Volume LXXX, Part 1 No. 152

PROCEEDINGS
May 9, 10, 11, 12, 1993

EMPIRICAL TESTING OF CLASSIFICATION RELATIVITIES

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Abstract

There has been considerable discussion regarding the theoretical basis for insurance classifications and the calculation of classification rates. Rather than focusing on those issues, this paper presents some tests of the relative accuracy of competing rating methodologies. These tests are empirical in nature and involve comparing among classes the cost differences that actually have emerged with estimates of those differences using an alternative classification ratemaking methodology. In addition to tests of classification relativities, this paper also includes a test of the differences in excess loss experience among classes. These tests have been applied in practice and this paper includes examples of the corresponding calculations.

I would like to acknowledge the immense effort by the National Council on Compensation Insurance in providing classification rates for a substantial number of alternatives and states.

1. INTRODUCTION

There has been considerable discussion in actuarial and insurance press regarding risk classification and the calculation of relative rate differences among the various classes. Much of this discussion has centered on the theoretical basis for the classification structure and the method used to assign rates to the classes. Rather than adding to that discussion, this paper explores some techniques used to test empirically how well various methods have performed in identifying relative cost differences among classes. This analysis arose from testing specific alternative classification ratemaking methodologies as part of the 1991 examination of the National Council on Compensation Insurance (NCCI) ratemaking procedures undertaken by the National Association of Insurance Commissioners (NAIC).

Although our focus will be on applications to NCCI workers' compensation classification ratemaking, this methodology could be used for other lines of insurance. Since the methodology generally does not depend on the specific NCCI methodology, the reader should not need knowledge of current NCCI classification ratemaking methodology. This paper will, however, briefly review that methodology to the extent that it helps in the understanding of the approach. The goal is to test which of two specific alternative methodologies more accurately predicts the relative cost differences that emerge among classes. Thus, the focus is on how well a particular methodology predicts actual relative loss differences among classes.

2. TEST OF RELATIVE ACCURACY

The basic test of relative accuracy compares actual relative limited loss differences with those inherent in the rates calculated under two alternatives. For example, the NAIC examination used actual limited policy year 1987 losses by class to compare the relative accuracy of alternative methods used to calculate class rates for 1987. Since we are concerned with *relative* loss cost differences, we adjust the rates under the alternatives to generate total expected losses equal to the actual limited losses reported for the year.

The purpose of this paper is to discuss the tests used to measure differences in the relative accuracy of two sets of classification rates. Thus, it will not address the source of any specific alternative set of classification rates.

Definitions

For class i, let P_i denote the 1987 exposure, L_i denote the 1987 actual limited losses, and R_{ij} denote the 1987 rate using alternative methodology j. For workers' compensation, the experience rating plan affects the final rates charged for individual insureds and thus for classes. Since the adjustments are intended to reflect expected loss differences, they should be considered in comparing actual and expected losses. Thus, for class i, use EP_i to denote the 1987 earned premium, and MP_i to denote the 1987 manual premium.

Generally, the manual premium refers to the premium for a risk before adjustment for experience modifications, while earned premium reflects those modifications. Therefore, it could be argued that the earned premium more closely reflects exposure to loss than manual premium. Implicit below is the assumption that the adjustment to reflect this difference is the same for both methodologies. This is a practical consideration. The tests compare the current rate methodology with an alternative. The manual and earned premiums by class are available for the current methodology but not for the alternative. Note, however, that when the NCCI conducted these tests without this adjustment, the results were quite similar to those derived herein.

Finally, let E_{ij} denote expected losses for class i using alternative methodology j, calculated as follows:

$$E_{ij} = \frac{P_i \times R_{ij} \times \dfrac{EP_i}{MP_i}}{\left[\dfrac{\sum\limits_k P_k \times R_{kj} \times \dfrac{EP_k}{MP_k}}{\sum\limits_k L_k}\right]}.$$

In this case, the sums are taken over all classes. The numerator is simply the 1987 total premium expected for the class, after adjustment for the historical relation between manual and earned premium. Note that here and elsewhere in this paper the term "earned premium" refers to earned standard premium and not earned collected premium. The denominator is a constant that assures the total expected losses equal the total actual losses experienced. This adjustment was made since the focus, at this point, is in the evaluation of how well a particular alternative predicts *relative* loss differences among classes. Thus, the tests focus on the comparison between actual losses L_i and expected losses E_{ij}.

To accomplish this goal, consider the squared error SE_{ij} between the actual and expected losses for class i and alternative j. Define SE_{ij} as:

$$SE_{ij} = E_{ij}\left[\frac{L_i}{E_{ij}} - 1\right]^2 = \frac{(L_i - E_{ij})^2}{E_{ij}}.$$

The first representation here shows SE_{ij} as the square of the relative error between the actual losses L_i and the expected losses E_{ij}, weighted by the volume of expected losses. The second part simply rearranges and cancels terms. Readers may find this latter term familiar, since it is similar to terms in the chi-square statistic, which is sometimes used to test goodness of fit for probability distributions.

Test Statistics

An obvious choice of a test statistic would be the mean squared error, calculated as an average of the SE_{ij} values over all classes. Let MSE_j denote the mean squared error for alternative j. We could then test the difference $MSE_1 - MSE_2$. If the difference is positive, the second alternative could be judged to more accurately identify relative differences. On the other hand, if the difference is negative, the first alternative would be judged better.

However, in order to assess the significance of this difference, we would need to estimate its distribution. Given that the comparison

will be made between two methods that will probably use the same data base to calculate relativities, we cannot assume that the mean squared errors observed for the methods are independent. Following Meyers [1], we use the Wilcoxon statistic, sometimes known as the Wilcoxon signed rank statistic, as one test of the significance of the difference between squared errors for the classes. This is a non-parametric test and does not depend on the underlying distribution of the squared errors. To this end define D_i for each class as:

$$D_i = \text{Rank}(|\, SE_{i\,1} - SE_{i\,2}\,|) \times \text{Sign}(SE_{i\,1} - SE_{i\,2})\,.$$

Here "Rank" denotes the rank of the quantity in parentheses when the quantities are listed in order, smallest to largest, and "Sign" denotes the sign of the quantity in parentheses. Then, define the Wilcoxon statistic as

$$W = \sum_{i=1}^{n} D_i \quad ,$$

where n is the number of classes.

Under the hypothesis that it is equally likely that the differences $SE_{i\,1} - SE_{i\,2}$ are positive as it is that they are negative, we can calculate the distribution for W. For example: If $n = 1$, W can take on only one of the values -1 or 1 with equal probability; if $n = 2$, it can take one of four values $-3, -1$, 1, and 3, each with equal probability; and so forth. However, for large values of n, the statistic

$$V = \frac{W}{\sqrt{n(n+1)\,(2n+1)/6}}$$

has an approximate standard normal distribution. Although a more rigorous treatment is found in Hogg and Craig [2], this latter conclusion heuristically can be seen to follow from the law of large numbers. Under the hypothesis above, $\mathrm{E}[W] = 0$. Thus,

$$\text{Var}(W) = \sum_{i=1}^{n} \text{Var}(D_i)$$

$$= \sum_{i=1}^{n} (-i)^2 (1/2) + (i)^2 (1/2)$$

$$= \sum_{i=1}^{n} i^2$$

$$= 1/6\, n\, (n+1)\, (2n+1).$$

Exhibit 1 shows the distribution for W with $n = 9$ as compared with the normal distribution approximation. They appear similar enough to use the normal distribution for values of n greater than 9. Note that in many applications, especially in workers' compensation classification ratemaking, there are more than 10 classes considered.

Exhibit 2 shows the calculation of this Wilcoxon statistic using actual NCCI data from a single state. Columns (1) through (4) show the 1987 payroll, earned premiums, manual premiums, and losses at first report for each class. Column (5) shows the final 1987 rates calculated using the current NCCI methodology, while Column (6) shows an alternate set of rates calculated using five years of data to calculate classification pure premiums. Columns (7) and (8) show the calculated "premiums," using both the current methodology [Column (7)] and the alternate [Column (8)] and adjusting for the ratio of earned to manual premiums. Columns (9) and (10) are the resulting expected losses, balancing to total reported losses, for the current and alternate methods, respectively. Columns (11) and (12) show the squared error statistics. Column (13) shows the differences, while Column (14) shows the resulting D_i values.

In this case, the statistic V has a value of 0.99. We can conclude at an approximate 84% confidence level that the alternate method, using five years of data for class rates, is relatively more accurate in identifying relative loss differences among classes than is the current method; i.e., squared errors tend to be less than under the current

method. Conversely, under the above assumptions, there is an approximate 16% chance that random fluctuations could produce a Wilcoxon statistic of the observed magnitude or larger if there were actually no difference between the two distributions. Here we used a "one-tailed" test. A "two-tailed" test would have concluded that the distributions were different with an approximate 92% confidence but would not have indicated which tended to have smaller squared errors.

In the analysis for the project, there were a number of occasions when the mean squared error (calculated as the arithmetic average of the squared errors) for the current method was less than that for the alternative but in which the Wilcoxon statistic was significantly positive, indicating that the alternative was relatively more accurate. There were also cases of the converse. Although this may seem contradictory at first, it reflects different characteristics measured by the two statistics. Upon further review it became clear that these situations were caused by numerically large squared errors dominating the averages, whereas their influence in the Wilcoxon statistic was more limited.

Due to limitations in available data, the analysis of NCCI methodology focused on using limited 1987 losses at first report. However, data at second report became available later in the analysis. There may be a difference in development among classes and it is preferable to use even more mature data if available. An alternative would be to include expected development to adjust first or second report losses to their expected ultimate level. Because the goal of the test is a "proof of the pudding" analysis, using actual unadjusted data to the greatest extent possible is desirable. Tests with second report data and developed data generally provided results similar to those using first report data.

During the examination of the NCCI, this same statistic was calculated using second report data ($V = 0.88$), using first report data developed to ultimate ($V = 0.86$), and using second report data developed to ultimate ($V = 0.57$). Generally these alternatives produce roughly the same indications, though at different significance levels.

3. A SECOND TEST OF RELATIVE ACCURACY

The analysis also considered the underwriting statistic as described by Meyers [1]. Since this method is described in detail in that reference, what follows is only a brief summary of the approach and results with these data.

The approach begins by segmenting the data into two groups. Group 1 includes those classes with expected losses for the current method less than those for the alternative method, while Group 2 is comprised of all other classes. By construction, the ratios of actual to expected losses will be lower for the alternative method in the first group and higher in the second as compared to those ratios for the current method.

If, in both groups, one method produces ratios of actual to expected losses that are closer to 1.00, then that method could be considered to provide coverage to classes with better loss experience for lower rates and to classes with worse loss experience for higher rates than the other method. Thus, this method could potentially have a competitive advantage relative to the other. This test focuses on this difference and hence is called the "underwriting test."

The significance of the differences in underwriting ratios is tested by comparing ratios of actual to expected losses from similarly sized groups randomly selected from all groups using a "bootstrapping" technique. The bootstrapping approach is sometimes used in statistical analysis when the actual underlying distributions are either unknown or too complex to analyze directly. Table 1 summarizes the results of the underwriting test. It compares an alternative classification ratemaking methodology to the current methodology.

TABLE 1

SUMMARY OF RESULTS OF UNDERWRITING TEST

Group 1 Ratios of Actual to Expected Losses (217 classes):	
Current Method	1.07
Alternative Method	0.99
Group 2 Ratios of Actual to Expected Losses (210 classes):	
Current Method	0.94
Alternative Method	1.01

Using a bootstrap approach, we randomly choose 2,000 samples of 217 classes (without replacement) from the population of 427 classes and calculate the resulting ratios of actual to expected losses based on the current method. This sampling results in the Table 2 distribution of ratios of actual to expected losses.

As can be seen from Table 2, less than 5% of the samples result in ratios in excess of 1.063; i.e., there is less than a 5% chance that the 1.07 ratio generated by the current method results from random chance. In addition, the alternative method results in a lower ratio in Group 1, the classes where the current method has the greatest difference between actual and expected losses, and also can be profitable with lower prices in Group 2 where the current method is more profitable. Thus there is a significant chance that remaining with the current method could result in adverse selection if a competitor selects the alternative. We also see that the ratio generated by the alternative method, 0.99, is well within expected variation.

