

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-24)
r ²				
4 Point	Linear	0.910	0.897	0.821
5 Point	Linear	0.934	0.942	0.845
6 Point	Linear	0.891	0.888	0.830
7 Point	Linear	0.891	0.860	0.863
8 Point	Linear	0.888	0.856	0.869
9 Point	Linear	0.907	0.890	0.881
10 Point	Linear	0.886	0.864	0.870
4 Point	Expon'l	0.909	0.902	0.828
5 Point	Expon'l	0.941	0.950	0.857
6 Point	Expon'l	0.903	0.900	0.847
7 Point	Expon'l	0.910	0.877	0.886
8 Point	Expon'l	0.911	0.878	0.897
9 Point	Expon'l	0.933	0.913	0.914
10 Point	Expon'l	0.915	0.889	0.906

MEDICAL		(Average)	(Incur)	(Pd-24)
r ²				
4 Point	Linear	0.911	0.854	0.956
5 Point	Linear	0.955	0.925	0.977
6 Point	Linear	0.964	0.941	0.981
7 Point	Linear	0.974	0.955	0.987
8 Point	Linear	0.961	0.943	0.974
9 Point	Linear	0.952	0.941	0.960
10 Point	Linear	0.934	0.920	0.944
4 Point	Expon'l	0.886	0.828	0.937
5 Point	Expon'l	0.943	0.914	0.968
6 Point	Expon'l	0.964	0.942	0.981
7 Point	Expon'l	0.977	0.963	0.985
8 Point	Expon'l	0.975	0.962	0.983
9 Point	Expon'l	0.977	0.969	0.980
10 Point	Expon'l	0.968	0.956	0.975

INDEMNITY Linear FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-24)
4 Point	2009	0.4671	0.4612	0.4728
	2010	0.5096	0.4993	0.5198
	2011	0.5521	0.5374	0.5668
	2012	0.5946	0.5755	0.6138
5 Point	2008	0.4365	0.4257	0.4472
	2009	0.4751	0.4630	0.4871
	2010	0.5136	0.5002	0.5270
	2011	0.5521	0.5374	0.5668
	2012	0.5906	0.5746	0.6067
6 Point	2007	0.4231	0.4143	0.4317
	2008	0.4548	0.4445	0.4650
	2009	0.4864	0.4747	0.4982
	2010	0.5181	0.5049	0.5314
	2011	0.5498	0.5351	0.5646
	2012	0.5815	0.5652	0.5978
7 Point	2006	0.4066	0.4040	0.4090
	2007	0.4347	0.4296	0.4398
	2008	0.4629	0.4552	0.4706
	2009	0.4911	0.4808	0.5014
	2010	0.5193	0.5064	0.5322
	2011	0.5475	0.5320	0.5630
	2012	0.5756	0.5576	0.5938
8 Point	2005	0.3928	0.3926	0.3928
	2006	0.4181	0.4154	0.4206
	2007	0.4434	0.4381	0.4485
	2008	0.4687	0.4609	0.4764
	2009	0.4940	0.4837	0.5043
	2010	0.5193	0.5064	0.5322
	2011	0.5446	0.5292	0.5601
	2012	0.5699	0.5519	0.5880
9 Point	2004	0.3741	0.3723	0.3757
	2005	0.3982	0.3947	0.4017
	2006	0.4224	0.4170	0.4277
	2007	0.4465	0.4393	0.4536
	2008	0.4706	0.4616	0.4796
	2009	0.4948	0.4839	0.5056
	2010	0.5189	0.5063	0.5316
	2011	0.5430	0.5286	0.5575
	2012	0.5672	0.5509	0.5835
10 Point	2003	0.3658	0.3660	0.3654
	2004	0.3874	0.3858	0.3889
	2005	0.4090	0.4056	0.4124
	2006	0.4307	0.4254	0.4359
	2007	0.4523	0.4452	0.4594
	2008	0.4739	0.4650	0.4829
	2009	0.4956	0.4848	0.5064
	2010	0.5172	0.5046	0.5299
	2011	0.5389	0.5244	0.5534
	2012	0.5605	0.5442	0.5769

