

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 1997 through 2009, 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 (1/1/2010 to 12/1/2012).

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-21st and the average of the incurred and paid-to-21st methods.

As an illustration, the incurred loss development approach generated an indemnity severity ratio of 0.7495 for policy year 2004 (page 6.1). Fitting the severity ratios for policy years 1998 to 2001 using a straight line and projecting that to 2004 yielded a severity ratio of 1.0396 (page 6.2) which overstates our current estimate for 2004 by 0.2901 points (page 6.3).

Indemnity
Actual Ultimate Severity Ratios

INDEMNITY	Policy Year	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-21)
	1997	0.5977	0.6097	0.5857
	1998	0.5989	0.5891	0.6086
	1999	0.6611	0.6469	0.6753
	2000	0.8791	0.8782	0.8801
	2001	0.7635	0.7514	0.7757
	2002	0.8075	0.8039	0.8109
	2003	0.7659	0.7503	0.7813
	2004	0.7655	0.7495	0.7817
	2005	0.8008	0.8009	0.8006
	2006	0.7676	0.7582	0.7772
	2007	0.8582	0.8790	0.8373
	2008	0.8468	0.8177	0.8762
	2009	0.8728	0.9013	0.8442

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-21)
1997-2000 (4)	2003	1.0921	1.0695	1.1149
1998-2001 (4)	2004	1.0460	1.0396	1.0527
1999-2002 (4)	2005	0.9234	0.9250	0.9216
2000-2003 (4)	2006	0.6710	0.6469	0.6945
2001-2004 (4)	2007	0.7596	0.7371	0.7822
2002-2005 (4)	2008	0.7757	0.7717	0.7799
2003-2006 (4)	2009	0.7931	0.7985	0.7882
1997-2001 (5)	2004	1.0060	0.9813	1.0308
1998-2002 (5)	2005	1.0018	1.0010	1.0026
1999-2003 (5)	2006	0.8444	0.8324	0.8561
2000-2004 (5)	2007	0.6839	0.6574	0.7103
2001-2005 (5)	2008	0.7969	0.7935	0.8003
2002-2006 (5)	2009	0.7590	0.7522	0.7663
1997-2002 (6)	2005	0.9947	0.9786	1.0106
1998-2003 (6)	2006	0.9281	0.9174	0.9385
1999-2004 (6)	2007	0.8093	0.7919	0.8267
2000-2005 (6)	2008	0.7299	0.7190	0.7408
2001-2006 (6)	2009	0.7785	0.7728	0.7843
1997-2003 (7)	2006	0.9443	0.9233	0.9650
1998-2004 (7)	2007	0.8855	0.8700	0.9010
1999-2005 (7)	2008	0.8193	0.8123	0.8261
2000-2006 (7)	2009	0.7282	0.7170	0.7393
1997-2004 (8)	2007	0.9104	0.8871	0.9338
1998-2005 (8)	2008	0.8822	0.8751	0.8892
1999-2006 (8)	2009	0.8010	0.7932	0.8089
1997-2005 (9)	2008	0.9070	0.8919	0.9220
1998-2006 (9)	2009	0.8581	0.8503	0.8659
1997-2006 (10)	2009	0.8848	0.8702	0.8995

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

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-21)
1997-2000 (4)	2003	-0.3262	-0.3192	-0.3336
1998-2001 (4)	2004	-0.2805	-0.2901	-0.2710
1999-2002 (4)	2005	-0.1226	-0.1241	-0.1210
2000-2003 (4)	2006	0.0966	0.1113	0.0827
2001-2004 (4)	2007	0.0986	0.1419	0.0551
2002-2005 (4)	2008	0.0711	0.0460	0.0963
2003-2006 (4)	2009	0.0797	0.1028	0.0560
1997-2001 (5)	2004	-0.2405	-0.2318	-0.2491
1998-2002 (5)	2005	-0.2010	-0.2001	-0.2020
1999-2003 (5)	2006	-0.0768	-0.0742	-0.0789
2000-2004 (5)	2007	0.1743	0.2216	0.1270
2001-2005 (5)	2008	0.0499	0.0242	0.0759
2002-2006 (5)	2009	0.1138	0.1491	0.0779
1997-2002 (6)	2005	-0.1939	-0.1777	-0.2100
1998-2003 (6)	2006	-0.1605	-0.1592	-0.1613
1999-2004 (6)	2007	0.0489	0.0871	0.0106
2000-2005 (6)	2008	0.1169	0.0987	0.1354
2001-2006 (6)	2009	0.0943	0.1285	0.0599
1997-2003 (7)	2006	-0.1767	-0.1651	-0.1878
1998-2004 (7)	2007	-0.0273	0.0090	-0.0637
1999-2005 (7)	2008	0.0275	0.0054	0.0501
2000-2006 (7)	2009	0.1447	0.1843	0.1049
1997-2004 (8)	2007	-0.0522	-0.0081	-0.0965
1998-2005 (8)	2008	-0.0354	-0.0574	-0.0130
1999-2006 (8)	2009	0.0718	0.1081	0.0353
1997-2005 (9)	2008	-0.0602	-0.0742	-0.0458
1998-2006 (9)	2009	0.0147	0.0510	-0.0217
1997-2006 (10)	2009	-0.0120	0.0311	-0.0553

