An Empirical Analysis Of The Service Quality In The Automobile Insurance: A Log-Linear Model

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Abstract

The study deals with the consumer satisfaction and the service quality of the private passenger automobile insurance that accounts for over 40 percent of the total premiums written in the US property and casualty insurance industry. It is designed to identify the characteristics that influence the service quality of automobile insurance. The independent variables of the model are identified and explained along with rationale and hypothesized signs. Complaint ratios are used as a proxy to measure the service quality of automobile insurers. The Illinois insurance market is characterized as easy regulation whereas in New Jersey the regulatory environment restricts competition. Therefore, the model includes a state dummy variable to find if a different degree of regulation can affect consumer satisfactions. The basic research question in the study is to know what types of firms are likely to produce more or less consumer complaints.

1.0 Introduction

The personal automobile insurance is the single largest line of the property and casualty insurance with about $117 billions in net earned premiums in 1998. It represents about 86 percent of the total premiums written in automobile and 41.7 percent of the total premiums written in all lines of the property and casualty business. As of December 31, 1998 over 1,400 insurance companies were operating in the US personal automobile market. It is highly competitive market and auto insurers are competing in price and service. The automobile insurance industry traditionally has been closely regulated in licensing, capital requirements, rate-making, policy terms among many other things. Due to the fact that automobile insurers are regulated by each state, they tend to have different pricing and marketing strategy at a state level. As a result, consumer satisfaction can be differentiated by each state.

The purpose of the study is to analyze the consumer satisfaction and service quality of auto insurance companies. The measurement of service quality is addressed first. Then, this research makes an attempt to identify the main characteristics that affect the consumer satisfaction and service quality offered by auto insurers. The Illinois automobile market is compared to the New Jersey automobile market. Illinois and New Jersey are very similar in market size. Illinois is known as a typical state where the regulatory environment allows the marketplace to determine insurance rates, whereas in New Jersey the regulatory environment restricts price competition. Consequently, New Jersey consumers seem to pay higher premiums in the nation and recently a new auto reform legislation was introduced in the state to roll back of 15 percent of premium for most insured motorists. The objective is to find how consumers are satisfied with auto insurers' service in a different regulatory environment.

2.0 Literature Review

The automobile insurance has been under fire in the last two decades and has been accused of making excessive profits by keeping prices artificially high and of rendering services of low quality (Jaffee and Russell, 1998). Auto insurers are faced with increasing competition in the market and forced to consider customer service

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as a potential source of business growth. With regard to the firm structure and its impact on service quality for automobile insurers, Doerpinghaus (1991) and Barrese, Doerpinghaus and Nelson (1995) explored this issue, using private passenger automobile complaint data. Doerpinghaus found that cross-firm service quality differences existed across automobile insurers and firms specializing in high-risk drivers received relatively more consumer complaints. Barrese et al. revealed that the independent agency system provided a superior service for automobile insurance and that the service differential decreased with an insurer size. Their view are in contrast to Pauly, Kleindorfer, and Kunreuther (1986), who argued that the expense difference between direct writers and independent agent systems was attributable to service differentials such as matching of policies with customer needs and assistance with claims.

3.0 Model

The service quality model for estimation is determined as:

SQ =	f(FCH, FSZ, MKT, ORG, RAT, CON, STATE, YEAR97 YEAR98), where
SQ =	the service quality measured by the number of consumer complaints received
FCH =	firm specific characteristic variable (1 for national or regional, 0 for local)
FSZ =	the size of insurer in terms of net premiums written
MKT =	the type of the insurance marketing system (1 for a direct writer, 0 for an independent agent)
ORG =	organizational form (1 for stock and 0 for mutual companies)
RAT =	financial rating (1 for B+ or higher, 0 for B or lower)
CON =	concentration or percentage of business in a domicile state
STATE =	1 for Illinois, 0 for New Jersey
YEAR97=	a dummy for year 1997
YEAR98=	a dummy for year 1998

Insurance firms differ greatly in geographic areas that they cover. They can be categorized as "national," or "local," based on geographic sales distributions. In addition, there might be also great differences in specialization across insurance firms. The firm specific variable (FCH) is hypothesized to affect service quality. Tennyson (1966) showed that national auto specialists exhibited significantly lower expense ratios (underwriting expenses as a percentage of premiums written) than other types of automobile insurers. Another characteristic of the auto insurance industry is that largest five insurers account for 50 percent of the private passenger automobile market, whereas the share of small players comprising majority number in the industry makes up only less than 10 percent. Therefore, our model includes a firm's size variable (FSZ) measured by premiums written. The variable can reveal whether there exists a firm-level economies of scale or not.