INDEMNITY Expon'l FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-24)
4 Point	2009	0.4687	0.4633	0.4739
	2010	0.5078	0.4981	0.5171
	2011	0.5501	0.5355	0.5643
	2012	0.5959	0.5757	0.6159
5 Point	2008	0.4397	0.4289	0.4504
	2009	0.4738	0.4618	0.4856
	2010	0.5105	0.4973	0.5235
	2011	0.5501	0.5355	0.5643
	2012	0.5927	0.5766	0.6084
6 Point	2007	0.4275	0.4185	0.4363
	2008	0.4548	0.4446	0.4648
	2009	0.4839	0.4723	0.4952
	2010	0.5148	0.5018	0.5276
	2011	0.5477	0.5331	0.5621
	2012	0.5828	0.5663	0.5989
7 Point	2006	0.4120	0.4089	0.4148
	2007	0.4358	0.4307	0.4406
	2008	0.4610	0.4536	0.4681
	2009	0.4876	0.4778	0.4972
	2010	0.5158	0.5032	0.5281
	2011	0.5456	0.5300	0.5610
	2012	0.5772	0.5583	0.5959
8 Point	2005	0.3991	0.3982	0.3998
	2006	0.4201	0.4173	0.4227
	2007	0.4422	0.4373	0.4469
	2008	0.4655	0.4583	0.4725
	2009	0.4900	0.4802	0.4995
	2010	0.5158	0.5032	0.5281
	2011	0.5430	0.5274	0.5584
	2012	0.5716	0.5526	0.5903
9 Point	2004	0.3813	0.3786	0.3839
	2005	0.4010	0.3970	0.4048
	2006	0.4217	0.4163	0.4269
	2007	0.4434	0.4366	0.4501
	2008	0.4663	0.4578	0.4746
	2009	0.4903	0.4800	0.5004
	2010	0.5156	0.5033	0.5277
	2011	0.5422	0.5278	0.5564
	2012	0.5702	0.5534	0.5867
10 Point	2003	0.3737	0.3729	0.3745
	2004	0.3911	0.3891	0.3931
	2005	0.4093	0.4059	0.4127
	2006	0.4284	0.4234	0.4332
	2007	0.4484	0.4418	0.4548
	2008	0.4693	0.4609	0.4774
	2009	0.4911	0.4808	0.5012
	2010	0.5140	0.5016	0.5261
	2011	0.5380	0.5233	0.5523
	2012	0.5630	0.5460	0.5798

MEDICAL Linear FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-24)
4 Point	2009	0.9530	0.9561	0.9500
	2010	1.0841	1.0870	1.0813
	2011	1.2152	1.2179	1.2126
	2012	1.3463	1.3488	1.3439
5 Point	2008	0.8160	0.8102	0.8217
	2009	0.9491	0.9461	0.9520
	2010	1.0821	1.0820	1.0823
	2011	1.2152	1.2179	1.2126
	2012	1.3482	1.3538	1.3429
6 Point	2007	0.7145	0.7122	0.7167
	2008	0.8390	0.8378	0.8401
	2009	0.9634	0.9633	0.9635
	2010	1.0878	1.0889	1.0869
	2011	1.2123	1.2144	1.2103
	2012	1.3367	1.3400	1.3337
7 Point	2006	0.6074	0.6117	0.6030
	2007	0.7279	0.7315	0.7242
	2008	0.8483	0.8513	0.8453
	2009	0.9687	0.9710	0.9665
	2010	1.0892	1.0908	1.0877
	2011	1.2096	1.2106	1.2088
	2012	1.3300	1.3304	1.3300
8 Point	2005	0.5407	0.5485	0.5328
	2006	0.6504	0.6570	0.6438
	2007	0.7601	0.7654	0.7547
	2008	0.8698	0.8739	0.8657
	2009	0.9795	0.9824	0.9767
	2010	1.0892	1.0908	1.0877
	2011	1.1989	1.1993	1.1986
	2012	1.3086	1.3077	1.3096
9 Point	2004	0.4793	0.4841	0.4743
	2005	0.5805	0.5848	0.5760
	2006	0.6816	0.6855	0.6777
	2007	0.7828	0.7862	0.7794
	2008	0.8840	0.8869	0.8812
	2009	0.9852	0.9875	0.9829
	2010	1.0863	1.0882	1.0846
	2011	1.1875	1.1889	1.1863
	2012	1.2887	1.2896	1.2880
10 Point	2003	0.4363	0.4454	0.4270
	2004	0.5283	0.5363	0.5201
	2005	0.6203	0.6272	0.6133
	2006	0.7123	0.7181	0.7064
	2007	0.8042	0.8090	0.7995
	2008	0.8962	0.8999	0.8926
	2009	0.9882	0.9908	0.9857
	2010	1.0802	1.0817	1.0788
	2011	1.1722	1.1726	1.1720
	2012	1.2642	1.2635	1.2651

