

PENNSYLVANIA COMPENSATION RATING BUREAU

Tail Factors for Loss Development

For a given calendar year, the PCRB collects financial loss development data for the current policy year and the twenty previous individual policy years. A single aggregate line of experience is reported for all older policy years combined.

Thus, the 2009 vs. 2010, 2010 vs. 2011, 2011 vs. 2012 and 2012 vs. 2013 valuations in the tail factor calculation will use policy year 1986 as the earliest separate policy year and an aggregate line of experience for policy years 1985 and prior.

The following discussion focuses on data with an earliest available policy year of 1978 for illustrative purposes. The discussion for data starting with later policy years would, however, be analogous.

Prior to 1995, the PCRB has computed incurred loss development for maturities older than policy year 1978 (i.e., the pre-1978 “tail”) by comparing the total amount of dollar development in incurred losses occurring in a given calendar year to the incurred loss reported for policy year 1978 at the beginning of that same calendar period.

As part of the Insurance Department’s examination of the Bureau, the actuarial firm retained to perform portions of that review commented that the PCRB’s approach effectively assumed that each policy year prior to 1978 had the same amount of ultimate losses as did policy year 1978. Since policy year losses have tended to increase from year to year in response to benefit and price changes, changes in employment volume and other features affecting loss trends, this assumption was noted as understating the true tail in the PCRB’s loss development analysis. The contractor recommended that for future filings the PCRB add a growth adjustment to its tail factor calculation.

In response to this recommendation the PCRB changed its derivation of tail factors for its 12/1/95 filing. That approach, used again for this filing, is applied separately for indemnity and medical loss experience and for each calendar year of experience, and outlined as follows:

1. A starting policy year loss amount based on the average reported incurred loss for policy years 1978-1980 was computed.
2. An annual loss inflation factor was selected based on observed changes in incurred losses by policy year for the older policy years having separate experience data reported.

3. A historical series of estimated incurred losses by policy year beginning with policy year 1977 was computed using the starting point from #1 and the selected inflation factor from #2.
4. A calendar year loss development factor was selected for policy year 1977 based on observed developments for the oldest years with actual separate experience available.
5. A rate of decline in calendar year loss development factors by policy year was then computed such that when the resulting series of loss development factors was applied to the historical series of estimated incurred losses in #3, the total implied dollar amount of loss development for the calendar year balanced to the observed amount of development on policy years prior to 1978.
6. The “tail factor” applicable to maturities prior to policy year 1978 based on that calendar year of experience was then computed as the cumulative product of the series of loss development factors constructed in #5.

In general, this approach produced policy year incurred losses and loss development factors such that measurable development terminated for policy years in the mid- to early 1930’s. Because the amount of calendar year development observed for policy years prior to 1978 varied considerably from year to year, some variations in the application of the initial selected loss development factor were necessary (i.e., whether the initial selection was applied to 1,2 or 3 prior policy years before beginning the application of the selected rate of decline in loss development). In addition, the selected rates of decline in loss development factors vary from calendar year to calendar year in order to achieve the desired balance with observed calendar year development.

Recognizing the volatility of observed calendar year development for policy years prior to 1978 in the aggregate, the PCRB elected to use an experience period comprising four calendar years of loss development in computing indicated tail factors for this filing.

A summary exhibit on page 1 presents results of the tail development factor calculations. Following the summary page, eight exhibits presenting the derivation of indicated tail factors using the procedure outlined above are attached (four for indemnity and four for medical). These exhibits are numbered as pages 2 through 9 respectively.

SUMMARY OF LOSS DEVELOPMENT TAIL FACTOR CALCULATIONS

VALUATION	MATURITY	<u>INDEMNITY</u> Tail Factor	<u>MEDICAL</u> Tail Factor
12V13	26TH TO ULT.	1.0020	1.0110
11V12	26TH TO ULT.	1.0010	1.0149
10V11	26TH TO ULT.	1.0033	1.0600
09V10	26TH TO ULT.	1.0013	1.0249
AVERAGE OF LATEST 4 VALUATIONS		1.0019	1.0277

Inputs for Tail Factor Estimation - 2015 Loss Cost Filing

Indemnity: 12v13

Latest 12/31 Prior to 1986 Incurred	4,713,627,048
Next Latest 12/31 Prior to 1986 Incurred	4,712,973,737
CY Development of Prior Yrs	653,311
Next Latest PY 1986 Incurred	716,140,724
# of 1986 Yrs in Prior Data	6.58
Selected Decrement, Development Factor	0.75
Selected Average PY Deflation Factor	0.95

- 1 Policy Yr 1985 Incurred = Average of 1986, 1987, 1988, reduced by PY Deflation ^ 2
- 2 PY 1984 & Prior = Subsequent Yr x PY Deflation
- 3 1985 Development Selected Based on Observed 1986, 1987, 1988
- 4 PY 1984 & Prior Development = (Subsequent Yr - 1.0) x Selected Decrement + 1.0

TAIL = .0000 vs 1.0009 653,311
0

Pennsylvania Compensation Rating Bureau
Tail Factor Model - 2015 Loss Cost Filing