4. TESTS FOR EXCESS LOSSES

The current NCCI ratemaking methodology uses limited loss data and distributes a provision for losses in excess of the limitation among classes in each industry group. The NAIC study compared rel-

TABLE 2

DISTRIBUTION OF RATIOS OF ACTUAL TO EXPECTED LOSSES FOR 217 CLASSES

Ratio	Estimated Percentile
0.937	0.025
0.949	0.050
0.961	0.100
0.973	0.200
0.979	0.250
0.984	0.300
0.994	0.400
1.001	0.500
1.009	0.600
1.019	0.700
1.025	0.750
1.031	0.800
1.039	0.850
1.049	0.900
1.063	0.950
1.073	0.975
1.075	0.980

ative rate differences from the various methodologies with the loss cost differences in actual reported limited losses for the tests of relative accuracy. But the distribution of excess losses among classes in an industry group implicitly assumes that the losses above the limitation are not sufficiently different among classes to have this provision vary by class or that any real difference cannot be measured reliably due to random variation. Thus, the study included a separate test of the difference of excess loss experience among classes in an industry group.

The study also included a limited test of the validity of this hypothesis. It used both limited and unlimited loss data, by class, for three policy years at the same valuation date: 1987 at first report,

1986 at second report, and 1985 at third report. The goal here was to test whether the expected loss experience above the limit for an individual class differed significantly from that of the rest of the industry group.

For this analysis, let UL_{ij} and LL_{ij} denote unlimited and limited losses for class i and year j, respectively. The class excess loss factor implied by the data would then be:

$$ELF_{ij} = \frac{UL_{ij}}{LL_{ij}}.$$

On the other hand, the excess loss factor for the other classes in the industry group implied by the data, excluding class i, would be:

$$GELF_{ij} = \frac{\sum_{k \neq i} UL_{kj}}{\sum_{k \neq i} LL_{kj}}.$$

Here the summation is taken over all the other classes in the industry group containing the subject class.

We now test the significance of the difference between the two statistics ELF_{ij} and $GELF_{ij}$. At this point, we again use the Wilcoxon statistic to test the whether the difference $ELF_{ij} - GELF_{ij}$ is significantly different from zero.

Exhibit 3 compares the excess loss experience for class 8810 (Clerical Office Employees NOC) with that of the remainder of the "All Other" industry group. Table 3 summarizes the results shown in that exhibit.

TABLE 3

EXCESS LOSS FACTORS

Year	Class 8810	Other "All Other"	Difference	D-Value
1985	1.0000	1.0453	−0.0453	−3
1986	1.0115	1.0365	−0.0250	−1
1987	1.0000	1.0407	−0.0407	−2
Total				−6

In the case of $n = 3$, the Wilcoxon statistic can only take the values −6, −4, −2, 0, 2, 4, and 6. There is a .25 probability of a 0 value and .125 probability for each of the other values. Thus, there is a 12.5% probability that random chance could result in a value of 6 under the null hypothesis that positive and negative values of the difference are equally likely. We would thus reject this null hypothesis at any confidence level below 87.5%.

Another test statistic also suggests itself. Given the construction of the two statistics ELF_{ij} and $GELF_{ij}$ we would expect both of the statistics to be at least 1.0 and, theoretically, unlimited. Thus assume that $GELF_{ij} - 1$ and $ELF_{ij} - 1$ both form random samples of size 3 ($j = 1, 2, 3$) from independent lognormal distributions. There is the possibility of a particular class not experiencing any excess loss for a particular year. In such cases, set $UL_{ij} = LL_{ij} + 1$. We include only classes with losses experienced in each policy year. Under these assumptions, the natural logarithms of $GELF_{ij} - 1$ and $ELF_{ij} - 1$ are random samples from independent normal distributions. Therefore, we evaluate the significance of the difference between the two means:

$$M_i = \tfrac{1}{3} \sum_{j=1}^{3} \ln(ELF_{ij} - 1) \text{ ; and}$$

$$GM_i = \tfrac{1}{3} \sum_{j=1}^{3} \ln(GELF_{ij} - 1).$$

The assumptions regarding the lognormality of the statistics imply that $\ln(ELF_{ij} - 1)$ and $\ln(GELF_{ij} - 1)$ are independent random samples from normal distributions with possibly different variances.

Thus, referring to normal statistical theory, set

$$Z_{ij} = \ln(GELF_{ij} - 1) - \ln(ELF_{ij} - 1),$$

$$\bar{Z}_i = \tfrac{1}{3} \sum_{j=1}^{3} Z_{ij}, \text{ and}$$

$$S_i^2 = \tfrac{1}{2} \sum_{j=1}^{3} (Z_{ij} - \bar{Z}_i)^2 .$$

Under the null hypothesis that the two underlying means are equal,

$$H_0\text{: } \mathrm{E}[\ln(GELF_{ij} - 1)] = \mathrm{E}[\ln(ELF_{ij} - 1)] ,$$

the variable Z_{ij} has a normal distribution with mean 0.

In the development thus far we assumed that $ELF_{ij} - 1$ and $GELF_{ij} - 1$ are independent lognormal variables. However, the statistics Z_{ij} will still form a random sample from a normal distribution if we simply assume that the ratios

$$\frac{GELF_{ij} - 1}{ELF_{ij} - 1}$$

form a random sample from a lognormal distribution. This softens the requirement that the numerator and denominator be independent. The above derivation shows that independence and lognormality are sufficient to conclude that Z_{ij} is normal but they are not necessary. For example, if $ELF_{ij} - 1$ and $GELF_{ij} - 1$ are jointly lognormal (i.e., if $\ln(ELF_{ij} - 1)$ and $\ln(GELF_{ij} - 1)$ are jointly normal but are not independent), then Z_{ij} will still be normal.

From this point on, simply assume that Z_{ij} forms a random sample from a normal distribution. Then the following statistic has a t distribution with 2 degrees of freedom:

$$T_i = \frac{\bar{Z}_i}{S_i / \sqrt{3}} .$$

Then use standard tables to test the significance of the difference between the expected excess losses for a class and that of the remaining industry group by testing the significance of the difference between T_i and 0. Either accept the null hypothesis that the Z_{ij} are a random sample from a normal distribution with mean 0 or reject that hypothesis.

Some may argue that the Z_{ij} values have different distributions for different valuation years. This could be due to a different mix of open and closed claims at different maturities and the possibility that larger claims experience different development than smaller claims.

The primary hypothesis we wish to test is whether the excess loss experience of a class is significantly different than that of the remainder of its industry group. Under the null hypothesis, then, we would expect similar excess loss behavior for both the class and the remainder of the industry group, and thus possibly some positive correlation between the statistics $\ln(GELF_{ij} - 1)$ and $\ln(ELF_{ij} - 1)$. Thus, one could argue that the potential difference in variance of the Z_{ij} from one maturity to the next may not be as great as that in the two component statistics. If this argument is accepted, the assumption that the Z_{ij} statistics have the same variance may not be significantly violated if the null hypothesis is indeed true. Unfortunately, we do not have sufficient data to test which is the actual case.

Note that if we had the data at the same maturity for all years this criticism would not arise. However, such data were not readily available for the NCCI analysis. Also note that this example uses only the three most recent years of data. This restriction is primarily due to data availability rather than theoretical reasons. More years of data should be used in this test. In addition, if data for older years were available and if the test were confined to those older years, then the concern noted above regarding differing maturities would probably be of less significance. In any case, though there may be some concerns with the application of this statistic in this particular situation,

there are many situations where it can be applied without such concerns.

Exhibit 3 gives an example of this calculation for class 8810 (Clerical Office Employees NOC). The first two columns give the "All Other" industry group loss data, both limited and unlimited. The next four columns give the loss, excess loss factor, and corresponding logarithmic transformation data for class 8810. Since the limited and unlimited losses for 1985 and 1987 are equal, the excess loss factors were calculated using

$$UL_{8810,1} = LL_{8810,1} + 1, \text{ and}$$

$$UL_{8810,3} = LL_{8810,3} + 1.$$

The last four columns provide the same information for the "All Other" industry group excluding class 8810. The resulting Z values and statistics are also shown there. In this case the value of the T_i is 2.3327. This value is significant at greater than 85.5% with a one-tailed test and greater than 92.8% with a two-tailed test. Thus, at a 90% confidence level, we would reject the hypothesis that the Z_{ij} form a random sample from a normal distribution with mean 0.

The limited analysis, based only on these three years of data, resulted in the Table 4 percentages of classes that were different from the remaining classes in the industry group, based on data from the same state used in the previous sections.

Table 4 shows that, based on the limited data analyzed, there is a sizable proportion of classes for which we reject the null hypothesis stated above. The NCCI study performed this test for a total of 10 states. Of the 30 industry group/state combinations tested, 17 had more than half of their classes significantly different from the group as a whole at the 99% confidence level.

TABLE 4

PERCENTAGE OF CLASSES WITH SIGNIFICANTLY DIFFERENT EXCESS LOSS EXPERIENCE THAN REMAINDER OF GROUP

	Confidence Level			
Industry Group	90%	95%	97.5%	99%
Manufacturing	1.6%	0.0%	0.0%	0.0%
Contracting	84.7%	79.7%	66.1%	49.2%
Other	84.9%	78.4%	65.5%	59.7%

Note that these results are based on only three years of experience. As such, it is possible that a class or classes may not have any excess loss experience or may have been "unlucky" enough to have excess losses during the experience period. This test, however, can be used to test the significance of differences with additional data.

REFERENCES

[1] Meyers, Glenn G., "Empirical Bayesian Credibility for Workers' Compensation Classification Ratemaking," *PCAS* LXXI, 1984, p. 96.

[2] Hogg, Robert V., and Craig, Allen T., *Introduction to Mathematical Statistics,* Third Edition, New York, Macmillan, 1970.

