

PENNSYLVANIA COMPENSATION RATING BUREAU

Measures of Goodness of Fit in Trend Calculations Using Loss Ratios

Estimates of trended loss ratios using from 4 to 10 data points for each loss development technique are shown in Exhibit 6 of this mailing.

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

Pages 2 and 3 show indemnity fitted loss ratios for each loss development method using from 4 to 10 data points. Page 2 uses linear regression and page 3 uses exponential techniques. Pages 4 and 5 present analogous results for medical-linear and medical-exponential respectively.

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		
r ²		(Pd & Inc)	(Incur)	(Pd-20)
4 Point	Linear	0.375	0.274	0.527
5 Point	Linear	0.680	0.619	0.762
6 Point	Linear	0.578	0.593	0.535
7 Point	Linear	0.074	0.208	0.001
8 Point	Linear	0.011	0.116	0.027
9 Point	Linear	0.007	0.063	0.155
10 Point	Linear	0.128	0.301	0.009
4 Point	Expon'l	0.364	0.263	0.518
5 Point	Expon'l	0.669	0.604	0.756
6 Point	Expon'l	0.576	0.585	0.537
7 Point	Expon'l	0.072	0.210	0.001
8 Point	Expon'l	0.011	0.121	0.031
9 Point	Expon'l	0.007	0.069	0.164
10 Point	Expon'l	0.119	0.301	0.005
MEDICAL		Average		
r ²		(Pd & Inc)	(Incur)	(Pd-20)
4 Point	Linear	0.691	0.662	0.724
5 Point	Linear	0.068	0.029	0.150
6 Point	Linear	0.042	0.005	0.153
7 Point	Linear	0.134	0.037	0.326
8 Point	Linear	0.294	0.175	0.466
9 Point	Linear	0.476	0.353	0.622
10 Point	Linear	0.433	0.363	0.496
4 Point	Expon'l	0.696	0.666	0.729
5 Point	Expon'l	0.064	0.027	0.145
6 Point	Expon'l	0.038	0.004	0.148
7 Point	Expon'l	0.130	0.033	0.326
8 Point	Expon'l	0.296	0.174	0.471
9 Point	Expon'l	0.483	0.359	0.628
10 Point	Expon'l	0.436	0.368	0.496

INDEMNITY Linear FITTED	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2001	0.5312	0.4904	0.5721
	2002	0.5217	0.4808	0.5626
	2003	0.5122	0.4712	0.5532
	2004	0.5027	0.4616	0.5437
5 Point	2000	0.5568	0.5218	0.5920
	2001	0.5420	0.5049	0.5790
	2002	0.5271	0.4881	0.5661
	2003	0.5122	0.4712	0.5532
	2004	0.4973	0.4543	0.5402
6 Point	1999	0.5563	0.5250	0.5877
	2000	0.5456	0.5119	0.5795
	2001	0.5349	0.4987	0.5712
	2002	0.5243	0.4856	0.5630
	2003	0.5136	0.4724	0.5547
	2004	0.5029	0.4593	0.5465
7 Point	1998	0.5352	0.5086	0.5620
	1999	0.5319	0.5023	0.5616
	2000	0.5285	0.4959	0.5612
	2001	0.5252	0.4896	0.5608
	2002	0.5218	0.4833	0.5604
	2003	0.5185	0.4770	0.5600
	2004	0.5151	0.4707	0.5595
8 Point	1997	0.5272	0.5026	0.5519
	1998	0.5261	0.4987	0.5536
	1999	0.5250	0.4949	0.5553
	2000	0.5240	0.4910	0.5570
	2001	0.5229	0.4871	0.5587
	2002	0.5218	0.4833	0.5604
	2003	0.5207	0.4794	0.5621
	2004	0.5197	0.4756	0.5638
9 Point	1996	0.5179	0.4981	0.5378
	1997	0.5186	0.4957	0.5417
	1998	0.5194	0.4933	0.5456
	1999	0.5202	0.4909	0.5495
	2000	0.5209	0.4885	0.5533
	2001	0.5217	0.4862	0.5572
	2002	0.5224	0.4838	0.5611
	2003	0.5232	0.4814	0.5650
	2004	0.5239	0.4790	0.5689
10 Point	1995	0.5495	0.5338	0.5653
	1996	0.5451	0.5261	0.5642
	1997	0.5408	0.5185	0.5631
	1998	0.5364	0.5108	0.5621
	1999	0.5321	0.5032	0.5610
	2000	0.5277	0.4956	0.5599
	2001	0.5234	0.4879	0.5589
	2002	0.5190	0.4803	0.5578
	2003	0.5147	0.4726	0.5567
	2004	0.5103	0.4650	0.5557

