

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	0.670	0.629	0.720
5 Point	Linear	0.833	0.811	0.860
6 Point	Linear	0.896	0.872	0.919
7 Point	Linear	0.925	0.912	0.937
8 Point	Linear	0.907	0.907	0.903
9 Point	Linear	0.658	0.737	0.550
10 Point	Linear	0.620	0.717	0.488
4 Point	Expon'l	0.679	0.641	0.726
5 Point	Expon'l	0.837	0.815	0.862
6 Point	Expon'l	0.896	0.872	0.919
7 Point	Expon'l	0.930	0.916	0.942
8 Point	Expon'l	0.910	0.908	0.906
9 Point	Expon'l	0.669	0.746	0.561
10 Point	Expon'l	0.631	0.724	0.500

MEDICAL		Average		
r ²		(Pd & Inc)	(Incur)	(Pd-20)
4 Point	Linear	0.280	0.241	0.313
5 Point	Linear	0.123	0.134	0.103
6 Point	Linear	0.007	0.002	0.017
7 Point	Linear	0.136	0.150	0.105
8 Point	Linear	0.170	0.211	0.103
9 Point	Linear	10.9%	0.218	0.010
10 Point	Linear	0.020	0.078	0.004
4 Point	Expon'l	0.291	0.251	0.324
5 Point	Expon'l	0.133	0.145	0.110
6 Point	Expon'l	0.009	0.003	0.020
7 Point	Expon'l	0.141	0.153	0.112
8 Point	Expon'l	0.177	0.215	0.111
9 Point	Expon'l	0.116	0.224	0.012
10 Point	Expon'l	0.023	0.082	0.003

INDEMNITY Linear FITTED	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2003	0.5360	0.5065	0.5655
	2004	0.5234	0.4927	0.5540
	2005	0.5107	0.4790	0.5425
	2006	0.4981	0.4652	0.5310
5 Point	2002	0.5556	0.5284	0.5828
	2003	0.5407	0.5120	0.5694
	2004	0.5257	0.4955	0.5559
	2005	0.5107	0.4790	0.5425
	2006	0.4958	0.4625	0.5291
6 Point	2001	0.5703	0.5426	0.5980
	2002	0.5554	0.5267	0.5841
	2003	0.5405	0.5109	0.5702
	2004	0.5256	0.4950	0.5563
	2005	0.5108	0.4792	0.5423
	2006	0.4959	0.4633	0.5284
7 Point	2000	0.5943	0.5684	0.6202
	2001	0.5773	0.5503	0.6044
	2002	0.5603	0.5321	0.5886
	2003	0.5433	0.5140	0.5727
	2004	0.5264	0.4958	0.5569
	2005	0.5094	0.4776	0.5411
	2006	0.4924	0.4595	0.5252
8 Point	1999	0.6016	0.5777	0.6254
	2000	0.5866	0.5613	0.6117
	2001	0.5715	0.5450	0.5980
	2002	0.5565	0.5286	0.5843
	2003	0.5414	0.5122	0.5706
	2004	0.5264	0.4958	0.5569
	2005	0.5113	0.4794	0.5432
	2006	0.4963	0.4630	0.5295
9 Point	1998	0.5922	0.5718	0.6124
	1999	0.5814	0.5594	0.6034
	2000	0.5707	0.5469	0.5944
	2001	0.5600	0.5345	0.5854
	2002	0.5492	0.5220	0.5765
	2003	0.5385	0.5096	0.5675
	2004	0.5278	0.4971	0.5585
	2005	0.5171	0.4847	0.5495
10 Point	1997	0.5925	0.5743	0.6106
	1998	0.5834	0.5634	0.6033
	1999	0.5743	0.5526	0.5961
	2000	0.5652	0.5417	0.5888
	2001	0.5561	0.5308	0.5815
	2002	0.5471	0.5199	0.5742
	2003	0.5380	0.5090	0.5669
	2004	0.5289	0.4982	0.5596
	2005	0.5198	0.4873	0.5523
	2006	0.5107	0.4764	0.5450

