

Independent and Exclusive Agency Insurers: A Reexamination of the Cost Differential

James Barrese*
Jack M. Nelson

ABSTRACT

Using 1967 data, Joskow (1973) found the independent agency system relatively inefficient for marketing insurance. Cummins and VanDerhei (1979) extended the study through 1976 and confirmed Joskow's findings. However, they found a smaller cost differential using total expenses rather than underwriting expenses alone. The current study extends the investigation through 1990, links the empirical evidence with the logic of agency theory, and provides an alternative measurement of marketing methods. The existence of a cost differential is reaffirmed, and the alternate marketing specification shows that exclusive agency firms have lower expenses than independent agency firms but that direct mail merchandisers have lower expenses than either type of agency firm. The estimated cost differentials are insignificant in some years when losses are used as a proxy for output.

Introduction

Most property and liability insurance in the United States is distributed through the independent or exclusive agency system; other distribution systems include mail marketing and the salaried employee systems.¹ Joskow (1973) offered empirical evidence, based on a cross-sectional study for the year 1967, that the exclusive agency system is more efficient than the independent agency system and recommended regulatory action to speed

* James Barrese is Associate Professor at The College of Insurance. Jack M. Nelson is Associate Professor and Chairholder—Broking & Risk Management at The College of Insurance.

This article benefitted from the comments of David Cummins, Jack VanDerhei, Ellen Thrower, and the attendees of presentations at ARIA and the University of Pennsylvania.

¹ These alternative marketing methods are described in Flanigan et al. (1979). However, the typical practice in empirical work and often in descriptions of insurance marketing is to specify a dichotomy between "direct" (exclusive agency companies) and "agency" (independent agency companies). Firms using the mail order and salaried employee distribution systems are typically included in the group identified as "direct" while firms using brokers are classified as "agency."

the transition from independent agency distribution to direct marketing methods.

Following Joskow's article, defenders of the independent agency system claimed that the cost differential is simply a premium paid for superior service; changes in technology were disproportionately lowering the costs of smaller independent agency insurers, causing cost differentials to diminish over time; and Joskow's results were biased because he had focused only on underwriting rather than total expense costs. An expanded investigation undertaken by Cummins and VanDerhei (1979) based on these arguments yielded mixed results.

Using data for the period 1968 through 1976, Cummins and VanDerhei found a lower but still significant cost differential when total costs were considered. Although the pooled data permitted a test of the claim that the cost difference was decreasing over time, they found no evidence to support this hypothesis.² They address the issue of a service differential by citing evidence presented by Etgar (1976) and by Cummins and Weisbart (1977), which shows no systematic difference in the quality of service between independent and exclusive agents. However, claims of a service differential persist, in part, because prior studies have encountered difficulties defining and measuring service quality.³

This study extends the investigation of the differential marketing costs through 1990, links the empirical evidence with the logic of agency theory, and provides an alternative measurement of marketing variables. The empirical findings are generally consistent with previous studies, but the more precise identification of firms by marketing strategy yields results suggesting that earlier estimates of the cost differential between independent and exclusive agency marketing systems are overstated. The study also provides discussion of the methodological difficulties and potential remedies involved in this and similar research.

Rationale

The reasons for a reinvestigation of the relative efficiency of property and liability insurance delivery systems include changes in the conditions under which previous studies were performed, concerns about the methodology and/or data of the previous research, and the provision of a theoretical framework not found in earlier research.

² Many studies of the measurement of economies of scale and of cost differences associated with organizational structure have estimated the relationship between marketing system and cost (for example, Doherty, 1981; Fields, 1988; Boose, 1990; and Grace and Timme, 1991).

³ Etgar (1976, pp. 497, 499) cautioned that the implication of his results were limited due to the use of a self-report questionnaire and the small number of responses; nonetheless, he states that "the steady erosion which independent insurance agents have suffered in their market share in the personal lines market does not reflect a market shift from expensive, service-intensive outlets to less service-intensive and low cost merchandisers as is often alleged."

Despite the evidence of a cost differential between the exclusive and independent agency systems, the trade press continues to describe efficiency improvements in the independent agency system (see Hammes, 1990; Nutter and Kading, 1989).⁴ Methodological reasons for a reinvestigation include the potential for clarification by using a more refined marketing variable, alternative statistical tests for changes in the cost differential over time, and alternative dependent variables.

Agency Theory and Insurance Marketing Systems

Agency theory and the related property rights literature are used to form hypotheses concerning the relationship between cost and insurance marketing systems. Jensen and Meckling (1976) define an agency relationship as a contract under which one or more persons (the principal) engage another person (the agent) to perform some service on their behalf. That agreement includes the delegation of some decision-making authority to the agent. Mayers and Smith (1982, p. 6) note that the agency problem analyzed by Jensen and Meckling is a special case of the more general contracting problem and that agency costs arise whenever cooperative effort is required.

Fama and Jensen (1983, p. 302) further develop the view of an agency relationship as a series of economically, but not necessarily legally, integrated processes. They note that the primary costs associated with an agency contract involve monitoring expenditures.⁵ Monitoring expenses are required to ensure compliance with the terms of an express or implied contract.

Empirical studies applying agency theory to insurance typically investigate the relationship between agency costs and organizational structure (Grossman and Hart, 1986; Mayers and Smith, 1988; Boose, 1990). Agency theory is also applicable to insurance marketing strategies (Etgar, 1976; Marvel, 1982; Mayers and Smith, 1982, 1990; Grossman and Hart, 1986; Berger, 1988). Building on the work of Etgar (1976), who hypothesized that differences between the independent and exclusive agency systems are a function of differences in the cost of interacting with insurers and the operating costs of their agencies, Mayers and Smith (1982) demonstrate that many relationships, including insurance marketing, may be viewed from the agency theory perspective.

⁴ For example, improvements in a computer network allowing independent agents to compare the price of insurance from several insurance companies were announced last year (Berg, 1990).

⁵ Total costs associated with an agency contract also include bonding expenditures, which are typically incurred by the agent to ensure that the agent will comply with the terms of the contract, and a residual loss, which Mayers and Smith (1982, p. 6) describe as the loss associated with agent decisions that differ from how the principal would have acted.

Joskow, Cummins and VanDerhei, and others have estimated the cost differential between exclusive and independent agency systems.⁶ Though many have suggested the agency theory-marketing system link, and others have estimated the cost differential between marketing systems, prior empirical studies have not explicitly made a connection to agency theory literature.

