

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-22)
r ²				
4 Point	Linear	0.875	0.838	0.800
5 Point	Linear	0.913	0.868	0.879
6 Point	Linear	0.879	0.852	0.844
7 Point	Linear	0.923	0.908	0.890
8 Point	Linear	0.860	0.829	0.851
9 Point	Linear	0.825	0.795	0.819
10 Point	Linear	0.755	0.708	0.772
4 Point	Expon'l	0.883	0.833	0.810
5 Point	Expon'l	0.924	0.872	0.892
6 Point	Expon'l	0.893	0.861	0.859
7 Point	Expon'l	0.933	0.911	0.906
8 Point	Expon'l	0.869	0.829	0.866
9 Point	Expon'l	0.835	0.797	0.836
10 Point	Expon'l	0.763	0.707	0.788

MEDICAL		(Average)	(Incur)	(Pd-22)
r ²				
4 Point	Linear	0.842	0.818	0.873
5 Point	Linear	0.890	0.865	0.918
6 Point	Linear	0.864	0.837	0.894
7 Point	Linear	0.849	0.831	0.869
8 Point	Linear	0.848	0.829	0.867
9 Point	Linear	0.836	0.821	0.853
10 Point	Linear	0.840	0.823	0.859
4 Point	Expon'l	0.880	0.856	0.908
5 Point	Expon'l	0.935	0.918	0.953
6 Point	Expon'l	0.918	0.899	0.938
7 Point	Expon'l	0.913	0.904	0.921
8 Point	Expon'l	0.921	0.912	0.929
9 Point	Expon'l	0.916	0.911	0.921
10 Point	Expon'l	0.928	0.921	0.935

INDEMNITY Linear FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-22)
4 Point	2007	0.6165	0.6064	0.6266
	2008	0.6468	0.6384	0.6553
	2009	0.6772	0.6704	0.6839
	2010	0.7075	0.7024	0.7126
5 Point	2006	0.5944	0.5870	0.6017
	2007	0.6220	0.6148	0.6291
	2008	0.6496	0.6426	0.6565
	2009	0.6772	0.6704	0.6839
	2010	0.7048	0.6982	0.7113
6 Point	2005	0.5842	0.5757	0.5926
	2006	0.6070	0.5990	0.6150
	2007	0.6299	0.6223	0.6374
	2008	0.6527	0.6456	0.6598
	2009	0.6756	0.6689	0.6823
	2010	0.6984	0.6922	0.7047
7 Point	2004	0.5589	0.5451	0.5728
	2005	0.5823	0.5701	0.5946
	2006	0.6057	0.5951	0.6164
	2007	0.6291	0.6201	0.6382
	2008	0.6525	0.6450	0.6600
	2009	0.6759	0.6700	0.6819
	2010	0.6993	0.6950	0.7037
8 Point	2003	0.5553	0.5434	0.5673
	2004	0.5748	0.5637	0.5859
	2005	0.5942	0.5840	0.6044
	2006	0.6137	0.6044	0.6230
	2007	0.6331	0.6247	0.6415
	2008	0.6525	0.6450	0.6600
	2009	0.6720	0.6654	0.6786
	2010	0.6914	0.6857	0.6971
	9 Point	2002	0.5510	0.5392
2003		0.5678	0.5567	0.5790
2004		0.5846	0.5742	0.5950
2005		0.6013	0.5917	0.6111
2006		0.6181	0.6091	0.6271
2007		0.6349	0.6266	0.6432
2008		0.6517	0.6441	0.6592
2009		0.6684	0.6616	0.6753
2010		0.6852	0.6790	0.6913
10 Point		2001	0.5517	0.5419
	2002	0.5657	0.5562	0.5753
	2003	0.5797	0.5705	0.5890
	2004	0.5938	0.5848	0.6027
	2005	0.6078	0.5991	0.6165
	2006	0.6218	0.6134	0.6302
	2007	0.6358	0.6277	0.6439
	2008	0.6498	0.6420	0.6577
	2009	0.6638	0.6563	0.6714
	2010	0.6778	0.6705	0.6851

