

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-21)
4 Point	Linear	0.029	0.019	0.046
5 Point	Linear	0.048	0.038	0.063
6 Point	Linear	0.069	0.073	0.064
7 Point	Linear	0.268	0.228	0.305
8 Point	Linear	0.508	0.476	0.536
9 Point	Linear	0.584	0.563	0.599
10 Point	Linear	0.400	0.442	0.347
4 Point	Expon'l	0.028	0.018	0.045
5 Point	Expon'l	0.045	0.035	0.060
6 Point	Expon'l	0.069	0.073	0.063
7 Point	Expon'l	0.263	0.226	0.300
8 Point	Expon'l	0.502	0.469	0.530
9 Point	Expon'l	0.579	0.557	0.595
10 Point	Expon'l	0.402	0.443	0.349

MEDICAL		Average		
r^2		(Pd & Inc)	(Incur)	(Pd-21)
4 Point	Linear	0.258	0.231	0.279
5 Point	Linear	0.122	0.133	0.109
6 Point	Linear	0.125	0.191	0.064
7 Point	Linear	0.050	0.080	0.022
8 Point	Linear	0.233	0.315	0.126
9 Point	Linear	0.300	0.427	0.124
10 Point	Linear	0.277	0.487	0.033
4 Point	Expon'l	0.249	0.222	0.271
5 Point	Expon'l	0.123	0.133	0.109
6 Point	Expon'l	0.128	0.193	0.067
7 Point	Expon'l	0.053	0.084	0.025
8 Point	Expon'l	0.235	0.313	0.130
9 Point	Expon'l	0.302	0.423	0.129
10 Point	Expon'l	0.281	0.482	0.036

INDEMNITY Linear FITTED	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-21)
4 Point	2004	0.5440	0.5169	0.5712
	2005	0.5467	0.5193	0.5741
	2006	0.5493	0.5217	0.5769
	2007	0.5519	0.5241	0.5798
5 Point	2003	0.5421	0.5144	0.5698
	2004	0.5445	0.5168	0.5722
	2005	0.5469	0.5192	0.5745
	2006	0.5493	0.5217	0.5769
	2007	0.5517	0.5241	0.5793
6 Point	2002	0.5585	0.5325	0.5846
	2003	0.5558	0.5293	0.5823
	2004	0.5531	0.5262	0.5800
	2005	0.5503	0.5230	0.5777
	2006	0.5476	0.5198	0.5754
	2007	0.5448	0.5166	0.5730
7 Point	2001	0.5718	0.5437	0.5999
	2002	0.5666	0.5387	0.5946
	2003	0.5615	0.5337	0.5893
	2004	0.5563	0.5286	0.5840
	2005	0.5511	0.5236	0.5787
	2006	0.5460	0.5186	0.5734
	2007	0.5408	0.5135	0.5681
8 Point	2000	0.5951	0.5677	0.6225
	2001	0.5863	0.5589	0.6137
	2002	0.5775	0.5501	0.6050
	2003	0.5687	0.5413	0.5962
	2004	0.5599	0.5324	0.5874
	2005	0.5511	0.5236	0.5787
	2006	0.5423	0.5148	0.5699
	2007	0.5335	0.5060	0.5612
9 Point	1999	0.6027	0.5765	0.6290
	2000	0.5941	0.5676	0.6206
	2001	0.5855	0.5588	0.6123
	2002	0.5770	0.5500	0.6039
	2003	0.5684	0.5412	0.5955
	2004	0.5598	0.5324	0.5872
	2005	0.5512	0.5236	0.5788
	2006	0.5426	0.5148	0.5704
10 Point	1998	0.5953	0.5717	0.6191
	1999	0.5893	0.5650	0.6136
	2000	0.5832	0.5583	0.6081
	2001	0.5771	0.5517	0.6026
	2002	0.5711	0.5450	0.5972
	2003	0.5650	0.5384	0.5917
	2004	0.5589	0.5317	0.5862
	2005	0.5529	0.5250	0.5807
	2006	0.5468	0.5184	0.5753
	2007	0.5407	0.5117	0.5698

