The Future of Banking: The Strategies That Won the Game Yesterday
Will Win The Game Tomorrow - -
Results from a National Survey of Banking Consumers

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At first thought you might think that the essence of banking is money. Yet in light of today's competitive market environment in which the guiding paradigm is that businesses should be consumer driven it is clear that banking is a people business and, by the way, they deal with money. Banking has always been a people business. The successful banks have always been those that reached out and extended themselves to the consumer.

It is not clear that banks are leading the charge to consumer driven paradigms. An exception might be Bank One who tells us that they will do "Whatever It Takes" to get and keep our business. Banks have even made it harder for customers to feel close by encouraging use of impersonal ATM machines and even charging customers who use real person tellers. The result--low satisfaction with banking and low loyalty to particular banks.

Consumer relationships are the competitive battlefield in the 1990's. The only real asset with long term value is a loyal consumer. Only satisfied consumers return. Today's winning companies are realizing that consumer satisfaction must drive their strategic decision making. If a business wants to be around in 25 years they must listen to their consumers, serve them better than the competition, and change to meet the changing needs and expectations of the consumer. If they don't someone else will. Banking is no exception. In today's competitive market environment where there is a bank branch on every corner, credit unions, savings and loans, telephone banking, and computer banking, the consumer has a choice. If banks don't serve consumers well the consumer will seek out alternatives. The future of banking is the consumer and the technology that will serve them.

It is therefore prudent to look at the factors determining consumer satisfaction with banks and try to tease out what the future of banking will be as banks become more aware of and sensitive to the importance of consumer satisfaction. The data for looking at the nature and scope of consumer satisfaction with banking was drawn from a survey we conducted with a nationally representative sample of 1000 bank consumers. The items on the survey were determined after a series of focus groups. (A complete survey is available from the authors as in published papers outlining some of the major findings -- Chakravarty, Feinberg, & Widdows, 1995; Chakravarty, Widdows, & Feinberg 1996).

Results

We characterized the possible relationships between consumers and banks as varying in the degree of satisfaction (high versus low present satisfaction) and importance (high or low importance to the consumer).

Satisfied and Important

Consumers were satisfied in the following important areas: trust, keeping promises, dependability, helpfulness, latest technology, location, and politeness of employees. Most of these issues deal with relationship issues. The evidence is that banks are satisfying customers in these areas.

Satisfied and Not Important To The Consumer

Consumers were currently satisfied with bank hours, availability and use of ATM machines, physical appearance of the banks and its employees, and phone contact.

Not Satisfied But Also Not Important

Consumers were not satisfied with the level of special/personalized service they received, lines, the ability to bank on the personal computer, availability of quiet areas to work, 1-800 numbers for access, newsletters, greeters, or help tapes and material. While these areas define dissatisfaction they do not also define areas that consumers consider important. From a

strategic point of view banks should worry about these only after dissatisfaction on important issues are managed well.

Not Satisfied and Important

From a strategic point of view the highest payoff in customer satisfaction can occur in elevating areas of importance where consumers are dissatisfied. The areas of high dissatisfaction in highly important areas were banks having hidden costs, not having the customers best interest at heart, no personalized attention, and no written materials to explain things.

Computer Use

Work at the Purdue University Retail Institute has identified computers and technology as means by which companies can serve two emerging consumer trends--consumer desire for control and consumer desire for individualized products/services. Consumers increasingly want control of the retail transaction (Schwab One Source allows consumers full access to research and trading without having to talk to a single person). In addition, consumers are increasingly demanding that goods and services be personalized to them. Technology allows the development of personalized mass merchandise. (Levi's can personalize a pair of jeans in their stores, supermarkets can track individual purchase and follow up with coupon from manufacturers to reinforce the purchase or induce purchase of competing product).

In this survey consumers were clear in stating that they would welcome the ability to do all their banking over the computer (60% agreement) and that they would switch banks if a competing bank allowed such activity (70%).

Strategic Implications For the Consumer Interest

The consumer interest is in creating institutions and business that serve them well. Consumer satisfaction is one measure by which we can assess how well consumer interests are being served. The findings from this survey showed a level of dissatisfaction with banks on decidedly relationship issues. The good news was that on many relationship issues consumers were very satisfied. Thus, successful banking is, as originally thought, a relationship/people issue. Moreover technology will allow banks to serve customers well by creating access to personalized relationships under the consumer control. The data show that consumers want it. Far from alienating consumers, our work at the Purdue Retail Institute on banking and other industries indicates that technology can allow banks and businesses

to become closer to the consumer in the consumers interest. And, this will work because not only is closeness in the consumers interest but it is also in the banks best self-interest (loyalty and profitability).

There is evidence that this is exactly what is happening. In a recent *New York Times* piece it was pointed out that since Citibank started computer banking 11% of its customer base has signed on. Nearly 100,000 customers signed up with Quicken in the first month of offering banking. While this represents less that 1% of the 100 million households in the United States the article made clear that once technical problems are solved home/computer banking will be a dominant force (Hansell, 1996). On the other hand, it seems that banks do not get "it" and banking will be dominated by software companies (Elgin, 1996).

The consumer does not get up in the morning and say, "What can I do for XYZ Bank but what can XYZ Bank do for me." And, if XYZ Bank does not do it the consumer will go elsewhere. Technology will allow banks to do exactly what the consumer wants when they want it.

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Seafood Safety Perceptions and Their Effects on Consumption Choices

This paper identifies factors that may influence consumers seafood safety perceptions. It examines how safety perceptions would affect future seafood consumption under a variety of hypothetical conditions. A telephone survey of random Rhode Island consumers provided data for this analysis.

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The seafood supply in the U.S. is associated with a diverse but controllable set of health risks. Consumers most at risk are those who consume raw molluscan shellfish which have been exposed to environmental contamination and naturally occurring bacteria (e.g., *Vibrios*) (National Academy of Sciences (NAS) 1991, p. 9). The second largest constituency at risk is consumers of recreational and subsistence fishery products. This results from environmental contamination and natural toxins. Minimization of these risks is, in part, the responsibility of regulatory agencies that administer programs such as water quality monitoring. However, a significant amount of control over seafood-related health risks lies in the hands of the consumer. For example, consumers can simply refrain from eating raw shellfish. In addition, they can use cooking methods which eliminate the possibility of cross-contamination between raw and cooked product.

While studies show that the nation's seafood supply is generally quite safe and highly nutritious (GAO, 1988; FDA, 1989; CDC, 1990; NAS, 1991; Hurley and Liebman, 1994), several other studies suggest that many consumers continue to perceive the seafood supply as somewhat unsafe, e.g. Anderson and Morrissey (1991), Lin *et al.* (1991), Brooks (1992), AUS Consultants (1992), Lin *et al.* (1993), and Wessells and Anderson (1995). Recently, the U.S. Food and Drug Administration (FDA) proposed a new and comprehensive inspection system to ensure the quality and safety of the nation's seafood supply (Yin, 1994).

The purpose of this study is two-fold. First, an ordered probit model of consumers' safety ratings of the seafood supply is used to perform hypothesis tests. This was done to determine whether past personal experience with seafood, including frequency of consumption of seafood and risk-taking behavior such as consumption of raw seafood, influences the safety ratings. Second, chi-squared tests are performed to evaluate the impact hypothetical exogenous changes may have on seafood

consumption of consumers with different levels of seafood safety perceptions. These hypothesis tests yield implications regarding the benefits of providing additional information to consumers to improve their seafood consumption decisions.

Survey Design and Qualitative Results

A random telephone survey of 156 Rhode Island households was conducted during the summer of 1990. The survey consisted of questions regarding seafood consumption by species and perceptions of seafood quality and safety. The respondents from all 156 households consume seafood in some form, either at home or at restaurants. The average number of times per month respondents consume finfish at home is 3.2 versus 1.8 times per month at restaurants. Similarly, the average consumption of shellfish at home is 2.8 times per month compared to 2.4 at restaurants. The most frequently consumed finfish among these Rhode Island residents is cod, followed by flounder, haddock, and swordfish. The most frequently consumed shellfish are clams, followed by scallops. Lobster and shrimp are also among the most popular seafood products.

One of the objectives of the survey was to determine to what extent consumers assume risk-taking behavior in their seafood consumption patterns. For that reason, respondents were asked if they consume shellfish or finfish raw. Forty-six percent reported that they consume shellfish raw, while 7.7% reported that they consume raw finfish. Additionally, respondents were asked if they consume various portions of fish and crustaceans, namely, the tomalley of lobster, and the skin, fatty portions, dark flesh, organs, or roe of finfish. These portions are scientifically proven to accumulate toxins, if any are present in the aquatic environment. Fifty-three percent of respondents report that they consume one or more of these portions of fish and lobsters.

In response to a question regarding the overall safety of the seafood supply, 21.2 percent stated that they believe seafood is safe, 48.0 percent believe seafood is somewhat safe, and 30.8 percent believe that seafood is somewhat unsafe. Of those who responded that seafood is safe, their frequency of finfish consumption per month is 5.4 and 1.4 times per month for bivalve shellfish.[3] For those who responded that the seafood supply is somewhat safe, the frequency of finfish consumption is 5.6 times per month and 1.8 times per month for bivalve shellfish. Of those respondents who stated that seafood is somewhat unsafe, the mean shellfish consumption was higher (1.9/month) than the sample average, while finfish consumption was lower (3.9/month). The differences in mean finfish consumption across respondent categories are significant at the 5% level. Of the respondents who stated that they believe seafood to be less than safe, 73.2% cited ocean pollution as a specific concern, followed by chemical toxins (23.6%), food poisoning (17.9%), and handling (20.6%). Many respondents (40.7%) also stated that they were specifically concerned about the safety of shellfish.[4]

Model of Seafood Safety Rating

There are several factors which can reasonably be expected to influence consumers' perceptions of seafood safety. In particular, frequency of consumption may be hypothesized to be correlated with safety ratings. Lin *et al.* (1991) hypothesize that oyster safety ratings are a function of frequency of consumption, and the empirical analysis confirms this. A frequent seafood consumer might *a priori* be expected to perceive seafood as safer than a consumer who does not consume seafood often. Similarly, Brooks (1992) finds that the relative risk rating of mussels to other food products is correlated with the frequency of mussel consumption. Wessells and Anderson (1995) find that frequency of consumption is positively correlated with willingness to pay for seafood safety assurances.

Risk-taking behaviors may also be related to safety perceptions. *A priori* it is expected that risk-taking behaviors, such as consuming raw shellfish or eating the organs where toxins accumulate, will be positively related to seafood safety ratings. In this study, a significant number of respondents reported that they had undertaken risks such as consuming raw shellfish or eating portions of finfish and crustaceans which elevate the long-term risk of becoming ill. It is possible that these respondents have limited, if any, information on the risks involved as a result of such behavior. However, given findings of Celsi *et al.* (1993), this behavior could also be explained by: a) respondents' confidence in their ability to choose a safe product; or b) respondents' extrapolation from previous seafood consumption experiences wherein they do not become ill, thus believing that they will not become ill from the continuation of such risk-taking behavior.

In this study, the data on seafood safety ratings have an inherent ordering. The ratings range from safe, somewhat safe, to somewhat unsafe. None of the respondents in this sample indicated that they felt the seafood supply is completely unsafe. Thus, if the dependent variable (safety rating) were recorded as a discrete variable, 0 = somewhat unsafe, 1 = somewhat safe, and 2 = safe, a multinomial logit or probit model would fail to take into account the ordinal nature of the responses. Therefore, an ordered probit model was estimated to explain consumer seafood safety ratings as a function of variables describing seafood experience and consumer characteristics. An ordered probit model is specified as:

$$y^* = \beta'x + \varepsilon \qquad (1)$$

where y^* is unobserved, x is a matrix of explanatory variables, β is a vector of parameters, and ε is a vector of error terms. What is observed is that:

$$y = 0 \text{ if } y^* \leq 0, \qquad (2)$$

$$y = 1 \text{ if } 0 \leq y^* \leq \mu_1 \qquad (3)$$

$$y = 2 \text{ if } \mu_1 \leq y^* \leq \mu_2 \qquad (4)$$

where $0 \leq \mu_1 \leq \mu_2$. If we assume that ε is normally distributed across observations and the mean and variance are normalized to zero and one, respectively, then the following probabilities are obtained:

$$\text{Prob}(y=0) = \Phi(-\beta'x) \qquad (5)$$

$$\text{Prob}(y=1) = \Phi(\mu_1 - \beta'x) - \Phi(-\beta'x) \qquad (6)$$

$$\text{Prob}(y=2) = 1 - \Phi(\mu_2 - \beta'x) \qquad (7)$$

where $\Phi(-\beta'x)$ is the cumulative normal density function evaluated at the vector of regression parameters and explanatory variables. The marginal effects of the regressors, x, on the dependent variable (probabilities) are not equal to the coefficients as in linear regression analysis. Instead, these marginal effects are equal to the partial derivative of equations (5) - (7) with respect to each regressor (Greene, 1993, p. 674).

Variable coefficient estimates of the ordered probit model are presented in Table 1. The associated

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Table 1

Estimated Variable Coefficients of the Probit Model and Marginal Effects

Variable	Coefficient	t-ratio	Marginal Effects		
			Prob(y=0)	Prob(y=1)	Prob(y=2)
Constant	-0.220	-0.297	0.046	-0.011	-0.035
FINFISH	0.081*	1.900	-0.017	0.004	0.013
SHELLFISH	-0.198*	-1.909	0.041	-0.010	-0.031
AGE	0.014	1.361	-0.003	0.001	0.002
EDUCATION	-0.037	-0.271	0.008	-0.002	-0.006
RISK	0.676*	1.947	-0.137	0.036	0.101

Summary Statistics: Number of observations = 156
Value of the Log-likelihood Function = -156.77
Chi-Square statistic = 11.99** (with 5 degrees of freedom)

*   indicates significant at 10% level
**   indicates significant at 5% level

marginal effects, calculated at the means for the continuous variables, are also presented. The estimated equation is significant at the 5 percent level since the χ^2 statistic for the likelihood ratio test of the estimated regression against a regression of the dependent variable on only the intercept is 11.99, compared to a critical χ^2 value of 11.07 (α=0.05) with 5 degrees of freedom. The effects of the socioeconomic variables (education, income, age) on the probability of rating seafood as safe are statistically insignificant.

Initially, regressions were estimated which considered frequency of seafood consumption as a single variable. This was done to test the hypothesis that the more frequent the overall seafood consumption of the respondent's household, the more likely the respondent is to attribute a safe rating to the seafood supply. However, the coefficient on this variable was insignificant. Therefore, it was replaced by two variables which account for finfish and shellfish consumption separately.

In the final regression, both frequency of consumption variables are significant, while the signs are opposite. Analysis of the marginal effects shows that in this sample of respondents, there is an increasing probability of rating seafood as safe given an *increase* in the frequency of finfish consumption, and an increasing probability of a larger magnitude of rating seafood as safe given a *decrease* in the frequency of shellfish consumption. A likely reason for this result is related to the manner in which many survey respondents obtain the

shellfish they consume. The survey question asking respondents to evaluate seafood safety referred to the available supply in general, not to the specific seafood they consume. However, 38% of respondents who rate seafood as somewhat unsafe, and 49% who rate seafood as somewhat safe, recreationally harvest shellfish for their consumption. Conversely, only 14% of those respondents who rate seafood as safe recreationally harvest shellfish. Additionally, the mean frequency of shellfish consumption among those who recreationally harvest shellfish is 2.7 times per month, compared to 1.5 times per month for those who do not. These differences in means are significant at the 5% level. Thus, while many respondents may be skeptical about the safety of the general seafood supply, they may have felt more confident about the shellfish they consume because they are personally responsible for its harvest. It is also possible that frequent consumers of bivalves may be more knowledgeable about the actual risks associated with shellfish. Thus, in general, greater experience with bivalves may be linked with increased consumer savvy regarding seafood. Those who eat relatively less shellfish yet rate it as safe may be inhibited from consumption by factors other than risk perception. Such factors may include high price, perceived difficulty in preparation or limited availability of high quality product.

Previously tested models also included two binary variables to evaluate the effects of risk-taking behavior. A binary variable was specified which was

Table 2

Respondents' Anticipated Change in Seafood Consumption Resulting from Hypothetical Events Given Their Safety Rating

| | Respondents' Seafood Safety Rating (Percentage) | | | |
Hypothetical Event	Somewhat Unsafe	Somewhat Safe	Safe	χ^2 Statistic[a] (p-value)
Label with Catch Date (N=154)				
Consumption same	10.4	22.1	13.0	5.94*
Consumption increase	20.8	25.3	8.4	(0.051)
Seafood Inspection (N=154)				
Consumption same	11.7	29.2	15.0	9.18*
Consumption increase	18.8	18.8	6.5	(0.010)
Selecting and Preparing (N=153)				
Consumption same	13.7	24.2	15.7	6.41*
Consumption increase	16.3	24.2	5.9	(0.041)
Media Oil Spill Stories (N=155)				
Consumption same	5.8	17.4	9.7	6.71*
Consumption decrease	24.5	31.0	11.6	(0.035)
Closure of Bay to Fishing (N=152)				
Consumption same	6.6	18.4	11.2	8.11*
Consumption decrease	24.3	29.0	10.5	(0.017)
Seafood Price Drops (N=156)				
Consumption same	14.7	16.7	7.1	2.64
Consumption increase	15.0	31.4	14.1	(0.268)
New Local Vendor (N = 152)				
Consumption same	25.0	32.2	15.8	3.95
Consumption increase	5.3	16.4	5.3	(0.139)

*   Significant at the 95% confidence level

[a]   Degrees of freedom = 2

equal to 1 if the respondent consumes either shellfish or finfish raw, 0 otherwise, and an additional binary variable was specified as 1 if the respondent consumes portions of fish and crustaceans, such as the dark portions of flesh, the skin, fatty portions, roe, or organs, 0 otherwise. Results indicated that these two binary variables are highly correlated, and thus little significance was individually attributed to either. However, when a binary variable (RISK) is specified as 1 if the respondent engages in any of these risk-taking activities, 0 otherwise, then this variable is significant at the 6% level and positively related to safety perception. The coefficient for the variable RISK suggests that an individual who undertakes risk in their seafood consumption is more likely to believe the seafood supply is safe than one who does not.

Changes in Seafood Consumption with Exogenous Events

The survey also included questions concerning whether or not respondents' frequency of seafood consumption would change as a result of a variety of hypothetical exogenous events. These events include: 1) the advent of availability of seafood with labels containing catch date information; 2) the institution of a federally mandated inspection system for seafood; 3) an increase in respondents' knowledge concerning selection and preparation of seafood; 4) the appearance of media news stories of an oil spill in Narragansett Bay (located primarily in Rhode Island with some of its watershed in Massachusetts); 5) the closure of Narragansett Bay to all fishing; 6) a drop in the price of seafood by 25%; and, 7) the recent opening of a local seafood vendor. The first five events have safety implications while the latter two do not. A series of chi-square tests are performed on the frequencies to determine if the existence of these events individually would cause respondents with differing seafood safety ratings to alter their consumption frequencies. An analysis of the frequency of responses and the results of the chi-square tests are presented in Table 2[5].

In the three events which have positive implications for seafood safety (1, 2 and 3), those respondents who are less confident about seafood safety are more likely to increase their seafood consumption in response to positive information about seafood relative to the other respondents. For example, Table 2 shows that almost two-thirds of those who rank seafood as somewhat unsafe would increase their consumption if labels containing catch date were available, compared to only one-third of those who already believe seafood to be safe. Respondents who perceive that seafood is somewhat unsafe are also more likely to increase their consumption given mandatory federal inspection than are those who perceive seafood to be somewhat safe or safe. Similarly, over one-half of those who rate seafood as somewhat unsafe would increase their seafood consumption if they were to learn more about selecting and preparing it, compared to about one-quarter of those who rate seafood as safe. Overall, consumers with little confidence in seafood safety tend to be more responsive to positive information about seafood than consumers who are already confident about its safety.

For those events which have negative implications for seafood safety, (4 and 5), the respondents who rated seafood as somewhat safe or somewhat unsafe are more likely to decrease their consumption if there is an oil spill in Narragansett Bay or if the Bay is closed to fishing than those who believe that seafood is safe. Only one-fifth of those respondents who believe the seafood supply to be somewhat unsafe would maintain their current level of consumption given an oil spill in the Bay, as opposed to only one-half of those who think seafood is safe. Similarly, consumers who perceive seafood to be somewhat unsafe or somewhat safe would be more likely to decrease their seafood consumption as a result of a bay closure than would consumers who perceive seafood to be safe. Thus, it appears that consumers with less confidence in seafood safety are also more sensitive to negative press.

The final two hypothetical events presented to respondents, a price decline by 25% and increased convenience of acquiring seafood, are not safety related. In both cases, the chi-square tests showed insignificant differences in anticipated consumption responses between the three groups of respondents. These results suggest that consumers who are less confident in the seafood supply are less likely to change their consumption given the occurrence of these latter two events than in the situation where there are safety-related events. For those respondents who rate the seafood supply as somewhat unsafe, information related to the safety of the product will have a greater impact on anticipated seafood consumption changes than those events which are not related to seafood safety.

Conclusions

An ordered probit model of consumers' safety ratings of the nation's seafood supply was used to perform hypothesis tests to determine whether personal experience with seafood influences consumers' seafood safety ratings. Results indicate that frequency of consumption of finfish and shellfish, as well as risk-taking behavior such as consumption of raw seafood, do significantly affect consumers' safety ratings. Familiarity and experience with seafood diminish the likelihood that consumers believe the seafood supply is unsafe. Demographic characteristics such as age, income, and education of respondents were not significant explanatory factors for this sample of respondents. Thus, it is not possible to recommend specific demographic groups within Rhode Island to target in an industry marketing campaign or statewide education programs regarding the efforts to ensure the safety of the seafood supply. Further research which is able to elicit demographic characteristics of consumers would be useful in any targeted campaign. Such campaigns might convey the information found by objective analysis that the nation's seafood supply, with a few avoidable exceptions, is safe.

The chi-squared tests reveal that positive and negative information with implications for seafood safety are likely to impact consumption of those consumers who are least confident about the safety of the nation's seafood supply, while a drop in prices and increase in shopping convenience have less influence. In general, the results suggest that safety perceptions act as a barrier to consumption. Respondents who rated seafood as somewhat unsafe are far more likely to anticipate a change in their consumption given a positive or negative exogenous event than are respondents who are more confident in the seafood supply. Therefore, respondents who are least confident in seafood safety may be more willing to change their seafood consumption when provided with additional information. Positive information such as labeling, selection, and preparation techniques or inspection is likely to provide incentives to these consumers to increase their seafood consumption. Likewise, accurate information following negative events, such as fishing closures and oil spills, could counteract anticipated reductions in seafood consumption by bolstering consumer confidence.

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3. Bivalve shellfish includes mussels, clams, and oysters--in other words, those shellfish which are typically consumed whole and sometimes raw.

4. Respondents were allowed to mention all their concerns; therefore, the percentages will not sum to 100.

5. The percentage of responses for each question sum to 100% of the respondents to that question.

A Model of Consumers' Risk Perceptions Toward Recombinant Bovine Growth Hormone (rbGH): The Impact of Risk Characteristics

This study examines the effect of risk characteristics, described as outrage factors by Hadden (1989), on consumers' risk perceptions toward recombinant bovine growth hormone (rbGH). Results suggest that all but one of these risky elements elicited consumer outrage perceptions.

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One of the first animal-specific applications to be approved for the marketplace, recombinant bovine growth hormone (rbGH), is considered a controversial test case shaping the public's acceptance of other biotechnology applications. Approval of rbGH was granted February, 1994 by the Food and Drug Administration (FDA) after scientific evidence suggested humans were not at risk consuming milk or meat from cows treated with rbGH (CAST, 1993).

Prior to FDA approval, numerous researchers explored the marketability of rbGH, reporting consumer apprehension (for synopses see Smith & Warland, 1992). Now that rbGH is available in the market, few researchers have followed up on consumer attitudes. In light of new information regarding risks (i.e., learning about FDA approval, commercial availability) consumers may be revising their perceptions of rbGH. Thus, the question remains whether consumer concern persists now that rbGH is FDA approved and available commercially.

Researchers focusing on understanding the causes of consumer concern have primarily concentrated on factors influencing consumers' risk perceptions. One factor stated to influence risk perceptions, or "...various kinds of attitudes and judgments about risk," is the characterization of risk.

Hadden (1989) and Sandman (1989) posit that risk is multifaceted, containing perhaps twenty different characteristics. These risky elements have been coined outrage factors. Outrage factors reflect the "relevant aspects about a risk besides how likely it is to be harmful" (Sandman, 1989, p. 45). The risk characteristics labeled as outrage factors by Hadden (1989) include the following paired dichotomy: voluntary or involuntary, familiar or unfamiliar, immediate or delayed effects, natural or artificial, controlled by the individual or by someone else, and

visible benefits or no visible benefits (Hadden, 1989, p. 141). The first characteristic in the pair is associated with less risk than the second.

The purpose of this study is to estimate the effect these risk characteristics, described as outrage factors by Hadden (1989), have on consumers' risk perceptions toward rbGH. The outrage factors applicable to milk from cows treated with rbGH are uncertain future health effects, involuntary risk exposure, unnatural product characteristics, ineffective risk communication with an unfamiliar product, and consumers' inability to distinguish milk from rbGH treated herds compared to milk from untreated herds.

Theoretical Background

When consumers weigh the benefits and risks of a consumption good they are making decisions under uncertainty. One theory that examines the economic behavior of households under uncertainty is the von Neumann-Morgenstern expected utility theory (Machina, 1987). In the framework of an expected utility function E(U), a household member can make choices between a risky good x, and a riskless composite good y. The assumption is that the uncertainty in the expected utility function stems from possible health problems linked to the quantity of risky food consumed. The possible occurrence of an adverse health effect, is one of the assumed outcomes a household faces. The alternative is no adverse health effect.

If there is no adverse health effect (NH), the households state-dependent utility function is denoted by $U_{NH}(x,y)$ and by $U_H(x,y)$ if there is an occurrence of the health effect (H), where $U_{NH}(x,y) > U_H(x,y)$ (Machina, 1987). It is assumed that a household faces only these two outcomes with probability of occurrence as $1-\pi$ and π, respectively. Where, π, the probability of occurrence

is assumed to be known to the individual and understood as the risk assessment estimated by experts. Therefore, the expected utility function is

$$E(U) = (1-\pi) U_{NH}(x,y) + \pi U_H(x,y). \quad (1)$$

Viscusi (1990) utilizes the expected utility theory to model the discrete cigarette smoking decision. The two possible outcomes in Viscusi's (1990) model are life or death. When alive, utility received is U(smoke) if the individual smokes, and U(don't) when the individual does not smoke. The outcome of death offers a payoff V, representing the utility foregone from living, or the negative amount of utility one would have if they continued living. Associated with each outcome is the probability of occurrence. If one smokes, the probability of living is denoted as (1 - s), while the probability of death is s; and zero otherwise (Viscusi, 1990). Viscusi (1990) posits that an individual will smoke if

$$(1 - s) U(smoke) + sV > U(don't) \quad (2)$$

meaning, an individual will smoke if the net gain from cigarette smoking (reflected by taste and price factors) is greater than the expected utility loss from death, or the foregone life expectancy.

