

DELAWARE COMPENSATION RATING BUREAU, INC.

Measures of Goodness of Fit in Trend Calculations Using Severity Ratios – Limited Losses

Estimates of trended severity ratios using from 4 to 10 data points for each loss development technique are shown in Exhibit 3.

The first page of the attachment shows R^2 values for the regressions producing those trended severity ratios.

Pages 2 through 5 show fitted values for the curves used in the trend projections. Page 2 shows indemnity results using linear regression, page 3 is for indemnity-exponential, page 4 for medical-linear, and page 5 for medical-exponential.

Pages 6 through 9 show residuals resulting from the comparison of actual and fitted (actual minus fitted) values for the curves used in the trend projections. Page 6 shows indemnity results using linear regression, page 7 is for indemnity-exponential, page 8 for medical-linear, and page 9 for medical-exponential.

INDEMNITY		(Average)	(Incur)	(Pd-23)
r ²				
4 Point	Linear	0.637	0.727	0.523
5 Point	Linear	0.624	0.705	0.519
6 Point	Linear	0.647	0.695	0.572
7 Point	Linear	0.646	0.676	0.589
8 Point	Linear	0.679	0.707	0.626
9 Point	Linear	0.680	0.699	0.638
10 Point	Linear	0.602	0.592	0.586
4 Point	Expon'l	0.640	0.734	0.509
5 Point	Expon'l	0.638	0.718	0.521
6 Point	Expon'l	0.675	0.715	0.594
7 Point	Expon'l	0.681	0.700	0.623
8 Point	Expon'l	0.724	0.742	0.672
9 Point	Expon'l	0.730	0.737	0.690
10 Point	Expon'l	0.642	0.617	0.633

MEDICAL		(Average)	(Incur)	(Pd-23)
r ²				
4 Point	Linear	0.983	0.997	0.948
5 Point	Linear	0.951	0.961	0.927
6 Point	Linear	0.957	0.961	0.942
7 Point	Linear	0.921	0.918	0.916
8 Point	Linear	0.891	0.882	0.895
9 Point	Linear	0.878	0.865	0.888
10 Point	Linear	0.836	0.814	0.856
4 Point	Expon'l	0.995	0.998	0.968
5 Point	Expon'l	0.977	0.978	0.960
6 Point	Expon'l	0.986	0.986	0.977
7 Point	Expon'l	0.960	0.954	0.960
8 Point	Expon'l	0.941	0.927	0.949
9 Point	Expon'l	0.939	0.923	0.950
10 Point	Expon'l	0.899	0.872	0.923

INDEMNITY Linear FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
4 Point	2008	0.5511	0.5397	0.5626
	2009	0.6067	0.5944	0.6189
	2010	0.6622	0.6491	0.6751
	2011	0.7177	0.7038	0.7314
5 Point	2007	0.5362	0.5238	0.5487
	2008	0.5782	0.5656	0.5909
	2009	0.6202	0.6073	0.6330
	2010	0.6622	0.6491	0.6751
	2011	0.7042	0.6908	0.7173
6 Point	2006	0.5196	0.5113	0.5280
	2007	0.5546	0.5451	0.5643
	2008	0.5897	0.5788	0.6006
	2009	0.6248	0.6126	0.6369
	2010	0.6599	0.6464	0.6732
	2011	0.6950	0.6802	0.7095
7 Point	2005	0.5092	0.5033	0.5152
	2006	0.5386	0.5311	0.5461
	2007	0.5680	0.5589	0.5770
	2008	0.5973	0.5868	0.6078
	2009	0.6267	0.6146	0.6387
	2010	0.6561	0.6425	0.6696
	2011	0.6855	0.6703	0.7004
8 Point	2004	0.4942	0.4887	0.4998
	2005	0.5207	0.5139	0.5276
	2006	0.5472	0.5391	0.5554
	2007	0.5737	0.5642	0.5831
	2008	0.6002	0.5894	0.6109
	2009	0.6267	0.6146	0.6387
	2010	0.6532	0.6398	0.6665
	2011	0.6797	0.6650	0.6943
9 Point	2003	0.4856	0.4818	0.4896
	2004	0.5090	0.5037	0.5143
	2005	0.5323	0.5257	0.5390
	2006	0.5556	0.5476	0.5637
	2007	0.5790	0.5696	0.5883
	2008	0.6023	0.5916	0.6130
	2009	0.6257	0.6135	0.6377
	2010	0.6490	0.6355	0.6623
	2011	0.6723	0.6575	0.6870
10 Point	2002	0.4901	0.4890	0.4912
	2003	0.5090	0.5063	0.5118
	2004	0.5280	0.5237	0.5323
	2005	0.5469	0.5410	0.5528
	2006	0.5659	0.5584	0.5733
	2007	0.5848	0.5758	0.5939
	2008	0.6038	0.5931	0.6144
	2009	0.6227	0.6105	0.6349
	2010	0.6417	0.6278	0.6554
	2011	0.6606	0.6452	0.6759

