PENNSYLVANIA COMPENSATION RATING BUREAU

Retrospective Test of Trend Projections for Severity Ratios

Attached is a retrospective test of the predictive accuracy of various trend procedures. Please note that instead of using ultimate loss ratios, as in Exhibit 11a, Exhibit 11b uses ultimate severity ratios, i.e., ultimate loss ratios adjusted by dividing out the frequency component. Please note that our analysis is limited to Policy Years 1998 through 2009, the years shown on Exhibit 6, page 6.

Results for both indemnity and medical are shown using both linear and exponential fits. All possible combinations of from four to ten data points, which permitted a test of the projected severity ratio three years hence, were used. Our current review trends policy year 2009 3.25 years, policy year 2008 4.25 years, and policy year 2007 5.25 years. An average of those three values is then calculated.

Current estimates of policy year ultimate severity ratios are compared with predicted values based on trending through earlier years. The results are shown for three loss development approaches: incurred, paid to twenty-third and the average of the incurred and paid to twenty-third methods.

As an illustration, the incurred loss development approach generated an indemnity severity ratio of 0.7454 for policy year 2004. Fitting the loss ratios for policy years 1998 to 2001 using a straight line and projecting that to 2004 yielded a severity ratio of 0.7961, which overstates our current estimate for 2004 by 0.0507.

Indemnity
Actual Ultimate Severity Ratios
Including Average of Paid and Incurred

INDEMNITY Policy Year	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
1998	0.5487	0.5319	0.5655
1999	0.6075	0.5875	0.6275
2000	0.6624	0.6404	0.6845
2001	0.6824	0.6565	0.7085
2002	0.7048	0.6859	0.7238
2003	0.7206	0.6960	0.7454
2004	0.7643	0.7454	0.7833
2005	0.7697	0.7412	0.7982
2006	0.7861	0.7588	0.8134
2007	0.8815	0.8376	0.9254
2008	0.9554	0.8860	1.0249
2009	0.9517	0.8694	1.0341

Trend # Years =   3

Indemnity
Linear Fit
Trended Severity Ratios

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
98-01 (4)	2004	0.8305	0.7961	0.8652
96-02 (4)	2005	0.8046	0.7827	0.8269
00-03 (4)	2006	0.7812	0.7580	0.8047
01-04 (4)	2007	0.8357	0.8205	0.8510
02-05 (4)	2008	0.8471	0.8140	0.8802
03-06 (4)	2009	0.8510	0.8182	0.8836
98-02 (5)	2005	0.8347	0.8089	0.8608
99-03 (5)	2006	0.8098	0.7845	0.8355
00-04 (5)	2007	0.8279	0.8096	0.8464
01-05 (5)	2008	0.8454	0.8195	0.8713
02-06 (5)	2009	0.8550	0.8210	0.8888
98-03 (6)	2006	0.8385	0.8109	0.8664
99-04 (6)	2007	0.8445	0.8235	0.8657
00-05 (6)	2008	0.8428	0.8169	0.8686
01-06 (6)	2009	0.8569	0.8282	0.8856
98-04 (7)	2007	0.8663	0.8426	0.8902
99-05 (7)	2008	0.8578	0.8313	0.8844
00-06 (7)	2009	0.8569	0.8286	0.8851
98-05 (8)	2008	0.8782	0.8502	0.9062
99-06 (8)	2009	0.8707	0.8422	0.8993
98-06 (9)	2009	0.8898	0.8603	0.9195

11b.2

Indemnity
Linear Fit
Differences: (Actual - Trended)

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
98-01 (4)	2004	-0.0662	-0.0507	-0.0819
96-02 (4)	2005	-0.0349	-0.0415	-0.0287
00-03 (4)	2006	0.0049	0.0008	0.0088
01-04 (4)	2007	0.0458	0.0171	0.0745
02-05 (4)	2008	0.1083	0.0720	0.1447
03-06 (4)	2009	0.1007	0.0512	0.1505
98-02 (5)	2005	-0.0650	-0.0677	-0.0626
99-03 (5)	2006	-0.0237	-0.0257	-0.0221
00-04 (5)	2007	0.0536	0.0280	0.0791
01-05 (5)	2008	0.1100	0.0666	0.1536
02-06 (5)	2009	0.0967	0.0484	0.1453
98-03 (6)	2006	-0.0524	-0.0521	-0.0530
99-04 (6)	2007	0.0370	0.0141	0.0597
00-05 (6)	2008	0.1126	0.0691	0.1563
01-06 (6)	2009	0.0948	0.0412	0.1485
98-04 (7)	2007	0.0152	-0.0050	0.0352
99-05 (7)	2008	0.0976	0.0547	0.1405
00-06 (7)	2009	0.0948	0.0408	0.1490
98-05 (8)	2008	0.0772	0.0358	0.1187
99-06 (8)	2009	0.0810	0.0272	0.1348
98-06 (9)	2009	0.0619	0.0091	0.1146

