Determinants of Bank and Retail Credit Card Revolvers: An Application Using the Life-Cycle Income Hypothesis

This study examined the demographic attributes and attitudes towards credit and the economy of those households which revolve their bank and store credit cards. The results are explained through application of the life-cycle income hypothesis. From using panel data from the 1989 Survey of Consumer Finances (SCF) and two probit analyses, it was determined that significant demographic and attitudinal differences exist in credit card revolving behavior. Further research is suggested in this area of credit behavior.

Robert E. P. Steidle, Purdue University[1]

An Overview

Through an individual's life there is an expectation of consumption and saving behavior. Inevitably, there will be times in life when the income level will be lower than the demand for products. In these instances, people borrow from future earnings (Thurow, 1969). Essentially, this is the life-cycle income hypothesis. It suggests that consumers try to redistribute or shift their resources from periods of high income to periods of low income in order to maintain their consumption needs (Bryant, 1992).

Under the life-cycle income hypothesis, families and individuals in their formative years borrow from their future earnings so that they will be able to purchase the necessary durable goods that are associated with the beginning years of family life. A common way these individuals borrow from their future income is through credit card usage. Using credit cards allows individuals and families to purchase the goods now, and pay off debts in the future when their household income may be higher.

Credit card users fall into two categories: convenience users and revolvers. Both types have been defined as, "(convenience users are)...those individuals who usually pay off their balance in full during the interest free grace period, thereby avoiding finance charges; revolvers are those who usually do not pay their balances in full and thereby incur finance charges"

(Canner & Luckett, 1992, p. 662).

Today, credit card debt has grown in size. Revolving credit was nearly $60 billion in 1980, and has since risen to $240 billion, or one third of consumer credit outstanding (Canner & Luckett, 1992). Clearly, not all consumers who use credit cards are similar (Heck, 1983). For example, one study found that retail credit card holders spend an average of $1459.28 a year on goods compared to $467.59 a year by bank card users, a difference of 212% annually (Abend, 1991).

Of all the credit card types, bank credit cards have seen the largest increase in debt, possession, and utilization. Unlike retail credit cards, bank cards have gained in popularity. By the year 2000, bank credit card spending is projected to be just under $500 billion, and retail credit card spending is projected to be under $300 billion (U.S. Dept. of Commerce, Bureau of the Census, 1992).

This paper investigates the issue of consumer credit card revolving behavior, specifically examining the use of both bank and retail credit cards (henceforth to be called *store*). The purpose of this paper is to explore the demographic characteristics and attitudes of households who are most likely to revolve on their bank cards, and those who are most likely to revolve on their store credit cards. These results will then be related to the life-cycle income hypothesis.

The recent trend of literature has produced empirical and

theoretical papers focused on the areas of possession and utilization of credit cards (see Heck, 1983, 1987). Unfortunately, many of these papers have been using inaccurate statistical procedures (Sullivan & Worden, 1986), or have not used nationally representative samples (Lindley, Rudolph, & Selby Jr., 1989; Mathews & Slocum, 1969; McAlister & Kinsey, 1979). This study is unique in that there are few studies which have solely examined the demographic and select attitudinal characteristics of credit card revolvers using a probit analysis.

Determinants of Bank and Retail Credit Card Revolving Behavior

Some credit card utilization studies have indicated that household income, education, and age are strongly related to credit card possession, utilization, and repayment behavior (Canner & Luckett, 1992; Curtin & Neubig, 1979; Heck, 1983, 1987; Mandell, Katona, Morgan, & Schmiedeskamp, 1973; McAlister & Kinsey, 1979; White, 1975).

In the following discussion of those households who are bank card or store card revolvers, 13 major determinants--*Income, Education, Race, Gender, Age, Marital Status, Attitude Towards Future Economy, Attitude Towards Future Interest Rates, Future Income Expectations, Past Income of Household, Is Credit Good, Credit Use for Vacations, and Did Not Apply For Credit*--are reviewed and are hypothesized to predict the degree to which a household will be a revolver on their bank or store credit card.

In studies conducted by Slocum and Mathews (1970), Garcia (1980), Canner (1988), and Lindley, Rudolph and Selby Jr., (1989), it was found that lower income individuals tend to be more likely to revolve their credit cards. Conversely, those individuals with high incomes tend to charge more per month on their cards, yet they will not revolve these balances; they pay off their debt in full (Garcia, 1980). Therefore it is predicted that, *H1: Household income (INC) will be negatively related to revolving debt on both store and bank credit cards.*

Several studies examining credit card utilization have found that highly educated individuals are more likely to use credit cards (Heck, 1983, 1987; Lindley, Rudolph & Selby Jr., 1989). However, with regards to revolving credit card balances, Canner (1988) found that both higher educated and lower educated people revolve their credit cards. Nonetheless, proportionally, the majority of the revolvers (60%) held less than an 8th grade education. Thus, *H2: Education (EDU) will be negatively related to revolving credit card debt for both store and bank credit cards.*

It has been found that not only do nonwhites possess fewer credit cards than whites (Heck, 1983), but they also use credit cards less often than whites (Heck, 1987). Conversely, White (1975), using data from bank transactions, found that nonwhites use credit cards more to facilitate sales. Therefore it will be hypothesized that, *H3: White households (WHI) will be negatively related to revolving credit card debt for both store and bank credit cards.*

Heck's (1983) study examining credit card possession found that women were less likely to have credit cards. It was also determined that they use them less than men (Heck, 1987; Lindley, Rudolph, & Selby Jr., 1989; White, 1975). White (1975) deduced that men enjoy the "convenience" of credit cards, which would tend to indicate that they are more likely to pay off their debts at the end of the month. While women display characteristics of a typical revolver. Therefore, it is hypothesized that, *H4: Male headed households (MALE) will be negatively related to revolving debt on both store and bank credit cards.*

There have been several studies examining the effects of age and credit card utilization and possession behavior, with many finding that a positive relationship exists (Awh & Waters, 1974; Lindley, Rudolph, & Selby Jr., 1989). In general, as individuals age they use credit cards at an increasing rate, until age 65. After age 65, people tend to be retired and are living on fixed incomes. This factor makes older people (above 65) use credit cards less than younger people (White, 1975). Further, it was shown

that there is a negative relationship between revolving credit cards and age. That is, younger individuals tend to revolve their credit cards more than older individuals (Canner, 1988; Curtin & Neubig, 1979). Thus, *H5: Age of household (AGE) will be negatively related to credit card revolving debt in both store and bank credit cards.*

Typically, those individuals who are married will have a larger amount of expenditures than single individuals. This is certainly true in the areas of necessities, such as food and rent. Becker, Michael, and Landes (1977) proposed that individuals only get married if their collective incomes will be greater when married than when they are single. This costly situation can be reflected in credit card usage. For example, marital status has been found to be positively related to credit card utilization and possession (Adcock, Jr., Hirschman, & Goldstucker, 1977; Kinsey, 1981; McAlister & Kinsey, 1979). Therefore, it is predicted that, *H6: Married households (MARI) will be positively related to revolving on bank and store credit cards.*

Heck (1983, 1987) found a positive relationship between attitudes about the economy and credit card possession behavior and utilization. Those people who believed the economy would be better in the future tended to use their credit cards more. This makes intuitive sense. Individuals who are more positive towards the future economic outlook should be more likely to venture into debt. Thus, it is assumed that, *H7: Households which expect a better future economy (FEC) will be positively related to revolving their bank and store credit cards.*

Canner and Luckett (1992) found that, ". . . revolvers would be much more likely than convenience users to be sensitive to the level of interest rates assessed on credit cards" (p. 655). Thus, *H8: Households which expect higher future interest rates (FIR) will be negatively related to revolving their bank and store credit cards.*

Individuals that expected their future household income to increase, as compared to the prices of goods, have been shown to be more likely to possess and use credit cards (Heck, 1983, 1987). With expectancies of increased income, they would be more likely to use their credit cards, and more likely to revolve them. This is behavior which is exhibited by both high and low income categories (Canner & Luckett, 1992). Therefore, it is hypothesized that, *H9: Households which expect higher incomes in the future (FINC) will be positively related to revolving their bank and store credit cards.*

Those individuals who experienced their household income increase more than the increased price of goods (in the past five years) should be positively associated with being revolvers now. In psychological theory, past behaviors are the best predictors of future behavior. Many individuals who have experienced something in the past, use this information and project it to the future (Katona, 1975), and discrepant behavior may be less memorable (Festinger, 1957). Thus it is expected that, *H10: Households which have experienced an increase in their past income (PINC) will be positively related to bank and store credit card revolving.*

Of the studies which examined the attitudes towards credit utilization and possession, all concluded that a positive relationship exists (Curtin & Neubig, 1979; Heck, 1983, 1987; McAlister & Kinsey, 1979; Sullivan & Worden, 1986). Therefore, it is hypothesized that, *H11: Households which have a positive attitude towards credit (ATC) will be positively related to revolving both bank and store credit cards.*

Those individuals who possess and use credit cards have been shown to be more likely to agree that it is acceptable to finance vacations with credit cards (Heck, 1983). Thus, *H12: Households that agree with using credit cards to pay off vacation fees (CVAC) will be positively related to revolving both bank cards and store cards.*

Sullivan and Worden (1986) determined that, "...those consumers who had trouble obtaining credit in the past were significantly more likely to have installment debt" (p. 24). Their result were post-hoc

and on a behavioral level, while the present survey asked respondents if they *never* applied for credit because of a fear of being rejected, which is on an attitudinal level. Those individuals which had an attitude (fear) towards being rejected and did not apply for credit may be less likely to revolve now. Thus, it is hypothesized that, *H13: Past fear of credit rejection (FEAR) will be negatively related to revolving.*

Methodology

Data and Sample

The data used for these two analyses came from the 1989 Survey of Consumer Finance (SCF). These data are from a national probability sample of households (N=3143) designed to represent the total civilian noninstitutional population of the United States. Before any analyses were undertaken, the data were cleaned for outliers and unusable responses. In particular, those individuals which reported a negative pre tax income (on the *INC* variable) were summarily deleted from any further analyses. The sample used in the empirical analysis consisted of those who revolve (n=794) and those who do not revolve (n=530) on their bank cards, and those that revolve (n=722) and those that do not revolve (n=997) on their store cards. The term "household" has been defined to include all persons residing together in the same dwelling who are related by blood, marriage or adoption. Households include one-person units as well as units of two or more persons (Avery, Elliehausen, & Canner, 1984; Chang & Hanna, 1990). The survey respondent was the "economically dominant" household member, which was defined as the person who owned or rented the home, provided the most income, or was the most knowledgeable about the families resources. (Survey of Consumer Finances, 1989).

Measure of Dependent Variable

The two dependent variables amount revolved on bank credit cards and store credit cards were measured in a continuous format, with dollar amounts rounded to the nearest one dollar. Those people which had a balance due on their bank or retail account were dummy coded. If their balance was greater than zero dollars, they were considered revolvers, if they had a *zero* balance they were considered non-revolvers.