**Indemnity
Exponential Fit
Trended Severity Ratios**

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-21)
1997-2000 (4)	2003	1.1886	1.1473	1.2319
1998-2001 (4)	2004	1.1329	1.1286	1.1377
1999-2002 (4)	2005	0.9512	0.9567	0.9458
2000-2003 (4)	2006	0.6834	0.6620	0.7045
2001-2004 (4)	2007	0.7598	0.7376	0.7823
2002-2005 (4)	2008	0.7757	0.7714	0.7801
2003-2006 (4)	2009	0.7931	0.7988	0.7880
1997-2001 (5)	2004	1.0712	1.0341	1.1099
1998-2002 (5)	2005	1.0651	1.0682	1.0620
1999-2003 (5)	2006	0.8573	0.8460	0.8682
2000-2004 (5)	2007	0.6934	0.6696	0.7176
2001-2005 (5)	2008	0.7970	0.7933	0.8005
2002-2006 (5)	2009	0.7594	0.7524	0.7667
1997-2002 (6)	2005	1.0548	1.0316	1.0786
1998-2003 (6)	2006	0.9651	0.9547	0.9751
1999-2004 (6)	2007	0.8179	0.8008	0.8350
2000-2005 (6)	2008	0.7346	0.7239	0.7450
2001-2006 (6)	2009	0.7784	0.7726	0.7843
1997-2003 (7)	2006	0.9869	0.9595	1.0149
1998-2004 (7)	2007	0.9107	0.8948	0.9267
1999-2005 (7)	2008	0.8269	0.8206	0.8331
2000-2006 (7)	2009	0.7324	0.7217	0.7431
1997-2004 (8)	2007	0.9430	0.9141	0.9725
1998-2005 (8)	2008	0.9044	0.8980	0.9107
1999-2006 (8)	2009	0.8069	0.7996	0.8142
1997-2005 (9)	2008	0.9367	0.9182	0.9555
1998-2006 (9)	2009	0.8751	0.8679	0.8824
1997-2006 (10)	2009	0.9089	0.8915	0.9265

Indemnity
Exponential Fit
Differences: (Actual - Trended)

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-21)
1997-2000 (4)	2003	-0.4227	-0.3970	-0.4506
1998-2001 (4)	2004	-0.3674	-0.3791	-0.3560
1999-2002 (4)	2005	-0.1504	-0.1558	-0.1452
2000-2003 (4)	2006	0.0842	0.0962	0.0727
2001-2004 (4)	2007	0.0984	0.1414	0.0550
2002-2005 (4)	2008	0.0711	0.0463	0.0961
2003-2006 (4)	2009	0.0797	0.1025	0.0562
1997-2001 (5)	2004	-0.3057	-0.2846	-0.3282
1998-2002 (5)	2005	-0.2643	-0.2673	-0.2614
1999-2003 (5)	2006	-0.0897	-0.0878	-0.0910
2000-2004 (5)	2007	0.1648	0.2094	0.1197
2001-2005 (5)	2008	0.0498	0.0244	0.0757
2002-2006 (5)	2009	0.1134	0.1489	0.0775
1997-2002 (6)	2005	-0.2540	-0.2307	-0.2780
1998-2003 (6)	2006	-0.1975	-0.1965	-0.1979
1999-2004 (6)	2007	0.0403	0.0782	0.0023
2000-2005 (6)	2008	0.1122	0.0938	0.1312
2001-2006 (6)	2009	0.0944	0.1287	0.0599
1997-2003 (7)	2006	-0.2193	-0.2013	-0.2377
1998-2004 (7)	2007	-0.0525	-0.0158	-0.0894
1999-2005 (7)	2008	0.0199	-0.0029	0.0431
2000-2006 (7)	2009	0.1404	0.1796	0.1011
1997-2004 (8)	2007	-0.0848	-0.0351	-0.1352
1998-2005 (8)	2008	-0.0576	-0.0803	-0.0345
1999-2006 (8)	2009	0.0659	0.1017	0.0300
1997-2005 (9)	2008	-0.0899	-0.1005	-0.0793
1998-2006 (9)	2009	-0.0023	0.0334	-0.0382
1997-2006 (10)	2009	-0.0361	0.0098	-0.0823

