

DELAWARE COMPENSATION RATING BUREAU, INC.

Measures of Goodness of Fit in Trend Calculations Using Severity Ratios – Unlimited 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-26)
r ²				
4 Point	Linear	0.984	0.989	0.965
5 Point	Linear	0.978	0.973	0.971
6 Point	Linear	0.898	0.780	0.945
7 Point	Linear	0.911	0.834	0.936
8 Point	Linear	0.895	0.814	0.924
9 Point	Linear	0.880	0.819	0.899
10 Point	Linear	0.877	0.836	0.885
4 Point	Expon'l	0.985	0.984	0.968
5 Point	Expon'l	0.985	0.976	0.980
6 Point	Expon'l	0.908	0.772	0.961
7 Point	Expon'l	0.929	0.838	0.960
8 Point	Expon'l	0.919	0.823	0.953
9 Point	Expon'l	0.909	0.836	0.933
10 Point	Expon'l	0.912	0.860	0.925

MEDICAL		(Average)	(Incur)	(Pd-26)
r ²				
4 Point	Linear	0.898	0.829	0.962
5 Point	Linear	0.798	0.699	0.891
6 Point	Linear	0.878	0.788	0.937
7 Point	Linear	0.919	0.848	0.960
8 Point	Linear	0.939	0.878	0.972
9 Point	Linear	0.953	0.903	0.979
10 Point	Linear	0.949	0.902	0.974
4 Point	Expon'l	0.927	0.866	0.977
5 Point	Expon'l	0.827	0.728	0.912
6 Point	Expon'l	0.900	0.835	0.932
7 Point	Expon'l	0.937	0.896	0.953
8 Point	Expon'l	0.958	0.928	0.967
9 Point	Expon'l	0.969	0.950	0.974
10 Point	Expon'l	0.974	0.955	0.979

INDEMNITY Linear FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-26)
4 Point	2011	0.4889	0.4539	0.5238
	2012	0.5437	0.5013	0.5860
	2013	0.5984	0.5487	0.6482
	2014	0.6532	0.5962	0.7104
5 Point	2010	0.4508	0.4245	0.4771
	2011	0.5000	0.4659	0.5341
	2012	0.5492	0.5073	0.5912
	2013	0.5984	0.5487	0.6482
	2014	0.6476	0.5902	0.7053
6 Point	2009	0.4392	0.4289	0.4494
	2010	0.4782	0.4578	0.4984
	2011	0.5171	0.4867	0.5475
	2012	0.5561	0.5157	0.5965
	2013	0.5950	0.5446	0.6456
	2014	0.6340	0.5735	0.6946
7 Point	2008	0.4143	0.4061	0.4223
	2009	0.4500	0.4336	0.4663
	2010	0.4857	0.4611	0.5103
	2011	0.5214	0.4886	0.5542
	2012	0.5572	0.5161	0.5982
	2013	0.5929	0.5436	0.6422
	2014	0.6286	0.5711	0.6861
8 Point	2007	0.3992	0.3975	0.4009
	2008	0.4308	0.4212	0.4403
	2009	0.4624	0.4449	0.4798
	2010	0.4940	0.4687	0.5193
	2011	0.5256	0.4924	0.5587
	2012	0.5572	0.5161	0.5982
	2013	0.5887	0.5399	0.6377
	2014	0.6203	0.5636	0.6771
9 Point	2006	0.3867	0.3865	0.3869
	2007	0.4149	0.4080	0.4219
	2008	0.4431	0.4294	0.4568
	2009	0.4714	0.4509	0.4918
	2010	0.4996	0.4724	0.5268
	2011	0.5278	0.4939	0.5617
	2012	0.5560	0.5154	0.5967
	2013	0.5843	0.5369	0.6317
	2014	0.6125	0.5584	0.6666
10 Point	2005	0.3734	0.3737	0.3731
	2006	0.3993	0.3938	0.4048
	2007	0.4251	0.4139	0.4364
	2008	0.4510	0.4340	0.4680
	2009	0.4769	0.4541	0.4996
	2010	0.5027	0.4742	0.5312
	2011	0.5286	0.4944	0.5629
	2012	0.5545	0.5145	0.5945
	2013	0.5803	0.5346	0.6261
	2014	0.6062	0.5547	0.6577