INDEMNITY Expon'l FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
4 Point	2008	0.5561	0.5429	0.5687
	2009	0.6043	0.5917	0.6164
	2010	0.6567	0.6449	0.6680
	2011	0.7137	0.7029	0.7239
5 Point	2007	0.5421	0.5285	0.5555
	2008	0.5779	0.5647	0.5907
	2009	0.6161	0.6035	0.6282
	2010	0.6567	0.6449	0.6680
	2011	0.7001	0.6892	0.7103
6 Point	2006	0.5261	0.5167	0.5354
	2007	0.5556	0.5456	0.5655
	2008	0.5869	0.5761	0.5974
	2009	0.6199	0.6083	0.6310
	2010	0.6547	0.6423	0.6665
	2011	0.6915	0.6783	0.7040
7 Point	2005	0.5161	0.5092	0.5230
	2006	0.5407	0.5327	0.5485
	2007	0.5664	0.5574	0.5752
	2008	0.5933	0.5832	0.6032
	2009	0.6216	0.6102	0.6325
	2010	0.6511	0.6384	0.6633
	2011	0.6821	0.6680	0.6956
8 Point	2004	0.5016	0.4951	0.5081
	2005	0.5235	0.5163	0.5308
	2006	0.5465	0.5383	0.5546
	2007	0.5705	0.5613	0.5794
	2008	0.5955	0.5852	0.6054
	2009	0.6216	0.6102	0.6325
	2010	0.6488	0.6362	0.6608
	2011	0.6773	0.6634	0.6904
9 Point	2003	0.4933	0.4885	0.4983
	2004	0.5126	0.5068	0.5184
	2005	0.5325	0.5258	0.5393
	2006	0.5533	0.5455	0.5610
	2007	0.5749	0.5660	0.5836
	2008	0.5973	0.5872	0.6071
	2009	0.6206	0.6092	0.6316
	2010	0.6448	0.6320	0.6571
	2011	0.6700	0.6557	0.6835
10 Point	2002	0.4972	0.4950	0.4996
	2003	0.5129	0.5095	0.5163
	2004	0.5290	0.5245	0.5335
	2005	0.5456	0.5399	0.5513
	2006	0.5628	0.5557	0.5698
	2007	0.5805	0.5720	0.5888
	2008	0.5988	0.5887	0.6085
	2009	0.6176	0.6060	0.6288
	2010	0.6370	0.6237	0.6498
	2011	0.6571	0.6420	0.6715

MEDICAL Linear FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
4 Point	2008	1.2066	1.2423	1.1708
	2009	1.4972	1.5633	1.4311
	2010	1.7878	1.8843	1.6915
	2011	2.0784	2.2053	1.9518
5 Point	2007	1.0598	1.0795	1.0400
	2008	1.3024	1.3478	1.2572
	2009	1.5451	1.6160	1.4743
	2010	1.7878	1.8843	1.6915
	2011	2.0305	2.1525	1.9086
6 Point	2006	0.8896	0.8977	0.8815
	2007	1.1125	1.1424	1.0827
	2008	1.3354	1.3871	1.2838
	2009	1.5583	1.6317	1.4850
	2010	1.7812	1.8764	1.6861
	2011	2.0041	2.1211	1.8873
7 Point	2005	0.8063	0.8146	0.7979
	2006	0.9970	1.0220	0.9720
	2007	1.1877	1.2294	1.1460
	2008	1.3784	1.4368	1.3200
	2009	1.5690	1.6442	1.4940
	2010	1.7597	1.8516	1.6680
	2011	1.9504	2.0590	1.8421
8 Point	2004	0.7412	0.7531	0.7293
	2005	0.9068	0.9313	0.8822
	2006	1.0723	1.1095	1.0352
	2007	1.2379	1.2877	1.1881
	2008	1.4035	1.4659	1.3411
	2009	1.5690	1.6442	1.4940
	2010	1.7346	1.8224	1.6470
	2011	1.9002	2.0006	1.7999
9 Point	2003	0.6737	0.6878	0.6596
	2004	0.8220	0.8461	0.7978
	2005	0.9702	1.0044	0.9361
	2006	1.1185	1.1627	1.0744
	2007	1.2668	1.3210	1.2126
	2008	1.4150	1.4792	1.3509
	2009	1.5633	1.6375	1.4891
	2010	1.7115	1.7958	1.6274
	2011	1.8598	1.9541	1.7656
10 Point	2002	0.6496	0.6727	0.6265
	2003	0.7783	0.8083	0.7482
	2004	0.9069	0.9440	0.8698
	2005	1.0356	1.0797	0.9915
	2006	1.1642	1.2154	1.1131
	2007	1.2929	1.3511	1.2348
	2008	1.4215	1.4868	1.3564
	2009	1.5502	1.6225	1.4780
	2010	1.6789	1.7581	1.5997
	2011	1.8075	1.8938	1.7213

