

DELAWARE COMPENSATION RATING BUREAU, INC.

Retrospective Test of Trend Projections for Severity Ratios – Unlimited 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 1996 through 2008, 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 (1/1/2009 to 12/1/2011).

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 0.7443 for policy year 2003 (page 6.1). Fitting the severity ratios for policy years 1997 to 2000 using a straight line and projecting that to 2003 yielded a severity ratio of 1.1229 (page 6.2) which overstates our current estimate for 2003 by 0.3786 points (page 6.3).

Indemnity
Actual Ultimate Severity Ratios

INDEMNITY	Policy Year	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-20)
	1996	0.5650	0.5640	0.5661
	1997	0.6360	0.6511	0.6209
	1998	0.6402	0.6318	0.6486
	1999	0.6985	0.6830	0.7141
	2000	0.9126	0.9296	0.8957
	2001	0.7831	0.7770	0.7893
	2002	0.8445	0.8378	0.8513
	2003	0.7593	0.7443	0.7745
	2004	0.8195	0.8124	0.8267
	2005	0.8029	0.7844	0.8213
	2006	0.7625	0.7531	0.7722
	2007	0.8741	0.8712	0.8772
	2008	0.8268	0.8109	0.8427

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)
1996-1999 (4)	2002	0.8170	0.7844	0.8497
1997-2000 (4)	2003	1.1215	1.1229	1.1203
1998-2001 (4)	2004	1.0479	1.0623	1.0336
1999-2002 (4)	2005	0.9485	0.9472	0.9499
2000-2003 (4)	2006	0.6456	0.5994	0.6920
2001-2004 (4)	2007	0.8124	0.7986	0.8264
2002-2005 (4)	2008	0.7775	0.7533	0.8014
1996-2000 (5)	2003	1.0693	1.0735	1.0653
1997-2001 (5)	2004	1.0174	1.0093	1.0257
1998-2002 (5)	2005	1.0224	1.0248	1.0201
1999-2003 (5)	2006	0.8264	0.8097	0.8432
2000-2004 (5)	2007	0.7188	0.6867	0.7511
2001-2005 (5)	2008	0.8092	0.7859	0.8323
1996-2001 (6)	2004	1.0168	1.0128	1.0210
1997-2002 (6)	2005	1.0173	1.0056	1.0292
1998-2003 (6)	2006	0.9151	0.9046	0.9258
1999-2004 (6)	2007	0.8354	0.8212	0.8497
2000-2005 (6)	2008	0.7379	0.7022	0.7736
1996-2002 (7)	2005	1.0268	1.0187	1.0350
1997-2003 (7)	2006	0.9384	0.9190	0.9581
1998-2004 (7)	2007	0.9064	0.8964	0.9166
1999-2005 (7)	2008	0.8250	0.8035	0.8466
1996-2003 (8)	2006	0.9656	0.9500	0.9813
1997-2004 (8)	2007	0.9311	0.9134	0.9489
1998-2005 (8)	2008	0.8867	0.8695	0.9040
1996-2004 (9)	2007	0.9593	0.9444	0.9745
1997-2005 (9)	2008	0.9132	0.8903	0.9361
1996-2005 (10)	2008	0.9430	0.9228	0.9632

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)
1996-1999 (4)	2002	0.0275	0.0534	0.0016
1997-2000 (4)	2003	-0.3622	-0.3786	-0.3458
1998-2001 (4)	2004	-0.2284	-0.2499	-0.2069
1999-2002 (4)	2005	-0.1456	-0.1628	-0.1286
2000-2003 (4)	2006	0.1170	0.1537	0.0802
2001-2004 (4)	2007	0.0617	0.0726	0.0508
2002-2005 (4)	2008	0.0493	0.0576	0.0413
1996-2000 (5)	2003	-0.3100	-0.3292	-0.2908
1997-2001 (5)	2004	-0.1979	-0.1969	-0.1990
1998-2002 (5)	2005	-0.2195	-0.2404	-0.1988
1999-2003 (5)	2006	-0.0639	-0.0566	-0.0710
2000-2004 (5)	2007	0.1553	0.1845	0.1261
2001-2005 (5)	2008	0.0176	0.0250	0.0104
1996-2001 (6)	2004	-0.1973	-0.2004	-0.1943
1997-2002 (6)	2005	-0.2144	-0.2212	-0.2079
1998-2003 (6)	2006	-0.1526	-0.1515	-0.1536
1999-2004 (6)	2007	0.0387	0.0500	0.0275
2000-2005 (6)	2008	0.0889	0.1087	0.0691
1996-2002 (7)	2005	-0.2239	-0.2343	-0.2137
1997-2003 (7)	2006	-0.1759	-0.1659	-0.1859
1998-2004 (7)	2007	-0.0323	-0.0252	-0.0394
1999-2005 (7)	2008	0.0018	0.0075	-0.0039
1996-2003 (8)	2006	-0.2031	-0.1969	-0.2091
1997-2004 (8)	2007	-0.0570	-0.0422	-0.0717
1998-2005 (8)	2008	-0.0599	-0.0586	-0.0613
1996-2004 (9)	2007	-0.0852	-0.0732	-0.0973
1997-2005 (9)	2008	-0.0864	-0.0794	-0.0934
1996-2005 (10)	2008	-0.1162	-0.1119	-0.1205