INDEMNITY Expon'l FITTED	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-21)
4 Point	2004	0.5438	0.5166	0.5711
	2005	0.5464	0.5189	0.5739
	2006	0.5490	0.5213	0.5767
	2007	0.5516	0.5236	0.5796
5 Point	2003	0.5420	0.5143	0.5697
	2004	0.5443	0.5166	0.5721
	2005	0.5467	0.5189	0.5744
	2006	0.5490	0.5213	0.5767
	2007	0.5513	0.5236	0.5791
6 Point	2002	0.5583	0.5322	0.5844
	2003	0.5555	0.5290	0.5821
	2004	0.5528	0.5258	0.5798
	2005	0.5500	0.5226	0.5775
	2006	0.5473	0.5195	0.5752
	2007	0.5446	0.5163	0.5729
7 Point	2001	0.5715	0.5435	0.5996
	2002	0.5663	0.5384	0.5942
	2003	0.5611	0.5333	0.5889
	2004	0.5559	0.5282	0.5837
	2005	0.5508	0.5232	0.5784
	2006	0.5458	0.5183	0.5733
	2007	0.5407	0.5133	0.5681
8 Point	2000	0.5946	0.5673	0.6220
	2001	0.5856	0.5582	0.6131
	2002	0.5767	0.5492	0.6042
	2003	0.5679	0.5404	0.5955
	2004	0.5593	0.5317	0.5869
	2005	0.5508	0.5232	0.5784
	2006	0.5424	0.5148	0.5701
	2007	0.5342	0.5066	0.5619
9 Point	1999	0.6027	0.5764	0.6289
	2000	0.5937	0.5672	0.6202
	2001	0.5849	0.5581	0.6117
	2002	0.5762	0.5492	0.6032
	2003	0.5676	0.5404	0.5949
	2004	0.5592	0.5317	0.5867
	2005	0.5509	0.5232	0.5786
	2006	0.5427	0.5148	0.5706
	2007	0.5346	0.5066	0.5627
10 Point	1998	0.5952	0.5717	0.6188
	1999	0.5889	0.5647	0.6132
	2000	0.5827	0.5578	0.6076
	2001	0.5765	0.5510	0.6020
	2002	0.5704	0.5443	0.5966
	2003	0.5644	0.5376	0.5911
	2004	0.5584	0.5310	0.5857
	2005	0.5525	0.5246	0.5804
	2006	0.5466	0.5181	0.5751
	2007	0.5408	0.5118	0.5699

MEDICAL Linear FITTED	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-21)
4 Point	2004	0.5262	0.5078	0.5446
	2005	0.5163	0.4981	0.5344
	2006	0.5064	0.4885	0.5243
	2007	0.4965	0.4788	0.5141
5 Point	2003	0.5209	0.5040	0.5377
	2004	0.5161	0.4988	0.5333
	2005	0.5112	0.4937	0.5288
	2006	0.5064	0.4885	0.5243
	2007	0.5016	0.4833	0.5198
6 Point	2002	0.5217	0.5080	0.5354
	2003	0.5179	0.5032	0.5327
	2004	0.5142	0.4983	0.5301
	2005	0.5105	0.4935	0.5275
	2006	0.5068	0.4886	0.5249
	2007	0.5030	0.4837	0.5223
7 Point	2001	0.5173	0.5027	0.5319
	2002	0.5155	0.5002	0.5307
	2003	0.5136	0.4977	0.5295
	2004	0.5117	0.4952	0.5283
	2005	0.5099	0.4927	0.5270
	2006	0.5080	0.4902	0.5258
	2007	0.5061	0.4877	0.5246
8 Point	2000	0.5302	0.5202	0.5401
	2001	0.5261	0.5147	0.5375
	2002	0.5220	0.5092	0.5349
	2003	0.5180	0.5037	0.5323
	2004	0.5139	0.4982	0.5297
	2005	0.5099	0.4927	0.5270
	2006	0.5058	0.4871	0.5244
	2007	0.5018	0.4816	0.5218
9 Point	1999	0.5341	0.5279	0.5403
	2000	0.5300	0.5220	0.5381
	2001	0.5260	0.5161	0.5359
	2002	0.5220	0.5102	0.5337
	2003	0.5179	0.5043	0.5315
	2004	0.5139	0.4984	0.5294
	2005	0.5099	0.4925	0.5272
	2006	0.5058	0.4866	0.5250
	2007	0.5018	0.4808	0.5228
10 Point	1998	0.5336	0.5324	0.5349
	1999	0.5303	0.5267	0.5339
	2000	0.5270	0.5211	0.5329
	2001	0.5237	0.5154	0.5319
	2002	0.5203	0.5097	0.5309
	2003	0.5170	0.5040	0.5299
	2004	0.5137	0.4984	0.5290
	2005	0.5103	0.4927	0.5280
	2006	0.5070	0.4870	0.5270
	2007	0.5037	0.4813	0.5260

