

Cost Effectiveness of Risk Management Practices

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Abstract

Despite the increasing importance of risk management in a successful business organization, virtually no research has been undertaken to evaluate the effectiveness of various risk management practices. Through analysis of data obtained from a survey of risk management professionals, such an evaluation has been made and is reported here. Results include the expected effects of lower costs associated with higher levels of retention, increased size, and less risky industries. The relationship of higher costs with the use of a captive, and the ineffectiveness of centralization or use of analytical tools were unexpected.

Introduction

Though how to achieve cost effectiveness of the risk management function is an important question, it has been given relatively little attention in the literature. The primary objective of the research presented here is to consider that question. Specifically, the cost-effectiveness of available risk management tools is measured while controlling for organizational risk characteristics.

Two steps are taken to meet this objective. First, the expected effectiveness of alternate designs of the risk management function are theorized. Second, data are analyzed to quantify how risk management functions are actualized and to measure the relative cost effectiveness of differing risk management designs.

Data to meet these objectives were obtained through a questionnaire sent to risk managers of large U.S.-based corporations. No published study has

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attempted to relate risk management practices to cost; hence, the results will contribute to the understanding of a neglected topic. In addition, some of the information previously provided by the *Cost of Risk Survey*,¹ is available through this study. Thus historical measures of risk management costs may help future decision-makers regarding various policy decisions.

Following a discussion of the literature, the remainder of the article is comprised of three parts. The first is a description of the theoretical background for the hypotheses tested with the data compiled through the questionnaire. Next, a presentation of the results of the data analysis is given. Lastly, conclusions regarding the results and discussion of future research are provided.

Literature Review

Most risk management research reported in this *journal* and elsewhere has focused on whether or not the discipline should persist. Early pieces considered the desirability of developing a specialized business curriculum for risk management (see, Christy, 1962; Criddle, 1963; Hammond, 1963; Loman, 1966; Long, 1961; Mehr, 1987; and Snider, 1961). The authors tended to agree that institutional specialization in risk management gave it a valued position in business education.

Later work evaluated risk management's role in the context of the "theory of the firm." These efforts are exemplified by Mehr and Forbes (1973) who state:

... risk management models which assume away the complex and conflicting objectives found within corporations appear to be naive. For example, while normative theory may prescribe a formal model for making a decision regarding the amount of the insurance deductible, such a formulation is likely to be inapplicable, for if there is a conflict between internal management and shareholder interests (as reflected in conflicting solvency and profitability objectives), one can expect the interests of the former to call for very low deductibles which violate the model's rule of conduct (p.396).

Mehr and Forbes suggest that "risk management theory needs to merge with traditional financial theory in order to bring added realism to the decision-making process" (p.389). Their work, in essence, foreshadowed future finance theories, such as agency theory, and various other research efforts such as those of Cummins (1976), Mayers and Smith (1982, 1983), Main (1983), Doherty (1975, 1985), Smith and Buser (1987), MacMinn (1989), Cho (1988), and others. These authors incorporate insurance and risk

¹The 1985 *Cost of Risk survey* was a joint project conducted by the Risk and Insurance Management Society, Inc. (RIMS) and Tillinghast Division of Towers, Perrin, Forster & Crosby (three prior studies were sponsored by RIMS and Risk Planning Group, which has since merged with Tillinghast). Data were gathered on insurance premiums, unreimbursed losses, risk control costs, and administrative expenses. Because of the low response rate (13 percent in 1985), RIMS agreed to continue the project only if at least 20 percent of the surveyed risk managers participated in the next survey; they did not. Hence, the *Cost of Risk Survey* has not been continued.

management decisions in what Mayers and Smith term "the modern theory of finance," considering use of insurance along with various debt and equity options in making financing decisions.

Mayers and Smith (1982) show that the corporate decision to purchase insurance is desirable (i.e., the risk management function adds value) when advantages in risk bearing and/or service activities accrue to insurers, reductions in the costs of bankruptcy are significant, contracting costs are minimized, and/or taxes are reduced. Meyers and Smith also show how bondholders can control an incentive conflict with shareholders by requiring the firm to purchase insurance (1987). Considering how to maximize the value of the risk management function, of which purchasing insurance is a part, is the purpose of the present study.

