HOMEOWNERS INSURANCE RATEMAKING

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INTRODUCTION

The approach taken in this paper is a little different from some other ratemaking papers in that no specific historical development was attempted. The only historical background felt to be needed was the "invention" of the homeowners policy in the 1950's and the introduction of a more detailed statistical plan in the 1960's. Because the homeowners policy is not much beyond its infancy, or at most adolescence, it is not surprising to find changes in ratemaking techniques occurring more frequently for this line of insurance. These changes are generally inspired by new insights into the nature of the coverage or by greater awareness of the statistical plan capabilities.

Because of these inevitable changes in techniques, and since ratemaking papers in the CAS *Proceedings* are not updated annually, the procedures described in this paper may not be "current" for very long. However, they can provide insight for other lines of insurance with similar problems, in addition to bringing the record up-to-date at least as of 1974. The main purpose, therefore, was to deal with some of the important concepts in Homeowners ratemaking and to illustrate some appropriate procedures consistent with basic ratemaking principles and made possible by the available statistical data.

The contents are not sufficient for a complete "Cookbook", and in order to keep the length of the paper manageable, presume a basic knowledge of policy forms, coverages, and statistical plans. The scope of the paper consists of:

1) General ratemaking perspective;

2) Statewide ratemaking for the basic policy forms (HO-1, 2, 3 & 5);

3) Territory ratemaking for the same forms;

4) Tenants Form (HO-4) ratemaking;

5) Summary and conclusions;

6) Appendices including some classification treatment of Policy Form and Amount of Insurance, as well as more detailed developments not appropriate for the body of the paper.

In addition to describing the procedures within each topic, some justification and perspective will also be given, along with any alternative methods that come to mind. Although the procedures are basically taken from a rating bureau standpoint (i.e. Insurance Services Office), some application can be made to individual company ratemaking.

SOME PERSPECTIVES ON RATEMAKING

Since one of the most difficult elements of the "scientific method" is the proof or verification of the hypothesis involved, perhaps insurance ratemaking should be viewed as more of an art than a science because no one can scientifically guarantee the future.With this in mind, insurance ratemaking could be defined as the art of projecting scientifically measured past experience into valid (but not absolutely certain) conclusions about future insurance experience.

Usually one of three situations or stages confronts the ratemaker in his attempt to project the future for a line of insurance. The first occurs when no data is available, or essentially when a new product is being formed; the next stage occurs when experience exists, with no expected changes in the nature of the product; and lastly when experience exists but modifications in coverage are expected to take place. Given the basic tenet in the art of ratemaking that "history will repeat itself", Stage Two is obviously the easiest environment in which to make rates.

Stage One No Data

Stage One is a most difficult time for ratemakers, especially when a product like Homeowners insurance comes along, with the packaging of many heretofore separate coverages on a mandatory basis into one policy. It may have been true that the contractual coverages looked similar to the monoline policies for fire, windstorm, theft, other physical damage, and personal liability; but no one could predict with accuracy the behavior of insureds with all those coverages together. Not only was "adverse selection" eliminated by mandating all these coverages, but amounts of insurance were also preordained for contents (both on and away from premises) once the value of insurance on the dwelling building was determined. This eliminated or reduced substantially the problems of underinsurance.

The result of all this was a policy form with lower pure premiums (loss cost per unit of exposure) for each of the coverages involved than on a monoline level where insureds may select only those coverages they think are neces-

sary, choosing to self-insure those hazards with much lower expected losses. The spread of loss achieved from this packaging of coverages on a mandatory basis gives the policyholder more coverage at a much lower total pure premium than obtained from buying the monoline policies separately, plus the advantage of the expense savings in a package policy. In this regard, no more successful package policy has existed before, nor is likely to be devised again, because of the nature of the hazards covered and the type of market involved.

The ratemaking for this first phase necessarily contains a lot of judgment, with the selection of package discounts from the monoline policy costs being based more on theory and hope than on empirical data. The rapid development of actual experience under the new product depends, of course, on its success in the marketplace. Ideally, the use of actual experience rapidly substitutes for the initial estimates based on theory and judgment.

Stage Two—Actual Experience

For Homeowners insurance, Stage Two built up rapidly with not too many of the transitional problems of having both monoline and package policies marketed simultaneously to the same types of customers. Consequently, the actual experience collected under Homeowners insurance could be used directly and more quickly in appropriate projections of the future experience for purchasers of this coverage.

Of course, ratemaking is not as simple as "history repeating itself". Even for a line of insurance remaining fairly stable as regards type of coverage, there is more to predicting the future than knowing precisely what happened in the past.

Certain modifications are needed to put past experience on current conditions. Premium levels may have changed such that today's manual rates are different from those in effect during the past experience period. Loss patterns may be changing such that a past year's value is but one observation in a changing sequence of pure premiums due to inflation, increased affluence, varying accident frequencies, and changes in claim consciousness. Furthermore, the observed experience in the past may have been a non-typical value owing to random fluctuations inherent in the data or to unusual events with a cyclical frequency extending beyond one or even ten years in cycle.

These phenomena, of current level adjustments, trend, credibility, and catastrophe, are present to some extent in every line of insurance and will be discussed in more detail in the procedures for Homeowners insurance ratemaking.

Stage Three—Changes in Coverages

Marked changes in coverage or conditions cause additional difficulties for the ratemaker since past experience must be supplemented by additional judgment.Homeowners insurance has been, and still is, in this third stage of ratemaking because of changes in deductibles over the past few years. The upheaval in coverage may not be as large when compared to No-Fault implementation in automobile insurance, but new insights are just as necessary in trying to project the most appropriate rates.

At this point it might be well to consider the differences between the "loss ratio" and the "pure premium" methods of ratemaking. The "loss ratio" method is a simpler approach and relies greatly on the actual premiums charged to insureds in the past. Class or territory detail need not be maintained to ascertain a statewide rate level change. As long as class, territory, and coverage relationships have stayed relatively constant, overall losses compared to overall premiums (adjusted to current conditions) are sufficient to decide how much to change current overall premiums to provide for future losses and expenses. In the simplest case, statewide earned premiums and statewide incurred losses can be adjusted to current levels. The resulting loss ratio when compared to an expected loss ratio yields the indicated statewide rate level change.This overall statewide rate level change is then applied to each class, territory and coverage manual premium to arrive at enough overall dollars in the future, keeping the same relationships among class, territory, and coverage.

However, what if there have been two optional coverages available, one of which was inadequately priced (e.g. a 50 deductible option), while the other was more properly rated (e.g. full coverage)? If the volume of premiums has also been switching from the full coverage to the 50 deductible option, then the loss ratio method using total statewide premium and losses would, in this example, show less of a rate level need than is appropriate.[1]

Example:

	Experience Pure Premium	Pure Premium (Avg. Rate × Expected Loss Ratio)	Number of Exposures
Full Coverage	\$ 110	\$ 120	100,000
\$50 Deductible	100	80	100,000
Average	\$ 105	\$ 100	200,000

Indicated Rate Level Change (Loss Ratio Method) $= \frac{\$105 \times 200{,}000}{\$100 \times 200{,}000} = \frac{\$21{,}000{,}000}{\$20{,}000{,}000} = +5\%$

However, if current distribution is 100% in \$50 Deductible,

True Indicated Rate Level Change $= \frac{\$100}{\$\ 80} = +25\%$.

The "pure premium" approach, on the other hand, would have the ability to identify the average loss per policy for each of the two coverages separately. It has the advantage of being independent of the actual premiums that were charged in the past and of the relative adequacy by class, territory or coverage. Taking the set of exposures in the past that produced the experience pure premiums, the current manual rates can be used to hypothetically re-rate those exposures as a test of the adequacy of today's rates. In addition, if only one coverage is being offered now, then the exposures can be extended at that particular set of rates, and the pure premiums can be modified accordingly.

Expressed more simply, the "pure premium" method is more concerned with rating a particular coverage properly, regardless of what the average insured may have paid or is paying today. After the coverage is rated, then an effort is made to see what the change is for the average insured to arrive at the new rate. On the other hand, the "loss ratio" method first determines an indicated change in rates. The difficulty with that method is then to find out whether some of the change has already been accomplished by recent switches in coverage or class.

STATEWIDE RATE LEVEL FOR BASIC HOMEOWNERS POLICY FORMS

Lest this paper dwell too long in a theoretical vein, it would be worthwhile to look at an example of a statewide rate level review. However, so that a concrete illustration won't bore the reader with simplicity, a further complication is introduced into the theory. Let us say that two optional coverages have existed in a state for some time: full coverage and a $50 disappearing deductible[2] on Section I (non-Liability) perils, with only the deductible premiums now being displayed in the manual. Suppose the intention is to withdraw those two options and only offer a third coverage in the future—namely, a $100 flat deductible on Section I perils. The idea is to test the adequacy of the current manual premiums (although they are for $50 deductible coverage) as being possibly appropriate for the new $100 deductible coverage. In case any changes are indicated, the resulting change in premiums might be a convenient way of calculating the new rate for the new coverage, but it would be insufficient to describe the entire transaction. The true rate level change would be the combination of the premium level change to the

[2] $50 deductible "disappears" at $500 via formula: Deductible amount equals $50 less 11% of loss amount above $50 up to $500.

present mix of deductible options and the change in coverage from the present options to a $100 Flat deductible.

