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 2000 through 2011, 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 2011 3.25 years, policy year 2010 4.25 years, and policy year 2009 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-fifth and the average of the incurred and paid to twenty-fifth methods.

As an illustration, the incurred loss development approach generates an indemnity severity ratio of 0.7458 for policy year 2006. Fitting the loss ratios for policy years 2000 to 2003 using a straight line and projecting that to 2006 yields a severity ratio of 0.7806, which overstates our current estimate for 2005 by 0.0348.

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-25)
2000	0.6366	0.6238	0.6495
2001	0.6619	0.6466	0.6773
2002	0.6952	0.6854	0.7051
2003	0.7092	0.6977	0.7207
2004	0.7484	0.7414	0.7556
2005	0.7462	0.7332	0.7591
2006	0.7580	0.7458	0.7702
2007	0.8290	0.8087	0.8492
2008	0.8715	0.8373	0.9057
2009	0.8636	0.8255	0.9018
2010	0.8540	0.8160	0.8921
2011	0.8966	0.8507	0.9426

Trend # Years =   3

11b.1

Indemnity
Linear Fit
Trended Severity Ratios

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-25)
00-03 (4)	2006	0.7887	0.7806	0.7968
01-04 (4)	2007	0.8268	0.8263	0.8274
02-05 (4)	2008	0.8112	0.7986	0.8237
03-06 (4)	2009	0.8053	0.7908	0.8198
04-07 (4)	2010	0.8845	0.8538	0.9149
05-08 (4)	2011	1.0023	0.9501	1.0545
00-04 (5)	2007	0.8257	0.8221	0.8294
01-05 (5)	2008	0.8231	0.8155	0.8306
02-06 (5)	2009	0.8127	0.7989	0.8264
03-07 (5)	2010	0.8828	0.8586	0.9068
04-08 (5)	2011	0.9551	0.9069	1.0031
00-05 (6)	2008	0.8287	0.8206	0.8367
01-06 (6)	2009	0.8255	0.8157	0.8353
02-07 (6)	2010	0.8755	0.8536	0.8971
03-08 (6)	2011	0.9444	0.9041	0.9846
00-06 (7)	2009	0.8335	0.8238	0.8431
01-07 (7)	2010	0.8777	0.8604	0.8948
02-08 (7)	2011	0.9321	0.8961	0.9680
00-07 (8)	2010	0.8793	0.8633	0.8952
01-08 (8)	2011	0.9289	0.8985	0.9591
00-08 (9)	2011	0.9266	0.8990	0.9541

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-25)
00-03 (4)	2006	-0.0307	-0.0348	-0.0266
01-04 (4)	2007	0.0023	-0.0176	0.0218
02-05 (4)	2008	0.0603	0.0387	0.0820
03-06 (4)	2009	0.0583	0.0347	0.0820
04-07 (4)	2010	-0.0305	-0.0378	-0.0228
05-08 (4)	2011	-0.1057	-0.0994	-0.1119
00-04 (5)	2007	0.0033	-0.0134	0.0198
01-05 (5)	2008	0.0484	0.0218	0.0751
02-06 (5)	2009	0.0509	0.0267	0.0754
03-07 (5)	2010	-0.0288	-0.0426	-0.0147
04-08 (5)	2011	-0.0585	-0.0562	-0.0605
00-05 (6)	2008	0.0428	0.0167	0.0690
01-06 (6)	2009	0.0381	0.0098	0.0665
02-07 (6)	2010	-0.0215	-0.0376	-0.0050
03-08 (6)	2011	-0.0478	-0.0534	-0.0420
00-06 (7)	2009	0.0301	0.0017	0.0587
01-07 (7)	2010	-0.0237	-0.0444	-0.0027
02-08 (7)	2011	-0.0355	-0.0454	-0.0254
00-07 (8)	2010	-0.0253	-0.0473	-0.0031
01-08 (8)	2011	-0.0323	-0.0478	-0.0165
00-08 (9)	2011	-0.0300	-0.0483	-0.0115

