HOMEOWNERS INSURANCE PRICING

By

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BIOGRAPHY

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ABSTRACT

This paper presents the basic ratemaking techniques used for Homeowners pricing. Development of the statewide indications for the buildings forms is presented. This is followed by the necessary modifications for the development of the indications for the contents forms. Two techniques for developing territorial indications are then presented. Brief discussions of the other rating factors and expense flattening are given.

INTRODUCTION

This paper is intended to cover basic ratemaking procedures used in Homeowners pricing. As such, it updates an excellent paper on Homeowners ratemaking written by Michael Walters.[1] The procedures discussed here, while similar to those presented in Mr. Walters' paper, are presented in light of current technology and reflect the changes in the product since 1974 when Mr. Walters' paper was published.

This paper will begin by showing the development of the statewide indications for the building forms. The difference in the development of the contents indication, as well as two procedures for the development of territorial indications, will then be presented. Finally, basic procedures for relativity curves and other rating factors will be discussed.

The paper is not all inclusive. Although the attempt has been made to be fairly comprehensive as required by a basic ratemaking paper, not all areas and issues can be covered. Any areas judged to be outside the scope of this paper have been so noted. Where possible, other papers or sources are referenced in footnotes for the interested reader to pursue. In addition, some unresolved issues are discussed in the final section.

1) Walters, Michael A, "Homeowners Insurance Ratemaking" CAS PROCEEDINGS, 1963, 1974, Vol. LXI, pp. 15-61.

The reader of the paper is expected to have some familiarity with the basic ISO Homeowners forms. The reader should also be familiar with the rating of a Homeowners policy using territorial base rate, amount of insurance relativity, protection/construction factor and deductible relativity.

The reader should also be familiar with some of the basic ratemaking techniques. A good presentation of ratemaking is contained in the chapter by McClenahan in the new CAS textbook.[2]

2) McClenahan, Charles L., Chapter 2 - Ratemaking, Foundations of Casualty Actuarial Science. The chapter is available in draft form in the CAS Forum - Spring 1988, p.117.

PREMIUM ADJUSTMENTS

The calculation of an indication begins with the necessary adjustments to premiums. The collected earned premiums in the experience period reflect different rate levels, different deductibles and different home values. The greater the number of these differences which can be quantified, the more accurate the final indication will be.

The first adjustment to be made is to adjust the collected earned premiums to current rate level since the rate indication is a test of the current rates. During the experience period it is likely that rate adjustments have been made, often on an annual basis. These prior rate changes have typically impacted different segments of the book in different amounts. For example, rates may have been raised in one territory while being lowered in another. Again, the more accurately rate impacts can be quantified, the more accurate the final indication.

The preferred method for rate level adjustments, therefore, is an extension-of-exposures method. Under an extension-of-exposures method, each policy is re-rated using current rates and rating factors. Thus, each change can be measured on a policy-by-policy basis resulting in a very accurate measurement of rate level changes, be they changes in rates by territory, protection class, etc.. The re-rated premium is subsequently earned across the policy period. The re-rated earned premium is then ratioed to the historical earned premium to derive a premium conversion factor (PCF) for each year in the experience period.

It is essential that the two premium figures, re-rated and collected, represent the same policies and coverages. There are some policies that cannot be re-rated, or coverages which are purchased infrequently, which will not be re-rated due to system complexity. If the charge for such coverages is not included in the re-rated premium, every effort should be made to exclude the historical charge from the historical premiums. The inclusion of premium in the historical premiums which is not matched by re-rated premium will result in an understated PCF. At times, the amount of the understatement can be deemed acceptable.

PCF's are calculated so that the unratable premium, excluded from the re-rating calculation, can be included in the indication. The assumption is made that the rate adjustments had the same impact on the excluded premium as on the re-rated premium. Thus, the PCF is applied to the collected premium in total. Obviously, this assumption is not likely to be completely accurate, but as long as the excluded premium is a small portion of the total premium, the distortion is very minimal.

An additional advantage of using an extension-of-exposures method is the ease and accuracy with which premiums can be adjusted to a common deductible. The advantages and disadvantages of using a common deductible will be discussed later. However, the ease of this adjustment is clear. When each policy is re-rated, the calculation assumes the selected deductible (in these examples $100 flat) for all policies and ignores the deductible coded on the record. The resultant PCF's then account for both the adjustment to current rate level and an adjustment to the common deductible. The PCF's shown on Exhibit 2 were determined in this fashion.

On Exhibit 2, the PCF's are applied to collected earned premium in order to calculate the Adjusted Earned Premium, which is the earned premium at current rates and at a common ($100) deductible.

Next, the premiums must be adjusted for the changes in home values from those that existed in the experience period to those that are anticipated in the future. As inflation increases the values of homes, insureds increase the amount of their homeowners insurance to assure adequate coverage. To facilitate the need for increases in coverage, many insurance companies have an automatic renewal increase program that increases the home value upon renewal. These increases in home values result in additional premium income from the exposure. The adjustment for this change in premium revenue is made in two parts.

The first stage is the adjustment from historical values to the latest year using Current Amount Factors. For each year in the experience period, the average earned relativity is calculated. As each policy is re-rated in the ratemaking system, the amount of insurance relativity is earned, accumulated and then averaged. The ratio of the latest year earned average relativity to that for the given year yields the factor for that year. Thus, the factor for the latest year is always one. The Current Amount Factors are derived by tempering the change implied by these factors.

Tempering is required due to the imprecise nature of the calculation of the amount factors. The attempt is being made to measure the change in home value due to inflation for an expiring policy to its renewal value. However, the calculation described includes some additional elements. First, all policies, renewal and new, are included in the calculation. Data from my company indicates that new policies tend to have a higher average value than the renewal book. Although this is not necessarily true, it is quite likely that the inclusion of new polices will change the average earned relativity to some degree. Second, policies that expire and are not renewed are included, again adding some distortion to the calculation of the average earned relativity. Finally, the data also includes changes in value due to renovation (i.e. additions, etc.). These changes represent changes in exposures, not just inflationary impacts, and as such, their effect on the premium should be removed or tempered. Here, the tempering factor is used for all distortions rather than attempting to remove any single influence. The tempering factor judgementally chosen for use here is 75%.

At alternative approach would be to calculate average earned relativities only for policies that are renewed. This approach was determined to be too complex given the available data.

The calculation of the Current Amount Factors is shown on Exhibit 4 and they are used in Exhibit 2.

To project future premium increases due to changes in value, a line is fitted to the average earned relativities. A tempering factor is again applied to the rate of change of the fitted line. The adjusted rate of change is then projected out from the mid-point of the latest year to 12 months beyond the effective date of the new rates. The end point of the trend period is the average earned date for policies using the new rates. The calculation of the Premium Projection Factor is shown on Exhibit 5 and used on the calculation in Exhibit 2.

The Trended Adjusted Earned Premium can be calculated at this point. As stated previously, the Adjusted Earned Premium is the historical earned premiums multiplied by the appropriate PCF. The Adjusted Earned Premium is then multiplied by the appropriate Current Amount Factor and the Premium Projection Factor to derive the Trended Adjusted Earned Premium. This is the premium used in the experience loss ratio for the indication calculation on Exhibit 1.

LOSS ADJUSTMENTS

Now that the premiums are ready for the indication calculation, the losses must be adjusted. For this example, calendar year incurred losses will be used. The changes necessary for accident year losses are described in a later section.

To start, each loss is adjusted to a full coverage basis. The deductible that was applied to the loss is added back in. The use of full coverage losses is required by the trend procedure used. Since external data reflecting total expenditures is used to calculate the trend factors, the factors are more accurately applied to full coverage losses.

No attempt is made to include losses that were totally below the deductible. Such losses are not on the company records. The exclusion of losses below the deductible will lead to an understatement of the total losses. This understatement can be significant if the deductible used in the indication is well below the average deductible for the book. This problem can easily be overcome by using a higher deductible for the indication.

The first adjustment made to these losses is for catastrophic losses. Catastrophe losses are relatively infrequent and do not affect each year similarly. The indicated rate level should include a provision for expected catastrophes, instead of those that happened to occur in the experience period. To make this adjustment, a longer time period, and possibly a larger body of data, is used to compensate for the infrequent nature of these losses. The procedure described here is very similar to the ISO excess wind procedure.

Wind is the primary cause for catastrophic losses. Although this is not the sole cause for catastrophic losses,[3] it was determined to be adequate in most cases for determining an adjustment. The excess wind calculation starts on Exhibit 8. Data on wind and total losses for a long time period, (27 years in this example), is used to calculate two values. One value is the median wind-to-nonwind ratio which is used as a threshold to determine which years are considered excess, requiring the exclusion of some losses. The median ratio is used rather than the average ratio since the average is subject to distortion from the excess years, as expected in any highly skewed, long-tail distribution.

The wind/non-wind ratio for each year is compared to the median to determine if the year is excess. If the ratio for the year is greater than 1.5 times the median and greater than .25, the year is considered excess. The minimum of .25 for a ratio to be considered excess eliminates some years in cases where the median ratio is small (less than .167 = .25/1.5). In these cases, the wind contribution to the losses is small enough not to require any adjustment.

The excess ratio, the difference between the wind/non-wind ratio for the excess year and the median, is determined for each excess year. Excess losses are the product of the excess ratio and the non-wind losses. The average excess ratio for the time period is also calculated.