MEDICAL Expon'l FITTED	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-21)
4 Point	2004	0.5257	0.5072	0.5440
	2005	0.5158	0.4975	0.5339
	2006	0.5061	0.4881	0.5240
	2007	0.4965	0.4788	0.5143
5 Point	2003	0.5206	0.5038	0.5374
	2004	0.5157	0.4985	0.5329
	2005	0.5108	0.4932	0.5284
	2006	0.5061	0.4881	0.5240
	2007	0.5013	0.4829	0.5196
6 Point	2002	0.5216	0.5080	0.5352
	2003	0.5177	0.5030	0.5325
	2004	0.5139	0.4980	0.5298
	2005	0.5101	0.4931	0.5272
	2006	0.5064	0.4882	0.5246
	2007	0.5027	0.4833	0.5220
7 Point	2001	0.5173	0.5027	0.5318
	2002	0.5153	0.5000	0.5306
	2003	0.5134	0.4974	0.5293
	2004	0.5115	0.4949	0.5280
	2005	0.5095	0.4923	0.5268
	2006	0.5076	0.4897	0.5255
	2007	0.5057	0.4872	0.5242
8 Point	2000	0.5300	0.5200	0.5400
	2001	0.5258	0.5143	0.5373
	2002	0.5217	0.5087	0.5347
	2003	0.5176	0.5032	0.5320
	2004	0.5136	0.4977	0.5294
	2005	0.5095	0.4923	0.5268
	2006	0.5055	0.4869	0.5241
	2007	0.5016	0.4816	0.5215
9 Point	1999	0.5340	0.5279	0.5402
	2000	0.5299	0.5217	0.5380
	2001	0.5258	0.5157	0.5358
	2002	0.5217	0.5097	0.5335
	2003	0.5176	0.5038	0.5313
	2004	0.5135	0.4979	0.5291
	2005	0.5095	0.4922	0.5269
	2006	0.5056	0.4864	0.5247
	2007	0.5016	0.4808	0.5225
10 Point	1998	0.5337	0.5326	0.5348
	1999	0.5303	0.5266	0.5338
	2000	0.5268	0.5208	0.5328
	2001	0.5234	0.5149	0.5317
	2002	0.5200	0.5092	0.5307
	2003	0.5167	0.5035	0.5297
	2004	0.5133	0.4979	0.5287
	2005	0.5100	0.4923	0.5277
	2006	0.5067	0.4868	0.5267
	2007	0.5034	0.4814	0.5257

INDEMNITY Linear RESIDUALS	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-21)
4 Point	2004	0.0174	0.0194	0.0153
	2005	-0.0183	-0.0196	-0.0169
	2006	-0.0156	-0.0192	-0.0121
	2007	0.0165	0.0193	0.0137
5 Point	2003	0.0004	-0.0001	0.0009
	2004	0.0169	0.0195	0.0144
	2005	-0.0185	-0.0195	-0.0173
	2006	-0.0156	-0.0192	-0.0121
	2007	0.0167	0.0193	0.0142
6 Point	2002	0.0172	0.0187	0.0157
	2003	-0.0133	-0.0150	-0.0116
	2004	0.0083	0.0101	0.0065
	2005	-0.0219	-0.0233	-0.0205
	2006	-0.0139	-0.0173	-0.0106
	2007	0.0236	0.0268	0.0205
7 Point	2001	0.0121	0.0093	0.0149
	2002	0.0091	0.0125	0.0057
	2003	-0.0190	-0.0194	-0.0186
	2004	0.0051	0.0077	0.0025
	2005	-0.0227	-0.0239	-0.0215
	2006	-0.0123	-0.0161	-0.0086
	2007	0.0276	0.0299	0.0254
8 Point	2000	0.0254	0.0266	0.0242
	2001	-0.0024	-0.0059	0.0011
	2002	-0.0018	0.0011	-0.0047
	2003	-0.0262	-0.0270	-0.0255
	2004	0.0015	0.0039	-0.0009
	2005	-0.0227	-0.0239	-0.0215
	2006	-0.0086	-0.0123	-0.0051
	2007	0.0349	0.0375	0.0324
9 Point	1999	-0.0019	-0.0002	-0.0037
	2000	0.0264	0.0267	0.0261
	2001	-0.0016	-0.0058	0.0025
	2002	-0.0013	0.0012	-0.0036
	2003	-0.0259	-0.0269	-0.0248
	2004	0.0016	0.0039	-0.0007
	2005	-0.0228	-0.0239	-0.0216
	2006	-0.0089	-0.0123	-0.0056
	2007	0.0344	0.0374	0.0314
10 Point	1998	-0.0302	-0.0258	-0.0347
	1999	0.0115	0.0113	0.0117
	2000	0.0373	0.0360	0.0386
	2001	0.0068	0.0013	0.0122
	2002	0.0046	0.0062	0.0031
	2003	-0.0225	-0.0241	-0.0210
	2004	0.0025	0.0046	0.0003
	2005	-0.0245	-0.0253	-0.0235
	2006	-0.0131	-0.0159	-0.0105
	2007	0.0277	0.0317	0.0237

