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A THEORETICAL FRAMEWORK FOR USE IN ANALYZING
THE COST STRUCTURE OF FARM MUTUAL PROPERTY INSURANCE COMPANIES

Ken Krause

A Theoretical Framework For Use in Analyzing
The Cost Structure of Farm Mutual Property Insurance Companies

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Note:

This paper is presented in two sections. Section I provides background material on the Farm Property Insurance Industry. Section II treats the cost structure problem of the industry and the procedure for use in analyzing it.

SECTION I

Introduction

Farmers' mutual fire and windstorm insurance companies illustrate one of the oldest forms of agricultural cooperatives in this country. About half of the existing companies were organized before the turn of the century. In earlier days, practically all farm mutuals offered protection against fire and lightning only. The amounts of insurance were small, in keeping with values at the time. The insurance was usually sold on a post loss assessment basis,^{1/} and as such, it was on a "neighborly" rather than a "business" basis.

Prior to about 1940, most farm property insurance^{2/} was on farm buildings. By 1954, the value of livestock and equipment on farms in the United States amounted to 31 per cent more than value of buildings. The need for higher coverages on farm property, and for protection on high-valued machinery and equipment and against additional perils, has been met by many companies. Some mutuals have not geared their operations to changing needs and have ceased operation or have been merged with other companies. Other mutuals are

^{1/} Post loss assessment includes a clause in the insurance contract that allows a company to collect from each policyholder to cover losses that the company incurs. This is in contrast, or in some cases, in addition to the Advanced Premium that companies collect to cover expected losses.

^{2/} Property Insurance includes fire and windstorm, and extended coverage on buildings, their contents and livestock and machinery.

increasing the volume of business and the insurance service they perform for members. Botts^{3/} found in 1954, that 52 per cent of the farm mutual fire insurance companies sampled had less than \$9.9 million of insurance in force and 48 per cent had \$10 million or more of insurance in force. With growth, more companies have been operated by full-time, salaried employees.^{4/}

Mutual Versus Stock Companies

Nearly all insurance policies sold in the United States today are sold under two broad major types of company ownership--stock or mutual. With either form of ownership, the insurance company is a system for changing measurable risk into known costs to the individual policyholder.

All insurance companies follow certain common principles. Based on averages of large numbers of observations, they establish premium rates for each class and degree of risk. In order for premiums to cover losses in a given year, a company must have a relatively large number of policyholders. The company must be safeguarded against adverse selection, and too great a concentration of risks.

A fundamental difference between stock and mutual companies is in ownership. A mutual company is owned and operated by its policyholders. Mutual companies may either pass (any excess) earnings on to their members in the form of reduced insurance costs (lower premiums or payment of dividends), or they may add these earnings to company reserves. A stock insurance company is owned and operated by its stockholder members. Stockholders may carry insurance with their company but they expect to share in the earnings of the company in proportion to their stock ownership rather than through lower cost insurance.

^{3/} Botts, Ralph K. and John D. Rush, and John C. Ellickson, Farmers' Mutual Fire and Windstorm Insurance in the United States, Agricultural Information Bulletin, No. 165, U.S.D.A.

^{4/} The term "small, medium, and large" farm mutual companies is used throughout this discussion. Small in this connotation means a company that has less than \$10,000,000 insurance in force. Medium \$10,000,000 to \$40,000,000 and large - over \$40,000,000 insurance in force.

Growth in the size^{5/} in many farm mutual companies has not been a goal in the past. In some instances it has been a step toward providing members with low cost insurance, but the general philosophy in some mutual companies has not been to aggressively seek expansion. In some mutuals, growth may be attributed to personal ambitions of the boards of directors or the company secretary. The small mutuals have been restricted in growth potential by laws limiting their geographic coverage.

On the other hand, growth in size generally is a goal in stock companies, since size has been considered necessary to increase operational efficiency and hence to increase dividends on stock and the value of stocks held by stockholders.

Observation suggests that aggressive sales policies are practiced to a greater extent in the large mutuals and stock companies than in the small mutual companies. Also, more detailed selection of property selected for insurance is practiced. Little empirical evidence exists comparing the services provided farmers by mutual or stock companies.