Adjusted Premiums

For many lines of insurance, the traditional way of adjusting premiums for ratemaking purposes was to start with the actual written premiums. In addition to being earned into a particular calendar period, they would also be adjusted to current level by means of "on-level" factor based upon price changes since the policies were originally written. This usually entails making assumptions as to when the policies were actually written (with the average policy customarily assumed to be written July 1, for example). Of course, any varying changes by class, territory, or coverage would compound the assumptions or calculations necessary to convert past premiums to current levels.

With the advent of computers, data bases, and more sophisticated statistical plans, however, many of those assumptions need not be made in arriving at premiums adjusted to current level. The existence of exposures in class and territory detail, for example, permits the calculation of premiums at present manual rates by extending each set of exposures by class and territory by the appropriate present manual rates. By accumulating the results over all classes and territories, a statewide total of adjusted premiums is produced without ever having to deal with past collected premiums and making assumptions on subsequent changes.Furthermore, a much better estimate is also produced for each subset of statewide totals, such as by territory or by class, for purposes of reviewing relative adequacy of the rates for those subsets. This method is also superior when experience for many insurance companies is pooled, because of the possibility of non-uniformity by company of both past rate levels and effective dates of changes in rate levels.

For Homeowners insurance, this method of extending exposures has the further advantage of being able to hypothetically re-rate all insureds at one particular coverage, regardless of what they had originally purchased. For example, if a mixture of full coverage and $50 disappearing deductible policies had been sold in the past, enough information is retained on the statistical record to extend all those policies at the current manual rates for the $50 deductible. The important concept is that adjusted premiums can represent a past set of insureds evaluated at a particular set of current rates for a specified coverage. Inherently, this exposure extension technique is a "pure premium" method rather than a "loss ratio" method of ratemaking.

The example given below illustrates the major steps involved in the com-

puter calculation of adjusted premiums from full class and territory detail. The computer scans the records sorted by state, territory, policy form, construction, protection, and amount of insurance. Written exposures in house years are then earned into calendar segments ("earned quarters") by means of term and inception month. The earned exposures in house-years for a calendar year or fiscal year (consisting of the sum of four appropriate earned quarters) are then multiplied by the corresponding annual premium for a particular coverage (usually the broadest deductible displayed in the manual). The manual premium depends upon the territory, policy form, construction and protection class, as well as the amount of insurance.

COMPUTER DEVELOPMENT OF ADJUSTED PREMIUM

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Detail	Class	Code	Earned Number of House Years	Unity ($15,000) Premium For Broadest Deductible	Policy Size Relativity Factor	Total Adjusted Premium (4) × (5) × (6)
State:	xx	xx				
Territory:	yy	yy				
Policy Form:	Form 1	1				
Construction:	Brick	3				
Protection:	3	3				
Amt. of Insurance:						
	:					
	$10,000	10	25.0	$49	.86	$1,053.50
	:					
	$12,000	12	6.0	$49	.90	264.60
	:					
	$15,000	15	45.0	$49	1.00	2,205.00
	:					

Additional factors[3] are then applied in appropriate detail to account for increased limits of liability, and additional endorsements such as credit card,

[3] Statistical Plan changes effective January 1, 1974 will facilitate the calculation of basic coverage losses and therefore the elimination or modification of these additional factors. For example, watercraft, snowmobile, and secondary dwellings will be identified on separate reporting records. A new "Type of Loss" code will also permit the subtraction of excess coverage losses from the total in order to more accurately price the "basic" Homeowners coverages found in every policy.

snowmobile, watercraft, etc. The result of all these detail calculations are summarized on a statewide basis and appear in Column (1) of the Statewide Rate Level Exhibit as "Adjusted Premiums". In Exhibit 1 the current broadest deductible used as the input premium was assumed to be a $50 disappearing deductible on Section I perils. Consequently, the initial evaluation will be to test those premiums for adequacy in providing $100 Flat deductible coverage in the future.

Adjusted Losses

The base from which adjustments are made consists of accident year incurred losses[4] as reported in class detail. This means that as of a particular evaluation date, e.g. March 31, 1973, accident year 1972 incurred losses are defined as all losses on accidents occurring during calendar year 1972 which were paid as of March 31, 1973, or which were unpaid as of then but which had loss reserves set up and reported as of March 31, 1973. Loss development factors are obviously needed, as incurred-but-not-reported (IBNR) claims may exist three months after the end of the year, for which no payments have been made nor reserves set up. In addition, the reserves as of March 31, 1973 are likely to be imprecise (generally to the same extent as 15 month reserves have been in the past) when payments are ultimately traced out.

Loss development factors for Homeowners insurance can be calculated in similar fashion as automobile liability insurance. Generally, for an accident year valued as of 15 months, they average less than 1.03 on a countrywide basis, but can vary by state, depending upon the percentage of liability losses. (See Appendix B.)

If changes in deductible are contemplated, as is the case in Exhibit 1, then adjustments should be made to convert the past losses to the new deductible level. In this particular state, the conversion is principally from a $50 disappearing deductible to a $100 flat deductible. However, since full coverage had been offered in the past, the losses under those policies must also be converted to a $100 deductible level.

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[4] Calendar year incurred losses can also be used, consisting of calendar year paid losses plus the increase in reserves over the calendar year period. If reserves in class detail are used in this calculation, a factor for the change in IBNR reserves (not included in class detail reserves) should be applied to the total, since only the paid IBNR losses are in the total paid losses. See Charles F. Cook, "Trend and Loss Development Factors", *PCAS*, Vol. LVII (1970) p. 15.

The method of conversion is through loss elimination ratios (LER's). Since the effect of a deductible will vary according to the distribution by size of loss, LER's should be calculated for each subset of losses which are likely to have a different size of loss distribution. Fire losses tend to have a much higher average size of claim than theft losses. (It is more difficult to imagine a total loss by theft than by fire.) Different policy forms are also likely to produce different average sizes of loss.

LER's are currently developed by cause of loss by policy form. (See Appendix A for method of calculation.) For credibility purposes, country-wide distributions by size of claim are usually utilized separately for each cause of loss and policy form. Once established, these LER's can be applied to a particular state's own loss distributions, including territory and class. The result of applying LER's in full class detail with summarization back to a statewide level is shown in Column (2) of Exhibit 1, as "Losses Adjusted to $100 Flat Deductible."

Catastrophe Losses

From a statistical plan standpoint, a "serialized loss" is defined as any loss arising from an event designated with a Catastrophe Serial Number. A Catastrophe Serial Number is currently assigned shortly after an event by the Statistical Agent (ISO) if all insured property losses from that event are expected to exceed one million dollars for all lines of insurance in all states. Generally, Catastrophe Serial Numbers arise from hurricanes and large tornadoes, and possibly explosions or large area fire conflagrations. For Homeowners insurance currently, "catastrophe losses" are defined to be the sum of all "serialized losses" in a state for each year.

Conceptually, a catastrophe loss is one which ought not be assigned exclusively to the year it occurred because of its unusually large size and infrequent nature. Large hurricanes do not occur every year, and to penalize insureds with a huge rate level increase the year after such an occurrence is to ignore a fundamental precept that ratemaking is not intended to recoup past losses but rather to predict future experience. By the same token, if no hurricanes or other catastrophes have occurred during the experience period under review (now five years for Homeowners insurance[5]), it would also be a

[5] Some states require consideration of "at least five years" experience in reviewing property insurance rate levels. It remains to be seen whether a long-term catastrophe experience period would be sufficient to satisfy the intent of these regulations. This would enable the basic (non-catastrophe element) experience period to be shortened further to three or even two years of premium and loss experience, provided enough volume existed on a statewide basis for credibility purposes. A two or three year experience period might also require the "normalization" of other fluctuating (though not catastrophe) perils by means of some averaging process.

mistake to assume that the potential for catastrophe has vanished.

Therefore, an averaging process is utilized whereby the actual incurred losses from catastrophic events during the experience period are removed and substituted by the expected value of such losses based upon a long range view of at least twenty years of experience for that state. Appendix C discusses a procedure utilizing catastrophe losses from both Homeowners insurance and Dwelling Extended Coverage policies which preceded the Homeowners Program. Essentially, a two-step procedure is involved, with the use of Dwelling EC and Homeowners catastrophe losses to obtain the ratio of catastrophe losses to non-catastrophe windstorm losses. This ratio is then applied to non-catastrophe windstorm Homeowners insurance losses and compared to all non-catastrophe Homeowners losses. This factor (supplemented by a Civil Disorder loading, if necessary) is then applied to the adjusted losses excluding catastrophes for each year in the experience period to arrive at a more normalized set of losses in Column (5) of Exhibit 1.

An alternative approach that is used in other lines of insurance is to keep some of the catastrophe losses in the year they occurred and remove only the excess portion over some specific cap[6]. This implies that perhaps the frequency of event was not so unusual as the severity of loss. A case could be made for either approach, and admittedly either one would show a certain distortion if adjusted loss ratios were used to attempt a loss ratio trending procedure. (Leaving in losses below the cap still shows a high "normal" loss ratio for the year, while removing all losses from the catastrophic event, would depress the "normal" loss ratio.)