INDEMNITY Expon'l FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-26)
4 Point	2011	0.4914	0.4554	0.5272
	2012	0.5410	0.4990	0.5830
	2013	0.5957	0.5467	0.6447
	2014	0.6559	0.5989	0.7129
5 Point	2010	0.4556	0.4280	0.4831
	2011	0.4982	0.4644	0.5319
	2012	0.5448	0.5039	0.5856
	2013	0.5957	0.5467	0.6447
	2014	0.6514	0.5931	0.7098
6 Point	2009	0.4455	0.4327	0.4580
	2010	0.4783	0.4578	0.4984
	2011	0.5136	0.4843	0.5423
	2012	0.5514	0.5124	0.5902
	2013	0.5921	0.5421	0.6422
	2014	0.6357	0.5735	0.6989
7 Point	2008	0.4220	0.4109	0.4331
	2009	0.4514	0.4343	0.4682
	2010	0.4827	0.4590	0.5061
	2011	0.5163	0.4850	0.5471
	2012	0.5522	0.5126	0.5915
	2013	0.5905	0.5417	0.6394
	2014	0.6316	0.5725	0.6912
8 Point	2007	0.4082	0.4031	0.4136
	2008	0.4337	0.4229	0.4443
	2009	0.4607	0.4438	0.4772
	2010	0.4893	0.4656	0.5126
	2011	0.5198	0.4885	0.5506
	2012	0.5522	0.5126	0.5915
	2013	0.5866	0.5378	0.6353
	2014	0.6231	0.5643	0.6825
9 Point	2006	0.3967	0.3928	0.4010
	2007	0.4191	0.4105	0.4277
	2008	0.4427	0.4290	0.4561
	2009	0.4676	0.4484	0.4865
	2010	0.4939	0.4687	0.5188
	2011	0.5218	0.4898	0.5533
	2012	0.5511	0.5119	0.5901
	2013	0.5822	0.5350	0.6293
	2014	0.6150	0.5592	0.6711
10 Point	2005	0.3844	0.3807	0.3885
	2006	0.4046	0.3971	0.4122
	2007	0.4258	0.4142	0.4374
	2008	0.4481	0.4320	0.4640
	2009	0.4716	0.4506	0.4923
	2010	0.4964	0.4699	0.5224
	2011	0.5224	0.4901	0.5542
	2012	0.5498	0.5112	0.5880
	2013	0.5786	0.5332	0.6239
	2014	0.6090	0.5561	0.6619

MEDICAL Linear FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-26)
4 Point	2011	1.2114	1.0582	1.3647
	2012	1.4003	1.2638	1.5369
	2013	1.5891	1.4693	1.7091
	2014	1.7780	1.6749	1.8813
5 Point	2010	1.1790	1.0469	1.3110
	2011	1.3157	1.1877	1.4437
	2012	1.4524	1.3285	1.5764
	2013	1.5891	1.4693	1.7091
	2014	1.7259	1.6101	1.8418
6 Point	2009	1.0311	0.9269	1.1351
	2010	1.1708	1.0621	1.2796
	2011	1.3106	1.1972	1.4241
	2012	1.4504	1.3323	1.5686
	2013	1.5902	1.4674	1.7131
	2014	1.7299	1.6026	1.8575
7 Point	2008	0.8937	0.8069	0.9803
	2009	1.0329	0.9385	1.1272
	2010	1.1721	1.0702	1.2741
	2011	1.3113	1.2018	1.4209
	2012	1.4506	1.3335	1.5678
	2013	1.5898	1.4651	1.7146
	2014	1.7290	1.5968	1.8615
8 Point	2007	0.7770	0.7095	0.8444
	2008	0.9117	0.8343	0.9891
	2009	1.0464	0.9591	1.1337
	2010	1.1811	1.0839	1.2784
	2011	1.3159	1.2087	1.4231
	2012	1.4506	1.3335	1.5678
	2013	1.5853	1.4583	1.7125
	2014	1.7200	1.5831	1.8571
9 Point	2006	0.6616	0.6104	0.7127
	2007	0.7929	0.7307	0.8551
	2008	0.9242	0.8509	0.9975
	2009	1.0555	0.9712	1.1398
	2010	1.1868	1.0914	1.2822
	2011	1.3181	1.2117	1.4246
	2012	1.4494	1.3320	1.5670
	2013	1.5807	1.4522	1.7094
	2014	1.7120	1.5725	1.8518
10 Point	2005	0.5833	0.5462	0.6204
	2006	0.7063	0.6576	0.7549
	2007	0.8292	0.7690	0.8894
	2008	0.9521	0.8804	1.0238
	2009	1.0751	0.9918	1.1583
	2010	1.1980	1.1032	1.2928
	2011	1.3209	1.2147	1.4273
	2012	1.4439	1.3261	1.5617
	2013	1.5668	1.4375	1.6962
	2014	1.6897	1.5489	1.8307