11b.3

Indemnity
Exponential Fit
Trended Loss Ratios

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Incur)	Severity Ratio (Incur)	Severity Ratio (Pd-25)
00-03 (4)	2006	0.7985	0.7913	0.8057
01-04 (4)	2007	0.8373	0.8390	0.8360
02-05 (4)	2008	0.8166	0.8037	0.8292
03-06 (4)	2009	0.8087	0.7940	0.8234
04-07 (4)	2010	0.8899	0.8574	0.9223
05-08 (4)	2011	1.0265	0.9678	1.0860
00-04 (5)	2007	0.8387	0.8367	0.8409
01-05 (5)	2008	0.8322	0.8256	0.8387
02-06 (5)	2009	0.8175	0.8034	0.8315
03-07 (5)	2010	0.8907	0.8655	0.9158
04-08 (5)	2011	0.9685	0.9158	1.0216
00-05 (6)	2008	0.8410	0.8339	0.8481
01-06 (6)	2009	0.8340	0.8248	0.8431
02-07 (6)	2010	0.8841	0.8614	0.9066
03-08 (6)	2011	0.9588	0.9153	1.0024
00-06 (7)	2009	0.8454	0.8365	0.8543
01-07 (7)	2010	0.8897	0.8725	0.9066
02-08 (7)	2011	0.9462	0.9077	0.9846
00-07 (8)	2010	0.8947	0.8790	0.9102
01-08 (8)	2011	0.9458	0.9142	0.9771
00-08 (9)	2011	0.9467	0.9182	0.9749

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-25)
00-03 (4)	2006	-0.0405	-0.0455	-0.0355
01-04 (4)	2007	-0.0083	-0.0303	0.0132
02-05 (4)	2008	0.0549	0.0336	0.0765
03-06 (4)	2009	0.0549	0.0315	0.0784
04-07 (4)	2010	-0.0359	-0.0414	-0.0302
05-08 (4)	2011	-0.1299	-0.1171	-0.1434
00-04 (5)	2007	-0.0097	-0.0280	0.0083
01-05 (5)	2008	0.0393	0.0117	0.0670
02-06 (5)	2009	0.0461	0.0221	0.0703
03-07 (5)	2010	-0.0367	-0.0495	-0.0237
04-08 (5)	2011	-0.0719	-0.0651	-0.0790
00-05 (6)	2008	0.0305	0.0034	0.0576
01-06 (6)	2009	0.0296	0.0007	0.0587
02-07 (6)	2010	-0.0301	-0.0454	-0.0145
03-08 (6)	2011	-0.0622	-0.0646	-0.0598
00-06 (7)	2009	0.0182	-0.0110	0.0475
01-07 (7)	2010	-0.0357	-0.0565	-0.0145
02-08 (7)	2011	-0.0496	-0.0570	-0.0420
00-07 (8)	2010	-0.0407	-0.0630	-0.0181
01-08 (8)	2011	-0.0492	-0.0635	-0.0345
00-08 (9)	2011	-0.0501	-0.0675	-0.0323

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-25)
2000	0.5722	0.5585	0.5860
2001	0.5844	0.5671	0.6019
2002	0.6255	0.6100	0.6410
2003	0.6812	0.6611	0.7013
2004	0.7453	0.7242	0.7664
2005	0.7493	0.7273	0.7713
2006	0.7507	0.7253	0.7762
2007	0.8409	0.8141	0.8674
2008	0.8564	0.8167	0.8959
2009	0.8680	0.8262	0.9096
2010	0.9186	0.8824	0.9549
2011	0.9731	0.9221	1.0241

Trend # Years =   3

11b.6

Medical
Linear Fit
Trended Severity Ratios

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-25)
00-03 (4)	2006	0.7815	0.7570	0.8058
01-04 (4)	2007	0.9014	0.8757	0.9269
02-05 (4)	2008	0.8963	0.8674	0.9252
03-06 (4)	2009	0.8273	0.7975	0.8571
04-07 (4)	2010	0.9012	0.8682	0.9339
05-08 (4)	2011	0.9845	0.9315	1.0370
00-04 (5)	2007	0.8632	0.8369	0.8894
01-05 (5)	2008	0.9019	0.8752	0.9285
02-06 (5)	2009	0.8697	0.8380	0.9014
03-07 (5)	2010	0.9159	0.8840	0.9475
04-08 (5)	2011	0.9454	0.8974	0.9930
00-05 (6)	2008	0.8834	0.8561	0.9106
01-06 (6)	2009	0.8885	0.8587	0.9183
02-07 (6)	2010	0.9348	0.9015	0.9679
03-08 (6)	2011	0.9536	0.9091	0.9977
00-06 (7)	2009	0.8838	0.8537	0.9138
01-07 (7)	2010	0.9442	0.9123	0.9758
02-08 (7)	2011	0.9679	0.9242	1.0114
00-07 (8)	2010	0.9373	0.9052	0.9691
01-08 (8)	2011	0.9763	0.9350	1.0173
00-08 (9)	2011	0.9713	0.9309	1.0114