INDEMNITY

Policy Year	(*=Estimate)	12/31/13 Incurred	Prior Year Development	Dollar Development	DF	Policy Year	(*=Estimate)	12/31/13 Incurred	Prior Year Development	Dollar Development	DF	
1942	*	85,387,986	1.000000	0	1.0000	#	1978	*	541,186,528	1.000032	17,511	1.0001
1943	*	89,882,090	1.000000	0	1.0000	#	1979	*	569,670,030	1.000043	24,576	1.0002
1944	*	94,612,726	1.000000	0	1.0000	#	1980	*	599,652,663	1.000058	34,492	1.0002
1945	*	99,592,344	1.000000	0	1.0000	#	1981	*	631,213,330	1.000077	48,409	1.0003
1946	*	104,834,046	1.000000	0	1.0000	#	1982	*	664,435,084	1.000102	67,941	1.0004
1947	*	110,351,627	1.000000	0	1.0000	#	1983	*	699,405,351	1.000136	95,353	1.0005
1948	*	116,159,608	1.000000	1	1.0000	#	1984	*	736,216,159	1.000182	133,823	1.0007
1949	*	122,273,271	1.000000	1	1.0000	#	1985	*	774,964,378	1.0002424056	187,810	1.0010 27TH TO ULT
1950	*	128,708,706	1.000000	1	1.0000	#	1986		716,876,079	1.0010		1.0020 26TH TO ULT
1951	*	135,482,849	1.000000	2	1.0000	#	1987		869,179,886	0.9994		
1952	*	142,613,525	1.000000	3	1.0000	#	1988		990,002,910	0.9999		
1953	*	150,119,500	1.000000	4	1.0000	#	1989		1,146,846,762	1.0009		
1954	*	158,020,526	1.000000	5	1.0000	#	1990		1,172,413,104	1.0008		
1955	*	166,337,396	1.000000	7	1.0000	#	1991		1,025,893,293	0.9990	Total Development:	
1956	*	175,091,996	1.000000	10	1.0000	#	1992		876,752,867	0.9992	653,311	
1957	*	184,307,364	1.000000	14	1.0000	#	1993		761,498,310	1.0011		
1958	*	194,007,752	1.000000	20	1.0000	#	1994		703,910,424	1.0025		
1959	*	204,218,686	1.000000	28	1.0000	#	1995		609,516,805	1.0009		
1960	*	214,967,038	1.000000	39	1.0000	#	1996		532,920,536	0.9998		
1961	*	226,281,093	1.000000	55	1.0000	#	1997		553,017,236	1.0014		
1962	*	238,190,624	1.000000	77	1.0000	#	1998		564,235,439	1.0006		
1963	*	250,726,973	1.000000	108	1.0000	#	1999		635,387,084	0.9997		
1964	*	263,923,129	1.000001	152	1.0000	#	2000		677,103,151	1.0016		
1965	*	277,813,820	1.000001	214	1.0000	#	2001		671,186,150	1.0051		
1966	*	292,435,600	1.000001	300	1.0000	#	2002		697,300,145	1.0021		
1967	*	307,826,947	1.000001	421	1.0000	#	2003		671,527,645	1.0021		
1968	*	324,028,366	1.000002	590	1.0000	#	2004		700,722,493	1.0050		
1969	*	341,082,490	1.000002	829	1.0000	#	2005		705,078,102	1.0025		
1970	*	359,034,200	1.000003	1,163	1.0000	#	2006		729,721,980	1.0067		
1971	*	377,930,737	1.000004	1,632	1.0000	#	2007		763,040,085	1.0000		
1972	*	397,821,828	1.000006	2,291	1.0000	#	2008		710,595,106	1.0089		
1973	*	418,759,819	1.000008	3,215	1.0000	#	2009		637,994,017	1.0286		
1974	*	440,799,810	1.000010	4,513	1.0000	#	2010		652,743,788	1.1108		
1975	*	463,999,800	1.000014	6,334	1.0001	#	2011		583,460,415	1.3946		
1976	*	488,420,842	1.000018	8,890	1.0001	#	2012		386,615,612	3.3298		
1977	*	514,127,202	1.000024	12,477	1.0001	#	2013		116,896,126			

Inputs for Tail Factor Estimation - 2015 Loss Cost Filing

Medical 12v13

Latest 12/31 Prior to 1986 Incurred	1,506,204,488
Next Latest 12/31 Prior to 1986 Incurred	1,504,616,816
CY Development of Prior Yrs	1,587,672
Next Latest PY 1986 Incurred	328,763,421
# of 1986 Yrs in Prior Data	4.58
Selected Decrement, Development Factor	0.75
Selected Average PY Deflation Factor	0.93

- 1 Policy Yr 1985 Incurred = Average of 1986, 1987, 1988, reduced by PY Deflation ^ 2
- 2 PY 1984 & Prior = Subsequent Yr x PY Deflation
- 3 1985 Development Selected Based on Observed 1986, 1987, 1988
- 4 PY 1984 & Prior Development = (Subsequent Yr - 1.0) x Selected Decrement + 1.0

TAIL = .0000 vs 1.0048 1,587,672
0

Pennsylvania Compensation Rating Bureau
Tail Factor Model - 2015 Loss Cost Filing