**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)
1996-1999 (4)	2002	0.8456	0.8060	0.8864
1997-2000 (4)	2003	1.2086	1.1974	1.2200
1998-2001 (4)	2004	1.1131	1.1349	1.0919
1999-2002 (4)	2005	0.9718	0.9745	0.9697
2000-2003 (4)	2006	0.6641	0.6277	0.7025
2001-2004 (4)	2007	0.8118	0.7976	0.8262
2002-2005 (4)	2008	0.7791	0.7556	0.8025
1996-2000 (5)	2003	1.1530	1.1509	1.1545
1997-2001 (5)	2004	1.0689	1.0522	1.0863
1998-2002 (5)	2005	1.0748	1.0813	1.0688
1999-2003 (5)	2006	0.8326	0.8172	0.8485
2000-2004 (5)	2007	0.7269	0.6995	0.7555
2001-2005 (5)	2008	0.8093	0.7859	0.8328
1996-2001 (6)	2004	1.0830	1.0731	1.0927
1997-2002 (6)	2005	1.0683	1.0500	1.0874
1998-2003 (6)	2006	0.9374	0.9267	0.9483
1999-2004 (6)	2007	0.8417	0.8288	0.8550
2000-2005 (6)	2008	0.7440	0.7124	0.7765
1996-2002 (7)	2005	1.0944	1.0811	1.1079
1997-2003 (7)	2006	0.9666	0.9411	0.9931
1998-2004 (7)	2007	0.9259	0.9162	0.9358
1999-2005 (7)	2008	0.8305	0.8100	0.8513
1996-2003 (8)	2006	1.0113	0.9897	1.0332
1997-2004 (8)	2007	0.9569	0.9347	0.9799
1998-2005 (8)	2008	0.9023	0.8847	0.9200
1996-2004 (9)	2007	1.0016	0.9818	1.0218
1997-2005 (9)	2008	0.9349	0.9076	0.9629
1996-2005 (10)	2008	0.9796	0.9543	1.0053

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)
1996-1999 (4)	2002	-0.0011	0.0318	-0.0351
1997-2000 (4)	2003	-0.4493	-0.4531	-0.4455
1998-2001 (4)	2004	-0.2936	-0.3225	-0.2652
1999-2002 (4)	2005	-0.1689	-0.1901	-0.1484
2000-2003 (4)	2006	0.0984	0.1254	0.0697
2001-2004 (4)	2007	0.0623	0.0736	0.0510
2002-2005 (4)	2008	0.0477	0.0553	0.0402
1996-2000 (5)	2003	-0.3937	-0.4066	-0.3800
1997-2001 (5)	2004	-0.2494	-0.2398	-0.2596
1998-2002 (5)	2005	-0.2719	-0.2969	-0.2475
1999-2003 (5)	2006	-0.0701	-0.0641	-0.0763
2000-2004 (5)	2007	0.1472	0.1717	0.1217
2001-2005 (5)	2008	0.0175	0.0250	0.0099
1996-2001 (6)	2004	-0.2635	-0.2607	-0.2660
1997-2002 (6)	2005	-0.2654	-0.2656	-0.2661
1998-2003 (6)	2006	-0.1749	-0.1736	-0.1761
1999-2004 (6)	2007	0.0324	0.0424	0.0222
2000-2005 (6)	2008	0.0828	0.0985	0.0662
1996-2002 (7)	2005	-0.2915	-0.2967	-0.2866
1997-2003 (7)	2006	-0.2041	-0.1880	-0.2209
1998-2004 (7)	2007	-0.0518	-0.0450	-0.0586
1999-2005 (7)	2008	-0.0037	0.0009	-0.0086
1996-2003 (8)	2006	-0.2488	-0.2366	-0.2610
1997-2004 (8)	2007	-0.0828	-0.0635	-0.1027
1998-2005 (8)	2008	-0.0755	-0.0738	-0.0773
1996-2004 (9)	2007	-0.1275	-0.1106	-0.1446
1997-2005 (9)	2008	-0.1081	-0.0967	-0.1202
1996-2005 (10)	2008	-0.1528	-0.1434	-0.1626

