

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 1992 through 2004, 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 (1/1/2005 to 12/1/2007).

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 0.4332 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 0.3643 (page 6.2) which understates our current estimate for 1999 by 0.0689 points (page 6.3).

**Indemnity
Actual Ultimate Severity Ratios**

INDEMNITY	Policy Year	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-20)
	1992	0.3036	0.2985	0.3087
	1993	0.3030	0.3024	0.3037
	1994	0.2651	0.2619	0.2684
	1995	0.2968	0.2976	0.2961
	1996	0.3351	0.3381	0.3322
	1997	0.3837	0.4037	0.3637
	1998	0.3676	0.3664	0.3688
	1999	0.4307	0.4332	0.4280
	2000	0.5386	0.5579	0.5192
	2001	0.4858	0.5044	0.4671
	2002	0.5526	0.5725	0.5326
	2003	0.5154	0.5450	0.4858
	2004	0.5033	0.5693	0.4374

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)
1992-1995 (4)	1998	0.2659	0.2707	0.2613
1993-1996 (4)	1999	0.3576	0.3643	0.3510
1994-1997 (4)	2000	0.4975	0.5350	0.4600
1995-1998 (4)	2001	0.4633	0.4739	0.4525
1996-1999 (4)	2002	0.5011	0.4970	0.5048
1997-2000 (4)	2003	0.6677	0.6785	0.6565
1998-2001 (4)	2004	0.6638	0.7079	0.6195
1992-1996 (5)	1999	0.3291	0.3369	0.3215
1993-1997 (5)	2000	0.4324	0.4601	0.4047
1994-1998 (5)	2001	0.4756	0.4911	0.4600
1995-1999 (5)	2002	0.5129	0.5176	0.5080
1996-2000 (5)	2003	0.6381	0.6544	0.6215
1997-2001 (5)	2004	0.6289	0.6496	0.6080
1992-1997 (6)	2000	0.3976	0.4221	0.3731
1993-1998 (6)	2001	0.4379	0.4518	0.4239
1994-1999 (6)	2002	0.5176	0.5275	0.5075
1995-2000 (6)	2003	0.6246	0.6430	0.6059
1996-2001 (6)	2004	0.6249	0.6478	0.6018
1992-1998 (7)	2001	0.4129	0.4275	0.3983
1993-1999 (7)	2002	0.4849	0.4949	0.4747
1994-2000 (7)	2003	0.6141	0.6343	0.5937
1995-2001 (7)	2004	0.6243	0.6479	0.6003
1992-1999 (8)	2002	0.4600	0.4715	0.4484
1993-2000 (8)	2003	0.5770	0.5959	0.5578
1994-2001 (8)	2004	0.6220	0.6467	0.5970
1992-2000 (9)	2003	0.5467	0.5658	0.5274
1993-2001 (9)	2004	0.5946	0.6179	0.5710
1992-2001 (10)	2004	0.5700	0.5932	0.5466

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)
1992-1995 (4)	1998	0.1017	0.0957	0.1075
1993-1996 (4)	1999	0.0731	0.0689	0.0770
1994-1997 (4)	2000	0.0411	0.0229	0.0592
1995-1998 (4)	2001	0.0226	0.0305	0.0146
1996-1999 (4)	2002	0.0515	0.0756	0.0278
1997-2000 (4)	2003	-0.1523	-0.1335	-0.1707
1998-2001 (4)	2004	-0.1605	-0.1386	-0.1821
1992-1996 (5)	1999	0.1016	0.0963	0.1065
1993-1997 (5)	2000	0.1062	0.0978	0.1145
1994-1998 (5)	2001	0.0102	0.0133	0.0071
1995-1999 (5)	2002	0.0397	0.0550	0.0246
1996-2000 (5)	2003	-0.1227	-0.1094	-0.1357
1997-2001 (5)	2004	-0.1256	-0.0803	-0.1706
1992-1997 (6)	2000	0.1410	0.1358	0.1461
1993-1998 (6)	2001	0.0479	0.0526	0.0432
1994-1999 (6)	2002	0.0350	0.0450	0.0251
1995-2000 (6)	2003	-0.1092	-0.0980	-0.1201
1996-2001 (6)	2004	-0.1216	-0.0785	-0.1644
1992-1998 (7)	2001	0.0729	0.0769	0.0689
1993-1999 (7)	2002	0.0677	0.0776	0.0579
1994-2000 (7)	2003	-0.0987	-0.0893	-0.1079
1995-2001 (7)	2004	-0.1210	-0.0786	-0.1629
1992-1999 (8)	2002	0.0926	0.1010	0.0842
1993-2000 (8)	2003	-0.0616	-0.0509	-0.0720
1994-2001 (8)	2004	-0.1187	-0.0774	-0.1596
1992-2000 (9)	2003	-0.0313	-0.0208	-0.0416
1993-2001 (9)	2004	-0.0913	-0.0486	-0.1336
1992-2001 (10)	2004	-0.0667	-0.0239	-0.1092

