

DELAWARE COMPENSATION RATING BUREAU, INC.

Retrospective Test of Trend Projections for Severity Ratios – Limited Losses

Attached is a retrospective test of the predictive accuracy of various trend procedures using severity ratios, i.e., ultimate loss ratios adjusted by dividing out the frequency component. The analysis is limited to Policy Years 1991 through 2003, the years for which frequency data is available.

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 loss ratio three years hence, were used. Our current review trends 2.9167 years beyond the midpoint of the latest available completed policy year (1/1/2004 to 12/1/2006).

Current estimates of policy year ultimate loss ratios are compared with predicted values based on trending through earlier years. The results are available for each of three loss development approaches: incurred, paid-to-20th and the average of the incurred and paid-20th methods.

As an illustration, the incurred loss development approach generated an indemnity severity ratio of 0.4427 for policy year 1999 (page 6.1). Fitting the severity ratios for policy years 1993 to 1996 using a straight line and projecting that to 1999 yielded a severity ratio of 0.3707 (page 6.2) which understates our current estimate for 1999 by 0.0720 points (page 6.3).

Indemnity
Actual Ultimate Limited Severity Ratios

INDEMNITY	Policy Year	Ult Limited Severity Ratio (Avg Pd & Inc)	Ult Limited Severity Ratio (Incur)	Ult Limited Severity Ratio (Pd-20)
	1991	0.3043	0.3000	0.3086
	1992	0.3065	0.2985	0.3145
	1993	0.3188	0.3157	0.3220
	1994	0.3046	0.2974	0.3118
	1995	0.3132	0.3065	0.3201
	1996	0.3546	0.3518	0.3574
	1997	0.3583	0.3683	0.3484
	1998	0.3659	0.3632	0.3685
	1999	0.4419	0.4427	0.4411
	2000	0.5620	0.5773	0.5470
	2001	0.5250	0.5511	0.4990
	2002	0.5188	0.5285	0.5091
	2003	0.5260	0.5495	0.5026

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-20)
1991-1994 (4)	1997	0.3145	0.3071	0.3219
1992-1995 (4)	1998	0.3134	0.3071	0.3201
1993-1996 (4)	1999	0.3750	0.3707	0.3794
1994-1997 (4)	2000	0.4238	0.4471	0.4006
1995-1998 (4)	2001	0.4208	0.4314	0.4099
1996-1999 (4)	2002	0.5015	0.5019	0.5009
1997-2000 (4)	2003	0.7412	0.7558	0.7270
1991-1995 (5)	1998	0.3174	0.3096	0.3256
1992-1996 (5)	1999	0.3648	0.3627	0.3671
1993-1997 (5)	2000	0.3944	0.4077	0.3811
1994-1998 (5)	2001	0.4232	0.4341	0.4121
1995-1999 (5)	2002	0.5011	0.5084	0.4937
1996-2000 (5)	2003	0.6657	0.6834	0.6484
1991-1996 (6)	1999	0.3574	0.3532	0.3618
1992-1997 (6)	2000	0.3849	0.3963	0.3737
1993-1998 (6)	2001	0.4047	0.4117	0.3977
1994-1999 (6)	2002	0.4897	0.4985	0.4809
1995-2000 (6)	2003	0.6372	0.6565	0.6180
1991-1997 (7)	2000	0.3770	0.3845	0.3697
1992-1998 (7)	2001	0.3975	0.4046	0.3905
1993-1999 (7)	2002	0.4661	0.4725	0.4597
1994-2000 (7)	2003	0.6088	0.6275	0.5903
1991-1998 (8)	2001	0.3907	0.3955	0.3858
1992-1999 (8)	2002	0.4527	0.4595	0.4459
1993-2000 (8)	2003	0.5748	0.5902	0.5595
1991-1999 (9)	2002	0.4410	0.4461	0.4358
1992-2000 (9)	2003	0.5514	0.5662	0.5368
1991-2000 (10)	2003	0.5314	0.5440	0.5190