INDEMNITY Expon'l FITTED	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2003	0.5362	0.5067	0.5656
	2004	0.5231	0.4924	0.5538
	2005	0.5105	0.4786	0.5423
	2006	0.4981	0.4651	0.5310
5 Point	2002	0.5560	0.5288	0.5831
	2003	0.5404	0.5115	0.5691
	2004	0.5252	0.4948	0.5556
	2005	0.5105	0.4786	0.5423
	2006	0.4961	0.4629	0.5294
6 Point	2001	0.5710	0.5434	0.5985
	2002	0.5552	0.5265	0.5839
	2003	0.5399	0.5101	0.5697
	2004	0.5250	0.4942	0.5558
	2005	0.5105	0.4789	0.5422
	2006	0.4965	0.4640	0.5290
7 Point	2000	0.5953	0.5697	0.6210
	2001	0.5771	0.5500	0.6042
	2002	0.5594	0.5309	0.5878
	2003	0.5422	0.5126	0.5718
	2004	0.5256	0.4948	0.5563
	2005	0.5095	0.4777	0.5412
	2006	0.4938	0.4612	0.5265
8 Point	1999	0.6031	0.5796	0.6266
	2000	0.5867	0.5616	0.6119
	2001	0.5708	0.5441	0.5975
	2002	0.5553	0.5271	0.5834
	2003	0.5402	0.5107	0.5697
	2004	0.5256	0.4948	0.5563
	2005	0.5113	0.4794	0.5432
	2006	0.4974	0.4645	0.5304
9 Point	1998	0.5933	0.5736	0.6130
	1999	0.5817	0.5599	0.6034
	2000	0.5703	0.5465	0.5940
	2001	0.5591	0.5334	0.5847
	2002	0.5482	0.5207	0.5756
	2003	0.5375	0.5082	0.5666
	2004	0.5269	0.4961	0.5578
	2005	0.5166	0.4842	0.5491
10 Point	1997	0.5937	0.5763	0.6113
	1998	0.5839	0.5643	0.6035
	1999	0.5742	0.5525	0.5958
	2000	0.5646	0.5409	0.5882
	2001	0.5552	0.5296	0.5808
	2002	0.5460	0.5185	0.5734
	2003	0.5369	0.5077	0.5661
	2004	0.5280	0.4971	0.5589
	2005	0.5192	0.4867	0.5518
	2006	0.5106	0.4765	0.5447

MEDICAL Linear FITTED	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2003	0.5308	0.5280	0.5336
	2004	0.5205	0.5175	0.5235
	2005	0.5102	0.5071	0.5134
	2006	0.4999	0.4966	0.5034
5 Point	2002	0.5247	0.5236	0.5257
	2003	0.5199	0.5181	0.5216
	2004	0.5151	0.5126	0.5175
	2005	0.5102	0.5071	0.5134
	2006	0.5054	0.5015	0.5093
6 Point	2001	0.5152	0.5109	0.5195
	2002	0.5143	0.5104	0.5182
	2003	0.5134	0.5098	0.5169
	2004	0.5125	0.5093	0.5157
	2005	0.5115	0.5087	0.5144
	2006	0.5106	0.5081	0.5131
7 Point	2000	0.5279	0.5288	0.5270
	2001	0.5243	0.5243	0.5243
	2002	0.5206	0.5197	0.5216
	2003	0.5170	0.5151	0.5188
	2004	0.5134	0.5106	0.5161
	2005	0.5097	0.5060	0.5134
	2006	0.5061	0.5015	0.5107
8 Point	1999	0.5303	0.5334	0.5271
	2000	0.5269	0.5289	0.5249
	2001	0.5235	0.5243	0.5227
	2002	0.5201	0.5197	0.5205
	2003	0.5168	0.5152	0.5183
	2004	0.5134	0.5106	0.5161
	2005	0.5100	0.5060	0.5139
	2006	0.5066	0.5015	0.5117
9 Point	1998	0.5274	0.5344	0.5203
	1999	0.5251	0.5305	0.5197
	2000	0.5228	0.5265	0.5191
	2001	0.5206	0.5226	0.5185
	2002	0.5183	0.5187	0.5179
	2003	0.5160	0.5147	0.5173
	2004	0.5137	0.5108	0.5167
	2005	0.5115	0.5069	0.5161
	2006	0.5092	0.5029	0.5154
10 Point	1997	0.5207	0.5264	0.5150
	1998	0.5198	0.5244	0.5153
	1999	0.5190	0.5223	0.5156
	2000	0.5181	0.5203	0.5160
	2001	0.5173	0.5182	0.5163
	2002	0.5164	0.5162	0.5166
	2003	0.5155	0.5141	0.5170
	2004	0.5147	0.5121	0.5173
	2005	0.5138	0.5100	0.5176
	2006	0.5130	0.5080	0.5180