Insurers have delegated much of the selling function to insurance agents (the most notable exception being large commercial insurance sales, which are conducted primarily by brokers and direct writers). Agents selling property and liability insurance can be grouped according to their right to independently contact policyholders. Independent agents have the right to contact policyholders and advise them to purchase their insurance from another insurer.⁷ The right to contact and advise policyholders is valuable because consumers with limited information about insurers and insurance products typically rely on agents for their insurance needs and are reluctant to change insurers and agents (Kahneman and Tversky, 1984; Berger, 1988; Berger, Kleindorfer, and Kunreuther, 1989).

Agent/Insurer Relationship

Property and liability insurance was originally sold directly by the insurer. Insurers advertised in cities where they hoped to gain new applications for insurance. Because fire insurance was the dominant line of coverage, insurers wanted to have a geographic spread of risks. Independent insurance agents provided this service at low cost. These independent agents permitted the insurer to diversify its portfolio of risks and sell insurance at a lower cost than it could by servicing new applicants from the home office.

This departure from the traditional method of recruiting policyholders required the insurer to deal with an agent who was not one of its employees and had the advantage of allowing more rapid expansion. But initial insurer/agent agreements did not restrict agents to sell exclusively for one insurer, and, consequently, the trend fostered the development of an intermediary requiring higher monitoring costs than employee or quasi-employee marketing systems.

As the agency system expanded, agents obtained greater bargaining power with insurers, while insurers experienced problems in controlling the agents' behavior (see Brearley, 1916). Agents charge a commission for their services and considered their clientele to be an asset belonging to them. That is, agents believed they could sell their client lists to other agents. This

⁶ Other studies include Houston and Simon (1970), Doherty (1981), and Johnson, Flanagan, and Weisbart (1981), Lee (1988), and Boose (1990).

⁷ They differ from exclusive agents by representing more than one insurer and in receiving the same commission rate on premiums regardless of whether the policy is new or a renewal. Exclusive agents represent one insurer and receive a lower commission rate when a policy renews.

belief was formalized when an insurer attempted to solicit its policyholders directly and avoid paying renewal commissions to an agent who had purchased an agency in Yonkers, New York. The courts upheld the agent's property rights to the client list.⁸ Thus, insurers and agents were officially set in positions of potential conflict despite the agents' function as representatives of the insurer.

Agents' need to monitor insurer: With the insurer challenge to the ownership of the client list, agents realized a need to monitor and control insurers, and they developed mechanisms for servicing clients themselves in an effort to foster client loyalty to the agent rather than to a particular insurer. Independent agents sought to minimize the contact between the insurer and the insured by performing many of the administrative functions of policy issuance and premium collection. Directly communicating with policyholders reduced the agent's cost of monitoring communications between insurers and policyholders. But it also contributes to the higher costs of the agency system. For example, in limiting contact between insurers and the insured, each independent agency bills for the policies it has written, and then remits the net premium to the insurer. Collecting premiums in this fashion leads to higher expenses due to the loss of scale economies. Hence, a cost differential due to lost scale economies can be viewed as a monitoring cost.⁹

Insurers' need to monitor agents: Insurers using independent agents also incur monitoring costs. Because policyholders typically renew their contracts rather than switch insurers, it is easier to retain than recruit new clients (Berger, 1988). Logically, insurers might compensate agents by offering lower commissions for renewing a policyholder than for obtaining a new client. This, however, would encourage agents to advise their clients to switch insurers rather than renew so the agent will receive the higher new sale commission. Insurers could counter such a practice by auditing agency records to determine which policyholders were new to the agency. Alternatively, by paying a level commission rate, insurers can remove the incentive for agents to switch clients on renewal, reducing monitoring costs.

D'Arcy and Doherty (1990) suggest an additional impediment to offering independent agents lower commissions on renewals: the ownership of expiration rights by independent agents creates an incentive to package good risks to a specific insurer and capitalize the value through the use of a contingent commission structure. Other insurers then must offer contingent commissions to avoid losing their best clients. In an effort to minimize the incentive for agents to place clients with the highest expected losses with

⁸ *National Fire Insurance Company v. Sullard*, 89 N.Y.S. 934; App. Div. 233 (17 Insurance Digest 360).

⁹ To reduce monitoring costs insurers are adopting innovative practices. For example, many automobile insurers bill policyholders directly rather than collect premiums through independent agents.

insurers with the lowest expected commissions, all insurers pay similar commission rates.

Insurers using independent agents are also forced to compete with other insurers for the attention and favor of independent agents. If an insurer provides agents with equipment to assist in managing the agency, then the insurer may win increased loyalty from the agent. However, it may also lose market share within the agency if the insurer must increase the price of its insurance products to recoup its capital investment in the agency. Even without the increased cost, other insurers serviced by the agent may receive an external benefit from the existence of the equipment (Cummins and Weiss, 1992). Likewise, insurers' advertisement expenditures may not be recouped as independent agents may place applicants who were attracted to the agency by an insurer's advertising with another insurer.

Exclusive agents: Because the contractual agreement between exclusive agents and insurers restricts the agent to represent one insurer, and because the insurer owns the client list, the exclusive agency system has developed in a different manner from the independent agency system. One result is that both the insurer and the agent benefit as the agent more effectively produces new business. Agents benefit from the administrative support provided by insurers, which allows them to focus on new sales. The insurer has greater confidence that clients brought into an agency by advertising expenditures will not be diverted to other insurers and therefore is more likely to invest in advertising and promotion. Similarly, capital expenditures that enhance the efficiency of insurer/agent communications increase agent productivity and lower agency interaction costs. Monitoring costs are lower for the exclusive agency system because of insurers' and agents' similar interests. Both parties lose if either fails to perform.

Why Independent Agents Continue to Exist

Research suggesting that independent agents are less efficient providers of insurance than exclusive agents typically leads one to wonder why independent agents continue to exist. It is argued that independent agents are more likely to offer superior service, which would account for both the cost differential and the resiliency of the independent system. Yet there is insufficient evidence to suggest that a service differential is perceived by purchasers of insurance (see Etgar, 1976; Cummins and Weisbart, 1977); Doeringhaus, 1991). Kahneman and Tversky (1984), Berger (1988), Zeckhauser and Samuelson (1989), and D'Arcy and Doherty (1990) offer insights but no definitive answer.

Berger (1988) suggests that new insureds are willing to recommend their insurer and that these good "word of mouth" recommendations offset the effect of poor recommendations. Berger also implies that the sluggish decline of more costly insurance is a function of the methods of information diffusion. Zeckhauser and Samuelson (1989) suggest that insureds are

unlikely to change insurers or agents because they fear the alternatives will be no better and that incurred search costs will not be recouped.

