

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 2007 vs. 2008, 2008 vs. 2009, 2009 vs. 2010 and 2010 vs. 2011 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 both the previous and revised approaches to the derivation of tail development factors. 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>	<u>MEDICAL</u>
		Tail Factor	Tail Factor
10V11	24TH TO ULT.	1.0051	1.0875
09V10	24TH TO ULT.	1.0023	1.0446
08V09	24TH TO ULT.	1.0038	1.0213
07V08	24TH TO ULT.	1.0015	1.0275
AVERAGE OF LATEST 4 VALUATIONS		1.0032	1.0452

Inputs for Tail Factor Estimation - 2013 Loss Cost Filing

Indemnity: 10v11

Latest 12/31 Prior to 1986 Incurred	4,805,803,313
Next Latest 12/31 Prior to 1986 Incurred	4,802,827,989
CY Development of Prior Yrs	2,975,324
Next Latest PY 1986 Incurred	727,040,543
# 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 = 1.0051 vs 1.0041 2,975,324  
0

Pennsylvania Compensation Rating Bureau  
Tail Factor Model - 2013 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
1941	*	82,125,863	1.000000	0	1.0000 #	1977	*	520,511,294	1.000109	56,846	1.0004
1942	*	86,448,277	1.000000	0	1.0000 #	1978	*	547,906,625	1.000146	79,780	1.0006
1943	*	90,998,186	1.000000	1	1.0000 #	1979	*	576,743,816	1.000194	111,967	1.0008
1944	*	95,787,565	1.000000	1	1.0000 #	1980	*	607,098,753	1.000259	157,136	1.0010
1945	*	100,829,015	1.000000	1	1.0000 #	1981	*	639,051,319	1.000345	220,523	1.0014
1946	*	106,135,806	1.000000	2	1.0000 #	1982	*	672,685,599	1.000460	309,471	1.0018
1947	*	111,721,901	1.000000	2	1.0000 #	1983	*	708,090,105	1.000614	434,278	1.0025
1948	*	117,602,001	1.000000	3	1.0000 #	1984	*	745,358,005	1.000818	609,388	1.0033
1949	*	123,791,580	1.000000	4	1.0000 #	1985	*	784,587,374	1.001090996	855,049	1.0044 25TH TO ULT.
1950	*	130,306,926	1.000000	6	1.0000 #	1986		727,529,937	1.0007		1.0051 24TH TO ULT.
1951	*	137,165,185	1.000000	8	1.0000 #	1987		878,215,976	1.0002		
1952	*	144,384,406	1.000000	12	1.0000 #	1988		1,002,300,758	1.0014		
1953	*	151,983,585	1.000000	17	1.0000 #	1989		1,159,317,276	1.0037	Total	
1954	*	159,982,721	1.000000	23	1.0000 #	1990		1,188,564,248	1.0010	Development:	
1955	*	168,402,864	1.000000	33	1.0000 #	1991		1,044,425,965	1.0007	2,975,324	
1956	*	177,266,173	1.000000	46	1.0000 #	1992		885,260,217	1.0023		
1957	*	186,595,971	1.000000	65	1.0000 #	1993		767,364,409	1.0023		
1958	*	196,416,812	1.000000	91	1.0000 #	1994		707,355,887	1.0027		
1959	*	206,754,539	1.000001	127	1.0000 #	1995		612,426,423	1.0005		
1960	*	217,636,357	1.000001	179	1.0000 #	1996		534,523,808	1.0005		
1961	*	229,090,902	1.000001	251	1.0000 #	1997		558,506,856	1.0005		
1962	*	241,148,318	1.000001	352	1.0000 #	1998		578,322,082	1.0007		
1963	*	253,840,334	1.000002	494	1.0000 #	1999		668,324,264	1.0018		
1964	*	267,200,352	1.000003	693	1.0000 #	2000		710,895,016	1.0037		
1965	*	281,263,528	1.000003	973	1.0000 #	2001		690,293,328	1.0025		
1966	*	296,066,872	1.000005	1,366	1.0000 #	2002		705,725,337	1.0095		
1967	*	311,649,339	1.000006	1,917	1.0000 #	2003		670,402,546	1.0132		
1968	*	328,051,936	1.000008	2,690	1.0000 #	2004		696,933,836	1.0146		
1969	*	345,317,827	1.000011	3,776	1.0000 #	2005		705,307,386	1.0134		
1970	*	363,492,449	1.000015	5,299	1.0001 #	2006		725,911,440	1.0192		
1971	*	382,623,631	1.000019	7,438	1.0001 #	2007		763,721,982	1.0332		
1972	*	402,761,717	1.000026	10,439	1.0001 #	2008		692,958,353	1.1048		
1973	*	423,959,702	1.000035	14,651	1.0001 #	2009		569,064,637	1.4154		
1974	*	446,273,370	1.000046	20,563	1.0002 #	2010		415,526,835	3.3282		
1975	*	469,761,443	1.000061	28,859	1.0002 #	2011		123,165,057			
1976	*	494,485,729	1.000082	40,504	1.0003 #						