3) Some recent examples of non-wind catastrophes are the freezing in several southern states in late 1983 and the rocket fuel factory explosion in Henderson, Nevada in 1988.

One final adjustment is needed to derive the excess wind factor. In the ratemaking procedure used here, the excess wind factor is applied to non-excess losses (total losses minus excess). The average excess ratio calculated above is an excess wind to non-wind ratio. Thus the ratio must be rescaled, which is accomplished by multiplying the average excess wind-to-non-wind ratio by the average non-wind-to-non-excess ratio.

Now that the long-term wind losses have been analyzed, each year in the experience period is tested to see if it is an excess year. Again, an excess year is one in which the wind/non-wind ratio is greater than 1.5 times the median and greater than .25. The excess losses are calculated for each year in the fashion outlined above. This calculation is Exhibit 9.

For each year, the excess losses from Exhibit 9 are subtracted from the total losses. The non-excess losses are then multiplied by the excess wind factor from Exhibit 8 to yield the adjusted incurred losses as shown on Exhibit 3. The Adjusted Incurred Losses have now been smoothed to remove some of the random variations inherent in wind-related catastrophes.

The Adjusted Incurred Losses are at historic cost levels and at full coverage, so there are still adjustments to be made. The adjusted incurred losses must be converted to future cost levels. The concept of loss trending is common to any ratemaking procedure. For Homeowners, the loss trend is made in two stages: first, all historical levels are converted to the latest observed cost levels, and then, the losses are projected to the anticipated future cost levels. The basis for Homeowners trend is external economic data.

For each quarter in the experience period and for all subsequent available quarters, a Current Cost Index (CCI) is calculated. The CCI is a weighted average of Boeckh's Residential Construction Cost Index and a modified Consumer Price Index (CPI). The Boeckh's index represents the changes in cost for the dwelling portion of the losses. The modified CPI represents the levels of cost for the remainder of the losses, and is a weighted average of the Housefurnishings, Apparel commodities, Entertainment commodities and Medical Care CPI's. The weights used for these coverages are shown on Exhibit 6. These weights were based on a study of losses by cause and should be reviewed and adjusted periodically for particular company circumstances.

The current cost factor is determined by taking the ratio of the CCI for the latest quarter to the average CCI for each year in the experience period. The application of the current cost factor brings losses to the latest observed cost levels. Note that the latest observed cost levels can occur more recently than the end of the experience period. The current cost factors are shown on Exhibit 6.

The second stage of the cost adjustment, the projection stage, requires an exponential curve fitted to the CCI's as shown in Exhibit 7. The fitted exponential is then used to project from the latest observed point to the midpoint of the period for future losses. The future point is twelve months beyond the effective date.

The Trended Full Coverage Losses are derived by applying the current cost factors and the trended cost factor as shown in Exhibit 3. These losses are still at full coverage which leads to the final adjustment to losses. The earned premiums used in the indication have been adjusted to a common deductible ($100). Therefore, we should adjust the losses to that deductible as well. This is accomplished by multiplying the number of claims to which the deductible is applicable (Section I claim count) by the amount of the deductible. The amount is then subtracted from the Trended Adjusted Incurred Losses, resulting in the Trended Incurred Adjusted Losses shown in Exhibit 3. These losses are used on Exhibit 1 for the indication.

INDICATION

Now that the premiums and losses are adjusted to a common basis ($100 deductible, anticipated cost and anticipated home values), we can calculate the indication. The indication stage begins by calculating the experience loss ratio for each year. The experience loss ratio is calculated by taking a weighted average of the loss ratios over the experience period.

The duration of the experience period has been unspecified up to this point; however, all examples show a five year period. This five year experience period is longer than the one to three year period commonly used for liability lines. This is a result of the additional variation in property lines due to the lower frequency. Many of the property causes of loss are weather related. Since weather varies greatly from one year to the next, the losses also show significant variation. In addition, fire, which contributes a major portion of the losses, is a relatively low frequency, high severity occurrence. To compensate for this variation in property coverages, a longer time period, here a five year period, is needed for stability.

The additional stability, however, has a price. A longer time period is less responsive to recent changes in the underlying hazard of the book. This loss of responsiveness is balanced in two ways. First, the five year period is selected rather than an even longer one. Second, the five years are weighted differently. The typical weights used are 30%, 25%, 20%, 15% and 10% from the most recent year to the oldest year. By giving greater weight to the more recent years, the indication is more responsive to recent changes in the book. It is these weights that are used to calculate the Weighted Experience Loss Ratio.

The losses used in the indication have no provision for loss adjustment expense (LAE). Typically, the allocated loss adjustment expense portion of LAE is very small for Homeowners; the unallocated portion comprises the bulk of the LAE. Therefore, it is simpler to treat all LAE as if it were unallocated and load it in as a percentage of losses. The LAE load can be calculated by using the ratio of LAE to losses from the Insurance Expense Exhibit (IEE). A three year average is typical.

The indication procedure explained here uses calendar year losses. As such, each year reflects the development of prior years IBNR as it emerged. In accident year ratemaking, the additional loss activity that is expected in the future is accounted for via loss development factors. In calendar year ratemaking, the actual development of prior years is used as a proxy for the development of the accident year. The actual loss emergence of prior years, however, will vary from the expected future emergence. This can be compensated for by adjusting the experience loss ratio to reflect the average change in IBNR reserves. Assuming adequate reserve, the IBNR reserve would be stable if the exposures did not change from year to year. As the exposures increase or decrease, so will the IBNR reserve. The change in the IBNR reserve reflects the difference between the prior year loss development in a calendar year and the expected future development.

An IBNR factor to reflect this adjustment is calculated by taking a three year average of the ratio of the change in IBNR to incurred losses. A countrywide ratio is calculated for stability. This IBNR adjustment is typically very small since the loss development on Homeowners beyond 12 months is also very small.

The Weighted Experience Loss Ratio is multiplied by the LAE and IBNR factors which yields the Adjusted Weighted Loss and Loss Adjustment Ratio.

Next, the Permissible Loss Ratio (PLR) is calculated. The PLR, (in liability ratemaking this is often referred to as the expected loss ratio), is unity minus a profit and contingencies load and an expense provision. The expense provision is the sum of provisions for commissions, other acquisition, general expenses and taxes.

The commission provision is either an average of historical commissions, both direct and contingent, or a budgetary provision. A budgetary provision should be used if commission schedules have been, or will be, changed from the historical levels. The provisions for other acquisition and general expense are based on a three year average from the IEE. An expense flattening technique is presented in a later section of the paper. The tax provision is a budgetary provision for premium taxes and a provision for miscellaneous taxes, licenses and fees. A load of 1% for the miscellaneous taxes is used here based on an internal expense review. In states with FAIR plans or guaranty funds an additional load should be added to the tax provision to account for these costs.

The profit and contingencies load used here is 6%. This is comprised of the historical 5% profit load and an additional 1% contingency load. Although the excess wind procedure accounts for wind related catastrophes, the additional load is necessary to account for catastrophes that result from causes other than wind.

The next factor that needs to be considered before the final indication is credibility. The procedure to this point is the same whether the indication is being developed for a large state like New York or for a small state like Idaho. However, no one is likely to feel that both experience indications are equally believable. The greater volume in New York would clearly lead to more confidence in its indication. Therefore, the experience indication must be credibility weighted. Partial credibility is based on the square root rule[4] and a full credibility standard of 40,000 earned house years in the experience period.[5] The 40,000 earned house years is based on 4000 claims for full credibility and a frequency of .10.

The complement of credibility is usually given to the loss ratio trend. In Homeowners, there is both a premium and a loss trend, so the complement would be given to the net trend which is the excess of the loss trend over the premium trend. In most cases, the net trend is small for property lines and can be ignored. Therefore, in this procedure, the credibility complement is given to no change. Thus, the Credibility Weighted Loss and Loss Adjustment Ratio is the sum of the credibility times the Adjusted Weighted Loss and Loss Adjustment Ratio and the complement of the Credibility times the Permissible Loss Ratio.

4) The square-root rule for partial credibility is discussed in:
Longley-Cook, L.H. "An Introduction To Credibility Theory," CAS PROCEEDINGS, 1962, VOL XLIX
Philbrick, Stephen W. "An Examination of Credibility Concepts," CAS PROCEEDINGS, 1981, VOL LXVII, p. 195.

5) Walters, p. 30.

The final element to be considered is investment income. The historical profit load of 5% will generate different operating returns depending on a company's payout pattern, leverage and investment returns. An investment income adjustment is often used so that the rates will yield the desired operating result. Several states specifically require consideration of investment income in determining rates. An investment income adjustment of 2% is shown here for illustrative purposes. A deviation of this factor is beyond the scope of this paper.[6]

The Investment Income Offset is used to adjust the PLR before determining the final indication. The Indicated Rate Level Change is the Credibility Weighted Loss and Loss Adjustment Ratio divided by the sum of the Permissible Loss Ratio and the Investment Income Offset minus one. This calculation is shown on Exhibit 1.

6) For information on how to determine an investment income factor, see: D'Arcy, Stephen P., Chapter 8-Investment Issues, Foundations of Casualty Actuarial Science. The chapter is available in draft form in the CAS Forum-Spring 1988, p. 211.