A number of surveys have been conducted to measure the risk management function.² These include O'Connell (1975), Cervený (1979) and Baglini (1976, 1983).³ The general intent of surveying risk managers in prior studies has been to measure their responsibilities and the methods by which they managed risk under various environmental situations (Baglini, for example, focused on international risk management). Taking a different approach, the *Cost of Risk Surveys* conducted by RIMS measured risk management costs attributed to various risk management functions and categorized them by organizational type. The survey used for the research reported here is an amalgamation of those types of surveys, measuring both risk management practices and costs.

Theoretical Background for Hypotheses

Risk management can be described as the performance of activities designed to minimize the negative impact (cost) of uncertainty (risk) regarding possible losses. Because risk reduction is costly, minimizing the negative impact will not necessarily eliminate risk. Rather, management must decide among alternative methods to balance risk and cost, and the alternative chosen will depend upon the organization's risk characteristics. This study measures the cost-effectiveness of available risk management tools while controlling for risk characteristics.

The costs to be measured (performance) and the attributes expected to affect cost must now be examined. Those attributes include risk management strategy regarding centralization and risk assumption; risk management techniques to implement the strategy chosen; and organization-specific and general industry characteristics expected to affect strategy, implementation, and cost.

²Other surveys have generally focused on specific aspects of risk management, such as the use of captive insurers.

³Baglini's two surveys served as prototypes for the one used here. In addition, many helpful comments were received from Dr. Baglini in the preparation of the survey.

Performance

The process of evaluating risk management performance is complex and difficult.⁴ For example, decisions to retain or transfer are best evaluated over several years rather than annually because of the averaging effect of random losses. Furthermore, measurement of loss control success requires a comparison of expenditures for loss control with the value of losses averted. The value of losses not experienced, of course, is unknown.⁵

Defining risk management performance or "success," therefore, is a challenge. The approach taken here is to define performance as premiums plus uninsured losses as a percentage of total assets, hereinafter referred to as per unit risk management costs. The initial field research⁶ pointed to this per unit cost value as representative of the risk manager's responsibilities. The risk manager can be expected to minimize per unit risk management costs over the long run. Loss control and administrative expenses are also elements of the risk management decision-making process. These expenses have not been included here, however, because of difficulties associated with survey responses as discussed under research methods.

The risk management function often will incorporate less tangible goals than minimization of explicit costs. One such goal may be maintenance of reputation. Furthermore, the objective of the organization's survival is implicit in any goal undertaken by the risk manager, yielding a tolerable level of zero probability for certain unsustainable events. The authors recognize, therefore, the potential existence of organizational objectives other than pure "financial ones."

Strategies

Evaluation of the cost-effectiveness of various risk management tools is undertaken by measuring relationships between specific risk management strategies and risk management performance. Those relationships are the result of two basic strategic decisions every risk manager addresses, whether explicitly or implicitly: how much risk to assume and whether to use a centralized or decentralized risk management program.

⁴Williams and Heins (1985) state that, "Because risk managers make decisions under uncertainty, much of their performance is difficult to evaluate in the short run."

⁵The problem is discussed by Mehr and Hedges (1987) on page 25 as involving "intangible costs and benefits whose measure is a purely judgmental matter."

⁶The field research constituted two parts, which provided input from approximately 15 insurance, brokerage, and risk management executives. One part involved interviews with brokers and insurers having expertise regarding international insurance programs. These interviews offered information concerning the financing options available to risk managers of international-oriented organizations. The second part of the field research was conducted through RIMS' Research and International Committees. Members of these committees offered reactions to the survey instrument.