An insurer's marketing system also may have an impact on the service quality to policyholders. Insurance products are distributed through three major channels: independent sales agents, exclusive sales agents, and other forms of direct marketing such as mail, telemarketing, and the Internet marketing. Some previous researches on the subject indicate that direct writers have lower expenses per dollar of premium than firms using the independent agency system. There is no convincing evidence whether such expense difference may be attributable to differences in service quality. Etgar (1976) found no evidence of a service differential among 116 California insurers. Cummins and Weisbart (1977) found a similar result from their 470 insurers. In the personal passenger automobile insurance, Doerpinghaus also found no clear evidence of a service differential between independent agencies and other forms of marketing. However, the empirical results of Barrese et. al. indicated that independent agency insurers provided a better customer service. This study reexamines the impact of marketing system on service quality.

The model includes other explanatory variables that might affect an insurer's service quality. The organizational form (stock or mutual) variable (ORG) is included in the model to see if stock insurance companies provide a better service quality to consumers. It might be true if stock organizations are more efficient that mutual companies. The financial rating variable (RAT) in the model is designed to find if firms with high ratings are associated with a better service quality to consumers. Also, the model includes the concentration variable (CON) to test if a firm's sales distribution has any impact on service quality. Furthermore, the model includes a state dummy variable (STATE) to capture different market structures and regulations in Illinois relative to New Jersey. It is

hypothesized that Illinois consumers are more satisfied than New Jersey consumers, considering the open competition system in Illinois can provide policyholders with an enhanced benefit. Finally, two yearly dummy variables are included in the model to capture a yearly difference in service quality with a base year of 1996.

4.0 Data

For the estimation of the model the study uses the firm-specific state data of Illinois and New Jersey. For the measurement of service quality the study uses the complaint ratio of each insurance firm filed to the insurance department in Illinois and New Jersey. The firm-specific complaint data were used as a proxy for service quality in Doerpinghaus (1991) and Barrese, Doerpinghaus, and Nelson (1995). Wells and Stafford (1995) measured actual consumer perceptions of service quality and compared them to the complaint ratio in order to determine if the complaint ratio is a valid tool for assessing the service quality of insurers. Their result showed that lower complaint ratios are significantly related to higher levels of perceived service quality, indicating that complaint ratios are good measures of service quality.

The consumer complaint data for each auto insurance company in Illinois and New Jersey are obtained from each state's Department of Insurance (1996-1998). In Illinois the complaint data are represented as a total number of complaints per $1 million in written premiums whereas New Jersey publishes the data based on the number of valid complaints per 1,000 cars insured. Data on the independent variables required for the model estimation were obtained from the Best's Reports: Property/Casualty edition published by the A. M. Best Company from 1996 to 1998.

5.0 Estimated Results

A natural log of the model is estimated. In other words, the dependent variable is a natural log of service quality whereas a natural log is taken for the non-dummy FSZ and CON independent variables. Please note that a natural log cannot be taken for dummy variables. Therefore, the estimated coefficients are elasticity measures relative to a percentage change in the dependent variable. The table 1 shows summary statistics for each variable in the model whereas table 2 shows the OLS regression results of the log-linear model.

As shown in Table 2, the FCH variable is not significant, meaning that service quality or consumer complaints has no significant relationship with the geographical distributions sales. Whether a firm is "nationalor "local" is found to have no impact on service quality. The log of the firm's size variable (FSZ) measured by net premiums written has a positive sign and is highly significant at the 5 percent level, meaning that a larger firm is associated with a better service quality to customers than a smaller firm. The MKT variable indicates whether a firm uses a direct marketing system or an independent agency system. This study finds that the distribution system of insurance products has a significant relationship with service quality. A firm with a direct marketing system is found to provide customers with a better service. Please note that most direct writers are large companies. Therefore, the estimated results of the FSZ and MKT variables are consistent, meaning that a larger firm with a direct marketing system provides a better service in the automobile insurance market. The ORG variable indicates whether a firm is a stock or a mutual company. The empirical result shows that the organizational form has no impact on consumer satisfaction and service quality.

The RAT variable in the model shows ratings based on a firm's financial strength. This variable has a positive sign and is highly significant, meaning that a firm with a higher rating is associated with a better service quality and less consumer complaints. Since a larger firm tends to receive a higher financial rating, the result is very consistent with the significant FSZ variable. The CON variable is a concentration variable that measures a percentage of an insurer's business in a domicile state. This study finds that the CON variable is not significant for explaining service quality. Unexpectedly, the STATE variable has a negative sign and is highly significant, indicating that the service quality in Illinois is worse than in New Jersey. Finally, the estimated results of the model found no yearly variations of service quality from year 1996.

Conclusion

This empirical study found that larger insurance companies with a direct marketing system and a higher financial rating provide their customers with a better service and receive less complaints. It is a quite unexpected finding that consumers in Illinois are less satisfied than consumers in New Jersey. Other independent variables are found insignificant. One explanation is that there might be some other factors that contribute to consumer satisfaction or the measurement of service quality is not correct. A misspecification of the model or lack of data can be another explanation. The department of insurance in Illinois complies complaint ratios for automobile insurance companies that receive ten or more complaints in a calendar year. Therefore, there might be a data omission problem for those automobile insurers who received less than ten complaints.

