

Simple Reserve Report Example

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Abstract

This document demonstrates how a very simple actuarial reserve report could be created using R. This document is only for display purposes. It was created using insurance loss data freely available on the CAS website. This report could be greatly improved by having better documentation for the relationships among tables. I am just getting started with L^AT_EX and will have more clearly documented reports in subsequent examples.

Purpose

Ractuary was requested by Nsure Ance Company (NAC) to provide a reserve estimate for their workers' compensation loss and allocated loss adjustment expense (ALAE) reserves. Losses are evaluated as of December 31, 1997...

Background

NAC began offering workers' compensation coverage in 1988. Each policy is written on a calendar year basis (i.e. beginning January 1 and ending December 31). NAC has never purchased reinsure coverage...

Other Stuff

Blah blah...

Conclusions

A summary of our reserve analysis is as follows:

Quitting from lines 105-121 (simple-reserve-report.Rmd) Error in eformat(smry, colnames = c("Paid", "Incurred", "Ultimate", "Case OS", : unused argument (colnames = c("Paid", "Incurred", "Ultimate", "Case OS", "IBNR", "Total OS")) Calls: ... withCallingHandlers -> withVisible -> eval -> eval -> pander -> eformat

From the table above, estimated ultimate loss & ALAE as of December 31, 1997 is 2,063,498 indicating a total outstanding loss & ALAE of 628,708.2.

Methodology

We used two actuarial projection techniques (paid projection and incurred projection) in creating the final estimated ultimate loss projection. The loss projections use loss experience for the more mature accident years to estimate the development of less mature accident years. See the following exhibits for detail regarding the projections and estimated ultimate loss and ALAE selection.

Exhibits

Quitting from lines 134-139 (simple-reserve-report.Rmd) Error in eformat(ult_selection, colnames = c("Paid Projection", "Incurred Projection", : unused argument (colnames = c("Paid Projection", "Incurred Projection", "Selected Ultimate")) Calls: ... withCallingHandlers -> withVisible -> eval -> eval -> pandoc -> eformat

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Quitting from lines 144-146 (simple-reserve-report.Rmd) Error in eformat(paid_proj, colnames = c("Paid",  
"LDF", "Ultimate")) : unused argument (colnames = c("Paid", "LDF", "Ultimate")) Calls: ... withCalling-  
Handlers -> withVisible -> eval -> eval -> pandor -> eformat
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	1	2	3	4	5	6	7	8	9	10
1988	22,190	60,834	85,104	100,151	108,812	114,967	118,790	121,558	123,492	125,049
1989	26,542	77,798	106,407	122,422	133,359	138,599	143,029	145,712	147,358	
1990	32,977	100,494	134,886	157,758	168,991	178,065	182,787	187,760		
1991	38,604	114,428	157,103	181,322	197,411	208,804	213,396			
1992	42,466	125,820	164,776	189,045	204,377	213,904				
1993	46,447	116,764	154,897	179,419	193,676					
1994	41,368	100,344	132,021	151,081						
1995	35,719	83,216	111,268							
1996	28,746	66,033								
1997	25,265									

Table 1: Paid Triangle

	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-Ult.
1988	2.742	1.399	1.177	1.086	1.057	1.033	1.023	1.016	1.013	
1989	2.931	1.368	1.151	1.089	1.039	1.032	1.019	1.011		
1990	3.047	1.342	1.170	1.071	1.054	1.027	1.027			
1991	2.964	1.373	1.154	1.089	1.058	1.022				
1992	2.963	1.310	1.147	1.081	1.047					
1993	2.514	1.327	1.158	1.079						
1994	2.426	1.316	1.144							
1995	2.330	1.337								
1996	2.297									
Simple	2.690	1.346	1.157	1.083	1.051	1.028	1.023	1.014	1.013	
Weighted	2.684	1.342	1.156	1.082	1.051	1.027	1.023	1.013	1.013	
Selected	2.700	1.350	1.550	1.080	1.050	1.030	1.025	1.015	1.013	1.150

Table 2: Paid Development Factor Triangle

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Quitting from lines 158-160 (simple-reserve-report.Rmd) Error in eformat(incurred_proj, colnames =  
c("Incurred", "LDF", "Ultimate")) : unused argument (colnames = c("Incurred", "LDF", "Ultimate"))  
Calls: ... withCallingHandlers -> withVisible -> eval -> eval -> pander -> eformat
```

	1	2	3	4	5	6	7	8	9	10
1988	91,892	120,466	129,785	134,401	134,051	134,264	134,169	133,158	133,800	133,513
1989	117,540	160,490	163,802	162,824	164,650	163,326	161,246	161,836	161,673	
1990	155,671	210,607	208,274	211,660	209,823	208,629	208,662	210,204		
1991	189,021	251,182	253,292	247,771	244,882	245,666	244,669			
1992	229,435	289,785	268,235	255,528	252,878	253,878				
1993	251,804	259,975	245,594	251,196	251,129					
1994	212,555	212,160	206,811	202,911						
1995	178,437	181,175	174,496							
1996	151,415	143,042								
1997	125,429									

Table 3: Incurred Triangle

	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-Ult.
1988	1.311	1.077	1.036	0.997	1.002	0.999	0.992	1.005	0.998	
1989	1.365	1.021	0.994	1.011	0.992	0.987	1.004	0.999		
1990	1.353	0.989	1.016	0.991	0.994	1.000	1.007			
1991	1.329	1.008	0.978	0.988	1.003	0.996				
1992	1.263	0.926	0.953	0.990	1.004					
1993	1.032	0.945	1.023	1.000						
1994	0.998	0.975	0.981							
1995	1.015	0.963								
1996	0.945									
Simple	1.179	0.988	0.997	0.996	0.999	0.996	1.001	1.002	0.998	
Weighted	1.159	0.979	0.994	0.995	0.999	0.996	1.002	1.002	0.998	
Selected	1.160	1.050	1.010	1.005	1.001	1.000	1.000	1.000	1.000	1.005

Table 4: Incurred Development Factor Triangle