Measures of Independent Variables

The income variable was a continuous variable consisting of several variables. Education was also a continuous variable with values ranging from 1 to 17 years. Race was measured by two dummy codes (white, nonwhite), as was gender (male, female) and marital status (married, single).

Procedure

A probit estimation model was chosen as the appropriate estimation technique due to the nature of the dependent variable and the mixture of continuous and categorical independent variables. One of the most important features of a probit are its estimate of probabilities it can yield.

Results and Discussion

Hypothesis Testing

In the present study, the null hypothesis is rejected at the 0.10 level of significance from using a Chi-Square analysis, indicating that this set of variables provided a significant contribution to the overall fit of the model. The value of the probability of goodness-of-fit for the bank card probit was p< 0.0093 while the store card model was p<0.0869, both of which were significant. The results of the two probit regressions are presented in Table 1.

Seven hypothesized predictors are significant for bank credit card revolving, while ten hypothesized predictors are significant for store credit card revolving.

Holding all other factors constant, unexpectedly, income had a positive effect on the probability of store card revolving and bank card revolving, although only store cards reached significance. It appears that those households which have a larger income also tend to be prone

Table 1
Probit Regression Analyses of Bank and Retail Credit Card Revolvers.

VAR	Bank	Store
INC	8.24 E-8	3.70 E-7***
EDU	-0.17***	-0.08***
WHI	0.22***	0.22***
MALE	-0.10	-0.59***
AGE	0.00	-0.00***
MAR	0.73***	1.05***
FEC	-0.05	0.10
FIR	-0.13	0.11
FINC	-0.03	-0.19**
PINC	0.33***	0.30***
ATC	0.45***	0.62***
CVAC	0.33***	0.07
FEAR	-0.50***	-0.25***
Int	2.73***	1.58***
Size	1324	1719
Log	-965.66	-998.04
Fit	0.0093	0.0869

Note: ** p< 0.05   *** p< 0.01

to revolving their store credit cards as opposed to lower income households. This behavior has been observed by Canner and Luckett (1992), although it seems rather contradictory based on the available evidence. Perhaps store cards offer certain perks to those that use them while shopping in their store, such as lower interest rates and warrantee extensions, that bank cards do not offer.

Other things being equal, education had significant negative effects on the probability of being either a bank card revolver or store card revolver, as hypothesized. Less educated households tended to have a greater probability of revolving their bank and store cards than higher educated households. According to the life-cycle hypothesis, individuals are trying to even out their flow of income. Those households that are more educated would probably be more aware of the changes that can occur with regards to their income level than less educated households. Also, higher educated households may be more aware of the finance charges that exist with credit card revolving, and are more apt to try to avoid further costs.

Controlling for other things, white households, unexpectedly, had a significantly greater probability to be revolvers than nonwhites on both bank and store credit cards. This result came as a surprise, since many studies have shown that nonwhite individuals are more likely to be revolvers.

As hypothesized, holding other things equal, male headed households were significantly negatively related to the probability of being a store card revolver, although bank cards did not reach a level of significance. It appears that women have a greater probability of being a store card revolver.

Holding everything else constant, younger households are significantly more probable of being a store credit card revolver, as predicted. Unexpectedly, this did not hold true for bank card revolving, yet this result failed to reach significance. Younger households may be purchasing durable goods for their homes, more so than older households, which may account for this difference.

Other things being equal, married households were significantly more probable to be a bank card and store credit card revolver than single households, as hypothesized. According to the life-cycle hypothesis, it seems that this would make intuitive sense. Married couples tend to spend more than single couples on a large variety of items ranging from food products to donations to charities (Bryant, 1992). Married people, depending on their ages, can vary quite a lot in the amount they charge on their credit cards.

Controlling for other things, as hypothesized attitude towards the future economy was positively related to store credit card revolving. Unexpectedly, it was found to be negatively related to bank card revolving. Perhaps the cards have some inherent differences that make bank card holders to be less likely if they perceive the future economy as being better.

Other things being held constant, households that expected a higher future household income relative to the prices of goods in the next 5 years were significantly

less probable to be store card revolvers. They are also less likely to be bank card revolvers, although this did not reach the level of significance. Contrary to the hypothesis, and the life-cycle hypothesis, those expecting a higher future income would borrow from their future income to finance present needs for durables. This would be most characteristic of younger, newly married families.

As hypothesized, households that experienced an increase in their income over prices of goods over the last 5 years had a significant positive probability of revolving on their bank and store cards, holding all other factors constant. Those households that experienced an increase in the past are most likely to expect a rise in the future. With increases comes the capability to save and spend more. Most likely, the households that are expecting the increase will spend more now, and worry about the incoming bills later, when there is more income.

Other things being equal, households with a positive attitude towards credit had a significant positive probability for revolving on bank and store cards, as hypothesized. Those that felt that credit is good were most likely to take advantage of what it offers them; namely the extension of credit.

Holding everything else constant, as hypothesized, households with a positive attitude for using credit cards to pay for vacations held a significant positive probability for revolving on bank cards, and a positive probability for revolving on store cards, although this did not reach significance. Interestingly, store cards are not used for financing or repaying vacations, while bank card usage is much more flexible. This may explain why store cards were not significant.

As hypothesized, those households who failed to apply for credit because of fear of being rejected were significantly less likely to revolve on both bank and store credit cards, holding everything else constant. These households probably did not apply for credit because they had either over extended themselves, or felt they were unworthy in some way for a loan.

Perhaps this belief of unworthiness is still apparent in their present credit card use pattern. These households may fear revolving because it may indicate that they are living beyond their means, and it is reminiscent of their previous credit situation.

Conclusions and Implications

Summary of the Findings

This study was an *exploratory* analysis of consumers credit card revolving behavior using the 1989 Survey of Consumer Finances. This study specifically examined the demographic characteristics and attitudes of those households that revolve on either their bank or store credit cards. Although this study examined the probability of certain characteristics of credit card revolvers being significant determinants, the empirical analysis produced some findings consistent with many studies in this area and tentatively supported some of the assertions made by the life-cycle hypothesis. One example is that married households were significantly more likely to be bank and store credit card revolvers than single households.

Implications for Consumer Education

The findings of this study tend to suggest that not all the consumers who revolve are the same. Revolvers vary even with regards to their choice of card to revolve. Interestingly, the findings reinforce the belief that lower educated people are the ones most likely to be revolvers. This may be due to two factors. First, perhaps these individuals do not understand that they are paying extra (nearly 19% interest per year) on their purchases, and that there may be alternative ways of purchasing items. Secondly, it could be that these individuals are consistently living above their means, and need financial counseling to help them improve their economic situation.

Implications for Credit Grantors

For the credit grantor, customers who revolve on their credit cards can mean extra money for the company. From this study, it appears

income categories. The results indicate that the Australian respondents have relatively higher incomes as compared to others in their nation since 55% report having family income in the top three categories of income as compared to 42% of Americans and 35% of Canadians respectively.

Factor Analysis

Factor analysis has been conducted using SPSS. The method chosen, varimax rotation, is used by Furnham (1984) in his original study. The analysis is forced into six basic factors indicated by Furnham's findings. Table 1 contains the results of the factor analysis. All 60 items are printed in the table in order to compare the overall factor structure of the MBBS by nation.

Evaluation of results indicates that a number of variables in the American and Australian data are highly correlated with each other to the extent that the determinant of the correlation matrix becomes less than .00000, thus resulting in an "ill conditioned matrix" generated by SPSS which indicates that the analysis violates a basic assumption of factor analysis. The variables marked "not in analysis" in Table 1 are those items which generated the warning message and they have been removed from the final factor analysis of both the American and Australian data sets.

The six factors are measured on a factor-by-factor basis, however the perceived meaning of the factors varies by nation. Factors 2 and 3 are reversed, perhaps suggesting that American and Canadian respondents are more alike in their attitudes toward money than they are relative to the Australian respondents. Factors 1 and 4 may prove to be unreliable due to problems with the factor loadings. The Australian Factor 5, similar to Furnham's Effort\Ability factor, shows a relationship between an individual's intelligence and effort and ability to earn more money in the marketplace. No significant findings are discovered using Factor 6. This may be a result of misunderstanding the concept or the MBBS may not actually contain six measurable factors for these three different groups of respondents.

Reliability

Previous research (Bailey and Gustafson, 1991) has found that although factors may be located in the data, their use in further analysis may be precluded if they have weak internal reliability. Using the reliability procedure in SPSS, Chronbach's Alpha has been determined for each of the 6 factors in each of the three nations. Those scales with Alphas below .40 will not be further discussed in this study. Three American, two Canadian, and one of the Australian factors have Alphas below the established criteria.

Discussion

This exploratory report only begins to examine the factors measured by the MBBS in these nations. The first goal of this study is to determine if the MBBS measures the same six factors among respondents from three English speaking nations. Although the MBBS measures six distinct factors among the original subjects in Great Britain, it is apparent that the MBBS measures somewhat different attitudes toward money among these groups of respondents.

The second goal of the study is to examine the subscale structures resulting from factor analysis. Some of the original concepts, such as Security/Conservatism, Inadequacy, and Effort/Ability are among the eighteen different factor structures found in this three nation study. However, new concepts have presented themselves. Some of these concepts remain undefined while others, such as the one of that could be labeled Secrecy in Factor 6 of the Australian respondents, are more readily visible.