EXHIBIT 1

COMPARISON OF WILCOXON CUMULATIVE DENSITY AND NORMAL APPROXIMATION WITH $n = 9$

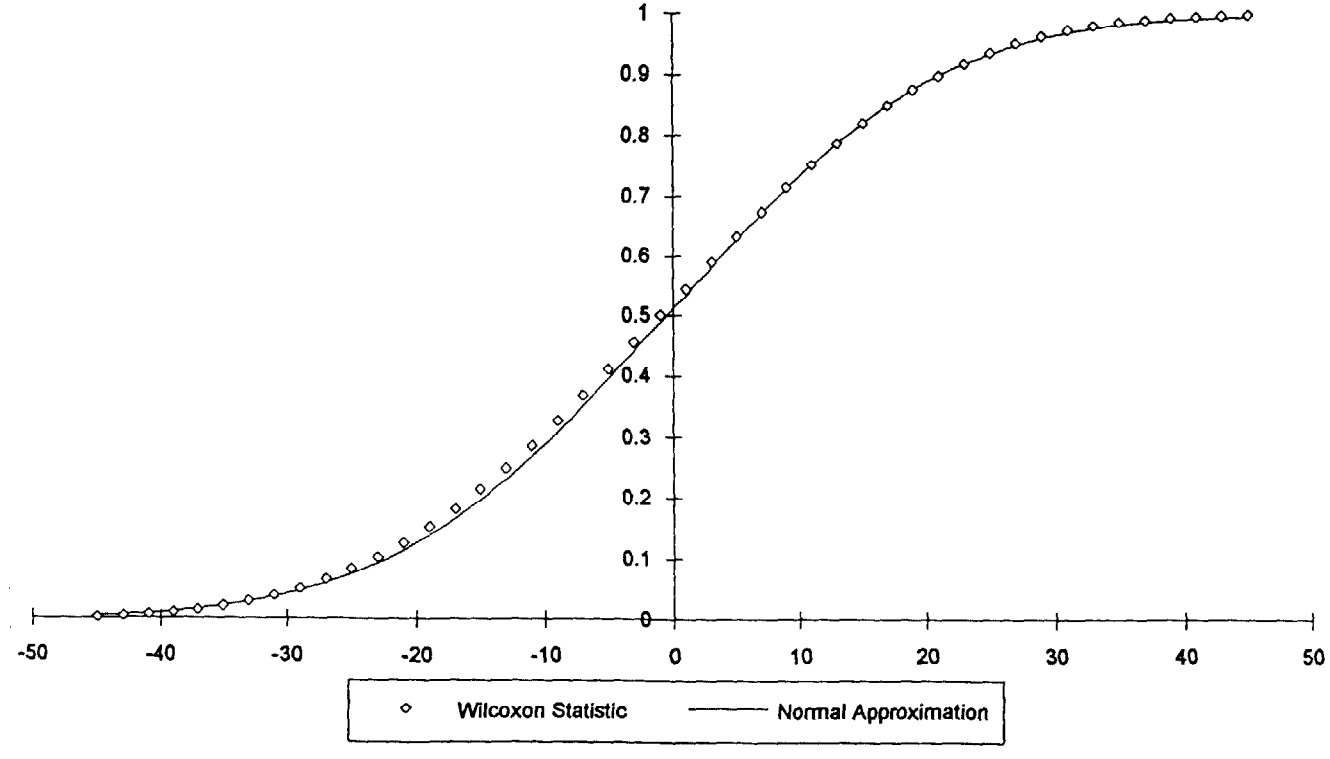

EXHIBIT 2

Part 1

CALCULATION OF WILCOXON STATISTIC

BASED ON 1987 LOSS EXPERIENCE FROM A SINGLE STATE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Class	1987 Payroll	1987 Earned Premium	1987 Manual Premium	1987 First Report Losses	Current Rate	Alternate Rate	Current Total Premiums (1)x(5)x (2)/[(3)x100]	Alternate Total Premiums (1)x(6)x (2)/[(3)x100]	Current Expected Losses	Alternate Expected Losses	Current Squared Error [(9)-(4)]^2/(9)	Alternate Squared Error [(10)-(4)]^2/(10)	Difference (11)-(12)	*D* Value
2361	1,153	10	11	0	1.23	1.23	13	13	7	7	7	7	0	1
2110	1,191	43	43	0	4.03	4.06	48	48	26	26	26	26	0	-2
4823	5,354	73	63	0	1.31	1.32	81	82	45	45	45	45	0	-3
4133	34,981	568	568	0	2.06	2.06	721	721	395	394	395	394	1	4
1438	5,039	125	125	0	2.76	2.79	139	141	76	77	76	77	-1	-5
3315	5,515	131	131	0	2.86	2.89	158	159	86	87	86	87	-1	-6
79	2,800	42	42	0	4.44	4.50	124	126	68	69	68	69	-1	-7
2790	95,223	924	924	136	1.21	1.21	1,152	1,152	631	630	389	388	1	8
4240	8,045	198	198	0	2.83	2.86	228	230	125	126	125	126	-1	-9
8203	332,198	14,607	13,762	7,999	4.61	4.62	16,255	16,290	8,907	8,914	93	94	-1	-10
9182	7,176	119	119	0	1.92	1.96	138	141	75	77	75	77	-1	-11
3385	214,627	1,559	1,604	0	0.92	0.92	1,919	1,919	1,052	1,050	1,052	1,050	1	12
4350	16,841	113	113	0	0.80	0.82	135	138	74	76	74	76	-2	-13
3118	19,519	422	422	0	2.27	2.29	443	447	243	245	243	245	-2	-14
3620	20,474,641	1,105,550	1,032,249	822,259	6.73	6.74	1,475,792	1,477,985	808,687	808,741	228	226	2	15
4923	30,835	327	327	0	1.40	1.39	432	429	237	235	237	235	2	16
4568	37,851	458	738	0	2.21	2.23	519	524	284	287	284	287	-2	-17
2600	114,484	1,660	1,660	1,040	1.89	1.91	2,164	2,187	1,186	1,197	18	20	-3	-18
4283	60,757	2,950	2,584	2,165	5.16	5.20	3,579	3,607	1,961	1,974	21	19	3	19
4431	58,109	569	569	0	1.06	1.07	616	622	338	340	338	340	-3	-20
169	3,000	222	222	0	7.28	7.46	218	224	120	122	120	122	-3	-21
4061	36,744	1,252	1,252	0	4.16	4.18	1,529	1,536	838	840	838	840	-3	-22
4053	75,843	1,183	1,183	0	2.07	2.08	1,570	1,578	860	863	860	863	-3	-23
36	76,614	3,788	3,788	1,073	6.08	6.08	4,658	4,658	2,553	2,549	858	855	3	24
4703	167,640	3,216	3,243	45	2.68	2.68	4,455	4,455	2,441	2,438	2,352	2,349	3	25
2105	19,596	498	528	0	3.36	3.40	621	628	340	344	340	344	-4	-26
2220	215,105	4,353	4,582	0	2.27	2.27	4,639	4,639	2,542	2,538	2,542	2,538	4	27
2413	43,682	1,005	1,005	0	2.99	3.01	1,306	1,315	716	719	716	719	-4	-28
7133	201,415	6,456	6,520	1,045	4.39	4.40	8,755	8,775	4,798	4,802	2,935	2,939	-4	-29
2286	123,121	2,610	2,610	521	2.51	2.52	3,090	3,103	1,693	1,698	812	816	-4	-30
4751	48,212	1,244	1,196	0	3.05	3.07	1,529	1,540	838	842	838	842	-4	-31

EXHIBIT 2

Part 2

CALCULATION OF WILCOXON STATISTIC

BASED ON 1987 LOSS EXPERIENCE FROM A SINGLE STATE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Class	1987 Payroll	1987 Earned Premium	1987 Manual Premium	1987 First Report Losses	Current Rate	Alternate Rate	Current Total Premiums (1)x(5)x (2)/[(3)x100]	Alternate Total Premiums (1)x(6)x (2)/[(3)x100]	Current Expected Losses	Alternate Expected Losses	Current Squared Error [(9)-(4)]^2/(9)	Alternate Squared Error [(10)-(4)]^2/(10)	Difference (11)-(12)	D Value
3807	7,592	207	207	0	2.99	3.10	227	235	124	129	124	129	-4	-32
113	9,042	428	433	0	4.39	4.49	392	401	215	220	215	220	-5	-33
3240	129,808	6,117	5,413	0	4.57	4.57	6,704	6,704	3,673	3,668	3,673	3,668	5	34
3830	1,215,518	6,756	12,123	0	1.17	1.17	7,926	7,926	4,343	4,337	4,343	4,337	6	35
2835	396,443	10,639	11,175	6,482	3.03	3.11	11,436	11,738	6,267	6,423	7	1	7	36
2578	636,366	22,682	19,854	15,900	3.86	3.84	28,063	27,917	15,377	15,276	18	25	-8	-37
1853	1,669	70	60	289	4.63	4.66	90	91	49	50	1,162	1,154	8	38
4815	209,640	3,319	3,123	227	2.19	2.20	4,879	4,902	2,674	2,682	2,239	2,247	-8	-39
3224	61,129	1,498	1,498	0	3.23	3.26	1,974	1,993	1,082	1,090	1,082	1,090	-9	-40
2688	254,162	3,635	3,635	170	1.72	1.73	4,372	4,397	2,395	2,406	2,068	2,078	-10	-41
2388	123,790	1,750	1,750	0	1.88	1.90	2,327	2,352	1,275	1,287	1,275	1,287	-12	-42
4360	245,198	1,433	1,433	0	0.63	0.64	1,545	1,569	846	859	846	859	-12	-43
4308	125,814	1,057	1,057	0	0.83	0.85	1,044	1,069	572	585	572	585	-13	-44
2150	136,326	5,974	6,970	36	7.35	7.34	8,588	8,576	4,706	4,693	4,634	4,621	13	45
2915	461,083	13,245	12,495	2,912	3.00	3.01	14,663	14,712	8,035	8,050	3,266	3,279	-13	-46
9180	542,222	25,508	24,385	16,254	5.58	5.55	31,649	31,479	17,343	17,225	68	55	14	47
4777	76,262	2,371	2,419	0	4.12	4.16	3,080	3,110	1,688	1,702	1,688	1,702	-14	-48
2651	190,000	4,322	4,598	738	3.23	3.25	5,769	5,804	3,161	3,176	1,857	1,872	-14	-49
7230	1,198,750	29,740	35,737	18,803	3.22	3.70	32,122	36,911	17,602	20,197	82	96	-14	-50
2300	151,586	3,000	2,941	0	2.00	2.02	3,093	3,123	1,695	1,709	1,695	1,709	-15	-51
4206	168,272	3,719	3,719	0	2.62	2.64	4,409	4,442	2,416	2,431	2,416	2,431	-15	-52
4279	375,634	10,796	8,771	365	2.82	2.83	13,039	13,085	7,145	7,160	6,433	6,448	-15	-53
2065	123,755	2,998	3,069	0	2.78	2.76	3,361	3,337	1,842	1,826	1,842	1,826	16	54
4720	76,752	1,719	1,719	1,496	2.85	2.79	2,187	2,141	1,199	1,172	74	90	-16	-55
4352	561,431	5,103	4,973	1,874	0.94	0.95	5,415	5,473	2,967	2,995	403	419	-17	-56
909	410	1,403	1,377	21	43.89	44.74	1,833	1,869	1,005	1,023	963	981	-18	-57
3022	1,985,144	68,885	75,592	11,812	5.67	5.68	102,571	102,752	56,206	56,225	35,064	35,082	-19	-58
1710	48,217	2,035	2,035	156	5.93	6.01	2,859	2,898	1,567	1,586	1,270	1,289	-19	-59
2503	386,275	1,946	1,946	0	0.59	0.60	2,279	2,318	1,249	1,268	1,249	1,268	-19	-60
8606	453,192	17,340	12,145	102	3.19	3.20	20,641	20,705	11,310	11,330	11,107	11,127	-19	-61