INDEMNITY Expon'l FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-22)
4 Point	2007	0.6177	0.6075	0.6278
	2008	0.6463	0.6376	0.6548
	2009	0.6761	0.6692	0.6829
	2010	0.7074	0.7024	0.7122
5 Point	2006	0.5960	0.5887	0.6032
	2007	0.6216	0.6144	0.6287
	2008	0.6483	0.6412	0.6552
	2009	0.6761	0.6692	0.6829
	2010	0.7052	0.6984	0.7117
6 Point	2005	0.5863	0.5779	0.5946
	2006	0.6072	0.5992	0.6152
	2007	0.6289	0.6212	0.6364
	2008	0.6513	0.6441	0.6584
	2009	0.6746	0.6678	0.6812
	2010	0.6987	0.6923	0.7048
7 Point	2004	0.5615	0.5477	0.5752
	2005	0.5826	0.5701	0.5950
	2006	0.6045	0.5935	0.6154
	2007	0.6273	0.6179	0.6366
	2008	0.6509	0.6432	0.6585
	2009	0.6754	0.6696	0.6811
	2010	0.7008	0.6970	0.7045
8 Point	2003	0.5582	0.5463	0.5701
	2004	0.5756	0.5644	0.5867
	2005	0.5936	0.5832	0.6039
	2006	0.6121	0.6025	0.6216
	2007	0.6312	0.6225	0.6398
	2008	0.6509	0.6432	0.6585
	2009	0.6712	0.6645	0.6777
	2010	0.6922	0.6866	0.6976
	9 Point	2002	0.5541	0.5425
2003		0.5691	0.5580	0.5802
2004		0.5844	0.5739	0.5949
2005		0.6002	0.5903	0.6100
2006		0.6163	0.6071	0.6255
2007		0.6329	0.6244	0.6414
2008		0.6500	0.6422	0.6577
2009		0.6675	0.6605	0.6743
2010		0.6855	0.6794	0.6914
10 Point		2001	0.5548	0.5451
	2002	0.5673	0.5577	0.5768
	2003	0.5800	0.5707	0.5893
	2004	0.5930	0.5839	0.6021
	2005	0.6063	0.5974	0.6152
	2006	0.6200	0.6113	0.6285
	2007	0.6339	0.6255	0.6421
	2008	0.6481	0.6400	0.6561
	2009	0.6627	0.6549	0.6703
	2010	0.6775	0.6700	0.6849

MEDICAL Linear FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-22)
4 Point	2007	1.0384	1.0788	0.9979
	2008	1.2591	1.3287	1.1895
	2009	1.4799	1.5785	1.3811
	2010	1.7006	1.8284	1.5727
5 Point	2006	0.8781	0.9112	0.8450
	2007	1.0787	1.1336	1.0237
	2008	1.2793	1.3561	1.2024
	2009	1.4799	1.5785	1.3811
	2010	1.6805	1.8010	1.5598
6 Point	2005	0.8021	0.8346	0.7696
	2006	0.9687	1.0173	0.9202
	2007	1.1353	1.1999	1.0707
	2008	1.3019	1.3826	1.2212
	2009	1.4686	1.5653	1.3717
	2010	1.6352	1.7479	1.5222
7 Point	2004	0.7369	0.7590	0.7149
	2005	0.8801	0.9170	0.8433
	2006	1.0233	1.0749	0.9718
	2007	1.1665	1.2329	1.1002
	2008	1.3097	1.3908	1.2286
	2009	1.4529	1.5488	1.3570
	2010	1.5962	1.7067	1.4854
8 Point	2003	0.6720	0.6906	0.6535
	2004	0.7995	0.8306	0.7685
	2005	0.9271	0.9707	0.8835
	2006	1.0546	1.1107	0.9985
	2007	1.1822	1.2508	1.1135
	2008	1.3097	1.3908	1.2286
	2009	1.4373	1.5309	1.3436
	2010	1.5649	1.6709	1.4586
9 Point	2002	0.6251	0.6386	0.6116
	2003	0.7384	0.7631	0.7137
	2004	0.8517	0.8876	0.8158
	2005	0.9650	1.0121	0.9179
	2006	1.0783	1.1366	1.0200
	2007	1.1917	1.2611	1.1221
	2008	1.3050	1.3857	1.2243
	2009	1.4183	1.5102	1.3264
	2010	1.5316	1.6347	1.4285
10 Point	2001	0.5702	0.5834	0.5572
	2002	0.6743	0.6969	0.6518
	2003	0.7784	0.8105	0.7464
	2004	0.8825	0.9241	0.8410
	2005	0.9866	1.0377	0.9355
	2006	1.0907	1.1512	1.0301
	2007	1.1947	1.2648	1.1247
	2008	1.2988	1.3784	1.2192
	2009	1.4029	1.4919	1.3138
	2010	1.5070	1.6055	1.4084