MEDICAL

Policy Year	(*=Estimate)	12/31/13 Incurred	Prior Year Development	Dollar Development	DF	Policy Year	(*=Estimate)	12/31/13 Incurred	Prior Year Development	Dollar Development	DF	
1942	*	16,540,359	1.000000	0	1.0000	#	1978	*	225,506,361	1.000171	38,599	1.0007
1943	*	17,785,333	1.000000	0	1.0000	#	1979	*	242,479,958	1.000228	55,336	1.0009
1944	*	19,124,014	1.000000	0	1.0000	#	1980	*	260,731,137	1.000304	79,328	1.0012
1945	*	20,563,456	1.000000	0	1.0000	#	1981	*	280,356,062	1.000406	113,721	1.0016
1946	*	22,111,243	1.000000	0	1.0000	#	1982	*	301,458,131	1.000541	163,018	1.0022
1947	*	23,775,530	1.000000	1	1.0000	#	1983	*	324,148,528	1.000721	233,676	1.0029
1948	*	25,565,086	1.000000	1	1.0000	#	1984	*	348,546,804	1.000962	334,939	1.0039
1949	*	27,489,339	1.000000	1	1.0000	#	1985	*	374,781,510	1.001282511	480,046	1.0051 27TH TO ULT
1950	*	29,558,430	1.000000	2	1.0000	#	1986		330,675,900	1.0058	1.0110	26TH TO ULT
1951	*	31,783,258	1.000000	2	1.0000	#	1987		436,236,426	1.0097		
1952	*	34,175,546	1.000000	3	1.0000	#	1988		533,058,225	1.0110		
1953	*	36,747,899	1.000000	5	1.0000	#	1989		645,216,983	1.0055		
1954	*	39,513,870	1.000000	7	1.0000	#	1990		668,525,720	1.0067		
1955	*	42,488,032	1.000000	10	1.0000	#	1991		633,537,646	1.0103	Total	
1956	*	45,686,056	1.000000	14	1.0000	#	1992		580,910,093	1.0092	Development:	
1957	*	49,124,791	1.000000	20	1.0000	#	1993		487,363,377	1.0056	1,587,672	
1958	*	52,822,356	1.000001	29	1.0000	#	1994		463,941,457	1.0051		
1959	*	56,798,232	1.000001	41	1.0000	#	1995		430,480,850	1.0074		
1960	*	61,073,368	1.000001	59	1.0000	#	1996		428,716,528	1.0111		
1961	*	65,670,288	1.000001	85	1.0000	#	1997		454,313,839	1.0092		
1962	*	70,613,213	1.000002	121	1.0000	#	1998		489,982,824	1.0074		
1963	*	75,928,186	1.000002	174	1.0000	#	1999		525,585,692	1.0064		
1964	*	81,643,211	1.000003	249	1.0000	#	2000		535,981,654	1.0080		
1965	*	87,788,399	1.000004	357	1.0000	#	2001		513,472,919	1.0072		
1966	*	94,396,128	1.000005	512	1.0000	#	2002		550,531,548	1.0103		
1967	*	101,501,213	1.000007	734	1.0000	#	2003		557,110,186	1.0027		
1968	*	109,141,089	1.000010	1,052	1.0000	#	2004		601,041,162	1.0147		
1969	*	117,356,009	1.000013	1,508	1.0001	#	2005		616,384,161	1.0136		
1970	*	126,189,257	1.000017	2,163	1.0001	#	2006		620,510,082	1.0068		
1971	*	135,687,374	1.000023	3,101	1.0001	#	2007		679,198,759	1.0120		
1972	*	145,900,402	1.000030	4,445	1.0001	#	2008		611,562,880	1.0132		
1973	*	156,882,152	1.000041	6,373	1.0002	#	2009		562,313,399	1.0143		
1974	*	168,690,486	1.000054	9,137	1.0002	#	2010		626,763,666	1.0335		
1975	*	181,387,620	1.000072	13,099	1.0003	#	2011		616,142,377	1.0908		
1976	*	195,040,451	1.000096	18,780	1.0004	#	2012		533,431,487	2.1651		
1977	*	209,720,916	1.000128	26,924	1.0005	#	2013		258,990,256			

Inputs for Tail Factor Estimation - 2015 Loss Cost Filing

Indemnity: 11v12

Latest 12/31 Prior to 1986 Incurred	4,712,949,899
Next Latest 12/31 Prior to 1986 Incurred	4,712,288,420
CY Development of Prior Yrs	661,479
Next Latest PY 1986 Incurred	715,759,664
# of 1986 Yrs in Prior Data	6.58
Selected Decrement, Development Factor	0.75
Selected Average PY Deflation Factor	0.95

- 1 Policy Yr 1985 Incurred = Average of 1986, 1987, 1988, reduced by PY Deflation ^ 2
- 2 PY 1984 & Prior = Subsequent Yr x PY Deflation
- 3 1985 Development Selected Based on Observed 1986, 1987, 1988
- 4 PY 1984 & Prior Development = (Subsequent Yr - 1.0) x Selected Decrement + 1.0

TAIL = .0000 vs 1.0009 661,479
0

Pennsylvania Compensation Rating Bureau
Tail Factor Model - 2015 Loss Cost Filing