Indemnity**Linear Fit****Differences: (Actual - Trended)**

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-20)
1991-1994 (4)	1997	0.0438	0.0612	0.0265
1992-1995 (4)	1998	0.0525	0.0561	0.0484
1993-1996 (4)	1999	0.0669	0.0720	0.0617
1994-1997 (4)	2000	0.1382	0.1302	0.1464
1995-1998 (4)	2001	0.1042	0.1197	0.0891
1996-1999 (4)	2002	0.0173	0.0266	0.0082
1997-2000 (4)	2003	-0.2152	-0.2063	-0.2244
1991-1995 (5)	1998	0.0485	0.0536	0.0430
1992-1996 (5)	1999	0.0771	0.0800	0.0740
1993-1997 (5)	2000	0.1676	0.1696	0.1659
1994-1998 (5)	2001	0.1018	0.1170	0.0869
1995-1999 (5)	2002	0.0177	0.0201	0.0155
1996-2000 (5)	2003	-0.1397	-0.1339	-0.1458
1991-1996 (6)	1999	0.0845	0.0895	0.0793
1992-1997 (6)	2000	0.1771	0.1810	0.1733
1993-1998 (6)	2001	0.1203	0.1394	0.1013
1994-1999 (6)	2002	0.0291	0.0300	0.0282
1995-2000 (6)	2003	-0.1112	-0.1070	-0.1154
1991-1997 (7)	2000	0.1850	0.1928	0.1773
1992-1998 (7)	2001	0.1275	0.1465	0.1085
1993-1999 (7)	2002	0.0527	0.0560	0.0494
1994-2000 (7)	2003	-0.0828	-0.0780	-0.0877
1991-1998 (8)	2001	0.1343	0.1556	0.1132
1992-1999 (8)	2002	0.0661	0.0690	0.0632
1993-2000 (8)	2003	-0.0488	-0.0407	-0.0569
1991-1999 (9)	2002	0.0778	0.0824	0.0733
1992-2000 (9)	2003	-0.0254	-0.0167	-0.0342
1991-2000 (10)	2003	-0.0054	0.0055	-0.0164

**Indemnity
Exponential Fit
Trended Severity Ratios**

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-20)
1991-1994 (4)	1997	0.3144	0.3069	0.3220
1992-1995 (4)	1998	0.3134	0.3071	0.3200
1993-1996 (4)	1999	0.3767	0.3721	0.3814
1994-1997 (4)	2000	0.4369	0.4681	0.4076
1995-1998 (4)	2001	0.4305	0.4449	0.4162
1996-1999 (4)	2002	0.5144	0.5149	0.5139
1997-2000 (4)	2003	0.8491	0.8623	0.8363
1991-1995 (5)	1998	0.3175	0.3095	0.3257
1992-1996 (5)	1999	0.3659	0.3639	0.3680
1993-1997 (5)	2000	0.3992	0.4147	0.3840
1994-1998 (5)	2001	0.4347	0.4500	0.4199
1995-1999 (5)	2002	0.5224	0.5341	0.5107
1996-2000 (5)	2003	0.7211	0.7432	0.6997
1991-1996 (6)	1999	0.3580	0.3537	0.3626
1992-1997 (6)	2000	0.3883	0.4015	0.3756
1993-1998 (6)	2001	0.4110	0.4197	0.4022
1994-1999 (6)	2002	0.5108	0.5249	0.4970
1995-2000 (6)	2003	0.6903	0.7188	0.6627
1991-1997 (7)	2000	0.3795	0.3877	0.3714
1992-1998 (7)	2001	0.4026	0.4115	0.3939
1993-1999 (7)	2002	0.4787	0.4880	0.4695
1994-2000 (7)	2003	0.6538	0.6819	0.6267
1991-1998 (8)	2001	0.3947	0.4006	0.3889
1992-1999 (8)	2002	0.4624	0.4721	0.4529
1993-2000 (8)	2003	0.6027	0.6236	0.5824
1991-1999 (9)	2002	0.4483	0.4554	0.4413
1992-2000 (9)	2003	0.5715	0.5912	0.5524
1991-2000 (10)	2003	0.5454	0.5612	0.5301