Theoretical Model

This study applies Viscusi's (1990) decision model to identify whether or not Hadden's outrage factors are determinants of consumers' perceiving risk toward rbGH. In this study, consumers choose between the alternatives of perceiving no risk (NRP$_{rbGH}$) or perceiving risk (RP$_{rbGH}$) about rbGH. The uncertainty in this model is assumed to derive from possible health problems from the quantity consumed of the rbGH product. Thus, the outcomes are no adverse health effect or occurrence of an adverse health effect. When there are no adverse health effects, the individual will receive utility U(NRP$_{rbGH}$) if they perceived no risks, and U(RP$_{rbGH}$) if the individual perceives risk associated with rbGH. While Viscusi's (1990) model equated V to the payoff offered by the outcome death, this study defines it as the cost, C, of an adverse health effect occurring. As in Viscusi's (1990) model, probabilities are assigned to each outcome. If one perceives no risk from rbGH, the probability of no health effects occurring is expressed as (1 - π), whereas the probability of an adverse health effect occurring is π; and zero otherwise. Equation (2) is modified to represent the choice alternatives regarding rbGH, and probabilities associated with occurrence of each outcome,

$$(1 - \pi) U(NRP_{rbGH}) + \pi C > U(RP_{rbGH}). \quad (3)$$

However, for the case of rbGH "no scientific evidence exists to suggest that humans are at risk in consuming milk from cows given rbGH" (CAST, 1993). Therefore, π, the probability of an adverse health effect occurring in equation (3) would be equal to zero and we would have a normal utility function. Slovic (1992) maintains that, "...experts define risk in a narrow, quantitative way, [while] the public has a wider view,...incorporating legitimate value-laden considerations." Therefore, an assumption of this model is that consumers use their own personal or subjective probabilities of the outcome occurring when deciding whether to perceive risks toward rbGH. Thus, π in equation (3) is modified to consumers' subjective probability of an adverse health effect occurring, π^*, while (1 - π^*) is the subjective probability when no adverse health effect occurs; and zero otherwise. This study posits that an individual will perceive risk toward rbGH if

$$(1 - \pi^*) U(NRP_{rbGH}) + \pi^* C < U(RP_{rbGH}), \quad (4)$$

meaning, a consumer will perceive risk toward rbGH if the subjective expected utility loss, or perceived health costs from consuming rbGH outweigh the utility from perceiving no risk toward rbGH.

Parametizing equation (4), an individual will choose to perceive risks toward rbGH if (Viscusi, 1990),

$$\begin{aligned} Pr(RP_{rbGH}) &= [Pr(B_1Y_1 + B_2\pi^*Y_2) < -u_2] \\ &= [1 + \exp(-B_1Y_1 - B_2\pi^*Y_2)]^{-1} \quad (5) \end{aligned}$$

where B_i ($_i$=1,2) represents the parameter vectors, Y_1 is a vector of attitudinal and demographic characteristics, Y_2 a vector of variables affecting utility loss, and a random error term, u_2.

It is reasonable to assume that consumer response to risk is affected by their attitudinal (behavior representing a strong belief) and demographic characteristics: knowledge, personal experience, demographics, economic situation, and social and cultural background (Hadden, 1989; Slovic, 1992). These attitudinal and demographic characteristics shape our unique experiences and may differ notably between consumers.

The vector of variables affecting utility loss are reflected by the outrage factors germane to rbGH. Theoretically, these outrage factors are characterized as risky elements, contributing to an increased probability of perceiving risks toward rbGH. First, in the absence of mandatory labeling by the FDA, rbGH imposes an

involuntary risk on consumers. If consumers are not offered a choice between non-treated and treated herd milk, the more involuntary the risk exposure appears to be the greater the likelihood of perceiving risk of rbGH.

Second, rbGH is considered an unnatural or artificial product by some consumers. Studies have found that people are willing to accept greater "natural" product risks than risk associated with synthetic products (Busch, 1991). Milk is perceived as one of the few unadulterated, naturally produced products on the market today (Busch, 1991). The stronger these beliefs about milk's natural production, the more adverse the impact on risk perceptions.

Third, consumers must feel they can trust regulators, given biotechnology's complexity and unfamiliarity. A study of past technology introduction reveals a pattern of ineffective communication and lack of trust on the part of consumers toward regulatory enforcement agencies (Hermann, 1982).

Fourth, scientists are unable to detect any nutritional or physical appearance differences in the milk from treated versus untreated herds (CAST, 1993). Although rbGH's use may provide a benefit by increasing milk production efficiency and reducing market price, this benefit may not be great enough to offset risk perceptions toward this product.

Finally, consumers are concerned with possible delayed ill health effects of rbGH (Grobe & Douthitt, 1995). One may find that consumers do not have as great of a concern for health risks in the short run as they appear to have in the long run.

Data

Data were collected through a nationwide telephone survey of primary household food purchasers attitudes toward food-related biotechnologies. In this study, the data set used combined four survey samples: National (n=969), Wisconsin (n=187), Vermont (n=186), and Poor (n=568), consisting of 1,910 completed surveys. The sample results were weighted to ensure findings are representative of the U.S. population. Almost 72 percent of this study's respondents were women. This study's sample was more educated than the U.S. households, with mean age of householder a few years younger than U.S. households (45.6 versus 48.2). Close to 60 percent of this sample respondents were married, with an average household size of 2.87; for U.S. households, the respective figures are 54.9 percent and 2.63. Median income was higher than the U.S. households figure ($40,000 versus $31,241). Eighty percent of this sample were Caucasian, consistent with U.S. households, with approximate representation of other ethnic groups.

Empirical Model

Perceived risk in the theoretical model (RP_{rbGH}), was operationalized through consumers' current concerns of human ill health effects (CURRENTCON), and concern for the future discovery of human ill health effects (FUTURECON) toward rbGH (Table 1).

The data shows that over 75 percent of respondents' expressed some level of current concern about human ill health effects associated with rbGH, while 85 percent expressed concern over future discovery of ill health effects. This suggests that consumers have greater concerns for future health effects. Expressing equation (5) as two empirical models, for current (6) and for future (7) health concerns, allows testing of what factors, if any, are related to concern over health effects toward rbGH,

CURRENTCON = f (PURCHASE UNTREATED, MILK BELIEF, NO TRUST, NO CONSUMER BENEFIT, AWARE, PERSONAL CONCERN, POOR, GENDER, RACE, AGE, ENVIRONMENT, ANIMAL RIGHTS, FUTURE KIDS) + e_1.   (6)

FUTURECON = g (PURCHASE UNTREATED, MILK BELIEF, NO TRUST, NO CONSUMER BENEFIT, AWARE, PERSONAL CONCERN, POOR, GENDER, RACE, AGE, ENVIRONMENT, ANIMAL RIGHTS, FUTURE KIDS) + e_2.   (7)

Given the similarity of these two empirical models, definition of the independent variables in equations (6) and (7) will be discussed concurrently.

The outrage factor of involuntary risk exposure was measured through PURCHASE UNTREATED. One would expect those having the choice of purchasing milk from untreated herds would more likely perceive control in their choice decision, decreasing health concerns toward rbGH.

The outrage factor unnatural product characteristics was measured by MILK BELIEF, based on agreement to the statement "milk is natural." It was hypothesized that if one holds strong beliefs toward milk produced naturally, they would more likely be skeptical of an artificially produced product, increasing safety concerns toward rbGH.

The outrage factor of ineffective risk communication with an unfamiliar product was measured by the trustworthiness of the FDA as a food-related information source (NO TRUST). One would

Table 1
Variable Definition

Dependent Variables

CURRENT CONCERN = 1 if little, moderate, or very concerned about current human ill health effects of rbGH; =0 if no concern

FUTURE CONCERN = 1 if little, moderate, or very concerned about future discovery of human ill health effects associated with rbGH; = 0 if no concern

Independent Variables

PURCHASE UNTREATED = 1 if there are food stores in your area where you can purchase milk from untreated cows; 0 otherwise

MILK BELIEF = 1 if agreed somewhat or strongly that milk is natural; 0 otherwise

NO TRUST = 1 if they feel the FDA is not very or not at all trustworthy; 0 otherwise

NO CONSUMER BENEFIT = 1 if disagreed somewhat or strongly that the use of rbGH benefitted consumers; 0 otherwise

AWARE = 1 if respondent recalled having heard or read anything about rbGH; 0 otherwise

PERSONAL CONCERN = 1 if respondent changed their food habits because of concern about future personal and family health risks; 0 otherwise

POOR = 1 if poor (qualified as poor under the February 9, 1995, USDA poverty guidelines); 0 otherwise

GENDER = 1 female; 0 otherwise

RACE = 1 for African American, Asian, Native American or of Hispanic origin; 0 otherwise

AGE Age in years

ENVIRON- MENT = 1 if somewhat or strongly identified with environmentalists; 0 otherwise

ANIMAL RIGHTS = 1 if somewhat or strongly identified with animal rights groups; 0 otherwise

FUTURE KIDS = 1 if agreed or strongly agreed with the statement "I worry about the future that today's children are facing"; 0 otherwise

expect that as lack of trustworthiness in the FDA increased, confidence in the safety of the food supply is likely to decrease, thereby increasing health concerns toward rbGH.

The outrage factor of consumers' inability to distinguish milk from rbGH treated herds from milk from untreated herds was measured by NO CONSUMER BENEFIT. This variable is based on the respondents' disagreement with the statement "increasing milk production by farmers using rbGH has benefitted consumers." It was hypothesized that if the respondent does not feel that rbGH yields consumer benefits, they will be more likely to increase their health concerns toward rbGH.

Knowledge of the risk was measured by the respondents awareness of rbGH (AWARE). Respondents were asked "do you recall having heard or read anything about the use of a synthetic bovine growth hormone commonly called bGH or bst." Given that scientific evidence suggests no risks from consuming milk from treated herds, it was hypothesized that consumers who have knowledge about rbGH are less likely to worry about health concerns toward rbGH.

The variable measuring personal experience (PERSONAL CONCERN) was based on response to changing food habits because of concern about future personal and family health risks. It was hypothesized that concern about personal health risks positively influences rbGH safety concerns.

Factors reflecting economic situation and demographic characteristics were POOR, GENDER, RACE, and AGE. All but age were binary variables. It was posited that because those in poverty are more likely to direct their energy to their present situation, they will have more concern for current rather than future discovery of ill health effects of rbGH. Women were assumed to be more concerned than men about milk from rbGH treated herds. Race and age were hypothesized to positively and negatively influence health concerns.

Variables reflecting social and cultural background are group affiliation and locus of control. Group affiliation measures the respondents level of identification with environmentalists (ENVIRONMENT) and level of identification with animal rights groups (ANIMAL RIGHTS). Locus of control, a person's perceived sense of control over life events, was measured by FUTURE KIDS, which was based on agreement to the statement "I worry about the future that today's children are facing." The group affiliation and locus of control variables were hypothesized to positively influence health concerns. For example, environmentalists or animal rights groups may

boycott milk if they believe the use of rbGH is harmful to the environment or cruel to cows, respectively, while others may believe their actions can not change the personal risks they face.

Empirical Results

The overall logit models were significant at the .0001 level, which implies that the models do a good job of explaining much of the health concerns toward rbGH. Regression estimates of equation (6) and (7) are presented in Table 2.

Hadden's (1989) outrage factors were found to be influential determinants of current and future health concerns. For both measures of concern, if the respondent agreed that milk is natural (MILK BELIEF), the probability that concern about health effects was expressed decreased by about one percent for current concern, and two percent for future concern. For those who felt there were no consumer benefits from farmers use of rbGH (NO CONSUMER BENEFIT), the probability that current concern about health effects was expressed increased by three percent, with an increase of five percent for those expressing concern about future health effects.

The variable measuring FDA trustworthiness (NO TRUST) was positively significant with current concern. When the respondent indicated less trust in the FDA, the probability of expressing current health concern increased by two percent. Finally, the outrage factor of involuntary control, measured by if the respondent was able to purchase milk from untreated herds (PURCHASE UNTREATED), was found to have a significant and negative effect on future concern.

As hypothesized, the attitudinal and demographic variables of GENDER, identified with environmentalists (ENVIRONMENT), identified with animal rights groups (ANIMAL RIGHTS), and worried about the future that today's children are facing (FUTURE KIDS) were significant and positive influences for both health concerns toward rbGH. For those respondents who changed their food habits because of a concern about future personal and family health risks (PERSONAL CONCERN), the probability of expressing future concern increased.

Conversely, if the respondent was not Caucasian (RACE equals one) the probability of expressing future concern decreased. The other attitudinal and demographic variables, AWARE, POOR, and AGE were insignificant.

Table 2
Parameter Estimates for Logit Results

Variable	Parameter Estimate	Marginal Effect[a]
Regression 1: CURRENT CONCERN (n=1813)		
CONSTANT	-2.229 **	
PURCHASE UNTREATED	-0.0298	-0.001
MILK BELIEF	-0.3752 *	-0.008
NO TRUST	0.9228 **	0.020
NO CONSUMER BENEFIT	1.2970 **	0.030
AWARE	-0.1527	-0.003
PERSONAL CONCERN	0.2437	0.005
POOR	0.1675	0.004
GENDER	0.9463 **	0.021
RACE	0.1691	0.004
AGE	0.0011	0.000
ENVIRONMENT	0.6789 **	0.015
ANIMAL RIGHTS	0.6088 **	0.014
FUTURE KIDS	1.4592 **	0.033

Log Likelihood -811.17   Chi-Squared 301.54**
Predicted Correctly: 80%

Regression 2: FUTURE CONCERN (n=1852)		
CONSTANT	-0.8361	
PURCHASE UNTREATED	-0.3970 *	-0.017
MILK BELIEF	-0.4154 *	-0.018
NO TRUST	0.5065	0.021
NO CONSUMER BENEFIT	1.1554 **	0.049
AWARE	0.0505	0.002
PERSONAL CONCERN	0.4016 *	0.017
POOR	-0.1961	-0.008
GENDER	0.6351 **	0.027
RACE	-0.3976 *	-0.017
AGE	-0.0087	-0.000
ENVIRONMENT	0.9982 **	0.042
ANIMAL RIGHTS	0.6387 **	0.027
FUTURE KIDS	1.3261 **	0.056

Log Likelihood -600.69   Chi-Squared 195.00**
Predicted Correctly: 88%

* Significant at the .05 level; **Significant at the .01 level.
[a] Marginal Effects Formula: $\delta P_i / \delta x_i = (e^{-t} / (1+e^{-t})^2) B_i$ where $t = B_0 + B_1 x_1 + B_2 x_2 + ... B_n x_n$ and x_i=mean for continuous variables, mode for dummy variables.

Concluding Remarks

One conclusion seems evident from the data, consumers remain concerned about rbGH despite FDA approval. Typically when there is concern about new food technology it tends to trend down in time. With rbGH that has not been the case.

In attempting to explain the underlying reasons for consumer concern, this study hypothesized that Hadden's (1989) outrage factors would be influential determinants of consumers' risk perceptions toward rbGH. Results suggest that all but one of these risky elements elicited consumer outrage perceptions. This

study shows that without perceived consumer benefits, consumers become intolerant of risk. In addition, consumers who distrusted the FDA as a food-related information source were more likely to be currently concerned about ill health effects of rbGH. This result may reflect consumer loss of confidence in regulators' abilities to protect them in the market. Further, results show that potential health concern is contingent on consumers' perceived control over the product. Establishing market alternatives where consumers can purchase milk from untreated herds may reduce future health concern. In contrast, consumers who have strong beliefs that milk is natural were not found to be more averse to an unnatural product. This result may suggest that consumers with strong beliefs hold on to them.

Nonetheless, sole consideration of these outrage factors provides a limited conception of risk. Including the attitudinal and demographic factors exhibit unique experiences that bring about notable differences between consumers. These factors further assist in understanding the consumer decision to perceive risk toward FDA approved rbGH.

This research could be improved by utilizing an ordered logit analysis to capture the magnitude of independent variable effects for the polynomial qualitative variables. In addition, evaluation of the don't know responses is warranted.

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Consumer Willingness-to-Pay for Food Safety:
An Application of Binary-Ordinal Double Hurdle Estimation

A binary-ordinal double hurdle model is proposed for analysis of consumer willingness-to-pay for hydroponically grown vegetables in Taipei, Taiwan. Consumers' decisions of whether or not to pay more and how much more to pay are viewed as two interrelated decisions. Results show that cross-equation correlation is positive and significant. Estimates of the single equation model are biased and inconsistent, if this interdependency of error terms is neglected.

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Introduction

Evidence of environmental degradation and health risks associated with pesticide use have made food safety a priority issue on the public policy agenda. Today's consumers are more informed about health and nutrition, ask more questions, and express more concerns about food quality and safety. Kramer and van Ravenswaay (1989) suggest that pesticides and their use are the contemporary public issues of paramount importance that will not go away any time in the foreseeable future. Consumers' risk perceptions and concerns about use of pesticide chemicals in food production will translate into market behavior, and alter demand for food products in the marketplace. Thus, producers, processors, wholesalers/retailers, and government regulators and policy-makers will have to respond to consumers' risk preferences, concerns about environmental quality and demand for safe foods (Kramer, 1990).

While previous surveys have consistently found that consumers have perceived both high and increasing levels of health risks due to potential presence of pesticide residues on fresh produce, a more recent national survey conducted by the University of Kentucky suggests that pesticides pose a lower risk to consumers than does microbial contamination (Buzby and Skees, 1994). However, to alleviate consumers' pesticide fears, some food retailers have initiated their own residue-monitoring programs and are advertising their produce as being specifically tested for chemical residues. Others are promoting the sale of organic foods. In a survey of supermarket shoppers from four suburban areas in Atlanta, Ott (1990) reported that two out of every three shoppers were willing to pay 5% to 10% more for fresh produce that is certified free of pesticide residues. Similarly, Buzby and Skees found that more than half of the respondents indicated preference to buy organically grown fresh fruit and vegetables, and would be willing to pay more for produce that was certified as pesticide residue-free. How important is it to consumers that fresh produce should be free of pesticide residues? How much are consumers willing to pay for "cleaner" or safer produce? There are few empirical studies addressing these questions. Most previous studies are primarily descriptive in nature and little research has focused on the analysis of factors that may affect consumers' concerns or their willingness-to-pay.

The objective of this study is to propose a model for empirical estimation of consumers' willingness-to-pay for hydroponically grown vegetables (HGV). The proposed model formulates consumers' food safety preferences and willingness-to-pay as an integrated framework in the decision-making process. Specifically, this study develops a joint probit and ordered probit model to simultaneously estimate the interrelationships between the decisions of whether or not to pay more and how much more to pay for HGV.

Econometric Model and Estimation Procedure

The standard double hurdle model was proposed by Blundell and Meghir (1987) as an extension to the standard univariate tobit model for data involving a continuous dependent variable with censoring. Since survey data often exhibit censoring structure, double hurdle models have been widely used in empirical studies of commodity demand and labor supply. The advantage of the double hurdle model is that it allows for a more general stochastic structure so that the dependent

variable and "censoring" process are modeled as separate (but correlated) processes or decisions. Nevertheless, when the data involve categorical dependent variables, the conventional double hurdle model may not be applicable.

One example is provided by Boyes et al. (1989) in their study of credit assessment problem. In order to provide accurate estimates on the probability of default or repayment, they developed a credit assessment model that consists of a credit granting and a loan default equation with binary dependent variables. Since only applicants that receive credit are observed either defaulting or repaying, the sample used to estimate repayment probabilities is censored and subjected to potential sample selection bias. However, the standard Heckman (1979) procedure or the double hurdle model is not applicable in such a case where both equations in the structure contain a qualitative dependent variable. Poirier (1980) showed that, under usual normality assumptions, the correct choice of distribution is a bivariate instead of a univariate probit model.

For the purpose of this study, we modified the bivariate probit model and extended it to include a probit and an (censored) ordered probit. Specifically, it is argued that in the case of willingness-to-pay for HGV, a respondent actually has two joint (simultaneous) decisions to make: 1) whether or not to pay more, and 2) how much more to pay as depicted by the diagram below. Previous studies have typically treated this consumer choice as a single decision-making process and estimated the willingness-to-pay with an ordered probit model (Misra et al., 1991).

To illustrate, the first equation that models the decision of whether or not to pay more for HGV is postulated as a function of consumers' risk perception and attitudes toward use of chemicals on food production. If the consumer has a desire to purchase HGV and is willing to pay more, then the intensity of his/her willingness-to-pay will be observed. Differences in socioeconomic characteristics are considered the underlying determinants that influence the extent of consumers' willingness-to-pay. Thus, the likelihood of how much more they would pay for HGV is hypothesized primarily as a function of consumers' socioeconomic characteristics.

The structure of the model that is exposed to the partial observability of the non-random sample selection rule is specified as:

$$d = \begin{cases} 1 & if \quad \delta X + \varepsilon_d > 0, \\ 0 & otherwise; \end{cases} \quad (1)$$

and given $d = 1$ for

$$y_t = \begin{cases} 1 & if \quad \mu_{j-1} < \lambda Z + \varepsilon_y < \mu_j, \quad j=1,\ldots,n \\ 0 & otherwise. \end{cases} \quad (2)$$

Where d and y_i denote the decisions of willing to pay more and the amount of premium that a consumer is willing to pay for HGV, respectively; X and Z represent matrices of explanatory variables measuring the consumers' risk perceptions, attitudes toward the use of chemical pesticides on food production, and the socioeconomic characteristics associated with the consumers; δ and λ are vectors of unknown parameters to be estimated; $\mu_0, \ldots, \mu_n$ are the categorical thresholds for the underlying response variable (y^*) with $\mu_0 \leq \mu_1 \leq \ldots \mu_n$; and ε_d and ε_y are the disturbance terms with zero-mean, and normally distributed as standard bivariate, i.e., $\varepsilon_d, \varepsilon_y \sim f(\varepsilon_d, \varepsilon_y; \rho)$, where $f(\varepsilon_d, \varepsilon_y; \rho)$ is a standard bivariate normal density function and ρ is the correlation coefficient. The cumulative distribution function of $f(\varepsilon_d, \varepsilon_y; \rho)$ is denoted by $F(\varepsilon_d, \varepsilon_y; \rho)$. In addition, the model presented in equation (2) is underidentified since any linear transformation applied to the underlying response variable and threshold value μ_j would lead to the same model. For estimation purposes, it can be assumed without loss of generality that $\mu_0 = -\infty$, $\mu_1 = 0$ and $\mu_n = +\infty$.

Note that d in equation (1) is fully observed, but y_i in equation (2) is observed only among those respondents who chose to pay a premium for HGV. The distributional assumption of the equations (1) and (2) results in a system consisting of a probit and an ordered probit model, which are to be estimated jointly. Although equations (1) and (2) can be estimated independently with probit and ordered probit procedures respectively, there will be a loss of efficiency of the parameter estimates unless $\rho = 0$. More importantly, observations for equation (2) represent a 'choice-based' or censored sample which could be subject to potential selectivity bias if estimated separately.

The model is to be estimated by the method of maximum likelihood. Thus, the likelihood function for the proposed model is specified as:

$$L = \prod_{i=1}^{N} \prod_{j=1}^{n} P(d_i = 0)^{1-d_i} P(d_i = 1, y_{ij} = 1)^{d_i y_{ij}},$$

where $P(d_i = 0)$ represents the probability that the ith consumer would not pay more, and $P(d_i = 1, y_{ij} = 1)$

represents the probability that the ith consumer would be willing to pay the jth level of premium for HGV. In this study, efficient parameter estimates for δ, λ, and ρ that maximize the above likelihood function are obtained using the GAUSS program.

Sample Data

The data for this study are obtained from a survey of consumers conducted in 1995 by the Survey Research Office of the Academia Sinica, Taipei, Taiwan. The participants were female home makers selected for personal interview from a stratified random sample of 400 households resided in the city of Taipei. The survey was designed to assess consumers' awareness of potential health risk associated with pesticide residues on food, consumers' evaluation of food quality and safety, and their willingness-to-pay to reduce exposure to pesticide residues on food. The survey obtained information from participants with respect to food purchasing patterns and behavior; attitudes toward pesticide use on food production and assessments on the safety of food purchased; and willingness-to-pay for HGV to reduce exposure to pesticide residue on food. With respect to willingness-to-pay for HGV, the respondents were first asked if they would be willing to pay a higher price for hydroponic vegetables that are produced pesticide-free. If the responses were positive, the respondents were then queried to indicate how much more they would pay, relative to current prices, from a checklist of price premiums.

Prior to the survey, a focus group interview was conducted to pre-test and to improve the questionnaire design. The survey was conducted in the spring of 1995 and resulted in a total of 379 completed questionnaires — a 95% completion rate. Due to refusal and potential misreporting of income, the completed questionnaires from those who reported zero total household income were deemed unusable and excluded from the empirical analysis. In addition, a few households that provided incomplete information were also deleted from the sample observations. The final sample used for this analysis consists of 323 observations with completed information. In general, the majority of respondents was married woman who is the primary food shopper in the household. More than half of the respondents, 52%, were employed wives. The average household size was about 4.8 persons. Respondents who were 35 years old or younger accounted for 23% of the sample. Approximately 42% of survey participants had high school or above high school education, and 36% had an average monthly household income greater than $2,000. The definitions, means, and standard deviations of the variables used in the statistical analysis are shown in Table 1.

Empirical Results

Previous studies have identified a variety of demographic characteristics that may affect consumer attitudes and behavior. Zind (1990) suggested low-income consumers were more likely to buy organically grown produce regardless of cost. Ott (1990) developed a profile of demographic characteristics of consumers that would constitute a target market for certified pesticide residue-free produce. His results suggest white middle-class consumers over 30 years old would be a target market. For empirical implementation, the explanatory variable of equations (1) and (2) are specified to include a set of sociodemographic characteristics. In addition, a set of binary variables representing the respondent's general attitude toward pesticides use (BANPEST), attitudes toward food safety problem (REDUCE and NOCHNG), and the importance of price in making purchase decisions (PRICE) is also included in equation (1). Furthermore, the respondent's willingness-to-pay a premium for "antibiotic-free" meat is also hypothesized as a major factor that will influence the respondent's willingness-to-pay for HGV.

The maximum likelihood estimates of the binary-ordinal double hurdle model are presented in Table 2. For purpose of comparison, the results of a separate estimation are also presented. In general, the resulting estimates between the joint and separate estimations are consistent in signs. Most significantly, the estimate of ρ that maximizes the likelihood function is 0.663 and significantly different from zero at the 0.01 significance level, based on the t- test. This suggests that the unexplained residuals of the probit and ordered probit equations are highly correlated, and that joint estimation is appropriate to correct for the potential simultaneity bias and to yield more efficient and consistent estimates. The pseudo-R^2 that measures the goodness-of-fit is 0.227 for joint estimation, and 0.217 for separate estimation. As shown in Table 2, most of the parameter estimates showed a higher level of statistical significance when cross-equation correlation is accounted for. Notably, BANPEST and REDUCE in the probit equation and UNDER12 and INCOME in the ordered probit equation become statistically significant at the 0.05 significance level when both equations are jointly estimated.