EXHIBIT 2

Part 3

CALCULATION OF WILCOXON STATISTIC

BASED ON 1987 LOSS EXPERIENCE FROM A SINGLE STATE

Class	(1) 1987 Payroll	(2) 1987 Earned Premium	(3) 1987 Manual Premium	(4) 1987 First Report Losses	(5) Current Rate	(6) Alternate Rate	(7) Current Total Premiums (1)x(5)x (2)/[(3)x100]	(8) Alternate Total Premiums (1)x(6)x (2)/[(3)x100]	(9) Current Expected Losses	(10) Alternate Expected Losses	(11) Current Squared Error [(9)-(4)]^2/(9)	(12) Alternate Squared Error [(10)-(4)]^2/(10)	(13) Difference (11)-(12)	(14) D Value
4362	394,819	2,092	2,092	0	0.65	0.66	2,566	2,606	1,406	1,426	1,406	1,426	-20	-62
9089	349,082	5,527	5,527	2,526	1.67	1.70	5,830	5,934	3,194	3,247	140	160	-20	-63
3303	92,397	4,528	4,362	1,011	4.82	4.78	4,623	4,585	2,533	2,509	915	894	21	64
2021	118,438	940	1,516	0	1.82	1.77	1,337	1,300	732	711	732	711	21	65
1925	290,833	10,964	10,964	1,235	4.43	4.45	12,884	12,942	7,060	7,082	4,806	4,827	-21	-66
4653	144,980	3,909	6,205	0	4.22	4.27	3,854	3,900	2,112	2,134	2,112	2,134	-22	-67
3255	278,472	6,850	6,850	132	3.20	3.19	8,911	8,883	4,883	4,861	4,623	4,600	22	68
7222	82,634	7,136	7,241	0	8.08	8.04	6,580	6,547	3,606	3,583	3,606	3,583	23	69
3132	176,657	5,070	4,487	1,397	3.14	3.17	6,268	6,328	3,435	3,462	1,209	1,232	-23	-70
908	1,138	3,079	2,969	245	29.86	30.27	3,524	3,572	1,931	1,955	1,472	1,495	-23	-71
3180	95,775	2,385	2,385	5,323	2.82	2.82	2,701	2,701	1,480	1,478	9,979	10,004	-25	-72
2380	774,945	10,691	12,012	1,436	2.14	2.15	14,760	14,829	8,088	8,114	5,471	5,496	-25	-73
4717	299,280	6,045	6,045	24	2.88	2.90	8,619	8,679	4,723	4,749	4,675	4,701	-26	-74
2710	315,241	28,695	26,086	6,410	9.93	9.96	34,434	34,538	18,869	18,899	8,226	8,253	-27	-75
2702	28,835	4,072	4,072	158	17.28	17.49	4,983	5,043	2,730	2,760	2,423	2,453	-29	-76
2130	904,417	42,960	42,960	12,049	5.36	5.36	48,477	48,477	26,564	26,526	7,931	7,901	30	77
7420	134,103	6,784	15,273	0	12.04	12.15	7,172	7,237	3,930	3,960	3,930	3,960	-30	-78
1655	80,983	2,488	2,588	0	5.21	5.29	4,056	4,118	2,223	2,254	2,223	2,254	-31	-79
6206	401,927	15,885	17,283	1,583	4.38	4.37	16,180	16,143	8,866	8,834	5,983	5,951	32	80
8050	5,276,895	44,648	47,068	28,910	1.10	1.03	55,061	51,558	30,172	28,212	53	17	35	81
2587	497,138	7,175	8,750	502	2.51	2.53	10,232	10,314	5,607	5,644	4,648	4,684	-36	-82
6214	22,489	1,082	1,082	0	5.56	5.27	1,250	1,185	685	649	685	649	37	83
3881	971,699	27,531	32,252	7,715	2.39	2.41	19,824	19,990	10,863	10,938	912	950	-38	-84
170	77,880	2,890	2,890	155	3.53	3.63	2,749	2,827	1,506	1,547	1,212	1,252	-40	-85
2016	332,674	4,720	4,588	113	1.47	1.45	5,031	4,963	2,757	2,715	2,535	2,494	41	86
9019	150,254	3,989	3,989	0	3.91	3.97	5,875	5,965	3,219	3,264	3,219	3,264	-45	-87
1701	358,100	4,901	7,074	229	2.69	2.66	6,674	6,599	3,657	3,611	3,213	3,168	46	88
6836	86,533	3,864	3,864	251	4.80	4.91	4,154	4,249	2,276	2,325	1,802	1,850	-48	-89
8204	89,212	6,656	5,981	0	7.42	7.52	7,367	7,466	4,037	4,085	4,037	4,085	-49	-90
4251	2,776,423	82,735	63,516	43,776	2.92	2.93	105,603	105,964	57,867	57,983	3,431	3,481	-50	-91
3257	460,875	11,578	12,041	2,897	3.19	3.17	14,137	14,048	7,746	7,687	3,036	2,985	51	92

EXHIBIT 2

Part 4

CALCULATION OF WILCOXON STATISTIC

BASED ON 1987 LOSS EXPERIENCE FROM A SINGLE STATE

Class	(1) 1987 Payroll	(2) 1987 Earned Premium	(3) 1987 Manual Premium	(4) 1987 First Report Losses	(5) Current Rate	(6) Alternate Rate	(7) Current Total Premiums (1)x(5)x (2)/[(3)x100]	(8) Alternate Total Premiums (1)x(6)x (2)/[(3)x100]	(9) Current Expected Losses	(10) Alternate Expected Losses	(11) Current Squared Error [(9)-(4)]^2/(9)	(12) Alternate Squared Error [(10)-(4)]^2/(10)	(13) Difference (11)-(12)	(14) *D* Value
4809	2,371,479	28,386	44,821	5,438	1.96	1.97	29,437	29,587	16,131	16,190	7,088	7,141	-53	-93
3188	1,138,601	18,816	21,178	21,019	2.37	2.38	23,975	24,076	13,138	13,174	4,728	4,671	57	94
8832	193,998,224	405,710	403,804	191,190	0.20	0.20	389,828	389,828	213,613	213,311	2,354	2,294	60	95
34	3,071,648	130,659	118,012	35,523	4.18	4.19	142,155	142,495	77,896	77,972	23,050	23,110	-60	-96
4740	309,595	9,726	6,173	514	2.50	2.48	12,195	12,097	6,682	6,619	5,694	5,631	62	97
3307	157,576	5,417	5,610	0	3.92	3.85	5,964	5,856	3,268	3,205	3,268	3,205	63	98
913	2,607	18,895	18,784	4,356	83.66	84.30	21,939	22,107	12,022	12,097	4,888	4,953	-65	-99
4273	2,959,304	85,272	75,462	27,046	3.33	3.33	111,356	111,356	61,019	60,933	18,915	18,846	69	100
2417	271,326	7,499	7,217	2,190	3.27	3.33	9,219	9,388	5,052	5,137	1,621	1,691	-70	-101
5402	25,100	1,561	1,561	0	8.01	7.51	2,011	1,885	1,102	1,031	1,102	1,031	70	102
3126	549,664	16,105	16,105	1,544	4.30	4.33	23,636	23,800	12,952	13,023	10,048	10,118	-71	-103
1165	284,653	9,436	9,394	0	3.31	3.36	9,464	9,607	5,186	5,257	5,186	5,257	-71	-104
3827	148,160	3,022	3,022	5,341	2.57	2.59	3,808	3,837	2,087	2,100	5,076	5,003	73	105
4351	1,297,629	6,801	5,698	1,168	0.64	0.65	9,912	10,067	5,432	5,509	3,347	3,420	-74	-106
8263	33,357	2,279	2,279	266	7.74	8.18	2,582	2,729	1,415	1,493	933	1,008	-76	-107
16	135,526	5,532	5,747	717	5.28	5.40	6,888	7,045	3,774	3,855	2,477	2,554	-77	-108
5348	2,325,278	84,651	80,813	53,839	4.21	3.98	102,543	96,941	56,191	53,045	98	12	87	109
5705	218,093	10,822	10,822	9,521	8.88	8.39	19,367	18,298	10,612	10,013	112	24	88	110
8103	558,518	16,953	13,349	1,401	2.84	2.82	20,144	20,002	11,038	10,945	8,414	8,323	92	111
3082	2,818,291	66,512	83,140	44,759	3.82	3.89	86,127	87,705	47,195	47,992	126	218	-92	-112
3113	1,516,818	18,091	19,256	1,814	1.59	1.58	22,658	22,516	12,416	12,320	9,053	8,960	94	113
3111	328,428	9,987	10,022	0	3.54	3.49	11,586	11,422	6,349	6,250	6,349	6,250	99	114
2660	571,213	9,444	9,597	126	2.41	2.38	13,547	13,378	7,423	7,320	7,173	7,071	103	115
4812	1,198,578	16,546	17,755	2,037	1.45	1.47	16,196	16,419	8,875	8,985	5,268	5,372	-104	-116
4558	846,859	19,904	19,485	686	2.59	2.57	22,405	22,232	12,277	12,165	10,944	10,832	112	117
5437	5,898,232	246,117	252,385	152,644	5.43	5.42	312,320	311,745	171,141	170,584	1,999	1,887	112	118
6237	75,151	2,561	1,879	0	3.29	3.09	3,370	3,165	1,847	1,732	1,847	1,732	115	119
8010	41,352,347	471,033	431,015	228,835	1.12	1.12	506,148	506,148	277,353	276,960	8,487	8,362	125	120
7405	355,906	12,128	12,349	0	3.23	3.30	11,290	11,535	6,187	6,312	6,187	6,312	-125	-121
4307	1,927,617	28,471	28,499	21,999	1.79	1.76	34,470	33,893	18,889	18,546	512	643	-131	-122
7502	7,960,829	167,385	168,722	111,428	2.59	2.49	204,552	196,654	112,088	107,607	4	136	-132	-123

EXHIBIT 2

Part 5

CALCULATION OF WILCOXON STATISTIC

BASED ON 1987 LOSS EXPERIENCE FROM A SINGLE STATE

Class	(1) 1987 Payroll	(2) 1987 Earned Premium	(3) 1987 Manual Premium	(4) 1987 First Report Losses	(5) Current Rate	(6) Alternate Rate	(7) Current Total Premiums (1)x(5)x [2]/[(3)x100]	(8) Alternate Total Premiums (1)x(6)x [2]/[(3)x100]	(9) Current Expected Losses	(10) Alternate Expected Losses	(11) Current Squared Error [(9)-(4)]^2/(9)	(12) Alternate Squared Error [(10)-(4)]^2/(10)	(13) Difference (11)-(12)	(14) + D Value
2041	40,380	1,583	1,215	0	3.95	4.45	2,078	2,341	1,139	1,281	1,139	1,281	-142	-124
4819	1,225,557	20,224	18,262	5,861	2.06	2.04	27,959	27,687	15,321	15,150	5,841	5,696	145	125
9586	21,884,849	70,375	64,544	82,667	0.34	0.34	81,131	81,131	44,457	44,394	32,841	32,996	-155	-126
2923	294,242	5,766	5,766	701	2.58	2.69	7,591	7,915	4,160	4,331	2,876	3,043	-167	-127
5610	522,477	17,880	18,906	430	4.58	4.65	22,631	22,977	12,401	12,573	11,556	11,727	-171	-128
2841	1,197,565	42,216	37,242	63,361	3.60	3.60	48,870	48,870	26,779	26,741	49,972	50,146	-175	-129
4557	978,544	24,572	25,453	403	2.74	2.71	25,884	25,601	14,184	14,008	13,389	13,214	175	130
9505	628,476	11,736	11,226	13,671	2.23	2.26	14,652	14,849	8,029	8,125	3,965	3,785	180	131
8820	82,040,082	118,300	120,083	118,877	0.16	0.16	129,315	129,315	70,861	70,760	32,537	32,719	-183	-132
5491	212,189	6,912	6,919	62	4.11	3.95	8,712	8,373	4,774	4,582	4,651	4,458	192	133
9530	96,604	7,004	8,108	171	9.46	9.05	7,894	7,552	4,326	4,133	3,991	3,798	193	134
2759	1,219,122	56,416	53,473	49,059	5.56	5.52	71,514	70,999	39,187	38,850	2,487	2,683	-196	-135
2623	584,100	16,589	20,736	4,801	4.22	4.13	19,719	19,299	10,806	10,560	3,337	3,141	196	136
9016	2,769,858	54,152	53,152	32,730	2.40	2.34	67,782	66,088	37,143	36,163	524	326	198	137
8719	698,615	12,183	12,251	0	1.94	1.89	13,478	13,131	7,385	7,185	7,385	7,185	201	138
8350	22,154,185	468,827	279,195	473,596	2.40	2.23	526,346	489,063	288,421	267,612	295	501	-206	-139
6018	87,310	5,300	5,265	0	10.34	9.92	9,088	8,719	4,980	4,771	4,980	4,771	209	140
3383	502,808	7,294	7,294	171	1.80	1.88	9,051	9,453	4,959	5,172	4,623	4,836	-213	-141
1463	491,996	24,803	23,648	21,670	6.67	6.47	34,419	33,387	18,860	18,269	419	633	-215	-142
9186	77,117	10,149	9,908	595	17.51	17.03	13,832	13,452	7,579	7,361	6,436	6,219	217	143
1747	767,345	26,511	28,008	0	3.78	3.84	27,455	27,891	15,045	15,262	15,045	15,262	-217	-144
2836	1,074,577	21,662	23,197	22,257	2.76	2.73	27,696	27,395	15,176	14,990	3,303	3,523	-219	-145
2881	637,002	14,841	14,851	6,708	2.96	2.85	18,843	18,142	10,325	9,927	1,267	1,044	223	146
3169	293,966	10,771	9,847	2,957	3.62	3.79	11,640	12,187	6,378	6,668	1,835	2,066	-230	-147
6252	94,139	6,615	7,706	0	8.88	8.37	7,176	6,764	3,932	3,701	3,932	3,701	231	148
4484	22,896,377	605,931	541,983	404,893	2.89	2.82	737,779	721,861	405,375	394,996	1	248	-247	-149
2576	959,365	25,060	23,392	1,583	3.12	3.08	32,067	31,655	17,571	17,322	14,548	14,300	248	150
3826	5,301,706	40,299	37,311	7,975	1.20	1.21	68,715	69,288	37,654	37,914	23,393	23,641	-248	-151
8803	30,875,662	35,145	43,142	68,494	0.17	0.17	42,759	42,759	23,431	23,397	86,669	86,920	-251	-152
3145	192,955	3,170	3,512	65	1.95	2.22	3,396	3,866	1,861	2,116	1,733	1,988	-254	-153
4150	6,460,814	37,235	34,806	15,608	0.69	0.68	47,691	47,000	26,133	25,718	4,239	3,974	265	154