Internal Company Functions

Functions internal to a company that writes farm property insurance are many and varied. No two companies are organized exactly the same.

In general, members of the board of directors of a mutual company are elected by the members on a one vote per member basis. The board of directors is responsible for operation of the company. They in turn elect a secretary from their membership or hire a secretary or general manager who is charged with the responsibility of operating the company. The manager is responsible for the following functions:

^{5/} Popular ways by which size is expressed in the farm mutual insurance industry are as follows: (a) company surplus or assets, (b) gross premiums, (c) net premiums, (d) geographic area covered, (e) number of people employed on sales and office force, (f) number of coverages offered and (g) amount of insurance in force.

1. Inspection
2. Sales
3. Public relations and education
4. Loss adjustment
5. Actuarial duties (risk determination and underwriting)
6. Internal records
7. Investment of surplus funds
8. Research

In the small companies all of these functions are in varying degrees performed by one man, the secretary. In the larger companies one or more people may be employed to perform each of these functions.

Financial compensation ranges from as low as \$200-\$300 per year for the secretary of the small company to \$20,000 plus for secretaries or managers of the large companies.

Farmers have looked upon election to management or the board of directors of the small mutual company as an honor which increased their prestige. Observation suggests that election to the board of directors of the larger mutuals may not be for prestige reasons but rather for monetary reasons.

In stock companies, a more formal management team has been organized, similar to that in the larger mutuals. Members of the board of directors are responsible for direction of the company, but are seldom involved in the day-to-day operations of the company. The company president is generally responsible for the operational management of the company. Generally, he has several department heads who are trained in various areas of insurance company management and organization. Observation suggests that executives in the stockowned and large mutuals adjust more rapidly to changing conditions than do the secretaries and boards of directors of the small mutuals.

The Farm Mutual Insurance Company as an Input-Output Firm

To our knowledge, no literature exists which looks conceptually at a stock or mutual insurance company as an input-output firm. In looking at a

farm mutual in this context, we may first trace through what the farm mutual insurance company provides for its members and secondly what the members contribute to the company, and in turn determine what are the inputs and outputs.

An individual farmer receives in return for a premium payment protection against a specified loss. He receives a guarantee that should his property be damaged or destroyed by causes for which he has bought protection, the insurance company will pay him in accordance to the insurance that he has purchased.

This arrangement is changed by firms that operate or can call for a post loss assessment, which many farm mutuals are allowed by law to exercise. In the case of a company that operates strictly on a post loss assessment, the farmer declares a value on his property at the start of a year, and the per cent insurance that he desires to carry. The company in turn agrees to levy an assessment on each policyholder, should anyone of the policyholders have a loss. The amount of the assessment that an individual farmer would receive depends on the amount of insurance that he carried on his property, the size of the loss plus some small additional amount to take care of administrative expenses.

Within the insurance company, assuming the company operates on an advance assessment, the company provides the farmer with protection against losses by various causes in return for a premium. The premium is calculated according to the type, (i.e., fire or wind), amount of loss and the probability of loss. The premium income is allocated in various uses by the insurance company. It appears that actual loss payment and expenses account for about 35-40 per cent of the total expenses of a farm property mutual. The remainder is used for salaries, other expenses, and a small percentage goes into the company surplus.

In looking at a mutual insurance firm as an input-output process, there is a problem in determining what to consider as inputs and what to consider as outputs. Most of the inputs are fairly clear cut such as office rent, salaries, sales expenses, etc. In this analysis it will be assumed that in addition to these classes of items, loss payments and an interest charge on the surplus^{6/} are input or cost items to the mutual insurance firm. The output of the mutual insurance firm then is the gross insurance coverage in force.

Description of Present Company Organizational Systems

That May Aid in Classifying Companies

Several company organizational systems are currently used in selling farm mutual property insurance. The least complex is the small farm mutual that insures property against only fire and lightning. The secretary and often members of the board of directors write the coverage for the company. In a few companies in Indiana this same distribution system exists where the local company may write fire, lightning, wind coverage and extended coverage^{7/}

Some small farm mutual companies which write only fire and lightning coverage have entered into a joint arrangement to write wind coverage for a larger company. The small farm mutual may receive a minor compensation for writing the wind coverage.