MEDICAL Expon'l FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
4 Point	2008	1.2346	1.2690	1.1989
	2009	1.4739	1.5336	1.4129
	2010	1.7595	1.8533	1.6652
	2011	2.1005	2.2397	1.9624
5 Point	2007	1.1054	1.1291	1.0814
	2008	1.2907	1.3319	1.2488
	2009	1.5069	1.5711	1.4420
	2010	1.7595	1.8533	1.6652
	2011	2.0543	2.1862	1.9228
6 Point	2006	0.9513	0.9671	0.9356
	2007	1.1093	1.1376	1.0807
	2008	1.2935	1.3382	1.2482
	2009	1.5083	1.5741	1.4418
	2010	1.7587	1.8516	1.6653
	2011	2.0507	2.1780	1.9235
7 Point	2005	0.8830	0.9008	0.8652
	2006	1.0110	1.0376	0.9843
	2007	1.1576	1.1950	1.1197
	2008	1.3254	1.3763	1.2738
	2009	1.5175	1.5852	1.4491
	2010	1.7374	1.8258	1.6485
	2011	1.9893	2.1028	1.8754
8 Point	2004	0.8289	0.8509	0.8070
	2005	0.9355	0.9636	0.9072
	2006	1.0557	1.0913	1.0199
	2007	1.1914	1.2359	1.1466
	2008	1.3446	1.3997	1.2890
	2009	1.5175	1.5852	1.4491
	2010	1.7126	1.7953	1.6291
	2011	1.9327	2.0332	1.8314
9 Point	2003	0.7711	0.7955	0.7467
	2004	0.8627	0.8918	0.8336
	2005	0.9653	0.9999	0.9306
	2006	1.0801	1.1210	1.0390
	2007	1.2086	1.2569	1.1599
	2008	1.3523	1.4091	1.2950
	2009	1.5131	1.5799	1.4457
	2010	1.6931	1.7713	1.6141
	2011	1.8944	1.9859	1.8020
10 Point	2002	0.7513	0.7830	0.7194
	2003	0.8292	0.8643	0.7939
	2004	0.9153	0.9541	0.8762
	2005	1.0103	1.0531	0.9670
	2006	1.1151	1.1625	1.0673
	2007	1.2308	1.2832	1.1779
	2008	1.3585	1.4165	1.3000
	2009	1.4994	1.5636	1.4347
	2010	1.6550	1.7259	1.5834
	2011	1.8268	1.9052	1.7475

INDEMNITY Linear RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
4 Point	2008	0.0197	0.0016	0.0376
	2009	0.0091	0.0284	-0.0099
	2010	-0.0773	-0.0617	-0.0930
	2011	0.0485	0.0316	0.0653
5 Point	2007	0.0271	0.0259	0.0283
	2008	-0.0074	-0.0243	0.0093
	2009	-0.0044	0.0155	-0.0240
	2010	-0.0773	-0.0617	-0.0930
	2011	0.0620	0.0446	0.0794
6 Point	2006	0.0230	0.0265	0.0195
	2007	0.0087	0.0046	0.0127
	2008	-0.0189	-0.0375	-0.0004
	2009	-0.0090	0.0102	-0.0279
	2010	-0.0750	-0.0590	-0.0911
	2011	0.0712	0.0552	0.0872
7 Point	2005	0.0285	0.0297	0.0271
	2006	0.0040	0.0067	0.0014
	2007	-0.0046	-0.0092	0.0000
	2008	-0.0265	-0.0455	-0.0076
	2009	-0.0109	0.0082	-0.0297
	2010	-0.0712	-0.0550	-0.0875
	2011	0.0807	0.0651	0.0963
8 Point	2004	0.0201	0.0186	0.0216
	2005	0.0170	0.0191	0.0147
	2006	-0.0046	-0.0013	-0.0078
	2007	-0.0104	-0.0145	-0.0061
	2008	-0.0294	-0.0481	-0.0107
	2009	-0.0109	0.0082	-0.0297
	2010	-0.0683	-0.0524	-0.0844
	2011	0.0865	0.0704	0.1024
	9 Point	2003	0.0296	0.0300
2004		0.0053	0.0036	0.0071
2005		0.0054	0.0073	0.0033
2006		-0.0130	-0.0098	-0.0162
2007		-0.0157	-0.0199	-0.0113
2008		-0.0315	-0.0503	-0.0128
2009		-0.0099	0.0093	-0.0287
2010		-0.0641	-0.0481	-0.0802
2011		0.0939	0.0779	0.1097
10 Point	2002	0.0526	0.0553	0.0498
	2003	0.0062	0.0055	0.0069
	2004	-0.0137	-0.0164	-0.0109
	2005	-0.0092	-0.0080	-0.0105
	2006	-0.0233	-0.0206	-0.0258
	2007	-0.0215	-0.0261	-0.0169
	2008	-0.0330	-0.0518	-0.0142
	2009	-0.0069	0.0123	-0.0259
	2010	-0.0568	-0.0404	-0.0733
	2011	0.1056	0.0902	0.1208