Risk Retention: As a firm uses increasing amounts of retention, per unit risk management costs are expected to decline.⁷ Because insurance includes a loading factor, the firm's costs decline as the amount of coverage declines. Of course as stated earlier, in any single year incurred losses may exceed expected losses so that insurance would have been cheaper than retention. Such a result is assumed to be random and ought to average out in a cross-sectional sample, just as the hypothesized relationship is expected to apply over the long run for a single firm. Thus cross-sectional data address the preference for evaluating performance in the long run, given that losses do not disproportionately affect a specific sample of the data. Risk assumption may result from retention of losses and/or employment of a captive insurer.

Use of a Captive: Firms employing captive insurers are expected to incur lower per unit risk management costs than are those not using captives. Generally the implementation of a captive is considered the most sophisticated form of retention. A firm is expected to use a captive organization only when such use is cost-effective. Even when the captive's stated objective is, for example, to obtain broader coverage or better terms, the ultimate result ought to be lower overall costs; otherwise the broader coverages or improved terms are irrelevant. Non-risk related objectives were not stated by respondents.

As demonstrated by Cross, Davidson, and Thornton (1987), the tax-deductibility of premiums appears to be a significant factor in forming a captive. This advantage would exist between pure self-insurance and use of a captive but not between commercial insurance and a captive. Thus, to decide upon formation of a captive, some cost advantage must exist over commercial coverage. The captive, of course, can produce profits for the parent firm. An assumption is made, however, that the firm can use resources more productively in its chosen industry than in investments of insurance proceeds. If not, the firm ought to switch operations to the investment industry. Hence, despite the omission of investment income and management fees, hypothetically, the function of a captive (defined to include risk retention groups) is to reduce risk management costs.

Centralization: Increased decentralization of the risk management function is expected to result in increased per unit risk management costs. In addition to deciding upon the proper level of risk assumption, risk managers must choose the desired degree of centralization. Business organizations differ in their approaches to autonomy of subsidiaries and divisions, some encouraging significant independence, others permitting little individual decision-making authority.

From a risk management perspective, a centralized program would be expected to yield lower costs. Centralization generates a variety of advantages including improved predictability of losses through application of the law of

⁷ As noted in the literature review, Mayers and Smith (1982) present a number of benefits attributable to the purchase of insurance. Some of these benefits reflect costs not included in the performance measure discussed here. If included, the hypothesis relating performance to the purchase of insurance may differ.

large numbers, availability of insurer premium credits, and economies of scale for the development of risk management and loss control expertise (and the staff to support the expertise). In discussing the advantages of a centralized program, Bradford (1988) quotes Eliot H. Pardee of Fred S. James & Co. saying "a risk manager who has to deal with only one broker and one insurer has an easier job than the buyer who must deal with several." Hence, the administrative costs also should be lower when managing with centralized rather than decentralized activities.

Such advantages of centralization must be weighed against possible disadvantages, such as inconsistencies with the organizational philosophy regarding centralization and possible reduction in productivity due to a sense of lost autonomy. These disadvantages, however, ought not be reflected in per unit risk management costs as defined. Overall, therefore, per unit risk management costs are expected to be lower for centralized than decentralized risk management programs.

Degree of Analysis

Per unit risk management costs are expected to decline as the risk manager utilizes increasingly advanced analytical techniques in making decisions. Performance will be affected not only by strategic decisions, but also by the implementation of those decisions. Risk managers have available a wide range of tools to make and execute decisions, each of which can be categorized by the degree of analysis required. Furthermore, various techniques decided upon are considered more sophisticated than others.

Methods to implement risk management decisions fall into a number of categories. Decisions can be made with little analysis, such as those based on custom or rules of thumb. Alternatively, actions or decisions may be based on extensive analysis considering expected loss, variance, historical trends, and so on. Multiple measures are available and used in the regression analysis discussed in the next section to assess the degree of analysis employed by the firm. These include questions regarding the firm's choice of retention level based on use of cash flow analysis and effect on earnings per share versus the level of retention customarily used; the use of flow chart and financial statement analysis for identification of loss exposures; and the use of risk management information systems, loss triangles, and probable maximum loss estimates for evaluating loss exposures.