EXHIBIT 2

Part 6

CALCULATION OF WILCOXON STATISTIC

BASED ON 1987 LOSS EXPERIENCE FROM A SINGLE STATE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Class	1987 Payroll	1987 Earned Premium	1987 Manual Premium	1987 First Report Losses	Current Rate	Alternate Rate	Current Total Premiums (1)x(5)x (2)/[(3)x100]	Alternate Total Premiums (1)x(6)x (2)/[(3)x100]	Current Expected Losses	Alternate Expected Losses	Current Squared Error [(9)-(4)]^2/(9)	Alternate Squared Error [(10)-(4)]^2/(10)	Difference (11)-(12)	*D* Value
2570	1,181,646	67,079	69,965	29,215	10.39	10.46	117,709	118,502	64,501	64,843	19,303	19,576	-273	-155
9620	7,421,678	68,597	68,491	21,182	1.19	1.20	88,455	89,198	48,470	48,808	15,363	15,637	-274	-156
4583	15,161,662	351,932	347,167	145,342	2.47	2.48	379,633	381,170	208,027	208,573	18,889	19,169	-280	-157
8032	567,303	8,693	8,591	12,453	1.58	1.60	9,070	9,185	4,970	5,026	11,267	10,976	291	158
3220	9,133,395	130,105	168,968	105,522	3.30	3.28	232,079	230,672	127,172	126,222	3,686	3,395	291	159
4808	3,285,558	60,126	60,126	0	2.09	2.11	68,668	69,325	37,628	37,934	37,628	37,934	-306	-160
3647	23,155	1,118	1,118	0	4.69	7.14	1,086	1,653	595	905	595	905	-310	-161
1642	1,126,650	19,048	35,940	0	3.47	3.38	20,720	20,183	11,354	11,044	11,354	11,044	310	162
8235	1,008,687	30,655	32,523	1,951	3.96	4.03	37,650	38,315	20,631	20,966	16,913	17,245	-332	-163
3085	1,248,233	37,859	41,474	2,698	3.78	3.84	43,071	43,754	23,601	23,942	18,514	18,850	-336	-164
9501	1,006,554	25,151	23,363	4,744	2.54	2.48	27,523	26,873	15,082	14,705	7,086	6,747	339	165
8710	66,855	941	1,492	1,696	2.29	2.47	966	1,041	529	570	2,573	2,225	348	166
4036	1,497,638	69,455	28,006	27,327	2.74	2.72	101,768	101,025	55,765	55,280	14,503	14,135	368	167
6005	226,495	10,578	10,574	269	6.70	6.41	15,181	14,524	8,319	7,947	7,789	7,418	371	168
8745	986,891	24,719	21,978	24,934	2.66	2.62	29,525	29,081	16,179	15,913	4,738	5,114	-376	-169
2302	1,141,546	15,822	15,982	14,216	1.68	1.76	18,986	19,890	10,404	10,884	1,397	1,020	377	170
5037	196,277	43,468	41,550	7,455	30.16	29.84	61,930	61,273	33,936	33,528	20,663	20,276	388	171
4635	919,597	17,814	18,909	5,891	2.82	2.72	24,431	23,565	13,387	12,894	4,198	3,804	394	172
2731	131,281	6,146	6,084	0	4.77	5.34	6,326	7,082	3,466	3,875	3,466	3,875	-409	-173
4825	3,064,657	28,889	30,593	3,833	1.11	1.14	32,123	32,991	17,602	18,052	10,771	11,200	-429	-174
9545	168,958	9,963	14,936	342	10.24	9.55	11,541	10,763	6,324	5,889	5,658	5,225	433	175
4692	3,976,240	13,277	13,323	1,154	0.45	0.43	17,831	17,039	9,771	9,323	7,599	7,158	441	176
8058	10,445,088	143,261	145,806	124,730	1.94	1.97	199,098	202,177	109,099	110,629	2,239	1,797	442	177
5191	33,249,911	370,710	433,339	201,011	1.16	1.42	329,955	403,911	180,805	221,017	2,258	1,811	447	178
3629	1,874,898	25,585	23,546	13,155	1.64	1.55	33,411	31,577	18,308	17,279	1,450	984	466	179
7590	962,276	27,567	28,611	647	3.76	3.67	34,861	34,027	19,103	18,619	17,831	17,348	483	180
8264	797,742	67,828	71,057	24,453	13.01	13.19	99,070	100,441	54,287	54,960	16,396	16,934	-538	-181
3719	61,450	4,592	2,702	0	5.76	4.82	6,015	5,034	3,296	2,754	3,296	2,754	542	182
35	1,085,012	18,254	18,553	20,466	2.25	2.19	24,019	23,379	13,162	12,793	4,053	4,603	-549	-183
8291	4,541,480	202,143	176,716	108,643	4.76	4.82	247,279	250,396	135,501	137,015	5,324	5,875	-551	-184
917	1,270,340	65,909	66,705	2,256	6.30	6.39	79,076	80,206	43,331	43,888	38,937	39,492	-555	-185

EXHIBIT 2

Part 7

CALCULATION OF WILCOXON STATISTIC

BASED ON 1987 LOSS EXPERIENCE FROM A SINGLE STATE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Class	1987 Payroll	1987 Earned Premium	1987 Manual Premium	1987 First Report Losses	Current Rate	Alternate Rate	Current Total Premiums (1)x(5)x (2)/[(3)x100]	Alternate Total Premiums (1)x(6)x (2)/[(3)x100]	Current Expected Losses	Alternate Expected Losses	Current Squared Error [(9)-(4)]^2/(9)	Alternate Squared Error [(10)-(4)]^2/(10)	Difference (11)-(12)	D Value
4000	9,629,197	312,859	316,194	411,479	4.11	4.12	391,586	392,539	214,576	214,794	180,684	180,103	581	186
6217	16,050,053	843,257	895,252	533,490	6.20	6.57	937,309	993,245	513,615	543,496	769	184	585	187
8013	12,649,879	40,140	39,248	7,573	0.32	0.33	41,400	42,693	22,686	23,361	10,068	10,670	-603	-188
6504	8,696,042	207,827	201,854	145,212	2.65	2.71	237,264	242,636	130,013	132,769	1,777	1,166	611	189
8215	10,964,091	265,332	264,035	73,307	2.74	2.73	301,892	300,790	165,427	164,590	51,298	50,626	672	190
3634	612,510	7,630	7,895	1,904	1.76	1.52	10,418	8,998	5,709	4,923	2,536	1,852	684	191
4902	3,070,355	52,816	49,197	10,751	1.89	1.85	62,298	60,980	34,138	33,368	16,021	15,330	692	192
6400	768,407	38,881	43,694	41,894	7.36	7.23	50,325	49,436	27,577	27,051	7,433	8,144	-711	-193
3227	1,082,189	34,383	36,578	42,393	5.30	5.19	53,914	52,795	29,543	28,889	5,589	6,312	-723	-194
6236	98,574	13,586	15,594	151	16.59	15.07	14,248	12,942	7,807	7,082	7,508	6,783	725	195
1320	2,015,246	45,311	49,503	1,250	2.52	2.60	46,484	47,959	25,472	26,243	23,033	23,803	-770	-196
8279	2,166,922	128,669	129,495	87,923	6.19	6.36	133,277	136,937	73,031	74,931	3,036	2,253	784	197
7520	6,796,775	151,449	153,316	69,405	3.09	3.06	207,463	205,449	113,683	112,420	17,246	16,459	787	198
4361	11,259,417	111,699	113,178	47,616	1.54	1.56	171,129	173,352	93,773	94,857	22,720	23,527	-807	-199
2589	2,385,229	29,019	29,506	35,402	1.61	1.58	37,768	37,065	20,696	20,281	10,450	11,273	-823	-200
9060	14,386,175	205,827	204,590	321,595	1.79	1.79	259,070	259,070	141,962	141,761	227,301	228,134	-832	-201
7601	236,155	14,233	15,702	0	8.41	7.71	18,003	16,504	9,865	9,031	9,865	9,031	834	202
251	6,252,334	133,687	156,354	232,249	3.18	3.19	170,000	170,535	93,155	93,315	207,689	206,854	836	203
2156	198,015	7,059	6,531	26,344	4.13	4.11	8,839	8,796	4,844	4,813	95,439	96,310	-871	-204
9156	2,068,115	17,382	17,087	1,483	1.06	1.14	22,300	23,984	12,220	13,124	9,434	10,325	-891	-205
8209	1,929,783	58,194	57,480	5,749	3.74	3.66	73,070	71,507	40,040	39,128	29,368	28,475	893	206
2883	3,230,429	82,738	80,609	38,707	2.99	2.89	99,141	95,825	54,326	52,435	4,491	3,594	897	207
1322	708,802	55,006	60,167	69,668	10.56	10.68	68,429	69,207	37,497	37,869	27,602	26,701	900	208
37	11,679,317	560,062	574,036	488,489	7.03	6.98	801,069	795,371	438,960	435,221	5,589	6,520	-931	-209
9521	4,882,808	127,142	123,957	77,801	3.19	2.96	159,764	148,245	87,545	81,118	1,085	136	949	210
4665	3,797,621	196,759	211,370	178,562	6.81	6.88	240,741	243,216	131,918	133,086	16,492	15,540	953	211
2039	1,351,325	44,614	47,648	7,649	3.61	3.77	45,677	47,701	25,029	26,102	12,069	13,045	-976	-212
9033	5,324,045	102,759	105,027	104,192	2.39	2.42	124,497	126,060	68,220	68,979	18,967	17,976	991	213
4420	956,613	24,100	24,492	26,549	3.19	3.08	30,028	28,992	16,454	15,864	6,193	7,196	-1,003	-214
8500	264,119	21,155	21,762	2,615	8.39	9.16	21,541	23,518	11,804	12,869	7,153	8,170	-1,017	-215
4459	1,512,761	38,441	36,788	37,953	2.92	2.83	46,157	44,735	25,293	24,479	6,337	7,417	-1,080	-216