A future possibility for Homeowners insurance might be the elimination of serialized numbers entirely, and the identification of unusual events by means of the distortion in cause of loss distributions on an annual, quarterly, or accident month basis. Of course, some flexibility in such a method may be necessary when applying the criteria to individual company experience versus bureau experience.

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[6] For example, automobile bodily injury liability insurance excludes excess losses above $10,000/$20,000 from basic statewide rate level experience, while both Commercial and Dwelling Extended Coverage ratemaking procedures keep an amount in losses up to 100% of the earned premium in the year of occurrence.

Loss Adjustment Expenses

Countrywide expenses as reported in the Insurance Expense Exhibit by company are broken into various functions: General Expense, Acquisition, Taxes, and Loss Adjustment Expenses. While the first three vary more with total premium volume, loss adjustment expenses are more logically a function of losses. Therefore, for Homeowners insurance, the ratio of loss adjustment expenses incurred to pure losses incurred obtained from the Insurance Expense Exhibit can be applied to the accident year incurred losses on a statewide basis to produce losses including Loss Adjustment Expense as shown in Column (6) of Exhibit 1. It currently takes about eleven cents to settle each dollar of a Homeowners claim for the average company.

Trend Factors

Observation of past experience may give the appearance of static conditions, while in fact certain dynamics are at work which influence both the size and frequency of claims. Inflation is perhaps the best known of these influences, and certainly any prediction of future loss experience should include some measurement of past and expected future changes in claim costs due to the increased cost of goods and services which are covered under the policy provisions.

Claim frequencies (within deductible options) can also be changing in Homeowners insurance due to increases in affluence, rising crime rates, and changes in claims consciousness.

Increases in coverage can also be anticipated as inflation causes a rise in the value of residences. Under current procedures, a price exists in the manuals for increased amounts of insurance which reflects both increased coverage and classification differences between houses of different values, (i.e. due to higher affluence, greater theft risk, etc.). The extent to which the classification difference exceeds the coverage difference at higher amounts of insurance represents a potential offset for expected rises in either claim cost or claim frequency.

For Homeowners insurance a simple trend factor can be utilized to track essentially the inflation element in claim costs. As illustrated in Appendix D, a combination of external indices can be used to develop a Composite Construction Cost Index by calendar year and quarter. It is a simple matter then to adjust a past year's losses to current conditions via "known" changes in these costs, and furthermore to project future changes based upon the latest rates of change. "Current Cost Factors" and "Trend Factors" represent the respective adjustments of past values to the date of the latest published gov-

ernment figures and the adjustment from that point to the average date of occurrence of losses payable under policies written after the proposed effective date of the new rates. (The average occurrence date would thus be one year past the effective date, assuming annual policies written over a period of one year.)

When exposure and loss information is available in Homeowners insurance for a sufficient period of time, it is in order to test whether the other elements of change should be quantified and brought into use. Increasing affluence can cause claim costs to rise faster than inflation, as well as affecting frequency and amounts of insurance. Because of changes in deductibles for Homeowners in the past few years, statewide observed claim frequency may not be used by itself. Pure premiums also have this disadvantage unless loss elimination ratios (LER's) are used to put the experience on a common deductible level. Even with this, random cause of loss fluctuations can mask a true pattern of changes by state. Nevertheless, some combination of statewide and countrywide pure premium by cause of loss offers perhaps the best chance to test the continued propriety of using government indices as trend factors.

In recent years, both inflation and increasing demand for personal residences has accelerated the cost of houses and the need for increased amounts of insurance to protect the owners. As mentioned before, the current policy size relativity factors provide for both increased coverage and differences in classification for the higher amounts of insurance. Abrupt increases in coverage amounts can therefore provide an increase in price without a commensurate increase in risk. (If an insured has been underinsured in the past, however, the increase in price is justified on an individual case basis.)

There are various ways of measuring the increase in premium due to this potential excess of price over true coverage. With the current accumulation of "two exposure bases" in Homeowners (number of house years and amount of insurance years), average amount of insurance can be calculated for a period of years. Average premiums at current manual rates can also be determined using the "extension of exposures" technique.

Because fluctuation in average amounts of insurance can occur from year to year due to abrupt lags and pushes in "insurance to value" as well as the influence of new construction, it is better to avoid using the simple observation of loss ratios for trend purposes or the simple fitting of least squares lines to average amounts of insurance in the past.

Whatever the measurement of this phenomenon may be, it is still likely to require a separate treatment of "current cost factors" and "trend" factors. In the illustration for statewide rate level purposes on Exhibit 1, Columns (7) and (8) show Current Cost/Amount Factors and a Trend Factor used to put loss ratios on a prospective experience period level. These factors were derived in Appendix D by one method of factoring out the increase in premium due to increasing amounts of insurance. The change in average policy size relativities is calculated and projected on Sheet 3 of Appendix D. Some tempering is needed to reflect the influence of new construction on average policy size changes.

Indicated Premium Adjustment

The weighting of adjusted loss ratios for all years in the review period is more arithmetical than scientific. With greatest weight given to the most recent year for responsiveness, any reasonable set of weights adding up to 100% could really be used. This presumes that any fluctuations due to catastrophic occurrences are identified and removed. On Exhibit 1, weights of .10, .15, .20, .25, and .30 are used for the five years. Perhaps in the future, some volume criteria could be imposed to allow for reviews with three or even fewer years of Homeowners insurance statewide normal loss experience.

The "Weighted Adjusted Loss Ratio" obtained in Column 8 of Exhibit 1 represents a projected average portion of the premium dollar that will be needed to cover losses and loss adjustment expenses at a $100 deductible level. It should be recalled in this example that the premium dollar being tested is the current broadest deductible premium displayed in the manual—in this case, the premium heretofore charged for a $50 disappearing deductible.

The Balance Point Loss Ratio of .602 in this example consists of the portion of the premium dollar that is available to pay losses and loss adjustment expenses. Identical in concept to the Expected Loss and Loss Adjustment Ratio for automobile insurance ratemaking, it consists of the sum of various appropriate expense ratios plus an allowance for underwriting profit and contingencies. Using the Insurance Expense Exhibit for an expense review of General Administration Expenses and Other Acquisition Costs, and knowing budget requirements for such items as Taxes, Licenses, and Fees as well as Commissions, an Expense Ratio is calculated to which is added a provision for Profit and Contingencies, also expressed as a function of premiums (margin on sales).

The tradition in property insurance has been for a higher provision for profit and contingencies than in casualty insurance due to the presumably greater risk generated by large scale catastrophes such as conflagrations, hurricanes, etc. However, a catastrophe factor dealing with the loss portion in the ratemaking procedure does not affect the need for an extra contingency loading in the profit and contingency factor because no amount of actuarial smoothing or averaging of past loss data for prospective ratemaking purposes has any influence on the inherent risk of loss. Since profit is essentially a reward for risk-taking, increased risk can be reflected in the profit provision independently of the average loss provision however calculated, i.e. through either long-term averaging or no averaging.

The complement of the combined expense and profit provision is called the Balance Point Loss Ratio, and illustrates the portion of premiums available to pay losses and loss adjustment expenses. The extent to which the Adjusted Loss Ratio exceeds the Balance Point Loss Ratio is called the indicated premium adjustment to the broadest deductible. In Exhibit 1, it shows how much today's manual premiums for $50 disappearing deductible coverage should be increased to provide $100 deductible coverage in the future, i.e. +4.2%.

Indicated Rate Level Change

The premium change is not the entire story, however. Since an increase in deductible represents a reduction in coverage, the indicated change in rate level is defined to be the change in premium related to the reduced coverage. In this example, the reduced coverage consists of an estimated average of 10.2% (Column (14)) of losses eliminated from the two coverages now offered (given the current distribution of premiums by deductible in Column (15)). The average premium level change from today's options to an automatic $100 deductible would be -0.6% (Column (13)). Therefore, the indicated rate level change is the average premium level change divided by the reduced coverage (.994 ÷ (1.000 − .102) = 1.107) or +10.7%.

Once the indicated rate level change is determined from the underlying experience, there are usually several ways of implementing the indication. One way is simply to change the coverage to the new deductible at the indicated change to the broadest deductible premium (in this example, the $50 Disappearing Section I deductible premiums).

A second alternative is to keep the old deductibles, with the premium change equal to the rate level change. A third choice is to offer two new

deductibles—both a $100 flat deductible and a new $50 flat deductible. Since the indicated rate level is fixed, as are the percentage of losses eliminated in switching to those new deductibles, the selection of a price relationship[7] between the $50 and $100 deductibles will determine the premium level change. For example, Exhibit 2 shows how, with certain assumptions as to distribution of business between the new $50 and $100 deductibles, a rate level change is converted to an average premium level change, which is then converted to the change in premium level for the new $100 deductible from the old $50 disappearing deductible level. Note that the appropriate rate for the $100 deductible can be different, depending on whether a $50 deductible option is available. With only a $100 deductible available, the rate can be directly determined from the experience. With the 50 deductible option, more adverse experience can be anticipated for those insureds with the greater coverage, and therefore a lower rate is permitted for the better risks with the $100 deductible.