^{6/} Company surplus includes all liquid or "near" liquid funds that a company owns and has at their command to use for loss payments, while company assets include all financial holdings of a company including buildings, equipment, checking and savings accounts and any monies invested in stock, bonds etc.

^{7/} Extended coverage includes the following hazards: hail, explosion, riot, non-owned vehicle damage, aircraft damage, and smoke. In some farm mutual policies, windstorm and hail are included in the extended coverage clause, in Boone County Company they are not.

Medium size and farm mutuals employ both full time and part time agents to market farm property coverage. These companies may offer such coverage as fire, lightning, wind and multiple peril and in some instances auto and life insurance. Agents for these companies have made arrangements with secretaries or board members of smaller companies to serve as agents. In some cases, this takes the form of the joint arrangement discussed above. Secretaries or managers of small companies have established agencies in other instances, independent of their local companies.

Reinsurance^{8/} usually is written on a deductible or "excess of loss" basis. That is, the company offering reinsurance agrees to pay losses in excess of a stated amount. The excess of loss or deductible amount may apply either to aggregate losses or to individual risks.

Reinsurance on an individual risk basis may be obtained from larger companies (some of which specialize in reinsurance) or several small farm mutuals may reinsure specific risks among each other. Excess of loss reinsurance may also be obtained from large companies, or companies may form a reinsurance pool. Such a pool has been established in Indiana. This plan calls for member companies to deposit a part of their company surplus in the pool in proportion to the insurance written on the local company. It operates on the principle of an aggregate excess of loss pool.

^{8/} Reinsurance is the transfer of part of the ultimate liability of loss from one insurance company to another. Thus an individual company is able to "insure" itself against losses beyond an amount which its officials think it can safely carry, considering the size of its safety funds. Reinsurance may apply to specific high-valued properties or to the business of a company as a whole. This transfer of risk is an intercompany affair in which the insured property owner has no voice or direct interest. If he has a claim, it is payable to him in the amount of insurance he carries by the direct-writing company from which he obtained insurance. Any payment on the loss by a reinsuring company is made directly to the company from which the insured obtained his policy. The latter company adds the amount needed to pay the loss in full.

Comparative Operating Expenses

Recent U.S.D.A. work indicates that, for companies writing only fire insurance, operating expenses are highest for the smallest mutuals while the medium size companies have been able to attain the lowest operating expense. However, the largest size companies were able to keep their operating expenses lower than the smallest companies. For companies writing fire and wind, the smallest sized mutuals have had the highest operating expenses while the medium sized companies attained the lowest operating expenses. Essentially, comparison in operating expenses by size group is analysis of "bedroom office" procedures for the small companies versus the I.B.M. machine for the large companies.

These recent results are in contrast to work by Valgren in 1915, when he found that operating expenses were lowest for the small companies. It is possible that while the coverages offered by the small companies today compared with those of the early 20th century, transportation, communications and internal operational techniques have improved such that the larger company is now able to operate at a lower cost per dollar of insurance in force.

The small mutual fire only, and fire and windstorm insurance companies have more safety funds per \$100 of insurance than have the larger companies. This may be attributed to the fact that fire losses per \$1000 of insurance in force cannot be predicted as accurately for the small company as for the larger company. It appears that stability in loss rates tends to increase with company size.

Merger

Conceptually, several reasons can be advanced for the farm mutual insurance industry's attempt to merge firms and expand coverages. Though consumer change may be only a partial cause for change in mutual insurance

firms and the industry behavior, it may be acting as a starter for change.