Information reduces the uncertainty of decision-making (see Tushman and Nadler, 1978). One would expect that the more sophisticated the analysis performed by the risk manager, the more complete will be the information on which decisions are made. Hence, a decision based on more advanced analysis would be expected to yield better results. Additionally, the more advanced the analysis undertaken by the risk manager, the better should be his or her position to negotiate with insurance brokers, and to manage local personnel. Because administrative expenses are not included in the measure of risk management costs used here, performance will not be worsened by the administrative burden of increased analysis.

Organization-Specific and General Industry Characteristics

Risk management costs are expected to be affected also by characteristics of the organization and the industry. Size and risk are two such characteristics.

Size: Larger organizations are expected to have lower per unit risk management costs than smaller firms. As an organization increases in size, it can be expected to benefit from advantages of economies of scale. Insurers are willing to give larger organizations quantity discounts because their losses are more predictable and because administrative costs increase at a decreasing rate relative to organizational size. As a result, lower per unit risk management costs are expected as size increases.

Risk: One of the most important factors likely to affect risk management costs is the organization's risk as defined by the industry in which it operates. The divergence of insurance rates across industries clearly indicates this importance. Thus organizations operating in industries with greater loss potential per exposure unit are expected to have higher risk management costs than those with smaller loss potential.

Research Methods

Questionnaire

To test the hypotheses discussed in the preceding pages, a questionnaire was sent to 374 managers identified by *Institutional Investor* (1986) as holding primary responsibility for risk management functions in their organizations. The companies represented by those 374 risk managers are large U.S.-based organizations. Of the 374 risk managers sent the questionnaire, 162 returned completed surveys, yielding a response rate of 43 percent.

The questionnaire solicited responses regarding four topical areas: identifying and evaluating exposures; decision-making; captive insurers; and organizational data (See Appendix A for the survey questions and mean responses). Responses were comprised primarily of rankings of importance on a scale of 1 to 5 of various risk management actions and decisions. Data collected from the sections requesting captive and organizational information included premiums, losses, total assets, and retention levels. The organizational information represents accounting, rather than market data, which may have an effect on the results because of variations in accounting rules. The authors, however, do not perceive any consistent bias that would influence the results.

A pre-test of the questionnaire was conducted with members of RIMS' Research and International Committees, and executives of CIGNA Corp., Johnson & Higgins, and Frank B. Hall. The major modification made as a result of the pre-test was to omit much of the financial data originally requested. The reviewers cautioned that a low response rate could be anticipated by asking for information considered proprietary or not readily available. Evidence from the 1985 *Cost of Risk Survey*, where only 50 percent or fewer of the respondents (with an already low response rate of 13 percent)

answered queries regarding loss control costs and administrative expenses, support this anticipation. Thus, questions such as the size of loss control expenditures (a value often unavailable to the risk manager because he or she does not have direct control of those expenditures), the amount of captive management fees, and the extent of premiums/losses in an extended time frame were omitted.

Research Results

Examination of Hypotheses

To test the hypotheses discussed in preceding pages, regression analysis was performed. As previously argued, per unit risk management cost are assumed to be a function of: the firm's retention strategy (ASSUM); the firm's centralization strategy (CENTRL); the degree to which the firm employs analytical tools in performing the risk management function (ANALY); whether or not the firm uses a captive insurer (CAP); the log of the firm's size (SIZE); and the firm's industry risk (INDCOST). Thus the regression equation is of the following form:

$$\text{FIRM COST} = b_0 + b_1\text{ASSUM} + b_2\text{CENTRL} + b_3\text{ANALY} + b_4\text{CAP} + b_5\text{SIZE} + b_6\text{INDCOST} + e$$

where b_0 represents an intercept term, b_1 through b_6 represent variable coefficients, and e represents the random error term.