TERRITORY RATE LEVEL

The purpose of a territory rate level review is to determine whether a statewide rate level inadequacy or redundancy is concentrated in only some geographic areas or is relatively uniform throughout the state. However, the measurement of appropriate rate level by territory for Homeowners insurance presents certain problems which may not exist at the statewide level.

First of all, the volume of data in each territory is less than statewide, with only partial credibility to be expected in some of the smaller territories. Secondly, the identification of catastrophe losses by territory may not have been possible for a long enough historical period. The result is that, even after removal or modification of actual catastrophe losses in the latest review period, a territory catastrophe factor cannot be empirically calculated from long-term experience. A third problem is whether to use the same factors and techniques by territory as in the statewide review, such as: trend factors, loss development factors, loss elimination ratios, accident year weights, etc.

By keeping in mind the purpose of territory ratemaking to distribute the statewide change equitably, it is easier to conclude that more judgment is

[7] With a Loss Elimination Ratio (LER) of 7% or 8% from a $50 Flat to a $100 Flat Deductible, a reasonable additional price for $50 Flat is 10% above $100 Flat with a minimum of $10 and a maximum of $25 as the additional premium.

permissible in the establishment of territory changes since the results are ultimately balanced to the statewide change. Therefore, the question of credibility becomes more of an arithmetic problem in deciding how much weight to give a territory observation versus the statewide indicated change. As an interim standard for Homeowners insurance, the use of 40,000 house years of exposure in a territory during the review period can be considered "fully credible" in calculating an indicated change for that territory. Assuming an average claim frequency of about ten percent for Homeowners insurance, this is equivalent to approximately 4,000 claims as the 100% credibility standard if number of claims were used. Partial credibility[8] can then be determined by the formula $Z = \sqrt{n/K}$, where K is the 100% credibility standard, and n is the individual territory number of exposures in house years. (Currently, K = 40,000 house years.)

The problem of catastrophe factors by territory can be resolved on an interim basis by using whatever information is available in the most recent years in the selection of factors by territory that average to the statewide catastrophe factor calculated from long-term data. In the example given in Exhibit 3, the Territory Catastrophe Factors in Column (6) of Sheet 2 balance to the Statewide Catastrophe Factor of 1.055. Columns (2) through (5) consist of the same data that underlies the statewide rate level experience. Even though future reviews of statewide rate level might contain fewer than five years of experience, it may still be desirable to use five years for territory review purposes. With regard to weights by years, actual premium weights might give more stability than arithmetically weighting the loss ratios. In addition, since judgment is used in the selection process, it is no doubt also sufficient to use the same loss development and other factors by territory as statewide, unless they are suspected to be substantially different.

Sheet 1 of Exhibit 3 shows the recapitulation of some useful information by territory, and illustrates the concept of a "base" territory (with largest volume) as the key to which all other territory indications are related (in Column (5)). This provides a framework and basis for judgment in the selection of relative changes. Additional items to be taken into account in the final selection may be the following: current rate differences among territories (Column (8)); consistency of loss ratios by year (including cause of loss fluctuations); and tempering of the magnitude of changes (realizing that ultimate

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[8] See L. H. Longley-Cook, "An Introduction To Credibility Theory," *PCAS*, XLIX (1962).

relativities may have to be achieved over a longer period than one or two years).

Of course, the selection process can just as easily take place in Column (7), especially if a specific limit or "cap" were decided for the changes by territory, such as a maximum change in premium level of 25%. This could be accomplished by imposing the statewide premium level change on Column (7), limiting any changes to + or −25%, and readjusting the other territories accordingly to balance to unity (1.000) again in Column (7). It is important to have this key column balance to "no change" rather than the indicated statewide rate level change, at this stage, because ultimately this column is used to distribute the final premium changes statewide, which can vary depending upon what deductible options are offered. The change to the broadest deductible premium can also be altered due to any classification changes, such as policy size relativities and policy form relativities.

Future innovations in territory ratemaking for Homeowners insurance are likely to include a regional approach to catastrophe factors by territory. This geographical expansion might overcome some of the chronological limitations of catastrophe experience by territory.

TENANTS (FORM 4)

The Tenant's Form in Homeowners insurance provides essentially the same coverage as the Broad Form (Form 2), but is restricted to contents only. Therefore, the nature of the risk can be substantially different since large amounts of insurance are not required for the residence building. This is reflected in the actual distribution of losses by cause of loss for tenants policies, with a majority of losses being from theft, whereas fire is the dominant peril in the basic Homeowners Forms (i.e. HO-1, 2, 3, 5).

The volume of experience under the Tenants Form is also much less than the other forms and at this point the ratemaking techniques are much more simplified. The adjustment of premiums to current manual rates is similar to that used in statewide fire insurance ratemaking[9]. Nevertheless, despite the lower volume, with changes now taking place in the rating of Tenants policies as well as in the marketplace, the extension of exposures is also a technique worth using in the future for this coverage. The example shown in Exhibit 4

[9] See Robert L. Hurley, "Commercial Fire Insurance Ratemaking Procedures for Statewide Rate Levels and Classification Adjustments", *PCAS*, Vol. LX (1973).

has premium adjusted to the latest premium level (although not necessarily to the broadest deductible level).

The treatment of losses is similar to the other Homeowners forms except that no formal catastrophe factor is deemed necessary owing to the "contents only" nature of the coverage and the relative location of risks generally purchasing Form 4.

Without the conversion of premiums to the broadest deductible, the indicated change is from the average premium (i.e. all deductibles) to the new $100 deductible coverage. Therefore this indication must then be converted to the change from each specific deductible available in the past. Column (12) shows this conversion, with Line (15) being the overall statewide rate level indication reflecting both premium changes and losses eliminated. The further conversion of this indication to premium changes under additional deductible options is similar to the other forms.

SUMMARY AND CONCLUSION

Homeowners insurance appears to be a unique line of insurance. It is a classic illustration of the advantages of a package policy, covering many perils and spanning the entire range of property and casualty insurance. The ratemaking techniques for this line of insurance will no doubt change and evolve along with the nature of the underlying experience data, which follows the changes in insureds themselves who reflect the evolution of society and the environment.

At various stages, the ratemaking for Homeowners insurance by state can become more complicated. This is especially true when there are coverage changes at the same time there are classification changes, all occurring at the time of a state and territory rate level revision. The illustration in this paper covers such a complex situation and is analogous to an automobile insurance rate revision by state and territory where the class plan and increased limits factors are being changed, at the same time as a No-Fault implementation.

Hopefully, there will be more stability in the future when all classes have been reviewed and are up-to-date in the Homeowners package. However, in reality new classes are likely to be formed as others are streamlined. For example, protection classes may be modified in the future, and construction class relativities are also likely to be revised.

While everyone would like to opt for a world of more stable conditions,

the actuarial review process is never really finished, if only to verify that conditions are not changing radically so as to warrant a more simplified treatment of the ratemaking process.

Exhibit I

STATEWIDE DEVELOPMENT OF INDICATED RATE LEVEL CHANGE -HOMEOWNERS FORMS 1, 2, 3, 5

YEAR	(1) ADJUSTED EARNED PREMIUMS	(2) LOSSES ADJUSTED TO $100 FLAT DEDUCTIBLE	(3) CATASTROPHE LOSSES ADJUSTED TO $100 FLAT DEDUCTIBLE	(4) INCURRED LOSSES LESS CATASTROPHES (2)−(3)
1968	$12,705,202	$ 6,504,561	$ 1,828,291	$ 4,676,270
1969	13,635,421	6,132,361	10,595	6,121,766
1970	14,391,884	7,287,662	343,183	6,944,479
1971	15,373,390	7,622,374	184,919	7,437,455
1972	16,675,396	10,345,604	2,147,956	8,197,648

YEAR	(5) LOSSES X CATASTROPHE FACTOR (4)×1.055	(6) LOSSES INCL. LOSS ADJUSTMENT EXPENSE (5)×1.115	(7) CURRENT COST/AMOUNT FACTOR	(8) ADJUSTED LOSS RATIOS [(6)×(7)×1.071[a]]÷(1)
1968	$ 4,933,465	$ 5,500,813	1.127	.523
1969	6,458,463	7,201,186	1.090	.617
1970	7,326,425	8,168,964	1.076	.654
1971	7,846,515	8,748,864	1.058	.645
1972	8,648,519	9,643,099	1.021	.632
		(WEIGHTED .10, .15, .20, .25, .30)		.627

(9) Indicated Premium Adjustment for $100 Flat Section I Deductible from $50 Disappearing Section I Deductible[b]:
.627÷.602 = 1.042 (= +4.2%)

(10) PRESENT DEDUCTIBLE OPTIONS	(11) PRESENT AVERAGE PREMIUM LEVEL	(12) INDICATED $100 FLAT SECTION I PREMIUM LEVEL	(13) (12)÷(11)−1 AVERAGE PREMIUM CHANGE	(14) % OF LOSSES ELIMINATED	(15) CURRENT PREMIUM DISTRIBUTION BY DEDUCTIBLE
Full Coverage	1.300	1.042	−19.8%	16.8%	20%
$50 Dis. Ded.	1.000	1.042	+4.2%	8.5%	80%
Average			−0.6%	10.2%	100%

(16) Indicated Rate Level Change = [1+(13)]÷[1−(14)]−1 = +10.7%

[a] Factor to adjust loss ratio on current cost level to 4/1/75.