**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)
1992-1995 (4)	1998	0.2664	0.2704	0.2627
1993-1996 (4)	1999	0.3604	0.3679	0.3530
1994-1997 (4)	2000	0.5518	0.6100	0.4968
1995-1998 (4)	2001	0.4883	0.5009	0.4748
1996-1999 (4)	2002	0.5199	0.5132	0.5265
1997-2000 (4)	2003	0.7219	0.7256	0.7184
1998-2001 (4)	2004	0.7269	0.7931	0.6638
1992-1996 (5)	1999	0.3276	0.3357	0.3199
1993-1997 (5)	2000	0.4474	0.4813	0.4145
1994-1998 (5)	2001	0.5150	0.5373	0.4926
1995-1999 (5)	2002	0.5471	0.5526	0.5408
1996-2000 (5)	2003	0.6905	0.7068	0.6736
1997-2001 (5)	2004	0.6694	0.6906	0.6482
1992-1997 (6)	2000	0.4009	0.4282	0.3745
1993-1998 (6)	2001	0.4556	0.4728	0.4381
1994-1999 (6)	2002	0.5659	0.5812	0.5501
1995-2000 (6)	2003	0.6874	0.7099	0.6642
1996-2001 (6)	2004	0.6730	0.6999	0.6459
1992-1998 (7)	2001	0.4208	0.4379	0.4037
1993-1999 (7)	2002	0.5123	0.5260	0.4982
1994-2000 (7)	2003	0.6888	0.7181	0.6593
1995-2001 (7)	2004	0.6863	0.7169	0.6553
1992-1999 (8)	2002	0.4755	0.4905	0.4603
1993-2000 (8)	2003	0.6239	0.6492	0.5985
1994-2001 (8)	2004	0.6987	0.7347	0.6628
1992-2000 (9)	2003	0.5757	0.6006	0.5508
1993-2001 (9)	2004	0.6500	0.6820	0.6181
1992-2001 (10)	2004	0.6093	0.6406	0.5785

**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)
1992-1995 (4)	1998	0.1012	0.0960	0.1061
1993-1996 (4)	1999	0.0703	0.0653	0.0750
1994-1997 (4)	2000	-0.0132	-0.0521	0.0224
1995-1998 (4)	2001	-0.0025	0.0035	-0.0077
1996-1999 (4)	2002	0.0327	0.0593	0.0061
1997-2000 (4)	2003	-0.2065	-0.1806	-0.2326
1998-2001 (4)	2004	-0.2236	-0.2238	-0.2264
1992-1996 (5)	1999	0.1031	0.0975	0.1081
1993-1997 (5)	2000	0.0912	0.0766	0.1047
1994-1998 (5)	2001	-0.0292	-0.0329	-0.0255
1995-1999 (5)	2002	0.0055	0.0199	-0.0082
1996-2000 (5)	2003	-0.1751	-0.1618	-0.1878
1997-2001 (5)	2004	-0.1661	-0.1213	-0.2108
1992-1997 (6)	2000	0.1377	0.1297	0.1447
1993-1998 (6)	2001	0.0302	0.0316	0.0290
1994-1999 (6)	2002	-0.0133	-0.0087	-0.0175
1995-2000 (6)	2003	-0.1720	-0.1649	-0.1784
1996-2001 (6)	2004	-0.1697	-0.1306	-0.2085
1992-1998 (7)	2001	0.0650	0.0665	0.0634
1993-1999 (7)	2002	0.0403	0.0465	0.0344
1994-2000 (7)	2003	-0.1734	-0.1731	-0.1735
1995-2001 (7)	2004	-0.1830	-0.1476	-0.2179
1992-1999 (8)	2002	0.0771	0.0820	0.0723
1993-2000 (8)	2003	-0.1085	-0.1042	-0.1127
1994-2001 (8)	2004	-0.1954	-0.1654	-0.2254
1992-2000 (9)	2003	-0.0603	-0.0556	-0.0650
1993-2001 (9)	2004	-0.1467	-0.1127	-0.1807
1992-2001 (10)	2004	-0.1060	-0.0713	-0.1411