INDEMNITY

Policy Year	(*=Estimate)	12/31/11 Incurred	Prior Year Development	Dollar Development	DF	Policy Year	(*=Estimate)	12/31/11 Incurred	Prior Year Development	Dollar Development	DF	
1942	*	85,382,800	1.000000	0	1.0000	#	1978	*	541,153,666	1.000033	17,730	1.0001
1943	*	89,876,632	1.000000	0	1.0000	#	1979	*	569,635,437	1.000044	24,883	1.0002
1944	*	94,606,981	1.000000	0	1.0000	#	1980	*	599,616,250	1.000058	34,924	1.0002
1945	*	99,586,296	1.000000	0	1.0000	#	1981	*	631,175,000	1.000078	49,015	1.0003
1946	*	104,827,680	1.000000	0	1.0000	#	1982	*	664,394,737	1.000104	68,791	1.0004
1947	*	110,344,926	1.000000	0	1.0000	#	1983	*	699,362,881	1.000138	96,545	1.0006
1948	*	116,152,554	1.000000	1	1.0000	#	1984	*	736,171,453	1.000184	135,496	1.0007
1949	*	122,265,846	1.000000	1	1.0000	#	1985	*	774,917,319	1.0002454509	190,157	1.0010 26TH TO ULT
1950	*	128,700,891	1.000000	1	1.0000	#	1986		716,125,836	1.0005		
1951	*	135,474,622	1.000000	2	1.0000	#	1987		869,689,099	1.0010		
1952	*	142,604,865	1.000000	3	1.0000	#	1988		990,087,512	0.9975		
1953	*	150,110,384	1.000000	4	1.0000	#	1989		1,146,110,037	1.0022		
1954	*	158,010,931	1.000000	5	1.0000	#	1990		1,172,030,143	1.0001		
1955	*	166,327,296	1.000000	7	1.0000	#	1991		1,027,029,414	1.0013	Total	
1956	*	175,081,364	1.000000	10	1.0000	#	1992		877,936,473	1.0025	Development:	
1957	*	184,296,172	1.000000	14	1.0000	#	1993		761,012,996	0.9999	661,479	
1958	*	193,995,971	1.000000	20	1.0000	#	1994		702,559,300	1.0011		
1959	*	204,206,285	1.000000	28	1.0000	#	1995		609,052,885	1.0012		
1960	*	214,953,984	1.000000	40	1.0000	#	1996		533,500,202	1.0028		
1961	*	226,267,352	1.000000	56	1.0000	#	1997		556,832,201	1.0021		
1962	*	238,176,160	1.000000	78	1.0000	#	1998		564,507,461	0.9975		
1963	*	250,711,747	1.000000	110	1.0000	#	1999		640,519,550	1.0009		
1964	*	263,907,103	1.000001	154	1.0000	#	2000		681,462,452	1.0017		
1965	*	277,796,950	1.000001	216	1.0000	#	2001		675,044,549	1.0028		
1966	*	292,417,842	1.000001	303	1.0000	#	2002		700,614,570	0.9996		
1967	*	307,808,255	1.000001	426	1.0000	#	2003		671,320,667	1.0032		
1968	*	324,008,689	1.000002	598	1.0000	#	2004		697,416,463	1.0041		
1969	*	341,061,778	1.000002	839	1.0000	#	2005		703,798,318	1.0016		
1970	*	359,012,398	1.000003	1,178	1.0000	#	2006		724,845,522	1.0016		
1971	*	377,907,788	1.000004	1,653	1.0000	#	2007		763,181,268	1.0017		
1972	*	397,797,671	1.000006	2,320	1.0000	#	2008		704,314,518	1.0212		
1973	*	418,734,391	1.000008	3,256	1.0000	#	2009		620,606,688	1.0957		
1974	*	440,773,043	1.000010	4,569	1.0000	#	2010		587,695,761	1.4141		
1975	*	463,971,624	1.000014	6,413	1.0001	#	2011		418,580,947	3.3468		
1976	*	488,391,183	1.000018	9,001	1.0001	#	2012		116,152,750			
1977	*	514,095,982	1.000025	12,632	1.0001	#						

Inputs for Tail Factor Estimation - 2015 Loss Cost Filing

Medical 11v12

Latest 12/31 Prior to 1986 Incurred	1,504,651,636
Next Latest 12/31 Prior to 1986 Incurred	1,500,119,871
CY Development of Prior Yrs	4,531,765
Next Latest PY 1986 Incurred	325,642,139
# of 1986 Yrs in Prior Data	4.62
Selected Decrement, Development Factor	0.75
Selected Average PY Deflation Factor	0.93

- 1 Policy Yr 1985 Incurred = Average of 1986, 1987, 1988, reduced by PY Deflation ^ 2
- 2 PY 1984 & Prior = Subsequent Yr x PY Deflation
- 3 1985 Development Selected Based on Observed 1986, 1987, 1988
- 4 PY 1984 & Prior Development = (Subsequent Yr - 1.0) x Selected Decrement + 1.0

TAIL = .0000 vs 1.0139 4,531,765
0

Pennsylvania Compensation Rating Bureau
Tail Factor Model - 2015 Loss Cost Filing

MEDICAL

Policy Year	(*=Estimate)	12/31/11 Incurred	Prior Year Development	Dollar Development	DF	Policy Year	(*=Estimate)	12/31/11 Incurred	Prior Year Development	Dollar Development	DF	
1942	*	16,390,236	1.000000	0	1.0000	#	1978	*	223,459,616	1.000494	110,308	1.0020
1943	*	17,623,909	1.000000	0	1.0000	#	1979	*	240,279,157	1.000659	158,121	1.0026
1944	*	18,950,440	1.000000	1	1.0000	#	1980	*	258,364,684	1.000878	226,647	1.0035
1945	*	20,376,817	1.000000	1	1.0000	#	1981	*	277,811,489	1.001171	324,847	1.0047
1946	*	21,910,556	1.000000	1	1.0000	#	1982	*	298,722,031	1.001561	465,549	1.0063
1947	*	23,559,738	1.000000	2	1.0000	#	1983	*	321,206,485	1.002081	667,107	1.0084
1948	*	25,333,051	1.000000	2	1.0000	#	1984	*	345,383,317	1.002775	955,765	1.0112
1949	*	27,239,840	1.000000	3	1.0000	#	1985	*	371,379,911	1.0036999150	1,369,009	1.0149 26TH TO ULT
1950	*	29,290,151	1.000000	5	1.0000	#	1986		328,761,623	1.0096		
1951	*	31,494,786	1.000000	7	1.0000	#	1987		432,071,173	1.0050		
1952	*	33,865,361	1.000000	9	1.0000	#	1988		527,338,937	1.0037		
1953	*	36,414,367	1.000000	14	1.0000	#	1989		641,859,353	1.0075		
1954	*	39,155,233	1.000000	19	1.0000	#	1990		664,252,678	1.0029		
1955	*	42,102,401	1.000001	28	1.0000	#	1991		627,278,869	1.0090	Total	
1956	*	45,271,399	1.000001	40	1.0000	#	1992		575,902,892	1.0098	Development:	
1957	*	48,678,924	1.000001	57	1.0000	#	1993		485,061,348	1.0083	4,531,765	
1958	*	52,342,929	1.000002	82	1.0000	#	1994		462,108,749	1.0197		
1959	*	56,282,719	1.000002	118	1.0000	#	1995		427,503,796	1.0122		
1960	*	60,519,053	1.000003	169	1.0000	#	1996		424,627,519	1.0083		
1961	*	65,074,250	1.000004	242	1.0000	#	1997		454,681,294	1.0087		
1962	*	69,972,312	1.000005	346	1.0000	#	1998		487,424,316	1.0080		
1963	*	75,239,045	1.000007	497	1.0000	#	1999		526,205,898	1.0023		
1964	*	80,902,199	1.000009	712	1.0000	#	2000		536,035,395	1.0034		
1965	*	86,991,612	1.000012	1,021	1.0000	#	2001		518,043,083	1.0051		
1966	*	93,539,368	1.000016	1,463	1.0001	#	2002		549,525,682	1.0031		
1967	*	100,579,965	1.000021	2,098	1.0001	#	2003		556,435,460	1.0121		
1968	*	108,150,500	1.000028	3,008	1.0001	#	2004		592,378,853	1.0051		
1969	*	116,290,861	1.000037	4,312	1.0001	#	2005		608,403,314	0.9970		
1970	*	125,043,936	1.000049	6,182	1.0002	#	2006		616,348,411	1.0077		
1971	*	134,455,845	1.000066	8,863	1.0003	#	2007		671,182,229	0.9960		
1972	*	144,576,178	1.000088	12,707	1.0004	#	2008		603,609,815	0.9998		
1973	*	155,458,256	1.000117	18,218	1.0005	#	2009		554,956,470	1.0267		
1974	*	167,159,415	1.000156	26,117	1.0006	#	2010		606,562,364	1.0825		
1975	*	179,741,306	1.000208	37,442	1.0008	#	2011		565,089,941	2.1094		
1976	*	193,270,221	1.000278	53,677	1.0011	#	2012		246,572,981			
1977	*	207,817,442	1.000370	76,949	1.0015	#						