INDEMNITY Expon'l RESIDUALS	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-21)
4 Point	2004	0.0176	0.0197	0.0154
	2005	-0.0180	-0.0192	-0.0167
	2006	-0.0153	-0.0188	-0.0119
	2007	0.0168	0.0198	0.0139
5 Point	2003	0.0005	0.0000	0.0010
	2004	0.0171	0.0197	0.0144
	2005	-0.0183	-0.0192	-0.0172
	2006	-0.0153	-0.0188	-0.0119
	2007	0.0171	0.0198	0.0144
6 Point	2002	0.0174	0.0190	0.0159
	2003	-0.0130	-0.0147	-0.0114
	2004	0.0086	0.0105	0.0067
	2005	-0.0216	-0.0229	-0.0203
	2006	-0.0136	-0.0170	-0.0104
	2007	0.0238	0.0271	0.0206
7 Point	2001	0.0124	0.0095	0.0152
	2002	0.0094	0.0128	0.0061
	2003	-0.0186	-0.0190	-0.0182
	2004	0.0055	0.0081	0.0028
	2005	-0.0224	-0.0235	-0.0212
	2006	-0.0121	-0.0158	-0.0085
	2007	0.0277	0.0301	0.0254
8 Point	2000	0.0259	0.0270	0.0247
	2001	-0.0017	-0.0052	0.0017
	2002	-0.0010	0.0020	-0.0039
	2003	-0.0254	-0.0261	-0.0248
	2004	0.0021	0.0046	-0.0004
	2005	-0.0224	-0.0235	-0.0212
	2006	-0.0087	-0.0123	-0.0053
	2007	0.0342	0.0368	0.0316
9 Point	1999	-0.0019	-0.0001	-0.0036
	2000	0.0268	0.0271	0.0265
	2001	-0.0010	-0.0051	0.0031
	2002	-0.0005	0.0020	-0.0029
	2003	-0.0251	-0.0261	-0.0242
	2004	0.0022	0.0046	-0.0002
	2005	-0.0225	-0.0235	-0.0214
	2006	-0.0090	-0.0123	-0.0058
	2007	0.0338	0.0368	0.0308
10 Point	1998	-0.0301	-0.0258	-0.0344
	1999	0.0119	0.0116	0.0121
	2000	0.0378	0.0365	0.0391
	2001	0.0074	0.0020	0.0128
	2002	0.0053	0.0069	0.0037
	2003	-0.0219	-0.0233	-0.0204
	2004	0.0030	0.0053	0.0008
	2005	-0.0241	-0.0249	-0.0232
	2006	-0.0129	-0.0156	-0.0103
	2007	0.0276	0.0316	0.0236

