A SYSTEM FOR ESTIMATING COMPLAINTS, COMPLAINT RESOLUTION AND SUBSEQUENT PURCHASES OF PROFESSIONAL AND PERSONAL SERVICES

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ABSTRACT

A block recursive system of equations is estimated to predict three components of the public complaint process: number of complaints, complaint resolution, and subsequent demand. Results of structural equation estimation indicate that economic variables, time restraints, and several taste and productivity shifters influence a consumer at each of the stages of the complaint process. Furthermore, given robust results, simultaneous modelling of complaints and complaint resolution appears justified.

INTRODUCTION

Customer satisfaction is coming of age. Sellers have realized that keeping consumers happy is an important part of doing business. Newsletters and workshops address customer satisfaction. The popular press identifies that consumers are becoming more sophisticated and are demanding satisfaction (Rice 1990). And, many companies are making it easier for consumers to voice their dissatisfaction (and satisfaction) through the implementation of 800 numbers, warranties, and guarantees.

This research takes both a step forward and a step back. The step forward is to model consumer complaining behavior in a manner that describes the actual process through time. Dissatisfaction and the probability that a complaint will be resolved influence complaining behavior of consumers. Complaints and company factors influence complaint resolution. Resolution, or lack of, influences subsequent purchase. This process can be modelled as a block recursive system of equations. Consumer complaints and complaint resolution by sellers are simultaneously determined. The rest of the model is recursive in that actions at one point in time influence future actions.

The step backward is to only examine "public" complaints. Public complaints are those that consumers voice directly to a seller. Few would deny that those persons who do not voice their dissatisfaction to a seller are as important as those who do. However, only persons who complain in a public manner can expect to have their complaint resolved. Because the model proposed examines complaint resolution as an important component of the complaint process, it includes only public complainers.

REVIEW OF LITERATURE

At least two comprehensive reviews of the literature about complaint behavior have been published (Robinson 1978; Andreasen 1988). Andreasen's categorization of the literature into four major streams is enlightening. He indicates that researchers have relied on either the cost/benefit, personality, learning, or restraints models to describe complaint behavior. Researchers have used these models independently to examine complaint behavior of consumers (Valle and Walendorf 1977; Warland et al. 1984; Duhaime and Ash 1981; Bearden 1983; Richins 1980; Hirschman 1970; Oster 1980). Kolodinsky (1990a; 1990b) has combined these models into a single model based on economic theory. The following is based on this theoretical model. However, empirically, it takes a different direction to include both recursive and simultaneous aspects of the complaint process.

METHODOLOGY

Von Weizsacker's (1971) work on endogenous changes in tastes has provided a framework for examining complaining behavior using an economic framework. A short-run utility function is maximized in each of several periods to obtain "optimal" levels of demand in each period. After

demand is ascertained, a consumer may learn that their behavior was "sub-optimal." Preference structures change accordingly and demand becomes a function of demand in a previous period. Complaining behavior can be modelled in this way (Kolodinsky 1990a; 1990b). A consumer is dissatisfied, complains, the complaint is resolved or not, and the consumer makes or does not make a subsequent purchase. This model can be expanded upon to include decisions that occur simultaneously. Specific to complaint behavior is the probability of complaining and the probability that a company will resolve a complaint. In all likelihood, when a consumer decides on whether to voice a complaint directly to a seller, a variable that influences the decision is the likelihood that the seller will resolve the complaint. In a world where scarcity of time is prevalent, efficient consumers will take probability of effectiveness into consideration. On the other hand, the probability that a company will resolve a complaint is, in all likelihood, a function of whether or not a consumer will voice a complaint. Bryant (1988) has suggested this scenario. This complicates the basic model in the following manner. No longer do we have a simple recursive model, where each event follows one another. We now have a block recursive model in which some events follow one another and others are simultaneously determined.

Conceptually, such a model is not difficult to compose. If one believes in the economic approach, complaints can be written as a function of the probability of resolution, economic factors including prices and income, and taste and productivity shifters, including personality traits, and non-pecuniary and time constraints. The probability of complaint resolution can be written as a function of complaints and several company factors. Subsequent demand of the good or service that originally caused the complaint can be written as a function of complaints, complaint resolution, economic factors, and taste and productivity shifters.