MEDICAL Expon'l FITTED	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2003	0.5307	0.5278	0.5335
	2004	0.5201	0.5170	0.5232
	2005	0.5098	0.5065	0.5131
	2006	0.4996	0.4961	0.5032
5 Point	2002	0.5247	0.5236	0.5257
	2003	0.5197	0.5178	0.5214
	2004	0.5147	0.5121	0.5172
	2005	0.5098	0.5065	0.5131
	2006	0.5049	0.5009	0.5089
6 Point	2001	0.5152	0.5108	0.5195
	2002	0.5141	0.5101	0.5181
	2003	0.5131	0.5095	0.5167
	2004	0.5121	0.5088	0.5154
	2005	0.5111	0.5081	0.5140
	2006	0.5101	0.5075	0.5126
7 Point	2000	0.5278	0.5285	0.5269
	2001	0.5240	0.5238	0.5241
	2002	0.5203	0.5192	0.5214
	2003	0.5166	0.5146	0.5186
	2004	0.5130	0.5101	0.5158
	2005	0.5093	0.5056	0.5131
	2006	0.5057	0.5011	0.5103
8 Point	1999	0.5303	0.5333	0.5272
	2000	0.5268	0.5286	0.5249
	2001	0.5233	0.5239	0.5226
	2002	0.5198	0.5192	0.5203
	2003	0.5164	0.5146	0.5181
	2004	0.5130	0.5101	0.5158
	2005	0.5096	0.5055	0.5136
	2006	0.5062	0.5011	0.5113
9 Point	1998	0.5274	0.5344	0.5203
	1999	0.5251	0.5303	0.5196
	2000	0.5227	0.5263	0.5190
	2001	0.5203	0.5222	0.5183
	2002	0.5180	0.5182	0.5177
	2003	0.5157	0.5142	0.5170
	2004	0.5133	0.5103	0.5163
	2005	0.5110	0.5064	0.5157
10 Point	1997	0.5206	0.5263	0.5149
	1998	0.5197	0.5242	0.5152
	1999	0.5188	0.5220	0.5155
	2000	0.5179	0.5199	0.5158
	2001	0.5170	0.5178	0.5161
	2002	0.5161	0.5157	0.5164
	2003	0.5152	0.5136	0.5167
	2004	0.5143	0.5115	0.5170
	2005	0.5134	0.5094	0.5173
	2006	0.5125	0.5074	0.5176

INDEMNITY Linear RESIDUALS	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2003	-0.0098	-0.0115	-0.0081
	2004	0.0165	0.0198	0.0133
	2005	-0.0037	-0.0051	-0.0024
	2006	-0.0030	-0.0032	-0.0028
5 Point	2002	0.0047	0.0055	0.0039
	2003	-0.0145	-0.0170	-0.0120
	2004	0.0142	0.0170	0.0114
	2005	-0.0037	-0.0051	-0.0024
	2006	-0.0007	-0.0005	-0.0009
6 Point	2001	-0.0003	-0.0022	0.0016
	2002	0.0049	0.0072	0.0026
	2003	-0.0143	-0.0159	-0.0128
	2004	0.0143	0.0175	0.0110
	2005	-0.0038	-0.0053	-0.0022
	2006	-0.0008	-0.0013	-0.0002
7 Point	2000	0.0106	0.0116	0.0096
	2001	-0.0073	-0.0099	-0.0048
	2002	0.0000	0.0018	-0.0019
	2003	-0.0171	-0.0190	-0.0153
	2004	0.0136	0.0167	0.0104
	2005	-0.0024	-0.0037	-0.0010
	2006	0.0027	0.0025	0.0030
8 Point	1999	-0.0136	-0.0124	-0.0148
	2000	0.0183	0.0187	0.0181
	2001	-0.0015	-0.0045	0.0016
	2002	0.0038	0.0053	0.0024
	2003	-0.0152	-0.0172	-0.0132
	2004	0.0136	0.0167	0.0104
	2005	-0.0043	-0.0055	-0.0031
	2006	-0.0012	-0.0010	-0.0013
9 Point	1998	-0.0404	-0.0366	-0.0440
	1999	0.0066	0.0059	0.0072
	2000	0.0342	0.0331	0.0354
	2001	0.0100	0.0059	0.0142
	2002	0.0111	0.0119	0.0102
	2003	-0.0123	-0.0146	-0.0101
	2004	0.0121	0.0154	0.0088
	2005	-0.0101	-0.0108	-0.0094
10 Point	1997	-0.0197	-0.0189	-0.0204
	1998	-0.0316	-0.0282	-0.0349
	1999	0.0137	0.0127	0.0145
	2000	0.0397	0.0383	0.0410
	2001	0.0139	0.0096	0.0181
	2002	0.0132	0.0140	0.0125
	2003	-0.0118	-0.0140	-0.0095
	2004	0.0110	0.0143	0.0077
	2005	-0.0128	-0.0134	-0.0122
	2006	-0.0156	-0.0144	-0.0168