MEDICAL Expon'l FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-22)
4 Point	2007	1.0677	1.1151	1.0205
	2008	1.2457	1.3127	1.1785
	2009	1.4534	1.5452	1.3609
	2010	1.6956	1.8189	1.5716
5 Point	2006	0.9171	0.9585	0.8759
	2007	1.0692	1.1239	1.0145
	2008	1.2466	1.3178	1.1750
	2009	1.4534	1.5452	1.3609
	2010	1.6944	1.8118	1.5762
6 Point	2005	0.8516	0.8927	0.8107
	2006	0.9716	1.0219	0.9213
	2007	1.1085	1.1698	1.0471
	2008	1.2647	1.3391	1.1900
	2009	1.4429	1.5329	1.3523
	2010	1.6462	1.7547	1.5369
7 Point	2004	0.7946	0.8260	0.7634
	2005	0.8935	0.9331	0.8541
	2006	1.0049	1.0540	0.9556
	2007	1.1300	1.1907	1.0691
	2008	1.2708	1.3450	1.1962
	2009	1.4291	1.5194	1.3383
	2010	1.6071	1.7163	1.4973
8 Point	2003	0.7369	0.7654	0.7086
	2004	0.8217	0.8567	0.7869
	2005	0.9164	0.9590	0.8737
	2006	1.0219	1.0735	0.9702
	2007	1.1396	1.2016	1.0773
	2008	1.2708	1.3450	1.1962
	2009	1.4171	1.5056	1.3282
	2010	1.5803	1.6853	1.4748
9 Point	2002	0.6959	0.7199	0.6721
	2003	0.7690	0.7986	0.7395
	2004	0.8497	0.8858	0.8137
	2005	0.9390	0.9825	0.8953
	2006	1.0376	1.0899	0.9851
	2007	1.1465	1.2089	1.0839
	2008	1.2669	1.3409	1.1925
	2009	1.4000	1.4874	1.3121
	2010	1.5470	1.6499	1.4437
10 Point	2001	0.6471	0.6710	0.6234
	2002	0.7120	0.7404	0.6837
	2003	0.7834	0.8169	0.7499
	2004	0.8619	0.9014	0.8224
	2005	0.9484	0.9946	0.9020
	2006	1.0435	1.0975	0.9893
	2007	1.1482	1.2110	1.0850
	2008	1.2633	1.3363	1.1900
	2009	1.3900	1.4745	1.3052
	2010	1.5294	1.6269	1.4314

INDEMNITY Linear RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-22)
4 Point	2007	0.0130	0.0167	0.0092
	2008	-0.0133	-0.0255	-0.0011
	2009	-0.0123	0.0007	-0.0253
	2010	0.0126	0.0080	0.0172
5 Point	2006	0.0054	0.0085	0.0024
	2007	0.0075	0.0083	0.0067
	2008	-0.0161	-0.0297	-0.0023
	2009	-0.0123	0.0007	-0.0253
	2010	0.0153	0.0122	0.0185
6 Point	2005	0.0158	0.0150	0.0167
	2006	-0.0072	-0.0035	-0.0109
	2007	-0.0004	0.0008	-0.0016
	2008	-0.0192	-0.0327	-0.0056
	2009	-0.0107	0.0022	-0.0237
	2010	0.0217	0.0182	0.0251
7 Point	2004	-0.0027	-0.0084	0.0030
	2005	0.0177	0.0206	0.0147
	2006	-0.0059	0.0004	-0.0123
	2007	0.0004	0.0030	-0.0024
	2008	-0.0190	-0.0321	-0.0058
	2009	-0.0110	0.0011	-0.0232
	2010	0.0208	0.0154	0.0261
8 Point	2003	0.0277	0.0325	0.0229
	2004	-0.0186	-0.0270	-0.0101
	2005	0.0058	0.0067	0.0049
	2006	-0.0139	-0.0089	-0.0189
	2007	-0.0036	-0.0016	-0.0057
	2008	-0.0190	-0.0321	-0.0058
	2009	-0.0071	0.0057	-0.0200
	2010	0.0287	0.0247	0.0327
	9 Point	2002	0.0250	0.0267
2003		0.0152	0.0192	0.0112
2004		-0.0284	-0.0375	-0.0192
2005		-0.0013	-0.0010	-0.0018
2006		-0.0183	-0.0136	-0.0230
2007		-0.0054	-0.0035	-0.0074
2008		-0.0182	-0.0312	-0.0050
2009		-0.0035	0.0095	-0.0167
2010		0.0349	0.0314	0.0385
10 Point		2001	0.0331	0.0382
	2002	0.0103	0.0097	0.0109
	2003	0.0033	0.0054	0.0012
	2004	-0.0376	-0.0481	-0.0269
	2005	-0.0078	-0.0084	-0.0072
	2006	-0.0220	-0.0179	-0.0261
	2007	-0.0063	-0.0046	-0.0081
	2008	-0.0163	-0.0291	-0.0035
	2009	0.0011	0.0148	-0.0128
	2010	0.0423	0.0399	0.0447