D'Arcy and Doherty (1990, p. 158-159) expand on the notion of inertia in buying patterns and selling decisions as a contributing cause of the slowness with which the exclusive agency system captures an increasing market share. They recognize, however, the limits of the inertia hypothesis: Independent agents may be combatting the relative cost advantage of exclusive agents by providing better service in particular lines of insurance. For example, in commercial lines of insurance, where policies are less standard than in personal lines, it may be to the policyholders' advantage to sue an independent agent who can help them shop for the best combination of coverage for a given rate. Consequently, independent agents may have advantages over exclusive agents in markets stressing personal contact and involvement with clients. Cummins and Weiss (1992) argue that buyers may be willing to pay rents to independent agents in lines where company/policyholder conflicts are relatively severe, because the agent's ownership of renewals enables him or her to intervene effectively on the client's behalf.

Marvel (1982) and Cummins and Weiss (1992) provide evidence that, while independent agents are losing market share in the aggregate, their experience differs across lines of insurance. For example, from 1970 through 1990, the independent agents' share of the private passenger auto bodily injury market fell from 57 to 33 percent; their share of the workers' compensation market rose from 73 to 79 percent. Overall, the independent agent's market share has declined from 69 percent to 57 percent.¹⁰ Cummins and Weiss (1992) also show that expense ratio differentials are much narrower in lines where independent agents retain high market shares.

Review and Critique of Empirical Studies

The remainder of this article addresses the measurement of the expected cost differential. Agency theory provides a framework for understanding the development of institutional features that grant exclusive agents a cost advantage. Joskow, Cummins and VanDerhei, and others have offered evidence that independent agents are less efficient than exclusive agents. But innovations in the measurement of variables used to differentiate between marketing methods suggest that statistical support for the hypothesized differential may have been overstated. And, with the passage of time, institutional features granting exclusive agents a cost advantage may have been mimicked by the cooperative efforts of independent agents and insurers.

¹⁰ Another possible cause of this decline is insurer decisions to market through exclusive dealing arrangements or to stop marketing through independent agents.

Dependent Variables

This study uses regression analysis to measure the impact of several independent variables on a dependent variable that measures insurer costs. Joskow's dependent variable is the ratio of underwriting cost to net premiums written.

Cummins and VanDerhei investigate four separate dependent variables: the ratio of underwriting expenses to net premiums, the ratio of underwriting plus loss adjustment expenses to net premiums, the dollar amount of underwriting expenses, and the dollar amount of underwriting expenses plus loss adjustment expenses. The first ratio is investigated to conform with Joskow's specification. The second ratio is investigated to address the claim that Joskow's results were biased by the limited measure of costs. The third and fourth variables are the numerators of the first and second variables. The use of expense levels rather than ratios may be appropriate because of potential problems in interpreting expense ratios.¹¹ For example, inflation causes both the numerator and denominator of the ratio dependent variable to increase, with no net change in the variable.

Joskow and Cummins and VanDerhei investigate the relationship between the cost of raising a dollar of premium and the distribution system used to obtain the premium. The models specified in these studies correct for differences in firm size, organization, specialization, and reliance on reinsurance. But uncertainties remain regarding the relationship between the dependent variable and the level and mix of reinsurance transactions, and the effect of inflation on the relationship between level independent variables and a ratio dependent variable. These and other measurement problems are discussed in more detail below.

Independent Variables

Joskow suggested that expenses as a percentage of premiums written are functionally related to four variables: the marketing method employed to obtain business, output (or size) measured by direct premiums written, the reliance placed on reinsurance, and the form of corporate organization. Cummins and VanDerhei began their analysis with the same basic set of variables but changed the model specification and used a pooled time series of insurers to permit an investigation over time. A discussion of the variables and the findings of these studies is presented below.

The marketing variable: To determine whether a cost difference could be attributed to alternative marketing mechanisms, Joskow and Cummins and

¹¹ The net expense level is generally used: the sum of expenses minus ceded plus assumed commissions. An additional issue concerning the numerator of both the ratio and level dependent variables involves other components of total expense, such as expenses not associated with the cost of marketing insurance (for example, taxes and fees). An alternative test using expenses minus taxes and fees for a subset of 40 firms and six time periods found no statistical difference in results.

VanDerhei used a dummy variable set equal to one for insurers classified as exclusive agency companies and to zero otherwise. Both studies found a significant negative relationship between this variable and insurer expenses. These findings were interpreted as supporting the hypothesis that the exclusive agency companies can supply insurance at a lower cost than independent agency companies.

Critics of the practice of using a single dummy variable to differentiate distribution systems suggest that some of the systems--mail order and salaried employee systems, for example--may have lower costs than exclusive agencies (Flanigan et al., 1979). Combining firms using the three distribution systems into one cohort may overestimate the true cost differential between exclusive agencies and independent agencies. The classification problem also may distort the measurement of a change over time.

As an alternative to the use of a single dichotomous variable, this study uses a continuous marketing variable: the percent of direct premiums written by members of a group using the independent agency system. For groups where all member firms use the exclusive agency system, the mail marketing system, or the salaried employee system, the value of the variable is zero. To differentiate among these groups, an additional dichotomous variable is included in the model to measure the hypothesized lower cost of mail and salaried employee distributors. For groups where all members use the independent agency system or for brokers, the value of the marketing variable is one. The value of the marketing variable varies over time for groups that employ more than one marketing strategy.

The output variable: To measure the effect of economies of scale on the cost differentials between independent and exclusive agency systems, the models specified by Joskow and by Cummins and VanDerhei included direct premiums written as a proxy for output. Cummins and VanDerhei also tested the equations using losses as an output proxy. If such economies were present, the expense ratio should be inversely related to the output proxy. Joskow found no evidence of such scale economies, but Cummins and VanDerhei did find such evidence.¹²

Unfortunately, the level of direct premium mixes both price and output effects. If output is falling, price increases may offset output decreases, or the firm may shift activities from a high volume-low price line of business to a low volume-high price line. An alternative measure of output is the number of policies issued, but this type of information is not publicly available (see Houston and Simon, 1970; Allen, 1986). Losses can be

¹² To determine if, in addition to general scale economies, exclusive agency companies have larger scale economies than independent agency companies, the cost specification of earlier models also included a dummy variable that equaled the value of total direct premiums for insurers using the exclusive agency system and zero for other insurers. Neither study found evidence of a difference in scale economies, and the possibility of such differential economies is not considered in this study.

employed as an alternative to the use of premiums as a proxy for output (Cummins and VanDerhei, 1979; Doherty, 1981).¹³ However, Johnson et al. (1981) suggest at least two defects of the loss measure: It ignores the costs of other services, and it is subject to managerial manipulation.