FORMS 4 AND 6

There are some minor differences between the indication procedure used for Forms 4 and 6 and those described above for the dwelling forms. These differences stem from the differences in the coverages. Forms 4 and 6 are contents forms with the small amount of building coverage in Form 6 considered insignificant. Being contents coverage, Forms 4 and 6 are not subject to the vagaries of weather to the extent the dwelling forms are. Therefore, some of the adjustments made to the dwellings forms are unnecessary for Forms 4 and 6.

The premium adjustments are the same as those for the dwelling forms. That is, the premiums are adjusted to current rate level and a common deductible. The premiums are then adjusted to a common value and projected to the values anticipated in the future.

The losses for Forms 4 and 6 are adjusted in a similar fashion to the dwelling forms with one exception - the adjustment for excess wind losses is unnecessary. The losses are adjusted to full coverage and then to current cost level, skipping the excess loss adjustment.

The experience period for Forms 4 and 6 is also a little different. Since weather is not as large a factor, a shorter period of three years is used. The weights used for this period are 50%, 30% and 20% from the most recent to the oldest. Although a 3 year experience period is used, a five year period is still employed for the current amount trend to yield a more stable trend.

The full credibility standard is also reduced from 40,000 earned house years to 25,000 in recognition of the greater stability expected in Form 4 and 6.

An example of the calculation of Forms 4 and 6 indication is shown on Exhibits 10 through 16. Exhibits 10 through 16 correspond to Exhibits 1 through 7 for the dwelling forms.

TERRITORIAL INDICATIONS

Now that the statewide indications have been determined, the change must be allocated to the territories. The process presented here will calculate the indication by zone. A zone can either be a single territory or a grouping of territories, whichever is desired. In most states, a zone will be a single territory. However, territories can be grouped to increase credibility or to derive common rates in the grouped territories. Territorial grouping is used quite often for Forms 4 and 6.

The experience period used in the zone indication is five years of data, which gives stability in the small sample of data. The premiums are adjusted to current rate level and a common deductible. The adjustment to current rate level is extremely important for zone indications. The impact of prior rate changes will vary by territory due to the allocation of the prior changes. Prior changes must be taken into account to determine what is needed this year.

The territorial losses are all adjusted to full coverage. The losses are also capped at some amount to decrease the influence of any individual loss on the territorial indication. The amount of the cap will vary by the volume of business in the state and number of territories (i.e. the average territorial volume). If the state is smaller a smaller cap should be used. In these examples, a $75,000 cap is used.

The losses for the dwelling forms are also adjusted for excess wind losses. The same process as described for the dwelling forms indication above, using the same median, is done territory by territory to determine the excess losses. The excess losses are then subtracted from the losses in each territory and the remainder multiplied by the excess factor.

In states with high wind hazards and significant variation of wind potential by zone within a state, some effort should be made to vary the wind load by territory. At this time, the author knows of no satisfactory procedure to make this adjustment, so the adjustment relies solely on judgement.

Clearly, the losses are not comparable to the premiums. The premiums are at current rates and a $100 deductible. The losses are at full coverage and have been capped. No additional load has been added to balance for the losses eliminated by the cap. The losses are also at historical cost levels.

Although the loss ratios are not meaningful in an absolute sense, they adequately represent the relative differences in the experience of the territories. Further adjustment of the losses to match more closely to the premiums would increase the precision, but only marginally since most adjustments would be the same for all territories.

The loss ratio indices alone could be used to allocate the statewide change. However, due to the small amount of credibility in some zones, it is likely that stopping at this point would lead to extreme swings. It is therefore preferable to reflect the credibility of the experience in each zone. The credibility is based on the five year total of earned house years using the same full credibility standard as used in the statewide indication (i.e. 40,000 for dwelling forms and 25,000 for Forms 4 and 6).

In the simple procedure, the complement of credibility is given to an index of 1.00. Unity represents no change in the relative level of the rates for the zone or the statewide change. The formula index is the product of the loss ratio index and the credibility plus the complement of credibility.

The weighted average of the formula indices is then calculated using the written premiums for the latest year as weights. These weights are the best representation of the current mix by zone. Usually this average will not be 1.00. The difference between the average and 1.00 is an off-balance that must be accounted for in the next step.

The zone indication is the formula index for the zone divided by the weighted average multiplied by the statewide change.[7] The weighted average of these zone indications will be the statewide change. Even though the zone indications are credibility adjusted, they still can exhibit some large swings, larger swings than are considered acceptable under normal business circumstances. Therefore, the zone indications are capped within a range to smooth out the changes.

7) It should be noted by the reader that as used here the "change" is not a percentage change but the factor applied to yield that change. For example, a "change" of 1.10 will yield a 10% change. This use of the term "change" is used elsewhere in this paper, and its meaning should be clear from the context in which it is used.

The capping is done within some range using a lower and upper cap. Usually, the range used is symmetric, that is the lower and upper cap are the same distance from the average. In this example, a range of ± 5% around the statewide change is used. First, the caps are applied by zone. Then, a weighted average of the raw capped indications is calculated. This weighted average is not usually equal to the statewide change desired. The final zone indication is the raw capped zone indication divided by average raw capped zone indications. The division takes care of any off-balance, so the average will equal the statewide change.

A simple enhancement to the basic procedure can be made by introducing further information to the formula through the credibility complement. Use of external information on zone relativities, in addition to company experience, results in a more accurate zone indication.

To do this, the zone relativities currently used by the company are determined. Then, the external relativities to be used are determined. The relativities are available from state insurance departments as public information contained in rate filings or they can be pulled directly from published information. If the external information used is that for key competitors, a rate relativity by zone is calculated as a proxy for loss relativities. The rate relativity is only a proxy since it exhibits the impact from capping and other business adjustments rather than directly reflecting the losses. To eliminate some of these business distortions, a weighted average of several competitors' rate relativities should be used to stabilize the information. The example shown here represents a weighted average of the rate relativities for the top five writers in the state. The rate information came from an ISO Premium Comparison Circular.

The ratio of the external company relativity to the relativity represents the amount by which the territorial relativity should be adjusted. The complement of credibility is given to this ratio instead of unity when calculating the formula index. From this point the procedure proceeds as described above. The reader will note that the simple procedure can be considered a special case of the enhanced procedure. The simple procedure would result when the company relativities are the same as the external relativities for all territories.

If the full indication is not to be taken with one change, this procedure can still be used. Instead of using the indication for the statewide change, the desired change is used. The process will then distribute the desired change to the territories.

RELATIVITY CURVES

An important factor that should be reviewed as part of every rate change is the amount of insurance relativity curves. The premium charge for a risk is the product of the territorial base rate and a factor for the desired amount of insurance. The base rate represents the charge for a specific amount of insurance. The rate for greater or lesser coverage will also be greater or lesser, respectively. The factors to determine the rate for various amounts of insurance are referred to as amount of insurance relativity curves or just relativity curves for short. Clearly, the relativity curves are nearly as important as the territorial base rate in achieving rate equity. Although a detailed discussion of relativity curves would require a whole paper of its own, some of the key considerations in a curve review will be presented here.

The relativity curve review starts with an analysis of the experience by amount of insurance. The experience curve must be determined by some process that will yield a smooth curve. The ISO procedure accomplishes this by a complex curve fitting process to the loss cost relativities.

An alternative is to fit curves to the frequency and severity seperately. By fitting straight lines to the frequency and severity, the resulting product is a quadratic that will, in most cases, satisfactorily represent the relativity curve. As shown on Exhibit 19, the raw frequency and severity is determined by amount of insurance. A line is then fitted to these values, ignoring points at either end with insufficient underlying volume. The data used here represents only one year, but more years should be used to yield better credibility. The fitted frequency and

severity are shown as calculated from the least squares line. The relativities to the desired unity value are then calculated as the product of the frequency and severity relativites.

This basic procedure can be adjusted as desired by fitting curves other than lines to the frequency and severity data. State values can also be credibility weighted, as needed, with regional or countrywide values to determine the loss cost relativity curve.

The relativity curve derived by experience reflects loss relativities only. The final relativity curve should also reflect the differences in fixed expenses between the low amount/low premium values on the curve and the high amount/high premium values. This is accomplished by adding a flat load to represent fixed expenses to each value on the curve and normalizing the curve. The load is the ratio of fixed expenses per policy to the average base rate. The curve is then normalized so that the unity is at the amount of insurance value desired. Exhibit 19 shows how the loss cost relativity curve is adjusted for the fixed expenses and renormalized to yield the final Adjusted curve.

The weighted average of the changes from the old curve to the proposed curve is calculated using written premiums as weights. Usually, the weighted average is used to derive an off-balance factor so the curve change is revenue neutral. The off-balance factor is used in the calculation of the new territorial base rates. This calculation is shown on Exhibit 20 using the final adjusted curve from Exhibit 19 as the proposed curve.

OTHER RATING FACTORS

There remain other key rating variables that should be reviewed as part of a rate change. These factors are not subject to as much change as other factors, (territory and relativity curves), and thus, do not need to be adjusted with every rate change. These rating variables include protection class, construction type, deductible and miscellaneous credits and coverages. Some of these will be discussed here.

