

Direct Marketing of Insurance

Integration of Marketing, Pricing and Underwriting

As insurers move to direct distribution and database marketing, new approaches to the business, integrating the marketing, underwriting and pricing activity will be increasingly important. Many insurers today are adopting increasingly sophisticated approaches to direct marketing, especially for automobile insurance. Large, sophisticated customer databases and sophisticated analytic approaches are used to direct marketing efforts.

The underwriting, pricing and marketing roles at these companies are evolving but are still largely segregated. Each area functions in a highly specialized area, linked to the others but still compartmentalized. Marketing analyzes customers and customer lists to predict response rates and thus profitability of the marketing activity. Actuarial analyzes experience data to estimate loss costs by type of insured. This is often done with special actuarial databases, making little use of more extensive customer databases.

To achieve optimal results, more integration of these three roles is needed. The actuary will need to have active hands on involvement in the marketing process, helping the marketers move beyond response prediction, to analysis of loss costs as well. This paper explores how companies should operate in this new environment.

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I. Introduction

Direct Marketing is increasing in importance in business in general, and in the insurance business in particular. Direct marketing is gaining share in the insurance business worldwide, with spectacular success in some areas such as U.K. auto. Database marketing techniques are increasing in sophistication, driven in part by increases in available computer power. Other Financial Services companies such as banks use these techniques well, and will bring them to the insurance markets, forcing insurers to adopt them to keep pace.

To maximize value from these techniques, they should not be viewed as simply a change in how insurance is marketed. They should be used in a way that has a broad impact on the entire operation, integrating marketing with pricing and underwriting.

Direct marketers use very sophisticated analytic techniques, developed over many years of marketing a wide variety of products. Insurance is a unique product for these techniques in many respects. One very important respect is that the cost of goods sold is a function of who buys the product. For other products, direct marketing

techniques are used to manage the volume of sales and the cost of selling, with the cost of the products sold taken as a fixed assumption in the analysis.

Managing the cost of goods sold is, in a sense, the focus of traditional actuarial pricing work. The actuary determines rates that will produce the targeted unit profits. The primary focus of the work is loss costs, which represent the bulk of the cost of goods sold for most types of insurance. Marketing unit costs are typically taken as an input assumption.

By integrating database marketing techniques with traditional actuarial approaches, the total profits from the business sold can be managed more effectively. Management of loss costs and marketing costs will be integrated into a single process.

This integration of marketing and pricing will impact the actuary's job tremendously. Traditionally, the pricing actuary has focused on rate analysis, typically reviewing each set of rates once or twice a year. The process for doing those reviews has not changed much for many years. That work has been coordinated with other areas of the company, but not closely integrated with them on a day-to-day basis.

In a database marketing environment, actuaries will have much larger data sets to analyze, updated much more frequently. Decisions concerning rate levels will be made frequently, not just for changing filed rates, but also for managing the marketing process.

The rest of this paper describes this new environment. First, there is a brief description of current processes in a non-integrated approach. Then, direct marketing approaches in general use for all industries are described, including emerging database marketing techniques.

The paper then goes on to describe a new objective function for insurance, one that integrates the usual direct marketing goal of maximizing business acquired per marketing dollar with the usual actuarial goals of managing the loss ratio. The goal of an integrated approach is to maximize this new objective function per dollar invested in marketing. The following sections go on to discuss how the marketing, pricing and underwriting functions should operate to accomplish that.

Most of the principles discussed here generally apply to any line of business, in any country. Examples used here to illustrate these principles generally are based on U.S. private passenger automobile insurance.

II. Traditional Approaches to Pricing, Underwriting and Marketing

Pricing

Traditionally, actuarial pricing activity has focused on the need to review and update the rates charged. Overall rate levels are reviewed every 6 to 12 months. Indicated changes in rates are filed with state regulators and implemented when approved. The

process is entirely a cost-based analysis in form, but in practice there is usually some recognition of the market (e.g., competitor prices) reflected in the final rate decisions.