To empirically implement such a framework, a limited dependent, simultaneous equation estimator is necessary. This estimator has been derived and is relatively easy to implement using the software package LIMDEP (Maddala 1976, 1983; Greene 1986).

Data

Data were collected by a mail survey sent to a simple random sample of 1500 households in a New England State in the Spring of 1989. The questionnaire was developed in three-steps. First, questions were developed by examining survey instruments of other researchers interested in consumer complaining behavior and the quality of services (Day and Landon 1977; Ash and Quelch 1979; Duhaime and Ash 1981; Day and Bodur 1977; Marketing Science Institute 1985; Berry, Zeithaml, and Parasuraman 1985; Zeithaml 1978). Next, the questionnaire was tested using a panel of experts skilled in survey research. Finally, students in a university level Consumer Motivation course pre-tested the instrument.

The survey consisted of three sections. The first collected information about satisfaction and complaining behavior associated with services. The second included a list of statements about consumerism and feelings toward the business community. The final section collected demographic information. A total of 509 questionnaires were returned completed. Of those completed, 147 observations (29 percent) expressed dissatisfaction with a professional or personal service and 104 actually voiced their complaint at least once. 100 non-respondents were contacted to identify whether they differed from those who completed the survey in any systematic way. Only one non-respondent indicated dissatisfaction with a professional or personal service. Table 1 describes the entire sample, the subsample that was dissatisfied, and the non-respondents. The subsample differs significantly from the entire sample with regard to only two variables: price of the item and number of young children. Those dissatisfied with professional and personal services spent more on the services and had fewer young children at home. Non-respondents were significantly older and fewer were employed. They had less education, fewer younger children, and were less likely to be married. Age appears to be the factor influencing the difference in characteristics of respondents versus non-respondents.

Table 1
Descriptive Statistics

Variable	Definition		
	Dissatisfied Sample	Entire Sample	Non-Responsive
PRICE	Price of service		
	393.19[m]	122.71[m]	na
	(1181)	(683)	
INCOME	Annual family income		
	33265[m]	31857[m]	na
	(19607)	(20833)	
YNGKIDS	Number of children under the age of six		
	.22[p]	.16[p]	.18[p]
OLDKIDS	Number of children ages 6-18		
	.59[p]	.32[p]	na
SIZE	Company dissatisfied with is large		
	.18[p]	na	na
URGE	Company offers an incentive for consumer voice		
	.26[p]	na	na
AGE	Age of respondent		
	45[m]	48[m]	50[m]
	(13)	(15)	(16)
COLL	Respondent completed college		
	.60[p]	.59[p]	.23[p]
PREPUR	Dissatisfaction occurred before purchase		
	.49[p]	na	na
DISAT	Respondent was very dissatisfied		
	.32[p]	na	na
FEMALE	Respondent is female		
	.46[p]	.45[p]	.48[p]
MARRIED	Respondent is married		
	.83[p]	.75[p]	.69[p]
RURAL	Respondent resides in a rural place		
	.46[p]	.38[p]	.38[p]
HOURS	Hours worked per week		
	31.5[m]	29.1[m]	na
COMPLAINTS	Number of complaints		
	1.92[m]	na	na
RESOLVE	Was the complaint resolved?		
	.259[p]	na	na
BUYAGAIN	Would service be purchased again?		
	.40[p]	na	na
	N=147	N=509	N=100

[m]Mean value is given
[p]Proportion of the sample is given
Standard deviations are given in parentheses

Empirical Specification

Empirically, a block recursive series of equations is set up to estimate number of times a consumer complains, the probability of a complaint being resolved, and the probability of subsequent demand of the service by a consumer. The structural equations are written as follows:

1. $\text{COMPLAINTS} = \alpha_0 + \alpha_1\text{PREPUR} + \alpha_2\text{DISAT} + \alpha_3\text{COLL} + \alpha_4\text{AGE} + \alpha_5\text{FEMALE} + \alpha_6\text{URGE} + \alpha_7\text{MARRIED} + \alpha_8\text{YNGKIDS} + \alpha_9\text{OLDKIDS} + \alpha_{10}\text{PRICE} + \alpha_{12}\text{FAMINC} + \alpha_{13}\text{HOURS} + \alpha_{14}\text{CONSPER} + \alpha_{15}\text{CONSUMER} + \alpha_{16}\text{RESOLVE} + \text{error1}$

2. $\text{RESOLVE} = \beta_0 + \beta_1\text{DISAT} + \beta_2\text{AGE} + \beta_3\text{FEMALE} + \beta_4\text{URGE} + \beta_5\text{SIZE} + \beta_6\text{PRICE} + \beta_7\text{COMPLAINTS} + \text{error2}$

3. $\text{BUYAGAIN} = \gamma_1\text{DISAT} + \gamma_2\text{COLL} + \gamma_3\text{AGE} + \gamma_4\text{FEMALE} + \gamma_5\text{URGE} + \gamma_6\text{YNGKIDS} + \gamma_7\text{OLDKIDS} + \gamma_8\text{PRICE} + \gamma_9\text{FAMINC} + \gamma_{10}\text{RURAL} + \gamma_{11}\text{HOURS} + \gamma_{12}\text{CONSPER} + \gamma_{13}\text{CONSUMER} + \gamma_{14}\text{RESOLVE} + \gamma_{15}\text{COMPLAINTS}$

Clearly, equations (1) and (2) must be simultaneously determined because number of complaints is dependent on whether a complaint will be resolved and resolution of a complaint is dependent on how many complaints are made. This is the "block" portion of the block recursive specification. Equation (3) is determined after (1) and (2) are estimated and is the "recursive" portion of the block recursive specification.

Several factors must be considered when choosing an estimator for this system. First, one must prevent the simultaneous equation bias that occurs if ordinary least squares regression analysis is used to estimate each equation. This bias would occur because error1 and error2 are not independent of one another when a dependent variable appears on the right hand side of an equation. Second, only 104 of 147 respondents complained about a personal or professional service. If ordinary least squares regression analysis were used to estimate equation (1), sample selection bias as well as simultaneous equation bias would ensue. Third, the probability of a complaint being resolved and the probability of making a subsequent purchase are both limited dependent variables. That is they are reported as 0 or 1; either the complaint was resolved or not, or a

subsequent purchase was made or not. Ordinary least squares is inappropriate when limited dependent variables are present.

The above factors led to the choice of a two-stage maximum likelihood estimator (Maddala 1983) joined with Heckman's (1972) correction for sample selection bias. Estimation involves the following steps:

1. Estimate reduced form equations including all independent variables in the system for (1) and (2) and obtain estimates of the number of complaints and the probability of complaint resolution.
    a. For equation (1) first estimate the probability of making a complaint using probit and then estimate the number of complaints made using Ordinary Least Squares. This corrects for sample selection bias.
    b. For equation (2) use logit to estimate the probability of complaint resolution
2. Estimate structural equations (1), (2), and (3) using predicted values for number of complaints and the probability of complaint resolution.
    a. For equation (1), estimate the probability of complaints using probit and then number of complaints using Ordinary Least Squares and the predicted value of complaint resolution as an independent variable.
    b. For equation (2), estimate the probability of complaint resolution using the predicted value of number of complaints as an independent variable.
    c. For equation (3), estimate the probability of subsequent purchase using predicted values for number of complaints and probability of complaint resolution as independent variables. Using predicted values of dependent variables as independent variables corrects for simultaneous equation bias.

Several independent variables are expected to influence complaints, complaint resolution, and subsequent purchase. Hypothesized direction of effects are formed based on economic and consumer behavior theory, and findings of previous researchers. Economic influences include price of the service (PRICE), and family income (FAMINC). These variables are included in equations to estimate number of complaints and subsequent purchase. PRICE is expected to have a positive influence on complaints and a negative influence on subsequent purchase. A more expensive item represents more of a loss to a consumer if there is a problem with it. The effect of FAMINC will indicate if complaints and the service in question are normal goods.