INDEMNITY Expon'l RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-22)
4 Point	2007	0.0118	0.0156	0.0080
	2008	-0.0128	-0.0247	-0.0006
	2009	-0.0112	0.0019	-0.0243
	2010	0.0127	0.0080	0.0176
5 Point	2006	0.0038	0.0068	0.0009
	2007	0.0079	0.0087	0.0071
	2008	-0.0148	-0.0283	-0.0010
	2009	-0.0112	0.0019	-0.0243
	2010	0.0149	0.0120	0.0181
6 Point	2005	0.0137	0.0128	0.0147
	2006	-0.0074	-0.0037	-0.0111
	2007	0.0006	0.0019	-0.0006
	2008	-0.0178	-0.0312	-0.0042
	2009	-0.0097	0.0033	-0.0226
	2010	0.0214	0.0181	0.0250
7 Point	2004	-0.0053	-0.0110	0.0006
	2005	0.0174	0.0206	0.0143
	2006	-0.0047	0.0020	-0.0113
	2007	0.0022	0.0052	-0.0008
	2008	-0.0174	-0.0303	-0.0043
	2009	-0.0105	0.0015	-0.0225
	2010	0.0193	0.0134	0.0253
8 Point	2003	0.0248	0.0296	0.0201
	2004	-0.0194	-0.0277	-0.0109
	2005	0.0064	0.0075	0.0054
	2006	-0.0123	-0.0070	-0.0175
	2007	-0.0017	0.0006	-0.0040
	2008	-0.0174	-0.0303	-0.0043
	2009	-0.0063	0.0066	-0.0191
	2010	0.0279	0.0238	0.0322
9 Point	2002	0.0219	0.0234	0.0203
	2003	0.0139	0.0179	0.0100
	2004	-0.0282	-0.0372	-0.0191
	2005	-0.0002	0.0004	-0.0007
	2006	-0.0165	-0.0116	-0.0214
	2007	-0.0034	-0.0013	-0.0056
	2008	-0.0165	-0.0293	-0.0035
	2009	-0.0026	0.0106	-0.0157
	2010	0.0346	0.0310	0.0384
10 Point	2001	0.0300	0.0350	0.0248
	2002	0.0087	0.0082	0.0094
	2003	0.0030	0.0052	0.0009
	2004	-0.0368	-0.0472	-0.0263
	2005	-0.0063	-0.0067	-0.0059
	2006	-0.0202	-0.0158	-0.0244
	2007	-0.0044	-0.0024	-0.0063
	2008	-0.0146	-0.0271	-0.0019
	2009	0.0022	0.0162	-0.0117
	2010	0.0426	0.0404	0.0449