Underwriting

The underwriting activity involves a review of individual risk applications that are received. Rating data is verified, using tools such as motor vehicle reports. Risks are evaluated based on factors not in the rating plan - e.g., credit history, interactions of unusual variables.

The underwriting process results in a decision whether to accept or reject the risk. It is frequently used to make judgmental adjustment to rates - e.g., assigning auto risks to one of several tiers: select, standard or non-standard. This evaluation process is increasingly being done using expert systems.

Some underwriting decision rules are based on analysis of loss experience data, but many are not. Often they reflect the seasoned judgment of experienced insurance professionals as to what constitutes a good risk.

Marketing

The objective in traditional direct marketing is to maximize sales per dollar of investment in acquiring customers. This traditional approach assumes that the cost of goods sold per unit is fixed and known. That is the case for many products commonly sold through direct marketing, e.g., Ginsu Knives. But not for insurance, where the

cost of goods sold is a random variable, and the expected value of that random variable is a function of who the buyer is.

Direct marketers have developed very sophisticated analytic tools for maximizing the sales generated per dollar of marketing costs. The marketing databases to which those tools are applied are increasingly large and powerful. These will be discussed in some detail in the next section. Applied to managing marketing costs alone, these techniques impact only 10-20% of the premium dollar. If they can also be applied to manage loss costs, representing 70-80% of the premium dollar, the potential payoff is much greater.

III. Direct Marketing Techniques

Direct marketing techniques have been well developed over many years, for many different types of products. They have increased in sophistication as computing power has become cheaper, and as increasing amounts of consumer data have become available. For those readers not familiar with the field, there are many popular books describing it. Two good examples are listed in the Appendix. The brief description below is a very high level overview, intended as background for the following sections.

In most applications, the goal of direct marketing is to maximize the return per dollar invested in marketing - e.g., in creating and mailing a direct mail campaign. The return is typically measured in terms of numbers of sales or dollar volume of sales. Tools to

manage that return include selecting who to mail to and design of marketing materials for direct mail. For other media, tools include advertising design, and choice of advertisement placement for print and radio and television.

In some cases, price is also a tool. By testing different prices, the company can select which combination of price (profit margin) and response rates (sales volume) will maximize total gross margins.

Past results are the basis for analysis using those tools. For example, results of past direct mail campaigns can be used to select the best prospects for a new mailing. The results of the past campaign are analyzed to determine the key characteristics of people who bought - e.g., demographics, psychographics, prior buying behavior for similar products. There are many mailing lists that can be rented to identify new prospects. This data can be added to the company's house list (the database of its own customers' past behavior). Mathematical analyses identify prospects promising the best return per marketing dollar in the new campaign.

Similarly, results on past print, radio and television campaigns are analyzed for planning future advertisement placement. The impact of variations in advertising copy is reviewed as part of that process.

Marketing database tools have increased in size and power over the years. Successful direct marketers continually enrich their databases. Knowledge about customers and

their buying behavior is a key competitive advantage. Marketing databases are constantly enriched through external data sources, through customer feedback and surveys, and through customer interaction with the call center.

Sophisticated mathematical tools are used to analyze this data, to spot buying behavior patterns that can help manage the marketing process more effectively. These tools are often based on linear regression models, enhanced by special techniques for examining interactions among variables. Sometimes advanced techniques such as Artificial Neural Networks are used.

In summary, direct marketing applies sophisticated mathematical techniques to large data sets, to manage the marketing process to maximize response rates or revenue generated. Much of this approach is valid for insurance as well, but the objective function - the item being maximized - should change.

IV. Objective of an Integrated Approach

The company's objective is to maximize the overall profit, reflecting both marketing costs and loss costs. In deciding how to invest its marketing dollars, the company will want to maximize, per dollar of marketing cost, the aggregate value of the profits generated by customers acquired.

Viewing just the next policy year, the profitability of each customer acquired can be viewed as the rate that is actually charged minus the indicated rate that should be charged to exactly meet the company's profit target. That indicated rate should cover all costs, including the cost of capital. To maximize profits, the company would want to market in a way that maximizes the aggregate value of: the profitability per target customer times the probability of acquiring that customer. Marketing, pricing and underwriting activities should coordinate to maximize that.