Employment of a respondent outside the home (HOURS) and the presence of children under the age of six (YNGKIDS) measure time constraints placed on the respondent. These variables are expected to have a negative influence on complaints since market work and presence of young children compete for available time. They are expected to have a positive effect on subsequent purchase since looking elsewhere for a service involves search time.

Whether the company offered some sort of outward customer service (URGE), such as toll-free telephone numbers to attract consumer comments, or offered a warranty, guarantee, or service contract, measure a possible softening of constraints by sellers that may influence consumer complaint behavior. URGE should exert a positive influence on complaints (Kendall and Russ 1975). SIZE and URGE are expected to exert a positive influence on complaint resolution, since larger companies are more likely to be able to afford customer service personnel and companies that offer guarantees and warranties are expected to honor them. The effect of URGE on subsequent purchases is difficult to predict.

Learning is measured by age of respondent (AGE), and whether or not a college education was completed (COLL). Persons with a college degree may be better at problem solving, while older consumers may be more experienced at problem solving due to increased experience, or may have decreased abilities due to old age. Previous research found ambiguous effects of age on complaints (Mason and Bearden 1981). Their effect on subsequent purchase is also difficult to predict. Age is included in the complaint resolution equation. If a complaint is made by telephone or in person, a seller may be able to ascertain the age of the respondent. The direction

of effect of age on complaint resolution will give an indication if older persons are treated differently by sellers than younger persons.

Attitudes are measured by two factors extracted from 21 different statements using Principal Components Analysis, [see Kolodinsky (1990b) for details]. These two factors are titled CONSPER, a measure of consumer attitudes toward business, and CONSUMER, a measure of consumer attitudes toward consumerism. CONSPER is expected to impact negatively on complaints because the factor is framed in terms of negative perceptions of business' willingness to respond to consumers. CONSUMER is expected to impact positively on complaints because consumers interested in the consumer movement may take steps to advance it forward.

Five additional variables are included in the analysis: the stage of the buying process dissatisfaction occurred (PREPUR), the level of dissatisfaction (DISAT), whether the respondent was female (FEMALE), whether the respondent was married (MARRIED), and whether the respondent resides in a rural area (RURAL). Little is known about complaining before purchase. Inclusion of PREPUR may give insight into what happens to complaints when dissatisfaction occurs before actual purchase. If a consumer is very dissatisfied (DISAT), one might expect complaints to increase, complaint resolution to increase, and subsequent purchases to decrease. Being married may affect consumer complaint behavior. Consumers may simply "complain" to their spouse instead of to a seller. Being married may also affect demand for a service. Research has found that rural consumers tend to be more satisfied with their buying experiences (Liefeld 1981). Thus, RURAL is expected to impact positively on subsequent purchases.

RESULTS

Results of structural equation estimates are provided in Table 2. Results of the Probit equation, which estimates the probability of making a public complaint is mainly used in the correction of sample selection bias since 105 of 147 of respondents did not complain. However, these results are interesting in their own right.

Table 2
Structural Parameters

Variable	Probit	# Complaints	Resolve	Buyagain
INTERCEPT	-.139	-.972	7.39	-
	(1.49)	(3.20)	(.894)	
PREPUR	-.489*	-.064	-	-
	(.27)	(.867)		
DISAT	-.992	1.23*	-.265	-1.68**
	(.339)	(.786)	(.449)	(.837)
COLL	.101	.099	-	1.61**
	(.272)	(.580)		(.742)
AGE	-.011	.195***	-.035*	-.225***
	(.023)	(.042)	(.022)	(.044)
FEMALE	-.252	1.20**	.296	-3.40***
	(.283)	(.538)	(.495)	(1.06)
URGE	.258	-.971	-.631	1.97**
	(.332)	(.781)	(.630)	(9.20)
MARRIED	-.072	-2.72***	-	-
	(.474)	(.902)		
SIZE	-	-	-.466	-
			(.567)	
YNGKIDS	-.212	2.43***	-	-3.65***
	(.331)	(.679)		(.946)
OLDKIDS	.009	2.09***	-	-2.48***
	(.273)	(.553)		(.660)
PRICE	.0007***	.0005*	-.0002	.0084***
	(.0002)	.0003	(.0003)	(.0016)
FAMINC	-.000008	-.00005**	-	-.00004**
	(.00001)	(.00002)		(.00002)
RURAL	-	-	-	2.93***
				.821
HOURS	.001	.044**	-	-.053**
	(.010)	(.020)		(.025)
CONSPER	-.118	-.194	-	-.548
	(.129)	(.237)		(.353)
CONSUMER	.370**	.995	-	2.80***
	(.176)	(.466**)		(.666)
COMPLAINTS	-	-	-.180	-12.15***
			(.890)	(2.28)
RESOLVE	1.37	8.90	-	16.69
	(1.30)	(2.57***)		(4.30)
LAMBDA	-	.741	-	-
		(1.04)		
LOGLIKE-LIHOOD	-70.02	-	-78.42	-33.28
R^2	-	.52	-	-