The differences among the factors are far more conspicuous than any similarities. Very few of the items have loaded on the same factors in all three nations. However, further analysis of both the content and the factor loadings by items suggests that Americans and Canadians have more similar attitudes toward money as measured by the MBBS than either has in common with Australians. This finding does not preclude the fact that, in some instances, American and Australian

180

Table 1
Factor and Factor Loadings of Items of the MBBS by Each Nation

MBBS Item	U.S. Factor Loading	Australia Factor Loading	Canada Factor Loading
I often buy things that I don't need or want because they are on sale or reduced price.	F1 .53	F1 .48	
I put money ahead of pleasure.			
I sometimes buy things that I don't need or want to impress people because they are the right things to have at the time.	F1 .75	F1 .70	F1 .63
Even when I have sufficient money I often feel guilty about spending money on necessities like clothes.	F3 .62	F2 .63	
Every time I make a purchase I expect people to take advantage of me.	F1 .54	F2 .45	F1 .55
I often spend money, even foolishly, on others but grudgingly on myself.	F3 .58	F2 .52	F6 .60
I often say "I can't afford it" whether I can or not.	F3 .64	F2 .48	
I know almost to the penny how much money I have in my purse, wallet or pocket at all times.	F2 .48	F3 .58	F2 .52
I often have difficulty in making decisions about spending money regardless of the amount.	F3 .43	F2 .58	
I feel compelled to argue or bargain about the cost of almost every thing that I buy.	F1 .56	F1 .42	F5 .45
I often insist on paying more than my share of restaurant or entertainment costs in order to make sure that I am not indebted to anyone.	F6 .49		F3 .59
If I had a choice, I would rather be paid more often (eg. weekly rather than monthly.)			F6 -.41
I prefer to use cash rather than credit cards.	F1 -.43		
I always know how much I have in my savings account (bank, credit union or building society).	F2 .54	F3 .54	F2 .62
If I have money left over at the end of the month (week), I often feel uncomfortable until it is all spent.	Not in analysis	F1 .52	F1 .46
I sometimes "buy" friendship by being very generous with those I want to like me.	Not in analysis	F1 .55	F1 .55

MBBS Item	U.S. Factor Loading	Australia Factor Loading	Canada Factor Loading
I often feel inferior to others who have more money than myself, even when I know that they have done nothing of worth to get it.	F1 .45	F2 .54	F1 .56
I often use money as a weapon to control or intimidate those who frustrate me.		Not in analysis	F1 .73
I sometimes feel superior to those who have less money than myself regardless of their ability and achievements.		Not in analysis	F1 .68
I firmly believe that money can solve all of my problems.		F1 .50	F1 .63
I often feel anxious and defensive when asked about my personal finances.		F1 .46	F5 .57
In making any purchase, for any purpose, my first consideration is cost.	F2 .49	F2 .44	
I believe that it is rude to inquire about a person's wage/salary.	F1 -.42 F2 .52	F6 .59	
I feel stupid if I pay a little more for something than a neighbor.	F3 .45	F2 .42	
I often feel contempt for money and look down on those who have it.	F1 .58	F2 .43	
I prefer to save money because I'm never sure when things will collapse and I'll need cash.	F2 .46	F4 -.39	F2 .62
The amount of money that I have saved is never quite enough.	F1 .51		F4 .40
I feel that money is the only thing that I can really count on.	Not in analysis	Not in analysis	F1 .74
I believe that money is the root of all evil.			F5 .48
I believe that one only gets what one pays for.			
I believe that money gives one considerable power.	F2 .53		
My attitude toward money is very similar to that of my parents.			F6 .50
I believe that the amount of money that a person earns is closely related to his/her ability and effort.	F5 .47	F5 .63	F6 .43
I always pay bills (phone, electricity, gas, credit card) promptly.	F2 .47	F4 .41	F2 .44

MBBS Item	U.S. Factor Loading	Australia Factor Loading	Canada Factor Loading
I often give tips to waiters/waitresses that I like.	F6 .58		F3 .62
I believe that time not spent in making money is time wasted.	Not in analysis	F1 .40	F1 .68
I occasionally pay restaurant/shop bills even when I think I have been overcharged because I am afraid the waiter/assistant might be angry with me.	F1 .53		F3 .42
I often spend money on myself when I am depressed.	F1 .41	F1 .54	F3 .41
When a person owes me money I am afraid to ask for it.	F3 .56		F3 .60
I don't like to borrow money from others (except banks) unless I absolutely have to.	Not in analysis	F6 .53	F2 .45
I prefer not to lend people money.	F2 .54	F6 .51	
I am better off than most of my friends think.	F4 -.64	F1 .53	
I would do practically anything legal for money if it were enough.	F1 .62	F1 .50	F1 .54
I prefer not to lend people money.	F2 .43		
I am proud of my financial victories - pay, riches, investments, etc. and let my friends know about them.	F1 .72	F1 .40	F1 .57
I am worse off than most of my friends think.	F4 .61	F4 .51	F4 .54
Most of my friends have less money than I do.	F1 .45 F6 .41	F1 .43	
I believe that it is generally better to conceal the details of my finances from friends and relatives.	F2 .50	F6 .66	F5 .56
I often argue with my partner (spouse, lover) about money.	F1 .41		
I believe that a person's salary is very revealing in assessing their intelligence.	Not in analysis	F5 .58	F1 .49
I believe that my present income is about what I deserve, given the job I do.	F5 .74	F5 .72	F5 -.42 F6 .54
Most of my friends have more money than I do.	F4 .52	F4 .57	F4 .69
I believe that my present income is far less than I deserve given the job I do.	F5 -.68	F5 -.58	F5 .53 F6 -.40

MBBS Item	U.S. Factor Loading	Australia Factor Loading	Canada Factor Loading
I believe that I have very little control over my financial situation in terms of my power to change it.	F1 .41	F2 .46	F4 .53
Compared to most other people that I know, I believe that I think about money much more than they do.	F1 .60	F3 .54	F1 .52
I worry about finances much of the time.	F2 .43	F3 .64	F1 .41
			F4 .45
I often fantasize about money and what I could do with it.	F1 .40	F3 .53	
I very rarely give homeless people money when they ask for it.	F6 −.35		F2 .42
I am proud of my ability to save money.	F4 −.59	F4 −.58	F2 .49
In this country, money is how we compare each other	F2 .48		

respondents have more in common with one another than they do with Canadians.

The fact that Americans and Canadians have more similar attitudes toward money than either has with Australians appears to make both common and logical sense due to the historical, economic, and geographic proximity of the two nations. The two nations' economies will become even more intermingled with the recent ratification of the North American Free Trade Agreement (NAFTA).

Future Research

Reich's (1991) new paradigm of a single world economy implies that consumer economists and others must consider cross-cultural issues related to money. This assumption demands that more international studies be conducted on attitudes toward money using a variety of instruments, samples, and techniques. The MBBS shows promise as an instrument that might be used in future research on this sensitive topic.

There are many difficulties that must be overcome in international studies about attitudes toward money. One major difficulty is related to the process of financing the research. The study conducted by this group of researchers has been done very economically, but to improve the generalizability of the findings, random sampling must occur, however nationwide random sampling can be expensive and time consuming therefore a major funding source must be located either on a nation by nation basis or from one multinational foundation or corporation. Another major difficulty that must be overcome is long-distance communication which is in the process of being solved through the implementation of Internet and improved FAX communication processes. Through communication by interconnected computer systems, researchers on this project have maintained communications. This research group intends to conduct future studies in the area of cross-cultural attitudes toward money despite the many obstacles, and hopes that other researchers will get involved. It is only through the understanding achieved by this type of economic attitude research that individuals and nations will be able to survive in a worldwide economic system.

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Endnotes

1. Assistant Professor, Department of Home Economics
2. Associate Professor, School of Family and Nutritional Sciences
3. Lecturer in Consumer Affairs, School of Humnaities and Social Sciences
4. Director of Home Economics Research Unit in School of Nutrition and Public Health
5. Senior Lecture in School of Nutrition and Public Health
6. Professor in Department of Human Environments

Determinants of the Use of
Home Equity Lines of Credit and Second Mortgages

Factors affecting the probability of using home equity lines of credit and second mortgage were examined using data from the 1989 Survey of Consumer Finances. The results from the logit analysis suggest that users of home equity lines of credit and second mortgage have different socio-demographic profiles and the two types of home equity loans may be drawn for different purposes. Implications for financial institutions, government, and financial advisors were discussed.

Julie Yu, Purdue University[1]
Emily Kao, Purdue University[2]

Introduction

Home equity loans are consumer borrowings secured by their residential properties. There are two kinds of home equity loans: second mortgages and home equity lines of credit. Second mortgage is "a close-end loan extended for a specified period of time and generally requiring repayment of interest and principal in equal monthly installments". (Canner, Luckett & Durkin, 1989, p. 333). A second mortgage is also called traditional home equity loan. Home equity lines of credit is a revolving account which "permits borrowing from time to time at the account holder's discretion up to the amount of the credit line" (Canner, Luckett & Durkin, 1989, p. 333).

In recent years, home equity borrowing has been growing rapidly. The 1977 Consumer Credit Survey indicates that 5.4 percent of homeowners had a home equity loan. In 1983, this number rose slightly to 6.8 percent. However, the most recent surveys (the 1988 Surveys of Consumer Attitudes) show that 11 percent homeowners, or about 6.5 million families had a home equity loan in the second half of 1988. Between the two types of home equity loans, home equity line of credit is growing faster than the traditional home equity loan. Before the mid 1980s, nearly all home equity loans were of the traditional type. (Canner, Luckett & Durkin, 1989). The percentage of families having home equity lines of credit rose from 0.3% in 1983 to 3.3% in 1989 (Kennickell & Shack-Marquez, 1992). Around 75% of all the home equity lines of credit were opened after 1986. One of the major reasons for this fast growth in demand for home equity lines of credit is that consumers can get credit at their discretion. (Canner, Luckett & Durkin, 1989).

This significant growth of home equity loans can be explained by the impacts of the Tax Reform Act of 1986 with the phase-out of the income tax deductibility of consumer credit interest and the great appreciation of home values in the 1980s. Therefore, consumers now have greater intention and ability to increase their home equity borrowing: a comparatively lower-cost financing. Because of the tax advantage and the nature of secured loans deserving a lower interest rate, consumers tend to substitute home equity loans for other forms of consumer credit such as vehicle loans or credit card debt. For the credit grantors, home equity loans are also more attractive because housing assets are more secure and valuable collaterals than those of other types of credit, resulting in less risk involved than the unsecured loans. (Demong and Lindgren Jr., 1989; Silvia and Whall, 1989).

The growth of home equity loans raises many research questions. Among the issues, an important question is who are the users of home equity loans. The purpose of this study is to identify the economic and demographic characteristics

associated with users and non-users of home equity loans including both home equity lines of credit and second mortgage among home-owners. Furthermore, the differences between users of home equity lines of credit and traditional home equity loans will be explored. The findings of this study will provide implications for financial institutions on how to target the consumer credit market and set up proper credit standards. It is expected that the information will shed light on the future of the home equity loan market according to projected demographic changes and help to predict who is likely to be the user of home equity loan in the future. Financial advisors may use the information to help their clients to use home equity loans more efficiently. Finally, financial educators may use the information from this study to design better programs to educate the consumers.

Review of the Literature

The life-cycle income hypothesis (Ando & Modigliani, 1963) suggests that households base their consumption and saving decisions on total resources available over the lifetime to maximize the inter temporal satisfaction. (Bryant, 1990). Owing to the uneven income stream and assets accumulation over their life cycle, people borrow when they are young, save at middle age, and dissave at the latter life stage to smooth out their total resources and support their consumption needs at different life cycle stages. Home equity is one of the most important assets accumulated during a homeowner's life, and this accumulation through the periodical mortgage payments is similar to the saving behavior proposed by life-cycle income hypothesis. Therefore, the use of home equity loan may follow the life cycle income hypothesis. Consumers may be less likely to draw home equity loans at middle ages, while more likely to borrow against their home at initial and later stages of their life cycle.