Indemnity
Exponential Fit
Differences: (Actual - Trended)

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-20)
1991-1994 (4)	1997	0.0439	0.0614	0.0264
1992-1995 (4)	1998	0.0525	0.0561	0.0485
1993-1996 (4)	1999	0.0652	0.0706	0.0597
1994-1997 (4)	2000	0.1251	0.1092	0.1394
1995-1998 (4)	2001	0.0945	0.1062	0.0828
1996-1999 (4)	2002	0.0044	0.0136	-0.0048
1997-2000 (4)	2003	-0.3231	-0.3128	-0.3337
1991-1995 (5)	1998	0.0484	0.0537	0.0428
1992-1996 (5)	1999	0.0760	0.0788	0.0731
1993-1997 (5)	2000	0.1628	0.1626	0.1630
1994-1998 (5)	2001	0.0903	0.1011	0.0791
1995-1999 (5)	2002	-0.0036	-0.0056	-0.0016
1996-2000 (5)	2003	-0.1951	-0.1937	-0.1971
1991-1996 (6)	1999	0.0839	0.0890	0.0785
1992-1997 (6)	2000	0.1737	0.1758	0.1714
1993-1998 (6)	2001	0.1140	0.1314	0.0968
1994-1999 (6)	2002	0.0080	0.0036	0.0121
1995-2000 (6)	2003	-0.1643	-0.1693	-0.1601
1991-1997 (7)	2000	0.1825	0.1896	0.1756
1992-1998 (7)	2001	0.1224	0.1396	0.1051
1993-1999 (7)	2002	0.0401	0.0405	0.0396
1994-2000 (7)	2003	-0.1278	-0.1324	-0.1241
1991-1998 (8)	2001	0.1303	0.1505	0.1101
1992-1999 (8)	2002	0.0564	0.0564	0.0562
1993-2000 (8)	2003	-0.0767	-0.0741	-0.0798
1991-1999 (9)	2002	0.0705	0.0731	0.0678
1992-2000 (9)	2003	-0.0455	-0.0417	-0.0498
1991-2000 (10)	2003	-0.0194	-0.0117	-0.0275

Medical
Actual Ultimate Limited Severity Ratios

MEDICAL	Policy Year	Ult Limited Severity Ratio (Avg Pd & Inc)	Ult Limited Severity Ratio (Incur)	Ult Limited Severity Ratio (Pd-20)
	1991	0.2659	0.2695	0.2623
	1992	0.2976	0.2993	0.2961
	1993	0.2978	0.3042	0.2913
	1994	0.3167	0.3341	0.2992
	1995	0.3429	0.3584	0.3275
	1996	0.3880	0.4168	0.3592
	1997	0.4233	0.4588	0.3878
	1998	0.4917	0.5273	0.4560
	1999	0.5671	0.6166	0.5175
	2000	0.7096	0.8086	0.6105
	2001	0.6979	0.8000	0.5958
	2002	0.7153	0.8175	0.6128
	2003	0.7432	0.8324	0.6541