Inputs for Tail Factor Estimation - 2013 Loss Cost Filing

**Medical 10v11**

Latest 12/31 Prior to 1986 Incurred	1,526,843,783
Next Latest 12/31 Prior to 1986 Incurred	1,502,676,474
CY Development of Prior Yrs	24,167,309
Next Latest PY 1986 Incurred	328,312,631
# of 1986 Yrs in Prior Data	4.65
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 = 1.0875 vs 1.0736 24,167,309  
0

Pennsylvania Compensation Rating Bureau  
Tail Factor Model - 2013 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	*	15,318,537	1.000000	1	1.0000 #	1977	*	208,848,396	1.001986	413,866	1.0080
1942	*	16,471,545	1.000000	1	1.0000 #	1978	*	224,568,167	1.002647	592,965	1.0106
1943	*	17,711,339	1.000000	2	1.0000 #	1979	*	241,471,148	1.003530	849,381	1.0142
1944	*	19,044,450	1.000000	3	1.0000 #	1980	*	259,646,395	1.004707	1,216,324	1.0190
1945	*	20,477,904	1.000000	4	1.0000 #	1981	*	279,189,672	1.006275	1,741,115	1.0254
1946	*	22,019,251	1.000000	6	1.0000 #	1982	*	300,203,949	1.008367	2,491,045	1.0340
1947	*	23,676,614	1.000000	8	1.0000 #	1983	*	322,799,945	1.011156	3,561,539	1.0455
1948	*	25,458,725	1.000000	12	1.0000 #	1984	*	347,096,715	1.014875	5,087,439	1.0610
1949	*	27,374,973	1.000001	17	1.0000 #	1985	*	373,222,274	1.019833531	7,258,357	1.0821 25TH TO ULT.
1950	*	29,435,455	1.000001	25	1.0000 #	1986		329,955,285	1.0050		1.0875 24TH TO ULT.
1951	*	31,651,027	1.000001	35	1.0000 #	1987		433,230,368	1.0072		
1952	*	34,033,362	1.000001	51	1.0000 #	1988		531,376,519	1.0125		
1953	*	36,595,013	1.000002	73	1.0000 #	1989		644,751,108	1.0107		
1954	*	39,349,477	1.000003	105	1.0000 #	1990		671,713,444	1.0094	Total	
1955	*	42,311,265	1.000004	150	1.0000 #	1991		631,605,803	1.0009	Development:	
1956	*	45,495,984	1.000005	215	1.0000 #	1992		575,859,503	1.0095	24,167,309	
1957	*	48,920,413	1.000006	308	1.0000 #	1993		485,263,649	1.0061		
1958	*	52,602,595	1.000008	442	1.0000 #	1994		456,433,810	1.0142		
1959	*	56,561,930	1.000011	633	1.0000 #	1995		425,551,344	1.0075		
1960	*	60,819,279	1.000015	908	1.0001 #	1996		424,562,250	1.0077		
1961	*	65,397,074	1.000020	1,301	1.0001 #	1997		453,405,264	1.0099		
1962	*	70,319,435	1.000027	1,866	1.0001 #	1998		497,438,114	0.9912		
1963	*	75,612,296	1.000035	2,675	1.0001 #	1999		553,001,730	1.0178		
1964	*	81,303,544	1.000047	3,835	1.0002 #	2000		557,835,047	1.0032		
1965	*	87,423,165	1.000063	5,498	1.0003 #	2001		530,896,350	1.0103		
1966	*	94,003,403	1.000084	7,883	1.0003 #	2002		551,404,341	1.0151		
1967	*	101,078,928	1.000112	11,301	1.0004 #	2003		551,991,564	1.0082		
1968	*	108,687,020	1.000149	16,201	1.0006 #	2004		591,646,506	1.0112		
1969	*	116,867,763	1.000199	23,227	1.0008 #	2005		612,886,572	1.0113		
1970	*	125,664,261	1.000265	33,298	1.0011 #	2006		614,082,435	1.0126		
1971	*	135,122,862	1.000353	47,735	1.0014 #	2007		675,886,708	1.0186		
1972	*	145,293,400	1.000471	68,429	1.0019 #	2008		607,515,662	1.0374		
1973	*	156,229,462	1.000628	98,090	1.0025 #	2009		542,401,714	1.0806		
1974	*	167,988,669	1.000838	140,602	1.0034 #	2010		559,831,385	2.2172		
1975	*	180,632,977	1.001117	201,523	1.0045 #	2011		262,234,496			
1976	*	194,229,008	1.001489	288,815	1.0060 #						