Inputs for Tail Factor Estimation - 2015 Loss Cost Filing

Indemnity: 10v11

Latest 12/31 Prior to 1986 Incurred	4,786,276,751
Next Latest 12/31 Prior to 1986 Incurred	4,783,310,914
CY Development of Prior Yrs	2,965,837
Next Latest PY 1986 Incurred	723,649,054
# of 1986 Yrs in Prior Data	6.61
Selected Decrement, Development Factor	0.75
Selected Average PY Deflation Factor	0.95

- 1 Policy Yr 1985 Incurred = Average of 1986, 1987, 1988, reduced by PY Deflation ^ 2
- 2 PY 1984 & Prior = Subsequent Yr x PY Deflation
- 3 1985 Development Selected Based on Observed 1986, 1987, 1988
- 4 PY 1984 & Prior Development = (Subsequent Yr - 1.0) x Selected Decrement + 1.0

TAIL = .0000 vs 1.0041 2,965,838
-1

Pennsylvania Compensation Rating Bureau
Tail Factor Model - 2015 Loss Cost Filing

INDEMNITY

Policy Year	(*=Estimate)	12/31/11 Incurred	Prior Year Development	Dollar Development	DF	Policy Year	(*=Estimate)	12/31/11 Incurred	Prior Year Development	Dollar Development	DF	
1942	*	86,198,133	1.000000	0	1.0000	#	1977	*	519,005,159	1.000109	56,664	1.0004
1943	*	90,734,877	1.000000	1	1.0000	#	1978	*	546,321,220	1.000146	79,526	1.0006
1944	*	95,510,397	1.000000	1	1.0000	#	1979	*	575,074,968	1.000194	111,610	1.0008
1945	*	100,537,260	1.000000	1	1.0000	#	1980	*	605,342,072	1.000259	156,635	1.0010
1946	*	105,828,694	1.000000	2	1.0000	#	1981	*	637,202,181	1.000345	219,820	1.0014
1947	*	111,398,626	1.000000	2	1.0000	#	1982	*	670,739,137	1.000460	308,484	1.0018
1948	*	117,261,711	1.000000	3	1.0000	#	1983	*	706,041,197	1.000614	432,894	1.0025
1949	*	123,433,380	1.000000	4	1.0000	#	1984	*	743,201,260	1.000818	607,446	1.0033
1950	*	129,929,874	1.000000	6	1.0000	#	1985	*	782,317,116	1.0010906749	852,324	1.0044
1951	*	136,768,288	1.000000	8	1.0000	#	1986	*	724,138,448	1.0007		
1952	*	143,966,619	1.000000	12	1.0000	#	1987	*	876,818,973	1.0002		
1953	*	151,543,810	1.000000	17	1.0000	#	1988	*	999,542,688	1.0015		
1954	*	159,519,800	1.000000	23	1.0000	#	1989	*	1,155,820,850	1.0037		
1955	*	167,915,579	1.000000	33	1.0000	#	1990	*	1,186,568,963	1.0010		
1956	*	176,753,241	1.000000	46	1.0000	#	1991	*	1,039,503,614	1.0007	Total	
1957	*	186,056,043	1.000000	64	1.0000	#	1992	*	885,735,961	1.0023	Development:	
1958	*	195,848,466	1.000000	90	1.0000	#	1993	*	766,710,739	1.0023	2,965,838	
1959	*	206,156,280	1.000001	127	1.0000	#	1994	*	707,391,976	1.0026		
1960	*	217,006,611	1.000001	178	1.0000	#	1995	*	611,754,336	1.0005		
1961	*	228,428,011	1.000001	250	1.0000	#	1996	*	534,368,625	1.0005		
1962	*	240,450,538	1.000001	351	1.0000	#	1997	*	558,093,394	1.0005		
1963	*	253,105,830	1.000002	492	1.0000	#	1998	*	570,406,550	1.0007		
1964	*	266,427,189	1.000003	691	1.0000	#	1999	*	644,724,536	1.0020		
1965	*	280,449,673	1.000003	970	1.0000	#	2000	*	686,812,258	1.0038		
1966	*	295,210,182	1.000005	1,361	1.0000	#	2001	*	678,564,277	1.0029		
1967	*	310,747,560	1.000006	1,911	1.0000	#	2002	*	702,989,793	1.0095		
1968	*	327,102,695	1.000008	2,682	1.0000	#	2003	*	670,435,033	1.0132		
1969	*	344,318,626	1.000011	3,764	1.0000	#	2004	*	697,115,544	1.0146		
1970	*	362,440,659	1.000015	5,283	1.0001	#	2005	*	705,359,481	1.0133		
1971	*	381,516,483	1.000019	7,414	1.0001	#	2006	*	725,842,732	1.0192		
1972	*	401,596,298	1.000026	10,406	1.0001	#	2007	*	763,871,297	1.0333		
1973	*	422,732,945	1.000035	14,604	1.0001	#	2008	*	692,790,945	1.1048		
1974	*	444,982,048	1.000046	20,497	1.0002	#	2009	*	569,411,306	1.4153		
1975	*	468,402,156	1.000061	28,767	1.0002	#	2010	*	417,090,247	3.3370		
1976	*	493,054,901	1.000082	40,374	1.0003	#	2011	*	125,567,147			