Results of the probit equation indicate that those respondents who had small children in their households would be more willing to pay a higher price for HGV. Similarly, the variable EDUC also shows a

Table 1
Variable Definition and Sample Statistics.

Variable	Definition	Mean	Standard Deviation
d	= 1, would pay a premium for HGV; = 0, otherwise.	0.8390	0.9160
y_1	= 1, would pay up to 5% more; = 0, otherwise.	0.2570	0.5069
y_2	= 1, would pay 6% - 15% more; = 0, otherwise.	0.3901	0.6246
y_3	= 1, would pay 16% or more; = 0, otherwise.	0.1950	0.4416
AGE	= 1, if the respondent is 35 years of age or younger; = 0, otherwise.	0.2291	0.4786
EDUC	Years of education.	9.2453	10.2206
UNDER12	= 1, children under 12 years old are present; = 0, otherwise.	0.5449	0.7382
SICK	= 1, if any household members has a chronic disease; = 0, otherwise.	0.2291	0.4786
INCOME	= 1, if total household income is more than NT$30,000 per month; = 0, otherwise.	0.6471	0.8044
EATOUT	= 1, if eatout more than 3 times a week; = 0, otherwise.	0.0681	0.2610
PRICE	= 1, if price is important when buying fresh vegetables; = 0, otherwise.	0.1672	0.4089
MEAT	= 1, would pay a premium for "antibiotic-free" meat; = 0, otherwise.	0.9226	0.9605
BANPEST	= 1, if the respondent indicated that the use of all kinds of pesticides should be banned; = 0, otherwise.	0.0836	0.2891
REDUCE	= 1, will reduce consumption of vegetables if there is a report of pesticide contamination; = 0, otherwise.	0.6687	0.8178
NOCHNG	= 1, will not change consumption of vegetables even if there is a report of pesticide contamination; = 0, otherwise.	0.0712	0.2668

significant and positive effect, suggesting that the probability of willing to pay a premium for HGV increases with the level of educational attainment. As might be expected, the effects of MEAT and REDUCE on willingness-to-pay are found to be positive and statistically significantly different from zero at the 0.001 and 0.01 significance level, respectively. In contrast, EATOUT, PRICE, and NOCHNG are found to have negative impacts on the probability of paying a higher price for HGV. It is somewhat surprising to see that the variable BANPEST also shows a significant and negative effect, suggesting that the probability of willing to pay a premium decreases if the respondent believes that all pesticides use should be banned.

With respect to how much more a consumer would pay, the ordered probit results show that socioeconomic characteristics are the major factors that have significant impacts on the amount of premium that a respondent would be willing to pay for HGV. The results suggest that respondents with small children and higher education are less likely to pay higher premiums

for HGV. However, those respondents who have family members suffering from a chronic disease and have higher household income are more likely than their counterparts to pay a price premium for HGV. It is interesting to note that while income is not a significant factor that affects the probability of willingness-to-pay, it does have a positive and significant effect on the amount of premium that a respondent is willing to pay. In other words, once a respondent has decided to pay a higher price for HGV, the amount of premium that the respondent is willing to pay increases as his/her household income increases. To the extent that higher income households have the ability and can afford to pay more, it is logical that they would be willing to pay a greater premium for HGV if they have a demand for it.

In general, the results support the notion that whether a consumer will pay more for HGV and the amount of premium that a consumer is willing to pay can be viewed as two different decisions. The results suggest that whether or not a consumer will pay a premium is influenced by socioeconomic characteristics as well as

Table 2
Results of Joint and Separate Estimation of the Binary-Ordinal Double Hurdle Model.

Variable	Joint Estimation		Separate Estimation	
	Probit	Ordered	Probit	Ordered
Constant	-0.795^c	1.193^c	-0.827^a	0.929^c
	(-4.476)	(6.612)	(-2.535)	(6.316)
AGE	-0.126	0.184	-0.108	0.189
	(-1.028)	(1.732)	(-1.011)	(1.348)
UNDER12	0.373^c	-0.212^a	0.320^c	-0.164
	(3.501)	(-2.053)	(3.490)	(-1.280)
EDUC	0.073^c	-0.070^c	0.078^c	-0.059^c
	(5.871)	(-5.586)	(5.753)	(-3.975)
SICK	-0.059	0.498^c	-0.072	0.523^c
	(-0.383)	(3.731)	(-0.757)	(3.994)
INCOME	-0.043	0.286^c	-0.075	0.279
	(-0.494)	(3.575)	(-0.740)	(1.831)
EATOUT	-0.676^c		-0.629^b	
	(-9.331)		(-2.959)	
PRICE	-0.408^c		-0.325^b	
	(-4.496)		(-2.994)	
MEAT	1.209^c		1.265^c	
	(6.092)		(6.124)	
BANPEST	-0.489^a		-0.325	
	(-2.333)		(-1.375)	
REDUCE	0.287^b	-0.160	0.232	-0.138
	(2.666)	(-1.572)	(1.809)	(-1.261)
NOCHNG	-0.452^a	0.377	-0.495^a	0.299^b
	(-2.335)	(1.931)	(-1.960)	(2.295)
μ_1		1.226^c		1.310^c
		(11.618)		(15.136)
ρ	0.663^b			
	(2.683)			
Log-likelihood	-391.069		-392.856	
Sample size	323	271	323	271

^{a,b,c} Indicate that the estimated coefficient is statistically significantly different from zero at the 0.05, 0.01, and 0.001 significance level, respectively.

attitudinal inclinations. In contrast, socioeconomic characteristics appear to be responsible primarily for the determination of the additional amount of premium that a consumer is willing to pay for HGV. Furthermore, even in cases where both demographic and attitudinal variables are important factors for both of the decisions, the results show that in most instances they have different effects on the two decisions.

Conclusions

This study proposes a binary-ordinal double hurdle framework to model and estimate simultaneously a consumer's joint decisions of whether or not to pay a premium and how much more to pay for HGV based on data collected from a consumer survey conducted in the city of Taipei, Taiwan. The results show that unexplained residuals of the two estimated equations are

highly correlated, and that more efficient parameter estimates are obtained from the joint estimation. If this interdependency is neglected, estimates of the model of single equations are likely to be biased and inconsistent.

Based on the empirical evidence, this study finds that those respondents who would pay a premium for "antibiotic-free" meat also are most likely to pay a premium for HGV. Similarly, respondents who had small children in the household, and who would reduce consumption of vegetables due to media reports of pesticide contamination are more likely than their counterparts to be willing to pay a higher price for HGV. With respect to amount of premium, the results suggest that socioeconomic characteristics are the major determinants that influence the respondents' choice of additional premium that they are willing to pay. The study shows that family health status and household income are the most important and significant factors that determine the amount of premium a consumer is willing to pay. However, they are insignificant in predicting the likelihood of a consumer's willingness-to-pay a higher price for HGV. The results show that, conditional on willing to pay more, a respondent would be most likely to pay 16% or more for HGV if there is a family member suffering from a chronic disease in the household. Similarly, as household income increases, those consumers who are willing to pay a premium for HGV most likely would pay a price premium at least 16% or more than the prevailing market price.

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Comparative Study of the Willingness to Pay for Organic and Irradiated Meat Products: An Experimental Design

Participants were willing to pay an average $1.16 premium for organic production, and $0.75 for irradiation. WTP was modelled as a two step process involving acceptance and level of payment. Perceived probability of foodborne disease was associated with acceptability of irradiation, and participants who had a full-time job were willing to pay less. No variables were significantly associated with acceptance of organic production. Income was negatively correlated with premium for an organic product.

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Introduction

The optimal level of provision for any good is the level at which the marginal cost just equals the marginal benefit. A properly functioning competitive market provides the optimal level of a good by equating marginal price and cost. In the case of market failure, private markets fail to provide the optimum level of a good. Determining the cost of providing a good for which there is no private market can be difficult. Often, however, determination of the net benefit is more difficult.

Net benefit can be estimated by summing the demand across the affected population. The maximum amount individuals are willing to pay for a good is a measure of net benefit. A variety of tools exist to estimate this net benefit. Estimation methods include contingent valuation, hedonic pricing, and experimental methods.

The demand for a particular process to increase food safety is well suited to estimation by experimental methods. Participants in an experiment have an incentive to pay an amount just equal to the perceived value of the process. There is little incentive for strategic bidding to purposely inflate or lower the price because the experiment is not hypothetical. Participants actually receive and pay for the good.

Two possible processes for increasing the safety of some foods are organic production and irradiation. There is not currently a USDA label, or even a generally recognized definition for organic meats. The definition of organic production used in this set of experiments was a product produced using meat from an animal raised without antibiotics, and raised on a diet produced without insecticides or herbicides. Irradiation of poultry has been approved to control salmonella, and irradiation of pork has been approved to control trichinella. Irradiation of beef has not been approved, but is being considered for approval to control e-coli O157:H7. The food item evaluated was a sandwich, described to participants only as a meat sandwich. The purpose of this series of experiments was to discover and compare the demand for organic production and irradiation.

Methods

A series of experiments was conducted in 1992 to determine adults' willingness to pay (WTP) for different aspects of food safety. Participants were non-student adults in northwest Arkansas. Fifteen to eighteen participants took part in each experimental session. Participants bid for the right to exchange a typical food product for one with an enhanced aspect of food safety. The experimental design was developed by researchers at Iowa State University, and has been used by researchers at both Iowa State University (Hayes, Shogren, Shin, and Kliebenstein, 1995) and the University of Arkansas to determine consumer demand for safer food products, and response to information.

Four sessions elicited participants' WTP for an organic food product, and four sessions elicited WTP for a product which had been irradiated to destroy disease-causing bacteria. A two-stage model was used that considers WTP for an irradiated or an organic product as the result of a two-stage process. 1) Acceptance of irradiation or organic production as an appropriate response to a perceived problem. 2) Determination of the maximum WTP. Variables related to WTP are not necessarily the same variables as those which determine acceptability.

The impact of variables on WTP is determined in a two-stage procedure. First a probit regression is performed to determine the impact of relevant variables on the likelihood that an individual will express acceptance of the process. The inverse Mill's ratio is saved from the probit regression. The inverse Mills' ratio is a monotonically decreasing function of the probability that an individual will express acceptance of the process. The inverse Mills' ratio and relevant independent variables are then regressed on the WTP using ordinary least squares regression (OLS), only for those individuals with a positive WTP. The resulting OLS coefficients express the estimated impact of independent variables on WTP, given the sample selection bias that only those individuals who accept the process are observed. The standard errors of the estimated coefficients in the OLS regression are corrected for covariance with the variables in the probit regression (Heckman, 1979).

Variables that might be expected to have an impact on the acceptability of organic production to decrease risk include the participant's age, gender, years of education, the presence of children in the home, and the perceived seriousness of chemical residues in the diet. Age was generated by subtracting the respondent's reported year of birth from 1992. Gender was expressed by a variable equal to one if male and zero if female. Level of education was recorded by category and the midpoint of the range was used in analysis. The presence of children in the home was coded as a dummy variable equal to one if the respondent reported any children in the household below the age of eighteen, and zero otherwise. The perceived seriousness of residues was determined by questionnaire before the experimental auction. Participants were asked to rank items which may have an impact on food safety from not at all serious (1) to very serious (5). Responses for pesticides/herbicides, additives/preservatives, antibiotics, and animal growth enhancers were summed to form a scale of perceived seriousness of chemical residues. The resulting scale had a range of from 4 to 20.

Variables that might be expected to have an impact on the level of payment, given the acceptability of organic production as a way of reducing risk, include household income, employment status, gender, and the number of meals consumed per week containing meat or poultry. Household income was determined by category, and the midpoint of the range was used in estimation. Employment status was coded as a dummy variable with those respondents who reported working full time (35 hours per week or more) coded as one and those not working full time coded zero.

Variables expected to have an impact on acceptance of irradiation as a way of decreasing the risk of foodborne disease included participant's age in years, gender, years of education, the presence of children in the household, perceived chance of food poisoning, and a remembered episode of food poisoning. The perceived chance of food poisoning was assessed before the auction. Participants were asked to estimate the number of Americans who become ill from a foodborne disease such as salmonella as the number per one million population. Because the relationship between the perceived chance of food poisoning and acceptance of preventative measures was expected to be multiplicative, rather than linear, the natural log of this perceived risk was used in the regression.

Variables expected to have an effect on WTP, given the acceptance of irradiation, included income, employment status, gender, the number of meals consumed per week containing meat or poultry, and the perceived seriousness of irradiation. Perceived seriousness of irradiation was assessed by asking participants to rate the seriousness of irradiation of food as it affects food safety on a scale from one to five, with one being "not at all serious" and five being "very serious".

Results

Participants were willing to pay an average of $1.16 to change from a typical sandwich to the organic sandwich, and an average of $0.75 for a sandwich that had been irradiated to destroy bacteria. The mean WTP for an organic sandwich, among participants with a positive WTP, was $1.38. Ten of sixty-two participants (16.1%) were unwilling to pay any additional amount for the organic sandwich. The mean WTP for irradiation, among those participants who expressed acceptance of the process, was $1.10. Nineteen of sixty participants (31.7%) were unwilling to pay any additional amount for the irradiated sandwich.

The Shazam econometric software package was used to estimate the two models. The model used fits the revealed WTP for an irradiated product much better than the revealed WTP for an organic product. The only variable approaching significance in the model of acceptance of an organic product was the presence of children in the home. Contrary to expectation, those respondents with children in the home were less likely to bid some positive amount for an organic product (Table 1). The hypothesis that acceptance of organic production is jointly independent of all variables considered can not be rejected.

In an analysis of the maximum level of payment, the only significant independent variable was

Table 1
Effect of variables on acceptability of the process:

Organic:		Irradiated:	
Variable	Coef.(Coef/SE)	Variable	Coef.(Coef/SE)
Age (10yr)	-.0765 (0.535)	Age (10yr)	-.0265 (0.189)
Presence of children	-.215 (1.385)	Presence of children	.104 (0.213)
		Chance of food poisoning *	.246 (2.816)
Seriousness of pesticide/chem	.0426 (0.708)	Education	-.219 (1.817)
		Gender	.520 (1.241)
Education	-.0518 (0.584)		
		Past Episode of Food	
Gender	.545 (1.123)	Poisoning	0.977 (0.211)

* = $p < .05$

household income. Contrary to expectation, the estimated coefficient on this variable was less than zero, indicating that household income has a negative impact on WTP for an organic product. The higher a respondent's household income, the less they were willing to pay for an organic product (Table 2).

The model fit the observed WTP for an irradiated product much better (Table 1). The log of perceived risk was significantly and positively related to acceptance of irradiation, evidenced by a positive WTP (T-ratio = 2.816). Years of schooling was inversely related to acceptance of irradiation at a .01 significance level (T-ratio = -1.817).

The only variable significantly associated with the level of payment was employment status. Those respondents who reported working thirty-five or more hours per week were willing to pay 63¢ less for an irradiated product. The effect of household income on WTP was not significant, but the coefficient had the expected (positive) sign (Table 2).

Discussion

One of the reasons the model may have failed in the case of an organic product is the possibility of omitted variables. The perceived risk of food poisoning was a significant indicator of acceptance of irradiation. There was no comparable data available for perceived risk from pesticide residues or other chemicals. Perceived seriousness of pesticides and herbicides, additives or preservatives, antibiotics, and animal growth enhancers may not be a good proxy for perceived risk. Given the negative coefficient for the effect of household income on WTP for an organic production, it is likely that there is an omitted variable problem, and that this variable is significantly negatively related to income. Future experimental sessions should more directly determine the perceived risk from pesticide and other residues.

Acceptance of organic production as evidenced by a positive WTP is widespread. Half of all participants were willing to pay at least a $1.00 premium for an organic sandwich. Experimental demand for organic

Table 2
Effect of variables on WTP, corrected for acceptability of the process:

Organic:		Irradiated:	
Variable	Coef.(Coef/SE)	Variable	Coef.(Coef/SE)
Income ($10K) *	-.225 (1.976)	Income ($10K)	0.109 (1.226)
Employment	-.428 (1.070)	Employment *	-.632 (2.147)
Gender	0.338 (0.691)	Gender	-.0806 (0.257)
Meals per week	0.0387 (0.637)	Meals per week	-.0061 (0.129)
		Seriousness of Irradiation	0.002 (0.018)

* = $p < .05$

Figure 1
Demand for Organic Sandwich

Willingness To Pay — Mean WTP
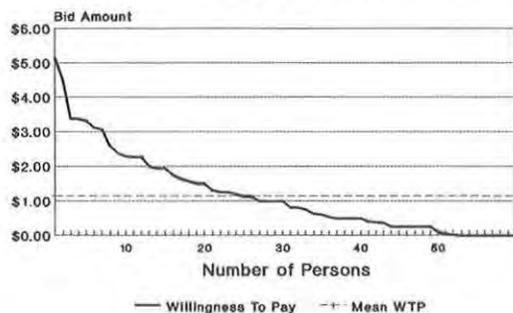
Figure 2
Demand for Irradiated Sandwich

Mean of Bids 17-20 — Mean WTP

benefits from irradiation. More individuals accept organic production, and are willing to pay more for it. This is consistent with the findings of surveys which have generally shown consumers to be more concerned about pesticide and other chemical residues than about bacteria in food (van Ravensway, 1988), even though most food safety experts consider foodborne bacteria a greater risk.

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production is shown in Figure 1. The median WTP for irradiation for all participants was $0.50. Estimated demand for irradiation is shown in Figure 2. It is possible that some participants with a recorded WTP for irradiation equal to zero would pay to avoid an irradiated product.

The actual amount consumers are willing to pay for irradiation is expected to be less than the experimental figure. Participants in experiments were unable to exercise other options generally available to consumers. They did not have the option of preparing the product at home, or of choosing a different product or source. The element of control has been shown to have a strong impact on perceptions of risk.

Experimental results suggest that the perceived benefits from organic production outweigh the perceived

Life and Health Insurance Customer Complaints: An Illustration

Customer complaints related to life and health insurance are examined. Service related problems generated most complaints. In those instances where consumers do not feel empowered, they tend to file complaints through state departments of insurance.

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Introduction

Value of Customer Complaints

Customers who complain should be among the most important customers to a company. Contingent upon a company's satisfactory response to complaints, a larger number of complaints received may result in a greater number of satisfied customers. When a customer chooses to complain about a product or service, the opportunity arises for the company to satisfy the customer, retain the customer's business, and satisfy other present and future customers as well.

Customer complaints often signal problems with products or services that a company may be able to correct, thus improving product or service quality. This will certainly have positive results on customer satisfaction as well as sales. About 40 years ago, W. Edward Deming designed his famous chain reaction for businesses. Deming suggested that improving quality would decrease costs and thus increase productivity. In 1994, an article written by Brian Joiner proposed that a step be added to Dr. Deming's chain reaction. Joiner suggested that companies "increase complaints to improve quality to decrease costs to increase productivity" ("Turn Complaints Into Sales," 1994).

Listening to customer complaints may result in several positive outcomes for companies. Most companies desire to act fairly and honestly in order to maintain a positive reputation in the marketplace. Consumer complaints can alert a company to aspects of their product or service that may seem unfair or deceitful to its customers. Addressing these complaints could help a company maintain a positive image. Consumer complaints may also serve as early warning signals about product defects and possible violation of laws. These problems can be corrected quickly before more serious problems arise. Companies may also listen to consumer complaints to avoid bad publicity. Particularly assertive customers may write letters to third parties such as government agencies which may lead to third-party liability claims or government regulation. Companies which are already subject to government regulation may listen to customer complaints to avoid poor relationships with regulators. Finally, attention paid to customer complaints will increase profits over the long run by gaining new customers who have been referred by existing satisfied, loyal customers (Garman, 1995).

Importance of Satisfied Customers

Resolving customer complaints in a manner which is satisfactory to the customer will encourage the repurchase of a company's product or service. Another means of retaining customers is to satisfy them the first time they purchase a good or service. Doing the job right the first time will generally encourage further business transactions. Joiner (1994) reported that 70% of consumers with service problems do not complain. These customers also frequently indicated that they stopped using the product, especially if it cost more than $200. First-time satisfaction is a result of good product design and engineering, manufacturing, sales, and service practices. Any of these components may generate customer complaints upon which improvements may be made which will improve first-time experiences and, thus have a positive impact on sales. Customers who continue to buy because they have been consistently satisfied may also generate new customers (Garman 1995).

When companies listen to customers and respond quickly and effectively to their complaints, they produce brand loyalty. This is especially important in highly competitive industries where consumers can easily switch brands. Results of the Survey of Complaining Consumers conducted by Technical Assistance Research Programs, Inc. for the Coca-Cola Company found that 94% of the customers who were

satisfied with the manner in which their complaint was handled would continue to buy at least at the same rate. However, only about 25% of those consumers who were not satisfied with the handling of their complaint indicated they would continue to buy at the same rate. This study also found customers who deemed the company's response acceptable told 5-6 people about this positive experience. However, customers who were not satisfied told 9-10 people about their negative experience ("Measuring the Grapevine-Consumer Response and Word-of-Mouth," 1982). These findings indicate the importance of making every customer's experience a positive one since positive experiences encourage retention and positive word-of-mouth testimony.

Satisfied customers save companies money. Since two-thirds of a company's business typically comes from repeat customers, it pays to keep current customers satisfied. When the cost of obtaining new customers is examined, the importance of satisfying customers the first time becomes even more apparent. It has been estimated that it costs about five times more to find a new customer than to keep an existing one. Companies will save money by concentrating on improving the quality of their products and services which will encourage their satisfied customers to speak of their positive experiences (Garman, 1995).

Summary of Complaint Data Significance

From the discussion above, it is clear that consumer complaints should be welcomed and analyzed for the ultimate purpose of improving customer satisfaction and enhancing customer loyalty. Customer complaints can help a company to identify possible violations of laws and problems with products and services. Correcting these problems can result in satisfied customers who advertise for the company through positive comments and exhibit a higher level of brand loyalty.

Analyzing consumer complaints is necessary to identify problems that can be resolved and situations that can be avoided in the future. Though it is important to resolve each complaint individually, a higher level of customer satisfaction may result if complaints are analyzed to identify significant problem areas. This paper is focused on an analysis of consumer complaint data. In the pages which follow, a consumer complaint data set is described and analyzed. Implications are drawn from the analysis.

Data and Analytical Approach

Complaint statistics from a large insurance company in Columbus, Ohio were analyzed to determine trends, relationships, issues, frequencies, and implications. The analysis is focused on life and health insurance complaints received between January 1, 1991 and June 30, 1994. Over this three and a half year period, 553 health insurance complaints were received and 449 life insurance complaints were received. Only those complaint categories for which at least 25 responses were recorded are considered (Table 1).

Table 1
Definitions of Complaint Types

Poor Time Service: Human factor determination relating to initial response time to the requestor.

Poor Service: Human factor determination relating to the general quality of service to the requestor.

Policyholder Service Miscellaneous: Specific instances of disappointments not coded elsewhere.

Service: Complaints regarding attributes of service or style of service.

Policyholder Service Delays: Response times after initial contact in servicing other than claims, underwriting, or sales.

Unkept Commitment: Human factor determination regarding alleged failure to follow through on a promise.

Incorrect/Insufficient Information: Inaccurate recording and use of information.

Agent Handling: General coding of agent involvement in an issue or service.

Alleged Misleading Statement or Representation: Contention that a statement or response made by a representative of the company lead to a mistaken action or belief to induce a sale.

Claims Delays: Response times related to the servicing of claims.

Rate Increase: Resulting amount charged is an increase over that previously encountered.

Unsatisfactory Settlement: Claim resolution amount or approach is disappointing.

Denial: Claim coverage and/or payment refused.

Premiums and Rating: Underwriting concern affecting amount to be paid for coverage.

No Response: Lack or absence of reply to inquiry or information request.

Refund: Handling of a return of premium.

Refusal to Insure: Underwriting concern affecting initiation of a policyholder relationship.

While it would be desirable to analyze the association between complainant characteristics and complaint type, this is not possible due to the nature of the data set. The data collection structure for insurance complaints is typically motivated by state regulations. In addition, since complaining is an inherently adversarial process, the less intrusive the complaint handling process, the more desirable it is perceived to be by both parties. This results in a data set consisting of names, addresses, dates, and type of complaint. Since there is virtually no data on the complainant, it is not possible to identify associations between complainant characteristics and type of complaint.

There is, however, an interesting piece of information in the data set for which identification of associations between this variable and type of complaint is fruitful. This variable is the type of "person" making the complaint. Insurance related complaints can come from a variety of sources including policyholders, state departments of insurance, consumer advocacy organizations, local government's consumer protection offices, and so on. In this study complaint source is categorized into three types: policyholder, state department of insurance, and other. It is worth noting that state department of insurance complaints typically originate with policyholders; however an important point is that state insurance regulations often require response or action within a specified time to complaints made through a state department of insurance.

Identifying associations between complainant type and type of complaint is useful because it may suggest how a customer perceives a company. If a customer believes that complaining to the company will not result in a satisfactory response, the customer may seek the assistance of a third party. However, if a customer perceives that the company will respond positively to the complaint, it is more likely that the company will be contacted.

Findings

Complaints Over Time

Over the 14 quarters studied, health insurance complaints generally declined (Table 2). In the first six months of 1991, 21.5% of all health insurance complaints were received while in the first half of 1994 9.9% of all complaints were received. This steady decrease may point to the implementation of new policies or practices that reduced the likelihood of consumer dissatisfaction.

A trend, such as that found for health insurance complaints, was not found with respect to life insurance complaints. Life insurance complaints tend to "bounce

around" from six-month period to six-month period. For example, 14.7% of all complaints occurred in the second half on 1991; 19.6% of the complaints occurred in the first half of 1992; and 11.6% of the complaints occurred in the second half of 1992. Examination of Table 2 suggests the possibility that the incidence of complaints may have started to decline during the last year; however, subsequent time periods of data are needed to verify this perception.

Table 2
Life and Health Insurance Complaints Over Time

Time Period	Health Ins (percent)	Life Ins (percent)
1st half 1991	21.5	15.6
2nd half 1991	18.1	14.7
1st half 1992	17.5	19.6
2nd half 1992	11.6	11.6
1st half 1993	12.1	16.9
2nd half 1993	9.2	9.8
1st half 1994	9.9	11.8
N	553	449

Frequency of Complaints

The highest percentage of complaints for both types of insurance occur in service related areas (Table 3). This suggests that service was the most frequent cause of complaints for both health and life insurance. For health insurance the most critical issue was poor time service while service was the most critical issue for life insurance. Initial response time to the service requestor (poor time service) was associated with 21.0% of health insurance complaints and 15.8% of life insurance complaints. Complaints regarding attributes of service or style of service (service) were associated with 27.8% of life insurance complaints and 14.1% of health insurance complaints.