Based on the life-cycle hypothesis, homeowners' propensity of borrowing against home equity to fund their current consumption was investigated by using the 1977 Consumer Credit Survey (Chen and Jensen, 1985). The results of logit analysis explained the dissaving behavior, specifically the use of home equity to finance current consumption of households with different demographic and economic characteristics, and also the variations between users and non-users of home equity borrowing. Their findings indicate that age is non-linearly correlated with the probability of using home equity borrowing. Middle-aged households with higher or certain income, or prosperous income expectations are more likely to borrow against their home equity, while older families who generally have lower income are less willing to risk the housing assets. This is contrary to the conventional life-cycle hypothesis that people dissave at older age, and may be explained by the risk aversion and other psychological barriers of the elderly toward risking their housing assets. For retired households, significant interaction was found between marital status and retirement status. Non-retired married and retired single households are more likely to be users of home equity compared to their counterparts. Holding everything else constant, low-income and high-income groups are more likely to take out home equity loans compared to the middle-income group while people with a large amount of wealth are less likely to draw home equity loans (Chen and Jensen, 1985).

In Canner, Fergus, and Luckett's (1988) and Canner, Luckett and Durkin's (1989) studies, univariate analysis was conducted using two weighted national samples: 1987 and 1988 Survey of Consumer Attitudes. Goff and Harris (1990) and Goff and Walters (1990) conducted ANOVA tests on data collected by mail surveys of respondents who are either home equity lines patrons or potential customers of a Middle Atlantic Commercial Bank. The findings from these four studies suggest that the holders of home equity lines of credit tend to have higher income and home equity. Male-headed households are more likely to incur a home equity line of credit. (Goff & Harris, 1990; Goff & Walters, 1990). Also, home equity lines

holders tend to be better educated and have a more positive attitude toward credit (Canner, Fergus, & Luckett, 1988; Goff & Harris, 1990). As far as the age is concerned, the results are mixed. Goff and Harris found that as age increases, people are more likely to have home equity lines of credit. However, Canner, Fergus, and Luckett (1988) found home equity line holders are younger.

These four studies also found that traditional home equity loan (second mortgage) holders have higher income and home equity than the rest of the population (Goff & Harris, 1990; Goff & Walters, 1990; Canner, Fergus, & Luckett, 1988; Canner & Luckett, 1989). As age increases, people are more likely to draw a second mortgage. Adopters of traditional home equity loans tend to be non-whites or Hispanics, and less educated compared to adopters of home equity lines of credit (Canner & Luckett, 1989).

There have been great concerns over whether home equity loans (including home equity lines of credit and second mortgages) are substitutes for other forms of consumer credit or mortgage debt because of the possible tax benefit (Goff & Harries, 1990; Canner, Fergus & Luckett, 1988; Canner & Luckett, 1989; Silvia & Whall, 1989; Caldwell & Rolfe, 1989). It was found that home equity line holders share many similar characteristics with those who refinance their first mortgage (Goff & Harris, 1990). However, home equity line holders are less likely to hold adjustable rate mortgages or second mortgages (Goff & Harries, 1990). Canner, Fergus and Luckett (1988) found that home equity loan holders are less likely to hold CDs, IRA or Trust Accounts, and other forms of consumer credit (Canner, Fergus & Luckett, 1988; Canner & Luckett, 1989). Among all types of consumer debt, home equity loans are most likely to be a substitute for credit card debt since credit card debt is a non-secured debt with usually very high interest rate while home equity loan has a much lower interest rate because of a much safer collateral (Silvia & Whall, 1989).

Methodology

Theoretical Background and Measurement of Variables

A model is developed based on the life-cycle income hypothesis and previous research. According to the life-cycle theory, whether consumers use home equity loans and what type of home equity loans they choose are affected by their income (INC), net worth (NW), and life-cycle related variables such as age (AGE), marital status (MS), and family size (SIZE) (Ando & Modigliani, 1963). Age square (AGESQ) is also included in this model to capture the curvilinear relationship with the probability of holding either type of home equity loans. Previous studies suggest that the use of home equity loan is also related to the amount of home equity (EQUITY) accumulated, educational level (EDUC), and race (RACE). (Goff & Harries, 1990; Canner, Fergus & Luckett, 1988; Canner & Luckett, 1989; Silvia & Whall, 1989; Caldwell & Rolfe, 1989). The square term of the amount of home equity (EQSQ) is employed in this model because a non-linear effect is expected. Current home value (VALUE), current outstanding of mortgage loans (MORTGAGE) against the home, and whether the mortgage is of adjustable rate (ARM) are three other predictors included in the model.

However, little research has been done about the relationship between consumer attitudes toward credit (ATT) or the extent of risk aversion (RISK) and the use of home equity loans. These two attitudinal factors are included in this study. Because the new tax code is more favorable to home equity loans than other forms of borrowing, home equity loans may be used by consumers as substitutes for other forms of credit. Therefore, the likelihood of using a home equity line of credit and second mortgage is also assumed to be affected by holdings of other forms of credit such as credit card debt (CARD).

In summary, most independent variables are continuous, while MS, RACE, and ARM are dummy, ATT and RISK are categorical. MS is coded as 1 if married, RACE as 1 if whites, and ARM as 1 if yes, 0 otherwise. ATT stands for the consumers' attitudes toward

credit, coded as 3 if it is a good idea, 2 if good in some ways bad in others, and 1 if bad. RISK , which represents the level of financial risk a respondent is willing to take, is measured by descending scores from four to one as level of risk declining from substantial, above average, average, to none.

A logistic regression analysis is used to estimate the likelihood of consumer's use of home equity lines of credit and second mortgages respectively. Because the uses of home equity lines of credit and second mortgages are not mutually exclusive, two separate logistic tests were performed. The model is given as following:

$$p = Pr(Y = 1 / X_i)$$
$$Logit(p) = log(p / (1 - p))$$
$$= b_0 + b_i * X_i$$

where

p = logit response function
  = f(independent variables)
  = $b_0 + b_i * X_i$
Y = dependent variable that takes the value of one if consumers use home equity lines of credit/second mortgage, and zero otherwise.
X_i = a vector of independent variables
b_0 = intercept.
b_i = a vector of coefficients associated with respective independent variables.

Data and Sample

The data were taken from the 1989 Survey of Consumer Finances (SCF), which was sponsored by the Federal Reserve Board in cooperation with other government agencies. The 1989 SCF is the most recent (collected between August 1989 and March 1990) in a series of consumer financial surveys designed and conducted by the Survey Research Center of the University of Michigan since 1947. The survey provides detailed balance sheet and demographic as well as attitudinal information of the US households. This survey over-sampled the higher-income households in an attempt to provide unbiased representation of the skewed distributions of income and net worth across American families. The sample consists of 2,277 households selected by a standard multi-stage area-probability sampling technique and a supplemental sample of 866 high income sample drawn from federal income tax files. The response rate was 69% for the random sample and 34% for the tax-data sample. Missing values were systematically imputed (Kennickell and Shack-Marquez, 1992). To meet the objectives of this study, homeowners were selected for the sample and weighted by the weight variables produced by the Survey Research Center at the University of Michigan to ensure the representativeness of the sample. This resulted in a sample size of 2,126 homeowners.

Results and Discussions

Results of comparisons between second mortgage and home equity lines of credit holders versus non-holders are reported in Tables 1 & 2. The characteristics of home equity lines of credit holders and non-holders are very different. Holders have almost twice as much income, net worth, home equity, and home values as the non-holders. They also hold more mortgage and credit card debt. Non-holders are less educated and less willing to take risk, and have a smaller household size. Also, households who have home equity lines of credit are younger than non-holders. Overall, home equity line holders seem to have a better economic profile and better control over their finances than non-holders. They are a more educated group of consumers and have a higher level of risk aversion.

The differences between second mortgage holders and non-holders are not as big as the differences between lines of credit holders and non-holders (Table 2). Net worth, home equity, income, attitudes, and risk tolerance are not significantly different between holders and non-holders. Holders have a slightly higher mean home value, mortgage, and credit card debt. In addition, these households are younger, better educated, and have a larger household size than non-holders. Therefore, second mortgage holders tend to be in greater need of credit, which is

reflected by their higher debt and mortgage holdings, large household size, and early stage of the life cycle. They may be quite capable of managing the debt because of their higher educational levels.

Table 1
Characteristics of Home Equity Line Holders vs. Non-holders

Var.	Holders Mean	Non-holders Mean	t-test
NW	328849.0	174066.0	3.37***
INC	72459.0	44048.0	1.62*
VALUE	166657.0	92264.0	6.26***
MORT	49408.0	23668.0	5.42***
EQU	117248.0	68715.0	5.38***
CARD	1457.0	735.0	2.78***
SIZE	3.4	2.8	5.08***
AGE	46.0	53.0	6.92***
EDUC	14.0	12.0	12.82***
ATT	2.2	2.0	1.31
RISK	1.7	1.6	7.47***

***Significant at .01;
 **Significant at .05;
  *Significant at .10.

Table 2
Characteristics of Second Mortgage Holders vs. Non-holders

Var.	Holders Mean	Non-holders Mean	t-test
NW	142849.0	197316.0	-.11
INC	57830.0	47061.0	.82
VALUE	131994.0	99919.0	1.67*
MORT	66165.0	24468.0	4.31***
EQU	66566.0	75514.0	-.48
CARD	1577.0	780.0	3.49***
SIZE	3.0	2.9	2.12***
AGE	44.0	53.0	9.11***
EDUC	14.0	12.5	3.56***
ATT	2.1	2.1	-.48
RISK	1.6	1.6	1.39***

***Significant at .01;
 **Significant at .05;
  *significant at .1.

Results from the multi-variate logit analysis are reported in Table 3. Both models are very significant which are reflected by the large log-likelihood functions that have large values of 221 and 143 for the two models respectively. The predictive power of the two models are indicated by the concordant values. For the

second mortgage model, the value is 70.3%, while it is 76.8% for the other model. That is, over seventy percent of the values in the data can be correctly predicted by the two estimated models in this study (SAS/STAT User's Guide, 1989).

Table 3
Estimated Results from the Logistic Analysis

Var.	CREDIT	LOAN
NW	.001	.002
INC	.000	-.006
VALUE		-.046**
MORT		.000***
EQU	.062***	
EQSQ	-.000***	
CARD	.000+**	.000*
SIZE	.094*	-.246***
AGE	.159***	.354***
AGESQ	-.002***	-.004***
MS	.308	.056
EDUC	.163***	-.030
RACE	.092	.134
ATT	.164**	-.113
RISK	-.164	-.119
ARM	-.137	-.535*
-2 LOG	220.97***	143.06***
Concordant	70.3%	76.8%-

***Significant at .01;
 **Significant at .05;
  *significant at .1.

Although home equity line holders have different behaviors compared to second mortgage holders in many of the aspects examined, there are still some similarities. Neither income nor net worth has a significant impact on the probability of holding either home equity lines of credit or second mortgages. Income and net worth, although two very important indicators of the economic well-being of the household, are not found to be important determinants of the home equity borrowing as measured by this study. For net worth, one possibility is that home equity accounts for such a large percentage of the total net worth of many households that the effect of net worth may have been absorbed by the effect of home equity.