Medical
Linear Fit
Trended Severity Ratios

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-20)
1991-1994 (4)	1997	0.3632	0.3912	0.3349
1992-1995 (4)	1998	0.3834	0.4172	0.3495
1993-1996 (4)	1999	0.4699	0.5163	0.4237
1994-1997 (4)	2000	0.5319	0.5867	0.4773
1995-1998 (4)	2001	0.6282	0.6872	0.5690
1996-1999 (4)	2002	0.7401	0.8054	0.6745
1997-2000 (4)	2003	0.9684	1.1152	0.8213
1991-1995 (5)	1998	0.3907	0.4194	0.3620
1992-1996 (5)	1999	0.4416	0.4872	0.3959
1993-1997 (5)	2000	0.5149	0.5704	0.4595
1994-1998 (5)	2001	0.6077	0.6625	0.5529
1995-1999 (5)	2002	0.7187	0.7890	0.6480
1996-2000 (5)	2003	0.9094	1.0363	0.7824
1991-1996 (6)	1999	0.4384	0.4787	0.3981
1992-1997 (6)	2000	0.4898	0.5442	0.4354
1993-1998 (6)	2001	0.5864	0.6432	0.5297
1994-1999 (6)	2002	0.6941	0.7602	0.6278
1995-2000 (6)	2003	0.8704	0.9898	0.7508
1991-1997 (7)	2000	0.4828	0.5324	0.4331
1992-1998 (7)	2001	0.5593	0.6161	0.5023
1993-1999 (7)	2002	0.6693	0.7360	0.6025
1994-2000 (7)	2003	0.8336	0.9423	0.7248
1991-1998 (8)	2001	0.5469	0.6004	0.4933
1992-1999 (8)	2002	0.6399	0.7061	0.5735
1993-2000 (8)	2003	0.7994	0.9031	0.6955
1991-1999 (9)	2002	0.6229	0.6858	0.5598
1992-2000 (9)	2003	0.7628	0.8620	0.6634
1991-2000 (10)	2003	0.7380	0.8312	0.6446

Medical**Linear Fit****Differences: (Actual - Trended)**

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-20)
1991-1994 (4)	1997	0.0601	0.0676	0.0529
1992-1995 (4)	1998	0.1083	0.1101	0.1065
1993-1996 (4)	1999	0.0972	0.1003	0.0938
1994-1997 (4)	2000	0.1777	0.2220	0.1332
1995-1998 (4)	2001	0.0697	0.1128	0.0268
1996-1999 (4)	2002	-0.0248	0.0121	-0.0617
1997-2000 (4)	2003	-0.2252	-0.2828	-0.1672
1991-1995 (5)	1998	0.1010	0.1079	0.0940
1992-1996 (5)	1999	0.1256	0.1294	0.1216
1993-1997 (5)	2000	0.1947	0.2382	0.1510
1994-1998 (5)	2001	0.0902	0.1375	0.0429
1995-1999 (5)	2002	-0.0033	0.0285	-0.0352
1996-2000 (5)	2003	-0.1662	-0.2039	-0.1283
1991-1996 (6)	1999	0.1287	0.1379	0.1194
1992-1997 (6)	2000	0.2198	0.2644	0.1751
1993-1998 (6)	2001	0.1115	0.1568	0.0661
1994-1999 (6)	2002	0.0212	0.0573	-0.0150
1995-2000 (6)	2003	-0.1272	-0.1574	-0.0967
1991-1997 (7)	2000	0.2268	0.2762	0.1774
1992-1998 (7)	2001	0.1386	0.1839	0.0935
1993-1999 (7)	2002	0.0460	0.0815	0.0103
1994-2000 (7)	2003	-0.0904	-0.1099	-0.0707
1991-1998 (8)	2001	0.1510	0.1996	0.1025
1992-1999 (8)	2002	0.0754	0.1114	0.0393
1993-2000 (8)	2003	-0.0562	-0.0707	-0.0414
1991-1999 (9)	2002	0.0924	0.1317	0.0530
1992-2000 (9)	2003	-0.0196	-0.0296	-0.0093
1991-2000 (10)	2003	0.0052	0.0012	0.0095