INDEMNITY Expon'l RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
4 Point	2008	0.0147	-0.0016	0.0315
	2009	0.0115	0.0311	-0.0074
	2010	-0.0718	-0.0575	-0.0859
	2011	0.0525	0.0325	0.0728
5 Point	2007	0.0212	0.0212	0.0215
	2008	-0.0071	-0.0234	0.0095
	2009	-0.0003	0.0193	-0.0192
	2010	-0.0718	-0.0575	-0.0859
	2011	0.0661	0.0462	0.0864
6 Point	2006	0.0165	0.0211	0.0121
	2007	0.0077	0.0041	0.0115
	2008	-0.0161	-0.0348	0.0028
	2009	-0.0041	0.0145	-0.0220
	2010	-0.0698	-0.0549	-0.0844
	2011	0.0747	0.0571	0.0927
7 Point	2005	0.0216	0.0238	0.0193
	2006	0.0019	0.0051	-0.0010
	2007	-0.0031	-0.0077	0.0018
	2008	-0.0225	-0.0419	-0.0030
	2009	-0.0058	0.0126	-0.0235
	2010	-0.0662	-0.0510	-0.0812
	2011	0.0841	0.0674	0.1011
8 Point	2004	0.0127	0.0122	0.0133
	2005	0.0142	0.0167	0.0115
	2006	-0.0039	-0.0005	-0.0071
	2007	-0.0072	-0.0116	-0.0024
	2008	-0.0247	-0.0439	-0.0052
	2009	-0.0058	0.0126	-0.0235
	2010	-0.0639	-0.0488	-0.0787
	2011	0.0889	0.0720	0.1063
	9 Point	2003	0.0219	0.0233
2004		0.0017	0.0005	0.0030
2005		0.0052	0.0072	0.0030
2006		-0.0107	-0.0077	-0.0135
2007		-0.0116	-0.0163	-0.0066
2008		-0.0265	-0.0459	-0.0069
2009		-0.0048	0.0136	-0.0226
2010		-0.0599	-0.0446	-0.0750
2011		0.0962	0.0797	0.1132
10 Point	2002	0.0455	0.0493	0.0414
	2003	0.0023	0.0023	0.0024
	2004	-0.0147	-0.0172	-0.0121
	2005	-0.0079	-0.0069	-0.0090
	2006	-0.0202	-0.0179	-0.0223
	2007	-0.0172	-0.0223	-0.0118
	2008	-0.0280	-0.0474	-0.0083
	2009	-0.0018	0.0168	-0.0198
	2010	-0.0521	-0.0363	-0.0677
	2011	0.1091	0.0934	0.1252