Home equity value is positively related to the possibility of holding a home equity line of credit, but has

a slightly downward trend as the home equity value becomes very large, which is indicated by the negative coefficient of equity squared. This result supports findings from previous research: households having larger home equity values have more demand for credit for convenience purposes. The reason might be that since the possibility of being granted a home equity lines of credit is positively related to the amount of home equity consumers hold, these households tend to hold more home equity lines of credit. Households with extremely large home equity may behave very differently than the rest of the households. They may not need credit at all, which means fewer holdings of home equity lines of credit.

The situation of second mortgages is quite different from the lines of credit borrowing. Those who have less home value but more mortgage debt have a higher probability of holding a second mortgage. This might be explained by the fact that the home equity lines of credit tend to be used for convenience purposes while a second mortgage is taken out by those who are really in need of credit. Those who have higher mortgage debt and less home value may have a greater credit need. Therefore, they have to borrow through a second mortgage to smooth consumption and enjoy the tax benefit associated with it. Credit card debt holders are more likely to hold both a home equity line of credit and a second mortgage. On one hand, this result suggests that consumers holding one form of credit are more likely to hold another form of debt. On the other hand, second mortgages and home equity lines of credit might sometimes be used to repay credit card debt by consumers to avoid high interest charges on it. Holdings of home equity lines of credit have very weak associations with holdings of adjustable-rate first mortgages (ARMs). However, those who hold ARMs are less likely to hold second mortgages. The reason behind this finding may be that there is so much uncertainty associated with the payment of their ARMs that households become very conservative on taking out a second mortgage. For the demographic variables

investigated, household size is positively related to the possibility of having home equity lines of credit, but negatively related to the possibility of holding second mortgage. Larger households usually have higher consumption levels resulting in higher levels of debt to finance the consumption. What form of credit these households prefer is a question. The findings of this study suggest that they might prefer home equity lines of credit to a second mortgage.

Education is positively related to the probability of holding a home equity line of credit. On one hand, better educated people have better knowledge of how to handle their finances. On the other hand, they tend to have higher consumption levels. Therefore, they are more likely to borrow to smooth their consumption. Consumers' attitude toward credit is also positively related to the probability of holding a home equity line of credit. This may be easily explained by that people who perceive credit as a good idea are more likely to borrow.

Age is positively related to the probability of holding either type of home equity loan, but with a slightly downward trend at later stages of life cycle. When consumers are young or old, they are less likely to hold a home equity line of credit or second mortgage. At early stages of their lives, consumers probably have not built enough home equity or even do not own a house, from which a loan can be drawn. At middle stages, the households become more mature and have enough home equity to borrow against. At the same time, their need for credit is higher as children grow up. Therefore, they are more likely to depend on home equity borrowing to support consumption. After retirement, or after children leave the household, the consumption level becomes lower and there is less need for borrowing against their home. In addition, older consumers might be very conservative in their financial decisions and using the house as collateral is less desirable for them.

Implications

Comparisons between home equity lines of credit holders and second mortgage holders vs. non-holders suggest that home equity lines of credit users tend to be in a better financial situation and seem to have better control over their finances. Second mortgage holders tend to hold more mortgages and credit card debt and are at earlier stages of life-cycle with relatively larger household sizes. Therefore, it seems that home equity lines of credit are more likely to be drawn for convenience purposes, whereas second mortgages are usually drawn for loan purposes. Knowing this difference can help financial institutions direct their products to specific consumer. For example, for convenience purposes, a home equity line of credit can be established instead of a second mortgage.

Besides these, understanding the factors associated with the probability of holding the two types of home equity and how to differentiate the two types of holders are important to the credit marketers. Age is an important factor associated with home equity borrowing. Households in middle stages of their life cycle are more likely to hold a home equity line of credit and second mortgage. Therefore, these households are a group which is well worth targeting for both types of home equity loan products. Larger households tend to have greater demand for credit and are more likely to have home equity lines of credit instead of second mortgages. Therefore, these households might be targeted with more home equity line products but less second mortgages. Well educated households are more likely to have home equity lines of credit instead of second mortgages due to the specific need of convenience credit. These people would be an important segment of the market for home equity lines of credit. In addition, people who already hold some credit card debt should be listed as potential users of home equity loans, so are those who have good opinions on credit. Households who have ARMs in the first mortgage should not be targeted with second mortgages since these households are less likely to draw a second mortgage.

There have been concerns for government officials and policy makers on whether consumers have the ability to deal with the increases in home equity loans on their balance sheet. The increasing consumer debt delinquency and bankruptcy rates have been worried by many people. For home equity loans, the results of delinquency could mean the loss of primary housing, which can be really devastating. The results of this study suggest that home equity line holders tend to be better educated, at later stages of their life-cycle, and in better financial situations. For second mortgage holders, they are also at mature stages of their life cycle and have a smaller household size. Generally speaking, these households should be capable of managing home equity loans. Therefore, as long as the households are guided and protected properly, there should not be much worry about consumers' ability to handle their loans.

The results of this study suggest that elderly households are not actively using home equity loans. Surveys show that elderly consumers usually pay off their mortgages and own their homes, but tend to lack liquid assets, and thus, have a lower standard of living. Properly drawing home equity loans could help these elderly out of this liquidity dilemma. Financial advisors can help their elderly clients to explore the possibility of raising their living standard by using home equity loans wisely.

According to demographic projections, a large percentage of the population, i.e., the baby boomers, are going to enter their later stages of life cycle soon. Since home equity loan users tend to be at later stages of their life-cycle, there should still be a potential boom for the home equity loan market. Policy makers and financial institutions should be aware of this potential boom and be prepared to set up new and appropriate strategies to serve these consumers.

It is also financial educators' responsibility to give consumers adequate knowledge to wisely use home

equity loans. Programs designed to teach elderly consumers how to depend on home equity loans to solve their liquidity problems can be especially helpful. Also, educating the baby-boomer generation in properly managing their finances and appropriately using home equity loans may create a healthy demand in the home equity loan market.

Because of limitations of the data, some other interesting aspects of this issue were not investigated. For example, the purpose for using these two types of home equity loans may be a very interesting aspect to examine. Further studies might concentrate on this issue.

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Endnotes
1. Graduate student, Department of Consumer Sciences and Retailing.
2. Graduate student, Department of Consumer Sciences and Retailing.

Educational Expectations and Debt Distribution:
An Empirical Analysis of Short-term Versus Long-term Debt

This study examined demographic factors and educational expectations on household debt structure using the 1986 Survey of Consumer Finances data. Results indicated that marital status, education, income, age, and saving purposes are related to holding short-term debt; while marital status, income, durable good purchases, saving purposes, and net worth are related to holding long-term debt. There is evidence to indicate that there are systematic differences in household debt distribution.

Kelli S. Rouse, Purdue University[1]

Introduction

"A fundamental concept of the economic life-cycle is that at different points in life a family's income and desired expenditures may not match" (Avery, Elliehausen & Kennickell, 1989, p.34). As explained by Thurow (1969), household's try to achieve maximum satisfaction of income over their lifetime by changing their saving and borrowing patterns. This is what Thurow called the Life-Cycle Income Hypothesis. The literature over the years indicates that the distribution of savings, as one way to smooth out consumption, is influenced by both demographics and expectations (Ando & Modigliani, 1963; Courtless, 1991; DeMagistris, 1982; Wilcox, 1991).

Katona's (1975) research added a psychological element to consumer behavior theory. Expectations were found to give advanced indications of changes in consumers' spending-saving behavior, especially of changes in expenditures on durables. Therefore, it is suggested that expectations or plans may influence behavior. Existing literature on expectations has covered virtually every topic; however, an expectation left unexplored is that of the education of children. It has been intuitively speculated that parents place considerable weight on their children's educational attainments, but it has only recently been documented that some parents save up funds and, through their children, invest for the future (Lunt & Livinstone, 1992). Further, Grossman, Davis, and Morrall (1971)

stress that education is a form of human investment.

Based on the life-cycle hypothesis, saving levels, as well as consumption patterns, differ systematically among households. Demographic factors, such as age, marital status, and education can influence the accumulation and distribution pattern of income over the life-cycle. Other psychological factors, such as expectations of the economy, of retirement, or of educational aspirations may also shape behavior. The prediction of consumption and saving patterns among households has emerged from previous research, but what about variations in household debt structuring? It is logical to assume that there might be differences among households in their holdings of short-term debt (consumer credit) versus their holdings of long-term debt (mortgage). Therefore, this paper proposes to analyze the impact of demographic factors and specifically, educational expectations, on household debt distribution.

An Overview

Consumer credit is the vehicle that consumers use to obtain goods in the present and pay for them in the future. Consumer installment credit, which includes those contracts which require two or more payment schedules, soared in the late 1970s due in part to the lengthening of maturities. Credit card debt, a major component of consumer installment credit, also rapidly increased during this time. As a

precaution to rising inflation, home ownership substantially increased. After the recessionary period of 1980-1982, low interest rates and lengthening maturities produced a 45% increase in outstanding mortgage debt (Avery, Elliehausen, & Kennickell, 1987). The sum of home mortgages and consumer installment debt outstanding rose from $1.3 trillion at the end of 1980 to just under $3.4 trillion at the end of 1990 (Canner & Luckett, 1991). With a substantial growth in both mortgage and installment debt, an examination of household characteristics to determine who borrows and for what reason was undertaken.

Determinants of Consumer Debt

Traditional life-cycle theory suggests that consumption patterns, as well as saving levels, differ among households. Studies have suggested that these differences are influenced by demographic factors (Abel, 1980; DeMagistris, 1982; Hendricks & Youmans, 1973; Lunt, 1992). Future expectations and planning horizons, such as those for retirement, bequests, and the future economic climate have been shown may also influence credit usage (Abel, 1980; Katona, 1975). Therefore, the question arises, what influences debt patterns? In the following discussion of debt structure, nine major determinants of holding debt-- *age, marital status, income, occupational rank, educational status, net worth, reason for saving, vehicle purchases, and durable purchases*--are analyzed and hypothesized to explain variations in holding short-term versus long-term debt.

The reason for addition of educational expectations as a determinant of debt holdings has to do with the cost of education, the importance of education, and education being a type of investment. First, Olson (1983) calculated that in 1980 "an average two parent family with no previous children and head age 25 can expect to spend a total of $214,956 (1982 undiscounted dollars) to raise a son born in 1980 from birth to age 22, assuming the son is not expected to attend a residential private college" (p.55). This amounted to 24% of the survey's

average family total income. Secondly, the value of education, not only to the household, but the economy as a whole, was taken into account. According to Katona (1975), the "decisions by adults...to the extent and form of the education of children are of crucial importance in our society" (p.39). And finally, Grossman, Davis, and Morrall's (1971) concept of education as a form of human investment seems to classify educational expectations as different from other long term goals.