The dependent variable and six independent variables are defined as follows:

FIRM COST: firm-specific ratio of premiums plus uninsured losses divided by total assets

ASSUM: firm-specific ratio of the summation of per occurrence retention levels, as measured by the corporate risk manager

CENTRL: importance of local manager in choosing local retention levels, as measured by the corporate risk manager

ANALY: importance of analytical tools in making risk management decisions, as measured by the corporate risk manager (those tools are defined in the preceding discussion of "degree of analysis")

CAP: 1 if the firm uses a captive; 0 otherwise

SIZE: log of the firm's total asset value

INDCOST: industry average of premiums plus uninsured losses divided by total assets, as measured by the 1985 Cost of Risk Survey (a measure of risk)

Results of the regression analysis are:

$$\begin{aligned}
 \text{FIRM COST} = & .107 - .301\text{ASSUM} + .001\text{CENTRL} - .0001\text{ANALY} \\
 & (3.39)^* \quad (-1.35)^{**} \quad (.093) \quad (-.39) \\
 & + .006\text{CAP} - .007\text{SIZE} + .023\text{INDCOST} \\
 & (1.43)^{**} \quad (-3.56)^* \quad (2.78)^*
 \end{aligned}$$

Values in parentheses represent t-statistics,

* indicates significance at the .01 level, ** indicates significance at the .10 level.

As the t-statistics indicate, four of the six variable coefficients are significantly different from zero using a one-tailed t-test. The two variables whose coefficients are not significant are centralization and degree of analysis. All of the coefficients except that corresponding to the captive variable are of the hypothesized sign. Tolerance levels exceed .86 for all variables, indicating low collinearity. Further, correlations are .23 or lower for all paired variables, considered acceptable levels. Additionally, residual plots show no consistent pattern, supporting the regression assumptions of linearity of the data and homogeneity of variance. The adjusted R^2 is .19, $F = 3.792$, significant at .0026.

Interpretation of Results

From the regression analysis reported above, four of the discussed hypotheses are supported. Two of these hypotheses concern variables about which the risk management department has little control: size and industry. The other two, which relate to level of risk assumption, involve important decisions for risk managers.

As is generally anticipated by risk management professionals, increases in levels of retention result in lower risk management costs. Of course, the risk manager must weigh the benefits of lower costs against the detriments of increased variability. The use of captive insurers, in contrast, does not reduce risk management costs, a result not anticipated by the researchers. Centralization and use of analytical tools apparently have no consistent effect on risk management costs.

An important aspect of these results is that advancements in decision making seem to have little impact on the cost effectiveness of risk management. Several observations may help explain this phenomenon. For example, very few organizations employ risk management information systems in making decisions. In ranking exposure evaluation methods from 1 (not important) to 5 (very important), probable maximum loss received the highest ranking with a mean score of 4.05. Risk management information systems placed last with a mean score of 3.64. Further, cash flow analysis (with a mean score of 3.30) is rated lower than all other methods of choosing retention levels except for the level of retention customarily used (with a mean score of 2.99) and local management decision (with a mean score of 2.20). The highest ranked method of choosing retention levels is level of expected losses, capturing a mean score of 4.42. Simple t-tests of differences among these

mean responses indicate that they are significantly different as described at the .05 level.

These observations provide evidence that risk managers generally are not using the most advanced tools as much as they are using the less advanced tools available to them. Hence, the lack of significance in the relationship between cost effectiveness and degree of analysis may stem from the absence of any true differentiation among risk managers. That is, degree of analysis may have no bearing on costs because few managers are using the techniques available. A possible explanation for the relatively low usage of advanced techniques is that risk managers may be on a steep learning curve, having advanced significantly in use of analytical tools, but not yet having caught up to the leading edge. Some evidence of this exists in comparing the results of this research with that of O'Connell (1976) who found that few risk managers were using quantitative techniques even though they had access to computers. Today risk managers appear to be using quantitative techniques to a greater extent than was true in 1975; however, the available techniques have also been elevated.

Alternatively those who do take advantage of the advanced techniques may fall into two opposing camps. One is the high-cost group, in which risk managers are forced to employ advanced risk management tools because their firm has been hurt badly by risk management costs, perhaps especially noticeable during the recent hard market (see O'Connell, 1977). The second group is the one that uses the techniques well, maintaining low costs. If the regression analysis fails to account for these potential differences, combining the two groups could yield a net effect of insignificance.