INDEMNITY Expon'l RESIDUALS	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2003	-0.0100	-0.0117	-0.0082
	2004	0.0168	0.0201	0.0135
	2005	-0.0035	-0.0047	-0.0022
	2006	-0.0030	-0.0031	-0.0028
5 Point	2002	0.0043	0.0051	0.0036
	2003	-0.0142	-0.0165	-0.0117
	2004	0.0147	0.0177	0.0117
	2005	-0.0035	-0.0047	-0.0022
	2006	-0.0010	-0.0009	-0.0012
6 Point	2001	-0.0010	-0.0030	0.0011
	2002	0.0051	0.0074	0.0028
	2003	-0.0137	-0.0151	-0.0123
	2004	0.0149	0.0183	0.0115
	2005	-0.0035	-0.0050	-0.0021
	2006	-0.0014	-0.0020	-0.0008
7 Point	2000	0.0096	0.0103	0.0088
	2001	-0.0071	-0.0096	-0.0046
	2002	0.0009	0.0030	-0.0011
	2003	-0.0160	-0.0176	-0.0144
	2004	0.0143	0.0177	0.0110
	2005	-0.0025	-0.0038	-0.0011
	2006	0.0013	0.0008	0.0017
8 Point	1999	-0.0151	-0.0143	-0.0160
	2000	0.0182	0.0184	0.0179
	2001	-0.0008	-0.0037	0.0021
	2002	0.0050	0.0068	0.0033
	2003	-0.0140	-0.0157	-0.0123
	2004	0.0143	0.0177	0.0110
	2005	-0.0043	-0.0055	-0.0031
	2006	-0.0023	-0.0025	-0.0022
9 Point	1998	-0.0415	-0.0384	-0.0446
	1999	0.0063	0.0054	0.0072
	2000	0.0346	0.0335	0.0358
	2001	0.0109	0.0070	0.0149
	2002	0.0121	0.0132	0.0111
	2003	-0.0113	-0.0132	-0.0092
	2004	0.0130	0.0164	0.0095
	2005	-0.0096	-0.0103	-0.0090
10 Point	1997	-0.0209	-0.0209	-0.0211
	1998	-0.0321	-0.0291	-0.0351
	1999	0.0138	0.0128	0.0148
	2000	0.0403	0.0391	0.0416
	2001	0.0148	0.0108	0.0188
	2002	0.0143	0.0154	0.0133
	2003	-0.0107	-0.0127	-0.0087
	2004	0.0119	0.0154	0.0084
	2005	-0.0122	-0.0128	-0.0117
	2006	-0.0155	-0.0145	-0.0165