Medical
Actual Ultimate Severity Ratios

MEDICAL	Policy Year	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-21)
	1997	0.7289	0.7708	0.6869
	1998	0.8078	0.8111	0.8046
	1999	0.9811	1.0030	0.9592
	2000	1.2820	1.3669	1.1973
	2001	1.1357	1.2118	1.0595
	2002	1.3732	1.4396	1.3066
	2003	1.3313	1.4039	1.2586
	2004	1.5307	1.6507	1.4107
	2005	1.6195	1.7021	1.5368
	2006	1.4892	1.5437	1.4347
	2007	1.8979	1.9863	1.8094
	2008	2.0632	2.1293	1.9968
	2009	2.1222	2.1423	2.1023

Medical
Linear Fit
Trended Severity Ratios

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-21)
1997-2000 (4)	2003	1.7746	1.8790	1.6706
1998-2001 (4)	2004	1.6297	1.8029	1.4564
1999-2002 (4)	2005	1.6565	1.7749	1.5376
2000-2003 (4)	2006	1.4540	1.5080	1.3995
2001-2004 (4)	2007	1.8571	2.0030	1.7114
2002-2005 (4)	2008	1.8859	2.0145	1.7574
2003-2006 (4)	2009	1.7458	1.7870	1.7047
1997-2001 (5)	2004	1.6310	1.7516	1.5105
1998-2002 (5)	2005	1.7587	1.8994	1.6176
1999-2003 (5)	2006	1.6165	1.7223	1.5103
2000-2004 (5)	2007	1.6771	1.7944	1.5595
2001-2005 (5)	2008	1.9606	2.0775	1.8438
2002-2006 (5)	2009	1.7289	1.8012	1.6567
1997-2002 (6)	2005	1.7596	1.8721	1.6468
1998-2003 (6)	2006	1.7250	1.8533	1.5965
1999-2004 (6)	2007	1.7647	1.9081	1.6211
2000-2005 (6)	2008	1.8235	1.9272	1.7197
2001-2006 (6)	2009	1.8385	1.9153	1.7617
1997-2003 (7)	2006	1.7541	1.8650	1.6431
1998-2004 (7)	2007	1.8403	1.9967	1.6837
1999-2005 (7)	2008	1.8808	2.0091	1.7524
2000-2006 (7)	2009	1.7688	1.8431	1.6944
1997-2004 (8)	2007	1.8629	2.0025	1.7231
1998-2005 (8)	2008	1.9398	2.0831	1.7963
1999-2006 (8)	2009	1.8371	1.9369	1.7372
1997-2005 (9)	2008	1.9599	2.0927	1.8269
1998-2006 (9)	2009	1.9057	2.0233	1.7879
1997-2006 (10)	2009	1.9397	2.0527	1.8266

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

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-21)
1997-2000 (4)	2003	-0.4433	-0.4751	-0.4120
1998-2001 (4)	2004	-0.0990	-0.1522	-0.0457
1999-2002 (4)	2005	-0.0370	-0.0728	-0.0008
2000-2003 (4)	2006	0.0352	0.0357	0.0353
2001-2004 (4)	2007	0.0408	-0.0166	0.0980
2002-2005 (4)	2008	0.1773	0.1148	0.2394
2003-2006 (4)	2009	0.3764	0.3553	0.3976
1997-2001 (5)	2004	-0.1003	-0.1009	-0.0997
1998-2002 (5)	2005	-0.1392	-0.1973	-0.0808
1999-2003 (5)	2006	-0.1273	-0.1786	-0.0756
2000-2004 (5)	2007	0.2208	0.1919	0.2499
2001-2005 (5)	2008	0.1026	0.0518	0.1530
2002-2006 (5)	2009	0.3933	0.3411	0.4456
1997-2002 (6)	2005	-0.1401	-0.1700	-0.1100
1998-2003 (6)	2006	-0.2358	-0.3096	-0.1618
1999-2004 (6)	2007	0.1332	0.0782	0.1883
2000-2005 (6)	2008	0.2397	0.2021	0.2771
2001-2006 (6)	2009	0.2837	0.2270	0.3406
1997-2003 (7)	2006	-0.2649	-0.3213	-0.2084
1998-2004 (7)	2007	0.0576	-0.0104	0.1257
1999-2005 (7)	2008	0.1824	0.1202	0.2444
2000-2006 (7)	2009	0.3534	0.2992	0.4079
1997-2004 (8)	2007	0.0350	-0.0162	0.0863
1998-2005 (8)	2008	0.1234	0.0462	0.2005
1999-2006 (8)	2009	0.2851	0.2054	0.3651
1997-2005 (9)	2008	0.1033	0.0366	0.1699
1998-2006 (9)	2009	0.2165	0.1190	0.3144
1997-2006 (10)	2009	0.1825	0.0896	0.2757