Reinsurance: To capture the impact of reinsurance on the ratio of expenses to premiums, Joskow included the ratio of net to direct premiums in the set of independent variables. Although Joskow did not find the relationship to be statistically significant, Cummins and VanDerhei did find a significant positive relationship. While insurance company expenses are expected to be positively related to retained risks, the ratio of net to direct premiums does not reflect total reinsurance activities. A retention ratio of one can describe a firm with no reinsurance transactions or a firm with substantial but equal amounts of ceded and assumed reinsurance.¹⁴ Nonetheless, it seems reasonable to assume that the further from one the ratio of net to direct premiums, the larger the expected cost to the insurer.

Corporate organization: Observing that stock companies had been criticized for having higher underwriting costs than mutual companies, Joskow (1973) included a set of dummy variables to measure the impact of organizational form on the expense ratio. Joskow found a negative and significant relationship between the stock organizational form and the expense ratio. However, because of the mix of automobile and fire insurance companies in the sample, Joskow's variables may have captured a difference in costs attributable to line of business specialization rather than organizational form.¹⁵ Cummins and VanDerhei indirectly address this difficulty through the use of specialization variables as well as a stock-mutual dummy variable.

With respect to the stock-mutual dummy variable, Cummins and VanDerhei (1979) obtain results that are easier to interpret than Joskow's. They found evidence that stock companies have higher expense ratios than mutual companies. However, they qualify this finding by noting that mutual

¹³ Cummins and VanDerhei (1979) use losses as the output measure in an alternative specification involving the auto physical damage line. The specification did not affect the direction or significance of the marketing cost differential.

¹⁴ Mayers and Smith (1990) provide an improvement, using the ratio of ceded to the sum of ceded plus assumed reinsurance. However, this measure also misses the market power that a large player in the reinsurance market may have. That is, an insurer ceding large amounts of insurance may receive more favorable terms than other insurers with similar ratios of ceded to total reinsurance. However, the ratio of net to direct premiums is likely to be correlated with superior measures of reinsurance activity. For this reason empirical results are likely to be affected only when the significance of estimated coefficients is marginal.

¹⁵ One difficulty in interpreting Joskow's results is related to how the model can include two stock-mutual dummy variables. The specification suggests a dummy variable trap. However, Joskow's sample included firms identified as either auto insurance firms or fire insurance firms. The variable D1 assigns a value of one to stock firms classified as auto insurance firms and assigns a zero to mutual auto firms and all fire insurance companies. D2 assigns a value of one to mutual auto insurance firms and assigns a zero to stock auto firms and all fire insurance companies.

insurers typically charge higher prices with the expectation of paying policyholder dividends. Consequently, the expense ratios for mutual insurers may be understated.

Specialization by line: Cummins and VanDerhei's model included specialization variables (defined as the percentage of direct premiums written in a given line) to identify cost differentials caused by emphasizing particular lines of insurance. They investigated auto and workers' compensation but found only the workers' compensation variable to be significant.

Other Empirical Issues

Level of analysis: Data difficulties arise when following an insurer through time. Unless the group is composed of exactly the same members throughout the entire time studied or the number of members grows over time only from internal creation of subsidiaries, there seems to be no correct way to follow a group through time. When the composition of the group changes over the sample time period (due to growth through merger and acquisition activities, for example), one has three options: Follow the group according to its composition at the beginning of the sample period, its composition at the end of the sample period, or its composition each year. This study investigates each insurer as it existed each year.¹⁶

The marketing differential over time: As noted above, the use of a single dichotomous variable to represent the distribution system provides no information on cost differences among the mail order, salaried employee, and exclusive agency systems. If companies using direct mail and salaried employee systems have lower costs than exclusive agency companies, then combining them with exclusive agency companies may overstate the cost differential between the exclusive and independent agency systems and may result in inaccurate estimates of changes in cost differentials over time. The latter possibility provides one of the reasons for reinvestigating Cummins and VanDerhei's finding of a statistically insignificant downward trend in the relative cost differential over time.¹⁷

Empirical Evidence

This section tests three primary hypotheses: (1) The independent agency system is less efficient than other insurance delivery mechanisms; (2) the

¹⁶ A. M. Best Company data tapes report five years of history for groups on an "as if final year" basis.

¹⁷ The precise F-test used to determine that a cost reduction was not occurring over time is not given. If the coefficients of the time-agency variables were simply constrained to be equal, the estimate of the coefficients would have approximated the mean of the unrestricted coefficients. There may have been no statistical difference between that mean value and any estimate for a particular year while a secular difference may have existed. On the other hand, the F-test suggests something stronger if the restricted form was constrained to equal the estimated unrestricted 1968 coefficient.

relative inefficiency is declining over time; and (3) economies of scale continue to exist for the industry. A number of variations of two basic models are estimated:

$$Y_{kjt} = f(Q_{jt}, (NPW/DPW)_{jt}, STK_{jt}, WC\%_{jt}, AUTO\%_{jt}, IA_{jt}, MAIL_{jt}) \quad (1)$$

$$Y_{kjt} = f(Q_{jt}, (NPW/DPW)_{jt}, STK_{jt}, WC\%_{jt}, AUTO\%_{jt}, HOME\%_{jt}, IA_{78,jt}, \dots, IA_{90,jt}, MAIL_{jt}) \quad (2)$$

where j = firm 1, 2, 3,...46; t = year 78, 79,...90,

Y_{kjt} = the k^{th} expense variable of group j in year t ; k denotes the alternative dependent variables: $k = 1$ is the ratio of expenses to net premiums times 100; $k = 2$ is the ratio of expenses to direct premiums times 100; $k = 3$ is the log of the level of expenses; and $k = 4$ is the log of the ratio of the level of expenses to the GNP implicit price deflator (PI),

Q_{jt} = the output variable; total direct premiums written (DPW) or total losses incurred (LOSSES) by group j in year t (when $k = 3$ or $k = 4$, Q is also in log terms); the variable is deflated by the GNP implicit price deflator when the dependent variable is deflated,

$(NPW/DPW)_{jt}$ = one minus the ratio of net premiums written (NPW) to total direct premiums written,

STK_{jt} = dummy variable set to 1 for stock companies, 0 otherwise,

$WC\%_{jt}$ = workers' compensation DPW as a percentage of total DPW for company j in year t ,

$AUTO\%_{jt}$ = automobile insurance DPW as a percentage of total DPW for company j in year t ,

$HOME\%_{jt}$ = homeowners' insurance DPW as a percentage of total DPW for company j in year t ,

$MAIL_{jt}$ = dummy variable set to 1 for firms utilizing mail marketing or salaried employee distribution systems, 0 otherwise,

IA_{jt} = the percentage of premiums written by independent agency members of the group, and

IAx_{jt} = the percentage of each group's direct premiums written by independent agency members of the group in year x , $x = 79, \dots, 90$, and 0 otherwise.¹⁸

Data

To test the hypotheses, pooled data have been assembled for a sample of 46 groups operating in the years 1978 through 1990 (Appendix 1). This sample is larger than those employed in earlier works, accounting for over 68 percent of direct premiums written in the United States during this period. Of the 46 groups included in the study, 27 employed only the independent agency system, nine used both the exclusive and independent agency systems; six used the exclusive agency system, and four employed the mail marketing system. Over 26 percent of direct premiums in the sample were written by the nine groups with subsidiaries that used a mix of marketing methods.