[b] Balance Point Loss Ratio: .602.

Exhibit 2

DEVELOPMENT OF INDICATED CHANGES STATEWIDE REFLECTING OPTIONAL $50/$100 FLAT DEDUCTIBLES FORMS 1, 2, 3, 5

(1) Indicated Rate Level Change (See Exhibit 1, Line (16)) +10.7%
(2) Estimated Losses Eliminated Under Optional Deductible Program 7.0%[d]
(3) Indicated Total Premium Level Effect [1+(1)]×[1−(2)]−1 + 3.0%[e]
(4) Indicated Premium Level Adjustment by Deductible Option:

(5) Present to Proposed Deductible Options	(6) Present Average Premium Level	(7) Indicated Average Premium Level	(8) (7)÷(6)−1 Average Premium Change	(9) % of Losses Eliminated	(10) Projected Deductible Distribution[a]
Full Coverage					
$50 FD	1.300	1.144[b]	−12.0%	10.6%	20.0%
$50 Dis. Ded.					
$50 FD	1.000	1.144[b]	+14.4%	1.9%	28.5%
$50 Dis. Ded.					
$100 FD	1.000	1.026	+ 2.6%[c]	8.4%	51.5%
Average			+ 3.0%[e]	7.0%	100.0%

Indicated Rate Level Change = +10.7% [1.030÷(1.000−.070)=1.107]

NOTE: If no change in deductible option were proposed, the premium level change would be +10.7%. The proposed optional ($50 and $100) Flat Section I Deductible decreases the needed premium level to +3.0%; this is due to the losses eliminated by the coverage change. The rate level change (or combined effect) remains the same, regardless of changes in deductible options.

[a] In Forms 1, 2 and 3, assumes 50% of the written premium volume will in the future be in the $50 Flat Deductible and 50% will be in the $100 Flat Deductible.

[b] The effect of the 10% additional charge for the $50 Flat option, with a minimum additional charge of $10 and a maximum of $25 is estimated to be 11.5%. (1.144 = 1.026 × 1.115).

[c] The premium change for the $100 Deductible is less than that developed on Line (9), Exhibit 1 (+4.2%). In recognition of anti-selection, the charge for the $50 deductible is greater than that indicated by loss elimination ratios. Therefore, the adjustment for the $100 Deductible is comparably reduced.

[d] Line (2) is derived by weighting Columns (9) and (10).

[e] Line (3) is then derived, and used to calculate the values in Column (8). (+2.6% is the deduced change to the broadest deductible premium level that reproduces the average change of +3.0% for all deductibles.)

Exhibit 3
Sheet 1

DEVELOPMENT OF INDICATED RATE LEVEL CHANGES BY TERRITORY
FORMS 1, 2, 3, 5

Territory	(1) 1972 Distribution of Adjusted Earned Premium	(2) 1968-72 Loss Ratio (Column 8, Sheet 2)	(3) Relativity to Base Territory[a]	(4) Credibility[b]	(5) (3)×(4)+(1.0−(4))× ((3) Avg.) Indicated Relative Change	(6) Selected Relative Change	(7) (6)÷Avg. (6) Relative Change With No Change Overall	(8) Estimated Current Average Relativity	(9) (5)×(8) Indicated Relativity
01	.546	.490	1.000	1.000	1.000	1.000	.947	1.00	1.00
02	.344	.594	1.212	1.000	1.212	1.100	1.042	1.00	1.21
03	.110	.644	1.314	.900	1.293	1.200	1.136	1.14	1.47
Average[c]	1.000	.543	1.108			1.056	1.000		

Description of Territories:
01 Eastern
02 Central
03 Western

[a] (2)÷[(2) in Territory with largest volume].
[b] Based on 100% credibility standard of 40,000 house years.
[c] Weighted on 1972 Adjusted Earned Premium Distribution.

Exhibit 3
Sheet 2

1968-1972 ADJUSTED EXPERIENCE BY TERRITORY
FORMS 1, 2, 3, 5

(1) Year	(2) Earned Prem. at Current Prem. Level[a]	(3) Adjusted Incurred Losses[b]	(4) Adjusted Catastrophe Losses[b]	(5) (3)−(4) Adjusted Incurred Losses Excl. Cats.[b]	(6) Territory Catastrophe Factor[c]	(7) (5)×(6)×1.115 Incurred Losses and Loss Adj. Exp. Excl. Trend	(8) (7)÷(2) Loss & Loss Adj. Ratio Excl. Trend
Territory 01: Eastern							
1968	$ 7,577,685	$ 2,332,324	$ 164,144	$ 2,168,180	1.043	$ 2,521,474	.333
1969	7,861,253	3,411,453	2,876	3,408,577	1.043	3,963,988	.504
1970	8,115,055	3,465,230	29,519	3,435,711	1.043	3,995,543	.492
1971	8,499,227	3,948,150	38,351	3,909,799	1.043	4,546,881	.535
1972	9,098,222	4,956,526	536,989	4,419,537	1.043	5,139,678	.565
Total	41,151,442	18,113,683	771,879	17,341,804		20,167,564	.490
Territory 02: Central							
1968	4,397,526	2,595,368	598,489	1,996,879	1.064	2,369,017	.539
1969	4,700,689	2,151,078	2,419	2,148,659	1.064	2,549,083	.542
1970	4,940,659	2,802,216	28,616	2,773,600	1.064	3,290,488	.666
1971	5,249,356	2,960,728	54,761	2,905,967	1.064	3,447,523	.657
1972	5,735,865	3,174,394	479,948	2,694,446	1.064	3,196,583	.557
Total	25,024,095	13,683,784	1,164,233	12,519,551		14,852,694	.594
Territory 03: Western							
1968	729,991	1,576,869	1,065,658	511,211	1.085	618,450	.847
1969	1,073,479	569,830	5,300	564,530	1.085	682,954	.636
1970	1,336,170	1,020,216	285,048	735,168	1.085	889,388	.666
1971	1,624,807	713,496	91,807	621,689	1.085	752,104	.463
1972	1,841,309	2,214,684	1,131,019	1,083,665	1.085	1,310,991	.712
Total	6,605,756	6,095,095	2,578,832	3,516,263		4,253,887	.644

[a] Reflects the current manual premium level for the $50 Disappearing Section I Deductible.

[b] Losses are developed and on a $100 Flat Section I Deductible Level.

[c] The territory catastrophe factors balance to the statewide catastrophe factor of 1.055; (*weighted on Column (5)*) and satsify the equation:

01: 1+X
02: 1+1.5X (The factors 1.5 and 2.0 are selected by judgment.)
03: 1+2.0X

Exhibit 4

STATEWIDE DEVELOPMENT OF INDICATED RATE LEVEL CHANGE—TENANTS—FORM 4

YEAR	(1) ADJUSTED EARNED PREMIUMS	(2) LOSSES ADJUSTED TO $100 FLAT DEDUCTIBLE[a]	(3) LOSSES INCL. LOSS ADJUSTMENT EXPENSE (2)×1.115	(4) CURRENT COST FACTOR
1968	$ 588,318	$ 231,267	$ 257,863	1.256
1969	698,673	302,109	336,852	1.185
1970	837,047	395,424	440,898	1.114
1971	1,046,955	499,867	557,352	1.067
1972	1,184,752	529,937	590,880	1.031

YEAR	(5) LOSSES ON CURRENT COST LEVEL (3)×(4)	(6) TRENDED INCURRED LOSSES (5)×1.062[b]	(7) ADJUSTED LOSS RATIOS (6) / (1)
1968	$ 323,876	$ 343,956	.585
1969	399,170	423,919	.607
1970	491,160	521,612	.623
1971	594,695	631,566	.603
1972	609,197	646,967	.546
	(WEIGHTED .10, .15, .20, .25, .30)		.589

(8) Indicated Premium Level Adjustment for $100 Flat Section I Deductible from Present Deductible options[c]: .589 ÷ .602 = .973 (= −2.2%).

(9) Present Deductible Options	(10) Present Average Premium Level	(11) Indicated $100 Flat Section I Premium Level	(12) (11)÷(10)−1 Average Premium Change	(13) % of Losses Eliminated	(14) Current Premium Distribution by Deductible
Full Coverage	1.250	1.063	−15.0%	17.1%	40%
$50 Dis. Ded.	1.000	1.063	+ 6.3%	10.9%	60%
			− 2.2%	13.4%	100%

(15) Indicated Rate Level Change = +12.9% [.978 ÷ (1.000 − .134) = 1.129]

[a] Average Loss Elinination Ratio (for 5 year period): .112.

[b] Factor to adjust losses on current cost level to 4/1/75.

[c] Balance Point Loss Ratio: .602.

Appendix A
Sheet 1

$100 FLAT DEDUCTIBLE LOSS ELIMINATION RATIO SUPPLEMENT

This memorandum explains the analysis and development of loss elimination ratios (LER's) recognizing the effect of a $100 Flat Deductible.