This is a pure profit maximization criterion. At times, the company may want to overlay other objectives on this, for example:

- geographic coverage of urban areas at least at specified minimum levels, to meet regulatory/public policy concerns; or
- geographic dispersion to manage catastrophe exposure

For discussion that follows, the pure profit maximization objective is assumed. The approaches discussed could easily be adapted to reflect additional considerations such as these.

A broader, longer-term profit measure, such as Lifetime Customer Value (LCV) may also be appropriate. This measures the value of an acquired customer over the lifetime of his relationship with the company. That is similar to approaches used by many life insurers to price long-term contracts, estimating the total profits over the lifetime of the policy. Embedded Value financial management approaches incorporate that view

into a regular financial reporting system. In some companies/industries LCV measures often extend beyond the current product sold, to include all future expected sales to the same customer.

In direct marketing, where money is invested in acquiring new customer relationships, that view of customer profitability is appropriate. The approach discussed here could be easily adapted to reflect it, on a reasonable approximation basis. As a simple example, assume that the market will adjust over time to eliminate excess returns-i.e., the excess of rates actually charged over the indicated rates-at a constant rate over 4 years. If inflation is 6% and the risk-adjusted rate of return that the company wants to earn on investments in marketing is 12%, then the present value of all excess returns could be estimated as:

$$[\text{Actual} - \text{Indicated Rates}] \times \\ [1 + 0.75 \times (1.06/1.12) + 0.50 \times (1.06/1.12)^2 + 0.25 \times (1.06/1.12)^3]$$

Another important issue in these analyses is how to treat expenses. What expenses should be reflected in determining these indicated rates? Many would argue that only variable costs should be reflected.

V. Marketing In An Integrated Approach

Insurance introduces a number of unique issues for direct marketing that are not present for most other products. For automobile insurance, for example, we can generally say that:

- Most people will definitely buy a policy, but only one policy.
- Most people already have a policy, and inertia will lead them to renew that unless there are significant savings from switching (e.g., 15 to 20% in research we have seen).
- Decisions to change insurers occur mainly at policy renewal dates, but also at the time of other significant changes such as moving to a new address, buying a new car, change in marital status. But absent one of these events, insureds are unlikely to change except at the renewal date.

In addition, there are variations in buyer behavior in insurance that do have strong parallels in direct marketing of other products.

- Some, but not all, insureds will shop around extensively for the best price before purchasing, and price will largely determine their purchase.
- Some people have a strong preference for dealing with an agent (and perhaps strong loyalty to their current agent or company), while others will have a strong preference to purchase direct.

These factors influence the marketing process in many ways. Targeting offers to people who are at the right time to switch is important for managing cost-effectiveness of the marketing effort. Renewal dates of current policies are important data to capture on the marketing database. Mailing lists of people at key events (e.g., moving) are also very useful.

Demographic factors are important indicators of propensity to buy direct, without an agent, and should influence marketing decisions. For example, Generation X is much more likely to buy direct than are Senior Citizens. Of course, each of these groups can be segmented into sub-groups more and less likely to buy direct.

In traditional direct marketing, the goal is simply to maximize expected sales volumes. For insurance, the objective function is more complex:

$$\begin{aligned} & \text{probability of acquiring the customer} \\ & \quad \times \quad \underline{\text{times}} \\ & \text{expected profit of the customer if acquired} \end{aligned}$$

For the first item, all of the usual direct marketing analytic approaches for targeting marketing investments will apply. In addition, insurance presents a new factor - the difference between the rate the company offers and competitor rates. While this is only one additional factor, in practice it is likely to be the most important factor in acquiring the customer.

The second item is unique to insurance. It involves comparing the rate the company offers with the best estimate of the indicated rate.

Thus, insurance introduces two new elements to the direct marketing process - the rates that competitors charge, and the indicated rate that the company should charge to meet its profit goal. Both of these are unknowns, both depend on the particular customer, and both are areas where the actuary can play a key role.