Medical
Actual Ultimate Severity Ratios

MEDICAL	Policy Year	Severity Ratio (Avg Pd & Inc)	Severity Ratio (Incur)	Severity Ratio (Pd-20)
	1992	0.3970	0.4274	0.3665
	1993	0.3248	0.3438	0.3060
	1994	0.3261	0.3501	0.3020
	1995	0.3886	0.4297	0.3475
	1996	0.4099	0.4453	0.3745
	1997	0.4893	0.5370	0.4415
	1998	0.5539	0.6087	0.4992
	1999	0.6804	0.7560	0.6048
	2000	0.8547	1.0192	0.6903
	2001	0.7716	0.9130	0.6305
	2002	1.0435	1.3187	0.7683
	2003	0.9670	1.1238	0.8102
	2004	1.1328	1.3837	0.8818

**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)
1992-1995 (4)	1998	0.3484	0.3937	0.3031
1993-1996 (4)	1999	0.5054	0.5651	0.4455
1994-1997 (4)	2000	0.6334	0.6999	0.5669
1995-1998 (4)	2001	0.7193	0.7881	0.6506
1996-1999 (4)	2002	0.9276	1.0385	0.8169
1997-2000 (4)	2003	1.1948	1.4475	0.9424
1998-2001 (4)	2004	1.0875	1.3535	0.8219
1992-1996 (5)	1999	0.4141	0.4601	0.3681
1993-1997 (5)	2000	0.5941	0.6620	0.5261
1994-1998 (5)	2001	0.7117	0.7864	0.6371
1995-1999 (5)	2002	0.8682	0.9633	0.7732
1996-2000 (5)	2003	1.1380	1.3566	0.9195
1997-2001 (5)	2004	1.1027	1.3480	0.8578
1992-1997 (6)	2000	0.5117	0.5687	0.4547
1993-1998 (6)	2001	0.6757	0.7511	0.6003
1994-1999 (6)	2002	0.8435	0.9389	0.7482
1995-2000 (6)	2003	1.0667	1.2536	0.8799
1996-2001 (6)	2004	1.1030	1.3311	0.8752
1992-1998 (7)	2001	0.6021	0.6686	0.5357
1993-1999 (7)	2002	0.8011	0.8946	0.7075
1994-2000 (7)	2003	1.0247	1.1973	0.8523
1995-2001 (7)	2004	1.0704	1.2763	0.8649
1992-1999 (8)	2002	0.7279	0.8123	0.6436
1993-2000 (8)	2003	0.9721	1.1328	0.8114
1994-2001 (8)	2004	1.0488	1.2430	0.8548
1992-2000 (9)	2003	0.8946	1.0397	0.7496
1993-2001 (9)	2004	1.0117	1.1953	0.8282
1992-2001 (10)	2004	0.9482	1.1174	0.7791

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)
1992-1995 (4)	1998	0.2055	0.2150	0.1962
1993-1996 (4)	1999	0.1750	0.1909	0.1594
1994-1997 (4)	2000	0.2213	0.3193	0.1235
1995-1998 (4)	2001	0.0523	0.1249	-0.0201
1996-1999 (4)	2002	0.1159	0.2802	-0.0486
1997-2000 (4)	2003	-0.2278	-0.3237	-0.1322
1998-2001 (4)	2004	0.0453	0.0302	0.0599
1992-1996 (5)	1999	0.2663	0.2959	0.2368
1993-1997 (5)	2000	0.2606	0.3572	0.1643
1994-1998 (5)	2001	0.0599	0.1266	-0.0066
1995-1999 (5)	2002	0.1753	0.3554	-0.0048
1996-2000 (5)	2003	-0.1710	-0.2328	-0.1093
1997-2001 (5)	2004	0.0301	0.0357	0.0240
1992-1997 (6)	2000	0.3430	0.4505	0.2356
1993-1998 (6)	2001	0.0959	0.1619	0.0302
1994-1999 (6)	2002	0.2000	0.3798	0.0201
1995-2000 (6)	2003	-0.0997	-0.1298	-0.0697
1996-2001 (6)	2004	0.0298	0.0526	0.0066
1992-1998 (7)	2001	0.1695	0.2444	0.0948
1993-1999 (7)	2002	0.2424	0.4241	0.0608
1994-2000 (7)	2003	-0.0577	-0.0735	-0.0421
1995-2001 (7)	2004	0.0624	0.1074	0.0169
1992-1999 (8)	2002	0.3156	0.5064	0.1247
1993-2000 (8)	2003	-0.0051	-0.0090	-0.0012
1994-2001 (8)	2004	0.0840	0.1407	0.0270
1992-2000 (9)	2003	0.0724	0.0841	0.0606
1993-2001 (9)	2004	0.1211	0.1884	0.0536
1992-2001 (10)	2004	0.1846	0.2663	0.1027