Medical
Actual Ultimate Severity Ratios

MEDICAL	Policy Year	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-20)
	1996	0.7027	0.7277	0.6778
	1997	0.7444	0.7823	0.7065
	1998	0.8760	0.8705	0.8816
	1999	1.0359	1.0689	1.0029
	2000	1.3492	1.4435	1.2549
	2001	1.1882	1.2376	1.1386
	2002	1.4139	1.4695	1.3583
	2003	1.3406	1.3896	1.2916
	2004	1.6504	1.7570	1.5437
	2005	1.5968	1.6272	1.5664
	2006	1.5065	1.4865	1.5266
	2007	1.8942	1.9343	1.8540
	2008	2.0038	1.9978	2.0098

**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)
1996-1999 (4)	2002	1.3488	1.3627	1.3349
1997-2000 (4)	2003	1.8898	2.0232	1.7564
1998-2001 (4)	2004	1.6748	1.8193	1.5299
1999-2002 (4)	2005	1.6847	1.7530	1.6161
2000-2003 (4)	2006	1.4129	1.4166	1.4093
2001-2004 (4)	2007	1.9893	2.1287	1.8499
2002-2005 (4)	2008	1.8868	1.9391	1.8344
1996-2000 (5)	2003	1.7339	1.8377	1.6300
1997-2001 (5)	2004	1.7191	1.8224	1.6157
1998-2002 (5)	2005	1.7867	1.9014	1.6718
1999-2003 (5)	2006	1.6026	1.6555	1.5497
2000-2004 (5)	2007	1.7659	1.8489	1.6827
2001-2005 (5)	2008	1.9648	2.0295	1.9002
1996-2001 (6)	2004	1.6744	1.7653	1.5834
1997-2002 (6)	2005	1.8237	1.9173	1.7300
1998-2003 (6)	2006	1.7186	1.8110	1.6261
1999-2004 (6)	2007	1.8439	1.9460	1.7417
2000-2005 (6)	2008	1.8241	1.8640	1.7842
1996-2002 (7)	2005	1.7931	1.8805	1.7056
1997-2003 (7)	2006	1.7819	1.8635	1.7001
1998-2004 (7)	2007	1.9072	2.0324	1.7818
1999-2005 (7)	2008	1.8902	1.9535	1.8269
1996-2003 (8)	2006	1.7826	1.8623	1.7028
1997-2004 (8)	2007	1.9456	2.0582	1.8329
1998-2005 (8)	2008	1.9500	2.0395	1.8604
1996-2004 (9)	2007	1.9388	2.0464	1.8310
1997-2005 (9)	2008	1.9914	2.0764	1.9063
1996-2005 (10)	2008	1.9937	2.0787	1.9085

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)
1996-1999 (4)	2002	0.0651	0.1068	0.0234
1997-2000 (4)	2003	-0.5492	-0.6336	-0.4648
1998-2001 (4)	2004	-0.0244	-0.0623	0.0138
1999-2002 (4)	2005	-0.0879	-0.1258	-0.0497
2000-2003 (4)	2006	0.0936	0.0699	0.1173
2001-2004 (4)	2007	-0.0951	-0.1944	0.0041
2002-2005 (4)	2008	0.1171	0.0588	0.1754
1996-2000 (5)	2003	-0.3933	-0.4481	-0.3384
1997-2001 (5)	2004	-0.0687	-0.0654	-0.0719
1998-2002 (5)	2005	-0.1899	-0.2742	-0.1054
1999-2003 (5)	2006	-0.0961	-0.1690	-0.0231
2000-2004 (5)	2007	0.1283	0.0854	0.1713
2001-2005 (5)	2008	0.0390	-0.0317	0.1096
1996-2001 (6)	2004	-0.0240	-0.0083	-0.0397
1997-2002 (6)	2005	-0.2269	-0.2901	-0.1636
1998-2003 (6)	2006	-0.2121	-0.3245	-0.0995
1999-2004 (6)	2007	0.0503	-0.0117	0.1123
2000-2005 (6)	2008	0.1797	0.1338	0.2256
1996-2002 (7)	2005	-0.1963	-0.2533	-0.1392
1997-2003 (7)	2006	-0.2754	-0.3770	-0.1735
1998-2004 (7)	2007	-0.0130	-0.0981	0.0722
1999-2005 (7)	2008	0.1136	0.0443	0.1829
1996-2003 (8)	2006	-0.2761	-0.3758	-0.1762
1997-2004 (8)	2007	-0.0514	-0.1239	0.0211
1998-2005 (8)	2008	0.0538	-0.0417	0.1494
1996-2004 (9)	2007	-0.0446	-0.1121	0.0230
1997-2005 (9)	2008	0.0124	-0.0786	0.1035
1996-2005 (10)	2008	0.0101	-0.0809	0.1013