For protection class or construction type the review procedure is the same. The premiums used are the premiums at current rate level and the $100 deductible. The losses are the full coverage losses and also the adjusted full coverage basis. The adjusted full coverage losses include an adjustment for excess wind and are capped at some amount. These are the same adjustments that are made for the territorial indications. Loss ratios are calculated on both bases and are then expressed as loss ratio relativities to the average. The loss ratio relativities indicate which factors should be increased, (relativities greater than one), and which should be decreased, (relativities less than one).

The relativities are examined on both bases since the wind adjustment and/or loss capping can introduce a bias to the figures as well as removing randomness. For example, the excess wind adjustment would likely take more losses from frame than from masonry. Or, the loss capping could eliminate more losses from the unprotected than the protected classes. By examining the relativities on both bases, some judgement can be applied to eliminate the swings in the total loss ratio and adjust for any bias in the adjusted loss ratio.

Analyzing protection or construction separately for credibility purposes is a simplistic analysis procedure. A combined protection/construction analysis is a good candidate for Bailey analysis.[8]

A procedure similar to the above can be used for miscellaneous credits and coverages. Miscellaneous coverages are those for which separate premium and loss statistics are unavailable. If identifiable premium and loss statistics are available for a coverage, the rates for the coverage can be reviewed in a fashion similar to the statewide base rates and the experience, (losses and premiums), for that coverage excluded from the base rate calculation. The experience for the credits is reviewed by comparing experience for risks with the credit to experience without the credit. If the experience with the credit has a higher loss ratio, the credit should be reduced and vice versa.

The miscellaneous credits and coverages are often reviewed on a countrywide basis for additional credibility.

8) Bailey, Robert A. "Insurance Rates with Minimum Bias." CAS PROCEEDINGS, Vol. L, p. 4.

Deductible factors are best reviewed by analyzing losses and loss costs directly rather than analyzing loss ratios. However, if the mix by territory, protection, etc. is expected to be significantly different among various deductibles, a loss ratio review is required to reflect the changes already in place for the differences in hazard. Papers on deductible pricing exist in the CAS literature and should be consulted for procedures that can be used.[9]

An alternative exists using the statewide indication procedure described earlier. The example shown develops an indication at $100 deductible. The same process can be used to develop an indication for other deductibles. The differences between the various indications is the amount by which the deductible credits should be adjusted. For example, if the indication at $100 deductible is +10% and the indication at $250 deductible is +8%, the $100 base rates should be increased by 10% and the $250 deductible rate decreased by 2% so that the rate impact at $250 is only +8%. Assuming the $250 factor is .90 the new credit is calculated by .98 (2% decrease) times .90 (the old factor) or .88. This process requires the calculation of multiple indications, but if the process is automated the iterations can be done quickly.

The weighted average of the impact should be calculated if any changes are proposed for these credits or coverages. If the needed rate change is fully reflected in the territorial base rates, these changes should be off-balanced. The off-balance factor is one plus the average percentage change.

9) A discussion on deductible pricing can be found in:
Bicherstaff, D.R. "Automobile Collision Deductible and Repair Cost Groups: The Lognormal Model," CAS PROCEEDINGS, 1972, Vol. LIX, p. 68
Walters, pp. 22-23.

NEW BASE RATES

Now that all the factors have been reviewed and the desired changes determined, the new base rates or unities can be calculated. For Homeowners, base rates are also referred to as unities since the base rate corresponds to the premium charge for the value where the curve relativity is unity. The base rate calculation proceeds by multiplying the current base rates by the territorial changes indicated and dividing by any off-balance factors.

Exhibit 21 shows an example based on the territorial indications shown in Exhibit 18. Included are off-balance factors for a curve change (Exhibit 20) and changes in protection class factors (Exhibit 22). Both the curve change and protection class change have been off-balanced.

EXPENSE FLATTENING

Not all costs for acquiring and processing business vary with the premium size of the policy. Many expenses are the same for every policy regardless of the premium size. These costs are referred to as fixed expenses. The average premium for the building forms is almost twice that of the contents forms. Recognizing this, the expense ratio for general and other acquisition expenses used in the indication should be higher for Forms 4 and 6 then for the buildings forms.

The first step in this procedure is to split the expenses into the fixed and variable portions. This can be done through an internal expense analysis or through an arbitrary split. Here, the common split of 50% fixed and 50% variable is used to split general and other acquisition expenses. The fixed portion of the expenses is divided by the number of policies to determine a fixed cost per policy. This cost is divided by the average premium for both the buildings forms and the contents forms to derive a fixed expense ratio for used in the two indications. The same variable expense ratio, the total variable expenses divided by the total premiums, is used for both indications. The sum of the fixed and variable expense ratios is used as the provision for the general and other acquisition expenses in the indications. This calculation is shown on Exhibit 23.

This procedure only flattens the expenses between the two form groups. The fixed expense ratio is treated the same as the variable expense ratio in the indication. A different indication calculation must be used if the fixed expenses are to be treated as fixed throughout the calculation.

The fixed cost per policy is the same in both form groups. There is one element of the contents forms, especially Form 4, that may lead one to expect higher fixed costs on these forms. The policyholder of contents forms tend to move more often than do buildings form policyholders. Tenants (Form 4) move freely since they do not own their home. Condominium owners (Form 6) trade up into a house fairly often. These moves require the rewriting of a policy or even the cancellation of the old policy and the issuance of an entirely new policy. These transactions increase the cost of these forms. If, as expected, the contents forms have higher costs, the procedure as described has not fully reflected the increased costs.

VARIATIONS

The basic procedures discussed to this point lend themselves to some variations. Most of the time, the variations selected will depend on the data available for the analysis and the data processing systems being used. Some of the more common variations that can be used will be discussed in this section.

Often, a system is not available that allows use of the extension-of-exposures technique with the data being analyzed. In such cases, an on-level technique must be used.[10] On-level factors are calculated based on the rate change history for the state and form group. The on-level factors, applied to historical earned premiums, bring earned premiums to current rate level. Earlier, it was stated that PCF's bring premiums to current rate level and to a common deductible.

To bring the premiums to a common deductible after the application of on-level factors, a second factor must be calculated. For each year, a distribution of earned premium by deductible is needed. This distribution is used to calculate the average deviation off of the deductible being used. For example, if a $100 common deductible is to be used, the credits (for higher deductibles) and charges (for smaller deductibles) off the $100 deductible rates are averaged. The on-level earned premium is then divided by this average factor to derive premiums at current rate level and a common deductible. These are the Adjusted Earned Premiums on Exhibit 2. The premium adjustments then proceed as discussed earlier.

10) For discussions of on-level factors and their use in ratemaking, see: McClenahan, Charles L., Chapter 2 - Ratemaking, Foundations of Casualty Actuarial Science. He calls this the "parallelogram method".

In addition, the losses cannot always be adjusted to full coverage. The losses are then at the various deductibles at which the policies were written. The losses are adjusted to full coverage for more accurate trending, however, the use of collected deductibles rather than full coverage is not likely to cause a significant change in the indication. If collected deductible are used for losses, the premiums must be on the same basis. If premiums are adjusted using extension of exposures, the policies must be re-rated at the deductible at which they were written. If on-level factors are used, the second adjustment for deductibles should not be made.

Another variation is to use accident year losses rather than the calendar year losses described in the basic procedures. The use of accident year losses is slightly more complicated but should add some precision. Accident year losses must be developed to an ultimate basis. This is done through the use of loss development factors. Loss development can be applied separately to the property and liability portions of the losses or to the total losses. When accident year losses are used, the losses are developed to ultimate and then adjusted to full coverage, if necessary. These losses are used in place of the incurred losses as a starting point on Exhibit 3.

The development to ultimate from 12 months is very small for Homeowners. In addition, loss development patterns are very stable. With these two conditions and fairly stable exposure levels, calendar year losses can be used. The calendar year losses in this case represent a very good approximation without the need for calculating and selecting loss development factors. The calendar year data is also easy to balance to financial data in statutory statements.

Another area of the calculation subject to variation is the trend. The basic procedure relies solely on the use of external data for loss trending. The external trend procedure adjusts for severity only. In essence, the basic procedure assumes no frequency trend. Internal trend data on frequency and severity can be used to yield a more accurate indication. Any of the common trend fitting procedures can be used to develop frequency and severity trends. One alternative to consider is to average the internal severity trend with the external trend described in the basic procedure. Either the two stage trend procedure, where history is adjusted to the most recent value and then projected, or a one step procedure, where each year is projected to the future in just one step by a common factor, can be used.

The last variation to be discussed is the necessary changes for a new program. A new program can either be the start up of a new company or the implementation of a new rating tier for an existing company or group. In either case, the new program is started using a rate bureau or another company as a basis. The benchmark rate level for the new program is usually some percentage of the basis rates. As the new program develops experience, the question becomes how to adjust the rate level. A rate indication can be developed as outlined in the basic procedure using the number of years of experience that have been developed. There must be at least 2 years of experience. Two years are necessary to get a line for the trend in average relativity. There are two adjustments that need to be made for this situation. First, the weights need to be adjusted.