The data were obtained from various A. M. Best Company publications. Descriptive statistics for selected variables are presented in Table 1.

Table 1
Descriptive Statistics for Selected Variables, 1978 through 1990

	Minimum	Median	Mean	Maximum	Standard Error	Coefficient of Variation
EXPENSE/NPW	13.8	37.7	37.2	104.6*	8.1	21.7
EXPENSE/DPW	7.6	35.8	35.8	146.2*	10.3	28.8
EXPENSE	2.0	466.8	745.3	7,885.7	927.3	124.4
DPW	11.3	1,310.0	2,199.0	24,702.3	2,924.5	133.0
LOSSES	8.1	887.5	1,525.8	20,000.0	2,143.0	140.5
NPW/DPW	-189.7	3.0	3.2	81.0	21.1	668.2
AUTO%	5.8	39.2	44.1	100.0	21.3	48.3
HOME%	0.0	8.6	10.3	42.3	7.1	69.0
WC%	0.0	11.6	12.8	53.3	11.2	87.4

Note: EXPENSE = underwriting plus loss adjustment expenses, NPW = net premiums written, DPW = direct premiums written, LOSSES = losses incurred, NPW/DPW = one minus the ratio of net to direct premiums, STK = 1 for stock insurers, 0 otherwise, WC% = ratio of workers' compensation DPW to total DPW, AUTO% = ratio of automobile DPW to total DPW, HOME% = ratio of homeowners' DPW to total DPW.

* The maximum values of EXPENSE/NPW and EXPENSE/DPW were attributable to the Prudential Company in its start-up year. When that year is excluded, the maximum drops to 81.98 for EXPENSE/NPW and 82.87 for EXPENSE/DPW.

Because many of the independent variables are functionally related to premiums, the variables in the specified equations may be subject to

¹⁸ For purposes of replication we also define the dummy variables JCV = 1 if the majority of direct premiums for a group are written under the independent agency system and equal 0 otherwise and dummy variables JCV x , $x = 79, \dots, 90$, which equals 1 if the majority of direct premiums for a group are written under the independent agency system in year x , and equal 0 otherwise.

multicollinearity.¹⁹ Appendix 2 presents the correlation matrix of the major variables (statistically insignificant correlations are not reported). Some of the highest correlations are between the specialization variables (absolute values between 0.5 and 0.6), indicating the presence of a degree of multicollinearity.

Organizational form: This study conforms to prior practice for identifying firms as stock or mutual: If any member of a group was a mutual in a particular year, the entire group was considered mutual for that year. Of the 46 groups, 31 were classified as stock and 15 as mutual. Table 2 presents summary statistics on key variables for the stock and mutual categories of firms.

Table 2
Selected Variables by Organization Type

	DPW		NPW		DPW/DPW	EXPENSE		EXPENSE/ DPW	EXPENSE/ NPW
	Total	Average	Total	Average		Total	Average		
Stock	962.9	2.39	878.2	2.18	0.9120	392.0	12.6	0.3374	0.3621
Mutual	352.0	1.81	345.2	1.77	0.9807	95.2	6.0	0.3071	0.3071

EXPENSE = underwriting plus loss adjustment expenses, NPW = net premium written, DPW = direct premium written.

Specialization by line of business: Three specialization variables were investigated: automobile, homeowners', and workers' compensation. In the aggregate, these lines accounted for 67.5 percent of direct premiums written by firms in the sample. Automobile liability and physical damage insurance accounted for 44.5 percent, homeowners' 10.4 percent, and workers' compensation 12.6 percent.

Marketing system and reinsurance: Firms employing the independent agency system relied on reinsurance far more than firms using any other marketing system. The effect of this difference is seen in Table 3 in the comparison of aggregate expenses to aggregate net and direct premiums.

Table 3
Ratio of Expenses to Premiums by Marketing Type

	Independent	Mixed	Exclusive	Mail	Average
Expenses to					
Net Premium	39.3%	37.5%	29.5%	26.3%	36.4%
Direct Premium	35.7%	34.8%	29.2%	25.6%	33.9%

¹⁹ Independent variables that are functions of premiums include direct premiums when used as a measure of output, the specialization variables, and the reinsurance variable.

As expected, the average aggregate expense ratio is higher when net premiums are the denominator than when direct premiums are used. The expense differential between independent agency firms and firms using other marketing systems is smaller when direct premiums are the denominator. However, since the numerator reflects the net effect of reinsurance, it is not clear whether the issue of direct premiums in the denominator is meaningful.

Methodology and Results

A pooled time series/cross-sectional model is employed with a data set containing 598 observations, 13 years times 46 insurers. A number of specifications were tested, including replications of Joskow (using OLS and the ratio of expenses to net premium as the dependent variable). The OLS replications yield similar results and confirm that the regression errors exhibit positive serial correlation. All other specifications are estimated using an error components approach.²⁰ The replications of Cummins and VanDerhei also yield results consistent with their findings. A modification of Cummins and VanDerhei's methodology is used to test the impact of alternative variables and variable measurement on the cost estimates. Both direct premiums and losses incurred are tested as proxies for output. Expenses, premiums, and losses incurred are measured in real terms.²¹ Not surprisingly, the models that specify an expense level as the dependent variable provide higher R-squared statistics than those with ratio dependent variables.

Table 4 reports the results for selected models estimated without accounting for temporal changes in the relationship between marketing strategy and cost. The results regarding economies of scale depend on the choice of output measure. When DPW is used as the output variable, the estimated coefficients are negative but not significantly different from 1.0. When losses are the output proxy, the coefficient is negative and significantly less than 1.0.²² The Cummins-VanDerhei replication, using premiums as the output proxy, suggests an absence of scale economies.