MEDICAL Linear RESIDUALS	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2003	-0.0198	-0.0227	-0.0170
	2004	0.0294	0.0311	0.0277
	2005	0.0007	0.0058	-0.0044
	2006	-0.0102	-0.0142	-0.0063
5 Point	2002	-0.0109	-0.0099	-0.0119
	2003	-0.0089	-0.0128	-0.0050
	2004	0.0348	0.0360	0.0337
	2005	0.0007	0.0058	-0.0044
	2006	-0.0157	-0.0191	-0.0122
6 Point	2001	-0.0130	-0.0165	-0.0094
	2002	-0.0005	0.0033	-0.0044
	2003	-0.0024	-0.0045	-0.0003
	2004	0.0374	0.0393	0.0355
	2005	-0.0006	0.0041	-0.0054
	2006	-0.0209	-0.0257	-0.0160
7 Point	2000	0.0136	0.0200	0.0071
	2001	-0.0221	-0.0299	-0.0142
	2002	-0.0068	-0.0060	-0.0077
	2003	-0.0060	-0.0098	-0.0022
	2004	0.0365	0.0380	0.0351
	2005	0.0012	0.0068	-0.0044
	2006	-0.0164	-0.0191	-0.0136
8 Point	1999	-0.0017	0.0001	-0.0035
	2000	0.0146	0.0199	0.0092
	2001	-0.0213	-0.0299	-0.0126
	2002	-0.0063	-0.0060	-0.0067
	2003	-0.0058	-0.0099	-0.0017
	2004	0.0365	0.0380	0.0351
	2005	0.0009	0.0068	-0.0049
	2006	-0.0169	-0.0191	-0.0146
9 Point	1998	-0.0104	-0.0059	-0.0148
	1999	0.0035	0.0030	0.0039
	2000	0.0187	0.0223	0.0150
	2001	-0.0184	-0.0282	-0.0084
	2002	-0.0045	-0.0050	-0.0041
	2003	-0.0050	-0.0094	-0.0007
	2004	0.0362	0.0378	0.0345
	2005	-0.0006	0.0059	-0.0071
	2006	-0.0195	-0.0205	-0.0183
10 Point	1997	-0.0170	-0.0226	-0.0114
	1998	-0.0028	0.0041	-0.0098
	1999	0.0096	0.0112	0.0080
	2000	0.0234	0.0285	0.0181
	2001	-0.0151	-0.0238	-0.0062
	2002	-0.0026	-0.0025	-0.0028
	2003	-0.0045	-0.0088	-0.0004
	2004	0.0352	0.0365	0.0339
	2005	-0.0029	0.0028	-0.0086
	2006	-0.0233	-0.0256	-0.0209

MEDICAL Expon'l RESIDUALS	Policy Year	Loss Ratio Average (Pd & Inc)	Loss Ratio (Incur)	Loss Ratio (Pd-20)
4 Point	2003	-0.0197	-0.0225	-0.0169
	2004	0.0298	0.0316	0.0280
	2005	0.0011	0.0063	-0.0041
	2006	-0.0099	-0.0137	-0.0061
5 Point	2002	-0.0109	-0.0099	-0.0119
	2003	-0.0087	-0.0125	-0.0048
	2004	0.0352	0.0365	0.0340
	2005	0.0011	0.0063	-0.0041
	2006	-0.0152	-0.0185	-0.0118
6 Point	2001	-0.0130	-0.0164	-0.0094
	2002	-0.0003	0.0036	-0.0043
	2003	-0.0021	-0.0042	-0.0001
	2004	0.0378	0.0398	0.0358
	2005	-0.0002	0.0047	-0.0050
	2006	-0.0204	-0.0251	-0.0155
7 Point	2000	0.0137	0.0203	0.0072
	2001	-0.0218	-0.0294	-0.0140
	2002	-0.0065	-0.0055	-0.0076
	2003	-0.0056	-0.0093	-0.0020
	2004	0.0369	0.0385	0.0354
	2005	0.0016	0.0072	-0.0041
	2006	-0.0160	-0.0187	-0.0132
8 Point	1999	-0.0017	0.0002	-0.0036
	2000	0.0147	0.0202	0.0092
	2001	-0.0211	-0.0295	-0.0125
	2002	-0.0060	-0.0055	-0.0065
	2003	-0.0054	-0.0093	-0.0015
	2004	0.0369	0.0385	0.0354
	2005	0.0013	0.0073	-0.0046
	2006	-0.0165	-0.0187	-0.0142
9 Point	1998	-0.0104	-0.0059	-0.0148
	1999	0.0035	0.0032	0.0040
	2000	0.0188	0.0225	0.0151
	2001	-0.0181	-0.0278	-0.0082
	2002	-0.0042	-0.0045	-0.0039
	2003	-0.0047	-0.0089	-0.0004
	2004	0.0366	0.0383	0.0349
	2005	-0.0001	0.0064	-0.0067
2006	-0.0190	-0.0201	-0.0179	
10 Point	1997	-0.0169	-0.0225	-0.0113
	1998	-0.0027	0.0043	-0.0097
	1999	0.0098	0.0115	0.0081
	2000	0.0236	0.0289	0.0183
	2001	-0.0148	-0.0234	-0.0060
	2002	-0.0023	-0.0020	-0.0026
	2003	-0.0042	-0.0083	-0.0001
	2004	0.0356	0.0371	0.0342
	2005	-0.0025	0.0034	-0.0083
	2006	-0.0228	-0.0250	-0.0205