A second set of problems or issues that caused complaints related to agents. For health insurance, accuracy and adequacy of information provided by agents and how agents handled a situation were the most common causes of complaints. Inaccurate recording and use of information (incorrect or insufficient information) was reported in 14.1% of health insurance complaints and agent involvement in an issue or service (agent handling) was present in 14.3% of health insurance complaints. The same two issues, at higher relative values, emerged for life insurance. Incorrect or insufficient information was indicated in 16.9% of life

insurance complaints and agent handling was associated with 21.2% of life insurance complaints.

The last set of complaints were caused by a set of issues related to the home office. These problems and issues were more common for health insurance than for life insurance. The most common issue for health insurance was denial of a claim, while the handling of a return of premium (refund) was the most common for life insurance. Denial was associated with 17.5% of health insurance complaints and refund was an issue of 6.5% of life insurance complaints. It is also interesting to note that claims delays and premiums/ratings were also relatively frequent causes of complaints for health insurance.

Table 3
Frequency of Complaints

Problem/Issue	Health Ins (percent)	Life Ins (percent)
SERVICE		
Poor Time Service	21.0	15.8
Poor Service	10.3	16.7
PH Service Misc	9.4	21.2
Service	14.1	27.8
PH Service Delays		8.9
AGENTS		
Unkept Commitment	5.8	6.0
Incorrect/Insufficient Info	14.1	16.9
Agent Handling	14.3	21.2
Alleg Mislead Stmnt/Rep	8.1	8.5
Claims Delays	11.4	
HOME OFFICE		
Rate Increase	7.1	
Unsatis Settlement	5.8	
Denial	17.5	
Premiums and Rating	11.0	
No Response		6.0
Refund		6.5
Refusal to Insure	6.9	
N	553	449

Percents do not add to 100 since a single complaint may have been associated with more than one problem or issue.

Sources of Complaints

When a service related problem or issue caused a complaint, relatively more policyholders filed complaints in every instance. This was the case for both health and life insurance (Table 4).

Relatively more policyholders also tended to complain with respect to problems or issues arising from the practices of agents and representatives of the company. The exception, however, was when an alleged misleading statement or representation was the cause of the complaint. In this instance relatively more state departments of insurance were the source for the complaint.

Most home office related problems/issues were associated with health insurance. When an unsatisfactory settlement, a denial, premiums and rating, or refusal to insure were the underlying issue or problem, relatively more state insurance departments filed complaints. However, when the issue or problem was a rate increase, relatively more policyholders filed a complaint.

Summary and Implications

Service is clearly a key cause of complaints. Problems or issues drawing the greatest number of complaints included initial response time to the service requestor (poor time service), general quality of the service to the requestor (poor service), specific instances of service disappointments (policyholder service miscellaneous), response times after initial contact in servicing other than claims, underwriting, or sales (policyholder service delays) and complaints regarding attributes of service or style of service (service). Policyholders appear to feel empowered to address these problems through direct interaction with the company as suggested by the finding that relatively more policyholders made service related complaints than did the other groups.

The most frequent problems found with agents involved alleged failure to follow-through on a promise (unkept commitments), inaccurate recording and use of information (incorrect or insufficient information), agent involvement in an issue (agent handling), and contention that a statement or response made by a representative of the company lead to a mistaken action or belief to induce a sale (alleged misleading statements or representation). Again, relatively more policyholders believe they can resolve these issues themselves. There is, however, one exception.

Table 4
Source of Complaint Related to Complaint Type

Problem/Issue	Health Insurance Source (percent)				Life Insurance Source (percent)			
	Policy Holder	Dept. of Ins	Other	N	Policy Holder	Dept. of Ins	Other	N
SERVICE								
Poor Time Service	64.7	27.6	7.8	116	84.5	11.3	4.2	71
Poor Service	80.7	15.8	3.5	57	82.7	10.7	6.7	75
PH Service Miscellaneous	65.4	28.8	5.8	52	74.7	17.9	7.4	95
Service	67.9	16.7	15.4	78	73.6	12.8	13.6	125
PH Service Delays					97.5	2.5		40
AGENTS								
Unkept Commitments	71.9	25.0	3.1	32	85.2	14.8		27
Incorrect/Insufficient Info	59.0	37.2	3.8	78	80.3	13.2	6.6	76
Agent Handling	67.1	24.1	8.9	79	82.1	12.6	5.3	95
Alleg Mislead Stmnt/Represent	40.0	60.0		45	60.5	39.5		38
HOME OFFICE								
Claims Delays	47.6	46.0	6.3	63				
Rate Increase	59.0	41.0		39				
Unsatisfactory Settlement	28.1	71.9		32				
Denial	22.7	74.2	3.1	97				
Premiums and Rating	45.9	52.5	1.6	61				
No Response					81.5	7.4	11.1	27
Refund					75.9	24.1		29
Refusal to Insure	39.5	47.4	13.2	38				

The one agent-related problem/issue for which relatively more state insurance departments filed complaints was alleged misleading statements or representations. Though the customer may perceive the company to be receptive to these complaints, the customer may no longer trust the company. The state department of insurance may be perceived to be a higher authority who will protect the consumer's interests.

For complaints related to the home office, there is a clear switch from policyholders filing complaints to state departments of insurance filing complaints. This is the case for complaints arising from unsatisfactory settlement, denial, premiums and rating, and refusal to insure. Interestingly, each of these involves an action of closure by the company. For example, an unsatisfactory settlement complaint indicates that the amount of claim paid or approach used to handle a claim is disappointing. A complaint arising from denial indicates that claim coverage and/or payment has been refused. Though the

company may actually be receptive to the customer's concerns about these issues, the customer may perceive that the company has closed the case. The customer then appears to seek the assistance of a "powerful" third party.

It is also interesting to note that there are more issues related to the home office for health insurance than for life insurance. This is not surprising given the frequencies of interactions between a policyholder and the company when seeking reimbursement for health insurance claims. This also relates to the prominence of denial and claims delays. It appears that when policyholder has a problem with the home office, s/he feels more helpless and tends to seek the help of the state department of insurance, especially where there is disagreement on how the payment of a claim was handled.

Conclusion

It appears from our analysis that improving service would reduce the number of complaints filed with the home office. It also appears that policyholders see the home office as a viable place to complain when the company is perceived to be somewhat open in addressing an issue or problem. However, when policyholders believe they have been "wronged" by not receiving full payment of a claim or have been "lied to," they will seek assistance from the state department of insurance. In this instance policyholders appear to believe that the company cannot be trusted or that there is an inherent conflict of interest which limits a company's willingness to address a problem or issue.

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Limited Partnerships, An Inappropriate Purchase:
A Profile of Individuals Seeking Restitution

A group of consumers seeking retribution for the purchase of certain limited partnerships is examined. The appropriateness of their investment, given their age, education, level of investment experience, and risk orientation is investigated.

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Introduction

On October 21, 1993, Prudential Securities Incorporated (PSI) reached a settlement with the U.S. Securities and Exchange Commission (SEC), securities regulators from 49 states, and the National Association of Securities Dealers (NASD) for violations of securities laws in the sale of certain limited partnerships. Admitting to sales abuses during the 1980s, PSI, Prudential-Bache Securities, Inc. and Bache & Co. Inc. accepted responsibility for selling limited partnership interests to persons for whom such investments were not suitable in light of their stated investment objectives, financial status, investment sophistication and other factors. PSI allegedly misrepresented and omitted material facts regarding the present and future value of assets owned or to be purchased by limited partnerships, the nature of the businesses owned or to be operated by them, or the projected profitability of such investments.

Over 700 limited partnerships were marketed and sold as safe investments. The highly speculative nature and risks associated with the partnerships were not shared with investors. As a consequence of these ubiquitous abuses, Prudential was directed to pay compensatory damages to aggrieved investors by way of an independent arbitration process. A $330 million open-ended reparation fund was initially established and subsequently increased to over $660 million. Prudential has set aside $1.4 billion to resolve claims and thus far has paid out more than $768 million (AP, 1995).

Background

Since the inception of the limited partnership, $140 billion has been invested into limited partnerships, with the heaviest investment taking place between 1983 and 1986 (Thompson & Dagbjartsson, 1991). Of the more than one hundred billion dollars' worth of limited

partnerships sold during the eighties, PSI sold $8.5 billion to private investors (Mahar, 1995). Approximately 325,000 Prudential investors were eligible to seek restitution for investments in 708 limited partnerships purchased between 1980 and 1990.

Limited partnerships were a conceptually enticing investment. Individual investors entrusted their funds with a general partner responsible for acquiring and managing assets. The investor, a passive partner with limited liability, benefited three ways. First, cash flows resulting from assets were to be paid out as periodic distributions. For example, investors in real estate limited partnerships were to receive cash distributions from rent. Second, tax benefits resulted. Partnerships operating at an initial loss allowed investors to reduce taxable income from depreciation.Third, investors eventually hoped to gain capital appreciation and proceeds from the sale of assets, usually after a holding period-- anywhere from five to ten years (Thompson & Williams, 1990).

Partnerships investing in oil, gas, real estate, research and development, entertainment, and cable television were highly speculative, however in the case of Prudential, 325,000 investors bought into the concept of limited partnerships. While the benefits were alluring, there were unforeseen deficiencies. First, investment principal in partnerships were often devoured by fees and charges. Further, cash distribution amounted to only a small percentage of investor's original capital. Second, tax sheltering that lured investors to limited partnerships died with the 1986 tax reform law. Third, appreciation yields from partnerships were to result in five to seven years, however many have drawn out over 15 years. Although a risky investment, brokers misled investors by presenting the instruments as safe and often promised 15 to 20 percent returns on investments. In actuality, most investors have realized only half the amount. Many investors with capital currently wrapped up in limited

partnerships are realizing only one and two percent returns annually (Mahar, 1995). Limited partnerships are not currently traded on any of the exchanges, however a secondary market is thriving. Volume in the secondary market increased 50 percent in 1994, with limited partnerships trading at a discount between 20 and 60 percent (Mahar, 1995).

The Prudential settlement is the largest ever reached by regulators and a brokerage firm. Under the settlement procedure, PSI was required to notify any investor who purchased any of 708 Prudential partnerships between 1980 and 1990 (Siconolfe, 1994). Investors were eligible to seek recovery for compensatory damages, which included interest on the capital investment (calculated at the annualized Treasury-bill rate during the time of the investment). Punitive damages and attorney's fees were not eligible. To determine the recovery amount, investors were required to complete a claim form and return it to the claims administrator. The claim form accounted for factors relating to circumstance surrounding the sale. For example, whether investors received any sales and marketing materials and the suitability of the investment at the time of the purchase given the investor's age, financial status, investment sophistication and investment objectives were taken into account. Further, misrepresentations in connection with the sale, loss incurred, residual value of the investment, distributions and tax benefits received were also considered in the recovery amount.

This study is exploratory. The purpose was to examine consumers who purchased Prudential limited partnership (LP) investments between 1980 and 1990. Specifically, the consumers were examined descriptively in terms of demographic characteristics, level of investment experience and risk orientation.

Methodology

The Sample

The study examines a unique sample consisting of a group of 230 Prudential LP investors who retained a law firm to assist them with the court ordered compensation process. A partner of the law firm, with expertise in securities litigation, believed the preparation of the claim form to be critical to the amount investors recovered. The firm sponsored free seminars in retirement areas of Colorado, Florida, and Arizona in early 1994 to solicit individuals with a minimum investment of $5,000 in Prudential limited partnerships. A fee of $100 was charged to retain the firm.

There are some obvious limitations associated with the data set that need to be acknowledged. First, the sample is limited because it is derived from a restricted geographic area and made up principally of older subjects. Second, the sample was unique among other Prudential investors because they sought legal aid in the retribution process. Since they received legal advice while the majority of investors completed the form on their own, the information provided may differ. Third, findings may be limited by the reliability and accuracy of the data reporting of clients. There is a moral hazard associated with the type of information. The Prudential fraud was highly publicized in local and national newspapers, with some articles giving advice on how to maximize recovery for damages. Influences from the media as well as legal advice may have had an affect on the information submitted.

Variables Examined and Analysis

The study examined demographic characteristics, investment experience prior to the LP investment and level of risk orientation. Specifically, age, education, annual gross income, net worth, number of dependents and retirement status were evaluated. Discussion is limited to investment experience regarding the first PSI LP purchase. Indices were formulated to assess level of investment experience and risk orientation of the sample.

Specifically, an experience index was derived from information regarding whether the client had ever invested in any one of 20 different types of investments prior to 1975. Clients who had previously made between one and five were considered less experienced, between six and ten were considered experienced and between 11 and 20 were considered very experienced. Similarly, a risk orientation index was formulated from the twenty securities clients specified investing in prior to 1975. Each of the twenty instruments was assigned a number according to the degree of risk commonly associated with it. A conservative investment instrument was assigned a -1, a moderately risky investment received a zero and a risky investment received a +1. Clients scoring between -4 and -2 were classified with a negative risk orientation, -1 to 1 with a neutral risk orientation, and two to five positive risk orientation.

Real estate, oil and gas, and other limited partnerships were among the twenty securities client invested in prior to 1975. Assuming the complainants were not fully apprised of the risks associated with investing in limited partnerships, a second risk orientation index was developed. The index was similar to the other one except that three types of limited partnerships were omitted. The rationale for including LPs in the first formulation was because limited partnerships were relatively new and had yet to be

proven successful beyond tax benefits, consequently investors were taking a degree of risk. Basic descriptive statistics and the formulation of indices was employed to evaluate investors and investment behavior. Chi-square test of association was performed on the data to test for within group differences among selected variables.

Results

Demographic and Financial Characteristics

Of those clients retaining the firm, 47 percent were over 62 years and 69 percent were retired at the time of the first LP investment. More than 75 percent were married and more than one half (55%) reported one independent. The sample was an educated group with more than half (54%) being college graduates or having post graduate education. At the time of the first PSI LP purchase, clients had a mean gross annual income of $62,523 and a mean total net worth was $527,009. Table 1.

Investments in Limited Partnerships

The number of LPs purchased ranged from one to 27 with four being the average. The mean amount invested in an LP was $67,463, with a range of $1,700 to $900,000. On average, the first limited partnership represented 15 percent of "total funds invested plus funds available for investment." Approximately 78 percent of clients reported to have between one and 20 percent of investable income in PSI LPs, 17 percent had between 21 and 40 percent, two percent had 41 and 60 percent, less than one percent invested between 61 and 80 percent, while three percent had invested 81 to 100 percent. Table 2.

Investment Experience

Of the 20 possible investment instruments clients invested in prior to 1975, the most instruments a client purchased was 18, the least was one. Sixteen percent of clients were less experienced, 47 percent were considered experienced, and 37 percent were considered very experienced (Table 2). Table 3 presents the data for statistically significant associations found among the level of investment experience and other variables. Percentages have pluses and minuses beside them to indicate the direction of the difference in observed and expected frequencies and their contribution to the overall chi-squared results. (A plus indicates that observed frequencies exceeded expected frequencies, while a minus indicates that observed frequencies fell below the expected frequencies). The percentages of less experienced, experienced, and very experienced clients and their response to the question of whether they had

Table 1
Sample Demographic and Financial Characteristics

Age (N=229)*	Frequency	Percentage
25 through 50 years of age	56	24
51 through 61 years of age	64	27
62 years of age or older	109	47
Education (N = 230)	**Frequency**	**Percentage**
Less than high school	10	4
High school graduate	52	23
Some college	44	19
College graduate	85	37
Post graduate work	39	17
Marital Status (N = 230)	**Frequency**	**Percentage**
Married	176	77
Separated	7	3
Divorced	8	4
Widowed	20	9
Single	19	8
Dependents (N = 230)	**Frequency**	**Percentage**
0	62	27
1	126	55
2+	42	18
Retirement Status* (N = 221)	**Frequency**	**Percentage**
Retired	120	52
Employed	109	48
Annual Gross Income* (N = 227)	**Frequency**	**Percentage**
Less than $25,999	61	27
$26,000 through $50,999	71	34
$51,000 through $75,999	41	18
$76,000 or more	51	22
Mean gross income ($62,523)		
Median gross income ($41,075)		
Est. Total Net Worth* (N = 228)	**Frequency**	**Percentage**
Less than $100,000	33	14
$100,001 through $250,000	80	35
$250,001 through $400,000	36	16
$400,001 through $650,000	30	13
$650,000 or more	49	22
Mean net worth ($527,009)		
Median net worth ($253,625)		

* At Time of 1st LP Purchase

invested in any other limited partnerships prior to the first Prudential are presented at the top. Of those not investing in a LP prior, fewer "less experienced" clients (18%) than expected were observed. Of those investing in a LP prior to the Pru purchase, most (63%) were "very experienced" investors.

In regards to annual gross income at first LP purchase, a larger proportion of the clients than expected in the lower income groups were less experienced (26%) and experienced (56%). At the other extreme, of those in the highest income group, more than the expected number were very experienced investors (67%).

The association between experience and net worth was assessed using two measures of net worth --

Table 2
Investment Experience and Risk Orientation

Characteristic (N = 230)	Theoretical Range	Sample Range
Investment Experience Index	1 to 20	1 to 18
Risk Orientation Index	-6 to 9	-3 to 5
Inclusive Risk Orientation Index	-6 to 8	-4 to 3

Investment Experience Index	Frequency	Percentage
Less Experience	36	16
Experienced	109	47
Very Experienced	85	37

Inclusive Risk Orientation Index	Frequency	Percentage
Negative Orientation	20	9
Neutral	125	54
Positive Orientation	85	37

Risk Orientation Index[a]	Frequency	Percentage
Negative Orientation	83	36
Neutral	138	60
Positive Orientation	9	4

Number of Pru LPs Purchased	Frequency	Percentage
1	64	28
2	46	20
3	41	18
4	24	10
5	13	6
6+	42	18
Range: 1-27 Mean # purchased: 4		

% of Total Invested/Investable Funds Represented by 1st LP Purchase	(N=226) Frequency	Percentage
0-20	176	78
21-40	39	17
41-60	4	2
61-80	1	1
81-100	6	3
Mean investment: $67,463		

[a] Excludes oil and gas, real estate, and other limited partnerships.

one measure including all assets and a second measure excluding home, cars, and furnishings. Using the more complete measure of net worth, of those clients having a net worth of the $500,000 or more, 67 percent were very experienced. When home, cars, and furnishings were excluded, 68 percent of those in the largest net worth category were very experienced. Table 3.

Clients estimated the percent of "total funds invested plus funds available for investment" represented by the purchase of PSI LPs (Table 3). The striking aspect of this table is that in the lowest category (0-20) all experience levels are present at lower than expected relative frequencies; however, at virtually all other levels, the observed relative frequencies exceed the expected. Of particular note, the highest two categories (61-80, 81-100) had no very experienced investors.

Table 3
Association Between Investment Experience and Selected Variables

	Investment Experience (percent)		
Invested in other LP Prior**	Less Experienced	Experienced	Very Experienced
Yes	7	30	63 (+)
No	18 (-)	53 (-)	29 (-)
Annual Gross Income at 1st LP Purchase**			
≤$25,999	26 (+)	56 (+)	18
$26,000 - $50,999	16	53 (+)	31
$51,000 - $75,999	7	54 (+)	39 (+)
$76,000≥	10	24	67 (+)
Total NW at 1st LP Purchase**			
≤ $500,000	19	55 (-)	27 (-)
$500,000 ≥	7	27	67 (+)
NW w/Exclusions[a] at 1st LP**			
≤ $500,000	17 (-)	53 (-)	30 (-)
$500,000 ≥	7	25	68 (+)
% of Total Invested /Investable Funds Represented: 1st LP[a]			
0-20	9 (-)	47 (-)	44 (-)
21-40	33 (+)	54 (+)	12
41-60	50 (+)	25 (+)	25 (+)
61-80	100 (+)	-	-
81-100	33 (+)	67 (+)	-

[a] not incl. home, cars, and furnishings
*P value = <0.01 **P value = <0.001

Risk Orientation

As noted above, risk orientation was assessed including and excluding LPs (Table 2). Less than ten percent (9%) of clients had a negative risk orientation using the more inclusive measure, while more than half (54%) were neutral in orientation. Approximately 37 percent of clients had a positive risk orientation. In regards to the second risk orientation index, 36 percent of the clients had a negative orientation, 60 percent neutral, and only four percent high.

Table 4 presents statistically significant associations found between the inclusive measure of risk orientation and investment experience and amount invested in LPs. Percentages have pluses and minuses beside them to indicate the direction of the differences between observed and expected frequencies. Clients with less investment experience tended to have a negative (14%) or neutral (75%) risk orientation. A significant association was also found between risk orientation and the amount of money invested in limited partnerships. Clients investing more than $75,001 tended to have a neutral (44%) or positive (45%) risk orientation.

Table 4
Association Between Risk Orientation and Selected Variables

(N = 230)	Risk Orientation (percent)		
	Negative	Neutral	Positive
Investment Experience**			
Less experienced	14 (+)	75(+)	11
Experienced	5	55	40
More experienced	12	45	44 (+)
Total Amount Invested			
in Pru LPs* (N=228)			
≤$25,000	5	53	42
Between $25,001 - $75,001	11	62	26
$75,001≥	11	44(+)	45 (+)

*P value = <0.05 **P value = <0.01

Discussion

The most vulnerable of securities fraud victims are senior citizens, with thirty percent of all securities fraud victims being 65 years or older (North American Securities Administrators Association). Exacerbating the situation, three out of four senior citizens rely on investment income to meet some of their daily living expenses (Congressional Record, S9205). Almost half of the clients in this study were beyond retirement age at the time of the first LP investment with 69 percent retired at the time of the first LP purchase. It is clear from these figures that at the time of the PSI investment the majority of clients were concerned with retirement funding. In data not reported here, the majority of investors specified conservative investment objectives, with ten percent of clients invested for retirement savings and 84 percent of clients indicated income and capital preservation. The sale of limited partnership investments in this case appears to be unsuitable in light of investment objective and investor's age.

Clients were better off compared to the average American household. Income was higher when compared with similar statistics provided by the Current Population Reports (CPR). In CPR 1990 the median income of all households was $30,786 and for households with head aged 65 years and over income was $17,160. Comparatively, the sample's median gross annual income at the time of the first LP purchase was $41,075. Since this predates the CPR, client income figures may be slightly underestimated since it has not been adjusted for inflation.

Comparatively, the median net worth of clients was $253,625 at the time of the first LP purchase, 1989 CPR indicates median net worth excluding home equity was $9,840 for all households and was $23,856 for household with head 65 years and over. The client's median net worth excluding home, cars and furnishings was $351,906 at the time of the first PSI purchase.

These comparisons indicate income and net worth of the sample to be much higher than the average household, however it is important to note that these values declined between the time of first purchase and the time the claim was filed (date not reported here). While comparing income figures to the population as a whole may suggest clients can afford the loss, the increased number of clients in retirement, the decreased annual gross income, and their investment objectives make the investments inappropriate.

Supporting the allegations that PSI limited partnership investments were misrepresented by brokers was client risk orientation. While the first risk orientation index found more than 60 percent of clients to have a negative or neutral risk orientation, the second risk index indicates over 95 percent of the clients were negative or neutral in risk orientation. The second risk orientation index indicates the sample to be a highly risk averse group of investors, supporting the case that investors were misinformed of the nature of the LP investment.

Conclusion

With investment company assets surpassing total commercial bank deposits for the first time in American history, policing of securities markets and protection of consumers from securities fraud is needed now more than ever ("SEC Chairman," 1994). Further, not only have investors reported twice as many securities frauds to the SEC in 1993 as in 1981, the number of securities fraud cases brought by state and federal authorities have increased by 45 percent (SEC and NASA). Despite over 60 percent of the sample having at least some college, more than 80 percent being fairly sophisticated in their investment experience, and over 90 percent possessing a relatively negative to neutral risk orientation, as a group they were victims of securities fraud. The securities market is complex for sophisticated investors, let alone less knowledgeable and experienced.

This study demonstrates the vulnerability of many investors in terms of the securities market investments and suggests the need for consumer protection. However, consumer protection in the securities market is currently under fire with pending legislative reform. Both the U.S. Senate and House of Representatives have drafted bills to support legislative reform of securities laws. All parrt of the House GOP's "Contract with America," the legislation follows the new product-liability bill as an attempt to curb unmeritorious securities lawsuits.While legislative reform may be necessary to control unworthy lawsuits, the protection of consumers is greatly jeopardized by the proposed bills (Lowenstein, 1995).

Demanding a delicate balance of both, the legislation in the area of consumer protection and the securities industry has essentially two dimensions, protection of the consumer and protection of issuing firms. The proposed bill limits the protective rights of investors by reducing the statute of limitations for filing securities-fraud lawsuits from five years to three; and creating a "safe harbor" for firms erroneously predicting future earnings and performance. Further, the judge can request punitive damages from the plaintiff if the law suit is considered frivolous, therefore shifting fees and costs to the plaintiff, rather than each side paying its own fees and costs. Further, professionals (e.g. accountants, auditors, attorneys) assisting in underwriting prospectuses who make any misstatements or misrepresentations have legal protection and auditors who fail to detect fraud would have limited financial liability (Raghavan, A., Lohse, D. & Anderson, M., 1995; Spain, C.L. 1995; Taylor, 1995). While professional litigators exist, private lawsuits provide additional enforcement of securities law and the SEC considers them essential to supplement their own protective efforts (S. Rep. No.98, 1995; H.R. Rep. No.50, 1995)

The Prudential case is the SEC's largest securities fraud settlement. Had the proposed legislation been enacted two years earlier, the statue of limitations would have eliminated opportunity for legal redress for 325,000 consumers investing in Prudential Securities limited partnerships. If the reform bill is passed the rights of 1.79 million investors to recover $2.87 billion will be eliminated (NASAA). Fortunately for Prudential investors they were supported by legislation currently in place and the SEC's goal to protect the interest of investors was upheld.

Acknowledgements

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The Elderly: Vulnerability to Deception and Fraud

The elderly consumers' vulnerability to deception and fraud was investigated using the 1993 Survey of Consumer Behavior commissioned by The American Association of Retired Persons. Compared to younger consumers, elderly consumers were found to be less wary to unfair business practices and less knowledgeable, and thereby more susceptible to deception and fraud. The implications for consumer educators and policy makers were drawn from the findings.

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Introduction

Consumer fraud against the elderly is growing, and the effect of fraud on the psychological, physiological, and economic well-being of the elderly can be devastating ("Fraudbusters," 1991; Harris, 1995; McGhee, 1983). Although the literature on consumer vulnerability and victimization to deception and fraud provides a variety of theories and compelling reasons of why the elderly consumers are more vulnerable to fraud (Butler, 1968; Brill, 1992; Dowd, 1975; Kuypers & Bengston, 1973; McGhee, 1983; Moon, 1990; Moschis, 1994), empirical research efforts to investigate the susceptibility of elderly consumers have been limited. This issue is addressed in this study. The purpose of this study is to examine the extent of the elderly consumers' (age 65 or older) vulnerability as compared to the younger consumers' (age between 18 to 64).