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-25)
00-03 (4)	2006	-0.0308	-0.0317	-0.0296
01-04 (4)	2007	-0.0605	-0.0616	-0.0595
02-05 (4)	2008	-0.0399	-0.0507	-0.0293
03-06 (4)	2009	0.0408	0.0287	0.0525
04-07 (4)	2010	0.0174	0.0142	0.0210
05-08 (4)	2011	-0.0114	-0.0094	-0.0129
00-04 (5)	2007	-0.0223	-0.0228	-0.0220
01-05 (5)	2008	-0.0455	-0.0585	-0.0326
02-06 (5)	2009	-0.0017	-0.0118	0.0082
03-07 (5)	2010	0.0027	-0.0016	0.0074
04-08 (5)	2011	0.0277	0.0247	0.0311
00-05 (6)	2008	-0.0270	-0.0394	-0.0147
01-06 (6)	2009	-0.0205	-0.0325	-0.0087
02-07 (6)	2010	-0.0162	-0.0191	-0.0130
03-08 (6)	2011	0.0195	0.0130	0.0264
00-06 (7)	2009	-0.0157	-0.0275	-0.0042
01-07 (7)	2010	-0.0256	-0.0299	-0.0209
02-08 (7)	2011	0.0052	-0.0021	0.0127
00-07 (8)	2010	-0.0187	-0.0228	-0.0142
01-08 (8)	2011	-0.0032	-0.0129	0.0068
00-08 (9)	2011	0.0018	-0.0088	0.0127

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-25)
00-03 (4)	2006	0.8016	0.7757	0.8273
01-04 (4)	2007	0.9471	0.9202	0.9737
02-05 (4)	2008	0.9281	0.8969	0.9593
03-06 (4)	2009	0.8355	0.8049	0.8662
04-07 (4)	2010	0.9077	0.8735	0.9414
05-08 (4)	2011	1.0055	0.9480	1.0627
00-04 (5)	2007	0.8980	0.8697	0.9261
01-05 (5)	2008	0.9433	0.9151	0.9712
02-06 (5)	2009	0.8919	0.8579	0.9261
03-07 (5)	2010	0.9314	0.8981	0.9643
04-08 (5)	2011	0.9580	0.9071	1.0086
00-05 (6)	2008	0.9213	0.8919	0.9506
01-06 (6)	2009	0.9226	0.8907	0.9544
02-07 (6)	2010	0.9639	0.9279	0.9997
03-08 (6)	2011	0.9738	0.9263	1.0210
00-06 (7)	2009	0.9195	0.8869	0.9521
01-07 (7)	2010	0.9851	0.9507	1.0191
02-08 (7)	2011	1.0008	0.9528	1.0487
00-07 (8)	2010	0.9806	0.9455	1.0154
01-08 (8)	2011	1.0212	0.9757	1.0663
00-08 (9)	2011	1.0199	0.9748	1.0645

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-25)
00-03 (4)	2006	-0.0509	-0.0504	-0.0511
01-04 (4)	2007	-0.1062	-0.1061	-0.1063
02-05 (4)	2008	-0.0717	-0.0802	-0.0634
03-06 (4)	2009	0.0325	0.0213	0.0434
04-07 (4)	2010	0.0109	0.0089	0.0135
05-08 (4)	2011	-0.0324	-0.0259	-0.0386
00-04 (5)	2007	-0.0571	-0.0556	-0.0587
01-05 (5)	2008	-0.0869	-0.0984	-0.0753
02-06 (5)	2009	-0.0239	-0.0317	-0.0165
03-07 (5)	2010	-0.0128	-0.0157	-0.0094
04-08 (5)	2011	0.0151	0.0150	0.0155
00-05 (6)	2008	-0.0649	-0.0752	-0.0547
01-06 (6)	2009	-0.0546	-0.0645	-0.0448
02-07 (6)	2010	-0.0453	-0.0455	-0.0448
03-08 (6)	2011	-0.0007	-0.0042	0.0031
00-06 (7)	2009	-0.0515	-0.0607	-0.0425
01-07 (7)	2010	-0.0665	-0.0683	-0.0642
02-08 (7)	2011	-0.0277	-0.0307	-0.0246
00-07 (8)	2010	-0.0620	-0.0631	-0.0605
01-08 (8)	2011	-0.0481	-0.0536	-0.0422
00-08 (9)	2011	-0.0468	-0.0527	-0.0404

11b.10