MEDICAL Expon'l FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-26)
4 Point	2011	1.2298	1.0844	1.3768
	2012	1.3908	1.2521	1.5291
	2013	1.5729	1.4457	1.6983
	2014	1.7789	1.6692	1.8862
5 Point	2010	1.2010	1.0750	1.3278
	2011	1.3140	1.1866	1.4413
	2012	1.4377	1.3097	1.5645
	2013	1.5729	1.4457	1.6983
	2014	1.7209	1.5957	1.8435
6 Point	2009	1.0568	0.9592	1.1548
	2010	1.1683	1.0631	1.2734
	2011	1.2915	1.1784	1.4041
	2012	1.4278	1.3061	1.5482
	2013	1.5784	1.4477	1.7072
	2014	1.7449	1.6046	1.8825
7 Point	2008	0.9278	0.8460	1.0099
	2009	1.0328	0.9427	1.1229
	2010	1.1496	1.0503	1.2487
	2011	1.2797	1.1702	1.3885
	2012	1.4245	1.3038	1.5439
	2013	1.5856	1.4527	1.7168
	2014	1.7650	1.6186	1.9090
8 Point	2007	0.8231	0.7586	0.8877
	2008	0.9185	0.8454	0.9916
	2009	1.0250	0.9421	1.1076
	2010	1.1438	1.0499	1.2373
	2011	1.2765	1.1700	1.3821
	2012	1.4245	1.3038	1.5439
	2013	1.5897	1.4530	1.7246
	2014	1.7740	1.6192	1.9265
9 Point	2006	0.7205	0.6700	0.7712
	2007	0.8074	0.7487	0.8660
	2008	0.9047	0.8367	0.9725
	2009	1.0138	0.9351	1.0921
	2010	1.1360	1.0450	1.2264
	2011	1.2730	1.1678	1.3773
	2012	1.4264	1.3051	1.5466
	2013	1.5984	1.4584	1.7369
	2014	1.7911	1.6299	1.9505
10 Point	2005	0.6568	0.6173	0.6965
	2006	0.7335	0.6866	0.7804
	2007	0.8192	0.7638	0.8744
	2008	0.9149	0.8497	0.9798
	2009	1.0218	0.9452	1.0978
	2010	1.1411	1.0514	1.2301
	2011	1.2744	1.1696	1.3783
	2012	1.4233	1.3011	1.5443
	2013	1.5895	1.4473	1.7304
	2014	1.7752	1.6100	1.9389

INDEMNITY Linear RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-26)
4 Point	2011	0.0051	-0.0020	0.0123
	2012	-0.0119	-0.0016	-0.0222
	2013	0.0084	0.0092	0.0076
	2014	-0.0016	-0.0056	0.0024
5 Point	2010	0.0112	0.0120	0.0103
	2011	-0.0060	-0.0140	0.0020
	2012	-0.0174	-0.0076	-0.0274
	2013	0.0084	0.0092	0.0076
	2014	0.0040	0.0004	0.0075
6 Point	2009	0.0342	0.0417	0.0267
	2010	-0.0162	-0.0213	-0.0110
	2011	-0.0231	-0.0348	-0.0114
	2012	-0.0243	-0.0160	-0.0327
	2013	0.0118	0.0133	0.0102
	2014	0.0176	0.0171	0.0182
7 Point	2008	0.0161	0.0071	0.0254
	2009	0.0234	0.0370	0.0098
	2010	-0.0237	-0.0246	-0.0229
	2011	-0.0274	-0.0367	-0.0181
	2012	-0.0254	-0.0164	-0.0344
	2013	0.0139	0.0143	0.0136
	2014	0.0230	0.0195	0.0267
8 Point	2007	0.0289	0.0264	0.0315
	2008	-0.0004	-0.0080	0.0074
	2009	0.0110	0.0257	-0.0037
	2010	-0.0320	-0.0322	-0.0319
	2011	-0.0316	-0.0405	-0.0226
	2012	-0.0254	-0.0164	-0.0344
	2013	0.0181	0.0180	0.0181
	2014	0.0313	0.0270	0.0357
9 Point	2006	0.0314	0.0209	0.0420
	2007	0.0132	0.0159	0.0105
	2008	-0.0127	-0.0162	-0.0091
	2009	0.0020	0.0197	-0.0157
	2010	-0.0376	-0.0359	-0.0394
	2011	-0.0338	-0.0420	-0.0256
	2012	-0.0242	-0.0157	-0.0329
	2013	0.0225	0.0210	0.0241
	2014	0.0391	0.0322	0.0462
10 Point	2005	0.0283	0.0165	0.0402
	2006	0.0188	0.0136	0.0241
	2007	0.0030	0.0100	-0.0040
	2008	-0.0206	-0.0208	-0.0203
	2009	-0.0035	0.0165	-0.0235
	2010	-0.0407	-0.0377	-0.0438
	2011	-0.0346	-0.0425	-0.0268
	2012	-0.0227	-0.0148	-0.0307
	2013	0.0265	0.0233	0.0297
	2014	0.0454	0.0359	0.0551