Literature Review

The literature on consumer victimization of the elderly has developed mainly along three research streams: (1) the cognitive and physiological impairment paradigm, (2) the social interaction paradigm, and (3) taxonomies of scams, schemes, and abuses. First, according to the cognitive and physiological impairment paradigm, a normal aging process often results in cognitive and physical impairment, which consequently makes older consumers more vulnerable. The physical impairment includes decreased physical strength, reduced hearing and eyesight (Butler, 1968; McGhee, 1983), while the cognitive impairment includes declines in memory, information processing, and other problem-solving skills (Cole & Gaeth, 1990; Gaeth & Heath, 1987; John & Cole, 1986; Moschis, 1994; Zeithaml &

Fuerst, 1983).

The cognitive and physical impairment literature provides valuable insights to the elderly's competency of decision making. However, since these studies have been typically conducted on controlled laboratory conditions, important variables which influence consumer competency of decision making in the market place, such as market knowledge, negotiation skills, and awareness of deceptive business practices, have not been fully incorporated into these investigations.

Second, the Social Interaction Paradigm explains the elderly consumer's vulnerability in terms of social isolation: Social isolation makes individuals less connected to friends and their sources of information or support as well as more responsive to the sellers who help them feel less useless by paying attention to them (Butler, 1968; Friedman, 1992; Philips & Sternthal, 1977). Thus, isolated consumers are eager to socialize, even with strangers, while they may not be aware of normative beliefs related to fair treatment in the marketplace due to a lack of social interaction. Although social isolation can be a life-long isolation, elderly consumers are more likely to experience it as a consequence of ill health or the loss of roles associated with retirement, widowhood, or death of friends (Butler, 1968; Moon, 1990; Kuypers & Bengston, 1973).

The Social Exchange Theory first posited by Emerson (1962) and Blau (1964) integrates the previous two paradigms: the cognitive and physiological impairments, and the social interaction. The Social Exchange Theory proposes that cognitive, physical, psychological, social, or economic asymmetries among individuals result in different levels of social power, which lead to asymmetric exchange relationships. Social power can be understood as the sum of the resources-

endogenous or exogenous of the consumer (Martin, 1971): Examples of resources endogenous to the individual include cognitive skills, education, vitality, physical strength, wealth, and family and friends, while resource exogenous to the individual is status in society which is often conferred by race, gender, income, and other congenital conditions.

According to the social exchange theory, as adults grow older their social power diminishes due to retirement with its consequent loss of command over productive resources, widowhood, loss of vitality, and reduction in cognitive ability (Dowd, 1975; Martin, 1971). This diminution of social power creates inequitable exchange relationships, which consequently make the elderly more vulnerable to market fraud.

Finally, taxonomical studies have often singled out the elderly as a common target of consumer scams which frequently rely on high pressure face to face selling or telemarketing schemes that by their nature take advantage of cognitive deficiencies, such as slower processing of new information, or physical impairments such as reduced hearing ("Fraudbusters," 1991; Friedman, 1992; Goodman, 1993; Harris, 1995; Hudson, 1993; "Ten Self-defense," 1994). The taxonomical literature has been mostly descriptive in nature and taken an ad-hoc approach, the causal relationship between age and consumer vulnerability can not be established from it.

While the literature on the elderly consumer's vulnerability provides compelling arguments of why they are more susceptible to fraud, limited research has been conducted to empirically examine the extent of the elderly consumers' vulnerability to fraud and deception. This issue is addressed in this study. Consumer's lesser sensitivity to deceptive business practices and a lack of knowledge about the market place have been proposed to predispose them to abusive situation (Lord & Kim, 1995; McGhee, 1983). Therefore, the elderly consumers' awareness of unfair business practices and knowledge of the market place are investigated and compared with that of young consumers' in this study.

It is particularly important to investigate consumer's vulnerability to fraud and deception independently from their self-reported experience of market swindle, since the costs of reporting their victimization experience have been suggested to be high, specifically for the elderly consumers (McGhee, 1983). Since vulnerability is more likely to reflect consumer's susceptibility to fraud than consumer's reported victimization experience, the findings from this study will then provide additional insights for the development of policy and education programs.

Methods

Data

The data for this study are from The 1993 Survey of Consumer Behavior commissioned by The American Association of Retired persons (AARP). The survey used telephone interviews among a national sample of 957 adults age 18 or older. Special sampling techniques were used to ensure that a large number of the oldest consumers would be interviewed. The details of data collection are provided in AARP (1994).

Since the data were purposively collected with an over-sampling of the elderly consumers, half (51.5%) of the subjects were age 65 or older. With regard to gender, male (42%) respondents were outnumbered by female respondents (58%). This is not surprising considering the longer life expectancy of female compared to male and the large number of elderly consumers. Fifty seven percent of respondents were married, while 22 percent were widowed. Regarding race, white were predominant (91%). Fifteen percent of respondents did not finish high school, while 42 percent received at least some college education. Seventy eight percent of respondents owned a house, and more respondents lived in South and Midwest.

Variables

Based on the presumption that consumers' awareness to deceptive practices and lack of knowledge predispose them to fraud and deception (Lord & Kim, 1995; McGhee, 1983), the following variables were employed to indicate consumer vulnerability: openness to appeals from marketers, consumer's awareness of source of information, knowledge of consumer rights and other market knowledge, and wariness of unfair business practices.

Specifically, consumer's openness to appeals from marketers was determined by (1) whether they usually listen to telemarketers who call, (2) whether they believe it is wrong to hang up on a persistent telemarketer, and (3) how often they read mail solicitations and promotions. Consumer's awareness of source of information was examined in terms of (1) whether they can identify a source of information for them to turn to when they want to check about the legitimacy of a charitable organization and (2) whether they can name a source of help when they have consumer problems.

The knowledge of consumer rights was self-reported by the respondents: The respondents were asked to rate their own understanding of consumer rights and the laws that protect consumers in a four-level scale.

TABLE 1.

Comparison of The Elderly Consumers' Vulnerability with The Young Consumers': Percentage of Respondents and Chi-Square Statistics.

	The Elderly		The Young		Chi-Square
	Yes	No	Yes	No	(P-value)
Awareness of source of information					
Identified a source of information about legitimate charities	67	33	65	35	0.6
Identified a source of help with consumer problems	84	16	94	6	24.5*
Openness to appeals from marketers					
Usually listen to telemarketers[1]	20	76	28	66	11.7**
Believe it's wrong to hang up a phone[1]	94	5	91	7	3.0
Usually read mail solicitation	26	74	25	75	0.2
Good knowledge of consumer rights	49	51	49	51	7.3
Knowledge of market practices					
How 1-800 numbers are charged	80	20	92	8	26.3*
How 1-900 numbers are charged	43	57	70	30	68.3*
Difference between a product warranty and a service contract	38	62	27	73	11.9*
Cancellation rule of door-to-door sales	29	71	31	69	0.4
Home can be lost if mortgage payment are missed	66	34	78	22	18.3*
Payment can be deducted automatically from the homeowner's bank	24	76	31	69	5.0
Homeowner can be sued if payment is missed	53	47	68	32	23.3*
Wariness of business practices:					
Business try to mislead consumers at least half the time					
Companies selling over the phone	62	38	74	26	7.7**
Car repair shops	56	44	74	26	16.5*
Home repair contractors	52	48	56	44	0.8
Insurance companies	50	50	66	34	12.2*
Door-to-door sales companies	48	52	71	29	24.6*
Finance companies	45	55	60	40	10.5*
Vitamin/health food stores	45	55	53	47	2.9
Cable TV companies	40	60	47	53	2.4
Appliance/electronic equipment stores	39	61	54	46	2.6
Places selling hearing aids	39	61	31	69	3.3
Telephone companies	33	67	50	50	13.0*
Grocery stores	33	67	38	62	1.1
Banks, credit unions/ savings & loans	32	68	30	70	0.3
Gas stations	27	73	44	56	15.7*
Travel agencies	26	74	37	63	6.6**
Drug stores	26	74	24	76	0.3

*=0.001, **=0.01

Note 1. Some respondents voluntarily answered to these questions by "don't know."

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Market knowledge was determined based on their knowledge of (1) the charging procedure for calls to '800" and "900" telephone numbers, (2) the difference between a product warranty and a service contract, (3) legal safeguards regarding purchases from door-to-door sales people, and (4) legal questions relating to delinquent or late payments on home improvement and home equity loans.

Finally, wariness of unfair business practices was measured by the degree of trust they have on a variety of businesses. Specifically, the respondents were asked about how often they believe the following businesses try to mislead or take advantage of consumers; grocery, drug stores, appliances and electronic equipment stores, banks, credit unions and savings and loans institutions, travel agencies, car repair shops, home repair contractors, telephone companies, vitamins and other health products stores, finance companies, door-to-door sales, telemarketing companies, places selling hearing aids, and gas stations. In addition, the respondent's actual experience of consumer fraud was reported. Based on previous experiences in the market place, the respondents were asked whether there was ever a time s/he felt as the subject of a major consumer swindle or fraud.

Results and Discussion

Exposure to Marketing Scams

The scam artists' modes of operation, telemarketing, charitable solicitations, door-to-door sales, prizes and contests, intrude on the lives of most consumers (Table 1). Well over half of all consumers, no matter their age, routinely receive telemarketing calls at home and are offered "prizes." Specifically, over 90 percents of respondents received at least one telemarketing call, while three-quarters were offered prizes during the six month period, and 70 percents received at least one call from someone requesting a charitable contribution. In addition, around 35 percent of the respondents had at least one visit of a door-to-door salesperson, and six percent was visited five or more times. Older and younger consumers were found to be subjects to these appeals to about the same extent.

Openness to Marketing Appeals

For most consumers, direct marketing appeals, including telemarketing and mail solicitation, are no more than a nuisance. A sizable minority however, listens to these appeals, and a smaller, but still significant, group won't hang up on them. Younger consumers (28%) were more likely to listen to telemarketers than older consumers (20%).

Awareness of Source of Information

Although telephone solicitations for charitable contributions are familiar to most of consumers, they cannot always be certain that the charitable organization is legitimate. Sources exist, however, to help consumers learn about the operations of legitimate charitable organizations. Unfortunately, about a third of consumers regardless of age could not name any of these sources.

On the other hand, almost all consumers could name a source they would use when they need help with a consumer problem. But, 16 percent of older consumers could not identify anyone could ask to for help with a consumer problem: This number is much higher than for younger consumers (6%).

Knowledge of Consumer Rights

Overall, nearly half of consumers believed they have a good (41%) or excellent (8%) understanding of consumer rights. An equal number rated themselves as having only fair (42%) or poor (7%) knowledge about the laws meant to protect consumers, regardless of age.

Market Knowledge

The results are mixed for market knowledge, although older consumers were usually less knowledge than younger consumers. Knowledge about how 800 and 900 telephone numbers are charged was high. Knowledge levels are markedly lower for the difference between a product warranty and a service contract and for cancellation rules on products purchased from a door-to-door salesperson. Knowledge about the consequences of delinquent home loans or mortgage payments is moderate to high.

Specifically, knowledge of how "800" and "900" are charged decreased with age. Older consumers were more ignorant of the potential costs of calls to "900" numbers. While 70 percent of the young consumers knew how "900" calls are charged, only 43 percent of the older consumers knew how these charges work.

Over half of all consumers did not know that the important difference between a product warranty and a service contract is that the consumer pays separately for the service contract. Younger consumers were found to be less knowledgeable in this respect than older consumers, which may due to less experience of purchasing household appliance or electronic equipment.

Regarding door-to-door sales, federal law requires that consumers have three days after the purchase is made, or an order is placed, to cancel and receive a full refund. A number of states have their own statutes that may extend the three day time period. Only

30 percent of consumers could correctly state their rights to cancel door-to-door purchases, regardless of age.

Consumers were asked a series of questions relating to the consequences of missing payments on home improvement or home equity loans. Older consumers were found to be less knowledgeable than younger consumers about the risk of being sued and losing ownership if payments were missed, although a majority of consumers were aware of these potential consequences. However, most of both young and old consumers were found to be ignorant of the ability of a creditor to deduct payments from a paycheck.

Wariness of Unfair Business Practices

Sharp differences in consumers' perception of unfair business practices were found among various businesses. In industries like telemarketing, car repair, home repair, insurance, and door-to-door sales, consumers fraud was viewed as pervasive. In others such as drug stores, consumers said they seldom encountered fraud. Younger consumers were found to be more wary than older consumers concerning the existence of deceptive practices in a wide range of businesses, including telemarketing companies, car repair shops, insurance companies, door-to-door sales companies, finance companies, telephone companies, banks, credit union, savings and loan institutions, and travel agencies.

Victimization Experience

With regard to consumer's actual victimization experiences, however, larger number of young consumers (17%) reported that they have had an experience of major consumer fraud or swindle when compared to older consumer (14%). Even though older people have had longer lives as consumers and presumably, more opportunities to become victimized, and more importantly, older consumers were found to be more vulnerable to fraud, major victimizations were reported more often by young consumers than by older consumers. These results support the proposition that the elderly tend to under-report their victimization experience. Furthermore, a significantly large number of the elderly consumers were not sure of whether they have been victims of fraud. This suggests that even higher percentage of the elderly had been a victim of fraud. Consequently, smaller number of older consumers (52%) were sure that they haven't involved in any consumer fraud or market swindle as compared to younger consumers (71%).

Conclusions and Implications

The elderly consumers' vulnerability to fraud and their victimization experiences were compared with their younger counterparts' in this study. Using the 1993 Interview of Consumer Behavior commissioned by the American Association of Retired Persons, it was found that elderly consumers were more susceptible to market fraud and swindles but less likely to report their victimization experience than younger consumers.

Specifically, the elderly were found to be less aware of a source of help with consumer problems, less knowledgeable of the charging procedure of "800" and "900" numbers and the consequence of missed payments of home equity and home improvement loans, and less wary of unfair business practices than their younger counterparts. This lack of knowledge and wariness implies the elderly's high level of susceptibility to deception and fraud.

However, despite their higher vulnerability, the elderly did not report a higher incidence of victimization experience as compared to the young consumers. Furthermore, a large number of the elderly were not sure whether they had experienced major market fraud or swindles. These results are consistent with the previous findings on the elderly's under-reports of fraud (Friedman, 1992; McGhee, 1983): The elderly are not only less likely to recognize that they have been victims of fraud or swindle but also are less likely to report abuse once they have recognized that it existed.

Implications at this point become very clear. Noting the fact that a large number of the elderly voluntarily claimed that they were not sure whether they have been victims of fraud or abuse, there is an unquestionable need for consumer education. The elderly, first, should be educated as to what constitutes market fraud and abuse. Then, if they get hurt by fraud or need to clarify whether they have been the target of unfair business practices, they should be educated regarding where to turn to get help. Agencies in private, government, and non-governmental sectors that serve consumer advocacy must increase their efforts to reach this audience. In encouraging the elderly to report their victimization experience, an inviting atmosphere needs to be provided. Since many of the elderly avoid to be labeled, they are less prone to report their bad experiences.

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Determinants of Fathers As Primary Child Care Providers in Working Families

A greater percentage of married mothers are in the workforce today than ever before. In spite of that fact fathers were only slightly more likely to be primary child care providers through 1988 than they were 10 years earlier. Why? Why were so few fathers involved in child care when their wife was at her place of employment? This study seeks to answer, if not why, at least what determines the probability that a father *will* be involved. This paper concludes, first, that there was minimal change in the prevalence of fathers as child care providers between 1984 and 1988, and, second, that the two most important factors determining a father's participation as principal child care provider are the number of children in the family and whether the mother works days. Other variables significantly affecting the role of child care by the father are whether the mother works part-time, the level of her income, the age of the father, the mother's attitude toward "traditional" husband/wife roles, ethnicity, and the sex of the child.

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Introduction

A family's options of child care obviously depend heavily on income and access. For many, both income and access to child care are at least partially dependent on public transfers. In order to rationally assess the need for public assistance for child care or family leave, policy makers must fully understand those options. With the increase over the past forty years in labor force participation by mothers in two-parent families, a portion of the knowledge required by policy makers lies in understanding the determinants of fathers as primary child care providers in working families. This study seeks to increase that understanding.

Over the past four decades there has been a dramatic increase in labor force participation rates among mothers in two-parent families. In 1950 only about 12% of married women with a child under age six were in the labor force; by 1985 the figure had more than quadrupled to 50% (O'Connell & Bloom, 1987). As mothers continue to enter or reenter the workforce, three phenomena are occurring. First, employment is extending into evenings and weekends as America becomes more of a 24-hour economy. Second, the need for child care when the mother works is increasing, and third, the pool of female relative care givers is dwindling as these women, too, enter the labor force.

As the percentage of married mothers in the workforce increases, one might expect a corresponding increase in the percentage of husbands who provide primary child care. However, at least through 1988 there was no such concomitant increase. In 1977, in two-parent families 17.1% of fathers of preschoolers were primary care providers (U.S. Department of Commerce, 1987), while in 1988 the figure had only risen to 17.9% (O'Connell & Bachu, 1988).

Previous Research Concerning Fathers as Child Care Providers

While there is a well-established literature on the availability, effects, and quality of child care services in general (e.g., see Clarke-Stewart, Gruber, & Fitzgerald, 1994; Hayes, Palmer, & Zaslow, 1990; Hofferth et al. 1991), only two studies have dealt solely with fathers as principal providers of child care while the mother is at her place of employment. The first was not nationally representative; all mothers were white and middle class and almost all fathers had completed college (Baruch & Barnett, 1981). While the second used a nationally representative sample, the study was descriptive rather than analytical, i.e., it looked only at frequencies of fathers providing child care without considering the effects of other variables (O'Connell, 1993).

Factors cited in previous studies for fathers' involvement in primary child care included a) unavailability of other arrangements, b) costs of nonfamilial care, c) the age of the child, d) the mother's work schedule, and e) the father's employment status and work schedule. Each of the first four variables will be discussed in detail below; but, because in this study *all* mothers are employed, the decision of the family becomes whether the father should seek market employment at all or remain at home and care for the youngest child. In short, this analysis views the father's

decision to work as linked to his decision to care for children while his wife is employed. Therefore, endogenous variables related to his employment decision, such as his work schedule and his hourly wage rate, are eliminated from this study. Exogenous variables, such as his age, his education, and the local unemployment rate, related to his employment decision are included. Any variable which increases the likelihood of paternal employment would decrease the probability of paternal involvement in child care.

Unavailability of Other Arrangements

When mothers work during the evening hours, fewer traditional child care options are available. As Presser (1988) pointed out, there are very few night care options, and fathers might assume a greater share of child care responsibility when the mother works nights.

Child Care Costs

The child care cost factor has two elements. First, families who earn lower incomes use a higher percentage of their income for child care. Casper et al. (1994) found that in 1991 women living in poverty devote about 27% of their income to child care costs versus only about 7% for women living above the poverty level.

The second aspect of the cost factor is that the total dollar costs paid to market care providers are higher as the number of children requiring child care increases. O'Connell (1993) found that families with 2 or more children were more likely than those with only 1 child to have the father serve as principal care provider.

Age of the Child

Results of previous studies regarding the effect of the age of the child on the father's participation in a child care role are mixed. Rossi (1984) argued that men distance themselves from caring for infants and may be more willing to participate when the child is older. In contrast, Hofferth et al. (1991) reported that the percentage of fathers who acted as the primary child care provider was actually *inversely related* to the age of the preschooler when the mother was employed (22.5% for children less than 1, 18.4% for children aged 1 or 2, and 12.1% for children aged 3 or 4). The findings of Casper et al. (1994) supported this result.

Mother's Work Schedule

In previous studies one of the most significant factors determining whether the father was the primary child care provider has been the mother's work schedule. O'Connell & Bachu (1988) found that in 1988 fathers of preschoolers were almost three times more likely to be the primary child care provider of preschoolers if the mother worked part-time rather than full-time. Hofferth et al. (1991), Presser (1988), and Moen (1992) also reported similar results. The less time an activity entails, the more easily that activity can fit into the limited number of hours one has available.

Empirical Measures and Models

The Data

This study utilized the National Longitudinal Survey of Labor Market Experience of Youth (NLSY), a multistage probability sample of 12,686 men and women aged 14 to 21 as of January 1, 1979. The sample frame for this study included only employed, married women who were aged 23 to 26 in either 1984 or 1988 and who had at least one preschool child (aged less than 5). Combining the two cohorts achieved two purposes. First, it permitted the testing of whether any significant change had occurred over the 1984-1988 interval, and second, it doubled the size of the sample.

The Variables

As noted, previous research centered on four factors affecting the probability that the father would be the primary child care provider when the mother was at her place of employment: unavailability of other arrangements (predominantly caused by the mother working nondays), child care costs (both the actual costs as a percentage of income and the number of children requiring care), age of the youngest child, and the work schedule of the mother (full-time versus part-time).

Unavailability of other arrangements. This analysis proxied the availability of other child care arrangements by whether the mother worked days or nights. As previous studies suggested, "night care" for children is limited; therefore, this analysis hypothesized that if the mother worked a day shift, the probability of child care by the father would be lower.

Child care costs. Since the NLSY data do not contain individual expenditures on child care costs, the assumption is made that those costs are constant per child, and the effects of those costs are different depending on income and the number of children in the family. The mothers were separated into two groups by median earned income, one group earned greater than the median and one earned less. The incomes of the 1988 subsample were deflated to 1984 levels by use of the CPI. This study hypothesized that if the mother's earned income was above the median, the father would be less likely to provide primary child care under the assumption that market care of children is a normal good, i.e., that as a mother's income increases she will

purchase more market care for the child.

The hypothesis adopted for this study was that as the number of children increased, so too would the probability of child care by the father. This hypothesis was posited for two reasons. First, it was predicted that as costs of child care increased, i.e., by increasing the number of children requiring care, the family would use less market care and more father care. Second, there are economies of scale extant when the father tends numerous children. His potential lost wages per hour remain constant, but the savings are multiplicative as the number of children increases.

Age of youngest child. The effect of age of the youngest child on the probability of child care by father was hypothesized to be negative. This hypothesis was adopted because of the strong findings of Hofferth et al. (1991) and O'Connell et al. (1994). Both of those studies presented results which indicated that the percentage of fathers acting as primary child care provider was inversely related to the age of the youngest child.

Mother's work schedule. In keeping with the findings of Hofferth et al (1991), O'Connell (1993) and O'Connell & Bachu (1988), this analysis hypothesized a positive effect on the probability of child care by the father if the mother worked part-time. The fewer the hours of child care required of the father, the more able he is to participate.

Other influential variables. This analysis also used a number of other variables thought to influence the probability of child care by the father. One binary variable, mother's attitude toward gender roles, was used to proxy the mother's attitude toward traditional husband/wife roles within the family ("traditional" connoting that the husband is the bread winner and the wife takes care of the home and children). The effect of a positive attitude toward traditional husband/wife roles on the probability of child care by father was hypothesized to be negative. The more the mother adopts total responsibility for a child, the less likely will be the father to participate. None of the previous studies considered the effects of this qualitative variable.

Other variables included in this analysis were rural/urban residence, local unemployment rates, sex of the child, presence of another adult in the household, age of the father, education of the mother, education of the father, the number of weeks worked during the previous six years by the mother (mother's market work experience), and a variable to determine whether there was any difference between the respondent group from 1984 and that from 1988. Potential effects caused by cultural differences were tested by including black and Hispanic as binary variables[2].

Empirical Model and Procedures

The outcome variable, **child care by father**, in this analysis was the probability that a woman, drawn at random from the sample, listed her spouse as the primary child care provider of her youngest child when she was at her place of employment. The predictor variables were those discussed in the previous section.

Because the response variable used in this analysis, child care by father, was dichotomous, a binomial logit estimation procedure was used. In the model, X_i represented the vector of predictor variables for the ith respondent, where $I = 1, 2, ... 583$. Further, π_i represented the conditional probability that the spouse of the *ith* respondent was the primary child care provider, and $1-\pi_i$ the conditional probability that the spouse was not, given the X_is. Then the logistic regression model for the log odds of child care by the father was

$$\log (\pi_i / 1 - \pi_i) = \log O_i = \alpha + (X_i)\beta_j,$$

where β_j represented the vector of logit parameters and O_i was simply the conditional odds of child care by the father given the explanatory variables (Aldrich & Nelson, 1984). The parameter estimates of the logit are presented in Table 1 along with the marginal effects of each variable.

Results and Discussion

The combined unweighted sample included 583 married, employed females who were mothers of at least one preschooler. For the weighted sample, 18.36% of the fathers acted as primary child care providers when the mother was at her place of employment. Using the model set forth above, and at a 5% level of significance, 7 of the 18 variables in the model were significant (Table 1). Due to space restrictions the text will contain a discussion of only those variables found to be significant in either previous literature or in this study. Also, the marginal effects of the variables are shown in Table 1 and will not be discussed in the text.

Unavailability of Other Arrangements

Whether the mother worked days versus nights proved to be highly significant ($\alpha=.01$) and had a negative impact on the probability of child care by father. The sign and the significance of the mother working days is in line with most previous studies, and speaks to the absence of "night care" in the formal child care market.

TABLE 1
Results of the Logit Analysis

Variable	Marginal Effect	Pr > Chi-Square	Odds Ratio
Intercept	-------	0.8104	1.532
UNAVAILABILITY OF OTHER ARRANGEMENTS			
Mother Works Days	-0.24443	0.0001***	0.195
CHILD CARE COSTS			
Below Median Income	0.13187	0.0367**	1.851
Number of Children	0.13949	0.0003***	1.847
Nonwage Income	0.000002	0.7776	1.000
AGE OF YOUNGEST CHILD			
Age of Youngest Child	0.02433	0.2348	1.117
MOTHER'S WORK SCHEDULE			
Mother Works Part-time	0.13658	0.0285**	1.768
OTHER VARIABLES			
Mother's Attitude Toward Gender Roles	-0.12196	0.0951*	0.526
Hispanic	-0.1997	0.0092***	0.307
Black	-0.0295	0.6354	0.855
Urban	0.09409	0.2124	1.471
Local Unemployment Rate	0.03387	0.2354	1.161
Male Child	-0.11103	0.0278**	0.581
Other Adult in Household	-0.087149	0.1876	0.658
Father's Age	-0.01793	0.0365**	0.925
Mother's Education	-0.024335	0.2862	0.900
Father's Education	0.008776	0.6592	1.035
Mother's Market Work Experience	-0.00035	0.9165	1.000
1988 Subsample	0.015715	0.9383	1.021

X^2 99.334 (degrees of freedom = 18) (p=.0001)

Unweighted Number of Observations = 583

* Significant at $\alpha = .10$.   ** Significant at $\alpha = .05$.   *** Significant at $\alpha = .01$.

Child Care Costs

The effect of the mother's income being below the median was significant (α=.05) and increased the probability that the father would be the primary child care provider. This supports the results of previous studies and the hypothesis that market care is a normal good and will increase as the mother's income increases (thereby decreasing the likelihood of child care by fathers). The number of children in the household proved to be highly significant (α=.01), and, as hypothesized, had a positive effect on the probability of child care by the father.

Age of the Youngest Child

Age of the youngest child proved to be an insignificant predictor of fathers' participation as primary child care provider. It also provided a sign inconsistent with the findings of Hofferth et al. (1991) and O'Connell et al. (1994). The positive sign tends to support the argument posed by Rossi (1984) that men tend to distance themselves from caring for infants and may be more willing to participate as the child ages, but, due to the lack of significance, the impact of this variable remains problematic.