* Significant at <.10 level
** Significant at <.05 level
*** Significant at <.01 level

Dissatisfaction occurring before purchase (PREPUR), significantly decreases the probability of complaining about dissatisfaction. The only variables at the structural stage which had significant, positive effects on the probability were service price (PRICE) and a positive attitude toward consumerism (CONSUMER). The higher the price of a service, the greater the loss to the dissatisfied consumer. Therefore, these consumers were hypothesized to have a higher probability of complaining. Those interested in consumerism were hypothesized to have a greater propensity to complain when dissatisfied since they felt that consumers can affect the marketplace through their actions. Together, all the variables in the equation predicted the probability of complaining correctly in 92 percent of the cases.

The number of complaints a respondent made to a seller were positively and significantly influenced by increases in the level of dissatisfaction with the service (DISAT), age of a respondent (AGE), being female (FEMALE), the presence of both young and older children (YNGKIDS, OLDKIDS), the price of the service (PRICE), hours worked in the labor market (HOURS), positive attitudes towards consumerism (CONSUMER), and increases in the probability of the problem being resolved (RESOLVE). Number of complaints are negatively and significantly influenced by being married (MARRIED), and increases in family income (FAMINC).

Complaints appear to be inferior goods, as income increases, the number of complaints made decrease. All else constant, it seems that complaining may not be economically worthwhile for persons with higher incomes. Age of a consumer appears to be measuring experience, as older consumers are more likely to complain. It is important to note, however, that this study did not contain a very large number of aged persons. It is not possible, therefore to draw conclusions about the elderly population. Being married decreases the number of complaints. It is possible that these persons tend to complain to their spouses to "get it off their chest" instead of voicing their dissatisfaction to a seller. As expected, the higher the loss associated with dissatisfaction (PRICE) and the greater the dissatisfaction (DISAT), the higher the number of complaints. The simultaneous specification of complaints and complaint resolution also appears to be justified, as complaints increase with increases in the probability of resolution.

It was hypothesized that the presence of children in a household and increasing numbers of hours worked in the labor market would be associated with time constraints, decreasing the time available to complain. Results indicate positive effects of these variables, contrary to expectations. These results are difficult to interpret in an economic sense. Perhaps households with children find it important to complain when dissatisfied since it may help the quality of services rendered to their children either at present or in the future. Perhaps, since those employed more hours in the labor market do face time constraints, they feel that complaining now may afford them better service in the future. Thus, there may be a mentality of "spend the time now and things will go smoothly later."

The equation used to estimate the probability of complaint resolution did not perform well. However, the equation predicted the probability of complaint resolution correctly in 98 percent of the cases. Therefore, the variables taken together appear to be better indicators of resolution than do individual variables. The only variable found to be significant was a decrease in the probability of complaint resolution associated with increases in the age of the respondent. Sellers do appear to treat older consumers differently than younger consumers, despite the fact that older consumers were more likely to complain.