EXHIBIT 2

Part 8

CALCULATION OF WILCOXON STATISTIC

BASED ON 1987 LOSS EXPERIENCE FROM A SINGLE STATE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Class	1987 Payroll	1987 Earned Premium	1987 Manual Premium	1987 First Report Losses	Current Rate	Alternate Rate	Current Total Premiums (1)x(5)x (2)/[(3)x100]	Alternate Total Premiums (1)x(6)x (2)/[(3)x100]	Current Expected Losses	Alternate Expected Losses	Current Squared Error [(9)-(4)]^2/(9)	Alternate Squared Error [(10)-(4)]^2/(10)	Difference (11)-(12)	D Value
8031	3,146,252	61,774	61,853	50,176	2.47	2.34	77,613	73,528	42,530	40,234	1,375	2,457	-1,082	-217
1803	672,457	33,608	33,582	1,214	6.84	6.55	46,032	44,080	25,224	24,120	22,854	21,753	1,101	218
2030	8,284,303	438,967	439,013	153,952	5.15	5.20	426,597	430,739	233,761	235,697	27,248	28,351	-1,103	-219
6233	830,497	56,710	65,903	43,662	9.96	9.16	71,179	65,462	39,004	35,820	556	1,717	-1,160	-220
9058	13,915,274	256,537	233,405	260,303	2.50	2.53	382,359	386,948	209,521	211,735	12,308	11,141	1,168	221
3808	280,235	7,062	7,062	23,815	2.79	2.82	7,819	7,903	4,284	4,324	89,033	87,851	1,183	222
9178	603,686	43,868	26,683	0	5.47	5.26	54,289	52,205	29,749	28,566	29,749	28,566	1,183	223
7600	17,622,321	253,473	243,212	99,703	1.82	1.84	334,258	337,931	183,162	184,913	38,029	39,266	-1,237	-224
5703	88,139	15,151	15,483	0	20.19	22.87	17,414	19,725	9,542	10,793	9,542	10,793	-1,251	-225
9220	2,827,686	96,801	94,362	17,043	4.41	4.33	127,924	125,604	70,098	68,729	40,156	38,869	1,287	226
3638	1,995,318	26,398	26,937	51,899	1.72	1.74	33,633	34,024	18,430	18,618	60,782	59,495	1,287	227
5606	40,801,432	756,184	756,486	433,919	2.11	1.76	860,567	717,819	471,563	392,784	3,005	4,308	-1,303	-228
8002	2,060,098	22,120	21,244	31,377	1.33	1.37	28,529	29,387	15,633	16,080	15,856	14,551	1,305	229
5192	5,672,275	113,950	115,227	100,120	2.43	2.49	136,309	139,674	74,693	76,429	8,656	7,344	1,312	230
9063	12,422,904	136,446	130,398	37,790	1.36	1.34	176,788	174,188	96,874	95,314	36,036	34,717	1,319	231
7855	505,800	40,002	40,353	12,488	11.69	11.13	58,614	55,806	32,118	30,537	11,998	10,668	1,330	232
7360	364,419	28,151	27,452	20,306	7.43	8.71	27,766	32,549	15,215	17,811	1,704	350	1,354	233
7422	1,754,449	64,829	70,660	2,024	3.66	3.82	58,914	61,489	32,283	33,646	28,362	29,720	-1,358	-234
9102	10,062,881	205,530	200,480	77,508	2.32	2.36	239,340	243,466	131,150	133,223	21,941	23,300	-1,360	-235
5223	699,315	30,245	29,056	2,116	5.18	4.84	37,707	35,232	20,662	19,279	16,647	15,279	1,368	236
3612	4,967,111	58,874	61,519	42,951	1.62	1.38	77,008	65,599	42,198	35,895	13	1,387	-1,373	-237
5020	1,260,575	48,497	44,756	542	3.61	3.43	49,311	46,852	27,021	25,637	25,947	24,564	1,383	238
2960	36,431	2,141	1,814	12,482	5.37	5.44	2,309	2,339	1,265	1,280	99,438	98,041	1,397	239
8116	30,099,924	689,003	689,532	797,102	3.05	3.06	917,343	920,351	502,675	503,609	172,452	171,042	1,410	240
8111	2,601,985	55,944	58,505	25,197	2.88	2.69	71,657	66,930	39,266	36,623	5,041	3,565	1,476	241
3373	2,235,703	86,162	85,085	4,696	4.31	4.44	97,579	100,522	53,470	55,005	44,490	46,014	-1,523	-242
6003	239,540	26,829	25,726	164	12.09	10.93	30,202	27,304	16,550	14,941	16,223	14,614	1,609	243
5069	131,426	25,366	27,179	39,958	22.21	22.64	27,243	27,770	14,928	15,196	41,968	40,353	1,615	244
7605	3,465,042	47,847	47,828	112,053	1.68	1.69	58,236	58,582	31,911	32,056	201,266	199,637	1,629	245
8106	2,110,785	84,989	75,338	65,447	4.30	4.03	102,391	95,962	56,107	52,509	1,555	3,188	-1,633	-246
3372	2,264,765	82,435	73,198	19,409	4.24	4.11	108,144	104,828	59,259	57,361	26,798	25,110	1,688	247

EXHIBIT 2

Part 9

CALCULATION OF WILCOXON STATISTIC

BASED ON 1987 LOSS EXPERIENCE FROM A SINGLE STATE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Class	1987 Payroll	1987 Earned Premium	1987 Manual Premium	1987 First Report Losses	Current Rate	Alternate Rate	Current Total Premiums (1)x(5)x (2)/[(3)x100]	Alternate Total Premiums (1)x(6)x (2)/[(3)x100]	Current Expected Losses	Alternate Expected Losses	Current Squared Error [(9)-(4)]^2/(9)	Alternate Squared Error [(10)-(4)]^2/(10)	Difference (11)-(12)	D Value
8755	3,233,485	19,120	19,810	0	0.66	0.76	20,598	23,719	11,287	12,979	11,287	12,979	-1,692	-248
4114	2,101,802	52,959	47,711	2,853	2.58	2.45	60,191	57,158	32,983	31,277	27,524	25,831	1,693	249
4130	1,859,746	53,839	51,813	4,888	3.51	3.35	67,830	64,738	37,168	35,424	28,035	26,322	1,713	250
4452	2,733,006	81,475	73,691	39,416	2.88	3.17	87,025	95,788	47,687	52,414	1,434	3,223	-1,789	-251
2586	4,264,081	53,905	44,495	18,436	1.42	1.34	73,355	69,223	40,196	37,878	11,780	9,979	1,801	252
7390	6,656,627	211,253	198,830	107,675	3.94	3.85	278,658	272,293	152,696	148,996	13,274	11,460	1,814	253
5474	12,130,377	732,297	739,183	543,925	8.04	8.82	966,197	1,059,932	529,445	579,986	396	2,242	-1,846	-254
6834	836,714	38,722	42,657	3,111	6.82	6.36	51,800	48,306	28,385	26,433	22,504	20,577	1,927	255
3114	10,041,081	142,622	132,989	102,309	1.99	1.76	214,291	189,524	117,425	103,706	1,946	19	1,927	256
7610	41,678,168	158,320	156,012	41,672	0.40	0.39	169,179	164,950	92,705	90,259	28,093	26,155	1,938	257
5	1,461,707	49,453	44,894	23,828	4.34	4.69	69,880	75,516	38,292	41,322	5,464	7,406	-1,942	-258
5480	884,982	53,794	52,722	6,412	6.56	7.00	59,235	63,208	32,459	34,587	20,902	22,952	-2,050	-259
8047	694,602	8,450	8,552	27,871	1.60	1.63	10,981	11,187	6,017	6,121	79,369	77,277	2,092	260
7421	4,778,773	125,775	126,047	46,171	3.04	2.92	144,961	139,239	79,434	76,190	13,929	11,828	2,101	261
2081	21,747,127	1,325,590	1,092,684	1,046,728	6.20	6.25	1,635,717	1,648,908	896,321	902,269	25,239	23,129	2,110	262
3040	4,789,830	189,119	189,361	103,638	4.88	4.62	233,445	221,007	127,920	120,933	4,609	2,474	2,136	263
9402	2,414,408	70,962	71,945	23,631	4.13	3.93	98,353	93,590	53,894	51,212	16,994	14,854	2,140	264
9549	1,295,403	98,550	97,470	73,362	9.25	8.40	121,152	110,020	66,388	60,202	733	2,877	-2,144	-265
8	297,516	12,943	12,130	414	3.82	5.08	12,127	16,127	6,645	8,824	5,843	8,016	-2,173	-266
9093	5,732,957	67,708	67,376	9,804	1.61	1.54	92,755	88,723	50,827	48,548	33,110	30,920	2,190	267
8392	2,176,680	51,893	40,786	63,122	2.32	2.26	64,251	62,589	35,208	34,248	22,132	24,342	-2,210	-268
6306	2,417,591	175,682	180,248	97,206	9.55	9.99	225,031	235,399	123,310	128,809	5,526	7,754	-2,227	-269
1624	2,066,236	93,668	97,380	6,523	4.56	4.82	90,629	95,796	49,662	52,419	37,472	40,185	-2,712	-270
5190	38,511,345	1,102,694	1,148,867	567,652	3.61	3.58	1,334,385	1,323,296	731,200	724,097	36,581	33,801	2,780	271
9522	3,749,914	61,511	54,163	55,812	1.55	1.65	66,009	70,268	36,171	38,450	10,665	7,840	2,825	272
7720	40,938,046	713,067	719,457	386,537	2.11	2.07	856,121	839,891	469,127	459,581	14,540	11,609	2,930	273
8381	4,916,653	95,766	96,347	44,598	2.08	2.34	101,650	114,356	55,701	62,575	2,213	5,164	-2,951	-274
7382	5,998,486	207,335	184,167	94,886	3.81	3.66	257,293	247,163	140,988	135,246	15,075	12,044	3,031	275
5102	1,841,823	68,205	67,295	58,943	4.92	4.38	91,843	81,763	50,327	44,740	1,475	4,509	-3,034	-276
4683	221,040	5,238	4,844	42,837	2.48	2.47	5,928	5,904	3,248	3,230	482,510	485,584	-3,074	-277
1164	577,974	35,146	33,795	0	5.82	6.81	34,983	40,933	19,169	22,398	19,169	22,398	-3,229	-278

EXHIBIT 2

Part 10

CALCULATION OF WILCOXON STATISTIC

BASED ON 1987 LOSS EXPERIENCE FROM A SINGLE STATE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Class	1987 Payroll	1987 Earned Premium	1987 Manual Premium	1987 First Report Losses	Current Rate	Alternate Rate	Current *Total* Premiums (1)x(5)x (2)/[(3)x100]	Alternate *Total* Premiums (1)x(6)x (2)/[(3)x100]	Current Expected Losses	Alternate Expected Losses	Current *Squared* Error [(9)-(4)]^2/(9)	Alternate *Squared* Error [(10)-(4)]^2/(10)	Difference (11)-(12)	*D* Value
3179	14,974,372	209,372	214,703	219,496	1.73	1.76	252,624	257,005	138,430	140,631	47,473	44,227	3,246	279
7231	3,587,760	119,235	117,480	108,349	3.91	4.12	142,377	150,024	78,018	82,092	11,792	8,398	3,393	280
8385	3,570,890	119,238	108,730	42,226	4.04	3.83	158,206	149,982	86,692	82,069	22,807	19,343	3,464	281
3146	4,448,063	113,093	95,550	30,553	2.69	2.55	141,621	134,251	77,604	73,461	28,527	25,062	3,465	282
5160	1,698,935	50,266	51,369	13,141	4.18	3.74	69,491	62,176	38,079	34,022	16,332	12,816	3,516	283
9061	11,647,584	167,354	166,705	41,453	1.89	1.83	220,996	213,981	121,099	117,088	52,383	48,858	3,524	284
2916	255,369	7,657	7,891	73,961	3.95	3.97	9,788	9,838	5,363	5,383	877,344	873,665	3,679	285
8265	2,470,228	188,044	184,016	52,279	10.34	10.04	261,013	253,440	143,027	138,680	57,578	53,830	3,748	286
7580	3,932,413	65,261	64,360	76,162	2.16	2.06	86,129	82,142	47,196	44,947	17,777	21,678	-3,900	-287
5403	20,474,132	1,509,972	1,548,228	671,460	8.24	8.17	1,645,382	1,631,404	901,616	892,691	58,752	54,826	3,926	288
5551	7,389,684	989,646	1,011,464	728,865	19.98	19.10	1,444,611	1,380,984	791,600	755,663	4,972	950	4,021	289
8831	8,922,017	116,057	116,182	46,322	1.53	1.66	136,360	147,946	74,721	80,955	10,793	14,816	-4,023	-290
8835	6,166,499	145,983	121,203	58,087	2.70	2.56	200,536	190,137	109,887	104,042	24,418	20,298	4,120	291
3030	14,831,410	467,255	559,416	80,365	4.40	4.34	545,072	537,640	298,682	294,192	159,576	155,415	4,160	292
2111	6,661,701	205,247	157,882	106,814	3.07	2.86	265,869	247,683	145,688	135,530	10,373	6,084	4,288	293
3685	74,161,767	401,530	555,378	299,716	0.90	1.06	482,561	568,349	264,428	310,996	4,709	409	4,300	294
3648	681,110	16,034	16,687	68,086	2.72	2.75	17,801	17,998	9,754	9,848	348,820	344,396	4,424	295
5215	2,305,227	83,462	85,498	26,742	4.92	4.45	110,716	100,140	60,669	54,796	18,972	14,363	4,610	296
6216	1,162,965	73,824	83,180	17,107	7.73	6.70	79,786	69,154	43,720	37,841	16,200	11,360	4,839	297
4581	1,333,272	8,999	11,999	54,475	0.97	0.98	9,699	9,799	5,315	5,362	454,706	449,840	4,866	298
9552	2,077,533	94,954	100,436	16,970	6.35	5.86	124,723	115,098	68,344	62,981	38,618	33,613	5,004	299
7403	4,002,777	54,311	69,286	4,738	2.01	2.32	63,067	72,793	34,559	39,832	25,732	30,920	-5,187	-300
3822	279,817	10,628	10,017	54,799	4.82	4.76	14,310	14,132	7,841	7,733	281,205	286,474	-5,269	-301
4263	284,655	12,997	10,878	54,320	4.02	3.97	13,672	13,502	7,492	7,388	292,697	298,119	-5,422	-302
8232	27,719,260	990,937	994,154	371,992	3.42	3.50	944,931	967,035	517,792	529,153	41,054	46,678	-5,623	-303
5445	14,778,714	539,230	527,738	446,391	5.15	4.78	777,678	721,806	426,142	394,966	962	6,696	-5,733	-304
8006	18,410,437	292,417	296,682	169,763	2.11	1.90	382,876	344,770	209,804	188,655	7,642	1,892	5,750	305
5951	10,807,540	113,631	114,560	22,912	1.27	1.16	136,143	124,351	74,602	68,044	35,815	29,935	5,880	306
3632	29,623,254	764,463	708,643	533,501	3.41	3.17	1,089,723	1,013,027	597,133	554,320	6,781	782	5,999	307
50	8,449,341	281,065	279,868	157,116	4.52	4.19	383,544	355,542	210,170	194,549	13,392	7,203	6,190	308
5645	22,285,573	1,234,934	1,176,975	1,059,867	8.00	7.62	1,870,640	1,781,785	1,025,051	974,978	1,183	7,391	-6,209	-309