Mother's Work Schedule

In keeping with much of the previous research, whether the mother worked part-time was significant ($\alpha=.05$) and positively related to the probability of child care by father.

Other Influential Variables

Whether the respondent was Hispanic proved to have a significant ($\alpha=.01$) and negative effect on the probability of child care by father. Presser (1988) asserted that those who are Hispanic may be less willing to care for their children during their "available" time than their counterparts. O'Connell and Bachu (1988), too, found that in 1988 preschool children of Hispanics were less likely (11.4% versus 15.5%) to have their fathers as primary providers. In the current study, looking at the weighted sample and ignoring the effects of other variables, non-Hispanic fathers were more than twice as likely to be the primary care providers as were Hispanics (18.98% to 8.85%).

Another significant finding from this study was the effect of the sex of the child on child care by the father. If the child was male the father was *less* likely to be the primary care provider ($\alpha=.05$). This result is opposite that of Barnett and Baruch (1987) who found fathers' participation in child care tasks was more likely with male children than with female. Whether the current finding suggests that fathers are more concerned about the safety of preschool daughters than about nurturing the masculinity of preschool sons, or whether fathers distance themselves from sons until their sons are able to interact in a more masculine manner is an issue for further study.

The age of the husband/father was also found to have a significant influence on whether the father provided primary child care ($\alpha=.05$). Whether this is due to an age-based imbalance in the bargaining position between older husbands and younger wives (recall that all mothers are between the ages of 23 and 26), or because younger males are less attached to the labor force and have lower potential wages is problematic.

The attitude of the mother toward traditional husband/wife roles had the expected effect, i.e., the more traditional the mother's views, the less likely the father was to be the primary child care provider. However, the variable was significant only at the 10% level.

Conclusions and Implications

This preliminary multivariate analysis presents the factors which shape the likelihood that a father will be the primary child care provider for his youngest preschool child. Three variables had a significant and positive impact on that probability. Both a greater number of children in the family and the mother's part-time as opposed to full-time employment increased the likelihood that the father would be the primary care provider. Also, if the mother's earned income was below the median, the father was more likely to be involved in child care.

Four variables significantly reduced the probability of child care by father. First is the decreased probability of paternal involvement if the child requiring care is male. This contradicts both the hypothesis and the findings of previous research. Not only is the effect in contrast to the hypothesis and the findings of prior studies, but it is statistically significant. Also, if the mother is Hispanic or works days the probability of child care by father is significantly reduced. It is also reduced as the age of the father increases. Also significant but at a lower level ($\alpha=.10$), the more "traditional" the attitude of the mother toward husband/wife roles, the lower is the probability of child care by the father.

The first conclusion to be drawn from this analysis is that the factors which affect the likelihood that a father will be the primary child care provider for his preschool child are many and diverse: incorporating economic, demographic, cultural, and attitudinal elements. The second is that the two factors most affecting child care by the father are the number of children in the family and the mother's employment status (days versus nights and full-time versus part-time).

The results presented here may or may not be generalizable for mothers/wives younger than 23 or older than 26. Also, the results does not provide insight into whether "dad care" is better than "day care," or whether there is a difference in the *quality* of care given by fathers, say, between daytime hours and nighttime hours.

Future research would be enhanced by expanding the sample frame to include mothers of all ages, by using data from more recent surveys, and by

having data on the cost of market provided child care. Data on the *husband's* views of "traditional" husband/wife roles and on the extent of care provided by the fathers, i.e., whether the father is reading to and nurturing the child or simply "at home" while the child sleeps, would also expand insights into the phenomenon of "dadcare".

Acknowledgments

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Endnotes

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2. A complete description of all variables can be obtained by contacting the author.

Effects and Implications of Employment History on Housing Tenure Status

Employment history was introduced as a new independent variable in a logistic regression model of housing tenure. The results indicate that as the number of different full-time positions held by young adults between the ages of 18 and 34 increase, the predicted probability of home ownership decreases. This study is useful for employers seeking ways to reward employee loyalty by developing incentive programs specifically designed to encourage savings for the purpose of purchasing a home.

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Home ownership is regarded as a strong cultural and family norm in the United States. Morris and Winter (1978) identified tenure as one of five norms indicative of housing satisfaction in families, with ownership being the preferred form of tenure in the United States. Home ownership also denotes an individual's status and prestige in the community as well as a willingness to accept responsibility (Perch, Lindamood, and Hanna, 1979). Further, owning a home serves as a source of savings for families through the accumulation of equity, as well as through the allowance of mortgage interest and real estate tax deductions from annual gross income (Hohm, 1983).

Recent economic trends have altered conditions in the labor market; and changing social trends have influenced the behavior of young people as they enter adulthood. The goals of young adults have shifted from marriage and procreation to extensive human capital development and career advancement. Young adults between the ages of 18 and 34 are changing jobs more frequently, in search of a variety of experiences and higher wages. Holding multiple jobs has also become necessary as young adults attempt to relieve debt accumulated during their years of education (Ratan, 1993).

The primary goal of this research is to provide a better understanding of employment behavior and demographic characteristics of young adults in the 1980s; and how these factors are affecting their housing choices. Employers seeking new ways to reward employee loyalty, reduce turnover, and provide benefits may consider developing incentive programs that encourage employee savings for the purpose of purchasing a home.

Literature Review

Economic Trends

The economic prosperity following World War II provided young workers in the 1950s and 1960s with higher wages and lower interest rates (Levy, 1991). Over 60% of all families in 1960 owned their own home (Coontz, 1992). The United States economy has been in transition since the close of World War II. Services have replaced manufacturing as the largest segment of the United States economy (Fuchs, 1968). In 1993, the service sector accounted for nearly 70% of the total market. The rapid growth of the service sector has altered the climate of the labor market; infusing a large number of part-time and contingent positions into the market. The majority of these positions offer lower wages, fewer benefits, and less stability than traditional manufacturing jobs (Robinson, 1993). The increase of jobs in the service sector played a major role in the decline of wages in the 1980s. Young adults faced a major decline in median family income, real wages, and net wealth. (Mishel, 1993).

The 1980s brought the first decade-long decline in home ownership since the 1930s. The US Census Bureau reported that contributing factors to this decline included an increase in non-family households (one-person households or non-relatives maintaining households), a decrease in home ownership rates of families, and a decline of home ownership rates of adults under the age of 60 (US Bureau of the Census, 1990).

Previous Studies of Housing Tenure

Although there has been extensive research in the area of housing tenure, no previous studies were found (to the best of the author's knowledge) that included employment history as an indicator of housing

tenure. Income, family size, age of household head, and race of head are the variables most typically found to be determinants of home ownership (Li, 1977).

Tenure transition models indicate that there is an optimal point in time when the transition between renting and purchasing a home is most favorable. Transition models suggest that households develop a sense of permanence as the members pass through a series of life cycle milestones. Examples of such milestones are the completion of education and the establishment of a career, marriage or the development of other strong interpersonal relationships between household members, an increasing desire to own a home, and decreased uncertainty of permanent income. Households with limited income or human capital development may have difficulty reaching an optimal tenure transition point (Jones, 1989).

Young adults' expectations of future home ownership were found to be significant in a 1983 study of college students (Hohm, 1983). Hohm found that students who expected to have five or more children, or whose parents owned a home were more likely to want to own their own single-family home in the future.

The changing economic and social trends over the past four decades enable researchers to predict the general conditions young adults will face into the next century. However, new research is needed to analyze the emerging effects of these trends. The purpose of this study is to determine if the frequency at which young adults change jobs negatively effects their likelihood of owning a home. This study introduces employment characteristics in a model of housing tenure in order to capture the effects of changing labor market conditions on housing consumption of persons between the ages of 18 and 34.

Methodology

Modeling the Tenure Decision

The theoretical modeling of the tenure decision suggests that a household will elect to own if the utility from home purchase is greater than from renting. Tenure transition models further recognize that the vast majority of households initially rent and wait for the optimal time of tenure transition to occur (Jones, 1989). The factors determining the length of this waiting time will depend upon, among other things, initial non-human wealth, human capital, and transition costs (Jones, 1989). Households with little initial non-human wealth and high transition costs may reach the tenure transition point later than their counterpart.

Conventionally, tenure choice decision is estimated by a logit model:

$$P\,(own) = p\,(Y, Z) \qquad (1)$$

where the likelihood of a household owning (P(own)) is a function of income and a Z-vector of household attributes. Household-specific transactions costs and tastes are embodied in the household characteristics included in the Z-vector. This study adopts the logit model for the analysis of ownership status. The estimation in this study focuses on households' observed choices between rent-or-own alternatives.

Method of Analysis

A logistic regression analysis is used to determine factors affecting the likelihood of owning a house. Logit is the appropriate method to investigate what variables are related to a binary dependent variable (Maddala, 1992, pp. 327). The coefficient estimates can be further used to calculate predicted probabilities for any combination of values of the independent variables (Maddala, 1992, pp.334).

Data

This study utilized data from the third wave of the Survey of Consumer Finance (SCF), conducted in 1989 (ICPSR release, February 1993). Included in the data are economic assets and liabilities of households, composition of household budgets, employment history of the respondent and spouse/partner, as well as attitudes toward consumer credit issues and their relationship with financial institutions. The 1989 SCF sample was drawn from a dual-frame; standard multistage area-probability acquired 2,277 households from the 48 contiguous United States. A high-income sample of 866 households was also selected using tax data. A multiple imputation techniques was used to create the 1989 data file, which included five sets of data. This study used the first data set for the empirical analysis.

Sample

In this study, a sub-sample of 438 households were chosen for the empirical analysis; included in the sub-sample were respondents between the ages of 18 and 34 employed either full or part-time at the time of the survey. Sixty-eight respondents who reported being unemployed at the time of the sample were omitted from this analysis. The 1989 SCF defines the respondent as "the most knowledgeable" about the household's

financial affairs, or the family member who is the most "economically dominant"; for example, serving as the primary wage earner or homeowner (Kennickel, 1989).

Measurement of Variables

The dependent variable used in this study is the current tenure status of the respondent's primary dwelling. Housing tenure (TENURE) is defined as a dichotomous variable; equal to 0 if the respondent owns the primary dwelling and equal to 1 if the respondent rents the primary dwelling. The 1989 SCF reports the ownership status of the respondent in six categories: 1) the respondent owns, 2) the respondent rents, 3) the respondent owns a condominium, 4) the respondent owns as part of a cooperative, 5) the respondent owns a townhouse or apartment, and 6) the respondent neither owns nor rents the primary dwelling. All categories indicating ownership were combined to form one categorical variable indicating ownership. The category of rent was unchanged. The inappropriate category containing 39 respondents who neither owned nor rented their primary dwelling was omitted from the analysis.

Table 1.
Independent Variables.

Variable	Code
Age of respondent (continuous)	AGE_R
Race of respondent (dummy)	NONWHITE
Marital status (dummy)	SINGLE
Household size of respondent (continuous)	HHSIZE
Years of education of respondent (continuous)	EDU
Employment history of respondent (continuous)	HISTORY
Employment status of respondent (continuous)	WKINDEX
Household gross income obtained from all sources in 1988 (continuous)	INCOME88
Household financial assets (continuous)	ASSETS
Squared term of financial assets (continuous)	ASSETSQ

Independent Variables

Table 1 contains a listing of the independent variables included in the model and their respective codes. Detailed descriptions of the categorical variables as well as the variables measuring employment history, employment status, and financial assets follow the table.

Race of Respondent. The 1989 SCF classifies respondent race into four categories: White, Black, Hispanic, and Other. The three latter categories were combined to form one classification, NONWHITE, which was used in the model. This category represented less than 25% of the total sample; over 75% of the sample reported being White. White respondents formed the reference category for this variable.

Marital Status. Marital status of the respondent was reported in six categories in the 1989 SCF: married, living with partner, separated, divorced, widowed, and never married. Respondents who reported being married or currently living with a partner were combined to form the reference category for this variable. All other respondents who reported being single, separated, widowed, or divorced at the time of the survey were combined to form the variable, SINGLE. This category contained about 35% of the sample.

Employment Characteristics. The 1989 SCF questioned respondents about their employment history based on their employment status at the time of the survey. First, respondents were asked if they were currently working full-time for pay, part-time for pay, or not currently working for pay. Respondents were then asked to answer the questions in the section that described their current employment status. The questions were divided into three sections: those currently working full-time for pay, those currently working part-time for pay, and those respondents who were not currently working for pay. This study examined the responses of those currently working for pay; respondents indicating that they were not working for pay at the time of the survey were omitted.

Identical questions relating to employment history were asked in both the full and the part-time section. In each respective category, respondents were asked to report the total number of different employers for which they worked in full-time positions lasting one or more years since the age of 18. Responses to the identical questions in both the full and part-time sections were combined to create the variable, HISTORY, indicating the number of different employers for whom each respondent in the sample has worked at full-time status for at least one year. Respondents were also asked to recall the status[2] (full- or part-time) at which they were employed for all or most of the year since the age of eighteen. If currently working full-time at the time of the survey, respondents were asked to report the actual number of years they had spent working in any full-time position for all or most of the year. In a separate question, respondents reported the actual number of years spent working in part-time positions for all or most of the year. Responses were totaled across each category

yielding the total number of years employed in full-time and part-time positions, respectively, since the age of 18.

The status variable, WKINDEX, is a ratio of employment status and age. A value of 1 was assigned to each year the respondent was employed at full-time status; a value of 0.5 was applied to each year the respondent had worked part-time. Therefore; in this analysis, one year of part-time work is equivalent to one-half year of full-time work. The sum of the two variables equals the total number of years the respondent has been employed at full-time status. This value is divided by the age of the respondent, less 16 to determine the number of years the respondent is beyond the age of 18.

$$WKINDEX = \frac{[(yearsft)+(yearspt \times 0.05)]}{(AGE\_R - 16)} \quad (2)$$

where: YEARSFT = the number of years respondent has worked full-time all or most of the year since the age of 18.

YEARSPT = the number of years respondent has worked part-time for all or most of the year since the age of 18.

AGE_R = actual age of respondent

Financial Assets. The variable, ASSETS, was created by adding the actual amount of the assets held in selected financial vehicles of both the respondent and his/her spouse. The following accounts were chosen for this analysis: main checking account, individual retirement or Keogh account, money market funds, certificates of deposit, passbook savings, mutual fund, government and corporate bonds/bills, and publicly traded stock. The values reported in each of the accounts listed were mutually exclusive. Pensions or retirement savings held in mutual funds were not included in mutual fund amounts. Home equity was not included. The squared term of the ASSETS variable was also included in the model to measure a possible curvilinear relationship between assets and the probability of owning a home.

Results and Discussion

Demographic Characteristics

Over forty-four percent of the sample owned their home at the time of the survey. In this study, eighty percent of respondents were male; one-half of all respondents were at least 30 years of age. Home ownership rates increased with age. There were no homeowners under the age of 22, while fifty percent of respondents over the age of 30 owned a home. Overall,

the ratio of renters to owners in the sample was consistently about 5 to 1.

Sixty-five percent of the sample were married or living with a partner at the time of the survey. The number of years of formal education received by the respondents in this study ranged from 2 to 17 years. Ninety-two percent of respondents reported being employed full-time. The work index variable indicated that on average, the respondents in this study worked at 71% of full-time status for all or most of their working years since the age of 18. The number of different employers with whom respondents were employed at full-time status for one or more years ranged from 0 (not yet worked a year in a full-time position) to 15 different employers. On average, the young adults in this study had worked full-time for at least a year for 2.6 different employers since the age of 18. The median household income reported in this study was $26,000; median assets held in financial accounts was $2,000. Table 2 contains mean values and standard deviations of the continuous variables used in the model

Table 2
Descriptive Results of the Independent Variables.

Variable	Mean	Standard Deviation
AGE_R (years)	29	3.9
HHSIZE (members)	3	1.7
EDU (years)	13.5	2.5
HISTORY (# of jobs)	2.7	1.9
WKINDEX (% full-time)	.70	0.19
INCOME88 (dollars)	64,605	190,394
ASSETS (dollars)	36,770	157,865

Logistic Regression Results

Six of the ten independent variables included in the model were significant ($p<0.05$) factors in describing housing tenure status. Table 3 contains the coefficients of the independent variables included in the model.

The goodness of fit of the model was calculated through a set of formulas used to compute the pseudo R-squared for a logistic regression analysis (Maddala, 1992, p.334). The pseudo R-squared indicates that 43.89% of the variation of the dependent variable, housing tenure status (TCHOICE), was explained by the independent variables included in the model.

The variables indicating the respondent's race, level of education, and work index value were not significant in this analysis. The remaining variables indicating the respondent's age, marital status (single),

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household size, gross household income, and financial assets; respectively, were each significant (p<0.05), controlling for all other variables. The negative parameter coefficient found in the marital status variable suggests that respondents who were not categorized as

Table 3
Analysis of Maximum Likelihood Estimates.

Variable	DF	Coeff.	S. E.	p>X²
INTERCEPT	1	-6.34	1.30	0.0001
AGE_R	1	0.13	0.04	0.0009
NONWHITE	1	-0.08	0.30	0.7673
SINGLE	1	-0.60	0.30	0.0473
HHSIZE	1	0.37	0.10	0.0003
EDU	1	0.03	0.05	0.4997
HISTORY	1	-0.12	0.06	0.0612
WKINDEX	1	0.57	0.78	0.4588
INCOME88	1	9.41E-05	2.89E-05	0.0011
ASSETS	1	0.000051	0.00001	0.0001
ASSETSQ	1	-3.59E-10	8.55E-11	0.0001

being married are less likely to own a home than the married /cohabiting respondents in this analysis. The predicted probability of home ownership for a single respondent was 35%. The young adults in this study who were not married were nearly 15% less likely to own a home than those respondents who were married/cohabiting.

The variables measuring employment status (WKINDEX) and employment history (HISTORY) were not significant the standard 95% confidence level. The HISTORY variable was negatively related to the probability of home ownership. It was not significant at a strict 95% confidence level; however, due to the narrow margin (1%), this variable should be investigated further in future research to determine if employment history is negatively related to the likelihood of owning a home.

When controlling for all other variables, the age of the respondent, household size, and income were each positively related to housing tenure. As the respondent ages by one year, the predicted probability of owning a home increases 3%; as the respondent's household size increases by one member, the predicted probability of owning a home increases 9%; and as income increases by $10,000, the predicted probability of owning a home increases 2%. The positive relationships of these variables in this study are consistent with previous studies of housing tenure status where income, family size, and age of head are found to be primary determinants of home ownership (Li, 1977).

In this analysis, financial assets have a positive coefficient; the squared term of financial assets has a negative coefficient, indicating that financial assets exhibit a curvilinear relationship with housing tenure. Initially, as finical assets increase, the likelihood of owning a home also increases but will begin to decrease as assets increase past a certain point. The maximum assets reported by a respondent was over 1.5 million dollars; the second highest was $100,000. In this analysis, financial assets and home ownership were positively related until assets reached $100,000. The probability of owning a home dropped sharply after $100,000 in assets were accumulated. The predicted probability of owning a home for those respondents with the mean value of assets in this study was 44%. For those respondents who had less than $2000 of financial assets (median value = $1967), the predicted probability of home ownership ranged from 11.4% (no financial assets reported) to 12.5% ($2000 in assets).

Conclusion

This study examined the employment history characteristics of 438 young adults between the ages of 18 and 34 to determine if employment status and the number of employers have a negative effect on the probability of owning a home. The results of this analysis are consistent with previous models of housing tenure, based on demographic characteristics of respondent age, income, and family size. Gender and education level of respondent did not exhibit significant relationships with housing tenure in this model.

This study introduced employment history and employment status as new independent variables in a model of housing tenure. However, employment status of the respondent did not have a significant effect in determining housing tenure in this model. Employment history of the respondent showed a tendency toward a negative relationship with housing tenure but was not strong enough to be considered as a significant variable in this analysis.

This study was designed to examine demographic, financial, and employment data of young adults in the 1980s. The findings indicate that income and financial assets had the greatest effect on the likelihood of the young adults in this sample of owning a home. Therefore, educating young adults in the areas of basic personal finance and financial planning may influence their desire to save so that they may purchase a home. Employers can also facilitate the development of this saving behavior in young employees by developing incentive programs that encourage employee loyalty as well as savings for the purpose of buying their first home

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Endnotes

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2. Employment status was self-reported in the 1989 SCF as either full-time or part-time status. The actual number of hours worked per week are unknown and the SCF makes no assumption about the minimum hours of full-time status.

Parental Marital History and Child Measured Cognitive Development

This study uses the Peabody Individual Achievement Test scores of children from the 1990 National Longitudinal Survey to test how parental marital status affects the measured cognitive development of children. Results show that children of separated and never married mothers scored lower, but not after controls for income were included. A change in the mother's marital status did not significantly decrease the child's test scores. Few differences were found between those whose mothers were always single, and those whose mothers were always married.

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Introduction

Nearly half of all children born today can expect to spend some time in single-parent homes (McLanahan & Sandefur, 1994). Previous research has established that adult children of single-parent families attain less education than children from two-parent families. Less is known about how parental marital history affects *child* outcomes. The objectives of this study are to compare measured cognitive development of children by the marital histories of the children's parents through the use of the Peabody Individual Achievement Test for Math, Reading Recognition, and Reading Comprehension. The first objective explores how the current marital status of a parent affects measured cognitive development. The second explores how family income may influence measured cognitive development. The final objective attempts to isolate how stress caused by marital status changes may deter a child's measured cognitive development[2].

Literature Review

Much of the empirical literature examining the effects of single-parenthood on children has focused on the educational outcomes of these children as adults. Past studies have linked single-motherhood to lower educational attainment for children, both in terms of years of schooling completed and in high school drop-out rates (Astone & McLanahan, 1991; Beller & Chung, 1992; Duncan, Featherman, & Duncan, 1972; Hill, Duncan, Augustyniak, & Ponza, 1986; Krein & Beller, 1988; McLanahan, 1985; Shaw, 1982).

One theory argues that these results are a function of lower incomes of one-parent families (Rainwater and Yancey, 1967. Income constrains the amount of goods and services a parent can purchase to aid in the development of the child, such as computers, toys, or college tuition. Several studies have found that income can account for a significant portion of the lower educational attainment of children from single-parent families. Hill et al. (1986) found this to be true for white sons and daughters, but not for black sons and daughters. McLanahan (1985) found that a $10,000 reduction in income decreased the probability of single-parent children being enrolled in school at age seventeen by 17%. Similar results were found for white daughters living in single-parent households by Shaw (1982). Finally, Beller and Chung (1992) found that income could explain some of the differences in years of completed schooling of children who had lived in a single-parent family.

These results are robust for child cognitive development measurements as well. Hill and O'Neill (1994) found that children whose mother had never married or who had ever separated or divorced did significantly worse on the PPVT assessment. However, when income was considered, these effects were no longer significant.

Besides being constrained by income, single parents are also constrained by time. Parental interaction stimulates a child's cognitive development. All else equal, one parent has less time available than two parents.

The employment statuses of a child's parents affects both the amount of resources and the time available to invest in the child. Hill and O'Neill (1994) have explored this trade-off in relation to the child's achievement, finding that without controlling for income, a mother's employment was positively related to the child's achievement. Controlling for income yielded a negative and significant effect for the mother's employment status. The authors argued that the first result indicates that earnings from work contributed to

the financial well-being of the family. The second result implies that time at work is time not spent with the child, which offsets the positive effect of more income.

A second theory addressing lower educational attainments of single-parent children is the stress theory, which postulates that stress from a marital disruption negatively affects a child's well-being. A study examining parenting practices before and after a marital disruption indicated that parents spent less time monitoring schoolwork, supervising, and communicating with the child (Astone & McLanahan, 1991). Hetherington, Cox & Cox (1978) found that parent-child relations were most stressed one year after divorce, but later stabilized.

The above literature review has focused on differences between single-parent and two-parent families. There are, however, many types of single-parents. Income and stress levels may vary by marital status type and may change when marital status changes. Some studies have taken these factors into account. McLanahan (1985) found that white children living with a separated parent were less likely to graduate from high school than children living with either a married, divorced, or widowed mother. For blacks, only children of widowed parents were significantly less likely to graduate. Measuring years of education attained, Beller & Chung (1992) found that children of separated parents completed the fewest years of schooling, followed by children whose parents never married and those whose parents divorced. The same study found that children of never married parents were least likely to complete high school. Finally, only children with divorced parents were significantly less likely to enter college after high school graduation.

What remains unresolved in the literature is how *child* outcomes vary by single-parent marital status, and may be influenced by marital status changes. This study will explore these issues, first, by determining how current marital status affects achievement, second, by relating past marital history to achievement, and finally, by comparing achievement of children whose parents have always been single, to those whose parents have always been married. The following section describes the empirical models and measures that are used.

Empirical Models and Measures

The child outcomes of interest are the standardized scores on three parts of the Peabody Individual Achievement Test (PIAT); Math, Reading Recognition, and Reading Comprehension[3]. Weighted least squares regression is used. The unit of analysis is the child. Each regression includes a measure of the past

or current marital status of the child's mother, as well as other measures of the child's background and socio-economic status.

Data for the analysis come from the National Longitudinal Survey of Youth - Mother/Child file. The mothers of the children were first interviewed in 1979 when they were between the ages of 14 and 21[4]. Follow-up surveys to the 1979 sample of 12,686 have been given each year. Beginning in 1986 and every other year since, the children of these mothers took the PIAT tests. This study utilized the 1990 interviews. In 1990, 5,803 children of the female respondents were interviewed. The NLSY oversampled blacks, Hispanics, and economically disadvantaged whites.

The sample for the analysis includes only those children over the age of five who lived with their mothers in the survey year[5]. Children of widows are also excluded. The final sample for the PIAT Math and Reading Recognition tests uses 2388 observations. The sample size for the Reading Comprehension test is 1694.

Each model regresses one of the three test scores on the four different marital status variables, income and poverty measures, and other background controls. Because of their shared experience as minorities in the United States, estimates for blacks and Hispanics will be separate from whites.

The first two models use dummy variables for the current marital status of the child's parent; divorced, separated, or never married. The first model excludes total family income and poverty status. These variables are then included in the second model.

The third model uses a dummy variable for whether or not the marital status of the child's mother has ever changed since the birth of the child. In this model, the type of change is not specified. It is expected that marital status changes cause instability in the lives of family members, and, therefore, are detrimental to the child's achievement.

The fourth model includes a measure of the number of marital status changes that the mother has experienced since the birth of her child. Those never experiencing a marital status change are coded as zero. It is expected that more marital changes create more instability and hence, lower achievement for the child.

The final model uses a subsample of the full sample. This subsample excludes all children whose mothers have *never* experienced a marital status change. A dummy variable for single-parent marital status is then included[6]. Those whose mothers have always been married are the reference group. Because no one in the sample has experienced a marital status change, any negative effects of single-parenthood must be attributed to something other than the change in marital status.