INDEMNITY Expon'l RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-26)
4 Point	2011	0.0026	-0.0035	0.0089
	2012	-0.0092	0.0007	-0.0192
	2013	0.0111	0.0112	0.0111
	2014	-0.0043	-0.0083	-0.0001
5 Point	2010	0.0064	0.0085	0.0043
	2011	-0.0042	-0.0125	0.0042
	2012	-0.0130	-0.0042	-0.0218
	2013	0.0111	0.0112	0.0111
	2014	0.0002	-0.0025	0.0030
6 Point	2009	0.0279	0.0379	0.0181
	2010	-0.0163	-0.0213	-0.0110
	2011	-0.0196	-0.0324	-0.0062
	2012	-0.0196	-0.0127	-0.0264
	2013	0.0147	0.0158	0.0136
	2014	0.0159	0.0171	0.0139
7 Point	2008	0.0084	0.0023	0.0146
	2009	0.0220	0.0363	0.0079
	2010	-0.0207	-0.0225	-0.0187
	2011	-0.0223	-0.0331	-0.0110
	2012	-0.0204	-0.0129	-0.0277
	2013	0.0163	0.0162	0.0164
	2014	0.0200	0.0181	0.0216
8 Point	2007	0.0199	0.0208	0.0188
	2008	-0.0033	-0.0097	0.0034
	2009	0.0127	0.0268	-0.0011
	2010	-0.0273	-0.0291	-0.0252
	2011	-0.0258	-0.0366	-0.0145
	2012	-0.0204	-0.0129	-0.0277
	2013	0.0202	0.0201	0.0205
	2014	0.0285	0.0263	0.0303
9 Point	2006	0.0214	0.0146	0.0279
	2007	0.0090	0.0134	0.0047
	2008	-0.0123	-0.0158	-0.0084
	2009	0.0058	0.0222	-0.0104
	2010	-0.0319	-0.0322	-0.0314
	2011	-0.0278	-0.0379	-0.0172
	2012	-0.0193	-0.0122	-0.0263
	2013	0.0246	0.0229	0.0265
	2014	0.0366	0.0314	0.0417
10 Point	2005	0.0173	0.0095	0.0248
	2006	0.0135	0.0103	0.0167
	2007	0.0023	0.0097	-0.0050
	2008	-0.0177	-0.0188	-0.0163
	2009	0.0018	0.0200	-0.0162
	2010	-0.0344	-0.0334	-0.0350
	2011	-0.0284	-0.0382	-0.0181
	2012	-0.0180	-0.0115	-0.0242
	2013	0.0282	0.0247	0.0319
	2014	0.0426	0.0345	0.0509