MEDICAL Expon'l FITTED	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-24)
4 Point	2009	0.9523	0.9525	0.9520
	2010	1.0728	1.0740	1.0714
	2011	1.2084	1.2111	1.2058
	2012	1.3613	1.3657	1.3570
5 Point	2008	0.8253	0.8178	0.8325
	2009	0.9371	0.9321	0.9419
	2010	1.0642	1.0625	1.0657
	2011	1.2084	1.2111	1.2058
	2012	1.3723	1.3805	1.3643
6 Point	2007	0.7353	0.7326	0.7378
	2008	0.8323	0.8303	0.8342
	2009	0.9421	0.9410	0.9431
	2010	1.0665	1.0665	1.0663
	2011	1.2072	1.2088	1.2055
	2012	1.3664	1.3701	1.3629
7 Point	2006	0.6392	0.6437	0.6345
	2007	0.7263	0.7302	0.7221
	2008	0.8252	0.8284	0.8216
	2009	0.9375	0.9398	0.9350
	2010	1.0651	1.0662	1.0640
	2011	1.2101	1.2096	1.2107
	2012	1.3749	1.3722	1.3777
8 Point	2005	0.5843	0.5918	0.5765
	2006	0.6588	0.6658	0.6517
	2007	0.7429	0.7489	0.7367
	2008	0.8377	0.8425	0.8327
	2009	0.9446	0.9478	0.9412
	2010	1.0651	1.0662	1.0640
	2011	1.2011	1.1994	1.2027
	2012	1.3543	1.3493	1.3594
9 Point	2004	0.5331	0.5374	0.5287
	2005	0.5981	0.6023	0.5938
	2006	0.6711	0.6750	0.6670
	2007	0.7529	0.7565	0.7492
	2008	0.8448	0.8478	0.8415
	2009	0.9478	0.9502	0.9452
	2010	1.0633	1.0649	1.0617
	2011	1.1930	1.1934	1.1926
	2012	1.3385	1.3375	1.3395
10 Point	2003	0.4987	0.5069	0.4904
	2004	0.5553	0.5631	0.5473
	2005	0.6182	0.6256	0.6107
	2006	0.6884	0.6950	0.6816
	2007	0.7665	0.7721	0.7606
	2008	0.8534	0.8578	0.8488
	2009	0.9502	0.9529	0.9473
	2010	1.0580	1.0587	1.0571
	2011	1.1779	1.1761	1.1797
	2012	1.3116	1.3067	1.3166

INDEMNITY Linear RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-24)
4 Point	2009	0.0101	0.0158	0.0045
	2010	-0.0231	-0.0204	-0.0257
	2011	0.0158	-0.0067	0.0381
	2012	-0.0029	0.0113	-0.0168
5 Point	2008	0.0080	0.0018	0.0143
	2009	0.0022	0.0141	-0.0098
	2010	-0.0271	-0.0213	-0.0329
	2011	0.0158	-0.0067	0.0381
	2012	0.0011	0.0122	-0.0097
6 Point	2007	0.0228	0.0235	0.0222
	2008	-0.0103	-0.0170	-0.0035
	2009	-0.0092	0.0023	-0.0209
	2010	-0.0316	-0.0260	-0.0373
	2011	0.0181	-0.0044	0.0403
	2012	0.0102	0.0216	-0.0008
7 Point	2006	0.0174	0.0229	0.0120
	2007	0.0112	0.0082	0.0141
	2008	-0.0184	-0.0277	-0.0091
	2009	-0.0139	-0.0038	-0.0241
	2010	-0.0328	-0.0275	-0.0381
	2011	0.0204	-0.0013	0.0419
	2012	0.0161	0.0292	0.0032
8 Point	2005	0.0201	0.0200	0.0204
	2006	0.0059	0.0115	0.0004
	2007	0.0025	-0.0003	0.0054
	2008	-0.0242	-0.0334	-0.0149
	2009	-0.0168	-0.0067	-0.0270
	2010	-0.0328	-0.0275	-0.0381
	2011	0.0233	0.0015	0.0448
	2012	0.0218	0.0349	0.0090
	9 Point	2004	0.0109	0.0041
2005		0.0147	0.0179	0.0115
2006		0.0016	0.0099	-0.0067
2007		-0.0006	-0.0015	0.0003
2008		-0.0261	-0.0341	-0.0181
2009		-0.0176	-0.0069	-0.0283
2010		-0.0324	-0.0274	-0.0375
2011		0.0249	0.0021	0.0474
2012		0.0245	0.0359	0.0135
10 Point	2003	0.0299	0.0304	0.0296
	2004	-0.0024	-0.0094	0.0047
	2005	0.0039	0.0070	0.0008
	2006	-0.0067	0.0015	-0.0149
	2007	-0.0064	-0.0074	-0.0055
	2008	-0.0294	-0.0375	-0.0214
	2009	-0.0184	-0.0078	-0.0291
	2010	-0.0307	-0.0257	-0.0358
	2011	0.0290	0.0063	0.0515
	2012	0.0312	0.0426	0.0201