LER's can be developed from a study of accident year loss data from a large sample of companies. The data consists of claims which are broken down by form, by deductible, by cause of loss and by size of loss. This is the basis for the computation of a $100 Flat Section I Deductible LER, i.e. the percentage of loss eliminated in converting full coverage losses to losses payable under a $100 Flat Section I deductible.

The following example is a step by step development of a $100 Flat Section I Deductible LER for Form 1 —Cause of Loss— Fire.

PART 1

The data shown on Sheet 2 is an extract of the data underlying the development of the aforementioned LER for Form 1, Cause of Loss —Fire. This extract represents Homeowners Policy Form 1, Deductible Code 1 (Full Cover), Cause of Loss—Fire; and shows the number and amount of losses broken out by size intervals (as shown below).

Size of Loss Intervals[a]	Size of Loss Code	Formula Identification	
		Number of Losses	Amount of Losses
.00- 1.77	1	N1	L1
1.78- 3.15	2	N2	L2
3.16- 5.61	3	N3	L3
5.62- 9.99	4	N4	L4
10.00- 17.77	5	N5	L5
17.78- 31.61	6	N6	L6
31.62- 56.22	7	N7	L7
56.23- 99.99	8	N8	L8
100.00- 177.82	9	N9	L9
177.83- 316.22	10	N10	L10
316.23- 562.33	11	N11	L11
562.34- 999.99	12	N12	L12
1000.00- 1778.27	13	N13	L13
1778.28- 3162.28	14	N14	L14
3162.29- 5623.37	15	N15	L15
5623.38- 9999.99	16	N16	L16
10000.00-17782.79	17	N17	L17
17782.80-31622.84	18	N18	L18
31622.85-56233.74	19	N19	L19
56233.75-99999.99	20	N20	L20
100000.00 and above	21	N21	L21

[a] Intervals selected from logarithmic scale (as size of loss distributions are often log-normal).

Appendix A
Sheet 2

LER SUPPLEMENT

HOMEOWNERS HO-1

FULL COVER, CAUSE OF LOSS FIRE

SIZE OF LOSS INTERVAL CODE(X)	NUMBER OF LOSSES(N)	AMOUNT OF LOSSES(L)
1	151	4.05
2	14	38.65
3	93	435.77
4	228	1806.39
5	736	10033.31
6	1159	28078.54
7	1225	52661.88
8	1120	86978.56
9	821	110678.75
10	636	149308.81
11	396	167214.81
12	257	192336.19
13	157	198823.31
14	96	224101.44
15	71	306616.31
16	75	574609.31
17	100	1280350.00
18	22	490346.25
19	1	42574.00
20	1	66000.00
21	0	0.0

Summary of above Data:

$\sum_{X=1}^{8} L_X$ = Sum of the amount of losses under $100.00 = $ 180,037

$\sum_{X=1}^{21} L_X$ = Sum of the total amount of losses = $3,982,996

$\sum_{X=9}^{21} N_X$ = Sum of the number of losses for loss amounts greater than or equal to $100.00 = 2,633

Appendix A
Sheet 3

LER SUPPLEMENT

PART 2

The following sets forth the formula for development of the Loss Elimination Ratio on a $100 flat basis and shows its application to the data summarized in Part 1. The Loss Elimination Ratio developed is .083 for the peril of Fire under Form 1. The same formula is used for other causes of loss under Forms 1, 2, 3 and 5.

$$\frac{\sum_{X=1}^{8} L_X \qquad +\$100 \sum_{X=9}^{21} N_X}{\sum_{X=1}^{21} L_X} = \text{LER}$$

The $100 Flat Deductible Loss Elimination Ratio formula described:

LER		$100 flat deductible loss elimination ratio
	=	equals
	$\sum_{X=1}^{8} L_X$	(a) the elimination of all losses under $100.00
	+	plus
$100	$\sum_{X=9}^{21} N_X$	(b) the elimination of $100 of every loss over $100.00
	÷	divided by
	$\sum_{X=1}^{21} L_X$	the total amount of losses.

The application of the formula to the data summarized in Part 1 develops the LER for Form 1, Cause of Loss Fire:

$$\text{LER} = \frac{\$180{,}037 + [\$100 \times 2{,}633]}{\$3{,}982{,}996} = \frac{\$443{,}337}{\$3{,}982{,}996} = .111$$

Tempered LER: $.111 \times .75 = .083$

The LER's are tempered to recognize the prospective change in loss settlement patterns resulting from increasing the size of deductibles for insureds.

LOSS DEVELOPMENT SUPPLEMENT

	Accident Year	Factor 15 to 27 Months	Weight	Factor 27 to 39 Months	Weight	Factor 39 to 51 Months	Weight	Factor 51 to 63 Months	Weight
Statewide	1968	1.041595	.07	1.007904	.10	1.002720	.20	.996567	1.00
	1969	1.032352	.27	1.006483	.40	1.005274	.80		
	1970	1.017355	.33	.992399	.50				
	1971	1.011214	.33						
	Weighted Average	1.021074		.999583		1.004763		.996567	
Countrywide	1968	1.028596	.07	1.000352	.10	.998903	.20	1.000000	1.00
	1969	1.025400	.27	1.000585	.40	1.000518	.80		
	1970	1.026445	.33	1.003333	.50				
	1971	1.021209	.33						
	Weighted Average	1.024586		1.001936		1.000195		1.000000	

Selected Factors

Applicable to Accident Years	Factor[a]	
1968 (63 months to ultimate)	1.000	
1969 (51 months to ultimate)	1.000:	1.000000 = (51 to 63 months) x (63 months to ultimate)
1970 (39 months to ultimate)	1.000:	1.000195 = (39 to 51 months) x (51 months to ultimate)
1971 (27 months to ultimate)	1.002:	1.002131 = (27 to 39 months) x (39 months to ultimate)
1972 (15 months to ultimate)	1.023:	1.023250 = (15 to 27 months) x (27 months to ultimate)

[a]State factor used for 15 to 27 months and Countrywide factors for 27 to 63 months.

Appendix C
Sheet 1

STATEWIDE

DERIVATION OF CATASTROPHE FACTOR BASED ON 1953-1972 EXPERIENCE

	(1) Catastrophe Serial Numbered Losses	(2) Homeowners Wind Losses	(3) Normal Wind Losses (2)−(1)
1953-1967[a] Dwelling ECE Losses	$ 2,544,426	$26,362,835	$23,818,409
1957-1972 Homeowners Losses	11,126,556	26,982,744	15,856,188
Total	$13,670,982	$53,345,579	$39,674,597

(4) Loading for Catastrophe = Total (1)/Total (3) = .345

(5) Provision for Cats. = (4) × Homeowners (3) = $15,856,188 × .345 = $5,470,385

(6) Total (All Causes) Homeowners Losses 1957-1972 = $111,070,095

(7) Total (All Causes) Normal HO Losses 1957-1972 = (6) − Homeowners (1):

$$\begin{aligned} \$111{,}070{,}095 &= (6) \\ 11{,}126{,}556 &= \text{Homeowners (1)} \\ \hline 99{,}943{,}539 &= \text{Total Normal HO Losses 1957-1972} \end{aligned}$$

(8) Catastrophe Factor for Normal Homeowners Losses = 1 + ((5)/(7)):

$$1 + \frac{\$\ 5{,}470{,}385}{\$99{,}943{,}539} = 1.055$$

[a] After 1967 Dwelling ECE is considered a truly residual coverage.

Appendix C
Sheet 2

DERIVATION OF STATEWIDE CIVIL DISORDER FACTOR BASED ON 1965-1972 EXPERIENCE

(1)	Statewide Reported Losses (1965-1972) (Forms 1, 2, 3, 5)	$ 69,065,557
(2)	Statewide Reported Catastrophe Losses, Including Riot and Civil Disorder Losses	7,139,025
(3)	Statewide Normal Losses: (1) − (2)	61,926,532
(4)	Statewide Reported Riot and Civil Disorder Losses	11,103
(5)	Statewide Civil Disorder Potential: (4) ÷ (3)	.0002
(6)	Statewide Civil Disorder Factor: (5) subject to maximum and minimum[a]	.0002
(7)	Statewide Catastrophe Factor (from Sheet 1)	1.055
(8)	Statewide Catastrophe Factor, Including Civil Disorder Factor: (6) + (7) (Rounded to three decimal places)	1.055

[a] To assure credibility the maximum Civil Disorder Factor is the higher of twice the countrywide potential and the mean of the state and countrywide potentials. The minimum is one-half the countrywide potential.