**Medical
Exponential Fit
Trended Severity Ratios**

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-21)
1997-2000 (4)	2003	2.1698	2.2942	2.0453
1998-2001 (4)	2004	1.8517	2.1294	1.5936
1999-2002 (4)	2005	1.7644	1.9187	1.6131
2000-2003 (4)	2006	1.4639	1.5153	1.4128
2001-2004 (4)	2007	1.9701	2.1281	1.8121
2002-2005 (4)	2008	1.9412	2.0817	1.8008
2003-2006 (4)	2009	1.7767	1.8105	1.7446
1997-2001 (5)	2004	1.8961	2.0564	1.7380
1998-2002 (5)	2005	2.0053	2.2274	1.7929
1999-2003 (5)	2006	1.7016	1.8302	1.5747
2000-2004 (5)	2007	1.7121	1.8296	1.5936
2001-2005 (5)	2008	2.0893	2.2121	1.9661
2002-2006 (5)	2009	1.7523	1.8227	1.6817
1997-2002 (6)	2005	2.0633	2.2162	1.9122
1998-2003 (6)	2006	1.9279	2.1159	1.7461
1999-2004 (6)	2007	1.8740	2.0473	1.7032
2000-2005 (6)	2008	1.8850	1.9890	1.7802
2001-2006 (6)	2009	1.9195	1.9906	1.8483
1997-2003 (7)	2006	2.0288	2.1767	1.8828
1998-2004 (7)	2007	2.0624	2.2858	1.8465
1999-2005 (7)	2008	2.0119	2.1662	1.8586
2000-2006 (7)	2009	1.8187	1.8877	1.7494
1997-2004 (8)	2007	2.1616	2.3506	1.9755
1998-2005 (8)	2008	2.1795	2.3825	1.9815
1999-2006 (8)	2009	1.9476	2.0607	1.8345
1997-2005 (9)	2008	2.2800	2.4598	2.1023
1998-2006 (9)	2009	2.1145	2.2727	1.9586
1997-2006 (10)	2009	2.2302	2.3763	2.0850

Medical
Exponential Fit
Differences: (Actual - Trended)

Years Used (# Yrs)	3 Yr Trend To	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-21)
1997-2000 (4)	2003	-0.8385	-0.8903	-0.7867
1998-2001 (4)	2004	-0.3210	-0.4787	-0.1829
1999-2002 (4)	2005	-0.1449	-0.2166	-0.0763
2000-2003 (4)	2006	0.0253	0.0284	0.0219
2001-2004 (4)	2007	-0.0722	-0.1418	-0.0027
2002-2005 (4)	2008	0.1220	0.0476	0.1960
2003-2006 (4)	2009	0.3455	0.3318	0.3577
1997-2001 (5)	2004	-0.3654	-0.4057	-0.3273
1998-2002 (5)	2005	-0.3858	-0.5253	-0.2561
1999-2003 (5)	2006	-0.2124	-0.2865	-0.1400
2000-2004 (5)	2007	0.1858	0.1567	0.2158
2001-2005 (5)	2008	-0.0261	-0.0828	0.0307
2002-2006 (5)	2009	0.3699	0.3196	0.4206
1997-2002 (6)	2005	-0.4438	-0.5141	-0.3754
1998-2003 (6)	2006	-0.4387	-0.5722	-0.3114
1999-2004 (6)	2007	0.0239	-0.0610	0.1062
2000-2005 (6)	2008	0.1782	0.1403	0.2166
2001-2006 (6)	2009	0.2027	0.1517	0.2540
1997-2003 (7)	2006	-0.5396	-0.6330	-0.4481
1998-2004 (7)	2007	-0.1645	-0.2995	-0.0371
1999-2005 (7)	2008	0.0513	-0.0369	0.1382
2000-2006 (7)	2009	0.3035	0.2546	0.3529
1997-2004 (8)	2007	-0.2637	-0.3643	-0.1661
1998-2005 (8)	2008	-0.1163	-0.2532	0.0153
1999-2006 (8)	2009	0.1746	0.0816	0.2678
1997-2005 (9)	2008	-0.2168	-0.3305	-0.1055
1998-2006 (9)	2009	0.0077	-0.1304	0.1437
1997-2006 (10)	2009	-0.1080	-0.2340	0.0173