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A set of background variables is included in each model. These include the sex of the child, the age of the child, the age of the mother, the number of adults in the household, the number of children in the household, the highest grade of schooling completed by the mother, the number of years since the last marital status change, and the average number of hours the mother works per week, which is included as a proxy for the mother's available time. This proxy is expected to be negatively associated with the child's test scores. It is expected that the more children there are in a household, the less attention each receives. The mother's attained schooling is expected to be positively associated with the child's scores. Family income is expected to be positively associated with the child's development. Poverty status is expected to have a negative relationship.

Estimation Results

Results for each of the five estimations are presented in Table 1. Because the variables of primary interest are the marital status and income variables, only coefficients for those variables will be reported. Other variables will be discussed, but are not reported.

The first model tests the hypothesis that children from single-parent families perform worse on tests that measure cognitive development than children from two-parent families. Within the group of single-parents, it was hypothesized that the children whose mothers were never married or separated would do worse than those who were divorced. Little support for this hypothesis was found for white children. Only those whose mothers were currently separated did significantly worse than the reference group of married, and only on the Math test. The signs for the never married dummies were negative but insignificant. The signs for the divorced group were positive but insignificant. The hypothesis is supported in the sample of minority children. Those whose mothers were currently separated or never married did significantly worse than those whose mothers were married. Children from divorced families did worse, but not significantly.

Other variables had signs as hypothesized. The education level of the mother was significant and positive for all tests. Test scores significantly decreased as the number of children in the household increased. For white children who took the two reading assessments, the number of adults in the household was positively association with the test scores. Females in the sample scored significantly better than males for all reading tests. The age of the child was negatively associated with all the test scores of minority children.

The age of the mother was significantly and negatively associated with the math scores of the minority sample.

The second model included a variable for family income and a dummy for whether or not the family's income was below the poverty level. Results show that income has a significant impact on these scores, and that negative effects of separated and never married marital statuses were no longer significant for minority children, when income was controlled. For white children, the negative effect of having a separated mother still exists beyond income differences. However, there is a significantly positive association between having a currently divorced mother and the Reading Recognition scores of white children, once income is controlled. This result is surprising and somewhat difficult to interpret. Having a divorced mother may be quite different from having a separated mother. This may be because separation is less stable in terms of legal settlements and living arrangements.

Total family income is positive and significant for all tests for minority children. It is also positive and significant for the Reading Recognition scores of white children. Poverty status, as expected, has a significantly negative effect upon the Math and Reading Recognition scores of the minority sample, as well as the two reading test scores of the white sample. Controlling for income, it was expected that the number of hours the mother worked would pick up the negative effect of having less time. However, the variable was insignificant for all, except for the math scores of black and Hispanic children. This result is contrary to the result found by Hill and O'Neill (1994).

The last three models explore the role of stress from marital status changes. In the third model the dummy for whether or not the child's mother ever changed marital status since the child was born, was not significant for white children. For black and Hispanic children, the scores for the Math and Reading Recognition tests were positively associated with ever experiencing a marital status change. This model also controls for income and poverty status, both of which are significant for the minority sample. Only poverty status was significant for the white sample. It is important to note that the type of marital status change is not specified. Changes could be from a single-parent status to a married status and vice versa.

The number of marital status changes was positively and significantly associated with all test scores of minority children. For the sample of whites, the test scores were negatively associated with the number of marital status changes. None were significant.

The final model examines whether the source of stress is having only one parent, not necessarily a

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Table 1
Regression results for key variables by ethnicity

Model 1 - Current marital status with no income controls

	Blacks and Hispanics (N=1379)			Whites (N=1009)		
	Math	ReadR	ReadC	Math	ReadR	ReadC
Never Married	-1.94	-2.70	-3.19	-0.61	-1.87	-1.17
	(2.03)*	(2.66)*	(2.97)*	(0.34)	(0.95)	(0.45)
Separated	-2.39	-2.84	-3.14	-4.01	-2.86	-4.15
	(2.16)*	(2.42)*	(2.35)*	(2.25)*	(1.47)	(1.85)
Divorced	-1.20	-1.85	-1.69	0.57	1.73	2.21
	(1.04)	(1.51)	(1.24)	(0.48)	(1.34)	(1.42)
R²	0.09	0.14	0.18	0.09	0.13	0.13
F-value	12.27	20.89	19.63	8.42	13.10	8.66

Model 2 - Current marital status *with* income controls

	Blacks and Hispanics			Whites		
	Math	ReadR	ReadC	Math	ReadR	ReadC
Never Married	-0.46	-0.78	-1.69	0.21	0.25	0.17
	(0.46)	(0.74)	(1.37)	(0.12)	(0.12)	(0.06)
Separated	-0.77	-0.77	-1.39	-3.71	-2.01	-3.57
	(0.67)	(.064)	(1.01)	(2.06)*	(1.04)	(1.57)
Divorced	0.32	0.06	0.03	1.07	3.07	2.83
	(0.27)	(0.05)	(0.02)	(0.87)	(2.30)*	(1.77)
Total Income	0.00007	0.00008	0.00010	0.00002	0.00005	0.00001
	(3.27)**	(3.53)**	(3.64)**	(0.68)	(2.04)*	(0.03)
Poverty	-2.29	-3.33	-1.20	-1.54	-3.57	-3.67
	(2.39)**	(3.28)**	(1.03)	(1.21)	(2.59)**	(2.16)*
R²	0.17	0.11	0.19	0.09	0.14	0.13
F-value	21.30	12.76	18.58	7.34	12.48	7.77

Model 3 - Control for whether the mother's marital status ever changed.

	Blacks and Hispanics			Whites		
	Math	ReadR	ReadC	Math	ReadR	ReadC
Ever Changed	1.99	2.32	1.73	-0.93	-0.93	0.73
	(2.01)*	(2.22)*	(1.43)	(0.77)	(0.71)	(0.46)
R²	0.11	0.17	0.19	0.08	0.14	0.13
F-value	15.42	26.65	21.93	8.20	14.09	8.56

Model 4 - Control for the number of times the mother's marital status changed.

	Blacks and Hispanics			Whites		
	Math	ReadR	ReadC	Math	ReadR	ReadC
Number of Changes	0.67	0.71	0.82	-0.04	-0.18	-0.22
	(2.27)**	(2.25)**	(2.36)**	(0.14)	(0.54)	(0.62)
R²	0.11	0.17	0.20	0.08	0.13	0.13
F-value	15.53	25.66	22.33	8.15	14.06	8.57

Model 5 - Subsample of children whose mother's marital status never changed.
Includes a control for whether the child's mother was always single or always married.

	Blacks and Hispanics (N=563)			Whites(N=421)		
	Math	ReadR	ReadC	Math	ReadR	ReadC
Always single	0.36	0.26	-4.63	-1.16	-1.46	1.52
	(0.25)	(0.18)	(2.50)**	(0.41)	(0.47)	(0.32)
R²	0.06	0.14	0.17	0.09	0.07	0.09
F-value	3.79	8.58	7.95	4.00	2.98	2.35

Coefficients are reported with corresponding t-values (absolute) below the coefficients
*significant at .05 level   **significant at .01 level

marital status change. For this test, the sample is broken into a subsample of only those children whose mothers never experienced a marital status change since the child was born. This sample includes 563 minority children and 421 white children (397 and 264 respectively for the Reading Comprehension assessment).

The regression results show little difference in the measured cognitive abilities of children whose mothers have always been single and those whose mothers have always been married. The only significant negative effect was found for the Reading Comprehension test of the minority subsample. All other coefficients for the dummy variables were insignificant. Income seems less important in this model than in previous models. This result supports the theory that stability in the family arrangement and family income may be crucial in determining outcomes of children.

In the final model, the education level of the mother was positively associated with the test scores of children. The number of children in the household was negatively associated with the reading recognition scores of black and Hispanic children, and for all test scores of the Non-Hispanic white sample. The number of hours the mother worked was negatively associated with the math scores of the white sample. Other control variables had results similar to those in the previous models.

Discussion

Results suggest that lower incomes associated with never married and separated statuses can account for much of the negative effects of being in a single-parent family, especially for black and Hispanic children. For white children with separated mothers, however, negative effects still exist for the math test. This result suggests that there is a difference between having a separated mother and having a divorced mother.

The impact of income is striking given how young the children are. One would expect income to be important for later educational outcomes, which depend more on the availability of family resources for further schooling. Some studies have found that differences in measured cognitive ability by income are less profound at younger ages (Ceci, 1990). Further work could explore just how income and marital status are entwined in the educational outcomes of these children.

Results of the two models that test the stress theory find little support for this theory. A marital status change was positively associated with test scores for minority children, and showed no relationship with the white sample. The number of marital status changes was also positively associated with higher test scores for

minority children. This result is puzzling. One explanation may be that the category of marital status changes includes changes from single to married. This may be a positive change for the child because there is now an adult male in the household. Observed changes could also be from separated to divorced statuses, which is predominantly a change in legal status. The implications of this type of change might be different than other changes. Another explanation, in the case of going from married to divorced, may be that the nature of the marriage was so bad, that when the husband left, the child's emotional or physical state improved.

Results of the last model suggest that there is little support for the theory that there is stress simply from having only one parent. Those who have lived with an always single-mother did no worse than those who lived with an always married mother, except in the case of the Reading Recognition scores for minority children. This result is not surprising once income and a measure for work hours of the mother are controlled. Other studies have found that stability is very important for child outcomes, whether there are two parents or just one (Block, Block, & Gjerde, 1986).

A general implication of these results is that after controlling for income, poor adult outcomes of children of one-parent families may not necessarily be attributed to impaired cognitive development. It may be true that these test scores have less to do with the probability of dropping out of school or the educational attainment of children than we think. It is also possible that marital status effects accumulate over a lifetime and are, therefore, more detectable for the adult outcomes of children.

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Endnotes

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2. It should be noted that the terms measured cognitive development and achievement are being used somewhat ambiguously. A discussion of what the tests measure and how success on these tests relates to later life outcomes is beyond the scope of this research.

3. These tests are widely used measures of a child's achievement and are considered reliable and valid measures (Baker, Keck, Mott, & Quinlan, 1993). Raw scores for all tests were standardized by the age of the child.

4. In 1990 these women were between the ages of 25 and 32, meaning that their childbearing is incomplete. The sample of children represents only two-thirds of a completed birth cohort to women ages 25 to 32 in 1990 (Baker et al., 1993).

5. Tests were administered only to those children over five. The user's manual warns about the stability of the Reading Comprehension scores of children under the age of seven (Baker et al., 1993). For this reason, only those over seven are used for this test.

6. This category is dominated by those whose mother never married.

Income Elasticities For Clothing Expenditure:
A Comparison Among Different Occupational Groups

The 1991-1992 Consumer Expenditure Survey was used to estimate income elasticities for clothing expenditure among different occupational groups, controlling selected demographic and socioeconomic factors. Significant relationships were found between income and clothing expenditure. Clothing expenditure was income elastic among certain occupational groups. In this study, education and region were negatively related to clothing expenditure. Income elasticities of clothing expenditure by different occupational groups can be used by retailers and producers developing marketing strategy.

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Clothing, like food and shelter, is a basic and necessary element of human life. According to Engel's law, as people get richer, they spend a smaller proportion of their total income on necessities. However, previous studies have shown that this "law" was not always correct (Monroe, 1974; Winakor, 1989). Clothing may be considered either a moderate luxury, or may fall between a luxury and a necessity (Houthakker, 1957; Dardis, Derrick, & Lehfeld, 1981; Winakor, 1989). Clothing not only protects the body; it is also used as a tool to attain higher levels of career achievement, especially by women (Ericksen & Sirgy, 1985, 1989). In addition, one's clothing influences other's perception and thus may contribute one's self-acceptance and self-esteem (Gibbins,1969; Gibbins & Gwyn,1975)

Recently, the increase in the labor force participation of women especially married women and women with children is a significant trend affecting the apparel industry. Dardis et al. (1981) found that households with a working wife allocated more income to clothing than did households with a non-working wife.

Dardis et al. (1981) found that clothing expenditure was elastic when total expenditures were used as a proxy for permanent income. Clothing expenditure increased more than one percent as income increased one percent. It is important for retailers and producers to know how much people will change clothing expenditure as their income increases and to target consumers effectively. Family economists are also interested in understanding clothing expenditure patterns among different occupational groups.

The purpose of this research is to examine income elasticity for clothing consumption among different occupational groups. The 1991-92 Consumer Expenditure Survey by the Bureau of Labor Statistics was used in this study.

Literature Review

Most of the previous studies used cross-section data from the Consumer Expenditure Survey (CES) to analyze clothing expenditure. In these studies, price was assumed to be constant; that is, every consumer faced the same price. In most studies, income was positively related to clothing expenditure. Either current income or total expenditure was used in these studies to analyze the relationship between household income and clothing expenditure (Houthakker & Taylor, 1970; Dardis et al., 1981; Frisbee, 1985; Winakor, 1989; Norum, 1989). Both Houthakker and Taylor (1970) and Dardis et al. (1981) compared the use of total consumer expenditures as a proxy for permanent income and disposable income as income measures and examined the effect of each measure on clothing expenditure. Both studies found that total expenditures served as a better explanatory variable, probably because families had more control over their expenditures than their income in the short run. In addition, Prais and Houthakker (1971) suggested that total consumption expenditure was shown to give a better fit than disposable income in models designed to predict expenditures for consumption categories such as clothing. However, Prais and Houthakker (1971) found that there was a bias in the use of total expenditures as an explanatory variable because it included the dependent variable. But, given the small proportion of total expenditures, they concluded the bias was not a problem. Overall, when total expenditure was used as an explanatory variable, clothing expenditure was found to be income elastic (Dardis et al., 1981; Frisbee, 1985; Winakor,1989; Bryant & Wang,1990). In contrast, clothing expenditure was income inelastic when disposable income was used (Dardis et al, 1981; Norum, 1989).

Few studies have examined income elasticities of clothing expenditures among different occupations. Most studies examined the effect of occupation on clothing expenditure (Dardis et al., 1981; Horton & Hafstrom, 1985; Norum, 1989). Dardis et al. (1981) found that being a salaried manager, clerical worker, or sales worker was significantly and positively related to clothing expenditure while being in the non-working and retired group was negatively related to clothing expenditure. Norum (1989) found that white-collar workers spent more on clothing than did blue-collar workers. Due to the increase in female labor force participation, many studies also focused on the effect of wife's occupation and employment status on clothing expenditure. Additionally, these results suggest that the wife's occupation significantly affected clothing expenditure (Dardis et al., 1981; Nelson, 1989; Norum, 1989).

Age, gender, family type, social class, marital status, and location were included in the clothing expenditure model to control for differences in taste and preference related to clothing expenditure. Most studies investigated the impact of the number of family members on clothing expenditure by using some combination of age and gender categories. After controlling for income, a positive relationship between family size and clothing expenditure has been found (Dardis et al., 1981; Frisbee, 1985; Hager & Bryant, 1977; Norum, 1989; Deweese & Norton, 1991). However, using family size as a continuous variable, Horton and Hafstrom (1985) discovered family size had no significant effect on clothing expenditure in female-headed families, but did have a significant effect on clothing expenditure in two-parent families.

Age of household head has been measured as a categorical variable (Dardis et al, 1981; Hager & Bryant, 1977; Norum, 1989) or a continuous variable (Frisbee, 1985; Horton & Norton, 1991) in previous studies analyzing clothing expenditure. A nonlinear relationship between age and clothing expenditure has been found; clothing expenditure increased as the age of respondents increased, but at a decreasing rate (Dardis et al., 1981; Frisbee, 1985; Norum, 1989; Deweese & Norton, 1991).

Households with married heads were found to spend less on clothing than did other households (Dardis et al., 1981; Norum, 1989). Furthermore, Lino (1994) found that never-married mothers spent the lowest dollar amount on clothing among single-mother and married-couple families with children. With respect to gender, male headed households spent less on clothing relative to female headed households (Frisbee, 1985).

After controlling for income, clothing expenditure and education were consistently found to be positively related (Dardis et al, 1981; Frisbee, 1985; Hager & Bryant, 1977; Norum, 1989; Horton & Hafstrom, 1985). Additionally, the difference in clothing expenditure between households headed by high school graduates and heads with other education levels was much greater in Norum's (1989) study than that of Dardis et al.'s (1981).

In studies by Dardis et al. (1981) and Norum (1989), urban households spent more on clothing relative to rural households. But, no significant effect of residence on clothing expenditure was found by Hager and Bryant (1977).

Dardis et al. (1981) examined the effect of race, and found that blacks spent more money and devoted a larger budget share to clothing than did whites. However, no significant relationship between clothing expenditures and race was found by either Hager (1977) or Norum (1989).

Theoretical Model

Demand theory was used for household expenditure on textiles and clothing (Dardis et al., 1981 Frisbee, 1985; Norum, 1989). According to this theory, consumers satisfy their wants within limited resources among available goods and services. Engel curves were used to estimate the relationship between expenditure and income, and price was assumed to be constant. In this study, multiple regression analysis was used to estimate the income elasticity of clothing expenditure, controlling for selected socioeconomic and demographic variables. Given the nonlinear relationship between income and clothing expenditure found in previous studies, the double logrithmic function was used in this study (Dardis et al.,1981; Frisbee, 1985; Norum, 1989). Income elasticity of expenditures was the percentage change in expenditure associated with a one percent change in income. The empirical model used in the study was:

$$\text{Log } C_j = a + b \log Y_i + \Sigma c_j X_{ji} + e_i, \quad i = 1, 2, ..., n$$

where: Log C_i = log of clothing expenditure of household i, Log Y_i = log of total expenditures of household i, X_{ji} = other independent variables relating to household i (family size, age, gender, education, occupation of both heads and spouses, marital status, race, and region), e_i = error term, and n = number of observations.

Sample

Data for this study were from the interview component of the 1991-92 Consumer Expenditure Survey (CES), collected by the Bureau of Labor Statistics. The data provided information on income, expenditures, and major sociodemographic

Table 1.

Definition of Independent Variables (n = 1988)

Variable	Mean
Log total expenditures (continuous)	$ 29413.96
Age of reference person (dummy)	
less than 34	
21%	
35-54	41%
55-64	13%
greater than 64*	25%
Family size (continuous)	2.7
Education of reference person (dummy)	
less than high school	22%
high school*	31%
some college	23%
college graduate	24%
Occupation of reference person (dummy)	
professional & managerial	23%
sales & technical	15%
self-employed	7%
service	6%
others (farming, forestry, fishing, craft, repair, labors, operators, and armed forces)	19%
retired & non-working*	30%
Occupation of spouse (dummy)	
professional & managerial	11%
sales & technical	15%
self-employed	11%
service	6%
others (farming, forestry, fishing, craft, repair, labors, operators, and armed forces)	5%
no spouse	40%
retired & non-working*	21%
Marital status of reference person (dummy)	
married	62%
not married* (widowed, divorced, separated, and never married)	38%
Gender of reference person (dummy)	
female	34%
male*	66%
Race of reference person (dummy)	
black	11%
non-black* (white, Asian American Indian, Aleut, and Eskimo)	89%
Region (dummy)	
urban northeast	20%
urban midwest	24%
urban south	25%
urban west*	20%
rural	11%

* reference variable

characteristics of consumer units. Cases selected for this study were those who had completed four consecutive quarters interview and who had complete income information. In this study, there were 1988 consumer units, representing a cross section of noninstitutional consumer units in the United States.

Variables

The dependent variable in this study was household expenditure on clothing. It included the total dollar amount of household expenditure on clothing and clothing services (dry-cleaning, laundry, and alteration). Average household clothing expenditure was $ 1171.73 per year. In this study, to capture income elasticity, log of clothing expenditure was used.

Ten independent variables were included in this study, income, age, family size, gender, marital status, education, occupation of both household head and spouse, race, and region. The definition of independent variables is given in Table 1.

Results and Discussion

A regression analysis was performed using total expenditure as a proxy for permanent income, age, family size, education, occupation, marital status, gender, race, and region as the predictor variables and clothing expenditure as the criterion variable. Regression results are presented in Table 2. The adjusted R-square value that indicated the goodness of fit of the model was found to be 17 percent in this study. Although this value was small, the probability of F-test (0.0001) showed that the predictor variables included in this model had a significant influence on log of clothing expenditure at the 0.1 level. Consistent with previous studies, the income proxy was positively and significantly associated with clothing expenditure (Dardis et al., 1981; Frisbee, 1985; Horton & Hafstrom, 1985; Norum, 1989).

The double-log model was used to indicate income elasticity of clothing expenditure. When income increased one percent, clothing expenditure increase 4.17 percent, other variables being held constant. Therefore, clothing expenditure was shown to be income elastic. Compared to Dardis et al.'s study (1981), the magnitude of income elasticity of clothing expenditure in the current study was higher. The difference may be due to changes over time. Dardis et al. used data from 1972 to 1973 and this study examined data from 1991 to 1992.

Income elasticities for clothing expenditure were calculated for the occupational groups that were significantly related to clothing expenditure level in this

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Table 2.

Household Expenditures on Clothing: Results of The Regression Analysis

Variable	CoefficientL
Log of total expenditures	**4.17**
Age (greater than 64)	
less than 35	**1.12**
35-54	
1.02 55-64	0.46
Family size	0.10
Education (high school)	
less than high school	**-0.48**
some college	-0.37
college graduate	-0.34
Occupation of respondents	
(retired & non-working)	
income X professional & managerial	**-2.17**
income X sales & technical	**-2.04**
income X service	**-2.18**
income X others (farming, forestry,	**-1.44**
fishing, craft, repair, labors,	
operators, and armed forces)	
income X self-employed	-0.67
Occupation of spouse	
(retired & non-working)	
income X professional & managerial	-0.65
income X sales & technical	**-1.24**
income X service	-0.84
income X others	-0.19
income X self-employed	-1.34
income X no spouse	-0.57
Occupation of respondents	
(retired & non-working)	
professional & managerial	**21.66**
sales & technical	20.29
service	**21.63**
others	13.85
self-employed	5.73
Occupation of spouse	
(retired & non-working)	
professional & managerial	6.78
sales & technical	**13.08**
service	8.75
others	2.16
self-employed	14.14
no spouse	5.83
Marital status (not married)	
married	-0.33
Gender (male)	
female	0.03
Race (non-black)	
black	0.48
Region (urban west)	
urban northeast	-0.32
urban midwest	-0.11
urban south	0.23
rural	**-0.85**
Adjust R- square 0.17	
F value 11.74	

Results in bold print are statistically significant at the 0.1 level.

study. These occupational groups were households whose respondent had a professional or managerial occupation, or who was employed in the service or "others" occupational group, and households whose both head and spouse had sales or technical occupation. These results appeared to support Dardis et al.'s (1981) finding that being a salaried manager and sales worker was significantly associated with clothing expenditures. In this study, to know the net effect of income elasticities for different occupational groups, the raw regression coefficient on income must be added to the raw regression coefficient on the interaction term. The interaction term presented the interaction between logarithmic income and regression coefficient of being each occupational group. Results of income elasticities for clothing expenditure among different occupational groups are given in Table 3. For example, the case of professional and managerial group was as follows:

$$4.17 + (-2.17) = 2.00$$

This tells us that, given a one percent increase in income, households whose respondent was in a professional or managerial occupation would spend 2.00 percent more on clothing. Households whose respondent had a sales or technical occupation would spend 2.13 percent more on clothing, whereas households whose respondent was employed in service would spend 1.99 percent more on clothing. Households whith a respondent in the "others" occupation would spend 2.73 percent more on clothing. And, households whose spouses had a sales or technical occupation would spend 2.93 percent more on clothing.

Consistent with previous studies, a non-linear relationship between age and clothing expenditure was found (Dardis et al., 1981; Frisbee, 1985; Norum, 1989). Although there was a significant and positive relationship between age and log of clothing expenditure for the less than 34 age group and the 35-54 age group, there was nonsignificant relationship between age and clothing expenditure for the 55-64 age group. Respondents under 35 years of age spent 1.12 percent more on clothing than did respondents over the age of 65. Furthermore, respondents aged from 35 to 54 spent 1.02 percent more on clothing than did respondents over age 65. Expenditure on clothing declined as the age of respondents reached 55 and over. This may reflect the accumulation of inventory over the later life stages.

Dardis et al. (1981) and Norum (1989) noted a significant and positive relationship between education and clothing expenditure. In this study, a significant and negative relationship between education and log of clothing expenditure was found for the less than high school group compared to the high school graduate

Table 3.

Results of Income Elasticities for Clothing Expenditure Being Different Occupational Groups

Variable	Income Elasticity
Occupation of respondent	
(retired & non-working)	
professional & managerial	**2.00**
sales & technical	**2.13**
service	**1.99**
others	**2.73**
self-employed	3.50
Occupation of spouse	
(retired & non-working)	
professional & managerial	**3.52**
sales & technical	**2.93**
service	**3.33**
others	**3.98**
self-employed	2.83
no spouse	**3.60**

Results in bold print are statistically significant at the 0.1 level

group. Respondents having less than a high school education spent 0.48 percent less on clothing than did respondents having high school education.

Family size in this study was not significantly related to log of clothing expenditure. This result was supported by Horton and Hafstron's finding (1985) that family size was significantly related to clothing expenditure for two-parent families but not for female-headed families. However, the finding in previous studies that family size was significantly related to clothing expenditure may be the result of using a different measure of family size (Frisbee, 1985; Hager & Bryant, 1977; Norum, 1989).

In contrast to previous studies (Dardis et al., 1981; Frisbee, 1985; Norum, 1989), marital status was not significantly related to clothing expenditure. This inconsistency may be because the not married category included widowed, divorced, separated, and never married. Members of these groups may behave differently from one another. Nether gender nor race (Norum, 1989) had no impact on clothing expenditure in this study.

Rural households spent 0.85 percent less on clothing than did households in the urban west locations. This was the only significant result for residence.

Conclusions and Implications

In this study, clothing expenditure was income elastic. In addition, the magnitude (4.17) indicated that clothing was considered to be a luxury good. Working in certain occupational groups was significantly related to log of clothing expenditure. These occupational groups were: respondents in the professional and managerial group, respondents in the service group, respondents in the "others" group which included farming forestry, fishing, craft, repair, labors, operators, and armed forces, and respondents and spouses who were in the sales and technical group. For these five different occupational groups, clothing was also shown to be income elastic. Among respondents, work in the "others" group was associated with greater income elasticity than that associated with work in the professional and managerial group, in the sales and technical group, or in the service group. Therefore, a one percent change in income of respondents working in the "others" group would be associated with a greater than one percent change in clothing expenditure and the magnitude of this change would be greater than that observed for respondents working in the professional and managerial group, in the sales group, or in the service group. In addition, spouses who worked in the sales and technical group had a relatively high income elasticity for clothing expenditure.

Effects of socioeconomic and demographic characteristics on log of clothing expenditure varied. Those who were less than 35 and those aged from 35 to 54 spent relatively more on clothing than those aged 65 and older. Spending by those aged from 54 to 64 was not significantly different from spending by the 65 and older group. Compared to respondents having a high school education, respondents with less than high school education spent relatively less on clothing. Households in rural locations spent relatively less on clothing compared to households in the urban west. In this study, family size marital status, gender, and race was not significantly related to log of clothing expenditure.