The relationship between each determinant and the exhibited behaviors are examined using a multivariate analysis, which assumes the controlling of all other factors (Hair, Anderson, & Tatham, 1987).

According to Canner (1988), the middle years (35-44) of households (henceforth called HH in the text) have been found to be positively related to the usage of installment debt. Because family formation and expenditures for durables produce needs that are greater than income, younger HH are predominantly those that acquire debt (Durkin & Elliehausen, 1977; Hendricks & Youmans, 1973; Kurihara, 1954; Lunt & Livingstone, 1992). Further studies have shown that age, as part of the life-cycle of a HH, is negatively related to credit card usage (White, 1975; Wiley & Lawrence, 1974). Lunt and Livingstone (1992) found that age was positively related to holding mortgage debt. Therefore, *H1: Age will have a curvilinear relationship to holding consumer credit debt and a positive relationship to holding mortgage debt.*

Most research on marital status has generally collapsed this variable with age into a broader "life-cycle" category. With this grouping, it has been suggested that younger married HH are more likely to incur debt (DeMagistris, 1982; Report of the National Commission on Consumer Finance, 1972). However, a recent study (Lunt & Livingstone, 1992) found that single people were more likely to be in debt than married couples. Further evidence suggests that married couples are more likely to own their own homes (US Bureau of Census, 1990). Therefore, *H2: Marital status will be positively related to holding consumer credit*

debt and mortgage debt.

Numerous empirical studies show support that the educational attainment of the HH head is positively related to using credit cards (Canner, 1988; Hirschman & Goldstucker, 1978; Johnson, 1979; Wiley & Lawrence, 1974). Also, the kinds of financial decisions made by HH are influenced by education level (Oberly, 1967). Therefore, *H3: Education will be positively related to holding both consumer credit debt and mortgage debt.*

Use of installment debt has been shown to be a middle/upper-middle phenomenon (Canner, 1988; Hendricks & Youmans, 1973; Katona, 1964; Lunt & Livingstone, 1992; Sullivan & Worden, 1986). In the theoretical model, however, it has been speculated that income may only be a proxy for debt usage; lower income groups have less income available for usage, therefore, these groups have a more modest demand for using consumer installment credit (Hendricks & Youmans, 1973). Data taken from the 1970, 1977, and 1983 Survey of Consumer Finances have shown that income is curvilinear to consumer installment debt and positive for holding mortgage debt. Therefore, *H4: Income will have a curvilinear relationship to holding consumer credit debt and be positively related to holding mortgage debt.*

Occupational rank has been found to have a positive relationship to holding consumer credit debt (Plummer, 1971; Wiley & Lawrence, 1974). No literature to date has been found concerning the effect occupation has on holding mortgage debt, therefore, use of this variable in the model is one addition to the credit usage literature. Because of the lack of information for the effect occupational rank has on holding mortgage debt, it is hypothesized that, *H5: Non-white collar occupations (craftsmen and laborers), will be negatively related to holding consumer installment debt and positively related to holding mortgage debt.*

The largest portion of installment credit represents vehicle debt (Katona, 1964; Report of the National Commission of Consumer Finance, 1972). Thus, *H6:*

Purchasing a vehicle will be positively related to holding consumer credit debt.

The existing literature suggests that durable purchases are financed more by consumer installment credit than by any other type of credit (Hendricks & Youmans, 1973; Katona, 1964). However, literature on the effect durable expenditures will have on mortgage debt is nonexistent. Therefore, *H7: Durables/home improvement expenditures (over $3,000) will be positively related to holding consumer credit debt and negatively related to holding mortgage debt.* By definition of the variable, it is speculated that those people who are engaged in these home improvements of greater than $3,000 cannot afford to purchase a new house or are currently renting.

"The desire to borrow against future income to smooth consumption may decline with wealth, while incentive to borrow to lever up in the housing market could increase" (Duca & Rosenthal, 1991, p.13). An earlier study by Katona (1964) suggested that mortgage debt would be related to younger age groups because of their limited net worth. One would expect, that with increasing net worth, the need for consumer installment credit would diminish and planned borrowing for housing would occur. Thus, *H8: Net worth will be negatively related to holding consumer credit debt and positively related to holding mortgage debt.*

Psychologically, it has been theorized that expectations may provide advance indications of changes in consumers' spending-saving patterns (Katona, 1975). Two studies have shown that children and expectations influence saving patterns in HH (Eizenga, 1960; Sheldon, 1973). Further studies by Modigliani (in Abel, 1980) and DeMagistris (1982) examined expectations through the planning horizon theory. According to Modigliani (in Abel, 1980), firms at all times have explicit plans covering all aspects of their operations over some definite horizon. These plans serve as parameter estimates and constraints over the business horizon. With expectations, goals change and

patterns of saving and indebtedness may also change. Lunt and Livingstone (1992) found evidence that parents do in fact place a considerable amount of weight on their children's educational attainments; therefore, they save up funds and, through their children, invest in the future.

To date, no literature linking educational expectations to consumer debt has been undertaken; therefore, the addition of this variable to the model is a significant contribution to the existing literature. It would seem likely that HH would rather tie their disposable income up in shorter contractual payments than in long term mortgage debt. Therefore, based on the planning horizon theory, it is hypothesized that, *H9: Educational expectations will be positively related to holding consumer credit debt and negatively related to holding mortgage debt.*

Methodology

Data and Sample

The financial data used for analysis in this study were taken from the 1986 Survey of Consumer Finances (SCF). Two sets of HH were included in the sample: those who had consumer installment debt and those who had mortgage debt. A select sample of 1,016 HH, from the original 2,822 respondents, were used in the final empirical analysis. The 1986 survey SCF was a re-interview of the HH surveyed in 1983. Households were defined to include all persons who resided in the same dwelling and were related by blood, marriage or adoption. The respondent was the "economically dominant" family member, defined as the person who owned or rented the home, provided the greatest amount of income, or was the most knowledgeable about the family finances (Survey of Consumer Finances, 1986).

Measure of Dependent Variable

The dependent variables, Consumer Installment Debt and Mortgage Debt, were measured by whether or not the HH possessed these types of debt. Total consumer installment debt was the summation of all credit card debt, consumer debt,

and other debt. Mortgage debt included the sum of first and second mortgage loans on the household's primary residence.

Measure of Independent Variables

All independent variables were measured categorically and the range of their values can be found in Table 1.

Table 1
Measurement of Independent Variables

I.V.	Range
Age (of HH head)	1=under 25
	2=25-34
	3=35-44
	4=45-54
	5=55 and over
Marital Status	0=Married
	1=Not Married
Education	0=College
	1=High School
Occupation	1=Craftsmen
	2=Laborers
	3=Farmers
	4=White collar
Income (total 1985)	1=$0-9,999
	2=$10-19,999
	3=$20-29,999
	4=$30-39,999
	5=$40,000+
Vehicle (purchase)	0=Yes
	1=No
Durables ($3,000+)	0=Yes
	1=No
Networth	1=$0-9,999
	2=$10-49,999
	3=$50-99,999
	4=$100-249,999
	5=$250-499,999
	6=$500-1 million
	10=> 1 million
Saving (reason)	0=Educational
	1=Other

Procedure

A probit analysis was used because of its advantages over other techniques such as regression or logit (Pindyck & Rubinfeld, 1981). Probit analysis yields estimates of the probabilities of certain events. By the nature of this study, the probability of holding various types of debt was being tested, therefore, probit was chosen as the appropriate technique. With dependent variables that are dichotomous in nature (whether or not they hold certain types of debt), coefficients for

regression analysis cannot be tested for significance, but coefficients from probits can be (Heck, 1987).

Results and Discussion

Coefficients and significance levels of the model can be found in Table 2.

Age. As hypothesized, age had a curvilinear relationship to holding consumer credit debt. Those in the middle years, 35-54, were more likely, as compared to those over 55, to hold consumer credit debt. Also as hypothesized, age was positively related to the probability of holding mortgage debt. As age increased, the probability of holding mortgage debt also increased.

Marital Status. As hypothesized, marital status was found to be positively related to holding both consumer credit debt and mortgage debt. Since marital status is highly related to age and life-cycle of the HH, it would be expected that married couples would be more likely to purchase goods on the installment plan and want to own their own homes.

Education. As hypothesized, education was found to be positively related to the probability of holding both consumer credit debt and mortgage debt. Analysis shows that education was a significant determinant of holding consumer credit debt, but not for holding mortgage debt. Thus, educational level does influence short-term debt, but generally, has little effect on long-term debt.

Income. Holding everything else constant, income was found to have a curvilinear relationship to the probability of holding consumer credit debt, as hypothesized. Those with incomes between $10,000 and $19,999 were significantly more likely to use consumer credit than those with incomes of greater than $40,000. The probability of holding mortgage debt was found to have a curvilinear relationship. Middle income groups, $10,000 to $29,999, were significantly more likely to hold mortgage debt than those with high incomes (over $40,000).

Occupation. As hypothesized, nonwhite collar professions, as compared to white collar occupations, were found to be negatively related to the probability of holding consumer credit debt, although not significant. The probability of holding mortgage debt produced mixed results. As hypothesized, farmers and craftsmen would be more likely to hold mortgage debt, although the results were insignificant. Laborers, however, were found to be less likely to hold mortgage debt.

Vehicles. As hypothesized, purchase of vehicles was found to be positively related to the probability of holding consumer credit debt and positively related, although insignificant, to holding mortgage debt.

Durables. Contrary to the existing literature and the proposed hypothesis, purchase of durables was found to be negatively related to the probability of holding consumer credit debt. Durables were also found to be negatively related to the probability of holding mortgage debt, as hypothesized. One possible explanation for the contrary results is that the time span or the amount limit ($3,000) may have skewed the results.

Net worth. Somewhat contrary to the hypothesis, all net worth categories were found to be significantly more likely to hold consumer debt than individual's with net worth of over one million. Net worth was also found to be positively related to the probability of holding mortgage debt, as hypothesized. Even though net worth was found to be positively related to the probability of holding both types of debt, it seems unusual that all levels would be so highly significant. A multicollinearity check was done and although it was not correlated to other variables, the levels may be inter-correlated.