Inputs for Tail Factor Estimation - 2013 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 - 2013 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 24TH TO ULT
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 - 2013 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 - 2013 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 24TH TO ULT
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			

Inputs for Tail Factor Estimation - 2013 Loss Cost Filing

Indemnity: 08v09

Latest 12/31 Prior to 1986 Incurred	4,723,492,361
Next Latest 12/31 Prior to 1986 Incurred	4,720,082,988
CY Development of Prior Yrs	3,409,373
Next Latest PY 1986 Incurred	716,626,830
# of 1986 Yrs in Prior Data	6.59
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 = 1.0051 vs 1.0048 3,409,373  
0

Pennsylvania Compensation Rating Bureau  
Tail Factor Model - 2013 Loss Cost Filing

INDEMNITY

Policy Year	(*=Estimate)	12/31/09 Incurred	Prior Year Development	Dollar Development	DF	Policy Year	(*=Estimate)	12/31/09 Incurred	Prior Year Development	Dollar Development	DF
1940	*	76,689,254	1.000000	0	1.0000 #	1975	*	461,751,513	1.000072	33,073	1.0003
1941	*	80,725,530	1.000000	0	1.0000 #	1976	*	486,054,224	1.000096	46,417	1.0004
1942	*	84,974,242	1.000000	0	1.0000 #	1977	*	511,636,025	1.000127	65,144	1.0005
1943	*	89,446,571	1.000000	1	1.0000 #	1978	*	538,564,237	1.000170	91,427	1.0007
1944	*	94,154,285	1.000000	1	1.0000 #	1979	*	566,909,723	1.000226	128,311	1.0009
1945	*	99,109,774	1.000000	1	1.0000 #	1980	*	596,747,077	1.000302	180,072	1.0012
1946	*	104,326,078	1.000000	2	1.0000 #	1981	*	628,154,818	1.000402	252,707	1.0016
1947	*	109,816,924	1.000000	2	1.0000 #	1982	*	661,215,598	1.000537	354,630	1.0021
1948	*	115,596,762	1.000000	4	1.0000 #	1983	*	696,016,419	1.000715	497,637	1.0029
1949	*	121,680,802	1.000000	5	1.0000 #	1984	*	732,648,862	1.000954	698,271	1.0038
1950	*	128,085,055	1.000000	7	1.0000 #	1985	*	771,209,328	1.001271982	979,718	1.0051
1951	*	134,826,374	1.000000	10	1.0000 #	1986		717,039,472	1.0006		