Countrywide Civil Disorder Potential:

$$= \frac{\text{Reported Civil Disorder and Riot Losses (1965-1972)}}{\text{Normal Reported Losses (1965-1972)}}$$

$$= .0004$$

DEVELOPMENT OF CURRENT COST FACTORS (CSF) AND TREND FACTOR FOR FORMS 1, 2, 3, 5

QUARTER ENDING JUNE 30, 1973

PART A: ESTABLISHMENT OF MONTHLY COMPOSITE CURRENT COST INDEX (CCCI), WITH:

60% WEIGHT TO BOECKH RESIDENTIAL CONSTRUCTION COST INDEX
40% WEIGHT TO MODIFIED CONSUMER PRICE INDEX (MCPI)[a]
(BOECKH BASE: 1967 = 100 MCPI BASE: 1967 = 100)

	1970				1971				1972			
MO.	BOECKH	MCPI	CCCI	3 MOS. AVG.	BOECKH	MCPI	CCCI	3 MOS. AVG.	BOECKH	MCPI	CCCI	3 MOS. AVG.
7	123.6	118.1	121.4		135.6	123.5	130.8		146.7	127.5	139.0	
8	123.9	118.7	121.8		136.3	123.9	131.3		147.6	127.7	139.6	
9	125.1	119.5	122.9	122.0	137.5	124.5	132.3	131.5	148.3	128.5	140.4	139.7
10	125.3	120.2	123.3		137.5	124.9	132.5		148.8	128.9	140.8	
11	126.1	120.9	124.0		137.5	125.3	132.6		149.3	129.3	141.3	
12	126.2	121.4	124.3	123.9	137.5	125.6	132.7	132.6	149.6	129.6	141.6	141.2

	1971				1972				1973			
MO.	BOECKH	MCPI	CCCI	3 MOS. AVG.	BOECKH	MCPI	CCCI	3 MOS. AVG.	BOECKH	MCPI	CCCI	3 MOS. AVG.
1	126.4	121.4	124.4		140.1	125.6	134.3		149.7	129.4	141.6	
2	126.6	121.5	124.6		141.9	126.0	135.5		151.4	129.9	142.8	
3	128.5	121.6	125.7	124.9	142.8	126.3	136.2	135.3	154.7	130.4	145.0	143.1
4	129.7	121.9	126.6		143.7	126.7	136.9		157.3	131.0	146.8	
5	129.7	122.7	126.9		144.6	127.1	137.6		159.2	131.6	148.2	
6	130.3	123.2	127.5	127.0	145.6	127.4	138.3	137.6	160.3	132.0	149.0	148.0

DEVELOPMENT OF CURRENT COST FACTORS (CSF) AND TREND FACTOR FOR FORMS 1, 2, 3, 5

QUARTER ENDING JUNE 30, 1973

PART B: USE OF AVERAGE ANNUAL CCCI TO CALCULATE CURRENT COST FACTORS (CCF)

CALENDAR YEAR AVERAGE CCCI				CURRENT COST FACTORS BASED ON AVERAGE CCCI VALUE FOR QUARTER ENDING JUNE 30, 1973 = 148.0
YEAR	BOECKH	MCPI	CCCI	
1968	107.3	104.7	106.3	148.0/106.3 = 1.392
1969	116.2	111.0	114.1	148.0/114.1 = 1.297
1970	122.4	118.0	120.6	148.0/120.6 = 1.227
1971	132.8	123.3	129.0	148.0/129.0 = 1.147
1972	145.8	127.6	138.5	148.0/138.5 = 1.069

[a] Modified Consumer Price Index (MCPI) = combination of following items in Consumer Price Index (with weights 60%, 20%, 10% and 10%): housing, apparel, recreation and medical care.

Appendix D
Sheet 2

PART C: COMPUTATION OF LOSS TREND FACTOR FOR FORMS 1, 2, 3, 5

CALENDAR YEAR	QUARTER ENDING	TIME (2X)	AVERAGE CCCI (Y)	(2XY)	$(4X^2)$
1970	SEP. 30	−11	122.0	−1342.0	121
1970	DEC. 31	−9	123.9	−1115.1	81
1971	MAR. 31	−7	124.9	−874.3	49
1971	JUN. 30	−5	127.0	−635.0	25
1971	SEP. 30	−3	131.5	−394.5	9
1971	DEC. 31	−1	132.6	−132.6	1
1972	MAR. 31	1	135.3	135.3	1
1972	JUN. 30	3	137.6	412.8	9
1972	SEP. 30	5	139.7	698.5	25
1972	DEC. 31	7	141.2	988.4	49
1973	MAR. 31	9	143.1	1287.9	81
1973	JUN. 30	11	148.0	1628.0	121
		0	1606.8	657.4	572

EQUATIONS:

$$Y = A + BX$$

$$SY = NA + BSX$$

$$SXY = ASX + BSX^2$$

WHERE A = MEAN OF FITTED LINE
B = AVERAGE QUARTERLY INCREMENT
S = SUMMATION
N = NUMBER OF OBSERVATIONS

$2SXY = 657.4$ OR $SXY = 328.70$

$4SX^2 = 572$ OR $SX^2 = 143$

A(MEAN OF FITTED LINE) = 1606.8/12 = 133.90

B(AVG. QUARTERLY INCREMENT) = 328.70/142 = 2.299

AVG. ANNUAL INCREMENT = 4 × 2.299 = 9.20

FITTED CCCI TREND AT MIDPOINT OF QTR. ENDING JUNE 30, 1973 = 133.90 + (5.5 × 2.299) = 146.54

LATEST ANNUAL RATE OF CHANGE = 9.20/146.54 = 6.3%

Appendix D
Sheet 3

CALCULATION OF CURRENT COST/AMOUNT FACTORS (FORMS 1, 2, 3, 5):

(1) YEAR	(2) AVERAGE RELATIVITY[a]	(3) RELATIVITY TO LATEST POINT (2) (1973)÷(2)	(4) CURRENT AMOUNT FACTOR (3) TEMPERED 85% [((3)−1)×.85]+1	(5) CURRENT COST FACTOR[c]	(6) CURRENT COST/AMT. FACTOR (5) ÷ (4)[d]
1968	1.292	1.276	1.235	1.392	1.127
1969	1.348	1.223	1.190	1.297	1.090
1970	1.415	1.165	1.140	1.227	1.076
1971	1.500	1.099	1.084	1.147	1.058
1972	1.562	1.055	1.047	1.069	1.021
5-15-73	1.648[b]	1.000	1.000		

[a] Computed as an average of policy size relativities weighted by exposures by amount of insurance.

[b] This is a projected value based on a least squares fit of the preceding five values.

[c] Based on Quarter Ending June 30, 1973 (See Sheet 1)

[d] Factor to adjust loss ratio to 5/15/73 level. (These are the factors used in Exhibit 1, Column (7).)

CALCULATION OF TRENDED COST/AMOUNT FACTOR (FORMS 1, 2, 3, 5):

Latest Annual Rate of Change of Average Relativities (from Column (2) above) = 4.4%

Tempered 75% = 3.3% = R

C = Latest Annual Rate of Change of Loss Cost (From Sheet 2) = 6.3%[e]

$\frac{1+C}{1+R}$ = Latest Annual Rate of Change in Loss Ratios = 1.029 (=2.9%)

Modified Trend Factor to Adjust Loss Ratio to a 4/1/75 level[f] from 5/15/73[g]:

$$1 + (.029 \times \frac{16.5}{12}) + (.063 \times \frac{6}{12}) = 1.071$$

[e] Based on CCCI trend data through 6/30/73.

[f] One year past proposed effective date on losses; six months past effective date for average relativities.

[g] Midpoint of latest quarter of trend experience.

Appendix D
Sheet 4

DEVELOPMENT OF CURRENT COST FACTORS (CCF) AND TREND FACTOR FOR FORM 4

QUARTER ENDING JUNE 30, 1973

PART A: ESTABLISHMENT OF QUARTERLY AVERAGE OF MODIFIED CONSUMER PRICE INDEX (MCPI)
(MCPI BASE: 1967 = 100)

	1970		1971		1972	
MONTH	MCPE	3 MOS. AVG.	MCPI	3 MOS. AVG.	MCPI	3 MOS. AVG.
7	118.1		123.5		127.5	
8	118.7		123.9		127.7	
9	119.5	118.8	124.5	124.0	128.5	127.9
10	120.2		124.9		128.9	
11	120.9		125.3		129.3	
12	121.4	120.8	125.6	125.3	129.6	129.3

	1971		1972		1973	
MONTH	MCPI	3 MOS. AVG.	MCPI	3 MOS. AVG.	MCPI	3 MOS. AVG.
1	121.4		125.6		129.4	
2	121.5		126.0		129.9	
3	121.6	121.5	126.3	126.0	130.4	129.9
4	121.9		126.7		131.0	
5	122.7		127.1		131.6	
6	123.2	122.6	127.4	127.1	132.0	131.5

PART B: USE OF AVERAGE ANNUAL MCPI TO CALCULATE CURRENT COST FACTORS (CCF)

CALENDAR YEAR AVERAGE MCPI		CURRENT COST FACTORS BASED ON AVERAGE MCPI VALUE FOR QUARTER ENDING JUNE 30, 1973 = 131.5
YEAR	MCPI	
1968	104.7	131.5/104.7 = 1.256
1969	111.0	131.5/111.0 = 1.185
1970	118.0	131.5/118.0 = 1.114
1971	123.3	131.5/123.3 = 1.067
1972	127.6	131.5/127.6 = 1.031