Saving for Education. As hypothesized, educational expectations were found to be

Table 2
Probit Analysis for Demographics/Expectations Between Consumer Credit Debt and Mortgage Debt

Variables	Consumer Installment Debt	Mortgage Debt
Age		
under 25	.35	-.22
25-34	1.00	.04
35-44	1.31**	.99
45-54	1.27**	1.01**
55+	-	-
Marital Status		
Married	1.06***	2.00***
Not Married	-	-
Education		
College	.36*	.21
High School	-	-
Occupation		
Craftsmen	-.28	.01
Laborers	-.05	-.18
Farmers	.04	-.48
White Collar	-	-
Income		
$0 to $9,999	.52	1.11
$10 to $19,999	.66*	.92**
$20 to $29,999	.29	.54*
$30 to $39,999	.04	.07
$40,000 +	-	-
Vehicle		
Yes	.68***	.07
No	-	-
Durables		
Yes	-.59***	-.57***
No	-	-
Networth		
$0 to 9,999	2.69***	-1.32***
$10 to 49,999	2.85**	.62***
$50 to 99,999	2.50***	1.17*
$100 to 249,999	1.76***	.99***
$250 to 499,999	1.17***	.91***
$500 to 1 million	.90***	1.38***
$1 million+	-	-
Saving		
Educational Reasons	.36*	.53*
Other	-	-
Intercept	-2.41***	-2.74***
Log Likelihood		
for Logistic	-547.54	-520.60
Sample Size	1016	1016

Note: * p<.10   ** p< .05   *** p< .01

positively related to the probability of holding consumer credit debt, although not significant. Contrary to the proposed hypothesis, expectations were found to be positively related to the probability of holding mortgage debt. It would seem that educational expectations had very little effect on the household's debt structuring; however, because of the small sample size (N=130), results may be understated and misleading.

Limitations

The major limitation to this study is the variable related to educational expectations. The variable used, reason for saving, may only give information on what a HH says they are saving their income for, not what in the end they use it for. Further, with such a small sample, the results may be skewed.

Conclusions and Implications

This study is an analysis of demographic factors and expectations on household debt structure. Holding consumer credit debt, as influenced by education, income, marital status, and age supports the "hump" curve of consumption over the life-cycle. Based on this study, there is evidence to show that not only are there systematic differences in household saving levels, as explained by demographics and expectations, there may be differences in household debt distribution.

Implications for Credit Grantors

The findings of this study suggest that as a variable determining credit usage, educational expectations may play an important role. For credit grantors to better assess their willingness to lend to consumers, inclusion of this variable may be worthwhile.

Implications for Consumer Financial Planners

Since existing literature on the effects educational expectations have on holding various debts is limited, this study has laid a foundation for further study. Because education is becoming such an important part of people's lives, and the costs of education seems to be skyrocketing, the need for financial planning is crucial for households. Education of how and when to save and how to efficiently distribute debt, so as not to overextend themselves, is necessary.

Future Study

Since the major limitation of this study is the lack of appropriate expectational variables, it is important that future research obtain better, more accurate, variables. Also, other expectational attitude variables (future incomes, interest rates, balance sheet information) may also be included to help explain the variance in debt structure distribution. Finally, further probing of educational level of parents and number of, age of, and spacing of children on educational savings distribution seems appropriate.

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Endnotes
1.   Masters' student, Consumer Behavior, Department of Consumer Sciences and Retailing.

Consumer Choice Between
Adjustable Rate Mortgages and Fixed Rate Mortgages

Using the data from 1989 Survey of Consumer Finances, the determinants of holding adjustable-rate mortgages were examined. The findings reveal that age, education, income, and the extent of risk aversion of household heads have significant influences on the probability holding different types of mortgages.

Yu-yin (Emily) Kao, Purdue University[1]

Introduction

In the United States, almost sixty percent of households own their principle residence, which is the largest investment for most families during their life time, while the mortgage for their housing assets is the largest financial obligation, which accounted for fifty-three percent of aggregate family debt in 1989 (Kennickell and Shack-Marquez, 1992). Fixed rate mortgages (FRMs) have played a dominant role in mortgage market for fifty years since the 1930s. The introduction of adjustable rate mortgages (ARMs) as a major form of housing financing was a significant innovation in the lending instruments and the residential mortgage market in the early 1980s (Goodman and Luckett, 1985). The deregulation of adjustable-rate instruments in 1981 gave federally insured financial institutions permission to carry ARMs, and thus in 1984, more than half of residential origination was loans with adjustable-rate features. The ARMs share of mortgage origination increased significantly to 68% in August 1984 and 69% in December 1987. However, the current (1990) share of ARMs has fallen to approximately 25% of residential mortgage loans originated (Goodman and Luckett, 1985; Peek, 1990).

The significant growth of ARMs was mostly attributed to lenders' aggressive promotion. Experiencing the high and volatile interest rates of the late 1970s and early 1980s, financial institutions, which had relied heavily on fixed-income assets such as FRMs, suffered liquidity and solvency risks. Therefore, the greatest advantages of ARMs to mortgage issuers are the transfer of part of interest rate risk to borrowers and reducing solvency risk by holding a more liquid portfolio.

The major attractive features of ARMs to borrowers are: 1) the discounted interest rates of ARMs compared to FRMs allow lower initial mortgage payments, 2) when the market rates are high, consumers expecting a lower rate in the future would take out ARMs to avoid interest rate risk and refinancing costs. However, consumers are reluctant to borrow ARMs due to the perceptions of some drawbacks such as a sharp increase in mortgage payments associated with an ARM rate increase but without a corresponding increase in income, and the complexity of ARMs which increases the costs of information search.

The purpose of this study is to investigate the determinants of consumers' choice between adjustable rate mortgages and fixed rate mortgages by employing a national data set, the 1989 Survey of Consumer Finances, to test how decisions are made by different households with varied characteristic and expectations. The next section of this study provides a review of previous research related to fixed- and adjustable rate mortgages. The following section develops the theoretical and empirical models to estimate the probability of holding either type of mortgage. The analytical results and tables are presented in the fourth section. A summary of the study's conclusions and implications are shown in the final section.

Review of Literature

The growing prevalence of adjustable-rate financing has drawn the attention and interest of researchers. Numerous studies have been done on the mortgage choices between ARMs and FRMs based on the theory of utility maximization, which means whether consumer mortgage choices are economically rational (Dhillon, Shilling and Sirmans, 1987; Gardner, Kang, and Mills, 1987; Lino, 1992; Mills and Gardner, 1986). It was concluded that consumer preferences, demographic characteristics and macroeconomic factors, as well as mortgage features have significant effects on consumer choices between mortgage types. Life-cycle variables such as age and education indirectly affect the choice between ARMs and FRMs due to the dispersion of income over time. Borrowers with uncertain earnings are more likely to choose fixed rate mortgages (Dhillon, Shilling and Sirmans, 1987; Mills and Gardner, 1986). Younger households are more likely to have ARMs because of their relatively low income and limited borrowing power, which is based on the qualification rule of the ratio of the initial mortgage payment to their income. Income or stream of income was found most significantly related to the decision-making on choosing mortgage type (Bruckner and Follain, 1988; Goodman and Luckett, 1985). The findings indicate that consumers with an initially lower but rapidly rising income stream or an anticipated increase in their future income are more likely to assume adjustable rate mortgages because their ability to make the mortgage payments could remain and adjust accordingly within any significant adjustment of interest rate. Surprisingly, findings from the study of Khazeh et. al (1991), which contradict to those of most studies, indicate that ARM borrowers tend to be older, have higher income, and buy more expensive homes than FRM borrowers. In addition, studies also have found that households with greater net worth and liquid assets tend to utilize adjustable-rate mortgages because they could continue the higher mortgage payments when interest rates are rising; that is,

they seem to have a greater ability to bear interest rate risk (Dhillon et. al, 1987).

Because of the relative complexity of ARMs and needed information search costs, education is a good proxy of knowledge about the advantages, disadvantages, and timing of choosing mortgage alternatives. Better-educated individuals are more likely to be aware of changes in economic factors, to accept newly developed financial instruments, and thus, to take out mortgages with adjustable rates (Dhillon et. al, 1987; Mills and Gardner, 1986). Another factor that may affect mortgage choice is the degree of risk aversion (Alm and Follain, 1987; Bruckner and Follain, 1988; Smith 1987). Theoretical and empirical studies by Alm and Follain (1987) and Bruckner and Follain (1988) suggest that consumers with high sensitivity to interest rate and larger extent of risk aversion are more likely to be FRM borrowers. Bruckner and Follain (1988) used the presence of younger children as the proxy of risk aversion variable. However, it was found to have no significant influence on the mortgage choice. This might be because this variable is a poor proxy for risk aversion variable.

In general, the previous empirical studies investigating the determinants of mortgage choice and the relationships between consumer preference, characteristics and mortgage choice were mostly based on regional data from states or cities or on the information from financial institutions or Realtors. However, no empirical study of consumers' decisions on choosing mortgages has been done with a nationally representative consumer survey. Therefore, this study used the 1989 Survey of Consumer Finances to examine the relationship between certain household characteristics and the choice of an adjustable or fixed rate mortgage.

Methodology

Theoretical Background

A theoretical model is developed based on the utility maximization theory of economics and previous research. According to the

theory and cost/benefit analysis, consumers' choice of the optimal type of mortgage loan will be affected by their socio-demographic, economic characteristics and the features of the loan they choose. The logistic regression analysis is used to estimate the likelihood of consumer's decision-making on alternative mortgage choice. The model is given as follows[2]:

$$p = \text{Pr}(\ Y{=}0 \ / \ X_i \ ) \qquad (1)$$

$$\text{Logit(p)} = \log(p \ / \ (1 - p))$$

$$= b_0 + b_i{*}X_i \qquad (2)$$

where

p = probability of holding ARMs
Y = dependent variable that takes value one if consumers hold ARMs, and zero otherwise.
X_i = a vector of independent variables.
b_0 = intercept.
b_i = a vector of parameters associated with respective independent variables.

Data Set and The Sample

The data for this analysis are from the 1989 Survey of Consumer Finances (SCF), which was sponsored by the Federal Reserve Board and a number of government agencies. The 1989 SCF is the most recent (collected between August 1989 and March 1990) in a series of consumer financial surveys designed and conducted by the Survey Research Center of the University of Michigan since 1947. Studies on the 1989 SCF suggest that income and net worth of households distributed more unevenly, that is, this survey over-sampled the higher-income and wealthier households to attempt to the skewed distributions of income provide unbiased representation of and net worth across the American families (Kennickell and Shack-Marquez, 1992). Due to the problem of multiple imputation in the 1989 Survey of Consumer Finances, only one data set out of five was used in the analysis, but it still covers the whole sample of the Survey, 3,143 respondents.

To create the sample used in this analysis, homeowners with mortgages were selected from the original Survey data set and were weighted based on th6e weight variables[2] produced by the Survey Research Center at the University of Michigan. This resulted in a sample size of 1,318 mortgagors including 260 ARM holders and 1,058 FRM holders[3], compared to the un-weighted sample of 290 ARM holders and 1028 FRM holders respectively.

Hypotheses

Based on the previous studies on mortgage choice and the theory of utility maximization, the general hypothesis of this study is that socio-demographic and economic characteristics, attitudes and expectations of households, and the terms and sizes of the assumed mortgage loans have significant relationships with mortgage choice. Based on life cycle hypothesis, it is hypothesized that age is negatively related to the probability of holding ARMs. That is, younger households whose borrowing power is relatively low based on the qualification rule of initial mortgage payment are more likely to utilize ARMs in order to qualify for a mortgage, while older families who might have accumulated a significant amount of financial assets or are psychologically reluctant (especially for the retired households) to take any financial risk, are expected to be less likely to hold ARMs. Male headed households or better-educated household heads, and with a larger family size are more likely to be ARM borrowers, when compared to those female or less-educated heads with smaller family size.