1952	*	141,922,499	1.000000	14	1.0000 #	1987		867,133,780	1.0003		
1953	*	149,392,104	1.000000	19	1.0000 #	1988		979,403,462	1.0006		
1954	*	157,254,846	1.000000	27	1.0000 #	1989		1,125,823,186	1.0001	Total	
1955	*	165,531,417	1.000000	38	1.0000 #	1990		1,158,349,805	1.0018	Development:	
1956	*	174,243,597	1.000000	53	1.0000 #	1991		1,010,036,500	1.0007	3,409,373	
1957	*	183,414,312	1.000000	74	1.0000 #	1992		854,493,305	0.9993		
1958	*	193,067,697	1.000001	104	1.0000 #	1993		736,668,141	1.0021		
1959	*	203,229,155	1.000001	146	1.0000 #	1994		675,497,186	1.0025		
1960	*	213,925,426	1.000001	205	1.0000 #	1995		579,777,152	1.0016		
1961	*	225,184,659	1.000001	287	1.0000 #	1996		497,857,135	1.0030		
1962	*	237,036,483	1.000002	403	1.0000 #	1997		520,524,155	1.0005		
1963	*	249,512,088	1.000002	566	1.0000 #	1998		550,315,412	1.0007		
1964	*	262,644,303	1.000003	795	1.0000 #	1999		639,711,732	1.0017		
1965	*	276,467,687	1.000004	1,115	1.0000 #	2000		668,707,016	1.0024		
1966	*	291,018,618	1.000005	1,565	1.0000 #	2001		641,480,690	1.0021		
1967	*	306,335,388	1.000007	2,197	1.0000 #	2002		654,218,207	1.0121		
1968	*	322,458,303	1.000010	3,083	1.0000 #	2003		623,011,834	1.0138		
1969	*	339,429,792	1.000013	4,327	1.0001 #	2004		639,977,707	1.0145		
1970	*	357,294,518	1.000017	6,073	1.0001 #	2005		653,699,997	1.0469		
1971	*	376,099,493	1.000023	8,524	1.0001 #	2006		652,929,123	1.1392		
1972	*	395,894,203	1.000030	11,963	1.0001 #	2007		629,348,058	1.4263		
1973	*	416,730,740	1.000040	16,790	1.0002 #	2008		424,835,135	3.4270		
1974	*	438,663,937	1.000054	23,565	1.0002 #	2009		113,070,766			



Inputs for Tail Factor Estimation - 2013 Loss Cost Filing

**Medical 08v09**

Latest 12/31 Prior to 1986 Incurred	1,461,552,784
Next Latest 12/31 Prior to 1986 Incurred	1,453,271,446
CY Development of Prior Yrs	8,281,338
Next Latest PY 1986 Incurred	314,873,818
# of 1986 Yrs in Prior Data	4.64
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 = 1.0285 vs 1.0263 8,281,338  
0