MEDICAL Linear RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-22)
4 Point	2007	0.0886	0.1116	0.0656
	2008	-0.0612	-0.0803	-0.0420
	2009	-0.1435	-0.1741	-0.1129
	2010	0.1161	0.1428	0.0893
5 Point	2006	0.0403	0.0548	0.0258
	2007	0.0483	0.0568	0.0398
	2008	-0.0814	-0.1077	-0.0549
	2009	-0.1435	-0.1741	-0.1129
	2010	0.1362	0.1702	0.1022
6 Point	2005	0.1132	0.1326	0.0940
	2006	-0.0503	-0.0513	-0.0494
	2007	-0.0083	-0.0095	-0.0072
	2008	-0.1040	-0.1342	-0.0737
	2009	-0.1322	-0.1609	-0.1035
	2010	0.1815	0.2233	0.1398
7 Point	2004	0.1171	0.1236	0.1106
	2005	0.0352	0.0502	0.0203
	2006	-0.1049	-0.1089	-0.1010
	2007	-0.0395	-0.0425	-0.0367
	2008	-0.1118	-0.1424	-0.0811
	2009	-0.1165	-0.1444	-0.0888
	2010	0.2206	0.2645	0.1766
8 Point	2003	0.1096	0.1253	0.0937
	2004	0.0545	0.0520	0.0570
	2005	-0.0118	-0.0035	-0.0199
	2006	-0.1362	-0.1447	-0.1277
	2007	-0.0552	-0.0604	-0.0500
	2008	-0.1118	-0.1424	-0.0811
	2009	-0.1009	-0.1265	-0.0754
	2010	0.2519	0.3003	0.2034
	9 Point	2002	0.1328	0.1451
2003		0.0431	0.0528	0.0335
2004		0.0023	-0.0050	0.0097
2005		-0.0497	-0.0449	-0.0543
2006		-0.1599	-0.1706	-0.1492
2007		-0.0647	-0.0707	-0.0586
2008		-0.1071	-0.1373	-0.0768
2009		-0.0819	-0.1058	-0.0582
2010		0.2851	0.3365	0.2335
10 Point		2001	0.1109	0.1312
	2002	0.0836	0.0868	0.0802
	2003	0.0031	0.0054	0.0008
	2004	-0.0285	-0.0415	-0.0155
	2005	-0.0713	-0.0705	-0.0719
	2006	-0.1723	-0.1852	-0.1593
	2007	-0.0677	-0.0744	-0.0612
	2008	-0.1009	-0.1300	-0.0717
	2009	-0.0665	-0.0875	-0.0456
	2010	0.3097	0.3657	0.2536

MEDICAL Expon'l RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-22)
4 Point	2007	0.0593	0.0753	0.0430
	2008	-0.0478	-0.0643	-0.0310
	2009	-0.1170	-0.1408	-0.0927
	2010	0.1211	0.1523	0.0904
5 Point	2006	0.0013	0.0075	-0.0051
	2007	0.0578	0.0665	0.0490
	2008	-0.0487	-0.0694	-0.0275
	2009	-0.1170	-0.1408	-0.0927
	2010	0.1223	0.1594	0.0858
6 Point	2005	0.0637	0.0745	0.0529
	2006	-0.0532	-0.0559	-0.0505
	2007	0.0185	0.0206	0.0164
	2008	-0.0668	-0.0907	-0.0425
	2009	-0.1065	-0.1285	-0.0841
	2010	0.1705	0.2165	0.1251
7 Point	2004	0.0594	0.0566	0.0621
	2005	0.0218	0.0341	0.0095
	2006	-0.0865	-0.0880	-0.0848
	2007	-0.0030	-0.0003	-0.0056
	2008	-0.0729	-0.0966	-0.0487
	2009	-0.0927	-0.1150	-0.0701
	2010	0.2096	0.2549	0.1647
8 Point	2003	0.0446	0.0505	0.0386
	2004	0.0323	0.0259	0.0386
	2005	-0.0011	0.0082	-0.0101
	2006	-0.1035	-0.1075	-0.0994
	2007	-0.0126	-0.0112	-0.0138
	2008	-0.0729	-0.0966	-0.0487
	2009	-0.0807	-0.1012	-0.0600
	2010	0.2364	0.2859	0.1872
	9 Point	2002	0.0620	0.0638
2003		0.0125	0.0173	0.0077
2004		0.0043	-0.0032	0.0118
2005		-0.0237	-0.0153	-0.0317
2006		-0.1192	-0.1239	-0.1143
2007		-0.0195	-0.0185	-0.0204
2008		-0.0690	-0.0925	-0.0450
2009		-0.0636	-0.0830	-0.0439
2010		0.2697	0.3213	0.2183
10 Point		2001	0.0340	0.0436
	2002	0.0459	0.0433	0.0483
	2003	-0.0019	-0.0010	-0.0027
	2004	-0.0079	-0.0188	0.0031
	2005	-0.0331	-0.0274	-0.0384
	2006	-0.1251	-0.1315	-0.1185
	2007	-0.0212	-0.0206	-0.0215
	2008	-0.0654	-0.0879	-0.0425
	2009	-0.0536	-0.0701	-0.0370
	2010	0.2873	0.3443	0.2306