Competitor Rate Comparisons

Competitor pricing is extremely important. The difference between the company's rates and the rates of competitors should be reflected in the marketing process, since they are a prime determinant of the probability of acquiring the customer. Competitor rates include both those charged by the insured's current carrier, and the rates other insurers would charge.

In principle, rates could be compared on a case-by-case basis in selecting prospects for a mailing. This comparison could be automated, using the company's rating plan logic and competitor rating plans, if the marketing data base contains the rating variables on each prospect and competitor rating plans are known.

For prospects on the database who are not customers, estimates of competitor rates may be inferred from results on similar people who are customers.

It should be relatively easy to identify categories of prospects where the company is more likely to beat competitor rates. Going beyond that to estimate competitor rates, the resulting probability of acquiring the customer and the expected profit per solicitation mailed will be much more complicated. At the simplest level, combining a sense of where the competitor rates are high with a sense of where the company's own rates are very profitable will give a good indication of where to focus marketing efforts.

The marketing process can be an important source of competitor rate data, particularly in cases where underwriting scoring systems are used to assign insureds to tiers of rates. Customer interaction processes should be designed to collect this data, as well as data that could be used purely for marketing. Also, it is useful to validate rate data from competitor rate manuals and similar sources.

As for traditional direct marketing, for insurance the marketing process can provide feedback to the price-setting process. At times, the competitors' rates may be significantly above the rates charged for categories of business that are attractive. Those situations should lead to rate increases in the next rate manual change or it may indicate adjustments. If the volume in those categories is large, that may indicate doing the next rate change earlier.

VI. Pricing in an Integrated Approach

There are two sets of prices to consider in direct marketing of insurance:

- prices actually charged
- indicated prices that would be charged to cover expected losses and administrative expense

The prices actually charged will be calculated using traditional approaches. Regulatory requirements, the need to fit policy administration systems, and general public understanding of the current rating system are all reasons for not changing the formal rating plans used. For the rate analyses submitted to regulators, where required, it will also be most practical to continue using traditional approaches.

For the indicated prices, however, there are no such restrictions. The analysis and rating only needs to be understood by internal experts and management. These analyses are not generally disclosed outside the company.

Determining indicated rates, of course, involves the same actuarial principles as traditional rate analysis - adjustments for loss development, trend, rate level changes, classification relativities, etc. But when integrated into a direct marketing operation, there are important differences in the application of those principles. There is a much larger set of variables of analyze - including characteristics captured on the marketing database as well as the variables used in the rating plan. The indicated rates should be

updated more frequently - e.g., recalculating estimates of indicated rates for each mailing or marketing program.

Two general types of approaches to meeting these new needs are discussed below. One involves adapting traditional actuarial approaches to these new circumstances. The other involves adapting traditional direct marketing analytic techniques for predicting response rates to the more complicated task of calculating indicated prices.

Indicated Prices Using Traditional Actuarial Approaches

The simplest approach would make a few adjustments to the rates actually used (and filed with regulators where applicable). Adjustments to those actual rates could be made for various considerations, for example:

- Judgmental adjustments to filed rates are often made for practical reasons which do not reflect better estimates of indicated rates (e.g., no policy to increase beyond 20%). These adjustments should be eliminated.
- Filed rates reflect trending to the average effective date of the business to be sold using those rates. That trend is too much for early sales and too little for later ones. For direct marketing, the indicated rates could be adjusted to reflect the timing of each marketing campaign.
- Seasonality of loss experience is usually ignored in filed rates, but may be important for catastrophes or for six month policies. That can be reflected in marketing decisions.

A more precise approach would actually update the indicated rates whenever new data is available. For example, if new marketing campaigns are developed each month, the indicated rates would be updated each month, incorporating the latest available experience data. The traditional rate recalculations can be easily automated, in a way that allows actuarial and management review at the appropriate points. Automating the process entirely without allowing for review would not be advisable. But the review process would need to be much quicker than is often the case for annual or semi-annual rate filings. It would have to be done more frequently, as part of the preparation for each marketing campaign.