The other adjustment is to the credibility. The five year experience period was selected to stabilize the indication. Thus, if we do not have the full five years, we must add stability through some other means - the credibility factor. The credibility generated by the square root formula is modified by the normal weight given the years of experience used. These weights and credibility adjustment factor are summarized in the table below:

Number of Years Experience	Weights	Credibility Adjustment Factor
2	50/50	.25
3	20/30/50	.45
4	10/20/30/40	.70

The complement of credibility should be given to the benchmark rate level until the full five years of experience is developed, at which time the basic procedure can be used. However, if the program only generates a small amount of credibility, it may be desirable to continue to give the complement of credibility to the benchmark rate level even after five years.

CLOSING REMARKS

Hopefully, this paper has outlined the basic procedures used in Homeowners ratemaking. If the paper can be used as a guide for Homeowners pricing, it will be considered a success. Not all issues that were raised, or could have been raised, were resolved in this paper. As stated in the Introduction this was not the purpose of the paper. To close, it seems appropriate to point out some of the key issues that still need further analysis in order to reach resolution. Possibly, this paper can serve as an impetus for further work and discussion on these issues.

The most important area requiring further work is the use of credibility. The credibility standard of 40,000 earned house years was developed quite some time ago. It was developed primarily for use in territorial indications, not for statewide indications. In addition, credibility techniques have progressed significantly in the interim. Therefore, it is probable that the use of newer techniques would develop a more appropriate full credibility standard to be used in statewide indications and even for use in territorial indications.

The analysis and development of coverage relativity curves is another area for additional research. At the first two CAS Ratemaking Seminars, "Homeowners Relativity Curves" was a topic for one of the sessions at each seminar.[11] The offering of this topic and the attendance at the sessions indicate the importance of this issue to actuaries. The ISO

11) 1988 CAS Ratemaking Seminar in Boston and 1989 CAS Ratemaking Seminar in Dallas.

procedure is too complex for most companies to use extensively and many actuaries do not like the results indicated by this procedure. The credibility problems presented by relativity curves are quite serious for any company. Relativity curves are needed for equitable pricing throughout the curve. However, an inaccurate curve will only lead to underpricing if the mix changes significantly due to anti-selection.

The final area to be addressed here is the other rating factors (protection class, construction type, deductible, etc.). These factors were only covered superficially in this paper. Advanced techniques, such as Bailey analysis, can be used to address these factors. However, these advanced techniques may be too complex for the number of variables involved. Simpler techniques that are adequate can be, or may have already been, developed to address these miscellaneous rating factors.

HOMEOWNERS RATE LEVEL INDICATION

STATE NAME
STATE NUMBER
FORMS 1-3,5

YEARS ENDING	(1) TRENDED ADJUSTED EARNED PREMIUM (A)	(2) TRENDED ADJUSTED INCURRED LOSSES (B)	(3) LOSS RATIO	(4) CALENDAR YEAR WEIGHTS
Dec-84	1,878,944	820,289	43.7%	0.10
Dec-85	1,926,183	1,650,796	85.7%	0.15
Dec-86	2,048,614	1,390,641	67.9%	0.20
Dec-87	1,669,302	802,782	48.1%	0.25
Dec-88	1,353,830	700,015	51.7%	0.30

(5)	WEIGHTED EXPERIENCE LOSS RATIO	58.3%
(6)	ADJUSTED WEIGHTED LOSS AND LOSS ADJUSTMENT RATIO (C)	66.7%
(7)	PERMISSIBLE LOSS RATIO (D)	57.7%
(8)	CREDIBILITY (E)	0.85
(9)	CREDIBILITY WEIGHTED LOSS AND LOSS ADJUSTMENT RATIO (F)	65.3%
(10)	INVESTMENT INCOME OFFSET	2.0%
(11)	INDICATED RATE LEVEL CHANGE (G)	9.5%

(A) See Exhibit 2
(B) See Exhibit 3
(C) Line (5) times LAE load (1.14) and IBNR load (1.003)
(D) Permissible Loss Ratio

Total Production Cost	17.6%
General Expenses	15.2%
Taxes Licenses, and Fees	3.5%
Profit & Contingencies	6.0%

(E) Credibility is based on total earned house years of 28,794
(F) (6)*(8) + [1-(8)]*(7)
(G) (9)/[(7)+(10)]-1

3) ADJUSTMENT OF EARNED PREMIUMS

(1)	EARNED PREMIUMS	Dec-84	1,270,840
		Dec-85	1,351,539
		Dec-86	1,524,297
		Dec-87	1,445,552
		Dec-88	1,249,298
(2)	PREMIUM CONVERSION FACTORS	Dec-84	1.277
		Dec-85	1.277
		Dec-86	1.245
		Dec-87	1.093
		Dec-88	1.038
(3)	ADJUSTED EARNED PREMIUMS [(1)*(2)]	Dec-84	1,622,863
		Dec-85	1,725,915
		Dec-86	1,897,750
		Dec-87	1,579,988
		Dec-88	1,296,772
(4)	CURRENT AMOUNT FACTORS (A)	Dec-84	1.109
		Dec-85	1.069
		Dec-86	1.034
		Dec-87	1.012
		Dec-88	1.000
(5)	PREMIUM PROJECTION FACTOR (B)		1.044
(6)	TRENDED ADJUSTED EARNED PREMIUM [(3)*(4)*(5)]	Dec-84	1,878,944
		Dec-85	1,926,183
		Dec-86	2,048,614
		Dec-87	1,669,302
		Dec-88	1,353,830

(A) See Exhibit 4
(B) See Exhibit 5

A) DEVELOPMENT OF LOSSES

(1)	FULL COVERAGE INCURRED LOSSES	Dec-84	1,086,488
		Dec-85	1,382,789
		Dec-86	1,198,606
		Dec-87	714,494
		Dec-88	642,011
(2)	EXCESS LOSSES (A)	Dec-84	392,413
		Dec-85	0
		Dec-86	0
		Dec-87	0
		Dec-88	0
(3)	EXCESS WIND FACTOR (B)		1.080
(4)	ADJUSTED INCURRED LOSSES [((1)-(2))*(3)]	Dec-84	749,601
		Dec-85	1,493,412
		Dec-86	1,294,494
		Dec-87	771,654
		Dec-88	693,372
(5)	CURRENT COST FACTORS (C)	Dec-84	1.120
		Dec-85	1.091
		Dec-86	1.069
		Dec-87	1.042
		Dec-88	1.013
(6)	TRENDED COST FACTOR (D)		1.054
(7)	TRENDED FULL COVERAGE LOSSES [(4)*(5)*(6)]	Dec-84	884,889
		Dec-85	1,717,296
		Dec-86	1,458,541
		Dec-87	847,482
		Dec-88	740,315
(8)	SECTION 1 CLAIM COUNT	Dec-84	646
		Dec-85	665
		Dec-86	679
		Dec-87	447
		Dec-88	403
(9)	TRENDED ADJUSTED INCURRED LOSSES [(7)-100*(8)]	Dec-84	820,289
		Dec-85	1,650,796
		Dec-86	1,390,641
		Dec-87	802,782
		Dec-88	700,015

(A) See Exhibit 9
(B) See Exhibit 8
(C) See Exhibit 6
(D) See Exhibit 7

CURRENT AMOUNT FACTORS
FORMS 1-3,5

	(1) EARNED RELATIVITIES	(2) AMOUNT FACTOR	(3) CURRENT AMOUNT FACTOR *
Dec-84	1.157	1.145	1.109
Dec-85	1.214	1.091	1.069
Dec-86	1.268	1.045	1.034
Dec-87	1.304	1.016	1.012
Dec-88	1.325	1.000	1.000

* - Includes tempering at 75%.
(2) = 1.325/(1)
(3) = 1+.75*[(2)-1]

TREND IN AVERAGE RELATIVITY

	X	Y AVERAGE RELATIVITY	2 X	XY
Dec-84	-2.0	1.157	4.00	-2.314
Dec-85	-1.0	1.214	1.00	-1.214
Dec-86	0.0	1.268	0.00	0.000
Dec-87	1.0	1.304	1.00	1.304
Dec-88	2.0	1.325	4.00	2.650
SUMS	0.0	6.268	10.000	0.426

LEAST SQUARES FIT TO Y = A + BX

A = AVERAGE(Y)
B = [N*SUM(XY)]/[N*SUM(X^2)]

A(MEAN OF FITTED LINE) =	1.254
B(AVERAGE ANNUAL INCREMENT) =	0.043
FITTED AVERAGE RELATIVITY =	1.339
LATEST ANNUAL RATE OF CHANGE =	3.2%
TEMPERED RATE OF CHANGE (75%) =	2.4%
PROJECTION PERIOD (MONTHS) =	22.0
PREMIUM PROJECTION FACTOR =	1.044

EXHIBIT 6

Homeowners Insurance

Development of Current Cost Factors
Policy Forms 1-3,5

1. U.S. Department of Labor - Bureau of Labor Statistics
Modified Consumer Price Index* (1967=100)

Calendar Year	Calendar Year Average	45% Weighting
1984	102.6	46.2
1985	105.1	47.3
1986	107.4	48.3
1987	110.8	49.9
1988	114.8	51.7

2. Boeckh Residential Construction Cost Index (1967=100)

Calendar Year	Calendar Year Average	55% Weighting
1984	105.6	58.1
1985	108.7	59.8
1986	110.6	60.8
1987	113.0	62.1
1988	115.6	63.6

3. Current Cost Index

1984	46.2 + 58.1 = 104.3
1985	47.3 + 59.8 = 107.1
1986	48.3 + 60.8 = 109.2
1987	49.9 + 62.1 = 112.0
1988	51.7 + 63.6 = 115.2

4. Current Cost Factor

1984	116.8 / 104.3 = 1.120
1985	116.8 / 107.1 = 1.091
1986	116.8 / 109.2 = 1.069
1987	116.8 / 112.0 = 1.042
1988	116.8 / 115.2 = 1.013

Average Value for the Latest Quarter = 116.8

* Includes Housing (48%), Apparel (16%), Entertainment (16%), Medical (20%).