**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)
1992-1995 (4)	1998	0.3480	0.3916	0.3047
1993-1996 (4)	1999	0.5339	0.6057	0.4633
1994-1997 (4)	2000	0.7073	0.7884	0.6268
1995-1998 (4)	2001	0.7965	0.8706	0.7227
1996-1999 (4)	2002	1.0989	1.2451	0.9541
1997-2000 (4)	2003	1.4676	1.8549	1.0978
1998-2001 (4)	2004	1.2240	1.5995	0.8758
1992-1996 (5)	1999	0.4150	0.4623	0.3680
1993-1997 (5)	2000	0.6471	0.7317	0.5636
1994-1998 (5)	2001	0.8125	0.9051	0.7207
1995-1999 (5)	2002	1.0051	1.1173	0.8931
1996-2000 (5)	2003	1.4216	1.7532	1.1000
1997-2001 (5)	2004	1.2853	1.6396	0.9503
1992-1997 (6)	2000	0.5210	0.5826	0.4599
1993-1998 (6)	2001	0.7566	0.8532	0.6613
1994-1999 (6)	2002	0.9981	1.1218	0.8755
1995-2000 (6)	2003	1.3016	1.5564	1.0482
1996-2001 (6)	2004	1.3398	1.6828	1.0120
1992-1998 (7)	2001	0.6294	0.7048	0.5548
1993-1999 (7)	2002	0.9297	1.0544	0.8068
1994-2000 (7)	2003	1.2681	1.5112	1.0277
1995-2001 (7)	2004	1.3010	1.5943	1.0146
1992-1999 (8)	2002	0.7863	0.8866	0.6871
1993-2000 (8)	2003	1.1775	1.4023	0.9564
1994-2001 (8)	2004	1.3043	1.5909	1.0249
1992-2000 (9)	2003	1.0057	1.1850	0.8280
1993-2001 (9)	2004	1.2451	1.5155	0.9822
1992-2001 (10)	2004	1.0963	1.3207	0.8767

**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)
1992-1995 (4)	1998	0.2059	0.2171	0.1945
1993-1996 (4)	1999	0.1465	0.1503	0.1415
1994-1997 (4)	2000	0.1474	0.2308	0.0635
1995-1998 (4)	2001	-0.0249	0.0424	-0.0922
1996-1999 (4)	2002	-0.0554	0.0736	-0.1858
1997-2000 (4)	2003	-0.5006	-0.7311	-0.2876
1998-2001 (4)	2004	-0.0912	-0.2158	0.0060
1992-1996 (5)	1999	0.2654	0.2937	0.2368
1993-1997 (5)	2000	0.2076	0.2875	0.1267
1994-1998 (5)	2001	-0.0409	0.0079	-0.0902
1995-1999 (5)	2002	0.0384	0.2014	-0.1248
1996-2000 (5)	2003	-0.4546	-0.6294	-0.2898
1997-2001 (5)	2004	-0.1525	-0.2559	-0.0685
1992-1997 (6)	2000	0.3337	0.4366	0.2304
1993-1998 (6)	2001	0.0150	0.0598	-0.0308
1994-1999 (6)	2002	0.0454	0.1969	-0.1072
1995-2000 (6)	2003	-0.3346	-0.4326	-0.2380
1996-2001 (6)	2004	-0.2070	-0.2991	-0.1302
1992-1998 (7)	2001	0.1422	0.2082	0.0757
1993-1999 (7)	2002	0.1138	0.2643	-0.0385
1994-2000 (7)	2003	-0.3011	-0.3874	-0.2175
1995-2001 (7)	2004	-0.1682	-0.2106	-0.1328
1992-1999 (8)	2002	0.2572	0.4321	0.0812
1993-2000 (8)	2003	-0.2105	-0.2785	-0.1462
1994-2001 (8)	2004	-0.1715	-0.2072	-0.1431
1992-2000 (9)	2003	-0.0387	-0.0612	-0.0178
1993-2001 (9)	2004	-0.1123	-0.1318	-0.1004
1992-2001 (10)	2004	0.0365	0.0630	0.0051