Also troubling is the non-negative sign of the captive coefficient. Generally a firm would be expected to implement a captive program with the intent of reducing costs. Even if, as was mentioned earlier, the stated objective is "to obtain broader coverage," supposedly obtaining that coverage is desired in order to reduce overall costs. The measure used here does omit consideration of investment earnings and tax effects. Further missing is information on captive management fees and risk management department costs. If risk managers were willing to provide such data, a better measure of the effect of captives on performance would be available.

Results on the impact of captives may be distorted somewhat because of the sample of firms surveyed. Captives are mainly used by the sample firms as corporate subsidiaries rather than as industry mutuals or rent-a-captives. These other forms of group captives are likely to be used more frequently by small and medium-sized firms, where economic efficiency may be more pronounced. As pointed out by Greene (1979), a captive may meet several organizational objectives. He identified four major objectives of: reducing insurance costs, facilitating the purchase of insurance coverage, obtaining more favorable insurance terms and conditions, and increasing profits on funds held for payment of losses (see also Baglini 1976 and 1983, and Porat 1982). Respondents of the present study also identify these objectives as important.

In fact, rankings of objectives for captives place "better control over insurance program" in first place and "profit potential" in last. Perhaps with reasoning similar to that proposed for the insignificance of analytical techniques, those firms that choose to use a captive may be the ones with greater risks and thus higher costs, such as is found in the oil and chemical industries with regard to pollution and other difficult-to-place liability exposures. The risk measure in this study may be insufficiently refined to account for such complex differences among firms with regard to their loss potential. The broad industry categories allow for wide variations among firms in each category, thus possibly failing to account for important idiosyncracies.

Evidence also exists that the greater the extent to which captives are used, the better the impact on performance. The evidence derives from regression analysis of the subset of cases in which captives are used. In this smaller sample, no dummy variable for captives is needed. Instead, the percent of premiums paid by the organization which correspond to captive revenue is added as an independent variable. While not significant (perhaps because of the small sample), the coefficient is negative. What may be occurring is that in some situations the captive is performing a role as a status symbol for the risk manager, thereby causing higher risk management costs. In other circumstances, where the captive is used extensively, the impact may be the expected positive effect. Alternatively, the measures used in this study to quantify performance may not account for the other objectives in using a captive insurer.

Summary, Conclusions, and Areas of Future Research

Risk management as a business discipline has undergone extensive change over the past 25 years. New favored recognition has been given the field as business executives, lawmakers, and the general public feel the effects of volatile insurance cycles and recognize the important contribution of an effective risk management program. Yet theoretical development and systematic compilation of data concerning effective risk management practices has been scarce. The research reported in this manuscript is an effort to fill some of that void.

A survey of risk management activities sent to risk managers of large U.S.-based organizations provides some interesting information. For example, very few survey respondents employ risk management information systems in making decisions. Further, cash flow analysis is only slightly more important in choosing retention levels than is the level of retention customarily used. These facts may provide some insight into the results of the analysis of factors affecting risk management costs.

Regression analysis was performed to test six hypotheses regarding various factors expected to affect risk management costs: relative size of retention levels, use of captive insurers or risk retention groups, centralization of risk management activities, degree of analysis undertaken in performing the risk

management function, size of the organization, and industry risk as measured by the *1985 Cost of Risk Survey* (1986). Results from the regression analysis indicate that, as expected, increased size, lower industry risk, and higher levels of retention are significantly, negatively related to risk management costs. Captive use, in contrast, is associated with higher costs. Centralization and use of advanced decision-making techniques apparently do not have consistent effects.

One possible reason for the insignificant impact of the risk manager's analytical activities is the differing expertise of risk managers. A savvy negotiator may be able to obtain lower insurance premiums for the same risk level than a less able risk manager, regardless of the extent of analysis undertaken by either one. Of course, the omission of loss control data also could be key to determining differences in effectiveness of risk management activities. Although information is included about industry risk, firms within the same industry may follow quite distinct loss control philosophies.