EXHIBIT 7

Homeowners Insurance

Development of Trended Cost Factors
Policy Forms 1-3,5

Year	Quarter Ending	Time (2x)	4xx	Avg. CCI Y	LN(Y)	2X*LN(Y)
1986	March 31	-11	121	108.3	4.685	-51.538
1986	June 30	-9	81	108.8	4.689	-42.203
1986	Sept. 30	-7	49	109.5	4.696	-32.872
1986	Dec. 31	-5	25	110.1	4.701	-23.507
1987	March 31	-3	9	111.0	4.709	-14.128
1987	June 30	-1	1	111.8	4.716	-4.716
1987	Sept. 30	1	1	112.2	4.720	4.720
1987	Dec. 31	3	9	113.1	4.728	14.184
1988	March 31	5	25	113.6	4.732	23.662
1988	June 30	7	49	115.0	4.745	33.214
1988	Sept. 30	9	81	115.6	4.750	42.752
1988	Dec. 31	11	121	116.8	4.760	52.362
			572	1345.7	56.634	1.930

Exponential Curve: Y = A*EXP(KX) Slope at any Point = AK*EXP(KX)

Equations: A = EXP(SLN(Y)/N)
K = (S2X*LN(Y))/S4XX

Where A = Fitted Value at Midpoint of Period of Trend Data
K = % Change at any Point = AK*EXP(KX)/A*EXP(KX)
S = Summation
^ = Exponentiation

Solvin A = EXP(56.634/12) = 112.111
K = 1.930/286 = 0.007

Trended Cost Factor* = (1.007)^(23.5/3) = 1.054

* 23.5 Represents the number of months from the midpoint of the latest quarter of cost data to twelve months beyond the anticipated effective date of this filing.

HOMEOWNERS INSURANCE - FORMS 1, 2, 3, 5

DERIVATION OF EXCESS WIND FACTOR

YEAR	(1) H.O.WIND LOSSES	(2) H.O. TOTAL LOSSES	(3) (2)-(1) TOTAL-WIND	(4) (1)/(3) WIND / (TOTAL-WIND)	(5) (4)) 1.5M WIND / (TOTAL-WIND) EXCESS YEARS*	(6) (5)-M EXCESS WIND RATIO	(7) (6) X (3) EXCESS WIND LOSSES	(8) (2)-(7) TOTAL-EXCESS	(9) (3)/(8) NONWIND / NONEXCESS
1960	1028703	3014969	1986266	.518	.518	.261	517485	2497484	.795
1961	636310	1854567	1218257	.522	.522	.265	322760	1531807	.795
1962	734743	2827011	2092268	.351	--	--	--	2827011	.740
1963	1306885	4572674	3265789	.400	.400	.143	466348	4106326	.795
1964	2327700	5804482	3476782	.669	.669	.412	1432859	4371623	.795
1965	5397899	9929800	4531901	1.191	1.191	.934	4231495	5698305	.795
1966	2127105	6559294	4432189	.480	.480	.223	986365	5572929	.795
1967	1898337	6563588	4665251	.407	.407	.150	697612	5865976	.795
1968	1745254	7386785	5641531	.309	--	--	--	7386785	.764
1969	1528938	8086737	6557799	.233	--	--	--	8086737	.811
1970	726350	6727004	6000654	.121	--	--	--	6727004	.892
1971	3651318	10574212	6922894	.527	.527	.270	1869529	8704683	.795
1972	1868665	9946801	8078136	.231	--	--	--	9946801	.812
1973	997615	9777691	8780076	.114	--	--	--	9777691	.898
1974	2687364	13128746	10441382	.257	--	--	--	13128746	.795
1975	3621079	15570542	11949463	.303	--	--	--	15570542	.767
1976	3143411	16099371	12955960	.243	--	--	--	16099371	.805
1977	2464421	15644809	13180388	.187	--	--	--	15644809	.842
1978	3552056	17489196	13937140	.255	--	--	--	17489196	.797
1979	1410209	16098198	14687989	.096	--	--	--	16098198	.912
1980	3001653	25068605	22066952	.136	--	--	--	25068605	.880
1981	6594032	26387819	19793787	.333	--	--	--	26387819	.750
1982	3017773	22716947	19699174	.153	--	--	--	22716947	.867
1983	4306411	31055487	26749076	.161	--	--	--	31055487	.861
1984	2627417	24035867	21408450	.123	--	--	--	24035867	.891
1985	8079556	33424449	25344893	.319	--	--	--	33424449	.758
1986	6171192	33349776	27178584	.227	--	--	--	33349776	.815
TOTAL	76652396	383695427	307043031	8.868		2.656	10524453	373170974	.816

MEDIAN (4) = M = .257
AVERAGE (4) = .328

AVG. EXCESS WIND RATIO
= 2.656/27
= .098

EXCESS WIND FACTOR = 1.0 + (.098) X (.816)
= 1.080

*THE WIND TO NONWIND RATIO FOR A YEAR ALSO MUST BE AT LEAST .250 FOR THAT YEAR TO QUALIFY AS AN EXCESS YEAR.

EXHIBIT 8

DEVELOPMENT OF EXCESS LOSSES

YEAR	(1) WIND LOSSES	(2) TOTAL LOSSES	(3) NON-WIND LOSSES	(4) WIND/ NON-WIND	(5) EXCESS YEAR *	(6) EXCESS RATIO	(7) EXCESS LOSSES
Dec-84	534,320	1,086,488	552,168	0.968	0.968	0.711	392,413
Dec-85	225,608	1,382,789	1,157,181	0.195	0.000	0.000	0
Dec-86	72,702	1,198,606	1,125,904	0.065	0.000	0.000	0
Dec-87	98,446	714,494	616,048	0.160	0.000	0.000	0
Dec-88	68,482	642,011	573,529	0.119	0.000	0.000	0

* - YEAR IS CONSIDERED EXCESS IS WIND/NON-WIND RATIO IS GREATER THAN 1.5 TIMES THE MEDIAN RATIO OF 0.257 AND GREATER THAN .25. THE EXCESS RATIO IS THE WIND/NON-WIND RATIO MINUS THE MEDIAN FOR EXCESS YEARS. THE EXCESS LOSSES ARE THE EXCESS RATIO TIMES THE NON-WIND LOSSES.

(3) = (2)-(1)
(4) = (1)/(3)
(6) = (5)-MEDIAN
(7) = (6)*(3)

EXHIBIT 10

HOMEOWNERS RATE LEVEL INDICATION

STATE NAME
STATE NUMBER
FORMS 4,6

YEARS ENDING	(1) TRENDED ADJUSTED EARNED PREMIUM (A)	(2) TRENDED ADJUSTED INCURRED LOSSES (B)	(3) LOSS RATIO	(4) CALENDAR YEAR WEIGHTS
Dec-86	97,183	14,300	14.7%	0.20
Dec-87	77,608	16,078	20.7%	0.30
Dec-88	59,725	11,329	19.0%	0.50

(5)	WEIGHTED EXPERIENCE LOSS RATIO	18.6%
(6)	ADJUSTED WEIGHTED LOSS AND LOSS ADJUSTMENT RATIO (C)	21.3%
(7)	PERMISSIBLE LOSS RATIO (D)	51.2%
(8)	CREDIBILITY (E)	0.22
(9)	CREDIBILITY WEIGHTED LOSS AND LOSS ADJUSTMENT RATIO (F)	44.6%
(10)	INVESTMENT INCOME OFFSET	2.0%
(11)	INDICATED RATE LEVEL CHANGE (G)	-16.1%

(A) See Exhibit 11
(B) See Exhibit 12
(C) Line (5) times LAE load (1.14) and IBNR load (1.003)
(D) Permissible Loss Ratio

Total Production Cost	17.6%
General Expenses	21.7%
Taxes Licenses, and Fees	3.5%
Profit & Contingencies	6.0%

(E) Credibility is based on total earned house years of 1,237
(F) (6)*(8) + [1-(8)]*(7)
(G) (9)/[(7)+(10)]-1

B) ADJUSTMENT OF EARNED PREMIUMS

(1) EARNED PREMIUMS	Dec-86	66,513
	Dec-87	52,476
	Dec-88	54,017
(2) PREMIUM CONVERSION FACTORS	Dec-86	1.206
	Dec-87	1.305
	Dec-88	1.020
(3) ADJUSTED EARNED PREMIUMS [(1)*(2)]	Dec-86	80,215
	Dec-87	68,474
	Dec-88	55,097
(4) CURRENT AMOUNT FACTORS (A)	Dec-86	1.118
	Dec-87	1.046
	Dec-88	1.000
(5) PREMIUM PROJECTION FACTOR (B)		1.084
(6) TRENDED ADJUSTED EARNED PREMIUMS [(3)*(4)*(5)]	Dec-86	97,183
	Dec-87	77,608
	Dec-88	59,725