EXHIBIT 2

Part 11

CALCULATION OF WILCOXON STATISTIC

BASED ON 1987 LOSS EXPERIENCE FROM A SINGLE STATE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
							Current Total	Alternate Total			Current Squared	Alternate Squared		
		1987	1987	1987 First			Premiums	Premiums	Current	Alternate	Error	Error		
Class	1987 Payroll	Earned Premium	Manual Premium	Report Losses	Current Rate	Alternate Rate	(1)x(5)x (2)/[(3)x100]	(1)x(6)x (2)/[(3)x100]	Expected Losses	Expected Losses	[(9)-(4)]^2/(9)	[(10)-(4)]^2/(10)	Difference (11)-(12)	D Value
7380	70,936,717	2,500,575	2,315,926	1,750,184	3.72	3.79	2,849,241	2,902,856	1,561,293	1,588,419	22,853	16,474	6,379	310
3635	2,923,290	87,645	71,621	27,956	2.38	2.85	85,140	101,954	46,654	55,788	7,494	13,885	-6,391	-311
8105	1,134,518	82,435	68,367	24,942	6.29	7.42	86,045	101,503	47,150	55,542	10,460	16,858	-6,398	-312
5651	1,642,158	95,003	92,858	3,064	7.24	6.55	121,639	110,046	66,654	60,216	60,667	54,244	6,423	313
4686	4,265,992	87,346	83,187	11,793	2.04	2.32	91,377	103,919	50,072	56,864	29,263	35,723	-6,460	-314
2070	16,600,823	449,562	447,170	317,559	2.96	3.24	494,013	540,744	270,703	295,891	8,110	1,587	6,523	315
6325	3,355,747	136,288	127,808	40,387	4.35	3.89	155,660	139,200	85,297	76,169	23,646	16,809	6,836	316
8001	8,462,865	86,746	83,936	107,370	1.26	1.20	110,202	104,954	60,387	57,430	36,554	43,427	-6,873	-317
6229	2,846,595	121,320	123,924	40,759	6.15	5.58	171,387	155,502	93,915	85,090	30,086	23,096	6,990	318
8748	48,854,652	267,450	268,310	154,643	0.72	0.79	350,626	384,715	192,132	210,513	7,315	14,828	-7,513	-319
5183	37,844,396	1,164,224	1,214,928	834,831	4.23	3.82	1,534,009	1,385,323	840,588	758,037	39	7,780	-7,740	-320
4304	12,948,990	249,235	267,909	88,506	2.51	2.34	302,365	281,886	165,686	154,246	35,952	28,018	7,934	321
8800	21,721,903	276,140	252,675	448,412	1.62	1.64	384,574	389,322	210,734	213,034	268,066	260,067	8,000	322
3004	20,047,116	193,414	288,678	198,090	1.80	1.72	241,768	231,023	132,481	126,414	32,492	40,640	-8,149	-323
5146	1,074,575	85,073	79,876	734	7.41	8.73	84,807	99,914	46,471	54,672	45,015	53,214	-8,199	-324
3064	257,472	9,308	9,217	37,962	4.46	4.64	11,597	12,065	6,355	6,602	157,214	148,973	8,241	325
9410	11,341,517	192,183	196,507	81,008	2.44	2.24	270,644	248,460	148,304	135,955	30,537	22,207	8,330	326
5057	407,253	77,419	91,504	8,238	32.34	27.79	111,432	95,755	61,061	52,396	45,697	37,215	8,481	327
9403	8,822,888	464,815	461,154	401,519	6.47	6.22	575,373	553,140	315,286	302,674	23,586	32,280	-8,695	-328
3365	3,066,446	194,670	200,187	81,109	8.55	7.69	254,956	229,311	139,707	125,477	24,578	15,688	8,890	329
2802	10,931,350	462,734	398,826	228,913	3.79	4.20	480,685	532,686	263,400	291,481	4,515	13,431	-8,915	-330
5213	12,589,193	1,074,887	1,096,043	749,402	9.80	10.49	1,209,927	1,295,116	663,001	708,677	11,260	2,340	8,919	331
8829	114,083,937	3,247,756	2,650,455	2,170,347	3.01	3.10	4,207,789	4,333,603	2,305,733	2,371,312	7,950	17,031	-9,082	-332
9040	36,371,375	802,337	712,533	419,576	2.42	2.52	991,122	1,032,077	543,103	564,744	28,096	37,316	-9,220	-333
8293	5,484,377	425,317	383,446	169,028	8.04	8.51	489,093	517,685	268,008	283,273	36,555	46,075	-9,521	-334
8046	15,863,946	174,136	180,816	273,671	1.53	1.50	233,751	229,168	128,088	125,399	165,466	175,317	-9,851	-335
2585	7,364,427	171,714	179,459	169,873	3.27	3.01	230,424	212,103	126,265	116,061	15,061	24,950	-9,889	-336
8292	9,731,885	313,771	294,174	269,286	3.74	3.50	388,219	363,307	212,732	198,798	15,035	24,993	-9,958	-337
3076	27,655,344	764,032	654,945	242,999	2.75	2.83	887,194	913,003	486,154	499,588	121,616	131,784	-10,168	-338
9052	28,240,721	763,424	698,457	458,060	2.83	3.17	873,551	978,501	478,678	535,428	888	11,179	-10,291	-339
5222	4,289,066	407,160	389,101	165,117	11.37	10.72	510,300	481,128	279,628	263,269	46,894	36,593	10,301	340
8901	21,192,744	77,969	70,339	114,643	0.38	0.40	89,268	93,966	48,916	51,418	88,315	77,744	10,571	341

EXHIBIT 2

Part 12

CALCULATION OF WILCOXON STATISTIC

BASED ON 1987 LOSS EXPERIENCE FROM A SINGLE STATE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Class	1987 Payroll	1987 Earned Premium	1987 Manual Premium	1987 First Report Losses	Current Rate	Alternate Rate	Current Total Premiums (1)x(5)x (2)/[(3)x100]	Alternate Total Premiums (1)x(6)x (2)/[(3)x100]	Current Expected Losses	Alternate Expected Losses	Current Squared Error [(9)-(4)]^2/(9)	Alternate Squared Error [(10)-(4)]^2/(10)	Difference (11)-(12)	D Value
8833	151,142,877	1,061,273	1,054,781	654,042	0.89	0.94	1,353,451	1,429,487	741,648	782,204	10,348	20,999	-10,651	-342
7423	12,269,708	162,201	190,142	129,036	1.68	2.14	175,841	223,987	96,355	122,564	11,085	342	10,743	343
3724	16,395,020	926,733	939,196	545,405	7.43	6.98	1,201,985	1,129,187	658,649	617,882	19,471	8,501	10,969	344
9154	4,595,131	50,798	55,583	52,515	1.30	1.64	54,594	68,873	29,916	37,687	17,072	5,835	11,237	345
6319	1,898,652	163,667	172,775	50,415	9.77	11.29	175,720	203,058	96,289	111,112	21,855	33,156	-11,301	-346
8393	12,610,541	282,756	284,165	148,105	2.40	2.90	301,152	363,892	165,022	199,119	1,734	13,070	-11,335	-347
7515	3,255,925	42,087	39,458	77,074	1.36	1.29	47,231	44,800	25,881	24,514	101,260	112,692	-11,431	-348
4693	6,668,810	43,724	50,712	54,892	0.90	0.79	51,749	45,424	28,357	24,856	24,831	36,297	-11,466	-349
4034	10,669,419	419,067	430,703	169,459	5.30	4.99	550,202	518,020	301,493	283,457	57,822	45,846	11,976	350
8008	57,110,661	335,902	315,953	109,058	0.62	0.67	376,443	406,801	206,279	222,598	45,821	57,913	-12,092	-351
6204	2,081,100	146,012	157,483	57,331	10.37	8.62	200,091	166,324	109,643	91,011	24,959	12,464	12,495	352
8044	22,781,209	365,061	366,118	272,583	1.70	1.92	386,162	436,136	211,605	238,650	17,572	4,825	12,747	353
8601	30,824,624	203,941	216,892	26,483	0.67	0.76	194,193	220,279	106,412	120,535	60,036	73,387	-13,351	-354
7538	1,220,533	121,542	115,061	9,603	11.54	9.59	148,783	123,642	81,528	67,656	63,453	49,813	13,640	355
4410	74,819,108	1,024,376	793,424	713,188	1.55	1.32	1,497,264	1,275,089	820,452	697,718	14,024	343	13,681	356
5059	1,008,336	173,442	153,767	8,310	19.53	17.27	222,126	196,421	121,718	107,480	105,665	91,503	14,162	357
9519	12,159,029	269,688	277,766	193,277	2.19	2.57	258,539	303,399	141,671	166,018	18,798	4,476	14,323	358
5462	2,273,739	158,508	168,302	124,941	7.60	10.69	162,748	228,918	89,181	125,262	14,339	1	14,339	359
912	343	3,498	3,453	46,108	123.50	125.72	4,291	4,368	2,351	2,390	814,229	799,562	14,666	360
3726	876,467	74,256	60,419	107,671	7.18	7.70	77,342	82,944	42,381	45,386	100,581	85,475	15,106	361
7370	8,355,779	246,850	252,449	53,654	4.11	3.73	335,806	304,758	184,011	166,761	92,347	76,716	15,631	362
3507	34,280,108	821,087	725,738	827,496	2.88	2.98	1,116,976	1,155,760	612,067	632,422	75,824	60,171	15,653	363
4243	7,345,527	299,109	261,245	85,569	4.86	4.45	408,734	374,252	223,973	204,788	85,527	69,404	16,123	364
9101	74,785,177	1,263,538	1,253,300	718,172	2.02	2.16	1,523,001	1,628,555	834,556	891,132	16,230	33,570	-17,340	-365
3821	5,279,222	196,148	182,394	35,692	6.30	5.72	357,671	324,743	195,992	177,696	131,108	113,482	17,627	366
8017	120,202,387	1,408,479	1,298,791	598,895	1.40	1.44	1,824,955	1,877,097	1,000,017	1,027,132	160,896	178,543	-17,647	-367
3400	25,284,319	618,201	694,069	648,142	3.10	3.03	698,136	682,372	382,556	373,388	184,380	202,175	-17,794	-368
8227	11,244,683	229,559	218,265	29,884	2.18	1.89	257,818	223,521	141,276	122,309	87,830	69,843	17,987	369
9179	25,200	2,150	2,150	41,241	9.54	9.69	2,404	2,442	1,317	1,336	1,209,919	1,191,755	18,164	370
8304	33,480,668	1,541,663	1,549,973	1,316,875	6.27	6.01	2,087,983	2,001,400	1,144,148	1,095,150	26,076	44,891	-18,815	-371
5040	1,419,960	149,829	150,564	118,750	12.69	9.90	179,313	139,890	98,258	76,547	4,274	23,269	-18,995	-372