INDEMNITY Expon'l FITTED	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2001	0.5310	0.4901	0.5720
	2002	0.5214	0.4803	0.5624
	2003	0.5119	0.4708	0.5530
	2004	0.5026	0.4614	0.5437
5 Point	2000	0.5568	0.5216	0.5920
	2001	0.5414	0.5040	0.5787
	2002	0.5264	0.4871	0.5657
	2003	0.5119	0.4708	0.5530
	2004	0.4978	0.4549	0.5406
6 Point	1999	0.5565	0.5253	0.5878
	2000	0.5454	0.5114	0.5793
	2001	0.5344	0.4979	0.5709
	2002	0.5237	0.4847	0.5627
	2003	0.5132	0.4719	0.5545
	2004	0.5030	0.4594	0.5465
7 Point	1998	0.5346	0.5083	0.5611
	1999	0.5312	0.5017	0.5608
	2000	0.5279	0.4952	0.5606
	2001	0.5246	0.4888	0.5603
	2002	0.5213	0.4825	0.5600
	2003	0.5180	0.4763	0.5598
	2004	0.5148	0.4701	0.5595
8 Point	1997	0.5266	0.5024	0.5511
	1998	0.5256	0.4983	0.5529
	1999	0.5245	0.4943	0.5547
	2000	0.5234	0.4904	0.5564
	2001	0.5224	0.4864	0.5582
	2002	0.5213	0.4825	0.5600
	2003	0.5202	0.4786	0.5618
	2004	0.5192	0.4748	0.5636
9 Point	1996	0.5174	0.4980	0.5371
	1997	0.5181	0.4954	0.5409
	1998	0.5189	0.4929	0.5448
	1999	0.5196	0.4904	0.5488
	2000	0.5204	0.4879	0.5527
	2001	0.5212	0.4855	0.5567
	2002	0.5219	0.4830	0.5608
	2003	0.5227	0.4805	0.5648
	2004	0.5234	0.4781	0.5689
10 Point	1995	0.5474	0.5319	0.5632
	1996	0.5432	0.5241	0.5624
	1997	0.5391	0.5165	0.5616
	1998	0.5349	0.5090	0.5608
	1999	0.5308	0.5015	0.5600
	2000	0.5268	0.4942	0.5592
	2001	0.5227	0.4870	0.5583
	2002	0.5187	0.4799	0.5575
	2003	0.5148	0.4729	0.5567
	2004	0.5108	0.4660	0.5559

MEDICAL Linear FITTED	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2001	0.4825	0.4773	0.4876
	2002	0.4998	0.4968	0.5027
	2003	0.5171	0.5163	0.5178
	2004	0.5344	0.5358	0.5328
5 Point	2000	0.5045	0.5065	0.5026
	2001	0.5087	0.5098	0.5077
	2002	0.5129	0.5130	0.5127
	2003	0.5171	0.5163	0.5178
	2004	0.5212	0.5196	0.5228
6 Point	1999	0.5065	0.5113	0.5018
	2000	0.5090	0.5124	0.5057
	2001	0.5115	0.5135	0.5096
	2002	0.5140	0.5145	0.5135
	2003	0.5165	0.5156	0.5174
	2004	0.5190	0.5166	0.5213
7 Point	1998	0.4986	0.5050	0.4924
	1999	0.5024	0.5073	0.4975
	2000	0.5061	0.5095	0.5027
	2001	0.5098	0.5118	0.5079
	2002	0.5136	0.5141	0.5131
	2003	0.5173	0.5164	0.5182
	2004	0.5211	0.5187	0.5234
8 Point	1997	0.4877	0.4910	0.4845
	1998	0.4929	0.4956	0.4902
	1999	0.4980	0.5002	0.4959
	2000	0.5032	0.5048	0.5016
	2001	0.5084	0.5095	0.5073
	2002	0.5136	0.5141	0.5131
	2003	0.5188	0.5187	0.5188
	2004	0.5239	0.5234	0.5245
9 Point	1996	0.4731	0.4752	0.4709
	1997	0.4799	0.4818	0.4780
	1998	0.4868	0.4884	0.4851
	1999	0.4936	0.4950	0.4922
	2000	0.5004	0.5016	0.4993
	2001	0.5073	0.5082	0.5064
	2002	0.5141	0.5148	0.5135
	2003	0.5210	0.5213	0.5206
	2004	0.5278	0.5279	0.5277
10 Point	1995	0.4739	0.4735	0.4744
	1996	0.4796	0.4793	0.4799
	1997	0.4852	0.4851	0.4853
	1998	0.4908	0.4910	0.4907
	1999	0.4964	0.4968	0.4961
	2000	0.5021	0.5026	0.5016
	2001	0.5077	0.5084	0.5070
	2002	0.5133	0.5143	0.5124
	2003	0.5189	0.5201	0.5178
	2004	0.5246	0.5259	0.5232