MEDICAL Linear RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-26)
4 Point	2011	0.0583	0.0808	0.0358
	2012	-0.0394	-0.0476	-0.0311
	2013	-0.0962	-0.1472	-0.0451
	2014	0.0773	0.1140	0.0405
5 Point	2010	0.1043	0.1295	0.0790
	2011	-0.0460	-0.0487	-0.0432
	2012	-0.0915	-0.1123	-0.0706
	2013	-0.0962	-0.1472	-0.0451
	2014	0.1294	0.1788	0.0800
6 Point	2009	-0.0102	0.0190	-0.0392
	2010	0.1125	0.1143	0.1104
	2011	-0.0409	-0.0582	-0.0236
	2012	-0.0895	-0.1161	-0.0628
	2013	-0.0973	-0.1453	-0.0491
	2014	0.1254	0.1863	0.0643
7 Point	2008	0.0027	0.0174	-0.0119
	2009	-0.0120	0.0074	-0.0313
	2010	0.1112	0.1062	0.1160
	2011	-0.0416	-0.0628	-0.0204
	2012	-0.0897	-0.1173	-0.0620
	2013	-0.0969	-0.1430	-0.0506
	2014	0.1263	0.1921	0.0603
8 Point	2007	0.0316	0.0480	0.0153
	2008	-0.0153	-0.0100	-0.0207
	2009	-0.0255	-0.0132	-0.0378
	2010	0.1022	0.0925	0.1116
	2011	-0.0462	-0.0697	-0.0226
	2012	-0.0897	-0.1173	-0.0620
	2013	-0.0924	-0.1362	-0.0485
	2014	0.1353	0.2059	0.0647
9 Point	2006	0.0318	0.0423	0.0213
	2007	0.0157	0.0268	0.0046
	2008	-0.0278	-0.0266	-0.0290
	2009	-0.0346	-0.0253	-0.0439
	2010	0.0965	0.0850	0.1078
	2011	-0.0484	-0.0727	-0.0241
	2012	-0.0885	-0.1158	-0.0612
	2013	-0.0878	-0.1301	-0.0454
	2014	0.1433	0.2164	0.0700
10 Point	2005	0.1005	0.1061	0.0950
	2006	-0.0129	-0.0049	-0.0209
	2007	-0.0206	-0.0115	-0.0297
	2008	-0.0557	-0.0561	-0.0554
	2009	-0.0542	-0.0459	-0.0624
	2010	0.0853	0.0732	0.0972
	2011	-0.0512	-0.0757	-0.0268
	2012	-0.0830	-0.1099	-0.0559
	2013	-0.0739	-0.1154	-0.0322
	2014	0.1656	0.2400	0.0911

MEDICAL Expon'l RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-26)
4 Point	2011	0.0399	0.0546	0.0237
	2012	-0.0299	-0.0359	-0.0233
	2013	-0.0800	-0.1236	-0.0343
	2014	0.0764	0.1197	0.0356
5 Point	2010	0.0823	0.1014	0.0622
	2011	-0.0443	-0.0476	-0.0408
	2012	-0.0768	-0.0935	-0.0587
	2013	-0.0800	-0.1236	-0.0343
	2014	0.1344	0.1932	0.0783
6 Point	2009	-0.0359	-0.0133	-0.0589
	2010	0.1150	0.1133	0.1166
	2011	-0.0218	-0.0394	-0.0036
	2012	-0.0669	-0.0899	-0.0424
	2013	-0.0855	-0.1256	-0.0432
	2014	0.1104	0.1843	0.0393
7 Point	2008	-0.0314	-0.0217	-0.0415
	2009	-0.0119	0.0032	-0.0270
	2010	0.1337	0.1261	0.1413
	2011	-0.0100	-0.0312	0.0120
	2012	-0.0636	-0.0876	-0.0381
	2013	-0.0927	-0.1306	-0.0528
	2014	0.0903	0.1703	0.0128
8 Point	2007	-0.0145	-0.0011	-0.0280
	2008	-0.0221	-0.0211	-0.0232
	2009	-0.0041	0.0038	-0.0117
	2010	0.1395	0.1265	0.1527
	2011	-0.0068	-0.0310	0.0184
	2012	-0.0636	-0.0876	-0.0381
	2013	-0.0968	-0.1309	-0.0606
	2014	0.0813	0.1697	-0.0047
9 Point	2006	-0.0271	-0.0173	-0.0372
	2007	0.0012	0.0088	-0.0063
	2008	-0.0083	-0.0124	-0.0041
	2009	0.0071	0.0108	0.0038
	2010	0.1473	0.1314	0.1636
	2011	-0.0033	-0.0288	0.0232
	2012	-0.0655	-0.0889	-0.0408
	2013	-0.1055	-0.1363	-0.0729
	2014	0.0642	0.1590	-0.0287
10 Point	2005	0.0270	0.0350	0.0189
	2006	-0.0401	-0.0339	-0.0464
	2007	-0.0106	-0.0063	-0.0147
	2008	-0.0185	-0.0254	-0.0114
	2009	-0.0009	0.0007	-0.0019
	2010	0.1422	0.1250	0.1599
	2011	-0.0047	-0.0306	0.0222
	2012	-0.0624	-0.0849	-0.0385
	2013	-0.0966	-0.1252	-0.0664
	2014	0.0801	0.1789	-0.0171