The following external forces constitute some of the changes that are occurring which may influence internal firm changes:

1. Change in number of policyholders.
2. Change in geographic concentration of policyholders.
3. Change in valuation of present farm building property.
4. Change in total value due to new buildings.
5. Change in degree of risk of loss due to structural design of buildings.
6. Change in degree of risk due to nature of farm operators remaining on farms (moral hazard).
7. Change in amount (per cent) of coverage that farmers desire on property due to "realized" change in nature of their farm business.
8. Change in services farmers require with farm property insurance coverage.^{9/}
9. Change in farmer loyalty to individual companies.
10. Change in farmer shopping habits for farm property coverage--including need for company office secretary to answer telephone, meet customers and provide on the spot answers.
11. Change in farmers' sources of information regarding farm property insurance coverage available and services made available by various companies.
12. Change in the forms of coverage that farmers desire.^{10/}

The general trend since 1936 has been to a reduction in the number of mutual fire insurance companies in the United States and in the Corn Belt. Mergers have accounted for the largest percentage of the companies that have ceased operation as farm mutual companies in the Corn Belt. A higher percentage of small companies have discontinued operation as compared with the larger companies.

^{9/} For instance, loss prevention which includes: any activity, function or operation, that reduces the probability of loss or damage from any cause.

^{10/} For instance, a multiple peril endorsement which includes: protection against direct loss by theft, larceny, robbery, pilferage, vandalism, malicious mischief, overturn, collision, water damage, smothering, freezing and electrocution of livestock and damage caused by sonic boom.

Little empirical work has been published on the underlying reasons for mergers. One suggestion is that some of the small companies have been unable to offer the coverages offered by the large companies. In turn, the secretary and often members of the boards of directors have become engaged in writing coverages for larger companies that the small company couldn't offer. These company officers could (a) see advantages for themselves in receiving larger commissions by merging their companies with the larger company and then working for the larger company, or (b) feel that the number of potential policyholders in their communities was declining so that ~~the~~ number of policyholders would be too small to continue operation of the company. The drive for power and closure are other possible reasons for mergers in the industry.

Mergers of medium size farm mutual companies with each other may be attributed to reasons such as (a) a desire to obtain internal efficiency through use of electronic data processing equipment, (b) desire of company personnel to obtain bigness in an effort to at least compete psychologically with large companies, and (c) combining of coverages offered and increasing of geographic area.

SECTION II

The Problem

To date limited research has been completed on either the supply of or the demand for farm property insurance. To the best of our knowledge most of the work completed at experiment stations has been of the farm production nature i.e., what types of insurance are available to farmers and how can they use it in their farm business? Within the Farm Economics Division of the U.S.D.A. numerous publications which deal with fire, windstorm and reinsurance companies and coverages made available have been released in the past decade.

In order to provide the best possible coverages and services to farmers at the least cost, the mutual insurance industry and individual companies need to know what effect internal size, specialization, or diversification of coverages have on operating efficiency of farm mutual insurance companies. In addition to knowing the relationship between these various economic factors, the farm mutual insurance industry may be able to improve its service to farmers through the knowledge of the effect that reinsurance programs have on the cost structure of individual companies. In addition knowledge of economies to be gained through use of deductible and package policies is needed.

This study then will focus primarily on the cost of production side. However, limited focus will be placed on the demand side, i.e., we will attempt to compile data on total farm property insurance coverage written in the U.S. for the years 1940-50-60, and determine what per cent of the total amount was written by stock and mutual companies.

Specific objectives of the study are:

1. To classify inputs in mutual insurance companies into meaningful categories; i.e., sales expense, loss payment expenses, officer salaries, advertising, or fixed and variable expenses.
2. To determine factors affecting operating costs per unit of insurance coverage.
3. To propose ways by which economies of operation may be obtained; e.g., increasing geographic area of operation, mergers, reinsurance, adding new lines of coverage.
4. To determine at what output level (total insurance in force) firms offering the various coverages and combinations of coverages are at the low point in average cost.

It is planned to limit the work to farm property insurance in the Corn Belt.

The Model

In this work with the farm property insurance industry it is proposed to work with the cost structure; i.e., to develop positive cost curves. These

cost curves will be developed from data for various type companies based on five year records. The costs will be in a per millions of dollars of insurance in force basis. (See Figure 1.)

Experiments will be made in developing a second cost structure by taking two or three year data and plotting points for each company for each of the two or three years. In this cost curve the actual loss cost payment will be used for each year selected. The company's surplus will be treated as mentioned above on a one year basis.