**Medical
Exponential Fit
Trended Severity Ratios**

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-20)
1991-1994 (4)	1997	0.3723	0.4051	0.3401
1992-1995 (4)	1998	0.3899	0.4299	0.3516
1993-1996 (4)	1999	0.4958	0.5542	0.4398
1994-1997 (4)	2000	0.5716	0.6389	0.5057
1995-1998 (4)	2001	0.6901	0.7667	0.6146
1996-1999 (4)	2002	0.8260	0.9020	0.7498
1997-2000 (4)	2003	1.1522	1.3589	0.9497
1991-1995 (5)	1998	0.4033	0.4378	0.3697
1992-1996 (5)	1999	0.4574	0.5139	0.4035
1993-1997 (5)	2000	0.5519	0.6239	0.4829
1994-1998 (5)	2001	0.6689	0.7382	0.6005
1995-1999 (5)	2002	0.8112	0.9043	0.7193
1996-2000 (5)	2003	1.0667	1.2367	0.8985
1991-1996 (6)	1999	0.4588	0.5090	0.4104
1992-1997 (6)	2000	0.5164	0.5864	0.4497
1993-1998 (6)	2001	0.6433	0.7196	0.5694
1994-1999 (6)	2002	0.7846	0.8710	0.6992
1995-2000 (6)	2003	1.0247	1.1929	0.8602
1991-1997 (7)	2000	0.5128	0.5769	0.4514
1992-1998 (7)	2001	0.6030	0.6800	0.5292
1993-1999 (7)	2002	0.7535	0.8459	0.6639
1994-2000 (7)	2003	0.9786	1.1283	0.8315
1991-1998 (8)	2001	0.5923	0.6649	0.5226
1992-1999 (8)	2002	0.7077	0.8006	0.6185
1993-2000 (8)	2003	0.9313	1.0788	0.7885
1991-1999 (9)	2002	0.6902	0.7786	0.6052
1992-2000 (9)	2003	0.8707	1.0121	0.7350
1991-2000 (10)	2003	0.8406	0.9729	0.7136

Medical
Exponential Fit
Differences: (Actual - Trended)

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-20)
1991-1994 (4)	1997	0.0510	0.0537	0.0477
1992-1995 (4)	1998	0.1018	0.0974	0.1044
1993-1996 (4)	1999	0.0713	0.0624	0.0777
1994-1997 (4)	2000	0.1380	0.1697	0.1048
1995-1998 (4)	2001	0.0078	0.0333	-0.0188
1996-1999 (4)	2002	-0.1107	-0.0845	-0.1370
1997-2000 (4)	2003	-0.4090	-0.5265	-0.2956
1991-1995 (5)	1998	0.0884	0.0895	0.0863
1992-1996 (5)	1999	0.1097	0.1027	0.1140
1993-1997 (5)	2000	0.1577	0.1847	0.1276
1994-1998 (5)	2001	0.0290	0.0618	-0.0047
1995-1999 (5)	2002	-0.0959	-0.0868	-0.1065
1996-2000 (5)	2003	-0.3235	-0.4043	-0.2444
1991-1996 (6)	1999	0.1083	0.1076	0.1071
1992-1997 (6)	2000	0.1932	0.2222	0.1608
1993-1998 (6)	2001	0.0546	0.0804	0.0264
1994-1999 (6)	2002	-0.0693	-0.0535	-0.0864
1995-2000 (6)	2003	-0.2815	-0.3605	-0.2061
1991-1997 (7)	2000	0.1968	0.2317	0.1591
1992-1998 (7)	2001	0.0949	0.1200	0.0666
1993-1999 (7)	2002	-0.0382	-0.0284	-0.0511
1994-2000 (7)	2003	-0.2354	-0.2959	-0.1774
1991-1998 (8)	2001	0.1056	0.1351	0.0732
1992-1999 (8)	2002	0.0076	0.0169	-0.0057
1993-2000 (8)	2003	-0.1881	-0.2464	-0.1344
1991-1999 (9)	2002	0.0251	0.0389	0.0076
1992-2000 (9)	2003	-0.1275	-0.1797	-0.0809
1991-2000 (10)	2003	-0.0974	-0.1405	-0.0595