MEDICAL Expon'l FITTED	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2001	0.4831	0.4782	0.4881
	2002	0.4995	0.4965	0.5025
	2003	0.5164	0.5155	0.5173
	2004	0.5339	0.5352	0.5326
5 Point	2000	0.5044	0.5061	0.5027
	2001	0.5084	0.5092	0.5075
	2002	0.5124	0.5123	0.5124
	2003	0.5164	0.5155	0.5173
	2004	0.5205	0.5186	0.5223
6 Point	1999	0.5065	0.5112	0.5019
	2000	0.5088	0.5121	0.5056
	2001	0.5112	0.5129	0.5094
	2002	0.5135	0.5138	0.5131
	2003	0.5159	0.5147	0.5169
	2004	0.5182	0.5156	0.5208
7 Point	1998	0.4987	0.5050	0.4925
	1999	0.5023	0.5071	0.4975
	2000	0.5058	0.5092	0.5025
	2001	0.5094	0.5113	0.5076
	2002	0.5131	0.5134	0.5127
	2003	0.5167	0.5155	0.5179
	2004	0.5204	0.5177	0.5231
	2004	0.5204	0.5177	0.5231
8 Point	1997	0.4878	0.4909	0.4847
	1998	0.4927	0.4953	0.4902
	1999	0.4977	0.4998	0.4957
	2000	0.5028	0.5043	0.5013
	2001	0.5079	0.5088	0.5070
	2002	0.5131	0.5134	0.5127
	2003	0.5183	0.5181	0.5185
	2004	0.5236	0.5227	0.5243
	2004	0.5236	0.5227	0.5243
9 Point	1996	0.4731	0.4751	0.4711
	1997	0.4797	0.4814	0.4779
	1998	0.4863	0.4878	0.4847
	1999	0.4930	0.4942	0.4917
	2000	0.4998	0.5008	0.4988
	2001	0.5067	0.5074	0.5059
	2002	0.5137	0.5141	0.5132
	2003	0.5208	0.5209	0.5206
	2004	0.5280	0.5278	0.5281
10 Point	1995	0.4741	0.4736	0.4746
	1996	0.4795	0.4791	0.4798
	1997	0.4849	0.4847	0.4850
	1998	0.4904	0.4903	0.4903
	1999	0.4959	0.4961	0.4957
	2000	0.5015	0.5018	0.5011
	2001	0.5071	0.5077	0.5065
	2002	0.5128	0.5136	0.5120
	2003	0.5186	0.5196	0.5176
	2004	0.5245	0.5256	0.5233

INDEMNITY Linear RESIDUALS	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2001	0.0037	0.0050	0.0024
	2002	0.0059	0.0070	0.0048
	2003	-0.0230	-0.0292	-0.0168
	2004	0.0133	0.0171	0.0096
5 Point	2000	0.0108	0.0146	0.0069
	2001	-0.0070	-0.0095	-0.0045
	2002	0.0005	-0.0003	0.0013
	2003	-0.0230	-0.0292	-0.0168
	2004	0.0187	0.0244	0.0131
6 Point	1999	-0.0140	-0.0124	-0.0156
	2000	0.0220	0.0245	0.0194
	2001	0.0000	-0.0033	0.0033
	2002	0.0033	0.0022	0.0044
	2003	-0.0244	-0.0304	-0.0183
	2004	0.0131	0.0194	0.0068
7 Point	1998	-0.0366	-0.0342	-0.0391
	1999	0.0104	0.0104	0.0105
	2000	0.0391	0.0405	0.0377
	2001	0.0097	0.0058	0.0137
	2002	0.0058	0.0045	0.0070
	2003	-0.0293	-0.0350	-0.0236
	2004	0.0009	0.0080	-0.0062
8 Point	1997	-0.0160	-0.0173	-0.0148
	1998	-0.0275	-0.0243	-0.0307
	1999	0.0173	0.0177	0.0168
	2000	0.0436	0.0454	0.0419
	2001	0.0120	0.0083	0.0158
	2002	0.0058	0.0045	0.0070
	2003	-0.0315	-0.0374	-0.0257
	2004	-0.0037	0.0031	-0.0105
9 Point	1996	-0.0171	-0.0138	-0.0204
	1997	-0.0074	-0.0104	-0.0046
	1998	-0.0208	-0.0189	-0.0227
	1999	0.0221	0.0217	0.0226
	2000	0.0467	0.0479	0.0456
	2001	0.0132	0.0092	0.0173
	2002	0.0052	0.0040	0.0063
	2003	-0.0340	-0.0394	-0.0286
	2004	-0.0079	-0.0003	-0.0156
10 Point	1995	0.0613	0.0631	0.0594
	1996	-0.0443	-0.0418	-0.0468
	1997	-0.0296	-0.0332	-0.0260
	1998	-0.0378	-0.0364	-0.0392
	1999	0.0102	0.0094	0.0111
	2000	0.0399	0.0408	0.0390
	2001	0.0115	0.0075	0.0156
	2002	0.0086	0.0075	0.0096
	2003	-0.0255	-0.0306	-0.0203
	2004	0.0057	0.0137	-0.0024

