

CHAPTER TEN

THE PROFIT PROVISION

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OVERVIEW

McClenahan and D'Arcy agree that profit should vary with the risk involved in transacting the business. The task is to estimate what profit is appropriate for a given level of risk. I shall address what I think are the characteristics of a proper risk-load, and I shall conclude with why I support the percentage of premium position at this time.

WHY DO WE CARE ABOUT THE PROFIT PROVISION?

When selecting a proper method for determining the profit provision, it helps to consider the context within which the profit provision is being used. Consider the following:

1. The actuary is given a goal from upper management that targets a certain return on either premium, equity, assets or any other base. If this is the context for which we are determining the profit provision for a rate, there is little controversy and less theory. We will set the rate level in such a way that the target return is expected to be earned.
2. The actuary bases the rate level on the current market conditions for a line of insurance in a given region. Again, there is little controversy and little theory involved. If the price is determined by market conditions, we do not need to be concerned with a theoretically appropriate profit provision.
3. The actuary wishes to determine the theoretically appropriate, risk-adjusted, profit provision. In this case, I am unaware of any method that adequately adjusts the required profit for all of the relevant risks involved. We need not go further since we do not have adequate tools.
4. The actuary wishes to determine a profit provision that will meet the requirements imposed by regulation. Obviously, the actuary must review the regulation and set the profit provision in such a way that it does not violate the regulatory standards. Again, theory does not matter. What matters is the standards set by the regulator.
5. The actuary is attempting to aid the regulators or management in determining the proper standard for a profit provision. I believe that this is the primary situation where any debate over a proper profit provision becomes useful. For regulators, the debate centers around a standard for rates that would not be excessive. For management, the debate centers on what would be the appropriate profit goals for this

portion of the company's operations. Realistically, these standards will not follow risk theory completely. Given that fact, an arbitrary return on sales standard is just as valid as an arbitrary return on equity standard or a discounted cash-flow analysis that uses an arbitrary discount rate.

THE PROPER RISK-LOAD FOR AN INSURANCE RATE

Consider the following companies. Assume the books of business are identical.

TABLE 1

	A	B
Surplus	\$ 100,000,000	\$ 50,000,000
Premium	100,000,000	100,000,000
Fixed Expense	20,000,000	20,000,000
Variable Expense	15%	15%
Investment Income	8,000,000	6,000,000
Losses	58,000,000	58,000,000
Profit	\$ 15,000,000	\$ 13,000,000
ROE	15%	26%

While the risk from transacting this business to both the policyholder and to the company is different given the surplus positions of each of the companies above, I know of no theory which would account for the magnitude of the difference in the proper theoretically required profit provision. Yet, economic principles state that in a competitive market, the price for a commodity should move towards an equilibrium and neither **A** nor **B** would be able to move this equilibrium price by itself. Property and casualty insurance is considered by many economists to have many of the characteristics of a competitive market.

Imagine the above two companies were given the option of transacting business in a new line that had the following characteristics:

TABLE 2

Expected Losses	\$ 5,800,000
Expected Investment Income	\$ 800,000
Fixed Expenses	\$ 2,000,000
Variable Expenses	15%

Below are some questions that illustrate the difficulty of determining an appropriate profit provision:

1. Should **A** choose profit provision that would produce a 15% ROE and **B** choose a profit provision which would produce a 26% ROE? Or, should the premium and the profit provision be similar?
2. From a regulator's point of view, should the two programs have the same price, or should the price vary due to the ROE requirements?
3. From the policyholder's point of view, how much of a premium difference would be acceptable to compensate for the extra safety provided by **A**, which has double the surplus?

I believe that, given an accurate risk-load, all profit models would generate comparable results, whether the model is based on a percentage of sales, discounted cash flow analysis, return on equity, return on assets, etc. The differing results generated by the various models can partly be attributed to the lack of an accurate method for determining the proper risk-loading for a rate. A true risk-load should be a function of the following:

1. The variability of the existing book of business: It is generally accepted that the different insurance lines do not vary in a uniform way. The risk load for each company should reflect the expected variability of that company's mix of business. An accurate risk-load should reflect the unique and changing characteristics of the company's portfolio of business.
2. The variability of the line for which the rate is being made: It would be wrong to expect uniform variability from every line of insurance. A line, such as earthquake insurance, would not exhibit the same variability as automobile physical damage. Even within a given line of insurance, the expected variance will differ depending on factors such as the company's marketing strategy, the geographic distribution of the exposures, the limit or deductible profile, etc. A company having a large concentration of homeowners business in a relatively small geographic area would face greater risk, due to the exposure to a catastrophic loss, than another company with a widely distributed book of homeowners business, all else being equal.
3. The variability in the investment portfolio: Each company follows its own investment strategy. Some companies accept higher investment risk for the expectation of higher investment return. Since the investment strategy contributes to each company's ability to honor its obligations, it can be argued that the characteristics of the investment portfolio should contribute to the estimation of a proper risk-load.
4. The amount of surplus available to the company, especially relative to the variability of insurance and investment operations: The smaller the company's surplus, relative to its premium writings and its liabilities, the greater the risk that the company will be unable to meet its obligations. Economic theory states that shareholders should demand a higher expected rate of return for accepting the greater uncertainty in

results. This higher expected return would increase the total profit provision, but not necessarily through a risk-load provision. Note that the opposite is true for the policyholders. The policyholder should be willing to pay a premium for coverage from a company with a relatively secure surplus position. Policyholders should demand a discount from companies that are less stable financially.

5. The variability in the prospective investment market: Expected changes in the financial markets will affect the company's ability to meet its obligations. An interest rate assumption could be based, in part, on such expectations.
6. The impact the new policies or the new rate (possibly with a reduction in total policies) will have on the variability of the existing portfolio: A company's portfolio of insureds will change in response to a rate filing. If possible, the risk-load should reflect the expected variability of the portfolio after the rate change, rather than the variability of the company's historic or current portfolio.
7. Ideally, the change in variability of the portfolio attributable to any individual risk written at the new rate: Here, I am advocating a dynamic risk-load algorithm. I shall use earthquake insurance to illustrate my point. One hundred written exposures in a given geographic region will expose the company to some undefined level of risk. I shall call this level of riskiness X. The problem for developing a risk-load is that when the company's exposure increases to 1000, the riskiness increases to something greater than 10X. A dynamic risk-load is more appropriate for this coverage. Some commercially available earthquake insurance computer models attempt to do just that.

If there is no theory accurately reflects these considerations, what practical method can be used to determine the price? Three common methods are listed below.

- I. Market price, possibly with a deviation.
 - A. Evaluate the pricing of competitors.
 - B. Profit analysis is limited to determining that a profit exists. For competing projects, choose the project with the highest profit relative to the estimated risk.
 - C. Many companies' prices today are driven by market price analysis.
- II. Return on Equity Analysis.
 - A. One form would have the required ROE provided either by the regulator or by the upper management of the company. This form of ROE analysis ignores the risk-characteristics of the product being priced. Many companies set their rates in this manner.

- B. A risk-based target ROE would be a more theoretically accurate method. Again, I know of no theory that considers all forms of risk.
 - C. In any ROE analysis, the allocation of equity is problematic.
- III. Return on Sales.
- A. This method is simple. In many industries, this is the method for determining a profit provision. Historically, this was the way a profit provision was determined. Many insurers continue to price this way.
 - B. This method, discounted cash-flow analysis, and ROE should be equivalent if consistent assumptions are used in formulating the risk-load.
 - C. If the methods are equivalent, why not use the simpler one?

CONCLUSION

Since I believe that there is no accepted theory for determining a proper risk-loading, and since the allocation of equity for a ROE analysis is problematic, I feel that there are two simple and acceptable ways to set a rate. The first would be to determine the level of rates in the market, and setting the prospective rates based on this market analysis. In a truly competitive market, this method would be required.

To the extent that insurance is not a commodity, and to the extent that the insurance marketplace violates some of the economic assumptions underlying the theory of competitive markets, the determination of a profit provision becomes more meaningful. I believe that any profit provision can be, at best, an estimate of a theoretically sound quantity. Without an accurate method for determining the risk-loading, I feel that this estimate will be based on simplifications and assumptions. The result of such a formula may be accurate on average, and may even be unbiased. However, I feel that any such risk-load will not reflect the unique risks of the line being priced. If this is true, why not use a simple method for estimating the profit provision?

The return on sales method makes comparison with other companies relatively simple, and changes in target profits are easily transformed into rates. All things considered, I think that determining a profit provision as a percentage of sales is the most practical of the method available today.