Study results have implications for clothing producers and retailers. Consistent with economic theory, clothing expenditure was income elastic; as income increased by one percent, survey participants would change their clothing expenditure by more than one percent. Direction and amount of change were found to be related to age, education and occupation. Noting this information can help clothing producers and retailers develop an effective market strategy. For example, senior college students may need practical a formal clothing for a new job. Given their education level, they will apply likely for certain jobs, such as, sales, technical work, or service work. And they are in an age and occupational group likely to spend more on clothing. Thus, clothing producers and retailers should target to ads to this group.

For future study, it may be helpful to reclassify the occupation of respondents and spouses by gender to better understand gender differences in clothing expenditure. Also, in this study, no significant

relationship was found between family size and clothing expenditure. In future studies, it might be helpful to use dummy variables to measure the age and gender of family members. Also, marital status could be divided into married, never married, formerly married to capture effects on log of clothing expenditure.

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On the Performance of Asset Allocation Mutual Funds

This manuscript is based on the award winning 1996 ACCI Master's Thesis.

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Over the past two decades the financial markets have undergone a dramatic change, not only in the types of securities offered, but also in the services available. Due to its innovative nature, the mutual fund industry has been one of the most expansive areas, growing in both number and complexity. This growth has made mutual fund investment a time consuming and complex task, thus reducing the investment ease that mutual funds are known for. With over 5300 funds and 33 different investment objectives to choose from, instead of simplifying investing decisions, mutual funds have actually added to the problems individual investors face in trying to select the investment(s) that most appropriately fit their needs.

One particular class of mutual funds, called an *asset allocation* fund, profess to have the answer to investors problems. Since 1991, over 82 new asset allocation funds have been created. These funds represent 63% of all asset allocation funds that Morningstar Inc. follows.[2] Today, 130 asset allocation funds manage almost $40 billion dollars worth of assets.

Asset allocation funds claim to offer investors an "all-in-one" investment by employing an *active* management strategy and diversifying across as many broad asset classes as possible. Opposed to a *passive* or "buy-and-hold" management strategy, these actively managed funds utilize *asset allocation*, a strategic decision making process, to determine the optimal mix of shareholder's resources across a wide variety of international and domestic securities. This process involves the periodic rebalancing of these allocations which, based on forecasts of near-term relative market and asset class valuations, are made in an attempt to provide investors with high total return, no matter what market conditions prevail.

However, as with any investment, the bottom line for investors is performance. In order for investors to make informed and effective decisions regarding the potential an investment has in helping them attain their financial goals, they need quality information concerning the ability of the investment to fulfill its performance claims. The purpose of this study is to address some of the performance issues related to asset allocation mutual funds, and provide investors with the information they need to make such decisions.

Theoretical Framework

Mutual funds, in general, and asset allocation funds, in particular are a type of asset called a "managed asset." Their performance is attributable, in part, to the skills of the management of the fund. Moreover, investors pay annual fees for this management which directly reduces the returns they earn on their investment. Performance evaluation must, therefore, take into account not only the return performance of these funds, but also the contribution that management has to this performance. In order to justify their use of active management and the fees paid by shareholders for this management, asset allocation funds must not only earn returns in excess of those earned by a passively managed fund, but must also demonstrate that their active strategies contribute to this performance. The ability of these funds to fulfill these obligations is focus of this study.

The framework used in constructing the performance measures employed in this study is the Capital Asset Pricing Model (Sharpe 1964), (Lintner 1965a), and (Mossin 1966).[3] The CAPM provides a set of predictions concerning the equilibrium expected returns on risky assets. "The CAPM provides the framework for determining the relationship between expected return and risk for individual securities as well as portfolios" (Farrell 1983, p.61). The CAPM takes the following form:

$$E(r_i) = r_f + [E(r_m) - r_f]B_i + e_i \qquad (1)$$

where $E(r_i)$ is the expected return on security (i), r_f is the risk-free rate, $E(r_m)$ is the expected return on the market portfolio, B_i is the risk associated with security (i), e_i is the error term.

In words, the CAPM states that the expected rate of return for security (i) is equal to risk free rate plus a

"risk premium" that is proportional to the amount of risk incurred by holding the security. The risk premium of a security is the return above the risk-free rate that compensates investors for assuming the additional risk associated with that security. In general, the risk-free rate is assumed to be that of the 90 day United States Treasury bill and is the minimum compensation investors would expect for simply foregoing consumption. The beta coefficient, B_i, is the "factor of proportionality" which determines the magnitude of the risk premium earned by a security. The beta of a security can be calculated as follows:

$$B_i = o_{im} / o^2m \qquad (2)$$

where o_{im} is the covariance between the return on security (i) and the return on the market (r_m), and o^2_m is the variance of the return on the market. By measuring the sensitivity of a security's returns to changes in the rate of return on the market, B_i, is used to quantify the risk of a security.

Data and Empirical Analysis

The return performance of 47 asset allocation funds was evaluated using two CAPM based, risk-adjusted measures of return performance as proposed by Sharpe (1966) and Treynor (1965). Then, following Henriksson & Merton (1981), a CAPM based parametric model was employed to evaluate the contribution that the active management strategies used by these funds have on this performance. A listing of the asset allocation mutual funds studied in this thesis appears in table (1).

The monthly return data of 47 mutual funds listing *asset allocation* as their objective, the S&P 500 composite index, and the 90 day U.S. Treasury bill were acquired from the Morningstar Inc. Mutual Funds Ondisc database. Sixty monthly (total) returns were used, beginning in October 1989 and ending September 1994.[4]

The choice of a uniform 60 months was made to ensure that the performance of each fund is assessed through equivalent market conditions and to increase comparability across funds. Additionally, the choice of a five year sample is based on the observation that capital markets are cyclical. A five year sample allows the performance of the funds to be evaluated through a wide variety of market conditions. During the sampling period, the 47 funds were exposed to 2 distinct up (bull markets) and 2 distinct down (bear markets).[5] As these funds claim that their active management strategies allow them to take advantage of changing market performances, these contrasting market conditions

provide a the perfect backdrop to assess their ability to do so.

Measures of Return Per Unit of Risk

Treynor index. Due to the broad asset diversification offered by asset allocation funds, it has been suggested by some asset allocation managers that their funds provide a solid foundation from which a portfolio of mutual funds could be constructed (Zimmerman 1993). That is, an asset allocation mutual fund would provide a stable core from which investors could add more specialized and aggressive funds to while further diversifying their portfolios. To evaluate this potential, the Treynor Index is calculated for each fund.

The Treynor Index employs the beta of a portfolio, B_p, as the relevant measure of risk. The theory behind this is, as securities are added to a portfolio the firm-specific risk is reduced up to the point where additional securities do not further reduce the overall portfolio risk. At this point, the relevant measure of the risk of the portfolio is the systematic risk as represented by B_p. Systematic risk or "market risk" is the undiversifiable risk that an investor must bear due to fluctuations in the overall market. A portfolio's beta is the weighted average of the beta's of its component securities, where the weights are the proportion of wealth in asset (i).[6] A security being considered for inclusion in an investor's portfolio should, therefore, be evaluated on the impact it has on a portfolio's systematic risk B_p. The Treynor Index is written as:

$$T_p = [E(r_p) - E(r_f)]/B_p \qquad (3)$$

where $E(r_p)$ is the average return on portfolio (p), $E(r_f)$ is the average return on the 90 day U.S. Treasury bill, $E(r_p) - E(r_f)$ is the average risk premium over the sample period, B_p and is the beta calculated over the sample period.

The Treynor Index is a performance measure sensitive to "depth" (Haugen 1993). Depth is a measure of the magnitude of risk premium captured for each unit of risk that is assumed by the fund. The Treynor index adjusts the risk premium captured by the portfolio by the amount of risk, B_p, that was taken to achieve it.

Using the time-series CAPM developed by Black, Jensen, and Scholes (1972), the beta coefficient, B_p, for each asset allocation fund is estimated.[7] Treynor indices are then calculated for each individual asset allocation fund and the S&P 500 composite index. The Treynor index calculated for the S&P 500 composite, T_m, is used as the passive benchmark. $T_p > T_m$ indicates that, on average, the performance of fund (p) is above that of a passively managed portfolio. Similarly, $T_p \leq T_m$

indicates that, on average, the performance of fund (p) is equal to or below that of a passively managed portfolio.

Sharpe index. Often dubbed "all-in-one" investments, asset allocation funds would lead individual investors to believe that a single portfolio could provide for all their investment needs. This would have great appeal to first-time investors and/or investors with limited means.

In order to evaluate each asset allocation fund as if it were an individual investor's sole investment, the Sharpe Index for each fund is calculated Sharpe (1966). Investors choosing to place their entire investment in a single portfolio will be concerned with the total variability or risk of the fund. The Sharpe Index, therefore, uses the standard deviation of a portfolio's returns as its relevant measure of risk. The Sharpe Index is written as:

$$S_p = [E(r_p) - E(r_f)]/o_{rp} \qquad (4)$$

where $E(r_p)$ is the average return on portfolio (p), $E(r_f)$ is the average return on the 90 day U.S. Treasury bill, $E(r_p) - E(r_f)$ is the average risk premium of the portfolio over the sample period, and o_{rp} is the standard deviation of returns earned by the portfolio over the sample period.

The Sharpe Index is a performance measure sensitive to "breadth" (Haugen 1993). Breadth is a measurement of the risk premium earned per unit of risk exposure. Similar to the Treynor index, the Sharpe index adjusts the risk premium captured by the portfolio by the amount of total risk, o_{rp}, that was taken to achieve it.

A Sharpe index is calculated for each of the 47 asset allocation funds as well as the S&P 500 composite. As with the Treynor index, the Sharpe index of the S&P 500, S_m, is used as a passive benchmark from which the performance of the individual asset allocation can be compared to. $S_p > S_m$ indicates that, on average, the performance of fund (p) is above that of a passively managed portfolio. Similarly, $S_p \leq S_m$ indicates that, on average, the performance of fund (p) is equal to or below that of a passively managed portfolio.

Tests of Forecasting Ability

Asset allocation funds generally employ two forms of asset allocation strategies, *policy* asset allocation and *tactical* asset allocation. Policy asset allocation establishes the appropriate "normal" asset mix of the portfolio that is consistent with investor's objectives, time horizon, and risk tolerance. Tactical asset allocation involves active departures from this policy mix that are instituted based on economic forecasts. These near-term forecasts of relative market

and asset class values result in the tilting of the policy mix within their prescribed ranges. This tilting involves the redistribution or reallocation of portfolio assets which is accomplished by identifying securities appropriate to these forecasts. Implicit in the use of tactical asset allocation is the assumption that fund management possesses such forecasting abilities.

Henriksson and Merton (1981) suggest that the management of portfolios chooses among "discretely different systematic risk levels for the portfolio." In particular, the portfolio will have two risk levels, one for when the market is up (bull markets) and one for when the market is down (bear markets). It is assumed that portfolios with management that possess this *market timing* ability will hold a larger portion of the market portfolio when the return on the market is high. The portfolio beta, B_p, will therefore, increase as the return on the market, r_m, increases. Henriksson and Merton specify the following parametric model to test for the presence of this type of forecasting ability in portfolio management:

$$r_{pt} - r_{ft} = a_p + B_1 x_{1t} + B_2 x_{2t} + e_{pt} \qquad (5)$$

where r_{pt} is the return per dollar on portfolio (p) at time (t), r_{ft} is the return per dollar on the risk-free asset at time (t), r_{mt} is the return on an index used as a proxy on the market portfolio at time (t), $x_t = r_{mt} - r_{ft}$, $x_{1t} = \min[0, x_t]$, and $x_{2t} = \max[0, x_t]$.

The coefficients of the regression can be interpreted as follows; When $x_t > 0$, $x_{1t} = 0$ and $x_{2t} = x_t$. In this case the coefficient B_2 can be interpreted as the risk level for bull markets. When $x_t < 0$, $x_{1t} = x_t$ and $x_{2t} = 0$. In this case the coefficient B_1 can be interpreted as the risk level for bear markets. Using this specification, a test for the presence of market-timing ability would be written as:

$$H_o; B_2 > B_1 \quad \textit{Market Timing Ability}$$

and

$$H_a; B_2 \leq B_1 \quad \textit{Lack of Market Timing Ability}$$

Additionally, *security selection* ability, or the capacity to identify securities which comply with the current *tactical* asset mix, can be identified by the intercept parameter of the specification. In this model, a_p is portfolio (p)'s expected excess return if the market's excess return is zero. The CAPM predicts that the average value of a_p is expected to be zero. Therefore,

Table 1

Return Per unit of Risk Measures

Fund	Name	Sp	Sp Rank	Tp	Tp Rank	Bp
1	General Securities	0.1198	27	0.613	22	0.82224***
2	SoGen International	0.3209	2	1.6989	4	0.32317***
3	Strong Investment	0.104	33	0.5520	24	0.35755***
4	Permanent Portfolio	0.0242	44	-0.1288	45	0.30513***
5	Bruce	-0.0194	43	-0.1229	44	0.83487***
6	USAA Investment Cornerstone	0.111	32	0.5188	27	0.53460***
7	Hancock Freedom Gold \ Govt B	0.0644	38	0.4529	36	0.25546***
8	Flex-funds Growth	0.0361	41	0.1958	43	0.49729***
9	Connecticut Mutual Total Return	0.1900	9	0.7216	16	0.62686***
10	United Gold \ Government	0.0299	42	25.410	1	0.00639
11	Dreyfus Captal Value A	0.0621	47	0.9308	8	-0.16577***
12	Blanchard Global Growth	0.0439	40	0.2039	42	0.52667***
13	Phoenix Total Return A	0.1863	11	0.7225	15	0.58456***
14	Stagecoach Asset Allocation	0.2021	7	0.8923	9	0.45096***
15	PaineWebber Asset Alloc B	0.0521	39	0.2203	41	0.54028***
16	Bailard Biehl Diversa	0.095	35	0.4924	31	0.65462***
17	Smith Barney Strategy Inv B	0.1276	3	0.4864	33	0.74152***
18	Oppenheimer Asset Allocation A	0.1337	21	0.5579	23	0.47628***
19	Elfun Diversified	0.1693	14	0.6727	17	0.49658***
20	Invesco Total Return	0.1817	12	0.6687	18	0.63663***
21	Prudential Allocation Strategy B	0.1116	30	0.4257	38	0.66719***
22	Prudential Allocation Managed B	0.165	15	0.6219	20	0.54251***
23	MIMLIC Asset Allocation A	0.1225	25	0.4732	34	0.65309***
24	Princor Managed	0.0901	36	0.3447	40	0.68863***
25	FBL Managed	0.3822	1	4.5309	2	0.09285***
26	Fortis Advantage Asset Alloc	0.1217	26	0.4881	32	0.63657***
27	Carillon Capital	0.1814	13	0.7521	13	0.49510***
28	EBI Flex	0.1412	19	0.5340	25	0.71920***
29	Seafirst Asset Allocation	0.1338	20	0.5016	28	0.53963***
30	Overland Express Asset Alloc A	0.1886	10	0.8129	11	0.47446***
31	API Total Return	-0.0363	46	-0.1546	46	0.81487***
32	API Special Markets	-0.1284	48	-0.6178	48	0.73269***
33	Comstock Partners Strategy O	0.152	17	3.4869	3	0.07381**
34	Dean Witter Managed Assets	0.1247	24	0.4929	30	0.65734***
35	Flex-funds Muirfield	0.1293	22	0.7612	12	0.42789***
36	Dean Witter Strategist	0.1192	28	0.4459	37	0.92107***
37	Vanguard Asset Allocation	0.1997	8	0.7481	14	0.70943***
38	Fremont Global	0.1147	29	0.4666	35	0.53724***
39	MetLife-State St Managed Ast A	0.1501	18	0.6176	21	0.53548***
40	Fidelity Asset Manager	0.2755	4	1.2164	7	0.48698***
41	Crabbe Huson Asset Allocation	0.1614	16	0.6502	19	0.54703***
42	Quest for Value Opportunity A	0.2091	6	0.8226	10	0.92274***
43	Merrill Lynch Global Alloc A	0.3129	3	1.4010	5	0.49182***
44	Merrill Lynch Global Alloc B	0.2725	5	1.2264	6	0.48710***
45	Merriman Asset Allocation	0.0976	34	0.5262	26	0.31806***
46	PaineWebber Global Grth\Inc A	0.0826	37	0.5012	29	0.50684***
47	North American Asset Alloc C	-0.034	45	-0.1572	47	0.53616***
48	Standard & Poor's 500 index	0.1114	31	0.4003	39	1.00000

*** Significant at lambda < .01 and **Significant at lambda < .05.

portfolio managers that are successful in identifying mispriced securities would have an a_p consistently greater than zero. The subsequent test for this ability would be written as:

H_o; $a_p > 0$ *Security Selection Ability*

and

H_a; $a_p \leq 0$ *Lack of Security Selection Ability*

To test for the presence of market timing and security selection abilities, this study uses the two factor model

specified in equation (5).

Results

Table 1 contains the results of the calculated Treynor and Sharpe indices using equations (3) and (4), respectively. Overall, the results of the two measures were quite similar.

When the returns were adjusted for systematic risk, B_p, 38 funds or 79% had Treynor measures above that of the S&P 500 composite index (passive benchmark), while 9 had indices that were below. Of the 9 funds below the S&P 500, 5 had negative Treynor indices indicating that, on average, they performed worse that the risk-free asset. Similarly, when the returns were adjusted for total risk, o_{rp}, 30 funds or 66% had Sharpe measures above that of the S&P 500 and 17 had measures that were below. Of these 17 funds, 6 had negative Sharpe indices, again, indicating performance worse than that of the risk-free asset..

Of equal importance are the results of a delineation of the Treynor and Sharpe indices of the top 5 and 10 funds as ranked by each index. Comparing the aggregate mean return and beta, B_p, of the top 10 funds as ranked by the Treynor index with those of the S&P 500 index revealed that, collectively, the larger Treynor index is, on average, a result of a 10% increase in mean return and a 62% decrease in risk (as measured by B_p). Moving from the top 10 to the top 5 ranked funds, the increase in the Treynor measure is due to a 50% decrease in risk despite a 7% decrease in mean return. Similarly, comparing the mean monthly return and standard deviation of the S&P 500 composite index to the aggregate mean monthly return and standard deviation of the top 10 funds as ranked by the Sharpe Index, revealed that, collectively, their higher ranking above the S&P 500 was due to a 17% increase in mean return and 39% decrease in standard deviation. Again, moving from the top 10 to the top 5 ranked funds, the higher Sharpe ranking was due to 3% increase in mean return and a 15% decrease in standard deviation. These results would imply that although these funds were able to, on average, earn higher expected returns that the S&P 500 index, the dominant factor in their higher risk adjusted performance was their ability to reduce portfolio risk.

Table 2 contains the results of the two factor model of market timing and security selection abilities (equation 5). The results show little evidence to support the idea that, collectively, the management of asset allocation mutual funds have the ability to either time the market or accurately perform security analysis.

When testing for the presence of security selection ability it was found that 14 funds exhibited positive security selection ability, $a_p > 0$, and 33 funds exhibited negative security selection ability, $a_p \leq 0$. Of the 14 funds with positive coefficients, 11 were statistically significant while none of the funds with negative coefficients were significant. These results would suggests that a number of asset allocation funds (23%) do possess security selection ability and is consistent with the findings of Chan & Chen (1992).

When testing for the presence of market timing ability it was found that 14 of the 47 funds exhibited positive market timing ability $B_2 > B_1$, and 33 funds exhibited negative market timing ability, $B_2 \leq B_1$. It should be mentioned, however, that only 4 of the 14 funds demonstrated statistically significant positive market timing ability.

Additionally, of the 33 funds with negative market timing ability, 26 had B_1 and B_2 that were significantly different from each other. These results would indicate that only a handful (8.5%) of asset allocation fund management actually possess the ability to forecast broad market movements. More interesting though is the idea that a majority (55%) of these funds actually allocate their portfolios in a manner that is contrary to market timing. These findings are also in agreement with those of Chan & Chen (1992).

Looking more closely at the individual funds that exhibit positive market timing ability revealed no clear similarities. A comparison of the funds that possess security selection and positive market timing abilities, however, provided additional insights into management ability; Of the 4 funds that demonstrated positive market timing ability, all had negative intercept coefficients, a_p, although none were significant. Moreover, of the 11 funds that exhibited significant security selection ability, 9 funds had $B_1 > B_2$ significantly different from each other. Consistent with Henriksson (1986), there appears to be a trade-off between market timing and security selection abilities.

Conclusions

Although a majority of the 47 actively managed funds examined out performed the passively managed S&P 500 composite index on a risk-adjusted basis, this performance is not a result of the management possessing the forecasting abilities needed to facilitate active management strategies such as market timing and security selection. Furthermore, the results suggest that there exists a trade-off between the two abilities: Funds that are able to earn superior returns through asset selection tend to have negative market timing ability. If one ability comes at the expense of the other, this draws

Table 2
Tests of Forecasting Ability

Fund	Parameter	Estimate	Fund	Parameter	Estimate	Fund	Parameter	Estimate
1	ap	-0.26147	17	ap	0.15586	33	ap	0.057079
	B1	0.64247***		B1	0.74883***		B1	-0.1575
	B2	0.96402***		B2	0.71430***		B2	0.00928
2	ap	0.71586***	18	ap	0.60517*	34	ap	0.58383
	B1	0.45819***		B1	0.67161***		B1	0.41019**
	B2	0.26558***		B2	0.35149***		B2	0.81331***
3	ap	-0.04542	19	ap	0.42675	35	ap	-0.42771
	B1	0.39381***		B1	0.55247***		B1	0.30308*
	B2	0.44765***		B2	0.42985***		B2	0.76976***
4	ap	-0.0288	20	ap	0.24051*	36	ap	-0.21767
	B1	0.36375***		B1	0.65813***		B1	0.8164***
	B2	0.26495***		B2	0.60858***		B2	1.00711***
5	ap	1.13464	21	ap	0.1095	37	ap	0.27587
	B1	1.47537***		B1	0.70338***		B1	0.69420***
	B2	0.31893		B2	0.63562***		B2	0.67235***
6	ap	0.42934	22	ap	0.30341	38	ap	0.40049*
	B1	0.67777***		B1	0.55273***		B1	0.68097***
	B2	0.40994***		B2	0.53157***		B2	0.41372***
7	ap	-0.03042	23	ap	-0.16521	39	ap	0.24901
	B1	0.24560**		B1	0.56680***		B1	0.54895***
	B2	0.26751***		B2	0.72325***		B2	0.46874***
8	ap	-0.5346	24	ap	-0.15081	40	ap	0.93049***
	B1	0.28379		B1	0.65418***		B1	0.61656***
	B2	0.80892***		B2	0.70315***		B2	0.40857***
9	ap	0.62733**	25	ap	0.54543*	41	ap	0.29238
	B1	0.71351***		B1	0.08702***		B1	0.60395***
	B2	0.55819***		B2	0.07353*		B2	0.49103***
10	ap	0.62039	26	ap	0.04718	42	ap	0.34272
	B1	0.18366		B1	0.63110***		B1	0.88994***
	B2	-0.15265		B2	0.63796***		B2	0.92790***
11	ap	-0.40651	27	ap	0.39118*	43	ap	0.95497***
	B1	-0.57470**		B1	0.57503***		B1	0.65790***
	B2	-0.08663		B2	0.41747***		B2	0.32301***
12	ap	0.32629	28	ap	-0.67743	44	ap	0.85904***
	B1	0.70126***		B1	0.49004***		B1	0.65399***
	B2	0.38513***		B2	0.90936***		B2	0.32279***
13	ap	0.68818**	29	ap	0.29969	45	ap	0.0898
	B1	0.66067***		B1	0.58120***		B1	0.33640***
	B2	0.45555***		B2	0.51940***		B2	0.30025***
14	ap	0.41122	30	ap	0.54445	46	ap	0.61787
	B1	0.53102***		B1	0.66967***		B1	0.73024***
	B2	0.37810***		B2	0.40294***		B2	0.31510**
15	ap	-0.0988	31	ap	0.1339	47	ap	0.22292
	B1	0.55178***		B1	1.10085***		B1	0.78317***
	B2	0.53061***		B2	0.65397***		B2	0.38996***
16	ap	0.74385	32	ap	-0.24182			
	B1	0.92413***		B1	0.96020***			
	B2	0.42341***		B2	0.58362***			

***Significant at lambda < .01, **Significant at lambda < .05, and *Significant at lambda < .10.

into question the use of such active management strategies and the size of the fees levied on shareholders for this type of management.

The findings, however, do not indicate that the managers of these funds are without any skill. Their risk-adjusted performance above the passively managed S&P 500 is a testament to their ability to increase expected return while reducing risk. Their ability to reduce portfolio risk can be attributed, in part, to the broad asset composition of asset allocation funds. By expanding

their portfolio holdings to include foreign debt and equity, U.S. debt, real estate and precious metals securities, asset allocation funds are able to exploit the lack of correlation between securities returns and reduce the risk levels of their portfolios.

This study also reaffirms the principals of diversification and suggests investors should keep in mind the correlation structure of markets. The implication here is individual investors themselves should concentrate on establishing a portfolio that contains as many different asset classes as possible. Investors should look to diversify their portfolios with not only domestic equity, debt, and money market securities but also with foreign and other types of securities that are not tied to the U.S. market and offer some protection against its fluctuations.

The results also indicate that because a number of these funds do live up to their claims of providing investors with good returns at lower-than-average risk levels, investors could potentially benefit by purchasing these funds. However, due to the fact that 23% more funds had risk-adjusted performance above the S&P 500 when ranked by the Treynor Index than by the Sharpe Index, the results imply that, collectively, these funds would make better components of an investor's portfolio, as opposed to an "all-in-one" investment. Recall that a portfolio's risk, Bp, is a weighted average of the B_i's of its component securities. Due to their ability to lower systematic risk levels, B_p, the inclusion of an asset allocation fund in an individual investor's portfolio would have the affect of reducing the volatility of a portfolio of funds. Furthermore, by including these funds as a component of their portfolios, investor's can diversify their portfolio across fund managers and reduce some of the risk associated with the uncertainty of the abilities of the management of these funds. This reduces the downside impact of an individual managers performance on the portfolio as a whole.

Acknowledgments

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Endnotes

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2. Morningstar Inc. is an independent, privately owned company, which provides investors with information concerning the return performance, risk, portfolio composition, analyst's opinions, and recent developments on the mutual funds that it tracks.

3. The CAPM was simultaneously and independently discovered by Lintner, L. (1965a), Mossin, J. (1966), and Sharpe (1964).

4. The total return is calculated by taking the change in monthly net asset value (NAV), reinvesting all income and capital-gains distributions during that month, and dividing by the starting NAV. The net asset value (NAV) of a fund is the price at which investors can purchase, or redeem, one share of a fund.

5. A bull (bear) market is observed when the return on the S&P 500 composite index is persistently above (below) that of the 90 day U.S. Treasury bill.

6. For a detailed discussion of this principal see Markowitz (1952).

7. In tests of the CAPM, Black, Jensen & Scholes (1972) developed a time-series CAPM that can be estimated using ordinary least squares regression. For a more detailed discussion of this model please refer to their paper.