In 1997, the Illinois Insurance Department received a total of 14,081 complaints for all lines, and the automobile line accounts for 48 percent of the total. There were four major reasons of complaints: claim handling, underwriting, policyholder service, and marketing & sales. It is interesting to note that seventy-three percent of all complaints were in the area of claim handling. When policyholders have a claim to be filed, they contact their agents and are referred to a local or regional claim office. Therefore, I suggest that a future study on the subject of service quality should address the claim handling issue, and try to identify what types of claim handling procedures can affect or enhance service quality in the automobile insurance. 🕮

Table 1: Summary Statistics

Variable		N	Mean	Standard Deviation
SQ		231	5.376	10.651
FSZ		241	1.271	3.955
CON		213	58.808	40.539
		Frequency	Percent	
FCH	0	85	33.5	
	1	169	66.5	
	Total	254	100.0	
STATE	0	147	57.9	
	1	107	42.1	
	Total	254	100.0	
MKT	0	174	68.5	
	1	78	30.7	
	Total	252	100.0	
ORG	0	24	9.4	
	1	230	90.6	
	Total	254	100.0	
RAT	0	53	20.9	
	1	201	79.1	
	Total	254	100.0	
YEAR	96	88	34.6	
	97	88	34.6	
	98	78	30.7	
	Total	254	100.0	

Table 2: The Estimated results of Log-Linear Model (Dependent variable: log of service quality)

Variable	Coefficient	T statistics	Significance
FCH	0.245	1.273	0.205
FSZ	3.81E-08	2.074	0.040
MKT	0.374	2.290	0.023
ORG	-4.4E-02	-0.188	0.851
RAT	0.893	5.407	0.000
CON	2.57E-03	1.000	0.319
STATE	-2.010	-14.267	0.000
YEAR97	0.163	1.080	0.282
YEAR98	0.264	1.685	0.094
Constant	0.551	1.507	0.134

F Value: 35.003
Significance of the model: 0.000
Degree of Freedom: 183

References

1. Bajtelsmit, V. L., and R. Bouzouita. (1998). "Market Structure and Performance in Private Passenger Automobile Insurance," *J. of Risk and Insurance*, 65, pp. 503-14.
2. Barrese, J., H. I. Doerpinghaus, and J. M. Nelson. (1995). "Do Independent Agent Insurers Provide Superior Service? The Insurance Marketing Puzzle," *J. of Risk and Insurance*, 62, pp. 297-308.
3. Chidambaran, N. K., T. A. Pugel, and A. Saunders. (1997). "An Investigation of the Performance of the U.S. Property-Liability Insurance Industry," *J. of Risk and Insurance*, 64, pp. 371-81.
4. Cockerell, H. A., and G. M. Dickson. (1980). *Motor Insurance and the Consumer. Cambridge*: Woodhead-Faulkner.
5. Cummins, J. D., and S. Tennyson. (1992). "Controlling Automobile Insurance Costs," *J. of Economic Perspectives*, 6, pp. 95-115.
6. Doerpinghaus, H. I. (1991). "An Analysis of Complaint Data in the Automobile Insurance Industry," *J. of Risk and Insurance,* 58, pp. 120-27.
7. Hogue, R. D. (1999). "The State of the Personal Auto Business," *Insurance Advocate*, June 26, pp. 42-5.
8. Jaffee, D. M., and T. Russell (1998). "The Causes and Consequences of Rate Regulation in the Auto Insurance Industry," in D. F. Bradford (ed.) *The Economics of Property-Casualty Insurance*, Chicago:Univ. of Chicago Press, pp. 81-112..
9. Kang, H. B., and G. B. Flanigan. (1988). "Insurance Marketing systems and Expense Efficiency in Property and Liability Insurance," Midwest Review of Finance and Insurance, 12, pp. 155-64.
10. Kim, Won-Joong, D. Mayers, and C. W. Smith, Jr. (1996) "On the Choice of Insurance Distribution Systems," J. of Risk and Insurance, 63, pp. 207-27.
11. Pauly, M., H. Kunreuther, and P. Kleindorfer. (1986). "Regulation and Quality Competition in the U.S. Insurance Industry," in J. Finsinger and M. Pauly (eds.) *The Economics of Insurance Regulation*. N.Y.: St. Martin's, pp. 65-107.
12. Rust, R. T., A. J. Zahorik, and T. L. Keininham (1995) "Return on Quality (ROQ): Making Service Financially Accountable," J. of Marketing. 59. pp. 58-70.
13. Suponcic S. J., and S. Tennyson. (1998). "Rate regulation and the Industrial Organization of Automobile Insurance," in D. F. Bradford (ed.) *The Economics of Property-Casualty Insurance*, Chicago: Univ. of Chicago Press, pp. 113-38.
14. Wells, B. P., and M. R. Stafford. (1995). "Service Quality in the Insurance Industry: Consumer Perceptions Versus Regulatory Perceptions," Journal of Insurance Regulation.

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