INDEMNITY Expon'l RESIDUALS	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2001	0.0039	0.0053	0.0025
	2002	0.0062	0.0075	0.0050
	2003	-0.0227	-0.0288	-0.0166
	2004	0.0134	0.0173	0.0096
5 Point	2000	0.0108	0.0148	0.0069
	2001	-0.0065	-0.0086	-0.0042
	2002	0.0012	0.0007	0.0017
	2003	-0.0227	-0.0288	-0.0166
	2004	0.0182	0.0238	0.0127
6 Point	1999	-0.0142	-0.0127	-0.0157
	2000	0.0222	0.0250	0.0196
	2001	0.0005	-0.0025	0.0036
	2002	0.0039	0.0031	0.0047
	2003	-0.0240	-0.0299	-0.0181
	2004	0.0130	0.0193	0.0068
7 Point	1998	-0.0360	-0.0339	-0.0382
	1999	0.0111	0.0109	0.0113
	2000	0.0397	0.0412	0.0383
	2001	0.0103	0.0066	0.0142
	2002	0.0063	0.0053	0.0074
	2003	-0.0288	-0.0343	-0.0234
	2004	0.0012	0.0086	-0.0062
8 Point	1997	-0.0154	-0.0171	-0.0140
	1998	-0.0270	-0.0239	-0.0300
	1999	0.0178	0.0183	0.0174
	2000	0.0442	0.0460	0.0425
	2001	0.0125	0.0090	0.0163
	2002	0.0063	0.0053	0.0074
	2003	-0.0310	-0.0366	-0.0254
	2004	-0.0032	0.0039	-0.0103
	9 Point	1996	-0.0166	-0.0137
1997		-0.0069	-0.0101	-0.0038
1998		-0.0203	-0.0185	-0.0219
1999		0.0227	0.0222	0.0233
2000		0.0472	0.0485	0.0462
2001		0.0137	0.0099	0.0178
2002		0.0057	0.0048	0.0066
2003		-0.0335	-0.0385	-0.0284
2004		-0.0074	0.0006	-0.0156
10 Point	1995	0.0634	0.0650	0.0615
	1996	-0.0424	-0.0398	-0.0450
	1997	-0.0279	-0.0312	-0.0245
	1998	-0.0363	-0.0346	-0.0379
	1999	0.0115	0.0111	0.0121
	2000	0.0408	0.0422	0.0397
	2001	0.0122	0.0084	0.0162
	2002	0.0089	0.0079	0.0099
	2003	-0.0256	-0.0309	-0.0203
	2004	0.0052	0.0127	-0.0026