²⁰ The error components model is based on an assumption that the regression disturbance is composed of three independent components: one varying with time, one with cross sections, and a third varying randomly with both time and cross sections. Specifically,

$$e_{it} = u_i + v_t + w_{it} \quad (i = 1, 2, \dots, N; t = 1, 2, \dots, T).$$

To address the serial correlation problem existing in the current data, the equations are estimated assuming first-order autocorrelation of the error terms. The estimation was carried out allowing the autocorrelation coefficients to differ by insurer.

²¹ The GNP implicit price deflator was used to convert nominal values to real values. The authors' specifications use monetary values denominated in real terms, while the replications use nominal variables for consistency with Joskow and Cummins and VanDerhei. The authors believe the use of real values is more appropriate for reasons given above.

²² In the log-linear models the relevant comparison value for a finding of scale economies is a coefficient associated with the output measure that is significantly lower than one. The values reported for output are adjusted to test for a difference from one rather than from zero.

Table 4
Comparison of Results and Replications

	Cummins and VanDerhei Ln(EXPENSE)		Alternate Estimations Ln(EXPENSE/PI)			
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Constant	-1.0841	-11.52	-1.2494	-10.53	-0.2658	-1.88
DPW	0.9833	71.35	0.9828	72.29		
LOSSES					0.9015	54.91
NPW/DPW	-0.0068	-18.25	-0.0062	-15.95	0.0024	4.67
STK	-0.0065	-0.18	0.0526	1.06	0.1697	2.78
WC%	-0.0035	-2.82	-0.0006	-0.43	-0.0011	-0.59
AUTO%			0.0019	2.19	-0.0011	-0.96
HOME%			0.0071	2.89	0.0068	2.15
JCV	0.2941	6.00				
MAIL			-0.2457	-2.92	-0.2067	-1.98
IA			0.2310	4.22	0.1709	2.50
Coefficient of Variation	98%		96%		88%	

Note: EXPENSE = underwriting plus loss adjustment expenses, PI = GNP implicit price deflator, DPW = log of direct premiums written except for replication, LOSSES = log of losses incurred, NPW/DPW = one minus the ratio of net to direct premiums, STK = 1 for stock insurers, 0 otherwise, WC% = ratio of workers' compensation DPW to total DPW, AUTO% = ratio of automobile DPW to total DPW, HOME% = ratio of homeowners' multiperil DPW to total DPW, JCV = 1 for independent agency firms, 0 otherwise, MAIL = 1 for mass marketers, 0 otherwise, IA = ratio of independent agency DPW to total DPW.

In the authors' models the coefficient of the MAIL variable is negative and significant, and the coefficients of the independent agency variable is positive and significant. This suggests that the expenses of exclusive agency firms fall in between those of direct mail and independent agency firms. Thus, the use of our marketing variables provides more information about cost differentials than the dichotomous variable used by Cummins and VanDerhei.

With the exception of models employing losses as a proxy for output, the stock-mutual variable is not significant regardless of the model estimated. While this finding is at variance with Cummins and VanDerhei's earlier study, their replicated approach with the current data set also yields a finding of insignificance. This result also is at variance with Joskow, but, as discussed above, it is difficult to know how much of Joskow's estimate was attributable to the stock-mutual distinction and how much was attributable to differences in the lines of business (fire and auto). When losses are employed as the measure of output, the models suggest that the more closely monitored stock firms have higher costs than mutual firms. This result is contrary to the implications of agency theory but not with the

results in Boose (1990).²³ The fact that the stock variable results are sensitive to model specification suggest that caution is in order in drawing inferences from this variable.

The aggregate retention variable is significant in both the replicated and alternative models, but the signs are reversed. The results of the models using real variables reflect a data issue: As an insurer increases its retentions, the associated retained expenses for the same insurer also increase. For this reason the coefficient may be measuring a contractual relationship between insurer and reinsurer along with a relationship between aggregate expense levels and reliance on reinsurance. Finally, the models show that the significance of the specialization variables depends on the dependent variable, a possible indication of multicollinearity problems.

Models Including a Time Component

When time is more explicitly addressed in the estimation, useful insights are gained. Table 5 summarizes the results of models that attempt to measure the yearly average cost differential between independent and exclusive agency distribution systems.

The results for each variable and for each model are virtually identical in terms of sign and significance with the models that ignored time. However, the switch from the dichotomous JCV approach to the combination of MAIL and a continuous IA variable is more revealing when the analysis over time is conducted. In both models, the JCV variables are positive and significant in each year. In almost every model using the alternative specification for marketing, the cost differential is insignificant in at least some years. In the models using real values and LOSSES as the output measure, the cost differential is found to be not significant in five of the thirteen years investigated. However, three of these years were the underwriting crisis period of 1984-1986, suggesting that caution should be exercised in interpreting these results. The current data set and estimations confirm that the marketing cost differential is not declining continuously over time. Indeed, for part of the time period the estimated coefficients increased. However, five insignificant differences in recent years may suggest some improvement in the independent agency system as compared to the exclusive agency system.

Conclusion

This article supplies a tie between agency theory and the costs associated with alternative insurance distribution systems and extends the discussion

²³ Boose (1990, p. 514) reports that mutual life insurers in New York had higher costs than stock firms when commissions were not included in costs. When commissions were included, as they are in this study, Boose found insufficient evidence of a stock versus mutual cost differential.

Table 5
Comparison of Results and Replications Including Time Effects

	Cummins and VanDerhei		Alternate Estimations			
	Ln(EXPENSE)		Ln(EXPENSE/PI)		Ln(EXPENSE/PI)	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Constant	-1.0638	-11.11	-1.2409	-10.41	-9.3267	-2.30
DPW	0.9803	70.23	0.9836	72.51		
LOSSES					0.9126	55.62
NPW/DPW	-0.0068	-18.22	-0.0063	-15.91	0.0027	5.16
STK	-0.0038	-0.07	0.0487	0.99	0.1510	2.50
WC%	-0.0037	-2.94	-0.0009	-0.59	-0.0024	-1.22
AUTO%			0.0018	1.97	-0.0007	-0.66
HOME%			0.0067	2.71	0.0059	1.87
JCV78	0.2724	4.47				
JCV79	0.2840	4.64				
JCV80	0.2900	4.74				
JCV81	0.2626	4.29				
JCV82	0.3398	5.56				
JCV83	0.3766	6.15				
JCV84	0.3306	5.41				
JCV85	0.3088	5.06				
JCV86	0.2428	3.98				
JCV87	0.2831	4.64				
JCV88	0.3059	5.01				
JCV89	0.2776	4.54				
JCV90	0.2680	4.39				
MAIL			-0.2389	-2.87	-0.2044	-1.98
IA78			0.1980	3.07	0.187	2.28
IA79			0.2068	3.20	0.1933	2.36
IA80			0.2124	3.30	0.1994	2.44
IA81			0.1859	2.87	0.1965	2.40
IA82			0.2624	4.04	0.2353	2.86
IA83			0.3034	4.66	0.2603	3.15
IA84			0.2534	3.91	0.0825	1.00
IA85			0.2506	3.85	0.0660	0.80
IA86			0.1913	2.92	0.0777	0.93
IA87			0.2377	3.61	0.1338	1.60
IA88			0.2624	3.95	0.2201	2.61
IA89			0.2416	3.63	0.2768	3.28
IA90			0.2270	3.39	0.2561	3.01
Coefficient of Variation	98%		96%		89%	