MEDICAL Linear RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
4 Point	2008	0.0462	0.0198	0.0726
	2009	-0.0564	-0.0299	-0.0829
	2010	-0.0258	0.0003	-0.0519
	2011	0.0360	0.0097	0.0622
5 Point	2007	0.0958	0.1055	0.0864
	2008	-0.0496	-0.0857	-0.0138
	2009	-0.1043	-0.0826	-0.1261
	2010	-0.0258	0.0003	-0.0519
	2011	0.0839	0.0625	0.1054
6 Point	2006	0.0659	0.0786	0.0533
	2007	0.0431	0.0426	0.0437
	2008	-0.0826	-0.1250	-0.0404
	2009	-0.1175	-0.0983	-0.1368
	2010	-0.0192	0.0082	-0.0465
	2011	0.1103	0.0939	0.1267
7 Point	2005	0.1611	0.1864	0.1357
	2006	-0.0415	-0.0457	-0.0372
	2007	-0.0321	-0.0444	-0.0196
	2008	-0.1256	-0.1747	-0.0766
	2009	-0.1282	-0.1108	-0.1458
	2010	0.0023	0.0330	-0.0284
	2011	0.1640	0.1561	0.1719
8 Point	2004	0.1758	0.2042	0.1475
	2005	0.0606	0.0697	0.0514
	2006	-0.1168	-0.1332	-0.1004
	2007	-0.0823	-0.1027	-0.0617
	2008	-0.1507	-0.2038	-0.0977
	2009	-0.1282	-0.1108	-0.1458
	2010	0.0274	0.0622	-0.0074
	2011	0.2142	0.2144	0.2141
9 Point	2003	0.1616	0.1861	0.1371
	2004	0.0950	0.1112	0.0790
	2005	-0.0028	-0.0034	-0.0025
	2006	-0.1630	-0.1864	-0.1396
	2007	-0.1112	-0.1360	-0.0862
	2008	-0.1622	-0.2171	-0.1075
	2009	-0.1225	-0.1041	-0.1409
	2010	0.0505	0.0888	0.0122
	2011	0.2546	0.2609	0.2484
10 Point	2002	0.2353	0.2711	0.1994
	2003	0.0570	0.0656	0.0485
	2004	0.0101	0.0133	0.0070
	2005	-0.0682	-0.0787	-0.0579
	2006	-0.2087	-0.2391	-0.1783
	2007	-0.1373	-0.1661	-0.1084
	2008	-0.1687	-0.2247	-0.1130
	2009	-0.1094	-0.0891	-0.1298
	2010	0.0831	0.1265	0.0399
	2011	0.3069	0.3212	0.2927

MEDICAL Expon'l RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-23)
4 Point	2008	0.0182	-0.0069	0.0445
	2009	-0.0331	-0.0002	-0.0647
	2010	0.0025	0.0313	-0.0256
	2011	0.0139	-0.0247	0.0516
5 Point	2007	0.0502	0.0559	0.0450
	2008	-0.0379	-0.0698	-0.0054
	2009	-0.0661	-0.0377	-0.0938
	2010	0.0025	0.0313	-0.0256
	2011	0.0601	0.0288	0.0912
6 Point	2006	0.0042	0.0092	-0.0008
	2007	0.0463	0.0474	0.0457
	2008	-0.0407	-0.0761	-0.0048
	2009	-0.0675	-0.0407	-0.0936
	2010	0.0033	0.0330	-0.0257
	2011	0.0637	0.0370	0.0905
7 Point	2005	0.0844	0.1002	0.0684
	2006	-0.0555	-0.0613	-0.0495
	2007	-0.0020	-0.0100	0.0067
	2008	-0.0726	-0.1142	-0.0304
	2009	-0.0767	-0.0518	-0.1009
	2010	0.0246	0.0588	-0.0089
	2011	0.1251	0.1122	0.1386
8 Point	2004	0.0881	0.1064	0.0698
	2005	0.0319	0.0374	0.0264
	2006	-0.1002	-0.1150	-0.0851
	2007	-0.0358	-0.0509	-0.0202
	2008	-0.0918	-0.1376	-0.0456
	2009	-0.0767	-0.0518	-0.1009
	2010	0.0494	0.0893	0.0105
	2011	0.1817	0.1818	0.1826
9 Point	2003	0.0642	0.0784	0.0500
	2004	0.0543	0.0655	0.0432
	2005	0.0021	0.0011	0.0030
	2006	-0.1246	-0.1447	-0.1042
	2007	-0.0530	-0.0719	-0.0335
	2008	-0.0995	-0.1470	-0.0516
	2009	-0.0723	-0.0465	-0.0975
	2010	0.0689	0.1133	0.0255
	2011	0.2200	0.2291	0.2120
10 Point	2002	0.1336	0.1608	0.1065
	2003	0.0061	0.0096	0.0028
	2004	0.0017	0.0032	0.0006
	2005	-0.0429	-0.0521	-0.0334
	2006	-0.1596	-0.1862	-0.1325
	2007	-0.0752	-0.0982	-0.0515
	2008	-0.1057	-0.1544	-0.0566
	2009	-0.0586	-0.0302	-0.0865
	2010	0.1070	0.1587	0.0562
	2011	0.2876	0.3098	0.2665