Inputs for Tail Factor Estimation - 2015 Loss Cost Filing

Medical 10v11

Latest 12/31 Prior to 1986 Incurred	1,522,306,788
Next Latest 12/31 Prior to 1986 Incurred	1,498,586,145
CY Development of Prior Yrs	23,720,643
Next Latest PY 1986 Incurred	326,879,883
# of 1986 Yrs in Prior Data	4.66
Selected Decrement, Development Factor	0.75
Selected Average PY Deflation Factor	0.93

- 1 Policy Yr 1985 Incurred = Average of 1986, 1987, 1988, reduced by PY Deflation ^ 2
- 2 PY 1984 & Prior = Subsequent Yr x PY Deflation
- 3 1985 Development Selected Based on Observed 1986, 1987, 1988
- 4 PY 1984 & Prior Development = (Subsequent Yr - 1.0) x Selected Decrement + 1.0

TAIL = 1.0807 vs 1.0726 23,720,643
0

Pennsylvania Compensation Rating Bureau
Tail Factor Model - 2015 Loss Cost Filing

MEDICAL

Policy Year	(*=Estimate)	12/31/11 Incurred	Prior Year Development	Dollar Development	DF	Policy Year	(*=Estimate)	12/31/11 Incurred	Prior Year Development	Dollar Development	DF	
1941	*	15,286,565	1.000000	1	1.0000	#	1977	*	208,412,493	1.001953	406,147	1.0078
1942	*	16,437,166	1.000000	1	1.0000	#	1978	*	224,099,455	1.002603	581,911	1.0105
1943	*	17,674,372	1.000000	2	1.0000	#	1979	*	240,967,156	1.003471	833,560	1.0140
1944	*	19,004,701	1.000000	3	1.0000	#	1980	*	259,104,469	1.004628	1,193,692	1.0187
1945	*	20,435,163	1.000000	4	1.0000	#	1981	*	278,606,955	1.006171	1,708,762	1.0249
1946	*	21,973,293	1.000000	6	1.0000	#	1982	*	299,577,372	1.008228	2,444,840	1.0334
1947	*	23,627,197	1.000000	8	1.0000	#	1983	*	322,126,206	1.010971	3,495,637	1.0447
1948	*	25,405,588	1.000000	12	1.0000	#	1984	*	346,372,264	1.014628	4,993,603	1.0600
1949	*	27,317,837	1.000001	17	1.0000	#	1985	*	372,443,295	1.019503671	7,125,047	1.0807
1950	*	29,374,018	1.000001	24	1.0000	#	1986		328,500,537	1.0050		
1951	*	31,584,966	1.000001	35	1.0000	#	1987		434,507,788	1.0072		
1952	*	33,962,329	1.000001	50	1.0000	#	1988		528,851,873	1.0125		
1953	*	36,518,633	1.000002	72	1.0000	#	1989		643,191,153	1.0106		
1954	*	39,267,347	1.000003	103	1.0000	#	1990		670,831,301	1.0094	Total	
1955	*	42,222,954	1.000003	147	1.0000	#	1991		629,194,025	1.0009	Development:	
1956	*	45,401,026	1.000005	211	1.0000	#	1992		576,058,709	1.0095	23,720,643	
1957	*	48,818,308	1.000006	302	1.0000	#	1993		484,593,760	1.0060		
1958	*	52,492,804	1.000008	433	1.0000	#	1994		456,425,413	1.0141		
1959	*	56,443,875	1.000011	621	1.0000	#	1995		425,422,256	1.0075		
1960	*	60,692,339	1.000015	891	1.0001	#	1996		424,191,525	1.0077		
1961	*	65,260,579	1.000020	1,277	1.0001	#	1997		452,920,198	1.0099		
1962	*	70,172,666	1.000026	1,831	1.0001	#	1998		488,153,639	0.9911		
1963	*	75,454,480	1.000035	2,625	1.0001	#	1999		528,818,390	1.0186		
1964	*	81,133,849	1.000046	3,763	1.0002	#	2000		540,806,945	1.0033		
1965	*	87,240,698	1.000062	5,396	1.0002	#	2001		521,969,354	1.0107		
1966	*	93,807,202	1.000082	7,735	1.0003	#	2002		549,797,130	1.0151		
1967	*	100,867,959	1.000110	11,090	1.0004	#	2003		552,082,650	1.0082		
1968	*	108,460,171	1.000147	15,899	1.0006	#	2004		591,864,297	1.0112		
1969	*	116,623,840	1.000195	22,793	1.0008	#	2005		613,039,319	1.0113		
1970	*	125,401,979	1.000261	32,676	1.0010	#	2006		614,118,827	1.0126		
1971	*	134,840,837	1.000348	46,843	1.0014	#	2007		675,997,480	1.0186		
1972	*	144,990,147	1.000463	67,151	1.0019	#	2008		607,148,978	1.0374		
1973	*	155,903,384	1.000618	96,258	1.0025	#	2009		544,282,560	1.0806		
1974	*	167,638,048	1.000824	137,977	1.0033	#	2010		562,019,372	2.2256		
1975	*	180,255,965	1.001098	197,762	1.0044	#	2011		269,578,397			
1976	*	193,823,619	1.001464	283,425	1.0059							