This procedure will provide one point for each company. The cost curve for each of these groups of data will then be developed by using a vector regression technique or a similar technique that may appear advisable after a preliminary examination of the data.

Several different cost curves will be developed for companies that are classified as farm mutuals. They are as follows:

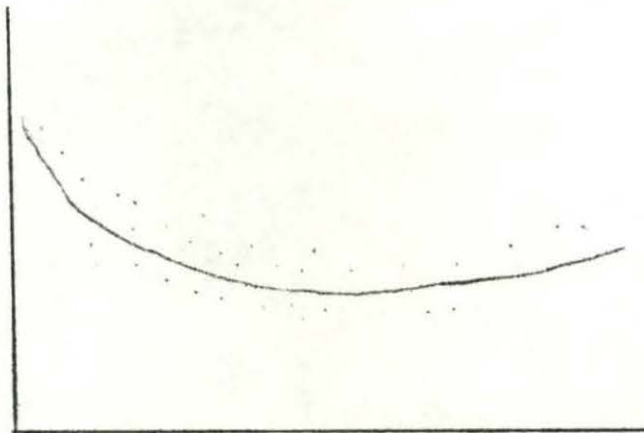
1. Fire only AND fire and 5-point extended coverage (E/C)
 - a. Without reinsurance
 - b. With reinsurance
2. Fire and wind AND fire and 7-point E/C AND fire and wind or 7-point E/C and other coverages (such as overturn, multiple peril, etc.)
 - a. Without reinsurance
 - b. With reinsurance

After the cost curves have been developed, attention will be given to the factors that influence the cost and output position of individual companies, i.e., what are the basic factors that influence growth in insurance in force and costs per \$1,000 of insurance in force.

The first aggregative cost structure will be developed by averaging total costs for individual companies for two years and dividing the total by the average amount of insurance in force for the two years. In the case

Figure 1.

Cost per \$1,000
of insurance in
force.



Millions of dollars of insurance in force.

of companies that use reinsurance, reinsurance costs will be used along with loss payments. Special treatment will be given the loss payments and company surplus. The total loss payments of an individual company for five years (divided by 5) will be used as the base for the loss cost item. This will permit account to be taken of an "excess of loss year" that an individual company may have.

Each company's surplus will be handled as follows: An opportunity cost of 6 per cent will be charged against the two year average of the surplus. From this amount will be subtracted the actual income received from the surplus. The difference will be used as the actual cost of the surplus. The actual amount that companies spend in managing their surplus will be used as a cost item. This will be computed for two years.

Source and Selection of Data

Two corn belt states have been tentatively selected for study, Illinois and Indiana. The first step will be to classify all farm mutuals on which the Insurance Commissioners have record for the past five years into the various categories mentioned earlier. The next step will be to randomly select companies in each category and collect the data. It should be noted

that a random sample of all farm mutuals in existence will not be developed since only those companies that file annual reports will have opportunity to enter the sample. However, if the reporting percentage is the same in the other states as it is in Indiana, only about 15 per cent of the farm mutuals will not be included.

In the event that records are not available for the most recent five years--as was the situation in Indiana--the most recent five years for which records are available will be selected; i.e., in Indiana, the farm mutual records for 1957 have been lost, hence, the study will concentrate on the years 1955, 56, 58, 59, 60. As was noted earlier in this discussion data will be required for only 1959 and 1960 for all cost items except loss costs which will require five year data. Five year data are selected so that account may be taken of an "excess loss year" that an individual company may have.

To aid in classifying companies into various stratifications and to examine variables that influence the cost per \$1,000 of insurance in force, a mail questionnaire will be developed that will be sent to the companies that are selected for the cost structure analysis. In the event that the Insurance Commissioner's records do not contain sufficient information to allow stratification of companies prior to attempting the construction of the cost curves, this information will be obtained by the mail questionnaire.

Since data will be used for companies in different states, state insurance laws may have an effect on the cost data for the companies. Company personnel will be queried on the effectiveness of their state laws and how such laws have affected operations through the years. This type of "attitude analysis" along with interpretation of the insurance laws of each state may provide some further insight into the cost analysis.