INDEMNITY Expon'l RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-24)
4 Point	2009	0.0085	0.0137	0.0034
	2010	-0.0213	-0.0192	-0.0230
	2011	0.0178	-0.0048	0.0406
	2012	-0.0042	0.0111	-0.0189
5 Point	2008	0.0048	-0.0014	0.0111
	2009	0.0034	0.0152	-0.0083
	2010	-0.0240	-0.0184	-0.0294
	2011	0.0178	-0.0048	0.0406
	2012	-0.0010	0.0102	-0.0114
6 Point	2007	0.0184	0.0193	0.0176
	2008	-0.0103	-0.0171	-0.0033
	2009	-0.0067	0.0047	-0.0179
	2010	-0.0283	-0.0229	-0.0335
	2011	0.0202	-0.0024	0.0428
	2012	0.0089	0.0205	-0.0019
7 Point	2006	0.0120	0.0180	0.0062
	2007	0.0101	0.0071	0.0133
	2008	-0.0165	-0.0261	-0.0066
	2009	-0.0104	-0.0008	-0.0199
	2010	-0.0293	-0.0243	-0.0340
	2011	0.0223	0.0007	0.0439
	2012	0.0145	0.0285	0.0011
8 Point	2005	0.0138	0.0144	0.0134
	2006	0.0039	0.0096	-0.0017
	2007	0.0037	0.0005	0.0070
	2008	-0.0210	-0.0308	-0.0110
	2009	-0.0128	-0.0032	-0.0222
	2010	-0.0293	-0.0243	-0.0340
	2011	0.0249	0.0033	0.0465
	2012	0.0201	0.0342	0.0067
9 Point	2004	0.0037	-0.0022	0.0097
	2005	0.0119	0.0156	0.0084
	2006	0.0023	0.0106	-0.0059
	2007	0.0025	0.0012	0.0038
	2008	-0.0218	-0.0303	-0.0131
	2009	-0.0131	-0.0030	-0.0231
	2010	-0.0291	-0.0244	-0.0336
	2011	0.0257	0.0029	0.0485
	2012	0.0215	0.0334	0.0103
10 Point	2003	0.0220	0.0235	0.0205
	2004	-0.0061	-0.0127	0.0005
	2005	0.0036	0.0067	0.0005
	2006	-0.0044	0.0035	-0.0122
	2007	-0.0025	-0.0040	-0.0009
	2008	-0.0248	-0.0334	-0.0159
	2009	-0.0139	-0.0038	-0.0239
	2010	-0.0275	-0.0227	-0.0320
	2011	0.0299	0.0074	0.0526
	2012	0.0287	0.0408	0.0172