11b.3

Indemnity
Exponential Fit
Trended Loss Ratios

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Incur)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
98-01 (4)	2004	0.8695	0.8315	0.9080
96-02 (4)	2005	0.8215	0.7996	0.8437
00-03 (4)	2006	0.7869	0.7639	0.8102
01-04 (4)	2007	0.8444	0.8307	0.8583
02-05 (4)	2008	0.8550	0.8207	0.8893
03-06 (4)	2009	0.8572	0.8238	0.8903
98-02 (5)	2005	0.8694	0.8424	0.8967
99-03 (5)	2006	0.8251	0.7995	0.8511
00-04 (5)	2007	0.8372	0.8196	0.8549
01-05 (5)	2008	0.8546	0.8288	0.8802
02-06 (5)	2009	0.8628	0.8275	0.8979
98-03 (6)	2006	0.8698	0.8409	0.8991
99-04 (6)	2007	0.8625	0.8419	0.8833
00-05 (6)	2008	0.8532	0.8274	0.8789
01-06 (6)	2009	0.8666	0.8377	0.8953
98-04 (7)	2007	0.8994	0.8752	0.9238
99-05 (7)	2008	0.8763	0.8494	0.9032
00-06 (7)	2009	0.8682	0.8397	0.8966
98-05 (8)	2008	0.9109	0.8818	0.9400
99-06 (8)	2009	0.8897	0.8606	0.9187
98-06 (9)	2009	0.9223	0.8915	0.9532

11b.4

Indemnity
Exponential Fit
Differences: (Actual - Trended)

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
98-01 (4)	2004	-0.1052	-0.0861	-0.1247
96-02 (4)	2005	-0.0518	-0.0584	-0.0455
00-03 (4)	2006	-0.0008	-0.0051	0.0032
01-04 (4)	2007	0.0371	0.0069	0.0671
02-05 (4)	2008	0.1004	0.0653	0.1356
03-06 (4)	2009	0.0945	0.0456	0.1438
98-02 (5)	2005	-0.0997	-0.1012	-0.0985
99-03 (5)	2006	-0.0390	-0.0407	-0.0377
00-04 (5)	2007	0.0443	0.0180	0.0705
01-05 (5)	2008	0.1008	0.0572	0.1447
02-06 (5)	2009	0.0889	0.0419	0.1362
98-03 (6)	2006	-0.0837	-0.0821	-0.0857
99-04 (6)	2007	0.0190	-0.0043	0.0421
00-05 (6)	2008	0.1022	0.0586	0.1460
01-06 (6)	2009	0.0851	0.0317	0.1388
98-04 (7)	2007	-0.0179	-0.0376	0.0016
99-05 (7)	2008	0.0791	0.0366	0.1217
00-06 (7)	2009	0.0835	0.0297	0.1375
98-05 (8)	2008	0.0445	0.0042	0.0849
99-06 (8)	2009	0.0620	0.0088	0.1154
98-06 (9)	2009	0.0294	-0.0221	0.0809

11b.5

Medical
Actual Ultimate Severity Ratios
Including Average of Paid and Incurred

MEDICAL Policy Year	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
1998	0.5154	0.5153	0.5155
1999	0.5440	0.5363	0.5518
2000	0.5853	0.5747	0.5961
2001	0.5955	0.5738	0.6172
2002	0.6317	0.6123	0.6510
2003	0.6885	0.6636	0.7133
2004	0.7608	0.7335	0.7882
2005	0.7726	0.7498	0.7953
2006	0.7759	0.7452	0.8068
2007	0.8754	0.8490	0.9021
2008	0.8986	0.8586	0.9386
2009	0.9189	0.8745	0.9635

Trend # Years =   3

Medical
Linear Fit
Trended Severity Ratios

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
98-01 (4)	2004	0.6868	0.6463	0.7274
96-02 (4)	2005	0.7121	0.6765	0.7474
00-03 (4)	2006	0.7809	0.7434	0.8178
01-04 (4)	2007	0.9178	0.8845	0.9513
02-05 (4)	2008	0.9362	0.9069	0.9655
03-06 (4)	2009	0.8728	0.8405	0.9053
98-02 (5)	2005	0.7164	0.6782	0.7545
99-03 (5)	2006	0.7767	0.7382	0.8148
00-04 (5)	2007	0.8744	0.8353	0.9133
01-05 (5)	2008	0.9315	0.9032	0.9597
02-06 (5)	2009	0.9122	0.8769	0.9477
98-03 (6)	2006	0.7724	0.7315	0.8130
99-04 (6)	2007	0.8590	0.8186	0.8992
00-05 (6)	2008	0.9064	0.8722	0.9404
01-06 (6)	2009	0.9237	0.8902	0.9574
98-04 (7)	2007	0.8469	0.8042	0.8896
99-05 (7)	2008	0.8962	0.8594	0.9327
00-06 (7)	2009	0.9133	0.8757	0.9509
98-05 (8)	2008	0.8867	0.8468	0.9264
99-06 (8)	2009	0.9101	0.8706	0.9497
98-06 (9)	2009	0.9056	0.8634	0.9478

