Favorable
2011	21,062	1.344	28,315	28,177	(139)	-0.5%	28,178	0.4%	28,295	20	Adverse
2012	19,267	1.423	27,411	27,684	273	1.0%	27,283	0.4%	27,397	14	Adverse
2013	17,586	1.553	27,303	27,969	666	2.4%	27,030	0.4%	27,146	157	Adverse
2014	15,440	1.789	27,619	28,695	1,076	3.7%	27,269	0.4%	27,378	241	Adverse
2015	11,726	2.353	27,593	29,491	1,898	6.4%	26,344	0.1%	26,384	1,209	Adverse
2016	5,190	5.149	26,723	30,180	3,456	11.5%					
Total	181,893		278,443	285,813	7,371	2.6%			2007 - 2015	1,393	
									2006 & Prior	(1,225)	
									2015 & Prior	168	

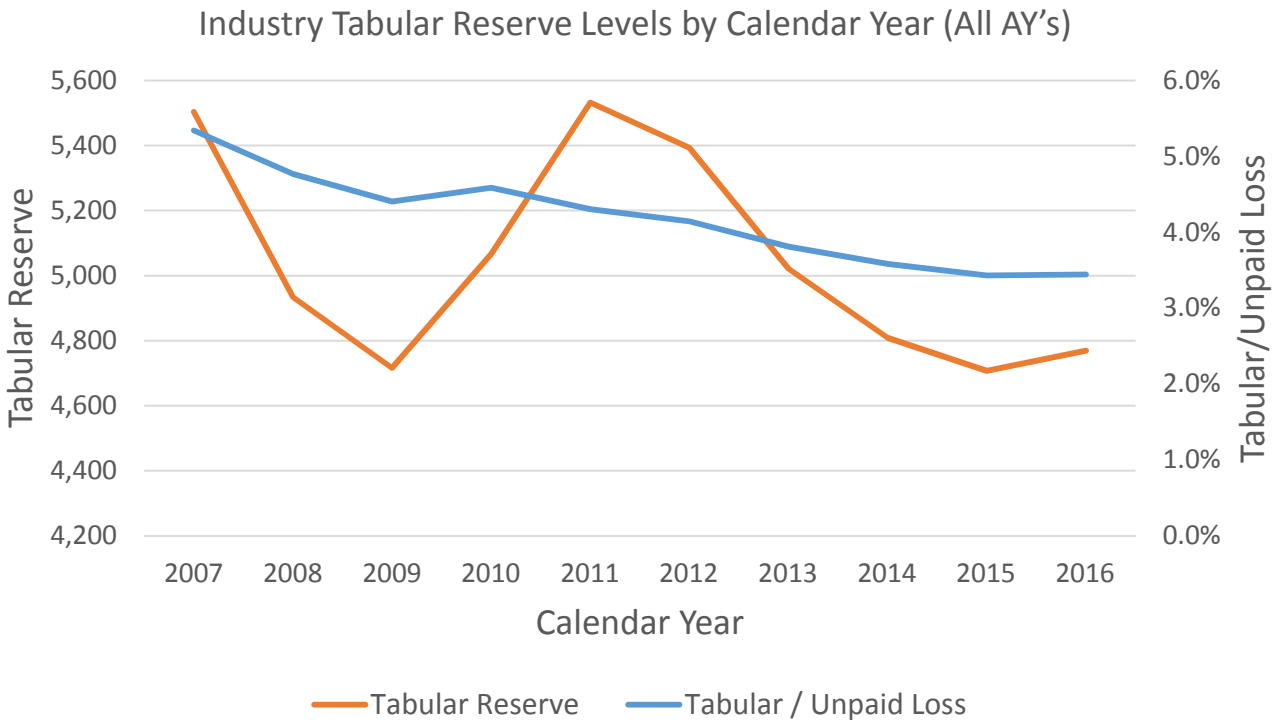
- Ultimate losses calculated using a Paid LDF method can be compared to previous years' ultimate losses to calculate the development this methodology would suggest.
- Adj column accounts for the difference in Part 2 ultimate losses for the same AY's at the same development point, but at different evaluation dates.
  - Most individual companies would have an adjustment of 0%.

Development of Paid LDF Method Compared to Selected Ultimate Losses from Part 2 Suggests that Actuaries Did Not Overreact to Settlements



- Settlements added to the volatility of the Paid LDF methodology
- Industry selected ultimate losses are more stable and did not overreact to the adverse development that settlements cause to the Paid LDF method.

Settlements Have Reduced the Industry Tabular Reserve Selection



- Settlements since 2011 have reduced the Work Comp tabular reserve
- This can be seen in the absolute amount of tabular reserve and the ratio of tabular reserve to unpaid loss
- Tabular Reserve = (Pt 2 – Pt 3 = Unpaid Loss+DCC; Net of Rein/S&S; Gross of Discount) - (Pt 1 = Unpaid DCC) - (Pt 1 = Unpaid Loss; Net of Rein/S&S/Discount) - (Pt 1 = Nontabular Discount)