MEDICAL Linear RESIDUALS	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2001	0.0081	0.0104	0.0058
	2002	-0.0021	-0.0037	-0.0004
	2003	-0.0201	-0.0236	-0.0166
	2004	0.0141	0.0170	0.0112
5 Point	2000	0.0263	0.0324	0.0201
	2001	-0.0182	-0.0221	-0.0143
	2002	-0.0152	-0.0199	-0.0104
	2003	-0.0200	-0.0236	-0.0166
	2004	0.0272	0.0332	0.0212
6 Point	1999	0.0056	0.0074	0.0038
	2000	0.0218	0.0265	0.0170
	2001	-0.0210	-0.0258	-0.0162
	2002	-0.0163	-0.0214	-0.0112
	2003	-0.0195	-0.0229	-0.0162
	2004	0.0294	0.0362	0.0227
7 Point	1998	-0.0062	-0.0061	-0.0064
	1999	0.0097	0.0114	0.0081
	2000	0.0247	0.0294	0.0200
	2001	-0.0193	-0.0241	-0.0145
	2002	-0.0159	-0.0210	-0.0108
	2003	-0.0203	-0.0237	-0.0170
	2004	0.0273	0.0341	0.0206
8 Point	1997	-0.0101	-0.0165	-0.0038
	1998	-0.0005	0.0033	-0.0042
	1999	0.0141	0.0185	0.0097
	2000	0.0276	0.0341	0.0211
	2001	-0.0179	-0.0218	-0.0139
	2002	-0.0159	-0.0210	-0.0108
	2003	-0.0218	-0.0260	-0.0176
	2004	0.0245	0.0294	0.0195
9 Point	1996	-0.0156	-0.0182	-0.0130
	1997	-0.0023	-0.0073	0.0027
	1998	0.0056	0.0105	0.0009
	1999	0.0185	0.0237	0.0134
	2000	0.0304	0.0373	0.0234
	2001	-0.0168	-0.0205	-0.0130
	2002	-0.0164	-0.0217	-0.0112
	2003	-0.0240	-0.0286	-0.0194
10 Point	1995	0.0147	0.0091	0.0202
	1996	-0.0221	-0.0223	-0.0220
	1997	-0.0076	-0.0106	-0.0046
	1998	0.0016	0.0079	-0.0047
	1999	0.0157	0.0219	0.0095
	2000	0.0287	0.0363	0.0211
	2001	-0.0172	-0.0207	-0.0136
	2002	-0.0156	-0.0212	-0.0101
	2003	-0.0219	-0.0274	-0.0166
2004	0.0238	0.0269	0.0208	

MEDICAL Expon'l RESIDUALS	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2001	0.0074	0.0095	0.0053
	2002	-0.0018	-0.0034	-0.0002
	2003	-0.0194	-0.0228	-0.0161
	2004	0.0145	0.0176	0.0114
5 Point	2000	0.0264	0.0328	0.0200
	2001	-0.0179	-0.0215	-0.0141
	2002	-0.0147	-0.0192	-0.0101
	2003	-0.0194	-0.0228	-0.0161
	2004	0.0279	0.0342	0.0217
6 Point	1999	0.0056	0.0075	0.0037
	2000	0.0220	0.0268	0.0171
	2001	-0.0207	-0.0252	-0.0160
	2002	-0.0158	-0.0207	-0.0108
	2003	-0.0189	-0.0220	-0.0157
	2004	0.0302	0.0372	0.0232
7 Point	1998	-0.0063	-0.0061	-0.0065
	1999	0.0098	0.0116	0.0081
	2000	0.0250	0.0297	0.0202
	2001	-0.0189	-0.0236	-0.0142
	2002	-0.0154	-0.0203	-0.0104
	2003	-0.0197	-0.0228	-0.0167
	2004	0.0280	0.0351	0.0209
8 Point	1997	-0.0102	-0.0164	-0.0040
	1998	-0.0003	0.0036	-0.0042
	1999	0.0144	0.0189	0.0099
	2000	0.0280	0.0346	0.0214
	2001	-0.0174	-0.0211	-0.0136
	2002	-0.0154	-0.0203	-0.0104
	2003	-0.0213	-0.0254	-0.0173
	2004	0.0248	0.0301	0.0197
9 Point	1996	-0.0156	-0.0181	-0.0132
	1997	-0.0021	-0.0069	0.0028
	1998	0.0061	0.0111	0.0013
	1999	0.0191	0.0245	0.0139
	2000	0.0310	0.0381	0.0239
	2001	-0.0162	-0.0197	-0.0125
	2002	-0.0160	-0.0210	-0.0109
	2003	-0.0238	-0.0282	-0.0194
10 Point	1995	0.0145	0.0090	0.0200
	1996	-0.0220	-0.0221	-0.0219
	1997	-0.0073	-0.0102	-0.0043
	1998	0.0020	0.0086	-0.0043
	1999	0.0162	0.0226	0.0099
	2000	0.0293	0.0371	0.0216
	2001	-0.0166	-0.0200	-0.0131
	2002	-0.0151	-0.0205	-0.0097
	2003	-0.0216	-0.0269	-0.0164
2004	0.0239	0.0272	0.0207	