11b.7

Medical
Linear Fit
Differences: (Actual - Trended)

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
98-01 (4)	2004	0.0740	0.0872	0.0608
96-02 (4)	2005	0.0605	0.0733	0.0479
00-03 (4)	2006	-0.0050	0.0018	-0.0110
01-04 (4)	2007	-0.0424	-0.0355	-0.0492
02-05 (4)	2008	-0.0376	-0.0483	-0.0269
03-06 (4)	2009	0.0462	0.0340	0.0582
98-02 (5)	2005	0.0562	0.0716	0.0408
99-03 (5)	2006	-0.0008	0.0070	-0.0080
00-04 (5)	2007	0.0010	0.0137	-0.0112
01-05 (5)	2008	-0.0329	-0.0446	-0.0211
02-06 (5)	2009	0.0068	-0.0024	0.0158
98-03 (6)	2006	0.0035	0.0137	-0.0062
99-04 (6)	2007	0.0164	0.0304	0.0029
00-05 (6)	2008	-0.0078	-0.0136	-0.0018
01-06 (6)	2009	-0.0048	-0.0157	0.0061
98-04 (7)	2007	0.0285	0.0448	0.0125
99-05 (7)	2008	0.0024	-0.0008	0.0059
00-06 (7)	2009	0.0056	-0.0012	0.0126
98-05 (8)	2008	0.0119	0.0118	0.0122
99-06 (8)	2009	0.0088	0.0039	0.0138
98-06 (9)	2009	0.0133	0.0111	0.0157

11b.8

Medical
Exponential Fit
Trended Loss Ratios

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
98-01 (4)	2004	0.7023	0.6554	0.7509
96-02 (4)	2005	0.7254	0.6855	0.7656
00-03 (4)	2006	0.7978	0.7565	0.8391
01-04 (4)	2007	0.9640	0.9288	0.9994
02-05 (4)	2008	0.9761	0.9455	1.0067
03-06 (4)	2009	0.8857	0.8529	0.9189
98-02 (5)	2005	0.7347	0.6901	0.7804
99-03 (5)	2006	0.7982	0.7543	0.8424
00-04 (5)	2007	0.9074	0.8630	0.9519
01-05 (5)	2008	0.9771	0.9484	1.0058
02-06 (5)	2009	0.9415	0.9039	0.9794
98-03 (6)	2006	0.7980	0.7495	0.8475
99-04 (6)	2007	0.8940	0.8467	0.9417
00-05 (6)	2008	0.9457	0.9073	0.9840
01-06 (6)	2009	0.9632	0.9280	0.9987
98-04 (7)	2007	0.8846	0.8325	0.9379
99-05 (7)	2008	0.9386	0.8955	0.9818
00-06 (7)	2009	0.9522	0.9101	0.9944
98-05 (8)	2008	0.9325	0.8834	0.9824
99-06 (8)	2009	0.9543	0.9082	1.0008
98-06 (9)	2009	0.9547	0.9030	1.0073

11b.9

Medical
Exponential Fit
Differences: (Actual - Trended)

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
98-01 (4)	2004	0.0585	0.0781	0.0373
96-02 (4)	2005	0.0472	0.0643	0.0297
00-03 (4)	2006	-0.0219	-0.0113	-0.0323
01-04 (4)	2007	-0.0886	-0.0798	-0.0973
02-05 (4)	2008	-0.0775	-0.0869	-0.0681
03-06 (4)	2009	0.0332	0.0216	0.0446
98-02 (5)	2005	0.0379	0.0597	0.0149
99-03 (5)	2006	-0.0223	-0.0091	-0.0356
00-04 (5)	2007	-0.0320	-0.0140	-0.0498
01-05 (5)	2008	-0.0785	-0.0898	-0.0672
02-06 (5)	2009	-0.0226	-0.0294	-0.0159
98-03 (6)	2006	-0.0221	-0.0043	-0.0407
99-04 (6)	2007	-0.0186	0.0023	-0.0396
00-05 (6)	2008	-0.0471	-0.0487	-0.0454
01-06 (6)	2009	-0.0443	-0.0535	-0.0352
98-04 (7)	2007	-0.0092	0.0165	-0.0358
99-05 (7)	2008	-0.0400	-0.0369	-0.0432
00-06 (7)	2009	-0.0333	-0.0356	-0.0309
98-05 (8)	2008	-0.0339	-0.0248	-0.0438
99-06 (8)	2009	-0.0354	-0.0337	-0.0373
98-06 (9)	2009	-0.0358	-0.0285	-0.0438

11b.10