MEDICAL Linear RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-24)
4 Point	2009	-0.0470	-0.0638	-0.0303
	2010	0.0498	0.0713	0.0282
	2011	0.0417	0.0486	0.0347
	2012	-0.0443	-0.0562	-0.0325
5 Point	2008	-0.0039	-0.0099	0.0019
	2009	-0.0432	-0.0538	-0.0323
	2010	0.0517	0.0763	0.0272
	2011	0.0417	0.0486	0.0347
	2012	-0.0463	-0.0612	-0.0315
6 Point	2007	0.0287	0.0344	0.0230
	2008	-0.0269	-0.0375	-0.0165
	2009	-0.0575	-0.0710	-0.0438
	2010	0.0460	0.0694	0.0226
	2011	0.0445	0.0521	0.0370
	2012	-0.0348	-0.0474	-0.0223
7 Point	2006	0.0201	0.0289	0.0113
	2007	0.0153	0.0151	0.0155
	2008	-0.0362	-0.0510	-0.0217
	2009	-0.0628	-0.0787	-0.0468
	2010	0.0446	0.0675	0.0218
	2011	0.0472	0.0559	0.0385
	2012	-0.0281	-0.0378	-0.0186
8 Point	2005	0.0752	0.0793	0.0713
	2006	-0.0229	-0.0164	-0.0295
	2007	-0.0169	-0.0188	-0.0150
	2008	-0.0577	-0.0736	-0.0421
	2009	-0.0736	-0.0901	-0.0570
	2010	0.0446	0.0675	0.0218
	2011	0.0579	0.0672	0.0487
	2012	-0.0067	-0.0151	0.0018
9 Point	2004	0.0795	0.0726	0.0865
	2005	0.0354	0.0430	0.0281
	2006	-0.0541	-0.0449	-0.0634
	2007	-0.0396	-0.0396	-0.0397
	2008	-0.0719	-0.0866	-0.0576
	2009	-0.0793	-0.0952	-0.0632
	2010	0.0475	0.0701	0.0249
	2011	0.0693	0.0776	0.0610
	2012	0.0132	0.0030	0.0234
10 Point	2003	0.1102	0.1175	0.1031
	2004	0.0305	0.0204	0.0407
	2005	-0.0044	0.0006	-0.0092
	2006	-0.0848	-0.0775	-0.0921
	2007	-0.0610	-0.0624	-0.0598
	2008	-0.0841	-0.0996	-0.0690
	2009	-0.0823	-0.0985	-0.0660
	2010	0.0536	0.0766	0.0307
	2011	0.0846	0.0939	0.0753
	2012	0.0377	0.0291	0.0463

MEDICAL Expon'l RESIDUALS	Policy Year	Severity Ratio (Average)	Severity Ratio (Incur)	Severity Ratio (Pd-24)
4 Point	2009	-0.0464	-0.0602	-0.0323
	2010	0.0610	0.0843	0.0381
	2011	0.0484	0.0554	0.0415
	2012	-0.0594	-0.0731	-0.0456
5 Point	2008	-0.0132	-0.0175	-0.0089
	2009	-0.0312	-0.0398	-0.0222
	2010	0.0696	0.0958	0.0438
	2011	0.0484	0.0554	0.0415
	2012	-0.0704	-0.0879	-0.0529
6 Point	2007	0.0079	0.0140	0.0019
	2008	-0.0202	-0.0300	-0.0106
	2009	-0.0362	-0.0487	-0.0234
	2010	0.0673	0.0918	0.0432
	2011	0.0496	0.0577	0.0418
	2012	-0.0645	-0.0775	-0.0515
7 Point	2006	-0.0117	-0.0031	-0.0202
	2007	0.0169	0.0164	0.0176
	2008	-0.0131	-0.0281	0.0020
	2009	-0.0316	-0.0475	-0.0153
	2010	0.0687	0.0921	0.0455
	2011	0.0467	0.0569	0.0366
	2012	-0.0730	-0.0796	-0.0663
8 Point	2005	0.0316	0.0360	0.0276
	2006	-0.0313	-0.0252	-0.0374
	2007	0.0003	-0.0023	0.0030
	2008	-0.0256	-0.0422	-0.0091
	2009	-0.0387	-0.0555	-0.0215
	2010	0.0687	0.0921	0.0455
	2011	0.0557	0.0671	0.0446
	2012	-0.0524	-0.0567	-0.0480
9 Point	2004	0.0257	0.0193	0.0321
	2005	0.0178	0.0255	0.0103
	2006	-0.0436	-0.0344	-0.0527
	2007	-0.0097	-0.0099	-0.0095
	2008	-0.0327	-0.0475	-0.0179
	2009	-0.0419	-0.0579	-0.0255
	2010	0.0705	0.0934	0.0478
	2011	0.0638	0.0731	0.0547
	2012	-0.0366	-0.0449	-0.0281
10 Point	2003	0.0478	0.0560	0.0397
	2004	0.0035	-0.0064	0.0135
	2005	-0.0023	0.0022	-0.0066
	2006	-0.0609	-0.0544	-0.0673
	2007	-0.0233	-0.0255	-0.0209
	2008	-0.0413	-0.0575	-0.0252
	2009	-0.0443	-0.0606	-0.0276
	2010	0.0758	0.0996	0.0524
	2011	0.0789	0.0904	0.0676
	2012	-0.0097	-0.0141	-0.0052