Yet another possible explanation for the insignificant results is that so little advantage is being taken of sophisticated risk management tools that *none* of the firms is reaping the benefits available, i.e., no true difference exists in the sophistication of the risk managers, the centralization of the risk management function, or the relative degree of retention. Alternatively, those risk managers most in need of help, that is, those with relatively high risk management costs, may be the managers who are forced to use sophisticated risk management techniques, including captives, as shown by O'Connell (1977). The results may also be indicative of the volatile insurance market from 1986 through 1987 when data were compiled.

Whatever the cause, results of this study provide justification for much future research. For example, work is needed in determining why risk managers have failed to move forward in the area of data analysis, forgoing opportunities to use analytical techniques such as cash flow analysis shown to be valuable in other settings. In conjunction with such information, study of the relationship between implementation of analytical decision-making techniques and risk management costs appears warranted.

The role of captive insurers ought to be given further critical analysis as well. Risk managers provide helpful qualitative information in explaining why they use captives; yet, a critical evaluation of the effectiveness of that decision has not been undertaken. When the risk manager says that captives are used to obtain better control over the risk management program, for instance, how does that translate into improved firm performance (i.e., lower cost)? And, how does that result in a benefit to the organization?

In general, extended quantitative analysis of the risk management function is required. Numerous texts and articles discuss the importance of risk management. Validation of those claims through data analysis deserves attention.

Appendix A Survey Results

Identification (Mean Score Rating)

How important are the following loss exposure identification techniques to your firm?

	not important			very important	
	1	2	3	4	5
Inspection by local manager			3.65		
Inspection by corporate risk mgr.			3.46		
Inspection by outside expert			4.17		
Risk survey or checklist			2.98		
Financial statement analysis			2.71		
Flow chart analysis			2.73		
Internal communication, such as informal conversation with employees			3.75		

Evaluation (Mean Score Rating)

How important are the following loss exposure evaluation techniques for your firm?

	not important			very important	
	1	2	3	4	5
Historical loss development (loss triangles)			3.91		
Frequency distributions of past losses			3.88		
Probable maximum loss estimates			4.05		
Maximum possible loss estimates			4.02		
Expected loss analysis			3.85		
Risk management information systems			3.64		

Retention (Mean Score Rating)

How important is each of the following considerations in deciding upon your firm's level of retention?

	not important			very important	
	1	2	3	4	5
Local management decision			2.20		
Level of expected losses			4.42		
Level of retention customarily used			2.99		
Effect on earnings per share			3.73		
Availability of insurer premium credit			3.39		
Effect measured by cash flow analysis			3.30		

Appendix A (continued)**Captive Organizations
(Mean Score Rating)**

How important are the following considerations in your firm's captive decision?
(asked only if have a captive)

	not important			very important	
	1	2	3	4	5
Better control over insurance program			4.12		
Broader (or only available coverage)			3.93		
Lower expenses and/or loss costs			3.86		
Profit potential			2.99		
Better loss control or claims service			3.23		
Improved cash flow			3.74		

Organizational Data

Average annual premiums (captive and commercial) paid in fiscal year 1987
(in thousands of U.S. dollars)

\$22,540

Average uninsured (self-insured and self-assumed) losses reported in fiscal year 1987
(in thousands of U.S. dollars)

\$20,131

Average annual property and casualty premiums paid by parents to captives during
fiscal year 1987? (in thousands of U.S. dollars)

Property \$2,701

Casualty \$5,705

Number of organizations utilizing the following forms of captives

Corporate subsidiary 78

Rent-a-captive 3

Industry mutual (pool) 30

Average corporate retention (including self-insurance but excluding captives) per
occurrence in fiscal year 1987 (in thousands of U.S. dollars)

Fire & Extended Coverages \$2,313

Earthquake \$5,475

Flood \$2,564

Premises-Operations Liability \$4,218

Products Liability \$5,969

Average total assets for fiscal year 1987 (in millions of U.S. dollars).

\$10,604

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