(A) See Exhibit 13
(B)See Exhibit 14

A) DEVELOPMENT OF LOSSES

(1)	FULL COVERAGE INCURRED LOSSES	Dec-86	14,656
		Dec-87	15,748
		Dec-88	11,830
(2)	CURRENT COST FACTORS (A)	Dec-86	1.077
		Dec-87	1.049
		Dec-88	1.017
(3)	TRENDED COST FACTOR (B)		1.058
(4)	TRENDED FULL COVERAGE LOSSES [(1)*(2)*(3)]	Dec-86	16,700
		Dec-87	17,478
		Dec-88	12,729
(5)	SECTION 1 CLAIM COUNT	Dec-86	24
		Dec-87	14
		Dec-88	14
(6)	TRENDED ADJUSTED INCURRED LOSSES [(4)-100*(5)]	Dec-86	14,300
		Dec-87	16,078
		Dec-88	11,329

(A) See Exhibit 15
(B) See Exhibit 16

EXHIBIT 13

CURRENT AMOUNT FACTORS
FORMS 4,6

	(1) EARNED RELATIVITIES	(2) AMOUNT FACTOR	(3) CURRENT AMOUNT FACTOR *
Dec-84	1.312	1.304	1.228
Dec-85	1.393	1.228	1.171
Dec-86	1.479	1.157	1.118
Dec-87	1.613	1.061	1.046
Dec-88	1.711	1.000	1.000

* - Includes tempering at 75%.
(2) = 1.711/(1)
(3) = 1+.75*[(2)-1]

C) TREND IN AVERAGE RELATIVITY

	X	Y AVERAGE RELATIVITY	2 X	XY
Dec-84	-2.0	1.312	4.00	-2.624
Dec-85	-1.0	1.393	1.00	-1.393
Dec-86	0.0	1.479	0.00	0.000
Dec-87	1.0	1.613	1.00	1.613
Dec-88	2.0	1.711	4.00	3.422
SUMS	0.0	7.508	10.000	1.018

LEAST SQUARES FIT TO Y = A + BX

A = AVERAGE(Y)
B = [N*SUM(XY)]/[N*SUM(X^2)]

A(MEAN OF FITTED LINE) =	1.502
B(AVERAGE ANNUAL INCREMENT) =	0.102
FITTED AVERAGE RELATIVITY =	1.705
LATEST ANNUAL RATE OF CHANGE =	6.0%
TEMPERED RATE OF CHANGE (75%) =	4.5%
PROJECTION PERIOD (MONTHS) =	22.0
PREMIUM PROJECTION FACTOR =	1.084

EXHIBIT 15

Homeowners Insurance

Development of Current Cost Factors
Policy Forms 4,6

1. U.S. Department of Labor - Bureau of Labor Statistics
Modified Consumer Price Index* (1982-84=100)

Calendar Year	Calendar Year Average
1984	102.1
1985	104.0
1986	105.6
1987	108.4
1988	111.8

2. Current Cost Factor

1984	113.7 / 102.1	= 1.114
1985	113.7 / 104.0	= 1.093
1986	113.7 / 105.6	= 1.077
1987	113.7 / 108.4	= 1.049
1988	113.7 / 111.8	= 1.017

Average Value for the Latest Quarter = 113.7

* Includes Housing (54%), Apparel (18%), Entertainment (18%), Medical (10%).

EXHIBIT 16

Homeowners Insurance

Development of Trended Cost Factors
Policy Forms 4,6

Year	Quarter Ending	Time (2x)	4xx	Avg. CCI Y	LN(Y)	2X*LN(Y)
1986	March 31	-11	121	104.7	4.651	-51.161
1986	June 30	-9	81	105.1	4.655	-41.898
1986	Sept. 30	-7	49	105.8	4.662	-32.631
1986	Dec. 31	-5	25	106.7	4.670	-23.350
1987	March 31	-3	9	107.1	4.674	-14.022
1987	June 30	-1	1	108.4	4.685	-4.685
1987	Sept. 30	1	1	108.6	4.687	4.687
1987	Dec. 31	3	9	109.7	4.697	14.092
1988	March 31	5	25	109.8	4.699	23.494
1988	June 30	7	49	111.7	4.716	33.009
1988	Sept. 30	9	81	112.0	4.719	42.468
1988	Dec. 31	11	121	113.7	4.734	52.069
			572	1303.2	56.249	2.072

Exponential Curve: $Y = A*EXP(KX)$ Slope at any Point = $AK*EXP(KX)$

Equations: $A = EXP(SLN(Y)/N)$
$K = (S2X*LN(Y))/S4XX$

Where
A = Fitted Value at Midpoint of Period of Trend Data
K = % Change at any Point = $AK*EXP(KX)/A*EXP(KX)$
S = Summation
^ = Exponentiation

Solvin
$A = EXP(56.249/12) = 108.569$
$K = 2.072/286 = 0.007$

Trended Cost Factor* = $(1.007)^{(23.5/3)}$ = 1.058

* 23.5 Represents the number of months from the midpoint of the latest quarter of cost data to twelve months beyond the anticipated effective date of this filing.

HOMEOWNERS TERRITORIAL EXPERIENCE - POLICY FORMS 1,2,3 & 5

CALENDAR YEARS 1985 - 1989

(1) ZONE	(2) ADJUSTED EARNED PREMIUM	(3) ADJUSTED LOSS RATIO	(4) LOSS RATIO INDEX (A)	(5) CREDI-BILITY WEIGHT (B)	(6) FORMULA INDEX (C)	(7) 1989 WRITTEN PREMIUM	(8) ZONE INDICATION (D)	(9) ZONE IND INCL SW CHANGE	(12) CAP ZONE INDICATION (E)
3	18,287	22.3	0.375	0.04	0.976	1,849	-3.2%	6.0%	5.2%
21	922,246	57.9	0.975	0.30	0.992	134,651	-1.6%	7.7%	7.0%
22	3,983,294	63.2	1.063	0.58	1.037	511,481	2.8%	12.5%	11.7%
23	847,039	73.1	1.230	0.31	1.071	152,153	6.2%	16.2%	13.7%
24	873,727	32.4	0.546	0.28	0.872	125,026	-13.6%	-5.4%	3.8%
30	35,272	10.5	0.177	0.06	0.951	6,387	-5.7%	3.2%	3.8%
31	315,892	41.0	0.690	0.16	0.952	52,760	-5.6%	3.3%	3.8%
32	542,272	53.4	0.900	0.25	0.975	116,647	-3.3%	5.9%	5.1%
33	34,539	16.6	0.280	0.06	0.959	5,861	-4.9%	4.1%	3.8%
34	332,116	93.5	1.573	0.17	1.095	37,594	8.6%	18.9%	13.7%
SW	7,904,684	59.4	1.000		1.009	1,144,409	0.0%	9.5%	9.5%

NOTE: (A) Column (3) Loss Ratio Indices divided by Total (3) Loss Ratio

(B) Credibility is based on Standard Homeowners Credibility Formula as published in proceeding of the Casualty Actuarial Society, Volume LXI, page 30

(C) (Column (4) * Column (5)) + (1 - Column (5))

(D) ((Column (6) / Total Column (6)) - 1) * 100

(E) Capped Indication is +/-5.0% around Statewide Change of 9.5%.

EXHIBIT 18

HOMEOWNERS TERRITORIAL EXPERIENCE - POLICY FORMS 1,2,3 & 5

CALENDAR YEARS 1985 - 1989

(1) ZONE	(2) ADJUSTED EARNED PREMIUM	(3) ADJUSTED LOSS RATIO	(4) LOSS RATIO INDEX (A)	(5) CREDI-BILITY WEIGHT (B)	(6) COMPANY RELATIVITY	(7) COMPETITOR AVERAGE RELATIVITY	(8) FORMULA INDEX (C)	(9) 1989 WRITTEN PREMIUM	(10) ZONE INDICATION (D)	(11) ZONE IND INCL SW CHANGE	(12) CAP ZONE INDICATION (E)
3	18,287	22.3	0.375	0.04	1.24	0.98	0.778	1,849	-23.2%	-15.9%	3.8%
21	922,246	57.9	0.975	0.30	0.97	0.97	0.991	134,651	-2.2%	7.1%	6.4%
22	3,983,294	63.2	1.063	0.58	1.09	1.07	1.030	511,481	1.7%	11.3%	10.6%
23	847,039	73.1	1.230	0.31	0.90	0.93	1.091	152,153	7.8%	18.0%	13.7%
24	873,727	32.4	0.546	0.28	0.93	0.91	0.859	125,026	-15.2%	-7.1%	3.8%
30	35,272	10.5	0.177	0.06	0.92	0.91	0.944	6,387	-6.8%	2.1%	3.8%
31	315,892	41.0	0.690	0.16	1.16	1.10	0.910	52,760	-10.2%	-1.6%	3.8%
32	542,272	53.4	0.900	0.25	0.81	0.95	1.101	116,647	8.7%	19.1%	13.7%
33	34,539	16.6	0.280	0.06	0.91	0.93	0.985	5,861	-2.7%	6.5%	5.8%
34	332,116	93.5	1.573	0.17	1.13	0.93	0.951	37,594	-6.1%	2.9%	3.8%
SW	7,904,684	59.4	1.000		1.00	1.00	1.013	1,144,409	0.0%	9.5%	9.5%

NOTE: (A) Column (3) Loss Ratio Indices divided by Total (3) Loss Ratio

(B) Credibility is based on Standard Homeowners Credibility Formula as published in proceeding of the Casualty Actuarial Society, Volume LXI, page 30

(C) ((Column (4) * Column (5) * Column (6)) + (1 - Column (5)) * Column (7))/Column (6)

(D) ((Column (8) / Total Column (8)) - 1) * 100

(E) Capped Indication is +/-5.0% around Statewide Change of 9.5%.