MEDICAL Linear RESIDUALS	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-21)
4 Point	2004	0.0168	0.0159	0.0176
	2005	-0.0134	-0.0104	-0.0164
	2006	-0.0235	-0.0270	-0.0200
	2007	0.0201	0.0215	0.0188
5 Point	2003	-0.0102	-0.0089	-0.0113
	2004	0.0269	0.0249	0.0290
	2005	-0.0083	-0.0060	-0.0108
	2006	-0.0235	-0.0270	-0.0200
	2007	0.0150	0.0170	0.0131
6 Point	2002	-0.0037	-0.0010	-0.0063
	2003	-0.0072	-0.0081	-0.0063
	2004	0.0288	0.0254	0.0321
	2005	-0.0076	-0.0058	-0.0095
	2006	-0.0239	-0.0271	-0.0206
	2007	0.0136	0.0166	0.0106
7 Point	2001	-0.0093	-0.0118	-0.0069
	2002	0.0025	0.0068	-0.0016
	2003	-0.0029	-0.0026	-0.0031
	2004	0.0313	0.0285	0.0339
	2005	-0.0070	-0.0050	-0.0090
	2006	-0.0251	-0.0287	-0.0215
	2007	0.0105	0.0126	0.0083
8 Point	2000	0.0154	0.0211	0.0097
	2001	-0.0181	-0.0238	-0.0125
	2002	-0.0040	-0.0022	-0.0058
	2003	-0.0073	-0.0086	-0.0059
	2004	0.0291	0.0255	0.0325
	2005	-0.0070	-0.0050	-0.0090
	2006	-0.0229	-0.0256	-0.0201
	2007	0.0148	0.0187	0.0111
9 Point	1999	-0.0003	0.0035	-0.0041
	2000	0.0155	0.0193	0.0117
	2001	-0.0180	-0.0252	-0.0109
	2002	-0.0040	-0.0032	-0.0046
	2003	-0.0072	-0.0092	-0.0051
	2004	0.0291	0.0253	0.0328
	2005	-0.0070	-0.0048	-0.0092
	2006	-0.0229	-0.0251	-0.0207
2007	0.0148	0.0195	0.0101	
10 Point	1998	-0.0084	-0.0026	-0.0144
	1999	0.0035	0.0047	0.0023
	2000	0.0185	0.0202	0.0169
	2001	-0.0157	-0.0245	-0.0069
	2002	-0.0023	-0.0027	-0.0018
	2003	-0.0063	-0.0089	-0.0035
	2004	0.0293	0.0253	0.0332
	2005	-0.0074	-0.0050	-0.0100
	2006	-0.0241	-0.0255	-0.0227
2007	0.0129	0.0190	0.0069	

MEDICAL Expon'l RESIDUALS	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-21)
4 Point	2004	0.0173	0.0165	0.0182
	2005	-0.0129	-0.0098	-0.0159
	2006	-0.0232	-0.0266	-0.0197
	2007	0.0201	0.0215	0.0186
5 Point	2003	-0.0099	-0.0087	-0.0110
	2004	0.0273	0.0252	0.0293
	2005	-0.0079	-0.0055	-0.0104
	2006	-0.0232	-0.0266	-0.0197
	2007	0.0153	0.0174	0.0133
6 Point	2002	-0.0036	-0.0010	-0.0061
	2003	-0.0070	-0.0079	-0.0061
	2004	0.0291	0.0257	0.0324
	2005	-0.0072	-0.0054	-0.0092
	2006	-0.0235	-0.0267	-0.0203
	2007	0.0139	0.0170	0.0109
	2007	0.0139	0.0170	0.0109
7 Point	2001	-0.0093	-0.0118	-0.0068
	2002	0.0027	0.0070	-0.0015
	2003	-0.0027	-0.0023	-0.0029
	2004	0.0315	0.0288	0.0342
	2005	-0.0066	-0.0046	-0.0088
	2006	-0.0247	-0.0282	-0.0212
	2007	0.0109	0.0131	0.0087
	2007	0.0109	0.0131	0.0087
8 Point	2000	0.0155	0.0213	0.0098
	2001	-0.0178	-0.0234	-0.0123
	2002	-0.0037	-0.0017	-0.0056
	2003	-0.0069	-0.0081	-0.0056
	2004	0.0294	0.0260	0.0328
	2005	-0.0066	-0.0046	-0.0088
	2006	-0.0226	-0.0254	-0.0198
	2007	0.0150	0.0187	0.0114
9 Point	1999	-0.0002	0.0035	-0.0040
	2000	0.0156	0.0196	0.0118
	2001	-0.0178	-0.0248	-0.0108
	2002	-0.0037	-0.0027	-0.0044
	2003	-0.0069	-0.0087	-0.0049
	2004	0.0295	0.0258	0.0331
	2005	-0.0066	-0.0045	-0.0089
	2006	-0.0227	-0.0249	-0.0204
	2007	0.0150	0.0195	0.0104
10 Point	1998	-0.0085	-0.0028	-0.0143
	1999	0.0035	0.0048	0.0024
	2000	0.0187	0.0205	0.0170
	2001	-0.0154	-0.0240	-0.0067
	2002	-0.0020	-0.0022	-0.0016
	2003	-0.0060	-0.0084	-0.0033
	2004	0.0297	0.0258	0.0335
	2005	-0.0071	-0.0046	-0.0097
	2006	-0.0238	-0.0253	-0.0224
	2007	0.0132	0.0189	0.0072