EXHIBIT 2

Part 13

CALCULATION OF WILCOXON STATISTIC

BASED ON 1987 LOSS EXPERIENCE FROM A SINGLE STATE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Class	1987 Payroll	1987 Earned Premium	1987 Manual Premium	1987 First Report Losses	Current Rate	Alternate Rate	Current Total Premiums (1)x(5)x (2)/[(3)x100]	Alternate Total Premiums (1)x(6)x (2)/[(3)x100]	Current Expected Losses	Alternate Expected Losses	Current Squared Error [(9)-(4)]^2/(9)	Alternate Squared Error [(10)-(4)]^2/(10)	Difference (11)-(12)	*D* Value
6235	2,714,329	231,262	258,037	212,213	9.34	8.68	227,212	211,157	124,505	115,543	61,786	80,879	-19,093	-373
4299	61,877,038	1,051,997	1,081,123	853,852	2.07	2.20	1,246,348	1,324,621	682,959	724,822	42,762	22,970	19,792	374
8720	5,331,620	51,176	49,311	116,842	1.13	1.07	62,526	59,206	34,262	32,397	199,036	220,111	-21,075	-375
2812	19,741,799	632,119	595,328	618,932	3.57	3.44	748,337	721,087	410,065	394,573	106,387	127,573	-21,187	-376
2157	11,857,205	533,978	513,251	169,270	5.82	5.43	717,958	669,847	393,418	366,535	127,707	106,166	21,541	377
4511	7,458,308	104,054	112,477	14,790	2.08	2.68	143,515	184,914	78,642	101,184	51,843	73,765	-21,922	-378
3081	3,895,336	216,471	166,768	331,025	6.17	5.90	311,973	298,321	170,951	163,239	149,888	172,460	-22,572	-379
5022	14,476,549	992,540	1,035,977	505,008	8.64	7.76	1,198,331	1,076,279	656,647	588,931	35,018	11,959	23,059	380
3681	5,209,109	44,609	37,908	77,146	1.02	0.88	62,525	53,943	34,262	29,517	53,676	76,853	-23,176	-381
8810	2,198,799,159	3,987,787	4,004,000	2,759,148	0.23	0.21	5,036,760	4,598,781	2,759,983	2,516,415	0	23,414	-23,414	-382
3574	24,992,917	467,358	408,842	74,659	2.34	2.50	668,539	714,251	366,338	390,833	232,235	255,776	-23,541	-383
8288	23,667,045	1,180,870	1,125,199	543,608	4.72	5.22	1,172,354	1,296,544	642,412	709,458	15,196	38,771	-23,575	-384
2095	26,471,742	959,542	772,960	892,468	3.85	4.11	1,265,174	1,350,614	693,275	739,045	57,233	31,850	25,383	385
3851	21,870,744	575,678	422,954	199,827	2.20	2.43	654,897	723,363	358,862	395,818	70,479	97,046	-26,567	-386
3028	11,999,897	675,901	692,641	65,577	6.22	6.67	728,354	781,049	399,115	427,384	278,736	306,292	-27,556	-387
5507	4,170,173	254,681	238,940	37,886	10.10	8.87	448,935	394,262	246,002	215,737	176,064	146,618	29,446	388
7539	71,736,766	688,515	1,338,025	777,860	1.84	1.80	679,217	664,452	372,189	363,583	442,164	472,041	-29,877	-389
8107	9,706,527	243,543	241,581	425,485	3.02	2.93	295,518	286,711	161,934	156,886	428,933	459,860	-30,926	-390
8039	49,879,481	580,746	549,856	198,561	1.64	1.50	863,979	790,224	473,433	432,404	159,588	126,462	33,127	391
7540	15,499,925	465,161	492,514	205,370	3.17	4.03	464,059	589,956	254,290	322,819	9,411	42,731	-33,320	-392
2014	27,908,321	971,287	974,378	735,224	4.13	3.71	1,148,957	1,032,114	629,592	564,764	17,723	51,449	-33,726	-393
1430	4,883,897	307,686	307,686	77,837	7.01	8.51	342,361	415,620	187,603	227,424	64,224	98,390	-34,166	-394
5188	2,282,927	77,020	78,760	141,647	3.64	3.36	81,263	75,012	44,529	41,046	211,812	246,569	-34,757	-395
3824	3,582,250	236,743	252,612	231,706	7.53	9.11	252,798	305,842	138,525	167,354	62,679	24,745	37,934	396
2501	21,700,953	218,282	197,851	262,158	1.24	1.09	296,879	260,967	162,680	142,799	60,830	99,767	-38,937	-397
8742	533,702,988	2,669,888	2,773,835	2,412,120	0.64	0.66	3,287,699	3,390,439	1,801,553	1,855,221	206,928	167,170	39,758	398
8102	9,760,884	252,267	302,481	29,538	3.29	4.22	267,823	343,529	146,758	187,976	93,627	133,542	-39,915	-399
106	786,502	52,593	52,320	258,101	7.88	8.06	62,300	63,723	34,138	34,869	1,469,299	1,429,156	40,142	400
4244	5,367,677	145,918	168,586	188,893	3.13	3.56	145,418	165,396	79,684	90,503	149,672	106,964	42,708	401
2002	4,567,395	134,253	144,330	231,838	3.71	3.44	157,619	146,149	86,370	79,971	245,001	288,397	-43,397	-402

EXHIBIT 2

Part 14

CALCULATION OF WILCOXON STATISTIC

BASED ON 1987 LOSS EXPERIENCE FROM A SINGLE STATE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Class	1987 Payroll	1987 Earned Premium	1987 Manual Premium	1987 First Report Losses	Current Rate	Alternate Rate	Current Total Premiums (1)x(5)x (2)/[(3)x100]	Alternate Total Premiums (1)x(6)x (2)/[(3)x100]	Current Expected Losses	Alternate Expected Losses	Current Squared Error [(9)-(4)]^2/(9)	Alternate Squared Error [(10)-(4)]^2/(10)	Difference (11)-(12)	D Value
3110	3,207,475	124,720	122,822	193,884	6.18	5.26	201,285	171,320	110,298	93,745	63,344	106,969	-43,625	-403
4611	13,529,498	167,782	154,904	256,871	1.57	1.42	230,072	208,091	126,072	113,866	135,703	179,603	-43,900	-404
9015	34,424,103	987,609	952,461	299,418	3.38	3.07	1,206,472	1,095,819	661,108	599,623	197,879	150,300	47,580	405
5221	17,090,299	865,655	851,460	509,214	7.64	6.38	1,327,467	1,108,539	727,409	606,583	65,450	15,630	49,820	406
8033	114,278,391	1,573,161	1,561,419	1,144,095	1.47	1.82	1,692,525	2,095,507	927,450	1,146,644	50,607	6	50,601	407
4021	4,352,460	301,046	300,048	23,004	6.61	8.88	288,655	387,784	158,173	212,192	115,511	168,678	-53,167	-408
9079	221,652,376	3,452,230	3,299,226	2,373,484	1.53	1.64	3,548,554	3,803,679	1,944,494	2,081,342	94,643	41,006	53,637	409
83	16,602,987	1,201,052	1,227,372	436,074	7.29	8.32	1,184,403	1,351,746	649,015	739,664	69,865	124,607	-54,741	-410
5506	53,826,037	2,137,466	2,178,983	1,124,480	5.79	5.42	3,057,147	2,861,785	1,675,219	1,565,945	181,059	124,456	56,602	411
5538	24,980,224	1,258,449	1,330,899	1,245,459	7.38	6.86	1,743,184	1,620,358	955,209	886,647	88,196	145,206	-57,010	-412
9014	24,107,903	1,429,909	1,374,524	1,031,564	5.51	6.16	1,381,870	1,544,885	757,220	845,348	99,396	41,020	58,376	413
3643	32,109,554	348,057	324,844	579,200	1.38	1.30	474,776	447,253	260,162	244,733	391,238	457,103	-65,865	-414
7219	232,034,434	14,488,896	14,405,233	8,790,011	7.71	7.42	17,993,756	17,316,948	9,860,001	9,475,691	116,113	49,617	66,496	415
5479	3,228,231	183,246	179,091	480,088	8.31	7.92	274,490	261,608	150,412	143,150	722,594	793,069	-70,475	-416
7409	534,873	50,687	51,988	231,773	11.28	10.79	58,824	56,269	32,234	30,790	1,235,234	1,311,943	-76,709	-417
42	5,190,961	284,643	281,989	382,858	6.44	7.45	337,444	390,366	184,909	213,605	211,910	134,109	77,800	418
3066	16,725,594	511,972	512,324	545,781	2.88	3.28	481,366	548,223	263,773	299,983	301,503	201,401	100,102	419
8018	49,827,999	1,785,041	1,592,061	1,581,311	4.62	3.93	2,581,095	2,195,606	1,414,357	1,201,418	19,708	120,124	-100,416	-420
2001	249,523	8,821	6,669	167,051	3.72	3.63	12,278	11,980	6,728	6,556	3,820,565	3,929,264	-108,699	-421
7704	9,011,417	360,915	367,354	507,643	4.97	5.93	440,017	525,010	241,115	287,281	294,618	169,030	125,588	422
8868	771,043,031	1,446,502	1,424,362	1,413,984	0.21	0.24	1,644,359	1,879,267	901,056	1,028,319	291,986	144,641	147,345	423
2089	66,807,604	1,954,756	1,835,535	2,114,472	3.16	3.38	2,248,241	2,404,764	1,231,964	1,315,867	632,178	484,676	147,502	424
2003	19,155,127	666,412	564,291	577,268	2.10	2.51	475,055	567,804	260,315	310,698	385,914	228,710	157,204	425
8021	44,796,783	2,597,631	2,700,620	948,809	7.23	8.31	3,115,294	3,580,650	1,707,081	1,959,302	336,819	521,153	-184,334	-426
7431	478,944	8,574	9,035	289,670	1.52	1.55	6,908	7,045	3,786	3,855	21,589,473	21,191,372	398,101	427
Total	7,826,102,306	116,482,865	114,671,811	78,098,909			142,524,603	142,726,762	78,098,909	78,098,909				5,068
										Arithmetic Average =	114,891	113,592		
													n =	427
													V =	0.99
													Approximate Confidence =	0.84

EXHIBIT 3

TEST OF EXCESS LOSS DIFFERENCES

	"All Other" Industry Group		Class 8810—Clerical Office Employees NOC				"All Other" Excluding Class 8810			
Year	Limited Losses	Unlimited Losses	Limited Losses	Unlimited Losses	Excess Loss Factor	$\ln(ELF-1)$	Limited Losses	Unlimited Losses	Excess Loss Factor	$\ln(GELF-1)$
1985	40,279,153	41,998,052	2,327,467	2,327,467	1.0000	−14.6595	37,951,686	39,670,585	1.0453	−3.0944
1986	41,989,480	43,468,233	2,180,452	2,205,452	1.0115	−4.4684	39,809,028	41,262,781	1.0365	−3.3104
1987	48,545,569	50,409,813	2,759,148	2,759,148	1.0000	−14.8372	45,786,421	47,650,665	1.0407	−3.2015
Average						−11.3217				−3.2021

Z_1	11.5650
Z_2	1.1580
Z_3	11.6356
$\bar{Z}$	8.1195
S^2	36.3485
T	2.3327