**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)
1996-1999 (4)	2002	1.5082	1.5042	1.5124
1997-2000 (4)	2003	2.3516	2.5390	2.1656
1998-2001 (4)	2004	1.8666	2.0902	1.6564
1999-2002 (4)	2005	1.7792	1.8559	1.7027
2000-2003 (4)	2006	1.4155	1.4183	1.4163
2001-2004 (4)	2007	2.1125	2.2719	1.9538
2002-2005 (4)	2008	1.9346	1.9824	1.8850
1996-2000 (5)	2003	2.0718	2.1975	1.9438
1997-2001 (5)	2004	2.0127	2.1471	1.8795
1998-2002 (5)	2005	1.9968	2.1717	1.8289
1999-2003 (5)	2006	1.6663	1.7220	1.6112
2000-2004 (5)	2007	1.7938	1.8701	1.7174
2001-2005 (5)	2008	2.0732	2.1352	2.0096
1996-2001 (6)	2004	1.9618	2.0732	1.8494
1997-2002 (6)	2005	2.1389	2.2623	2.0168
1998-2003 (6)	2006	1.8777	2.0078	1.7514
1999-2004 (6)	2007	1.9443	2.0550	1.8334
2000-2005 (6)	2008	1.8695	1.8990	1.8406
1996-2002 (7)	2005	2.1231	2.2341	2.0118
1997-2003 (7)	2006	2.0452	2.1483	1.9432
1998-2004 (7)	2007	2.1048	2.2770	1.9372
1999-2005 (7)	2008	1.9990	2.0620	1.9353
1996-2003 (8)	2006	2.0857	2.1849	1.9864
1997-2004 (8)	2007	2.2497	2.3959	2.1051
1998-2005 (8)	2008	2.1496	2.2697	2.0308
1996-2004 (9)	2007	2.2897	2.4291	2.1507
1997-2005 (9)	2008	2.2957	2.4016	2.1899
1996-2005 (10)	2008	2.3537	2.4603	2.2465

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)
1996-1999 (4)	2002	-0.0943	-0.0347	-0.1541
1997-2000 (4)	2003	-1.0110	-1.1494	-0.8740
1998-2001 (4)	2004	-0.2162	-0.3332	-0.1127
1999-2002 (4)	2005	-0.1824	-0.2287	-0.1363
2000-2003 (4)	2006	0.0910	0.0682	0.1103
2001-2004 (4)	2007	-0.2183	-0.3376	-0.0998
2002-2005 (4)	2008	0.0692	0.0154	0.1248
1996-2000 (5)	2003	-0.7312	-0.8079	-0.6522
1997-2001 (5)	2004	-0.3623	-0.3901	-0.3358
1998-2002 (5)	2005	-0.4000	-0.5445	-0.2625
1999-2003 (5)	2006	-0.1598	-0.2355	-0.0846
2000-2004 (5)	2007	0.1004	0.0642	0.1366
2001-2005 (5)	2008	-0.0694	-0.1374	0.0002
1996-2001 (6)	2004	-0.3114	-0.3162	-0.3057
1997-2002 (6)	2005	-0.5421	-0.6351	-0.4504
1998-2003 (6)	2006	-0.3712	-0.5213	-0.2248
1999-2004 (6)	2007	-0.0501	-0.1207	0.0206
2000-2005 (6)	2008	0.1343	0.0988	0.1692
1996-2002 (7)	2005	-0.5263	-0.6069	-0.4454
1997-2003 (7)	2006	-0.5387	-0.6618	-0.4166
1998-2004 (7)	2007	-0.2106	-0.3427	-0.0832
1999-2005 (7)	2008	0.0048	-0.0642	0.0745
1996-2003 (8)	2006	-0.5792	-0.6984	-0.4598
1997-2004 (8)	2007	-0.3555	-0.4616	-0.2511
1998-2005 (8)	2008	-0.1458	-0.2719	-0.0210
1996-2004 (9)	2007	-0.3955	-0.4948	-0.2967
1997-2005 (9)	2008	-0.2919	-0.4038	-0.1801
1996-2005 (10)	2008	-0.3499	-0.4625	-0.2367