Inputs for Tail Factor Estimation - 2015 Loss Cost Filing

Indemnity: 09v10

Latest 12/31 Prior to 1986 Incurred	4,814,870,434
Next Latest 12/31 Prior to 1986 Incurred	4,813,299,084
CY Development of Prior Yrs	1,571,350
Next Latest PY 1986 Incurred	727,002,266
# of 1986 Yrs in Prior Data	6.62
Selected Decrement, Development Factor	0.75
Selected Average PY Deflation Factor	0.95

- 1 Policy Yr 1985 Incurred = Average of 1986, 1987, 1988, reduced by PY Deflation ^ 2
- 2 PY 1984 & Prior = Subsequent Yr x PY Deflation
- 3 1985 Development Selected Based on Observed 1986, 1987, 1988
- 4 PY 1984 & Prior Development = (Subsequent Yr - 1.0) x Selected Decrement + 1.0

TAIL = 1.0023 vs 1.0022 1,571,350
0

Pennsylvania Compensation Rating Bureau
Tail Factor Model - 2015 Loss Cost Filing

INDEMNITY

Policy Year	(*=Estimate)	12/31/10 Incurred	Prior Year Development	Dollar Development	DF	Policy Year	(*=Estimate)	12/31/10 Incurred	Prior Year Development	Dollar Development	DF
1941	*	82,234,918	1.000000	0	1.0000 #	1976	*	495,142,355	1.000043	21,385	1.0002
1942	*	86,563,071	1.000000	0	1.0000 #	1977	*	521,202,479	1.000058	30,014	1.0002
1943	*	91,119,023	1.000000	0	1.0000 #	1978	*	548,634,188	1.000077	42,124	1.0003
1944	*	95,914,761	1.000000	0	1.0000 #	1979	*	577,509,672	1.000102	59,120	1.0004
1945	*	100,962,906	1.000000	1	1.0000 #	1980	*	607,904,918	1.000137	82,972	1.0005
1946	*	106,276,743	1.000000	1	1.0000 #	1981	*	639,899,913	1.000182	116,446	1.0007
1947	*	111,870,256	1.000000	1	1.0000 #	1982	*	673,578,856	1.000243	163,424	1.0010
1948	*	117,758,164	1.000000	2	1.0000 #	1983	*	709,030,375	1.000324	229,348	1.0013
1949	*	123,955,962	1.000000	2	1.0000 #	1984	*	746,347,763	1.000431	321,857	1.0017
1950	*	130,479,960	1.000000	3	1.0000 #	1985	*	785,629,224	1.0005752391	451,665	1.0023
1951	*	137,347,326	1.000000	4	1.0000 #	1986		728,208,005	1.0017		
1952	*	144,576,133	1.000000	6	1.0000 #	1987		880,584,420	0.9995		
1953	*	152,185,403	1.000000	9	1.0000 #	1988		1,002,717,462	1.0004		
1954	*	160,195,161	1.000000	12	1.0000 #	1989		1,155,458,023	0.9998		
1955	*	168,626,486	1.000000	17	1.0000 #	1990		1,188,730,687	1.0002	Total	
1956	*	177,501,564	1.000000	24	1.0000 #	1991		1,044,753,535	1.0027	Development:	
1957	*	186,843,751	1.000000	34	1.0000 #	1992		886,122,365	0.9989	1,571,350	
1958	*	196,677,633	1.000000	48	1.0000 #	1993		765,605,385	0.9998		
1959	*	207,029,087	1.000000	67	1.0000 #	1994		705,445,046	0.9994		
1960	*	217,925,355	1.000000	94	1.0000 #	1995		612,168,566	1.0006		
1961	*	229,395,111	1.000001	132	1.0000 #	1996		534,274,701	1.0012		
1962	*	241,468,538	1.000001	186	1.0000 #	1997		558,218,342	0.9990		
1963	*	254,177,408	1.000001	261	1.0000 #	1998		578,043,915	1.0000		
1964	*	267,555,166	1.000001	366	1.0000 #	1999		667,139,805	1.0000		
1965	*	281,637,017	1.000002	514	1.0000 #	2000		708,302,720	1.0042		
1966	*	296,460,018	1.000002	721	1.0000 #	2001		688,551,308	1.0022		
1967	*	312,063,177	1.000003	1,012	1.0000 #	2002		699,101,637	1.0094		
1968	*	328,487,555	1.000004	1,420	1.0000 #	2003		661,679,326	1.0125		
1969	*	345,776,373	1.000006	1,994	1.0000 #	2004		686,907,908	1.0129		
1970	*	363,975,130	1.000008	2,798	1.0000 #	2005		696,007,622	1.0159		
1971	*	383,131,716	1.000010	3,927	1.0000 #	2006		712,217,212	1.0399		
1972	*	403,296,543	1.000014	5,511	1.0001 #	2007		739,181,885	1.1189		
1973	*	424,522,677	1.000018	7,735	1.0001 #	2008		627,198,812	1.3976		
1974	*	446,865,975	1.000024	10,856	1.0001 #	2009		402,073,924	3.4222		
1975	*	470,385,237	1.000032	15,237	1.0001 #	2010		124,970,578			