Pennsylvania Compensation Rating Bureau  
Tail Factor Model - 2013 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		
1940	*	13,660,587	1.000000	0	1.0000	#	1975	*	173,207,282	1.000396	68,553	1.0016	
1941	*	14,688,803	1.000000	0	1.0000	#	1976	*	186,244,390	1.000528	98,271	1.0021	
1942	*	15,794,412	1.000000	0	1.0000	#	1977	*	200,262,785	1.000704	140,866	1.0028	
1943	*	16,983,238	1.000000	1	1.0000	#	1978	*	215,336,328	1.000939	201,910	1.0038	
1944	*	18,261,546	1.000000	1	1.0000	#	1979	*	231,544,438	1.001251	289,387	1.0050	
1945	*	19,636,071	1.000000	1	1.0000	#	1980	*	248,972,514	1.001669	414,719	1.0067	
1946	*	21,114,055	1.000000	2	1.0000	#	1981	*	267,712,381	1.002225	594,249	1.0089	
1947	*	22,703,285	1.000000	3	1.0000	#	1982	*	287,862,775	1.002966	851,340	1.0119	
1948	*	24,412,135	1.000000	4	1.0000	#	1983	*	309,529,866	1.003955	1,219,357	1.0159	
1949	*	26,249,607	1.000000	6	1.0000	#	1984	*	332,827,813	1.005273	1,745,889	1.0213	24TH TO ULT.
1950	*	28,225,384	1.000000	8	1.0000	#	1985	*	357,879,369	1.007031047	2,498,698	1.0285	23RD TO ULT.
1951	*	30,349,875	1.000000	12	1.0000	#	1986		316,426,282	1.0049			
1952	*	32,634,275	1.000001	17	1.0000	#	1987		420,441,984	1.0058			
1953	*	35,090,618	1.000001	25	1.0000	#	1988		504,475,364	1.0089			
1954	*	37,731,847	1.000001	36	1.0000	#	1989		609,332,150	1.0081	Total		
1955	*	40,571,879	1.000001	51	1.0000	#	1990		640,785,582	1.0017	Development:		
1956	*	43,625,676	1.000002	73	1.0000	#	1991		606,548,458	1.0119	8,281,338		
1957	*	46,909,329	1.000002	105	1.0000	#	1992		543,491,240	1.0113			
1958	*	50,440,139	1.000003	150	1.0000	#	1993		455,416,432	1.0093			
1959	*	54,236,708	1.000004	215	1.0000	#	1994		430,021,071	1.0120			
1960	*	58,319,041	1.000005	309	1.0000	#	1995		392,450,978	1.0107			
1961	*	62,708,647	1.000007	442	1.0000	#	1996		387,821,400	1.0092			
1962	*	67,428,652	1.000009	634	1.0000	#	1997		417,963,891	1.0127			
1963	*	72,503,927	1.000013	909	1.0001	#	1998		470,088,916	1.0081			
1964	*	77,961,212	1.000017	1,304	1.0001	#	1999		516,410,377	1.0035			
1965	*	83,829,260	1.000022	1,869	1.0001	#	2000		521,302,756	1.0015			
1966	*	90,138,989	1.000030	2,680	1.0001	#	2001		489,301,749	1.0078			
1967	*	96,923,645	1.000040	3,842	1.0002	#	2002		505,820,566	1.0149			
1968	*	104,218,973	1.000053	5,508	1.0002	#	2003		515,160,011	1.0152			
1969	*	112,063,411	1.000070	7,896	1.0003	#	2004		539,482,665	1.0050			
1970	*	120,498,292	1.000094	11,321	1.0004	#	2005		566,551,518	1.0194			
1971	*	129,568,056	1.000125	16,230	1.0005	#	2006		561,963,046	1.0495			
1972	*	139,320,490	1.000167	23,268	1.0007	#	2007		610,937,669	1.1105			
1973	*	149,806,979	1.000223	33,357	1.0009	#	2008		513,022,991	2.2144			
1974	*	161,082,773	1.000297	47,820	1.0012	#	2009		213,230,556				

Inputs for Tail Factor Estimation - 2012 Loss Cost Filing

Indemnity: 07v08

Latest 12/31 Prior to 1986 Incurred	4,823,613,335
Next Latest 12/31 Prior to 1986 Incurred	4,821,729,417
CY Development of Prior Yrs	1,883,918
Next Latest PY 1986 Incurred	730,672,424
# of 1986 Yrs in Prior Data	6.60
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 = 1.0021 vs 1.0026 1,883,918  
0

Pennsylvania Compensation Rating Bureau  
Tail Factor Model - 2012 Loss Cost Filing