The equation used to estimate subsequent demand performed quite well. Subsequent demand was predicted correctly for 91 percent of cases. Significant positive effects on subsequent demand were found for those with a college education (COLL), offering a guarantee, warranty or toll free number (URGE), increases in the price of a product (PRICE), residing in a rural location (RURAL), having a positive attitude toward consumerism (CONSUMER), and increases in the probability that the complaint would be resolved (RESOLVE). Treating COLL as a learning variable may be inappropriate. If consumers learn from their dissatisfaction, one would have expected subsequent demand to decrease with increases in education. The findings for URGE and RESOLVE are encouraging. Sellers that offer

some sort of guarantee of customer satisfaction, or satisfy consumers after dissatisfaction takes place are likely to retain customers. This supports the view of a "defensive marketing strategy" taken by Fornell and Wernerfelt (1987). The results for PRICE and CONSUMER are puzzling. All else constant, one would have expected that as the price, or risk of loss increases, a consumer would not purchase the same service from the same seller again. And, although being interested in the consumer movement appears to affect complaining behavior, it does not affect purchase behavior in the future. Those living in a rural location (RURAL) may be limited in the number of sellers available, and may have little choice in subsequent purchase of a needed service.

Significant negative effects were found for increases in the level of dissatisfaction (DISAT), increases in age (AGE), being female (FEMALE), having younger and older children at home (YNGKIDS, OLDKIDS), increases in the hours worked in the labor market (HOURS), and increases in the number of complaints made (COMPLAINTS). Therefore, when a consumer is very dissatisfied and complains many times they are less likely to purchase a service again, even if the complaint is resolved. The results on YNGKIDS, OLDKIDS, and HOURS are once again puzzling. It was expected that time constraints would increase the probability of making the same purchase again, even if dissatisfied. Results indicate this is not the case. Perhaps these persons are willing to invest time in search for a better service once dissatisfied.

DISCUSSION

The empirical specification of a block recursive model to describe the process of complaints, complaint resolution, and subsequent demand of professional and personal services by dissatisfied consumers appears to be viable. Indeed, the model worked quite well in predicting the probability of complaints, complaint resolution, and subsequent demand. It also provided insight into the effects of several variables representing economic, learning, restraints, and personality factors.

Surprisingly, it appears that time restraints do not decrease the probability of complaining about dissatisfaction with the included services. However, once dissatisfied, those with time constraints are not likely to repurchase the same service again. This is both good and bad news for sellers. On the one hand, sellers are alerted to inadequate service provision. On the other hand, all else held constant, they tend to lose these customers anyway. In addition, although the model did not specifically include private complaining, that is, complaining to friends and neighbors or boycotting a product or service, indications are that those with time constraints do end up boycotting services when dissatisfied. The same can be said for older consumers and females. These findings have implications for sellers in that providing quality upfront may retain customers.

Findings also indicate that customers living in rural locations increases the probability of subsequent purchases, despite dissatisfaction. If these consumers are restrained in their choices because of a limited number of suppliers, other channels of complaint resolution may be important. These include third party techniques such as consumer assistance programs and litigation.

Bad news for consumers is that increases in the number of complaints does not increase complaint resolution. Unfortunately, it also appears that having positive attitudes about consumerism increases actions taken by consumers about dissatisfaction, but does not increase problem resolution by sellers. Encouraging for sellers, however, is the finding that if a complaint is resolved, consumers are likely to purchase from that seller again. Therefore, on the one hand, it appears that providing quality in the first place is very important. On the other hand, if a consumer is dissatisfied, customer service is an important component of service offerings.

To help consumers, perhaps a consumer information network is in order. While publications such as *Consumer Reports* are available for tangible products, little pre-purchase information exists for services. The fact that many services are intangible and credence goods makes such an information network difficult to devise and implement. Such a network has been proposed by Maynes et al. (1977), but little in the way of implementation has taken place.

Finally, this study looked only at an aggregated group of personal and professional

services. A next step would be to desegregate this group into its components. One idea would be to examine medical services. Thus, the area of examining the process of consumer complaint behavior and predicting complaints remains fruitful.

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APPENDIX I

Professional and Personal Services
- services of lawyers
- veterinarian services
- home security services/private detectives
- architects
- employment agencies
- travel agencies
- barber shops/beauty salons/spas
- nursing or rest homes
- real estate brokers or agents
- dentists or dental technicians
- income tax preparation
- computer dating services
- medical doctors/nurses
- psychologists
- optometrists or ophthalmologists
- physical therapists

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