An even more tailored approach would incorporate in this traditional actuarial approach rating variables that are not part of the rating plan used for rates actually charged, but that do significantly impact the indicated rate. For the indicated rates, used internally only, there is no need to restrict the analysis to variables formally used in the rating plan.

Indicated Prices Using Database Marketing Techniques

The alternative general approach is to adapt the tools and techniques used by direct marketers to the prediction of loss costs. Those tools are primarily variations of linear regression approaches. The use of Generalized Linear Models to analyze insurance rates is common for personal automobile insurance in the U.K., but not as widely in the U.S. These linear regression and related techniques are better suited in many ways than traditional actuarial techniques for this process, which involves large number of variables, and updating the analysis (and often even the set of variables used) very frequently. Practice, and mathematics, in this area has been highly refined through years of use in predicting response rates.

However, projecting insurance loss experience is more complex than projecting response rates. Insurance loss experience, and expected loss amounts, are more volatile than response rates or sales volumes, and generally more complex to predict (e.g., more variables may be needed in the analysis.) Concepts and skills from traditional actuarial analysis of loss experience should be incorporated in using these techniques. For example:

- Several years of experience may be needed, especially where the experience base is small, given the much larger potential number of classification factors.
- Premiums at current rates should be used for experience loss ratios, where those are the profit measures used in the analysis.

- A common actuarial approach is to limit losses, to avoid instability due to large losses. It may be desirable to test alternative levels of and approaches to capping (with broad average factors to provide for losses above the cap).
- Losses should be adjusted for loss development to ultimate, and for trend. These adjustments should be done in a way that is consistent with the cap on losses.

There are a number of theoretical issues to address in applying linear regression techniques to insurance loss data. Those are beyond the scope of this paper. They are likely covered in the literature in areas where Generalized Linear Models are commonly used for insurance rate analysis.

No matter how sophisticated the regression techniques used to estimate indicated rates, they can only reflect the experience on policies actually written by the insurer. For a small or rapidly growing insurer, the current book may not indicate expected experience from the overall target market. Most insurers feel they have a lot of knowledge of their business beyond the experience data being analyzed. Raw experience indications are tempered to reflect that, using credibility techniques. Bringing actuarial credibility techniques into use with linear regression analyses will present additional challenges.

VII. Conclusion

Direct marketing and the emerging technology of database marketing are here to stay. They will increase in power and in usage, as the analytic techniques become more refined, as computer power continues to decrease in price, as customer databases become richer, and as consumers continue to become accustomed to purchasing without an agent.

Direct writers using these approaches will gain share in personal automobile insurance, and in other lines as well. Banks and other financial services industries are ahead of the insurance industry in mastering these techniques. They will enter the insurance industry, bringing these techniques with them. Insurers will need to adopt them to compete. Agent-based insurers will also need to adopt them, to help improve agent productivity and reduce marketing costs.

These new techniques should not be regarded just as enhanced marketing tools. They should fundamentally change the operations of insurers, with integration of marketing, underwriting and pricing. Insurers who do not do this will miss the full potential of these new tools. This integration offers expanded opportunities for actuaries, as the pricing actuary is drawn into the marketing team, helping to manage that process on a day-to-day basis.

It also presents a threat to those actuaries who stick to traditional approaches and roles. Companies using these new techniques will bring in marketing executives with mathematical skills comparable to most actuaries, and with a business orientation that

may resonate better with top management. If actuaries do not learn and use these new techniques, and apply their unique skills to using them, they risk becoming viewed as regulatory compliance technicians, not as executives who help drive the business.

APPENDIX - SUGGESTED READINGS

Direct Marketing - Strategy, Planning and Execution

By Edward L. Nash, McGraw-Hill, Third Edition (1995)

For the marketing-oriented actuary, this book gives a good description of the marketing processes, different direct marketing media, etc. The economics of direct marketing are discussed, but at a non-technical level.

The New Direct Marketing, How to Implement a Profit-Driven Database Marketing Strategy

David Shepard Associates, Inc, Irwin. Second Edition (1995),

For the more mathematically inclined, this book gives a good review of some of the mathematics used by direct marketers.