INDEMNITY

Policy Year	(*=Estimate)	12/31/08 Incurred	Prior Year Development	Dollar Development	DF	Policy Year	(*=Estimate)	12/31/08 Incurred	Prior Year Development	Dollar Development	DF
1941	*	82,544,574	1.000000	0	1.0000 #	1975	*	472,156,476	1.000039	18,269	1.0002
1942	*	86,889,025	1.000000	0	1.0000 #	1976	*	497,006,817	1.000052	25,640	1.0002
1943	*	91,462,132	1.000000	0	1.0000 #	1977	*	523,165,071	1.000069	35,986	1.0003
1944	*	96,275,928	1.000000	0	1.0000 #	1978	*	550,700,074	1.000092	50,505	1.0004
1945	*	101,343,082	1.000000	1	1.0000 #	1979	*	579,684,289	1.000122	70,883	1.0005
1946	*	106,676,929	1.000000	1	1.0000 #	1980	*	610,193,988	1.000163	99,480	1.0007
1947	*	112,291,504	1.000000	1	1.0000 #	1981	*	642,309,461	1.000217	139,614	1.0009
1948	*	118,201,583	1.000000	2	1.0000 #	1982	*	676,115,222	1.000290	195,935	1.0012
1949	*	124,422,719	1.000000	3	1.0000 #	1983	*	711,700,234	1.000387	274,971	1.0015
1950	*	130,971,283	1.000000	4	1.0000 #	1984	*	749,158,141	1.000515	385,874	1.0021
1951	*	137,864,509	1.000000	5	1.0000 #	1985	*	788,587,517	1.0006871227	541,484	1.0028
1952	*	145,120,536	1.000000	8	1.0000 #	1986		729,365,680	0.9982		
1953	*	152,758,459	1.000000	11	1.0000 #	1987		885,407,408	1.0006		
1954	*	160,798,377	1.000000	15	1.0000 #	1988		1,006,570,459	1.0002		
1955	*	169,261,450	1.000000	21	1.0000 #	1989		1,164,088,392	1.0015	Total	
1956	*	178,169,947	1.000000	29	1.0000 #	1990		1,191,295,662	1.0000	Development:	
1957	*	187,547,313	1.000000	41	1.0000 #	1991		1,049,568,925	1.0012	1,883,918	
1958	*	197,418,224	1.000000	57	1.0000 #	1992		896,325,114	1.0007		
1959	*	207,808,657	1.000000	81	1.0000 #	1993		771,091,629	1.0016		
1960	*	218,745,955	1.000001	113	1.0000 #	1994		709,821,060	1.0019		
1961	*	230,258,900	1.000001	159	1.0000 #	1995		616,311,682	1.0025		
1962	*	242,377,789	1.000001	223	1.0000 #	1996		534,720,552	0.9998		
1963	*	255,134,515	1.000001	313	1.0000 #	1997		562,718,687	1.0006		
1964	*	268,562,647	1.000002	439	1.0000 #	1998		586,919,103	0.9933		
1965	*	282,697,523	1.000002	616	1.0000 #	1999		669,590,595	1.0009		
1966	*	297,576,340	1.000003	865	1.0000 #	2000		706,572,308	1.0000		
1967	*	313,238,253	1.000004	1,213	1.0000 #	2001		685,847,135	1.0016		
1968	*	329,724,477	1.000005	1,703	1.0000 #	2002		683,448,332	1.0185		
1969	*	347,078,397	1.000007	2,390	1.0000 #	2003		644,770,809	1.0385		
1970	*	365,345,681	1.000009	3,355	1.0000 #	2004		664,194,830	1.0701		
1971	*	384,574,401	1.000012	4,708	1.0000 #	2005		648,604,553	1.1634		
1972	*	404,815,159	1.000016	6,608	1.0001 #	2006		596,426,891	1.4728		
1973	*	426,121,220	1.000022	9,275	1.0001 #	2007		460,887,927	3.3570		
1974	*	448,548,652	1.000029	13,017	1.0001 #	2008		130,532,565			

Inputs for Tail Factor Estimation - 2012 Loss Cost Filing

Medical **07v08**

Latest 12/31 Prior to 1986 Incurred	1,489,000,219	
Next Latest 12/31 Prior to 1986 Incurred	1,474,478,859	1 Policy Yr 1985 Incurred = Average of 1986, 1987, 1988, reduced by PY Deflation ^ 2
CY Development of Prior Yrs	14,521,360	2 PY 1984 & Prior = Subsequent Yr x PY Deflation
Next Latest PY 1986 Incurred	320,233,212	3 1985 Development Selected Based on Observed 1986, 1987, 1988
# of 1986 Yrs in Prior Data	4.65	4 PY 1984 & Prior Development = (Subsequent Yr - 1.0) x Selected Decrement + 1.0
Selected Decrement, Development Factor	0.75	
Selected Average PY Deflation Factor	0.93	

TAIL = 1.0368 vs 1.0453 14,521,360  
0

Pennsylvania Compensation Rating Bureau  
Tail Factor Model - 2012 Loss Cost Filing