Note: T-state = ratio of estimated coefficient to its established standard error, EXPENSE = underwriting plus loss adjustment expenses, PI = GNP implicit price deflator, DPW = log of direct premiums written except for replication, LOSSES = log of losses incurred, NPW/DPW = one minus the ratio of net to direct premiums, STK = 1 for stock insurers, 0 otherwise, WC% = ratio of workers' compensation DPW to total DPW, AUTO% = ratio of automobile DPW to total DPW, HOME% = ratio of homeowners' multiperil DPW to total DPW, JCV78-JCV90 = 1 for independent agency firms by year from 1978 through 1990, 0 otherwise, MAIL = 1 for mass marketers, 0 otherwise, IA78-IA90 = ratio of independent agency affiliates DPW to total DPW by year from 1978 through 1990.

of the appropriate variables to use in applied insurance research. This study confirms several of the relationships found in previous studies but provides insufficient evidence for others.

Almost every variable used in applied research has some imperfection limiting its value, but most empirical estimates are affected by alternative specifications only in cases where the significance of estimated coefficients is marginal. Some measurement issues, this study's response, and suggested improvements are summarized below.

When the ratio of expenses to net premiums is used as the dependent variable, the relationship between marketing method and expenses is affected in uncertain ways by reinsurance transactions. Consequently, this study stresses the use of the level of expenses. Inflation also distorts the relationship between variables when ratio dependent variables are used. This imprecision extends to the level dependent variable models when premium levels or losses are used as a proxy for output. Consequently, adjustments were made to the premium, loss, and expense variables using the GNP implicit price deflator.

The use of a dichotomous marketing variable lumps insurers into imprecise categories, which overstates the differential between independent agency systems groups and groups that use the exclusive agency system. This study explicitly recognizes direct mail merchandisers and uses a continuous independent agency marketing variable.

The use of an aggregate retention ratio as an independent variable obscures the impact of a differential use of reinsurance by line of business. It also obscures the level of reinsurance activities, because high levels of reinsurance activities ceded and assumed may result in a retention rate of one. Nonetheless, the aggregate retention ratio is used in this article. Future improvements may be obtained by using alternative measures that can capture the reliance placed on reinsurance by the firm, for example, the ratio of ceded to the sum of ceded and assumed reinsurance and the level of reinsurance ceded.

The set of specialization variables is highly correlated, suggesting that the estimated coefficients for these variables cannot be viewed with confidence. Future research may employ an alternative division by commercial lines and personal lines, which may be more revealing and may reduce the degree of multicollinearity.

The results show a continued marketing cost differential between independent and exclusive agency insurers. But the evidence also suggests that the cost differential is lower than has been estimated in the past and may not be significant in all time periods.

References

- Allen, R. F., 1986, Cross Sectional Estimates of Cost Economies in Stock Property-Liability Companies, *Review of Economics and Statistics*, 56: 100-103.

- A. M. Best Company. *Best's Key Ratings Guide* (Oldwick, N.J.: A. M. Best), annually.
- A. M. Best Company. *Best's Aggregates and Averages* (Oldwick, N.J.: A. M. Best), annually.
- A. M. Best Company. *Best's Insurance Reports: Property-Casualty* (Oldwick, N.J.: A. M. Best), annually.
- Berg, Eric, 1990, Big Insurers Planning Agent Computer Link, *New York Times*, June 28: D4.
- Berger, Lawrence A., 1988, Word of Mouth Reputations in Auto Insurance Markets, *Journal of Behavior and Organization*, 10: 225-234.
- Berger, Lawrence A., Paul R. Kleindorfer, and Howard Kunreuther, 1989, A Dynamic Model of the Transmission of Price Information in Auto Insurance Markets, *Journal of Risk and Insurance*, 56: 17-33.
- Boose, Mary Ann, 1990, Agency Theory and Alternative Predictions for Life Insurers: An Empirical Test, *Journal of Risk and Insurance*, 57: 499-518.
- Brearley, Harry Chase, 1916, *Fifty Years of a Civilizing Force* (New York: Frederick A. Stokes).
- Cummins, J. D. and Jack VanDerhei, 1979, A Note on the Relative Efficiency of Property-Liability Distribution Systems, *Bell Journal of Economics and Management Science*, 10: 709-719.
- Cummins, J. D. and S. N. Weisbart, 1977, *The Impact of Consumer Services on Independent Insurance Agency Performance* (Glenmont, N.Y.: IMA Education and Research Foundation).
- Cummins, J. D. and M. A. Weiss, 1992, The Structure, Conduct, and Regulation of the Property-Liability Insurance Industry, in: A. W. Kopcke and R. E. Randall, eds., *The Financial Condition and Regulation of Insurance Companies* (Boston: Federal Reserve Bank of Boston).
- D'Arcy, Stephen P. and Neil A. Doherty, 1990, Adverse Selection, Private Information, and Lowballing in Insurance Markets, *Journal of Business*, 63: 145-164.
- Doerpinghaus, Helen, 1991, An Analysis of Complaint Data in the Automobile Industry, *Journal of Risk and Insurance*, 58: 120-127.
- Doherty, Neil A., 1981, The Measurement of Output and Economies of Scale in Property-Liability Insurance, *Journal of Risk and Insurance*, 48: 390-402.
- Etgar, Michael, 1976, Service Performance of Insurance Distributors, *Journal of Risk and Insurance*, 43: 487-499.
- Fama, Eugene F. and Michael C. Jensen, 1983, Separation of Ownership and Control, *Journal of Law and Economics*, 26: 301-325.
- Fields, Joseph A., 1988, Expense Preference Behavior in Mutual Life Insurers, *Journal of Financial Services Research*, 1: 113-129.
- Flanigan, George B., Joseph E. Johnson, Ellen P. Thrower, and Steven N. Weisbart, 1979, Marketing Systems Employed in Property and Liability Insurance: An Empirical Analysis, *CPCU Journal*, March: 77-83.