Inputs for Tail Factor Estimation - 2015 Loss Cost Filing

Medical 09v10

Latest 12/31 Prior to 1986 Incurred	1,507,461,919
Next Latest 12/31 Prior to 1986 Incurred	1,494,104,546
CY Development of Prior Yrs	13,357,373
Next Latest PY 1986 Incurred	322,157,360
# of 1986 Yrs in Prior Data	4.68
Selected Decrement, Development Factor	0.75
Selected Average PY Deflation Factor	0.93

- 1 Policy Yr 1985 Incurred = Average of 1986, 1987, 1988, reduced by PY Deflation ^ 2
- 2 PY 1984 & Prior = Subsequent Yr x PY Deflation
- 3 1985 Development Selected Based on Observed 1986, 1987, 1988
- 4 PY 1984 & Prior Development = (Subsequent Yr - 1.0) x Selected Decrement + 1.0

TAIL = 1.0446 vs 1.0415 13,357,373
0

Pennsylvania Compensation Rating Bureau
Tail Factor Model - 2015 Loss Cost Filing

MEDICAL

Policy Year	(*=Estimate)	12/31/10 Incurred	Prior Year Development	Dollar Development	DF	Policy Year	(*=Estimate)	12/31/10 Incurred	Prior Year Development	Dollar Development	DF
1941	*	15,249,833	1.000000	1	1.0000 #	1976	*	193,357,891	1.000822	158,851	1.0033
1942	*	16,397,670	1.000000	1	1.0000 #	1977	*	207,911,711	1.001096	227,680	1.0044
1943	*	17,631,904	1.000000	1	1.0000 #	1978	*	223,560,979	1.001462	326,304	1.0059
1944	*	18,959,036	1.000000	2	1.0000 #	1979	*	240,388,150	1.001949	467,593	1.0078
1945	*	20,386,060	1.000000	2	1.0000 #	1980	*	258,481,882	1.002599	669,949	1.0104
1946	*	21,920,495	1.000000	3	1.0000 #	1981	*	277,937,507	1.003465	959,671	1.0139
1947	*	23,570,425	1.000000	5	1.0000 #	1982	*	298,857,534	1.004620	1,374,291	1.0186
1948	*	25,344,543	1.000000	7	1.0000 #	1983	*	321,352,188	1.006160	1,967,295	1.0249
1949	*	27,252,196	1.000000	9	1.0000 #	1984	*	345,539,987	1.008213	2,814,750	1.0333
1950	*	29,303,437	1.000000	14	1.0000 #	1985	*	371,548,373	1.010950	4,024,556	1.0446
1951	*	31,509,072	1.000001	19	1.0000 #	1986		329,493,683	1.0228		
1952	*	33,880,723	1.000001	28	1.0000 #	1987		433,512,994	1.0063		
1953	*	36,430,885	1.000001	40	1.0000 #	1988		525,749,385	1.0076		
1954	*	39,172,994	1.000001	57	1.0000 #	1989		638,810,990	1.0109		
1955	*	42,121,499	1.000002	82	1.0000 #	1990		666,552,410	1.0094	Total	
1956	*	45,291,935	1.000003	118	1.0000 #	1991		632,352,605	1.0062	Development:	
1957	*	48,701,005	1.000003	169	1.0000 #	1992		572,076,632	1.0091	13,357,373	
1958	*	52,366,672	1.000005	243	1.0000 #	1993		482,324,946	1.0098		
1959	*	56,308,249	1.000006	348	1.0000 #	1994		450,051,836	0.9985		
1960	*	60,546,505	1.000008	499	1.0000 #	1995		422,379,225	1.0030		
1961	*	65,103,769	1.000011	715	1.0000 #	1996		421,311,686	1.0074		
1962	*	70,004,052	1.000015	1,026	1.0001 #	1997		448,966,050	1.0040		
1963	*	75,273,174	1.000020	1,470	1.0001 #	1998		501,854,147	1.0100		
1964	*	80,938,897	1.000026	2,108	1.0001 #	1999		543,336,647	1.0068		
1965	*	87,031,072	1.000035	3,022	1.0001 #	2000		556,033,422	1.0122		
1966	*	93,581,798	1.000046	4,333	1.0002 #	2001		525,466,259	1.0067		
1967	*	100,625,589	1.000062	6,212	1.0002 #	2002		543,209,065	1.0127		
1968	*	108,199,559	1.000082	8,906	1.0003 #	2003		547,486,207	1.0148		
1969	*	116,343,611	1.000110	12,768	1.0004 #	2004		585,087,127	1.0230		
1970	*	125,100,657	1.000146	18,304	1.0006 #	2005		606,055,676	1.0108		
1971	*	134,516,836	1.000195	26,241	1.0008 #	2006		606,439,956	1.0234		
1972	*	144,641,759	1.000260	37,619	1.0010 #	2007		663,525,395	1.0261		
1973	*	155,528,773	1.000347	53,930	1.0014 #	2008		585,616,632	1.0823		
1974	*	167,235,240	1.000462	77,310	1.0019 #	2009		501,944,866	2.2298		
1975	*	179,822,839	1.000617	110,821	1.0025 #	2010		252,669,274			