MEDICAL

Policy Year	(*=Estimate)	12/31/08 Incurred	Prior Year Development	Dollar Development	DF	Policy Year	(*=Estimate)	12/31/08 Incurred	Prior Year Development	Dollar Development	DF
1941	*	15,027,953	1.000000	1	1.0000 #	1975	*	177,206,468	1.000681	120,557	1.0027
1942	*	16,159,089	1.000000	1	1.0000 #	1976	*	190,544,589	1.000908	172,802	1.0036
1943	*	17,375,364	1.000000	1	1.0000 #	1977	*	204,886,655	1.001210	247,670	1.0049
1944	*	18,683,188	1.000000	2	1.0000 #	1978	*	220,308,231	1.001614	354,939	1.0065
1945	*	20,089,449	1.000000	2	1.0000 #	1979	*	236,890,571	1.002152	508,600	1.0086
1946	*	21,601,558	1.000000	4	1.0000 #	1980	*	254,721,044	1.002869	728,654	1.0115
1947	*	23,227,482	1.000000	5	1.0000 #	1981	*	273,893,596	1.003825	1,043,670	1.0154
1948	*	24,975,787	1.000000	7	1.0000 #	1982	*	294,509,243	1.005100	1,494,403	1.0206
1949	*	26,855,685	1.000000	10	1.0000 #	1983	*	316,676,606	1.006800	2,138,895	1.0275 24TH TO ULT.
1950	*	28,877,080	1.000001	15	1.0000 #	1984	*	340,512,479	1.009067	3,059,628	1.0368 23RD TO ULT.
1951	*	31,050,624	1.000001	21	1.0000 #	1985	*	366,142,451	1.0120891080	4,373,464	1.0494 22ND TO ULT.
1952	*	33,387,768	1.000001	30	1.0000 #	1986		321,338,380	1.0035		
1953	*	35,900,826	1.000001	44	1.0000 #	1987		429,883,710	1.0033		
1954	*	38,603,038	1.000002	63	1.0000 #	1988		518,782,942	1.0121		
1955	*	41,508,643	1.000002	90	1.0000 #	1989		630,672,362	1.0071	Total	
1956	*	44,632,950	1.000003	128	1.0000 #	1990		660,591,177	1.0068	Development:	
1957	*	47,992,419	1.000004	184	1.0000 #	1991		625,784,460	1.0074	14,521,360	
1958	*	51,604,752	1.000005	264	1.0000 #	1992		565,613,825	1.0074		
1959	*	55,488,981	1.000007	379	1.0000 #	1993		475,205,952	1.0025		
1960	*	59,665,571	1.000009	543	1.0000 #	1994		450,643,640	1.0166		
1961	*	64,156,527	1.000012	778	1.0000 #	1995		420,157,331	1.0076		
1962	*	68,985,513	1.000016	1,116	1.0001 #	1996		415,458,474	1.0020		
1963	*	74,177,971	1.000022	1,600	1.0001 #	1997		445,640,747	1.0088		
1964	*	79,761,260	1.000029	2,293	1.0001 #	1998		502,382,124	1.0041		
1965	*	85,764,795	1.000038	3,288	1.0002 #	1999		539,604,296	1.0084		
1966	*	92,220,210	1.000051	4,714	1.0002 #	2000		556,380,158	1.0039		
1967	*	99,161,516	1.000068	6,758	1.0003 #	2001		517,817,894	1.0106		
1968	*	106,625,286	1.000091	9,688	1.0004 #	2002		527,653,955	1.0033		
1969	*	114,650,845	1.000121	13,890	1.0005 #	2003		530,585,927	1.0072		
1970	*	123,280,479	1.000162	19,913	1.0006 #	2004		565,590,827	1.0049		
1971	*	132,559,655	1.000215	28,548	1.0009 #	2005		582,326,632	1.0366		
1972	*	142,537,263	1.000287	40,926	1.0011 #	2006		561,217,472	1.1110		
1973	*	153,265,874	1.000383	58,669	1.0015 #	2007		581,053,682	2.2194		
1974	*	164,802,015	1.000511	84,103	1.0020 #	2008		242,952,032			