- Grace, Martin F. and Stephen Timme, 1991, *An Examination of Cost Economies in the U.S. Life Insurance Industry* (Atlanta: Georgia State University, Center for Risk Management and Insurance Research, Working Paper Series No. 90-5).
- Grossman, Sanford J. and Oliver D. Hart, 1986, The Costs and Benefits of Ownership: Theory of Vertical and Lateral Integration, *Journal of Political Economy*, 94: 691-719.
- Hammes, Carol A., 1990, Believing in the System, *Best's Review*, January: 39-90.
- Houston, D. B. and R. M. Simon, 1970, Economies of Scale in Financial Institutions: A Study in Life Insurance, *Econometrica*, 38: 856-864.
- Jensen, Michael C. and William H. Meckling, 1976, Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure, *Journal of Financial Economics*, 3: 306-360.
- Johnson, J. E., G. B. Flanigan, and S. N. Weisbart, 1981, Returns to Scale in the Property and Liability Insurance Industry, *Journal of Risk and Insurance*, 48: 18-45.
- Joskow, P. L., 1973, Cartels, Competition, and Regulation in the Property-Liability Insurance Industry, *Bell Journal of Economics and Management Science*, 4: 375-427.
- Kahneman, Daniel and Amos Tversky, 1984, Choices, Values, and Frames, *American Psychologist*, April: 341-350.
- Lee, Chong G., 1988, Economies of Scale and Economies of Scope for Direct Writers in the Property-Liability Insurance Industry, unpublished Ph.D. dissertation, University of Pennsylvania, Philadelphia.
- Marvel, Howard P., 1982, Exclusive Dealing, *Journal of Law and Economics*, 25: 1-25.
- Mayers, David and Clifford W. Smith, Jr., 1982, *Toward a Positive Theory of Insurance*, Monograph 82-1, New York University, New York.
- Mayers, David and Clifford W. Smith, Jr., 1988, Ownership Structure Across Lines of Property-Casualty Insurance, *Journal of Law and Economics*, 31: 351-378.
- Mayers, David and Clifford W. Smith, Jr., 1990, On the Corporate Demand for Insurance: Evidence from the Reinsurance Market, *Journal of Business*, 63: 200-223.
- Nutter, Franklin W. and Bradley L. Kading, 1989, Riding for a Fall, *Insurance Review*, December: 29-31.
- Zeckhauser, Richard and William Samuelson, 1989, Status Quo Bias and Insurance Markets, *John Liner Review*, 3: 38-50.

Appendix 1

Insurers in the Sample

- | | |
|---|---|
| <p>I. Mail or Salaried Employee
 Colonial Penn Group^S
 New Jersey Manufacturers Group^M</p> <p>II. Exclusive Agency
 American Hardware Insurance Group^M
 Harco National Insurance Company^S
 Members Insurance Group^M</p> <p>III. Mixed Strategy
 Less than 50 percent
 Allstate Insurance Group^S
 Nationwide Group^M
 Federated Mutual Group^M
 Prudential of America P&C Group^S</p> <p>IV. Independent Agency
 Aetna Life & Casualty Group^S
 American International Group^S
 Central Mutual (Ohio) Group^M
 CIGNA Group^S
 CNA Insurance Companies^S
 Firemans Fund Insurance Companies^S
 Harleysville Insurance Companies^M
 Home Insurance Group^S
 Lincoln National Group^S
 Metropolitan Group^S
 Reliance Insurance Companies^S
 The Atlantic Mutual Companies^M
 Travelers Group^S
 Zurich Insurance Group--U.S.^S</p> | <p>GEICO Corporation Group^S
 USAA Group^S</p> <p>Country Companies^S
 Liberty Mutual Insurance Companies^M
 State Farm Group^M</p> <p>50 percent or more
 Continental Insurance Companies^S
 Hartford Insurance Group^S
 Royal Insurance Group^S
 Crum & Forster Insurance Companies^S
 John Hancock Group^M</p> <p>American Family Insurance Group^S
 Auto-Owners Group^M
 Chubb Group of Insurance Companies^S
 Cincinnati Financial Corporation^S
 Farmers Insurance Group^S
 General Accident Insurance Group^S
 Holyoke Mutual Insurance Companies^M
 Kemper Group^M
 Merchants Insurance Group^M
 Ohio Casualty Group^S
 St. Paul Group^S
 Transamerica Corporation Group^S
 United States Fire & Guaranty Group^S</p> |
|---|---|

^MMutual^SStock

Appendix 2
Correlation Matrix for Selected Variables

	STK	IA	MAIL	JCV	WC%	HOME%	AUTO%	NPW/DPW	LOSSES	DPW
EXPENSE/NPW	0.104	0.528	-0.386	0.534	—	0.125	-0.378	0.114	—	—
EXPENSE/DPW	—	0.321	-0.327	0.322	-0.168	0.418	—	-0.636	—	-0.140
EXPENSE	0.142	-0.024	-0.172	—	—	—	-0.085	0.059	0.964	0.972
DPW	0.093	—	-0.138	—	—	—	—	0.135	—	1.000
LOSSES	—	-0.131	-0.131	-0.138	—	—	—	—	1.000	—
NPW/DPW	—	—	—	0.084	0.172	-0.430	-0.328	1.000	—	—
AUTO%	-0.126	-0.505	0.374	-0.402	-0.583	0.391	1.000	—	—	—
HOME%	-0.158	—	—	—	-0.538	1.000	—	—	—	—
WC%	-0.096	0.123	—	0.128	1.000	—	—	—	—	—
JCV	0.245	0.993	-0.466	1.000	—	—	—	—	—	—
MAIL	0.221	-0.476	1.000	—	—	—	—	—	—	—
IA	0.245	1.000	—	—	—	—	—	—	—	—
STK	1.000	—	—	—	—	—	—	—	—	—

Note: EXPENSE = underwriting plus loss adjustment expenses, PI = GNP implicit price deflator, DPW = direct premiums written, NPW = net premiums written, LOSSES = losses incurred, NPW/DPW = one minus the ratio of net to direct premiums, STK = 1 for stock insurers, 0 otherwise, WC% = ratio of workers' compensation DPW to total DPW, AUTO% = ratio of automobile DPW to total DPW, HOME% = ratio of homeowners' multiperil DPW to total DPW, JCV = 1 for independent agency firms, 0 otherwise, MAIL = 1 for mass marketers, 0 otherwise, IA = ratio of independent agency affiliates DPW to total DPW.

Copyright of Journal of Risk & Insurance is the property of Blackwell Publishing Limited and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.