HOMEOWNERS - FORMS 1-3,5
AMOUNT OF INSURANCE RELATIVITY CURVE

Exhibit 19

Amount of Insurance	Raw Frequency	Raw Severity	Fitted Frequency	Fitted Severity	Frequency Relativity	Severity Relativity	Loss Cost Relativity	Fixed Expense	Curve With Expense Load	Adjusted Curve
10,000	0.00	0	11.36	1551	0.841	0.798	0.671	6.4%	0.735	0.691
15,000	0.00	424	11.57	1590	0.857	0.818	0.701	6.4%	0.765	0.719
20,000	6.85	671	11.79	1630	0.872	0.838	0.732	6.4%	0.796	0.748
25,000	12.87	3656	12.00	1669	0.888	0.859	0.763	6.4%	0.827	0.777
30,000	5.67	1218	12.22	1708	0.904	0.879	0.795	6.4%	0.859	0.807
35,000	8.33	1357	12.43	1747	0.920	0.899	0.827	6.4%	0.891	0.838
40,000	12.27	1865	12.65	1787	0.936	0.919	0.861	6.4%	0.925	0.869
45,000	10.37	2117	12.86	1826	0.952	0.939	0.894	6.4%	0.958	0.901
50,000	12.02	2168	13.08	1865	0.968	0.960	0.929	6.4%	0.993	0.933
55,000	14.13	1461	13.29	1904	0.984	0.980	0.964	6.4%	1.028	0.966
60,000	14.54	2127	13.51	1944	1.000	1.000	1.000	6.4%	1.064	1.000
65,000	17.28	1459	13.72	1983	1.016	1.020	1.036	6.4%	1.100	1.034
70,000	14.50	2225	13.94	2022	1.032	1.040	1.074	6.4%	1.138	1.069
75,000	15.27	2039	14.16	2061	1.048	1.061	1.111	6.4%	1.175	1.105
80,000	16.71	1434	14.37	2101	1.064	1.081	1.150	6.4%	1.214	1.141
85,000	17.87	1175	14.59	2140	1.080	1.101	1.189	6.4%	1.253	1.177
90,000	14.71	1617	14.80	2179	1.096	1.121	1.228	6.4%	1.292	1.215
95,000	16.75	1648	15.02	2218	1.112	1.141	1.269	6.4%	1.333	1.253
106,000	16.41	2464	15.49	2305	1.147	1.186	1.360	6.4%	1.424	1.338
125,000	20.16	3090	16.31	2454	1.207	1.263	1.524	6.4%	1.588	1.493
150,000	19.21	2327	17.39	2650	1.287	1.363	1.755	6.4%	1.819	1.709
175,000	14.08	2544	18.46	2846	1.367	1.464	2.001	6.4%	2.065	1.941
200,000	19.76	6223	19.54	3043	1.446	1.565	2.264	6.4%	2.328	2.188
232,000	17.83	1532	20.92	3294	1.548	1.695	2.624	6.4%	2.688	2.526
350,000	16.72	4052	26.00	4220	1.924	2.171	4.179	6.4%	4.243	3.987

HOMEOWNERS - FORMS 1-3,5 Exhibit 20
AMOUNT OF INSURANCE RELATIVITY CURVE

AMOUNT OF INSURANCE	WRITTEN PREMIUM PERCENTAGE	HOUSE YEARS PERCENTAGE	PRESENT CURVE	PROPOSED CURVE	CURVE CHANGE (PROP/PRES)	OFF BALANCED CHANGE
10,000	0.0%	0.0%	0.600	0.691	15.2%	31.2%
15,000	0.0%	0.0%	0.640	0.719	12.3%	28.0%
20,000	0.2%	0.2%	0.680	0.748	10.0%	25.3%
25,000	0.3%	0.5%	0.710	0.777	9.4%	24.7%
30,000	0.9%	1.0%	0.748	0.807	7.9%	22.9%
35,000	1.8%	2.1%	0.785	0.838	6.8%	21.6%
40,000	2.2%	2.4%	0.818	0.869	6.2%	21.0%
45,000	3.5%	4.2%	0.850	0.901	6.0%	20.8%
50,000	4.2%	5.0%	0.880	0.933	6.0%	20.8%
55,000	6.9%	8.3%	0.960	0.966	0.6%	14.6%
60,000	6.4%	8.3%	1.000	1.000	0.0%	13.9%
65,000	6.3%	7.9%	1.058	1.034	-2.3%	11.3%
70,000	8.2%	10.2%	1.114	1.069	-4.0%	9.3%
75,000	6.4%	7.4%	1.195	1.105	-7.5%	5.3%
80,000	7.5%	8.2%	1.255	1.141	-9.1%	3.6%
85,000	7.4%	7.4%	1.340	1.177	-12.2%	0.1%
90,000	4.6%	4.7%	1.420	1.215	-14.4%	-2.5%
95,000	5.4%	5.0%	1.545	1.253	-18.9%	-7.6%
106,000	8.7%	7.0%	1.805	1.338	-25.9%	-15.5%
125,000	6.6%	4.6%	2.225	1.493	-32.9%	-23.6%
150,000	3.6%	2.1%	2.780	1.709	-38.5%	-30.0%
175,000	2.3%	1.1%	3.238	1.941	-40.1%	-31.7%
200,000	1.7%	0.8%	3.647	2.188	-40.0%	-31.6%
232,000	1.8%	0.7%	4.170	2.526	-39.4%	-31.0%
350,000	3.2%	1.0%	5.283	3.987	-24.5%	-14.0%
	1,148,000	4,234			0.878	

Exhibit 21

UNITIES - FORMS 1-3,5

Territory	(1) Current Unity	(2) Rate Change	(3) Curve Off-Balance	(4) Protection Class Off-Balance	(5) Proposed Unity
3	210	3.8%	0.878	1.009	246
21	164	6.4%	0.878	1.009	197
22	184	10.6%	0.878	1.009	230
23	153	13.7%	0.878	1.009	196
24	158	3.8%	0.878	1.009	185
30	156	3.8%	0.878	1.009	183
31	197	3.8%	0.878	1.009	231
32	137	13.7%	0.878	1.009	176
33	154	5.8%	0.878	1.009	184
34	190	3.8%	0.878	1.009	223

Notes: (5) = [(1)*(2)]/[(3)*(4)]

Exhibit 22

FORMS 1-3,5 PROTECTION CLASS REVISIONS
****

PROTECTION CLASS	WRITTEN PREMIUM	PRESENT FACTOR	PROPOSED FACTOR	RATE CHANGE
8	137,482	1.35	1.45	7.4%
All Other	1,006,927	N/A	N/A	0.0%
TOTAL	1,144,409			0.9%

EXPENSE EXHIBIT

HOMEOWNERS

POLICY FORM EXPENSE CALCULATION

	1986	1987	1988	AVERAGE
NET PREMIUMS WRITTEN	238,056,000	235,061,000	225,900,913	
OTHER ACQ & GEN'L EXP	32,767,000	32,984,000	30,169,000	
WRITTEN PREMIUMS	241,144,759	229,450,619	205,485,000	
FORMS 1-3,5	224,697,657	213,903,308	191,121,000	
FORMS 4,6	16,447,102	15,547,311	14,364,000	
WRITTEN HOUSE YRS	693,224	628,849	556,900	
FORMS 1-3,5	604,770	548,870	483,027	
FORMS 4,6	88,454	79,979	73,873	
AVERAGE PREMIUM	347.86	364.87	368.98	
FORMS 1-3,5	371.54	389.72	395.67	
FORMS 4,6	185.94	194.39	194.44	
SCALED OTHER ACQ & GEN'L	33,192,149	32,196,746	27,442,461	
FIXED EXPENSES (50%)	16,596,075	16,098,373	13,721,230	
FIXED EXP PER POLICY	23.94	25.60	24.64	
FORMS 1-3,5	23.94	25.60	24.64	
FORMS 4,6	23.94	25.60	24.64	
FIXED EXP / AVG PREM	6.9%	7.0%	6.7%	
FORMS 1-3,5	6.4%	6.6%	6.2%	
FORMS 4,6	12.9%	13.2%	12.7%	
VARIABLE EXP	16,596,075	16,098,373	13,721,230	
VARIABLE EXP / AVG PREM	6.9%	7.0%	6.7%	
FORMS 1-3,5	6.9%	7.0%	6.7%	
FORMS 4,6	6.9%	7.0%	6.7%	
OTHER ACQ & GEN'L EXP	13.8%	14.0%	13.4%	13.7%
FORMS 1-3,5	13.3%	13.6%	12.9%	13.3%
FORMS 4,6	19.8%	20.2%	19.3%	19.8%