Appendix D
Sheet 5

PART C: COMPUTATION OF TREND FACTOR FOR FORM 4

CALENDAR YEAR	QUARTER ENDING	TIME (2X)	AVERAGE MCPI (Y)	(2XY)	($4X^2$)
1970	SEP. 30	−11	118.8	−1306.8	121
1970	DEC. 31	−9	120.8	−1087.2	81
1971	MAR. 31	−7	121.5	−850.5	49
1971	JUN. 30	−5	122.6	−613.0	25
1971	SEP. 30	−3	124.0	−372.0	9
1971	DEC. 31	−1	125.3	−125.3	1
1972	MAR. 31	1	126.0	126.0	1
1972	JUN. 30	3	127.1	381.3	9
1972	SEP. 30	5	127.9	639.5	25
1972	DEC. 31	7	129.3	905.1	49
1973	MAR. 31	9	129.9	1169.1	81
1973	JUN. 30	11	131.5	1446.5	121
		0	1504.7	312.7	572

EQUATIONS:

$$Y = A + BX$$
$$SY = NA + BSX$$
$$SXY = ASX + BSX^2$$

WHERE A = MEAN OF FITTED LINE
B = AVERAGE QUARTERLY INCREMENT
S = SUMMATION
N = NUMBER OF OBSERVATIONS

$2SXY = 312.7$ OR $SXY = 156.35$

$4SX^2 = 572$ OR $SX^2 = 143$

A(MEAN OF FITTED LINE) = 1504.7/12 = 125.39

B(AVG. QUARTERLY INCREMENT) = 156.35/143 = 1.093

Appendix D
Sheet 5

PART C: COMPUTATION OF TREND FACTOR FOR FORM 4

AVG. ANNUAL INCREMENT = 4 × 1.093
= 4.37

FITTED MCPI TREND AT MIDPOINT OF QTR. ENDING JUNE 30, 1973 = 125.39 + (5.5 × 1.093)
= 131.40

LATEST ANNUAL RATE OF CHANGE = 4.37/131.40 = 3.3%

TREND FACTOR TO ADJUST LOSSES[a] TO A 4/1/75 LEVEL FROM 5/15/73:

$$1 + (.033 \times \frac{22.5}{12}) = 1.062$$

[a]Losses only are projected because Form 4 is an Actual Cash Value coverage on depreciating contents values, not subject to the same inflationary pressure as that on replacement cost for building values.

Appendix E

REVISION OF HOMEOWNERS INSURANCE RELATIVITY CURVE

CALCULATION OF PREMIUM OFF-BALANCE RESULTING FROM INTRODUCTION OF NEW RELATIVITY CURVE BY AMOUNT OF INSURANCE

ILLUSTRATION: FORM HO-2 STATEWIDE OFF-BALANCE

(1) Amount of Insurance (in $1,000's)	(2) Estimated Exposure Distribution	(3) Present Average Relativity	(4) Revised Average Relativity	(5) Relative Change Incl. Effect of Off-Balance[a]
08-12	7.2%	.86	.86	−3.0%
13-17	16.9%	1.00	1.00	−3.0%
18-22	29.5%	1.24	1.24	−3.0%
23-27	16.0%	1.55	1.57	−1.7%
28-32	12.3%	1.90	2.02	3.2%
33-37	8.0%	2.30	2.44	2.9%
38-42	4.7%	2.70	2.86	2.8%
43-47	1.6%	3.10	3.28	2.7%
48-52	1.2%	3.50	3.70	2.6%
53-57	1.0%	3.90	4.12	2.5%
58-62	.4%	4.30	4.54	2.5%
63-67	.3%	4.70	4.96	2.4%
68-72	.3%	5.10	5.38	2.4%
73-77	.1%	5.50	5.80	2.3%
78-99	.4%	7.42	7.82	2.3%
TOTAL	100.0%	1.607	1.656	0.

OFF-BALANCE = 1.656/1.607 = 1.030. THE OFF-BALANCE IS THE PREMIUM LEVEL CHANGE RESULTING FROM APPLICATION OF THE NEW RELATIVITY CURVE WITH NO CHANGE IN UNITY ($15,000 AMOUNT OF INSURANCE) PREMIUMS. TO PRODUCE NO PREMIUM LEVEL CHANGE, THE FORMER UNITY PREMIUMS MUST BE DIVIDED BY THE OFF-BALANCE.

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[a](5) = [((4) ÷ (3)) ÷ OFF-BALANCE] − 1.0

Appendix F
Sheet 1

REVISION OF HOMEOWNERS INSURANCE FORM RELATIVITIES

This deals with the introduction of premium relativities by Form. In addition to simplifying future experience reviews, the establishment of uniform relationships between forms should facilitate machine rating of Homeowners policies. Sheets 2 and 3 show the development of the new relativities.

Column 1 of Sheet 2 is the current average relativity of Forms 1, 2, and 5 to Form 3 at the unity premium as shown on Sheet 3 (assuming all Forms are on the same policy size relativity curve).

Column 2 is the rate level increase which would result from the introduction of the new policy size relativity curve with no change in unity premiums. (See Appendix E.)

Column 3 Statewide loss ratios by Form balance to the combined adjusted loss ratio, as developed on Exhibit 1.

Column 4 shows the arithmetic "indicated" loss ratios by Form at Form 3 rates, excluding credibility considerations.

Column 5 makes Form 3 the base Form, and contains "indicated" Form relativities.

Column 6 shows the new Form relativities, selected by judgment in comparing Columns (1) and (5), bearing in mind the volume of data implied by Column (7).

Column 7 is the current distribution of premiums by Form.

Sheet 3 shows the current average form relativities by territory and statewide.

The new Form relativities for this state are:

Form 1:	.70
Form 2:	.85
Form 3:	1.00
Form 5:	1.40

Appendix F
Sheet 2

POLICY FORM RELATIVITIES

Form	(1) Current Average Form Relativity[a]	(2) Off-Balance of Revised Relativity Curve[b]	(3) 5 Year Adjusted Loss Ratio	(4) Indicated Loss Ratios at Form 3 Rates (3) × (1) ÷ (2)	(5) Relativity of Loss Ratios to Form 3	(6) Selected Form Relativity	(7) 1972 Form Distribution of Adjusted Earned Premium
1	.652	1.014	.811	.521	.768	.70	.309
2	.871	1.030	.651	.551	.813	.85	.468
3	1.000	1.047	.710	.678	1.000	1.00	.201
5	1.630	1.055	.606	.936	1.381	1.40	.022

[a]Assumes all Forms are on same Relativity Curve by Amount of Insurance.
[b]See Appendix E for illustration of Off-Balance Calculation for Form 2.

Appendix F
Sheet 3

CURRENT AVERAGE FORM RELATIVITIES BY TERRITORY

Territory	Form	Current Average Relativity (to Form 3)	New Form Relativities
01	1	.648	.70
	2	.866	.85
	5	1.582	1.40
02	1	.657	.70
	2	.882	.85
	5	1.663	1.40
03	1	.650	.70
	2	.867	.85
	5	1.624	1.40
STATEWIDE	1	.652	.70
	2	.871	.85
	5	1.630	1.40

Appendix F
Sheet 4

CALCULATION OF REVISED MANUAL PREMIUMS AT $15,000 (UNITY)

The revised manual premiums are developed using the formula shown below:

$$\sum AEP_i \times OB_i \times \frac{PREL_i}{CREL_i} \times (1 + R) = 1 + X$$

Where i = 1, 2, 3, and 5

AEP_i = 1972 Adjusted Earned Premium for Form i as a percentage to total for Forms 1, 2, 3, and 5.

OB_i = Off-Balance of Form i which is the result of introducing a new relativity curve. (See Appendix E)

$PREL_i$ = New relativity of Form i to Form 3 at $15,000. (See Page F-3.)

$CREL_i$ = Current average relativity of Form i to Form 3 at $15,000. (See Page F-3.)

R = Change to Form 3 Broadest Deductible unity premiums to go to $100 Flat Option.

X = Overall change to Forms 1, 2, 3, and 5 Broadest Deductible unity premiums to go to $100 Flat Option.

As an example, the development of the revised unity premiums for a $100 Flat Section I Deductible for Premium Group 1 follows: (Premium Group 1 = Territory 01, Brick, Protection Class 2)

Appendix F
Sheet 4

CALCULATION OF REVISED MANUAL PREMIUMS AT $15,000 (UNITY)

Territory 01:

Form	(1) Distribution of 1972 Adjusted Earned Premiums	(2) Policy Size Relativity Off-Balance[b]	(3) New Form Relativity	(4) Current Form Relativity	(5) Form Relativity Off-Balance (3) ÷ (4)	(6) Off-Balance Factor (1)×(2)×(5)
1	.334	1.011	.700	.648	1.080	.3647
2	.531	1.029	.850	.866	.982	.5366
3	.123	1.045	1.000	1.000	1.000	.1285
5	.012	1.351	1.400	2.110	.664	.0108
					Total (6) =	1.041

Current $50 Dis. Ded. Premium at $15,000 for Form 3		Territory 01 Premium Level Adjustment Factor		Total (6)		Revised $100 FD Premium at $15,000 for Form 3
$64	×	.972[a]	÷	1.041	=	$60

Revised $15,000 Section I premiums:	Form 1	Form 2	Form 3	Form 5
	$42	$51	$60	$84

[a] .972 = 1.026 × .947 [Statewide Change (Exhibit 2, Col. (7)) × Territory 01 Relative Change (Exhibit 3, Sheet 1, Col. (7))].

[b] Off-balance by territory is calculated similarly to statewide off-balance illustrated in Appendix E.