Lower-income families are more apt to take out adjustable-rate mortgages because they can take the advantage of lower initial interest rate provided by ARMs to qualify for a mortgage loan and buy a home. Households with less liquid assets are also expected to be more likely to be ARM borrowers due to the inability to pay relatively higher initial loan payments associated with FRMs. Those households who expect a rising future income stream, or are more willing to take risk when they make decisions on financial investments are more likely to draw adjustable-rate mortgages because

ARMs are always perceived as riskier and expectations of higher future income could assure the ability to pay when market rates increases.

Families hold many types of debt, The proportion of credit card debt to total debt for most households increased substantially by more than 60 percent in the mean outstanding of credit card debt, during 1983 to 1989 (Kennickell and Shack-Marquez, 1992). Therefore, it is hypothesized that credit card debt is negatively related to holding ARMs. When the value of the home is more expensive, or the larger amount of mortgage loan borrowed, consumers are more likely to hold ARMs, of which the initial loan payment is typical lower than of FRMs, and thus, more affordable. Consumers are more likely to borrow ARMs when the original length of the loan contract is shorter because the mortgage can be paid off more quickly with the same amount of each loan payment based on the favorable discounted rate of ARMs. With the same amount of monthly mortgage payments, ARM borrowers can take advantage of lower interest rate (if they expect no significant rate adjustments would occur, or the average interest rate of ARMs over the loan life is still lower than that of FRMs) and then sign a shorter-term loan contract. Therefore, holding everything else constant, it is expected if the length of loan maturity is shorter, borrowers would probably prefer ARMs.

Measurement of Variables

Variables used in this analysis are defined in Table 1. The dependent variable is operationalized as a dichotomous variable reflecting the probability of holding mortgage alternatives. This analysis employed fourteen independent variables, which can be divided into three categories: demographic factors, attitudinal factors, financial factors related to economic status of households and to mortgages.

Results

Characteristics of the Sample

The simple t-test was performed to determine whether there are statistically significant differences in independent variables between the

Table 1
Measurement of Variables

Variables	Measurement
Choice	1=ARM, 0=FRM
Age	Age of household head
Age2	Age squared
Size	Family size
Education	Years of schooling
Gender	1=male, 0=female
Exp_int	Expectation of interest in the next five years 3=higher, 2=same, 1=lower
Exp_inc	Expectation of income in the next five years 3=higher, 2=same, 1=lower
Risk	Level of risk willing to take, 4=substantial, 3=above the average, 2=average, 1=no
Income	Family income in $1,000
Inc2	Income squared
Liquid	Liquid assets in $10,000
Home	Market value of home
Card	Outstanding of credit card debt in $1,000
Mortgage	Mortgage loan in $10,000
Length	Original term of mortgage contract (years) 1= <=10, 2= 11-20, 3= 21-30, 4= >30

users of these two alternative mortgages (see Table 2). ARM borrowers significantly tend to be younger although the absolute value of mean difference is only 2.7 years. Those households who hold ARMs are less likely to be female-headed and better-educated. Economic status is significantly different between these two groups. The ARM holders have higher income, greater liquid assets, and own more expensive housing, but they also have greater obligations of credit card debt as well as much higher mortgage debt than FRM holders. The results indicate that no significant differences in attitudinal factors between ARM users and FRM users. This means that all households' views of the future macroeconomic situation are quite consistent, and expectations of individual's economic status as well as the extent of risk aversion are similar.

Table 2
t-test Comparison Between ARM Holders and FRM Holders

Variables	ARMs Means	FRMs Means	p-value
Age	44.5	47.2	.006***
Size	3.4	3.3	.999
Education	14.7	14.2	.483
Gender	.93	.89	.000***
Exp_int	2.00	2.20	.770
Exp_inc	2.22	1.97	.968
Risk	2.10	1.93	.263
Income	462.5	209.6	.000***
Liquid	64.0	39.5	.000***
Home	6.73	1.04	.000***
Card	1.42	1.14	.000***
Mortgage	17.8	7.7	.000***
Length	2.58	2.56	.019*

*p<.05, **p<.01, ***p<.001

Analytical Results

The logistic regression was performed and the coefficients associated with the independent variables were generated to estimate the changes in the probability of mortgage holding in accordance with changes in the independent variables. Based on the Chi-square for covariates of log likelihood score, this model reflects a good fit with a significance level at .0001.

The results of logit analysis (see Table 3) suggest that age is significantly and non-linearly correlated with the probability of holding ARMs when other explanatory variables are constant. Partially contradictory to the hypothesis, this non-linear relationship indicates that consumer at younger and older life stages are less likely to be ARM borrowers, compared to middle-aged households. The elderly households, as expected, are less likely to be the ARM borrowers, but younger families also are less likely to hold ARMs. This could be explained by that younger respondents are likely have less experience or knowledge about mortgages, and have less information from their peers.

Surprisingly, education is significantly and negatively related to the probability of holding ARMs. This conflicts with the hypothesis that better-educated households tend to adopt a newly developed financial instruments, and may be more

knowledgeable about the benefits of ARMs, when other situations are controlled. There might be an explanation that less educated households are more likely to be influenced by financial institutions' aggressive promotions and to choose ARMs.

Family income, an important factor affecting consumer financial decisions, was found to support the hypothesis that lower- and higher-income households are more apt to borrow ARMs compared to middle-income households. This could be explained by that the requirement of initial mortgage payments of ARMs is lower than that of FRMs at the same amount of mortgages (Lino, 1992), for which the low-income borrowers are more likely to be able to qualify. Higher income people have greater ability to bear the risk of increases in loan payments along with changes in interest rates. Those households expecting higher income in the future five years tend to be ARM borrowers. This implies that even if loan payments rises due to adjustments in interest rates, they can sustain their ability to pay debt. The same rationale applies to the amount of liquid assets owned by families affecting their mortgage holding, though no significant effects are present. Holding everything else constant, the higher the value of housing assets, the more likely consumers are to hold ARMs. This is consistent with the utility maximization theory and cost/benefit analysis that the differential rates between ARMs and FRMs make ARMs less expensive and larger housing assets more affordable.

In this analysis, the size of mortgage loan has a very significantly positive influence on the likelihood of selecting adjustable-rate mortgages. As hypothesized, a large amount of mortgage is more affordable because of the discounted rate financial institutions offer for ARMs, ceteris paribus.

Attitudinal variables are significant factors affecting consumer decision-making. It is concluded from the analysis that households willing to take substantial risk when making decision on financial investments are

significantly more likely to hold ARMs, which are known for the potential interest risk, than those reluctant to assume any risk. This result confirms the well-accepted belief that when expecting a higher interest rate, a borrower will hold a FRM to avoid risks of rising interest rate and an increase in loan payments.

Table 3
Estimated Coefficients from Logistic Regression on the Probability of Holding ARMs

Variables	Estimated Coefficients
Intercept	-3.792***
Demographic Factors:	
Age	.126**
Age2	-.002***
Size	.036
Education	-.081
Gender	.359
Attitudinal Factors:	
Exp_int	-.213***
Exp_inc	.104
Risk	.214**
Financial Factors:	
Income	-.003*
Inc2	.378*
Liquid	-.010
Home	.004
Card	-.005
Mortgage	1.199***
Length	-.042

Model Chi-square=105.68***
Concordant=67%
N=1318

*p<.10, **p<.05, ***p<.01

Strengths of the effects of those significant variables were examined. Based on the formula provided in Methodology Section, the probability of holding ARMs at the sample mean of each independent variable was calculated to be .187. Table 4 reports the changes in the probability when an individual variable changes holding other variables at mean values. An increase in age of respondents by ten years raises the probability of holding ARMs by almost 26 percent point. A household head with a college degree has a lower probability of holding ARMs than one with high school diploma does by 3.7 percent points.

The income effect on the change in probability seems weak as indicated by that a rise of ten thousand dollars in annual family income only decreases the probability by .5 percent point. A change of ten thousand dollars in the size of mortgage loan changes the probability about four percent points. The magnitudes of changes in probability of holding ARMs of the two attitudinal factors, expectations of future interest rate (higher vs. lower) and the degree of risk aversion (substantial vs.none), are 6.6 and 10.5 percent points respectively.

Table 4
Changes in Probability of Holding ARMS[4]

Changes in Factors	Changes in Probability
Age (+10 years)	+.258
Education (12 vs.16)	-.037
Income (+$1,000)	-.005
Mortgage(+$10,000)	+.039
Exp_int (1 vs. 3)	-.066
Risk (1 vs. 4)	+.105

Conclusions and Implications

This study examined consumer choice between adjustable-rate and fixed-rate mortgages based on the socio-demographic characteristics and economic status of households using the 1989 Survey of Consumer Finances. The most important factors affecting the probability of holding ARMs over FRMs, which were identified by the logit regression analysis, are age, education, income, and the amount of mortgage borrowed, as well as the expectations of future interest rate and the degree of risk aversion.

Criticisms may arise because such variables as the differential rate between ARMs and FRMs that financial institutions would offer at the time of decision-making, and the market interest rate at the time of taking out mortgage loans to estimate the potential interest rate risk, are not available in the 1989 Survey, and thus, were not included in this study. This could explain why the intercept term in the logit model is

very significant. Although the expectation of interest rate in the following five years was used in the analysis, and generated a significant result that those consumers who expect a higher interest rate are less likely to hold ARMs, this finding may be doubtful because the time of interview of this Survey was not the time when consumers were making decision on choosing mortgage types. Further replications of this study would hopefully be able to secure information about the characteristic and expectations of households as well as market conditions at the time of taking out mortgage loans if the data are available.

Several implications both for lenders and borrowers emerged from the results of this study. Financial institutions are more willing to market adjustable-rate mortgages to consumers while consumers hesitate to assume this type of mortgage debt because ARMs are always perceived to be complicated and risky. Especially when market rate is low, the attractive features of ARMs would disappear. Consumers would be more likely to refinance their ARMs with FRMs. Therefore, financial institutions had better understand the consumer profiles in the mortgage market more extensively and develop more attractive products in order to successfully market their financial instruments with adjustable-rate features to different categories of borrowers and retain their profitability. Because of the complexity and perceived risk of adjustable-rate mortgages, consumer acceptability of ARMs is not widespread. Since housing assets are the most important financial investment over consumer life time, consumer education is needed to enrich consumer knowledge of various features and advantages that different types of mortgages would offer. Based on their characteristics, preferences, and needs, consumers with sufficient knowledge could achieve the maximum utility through the right choice.

Acknowledgement

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Endnotes

1. Graduate student, Department of
   Consumer Sciences and
   Retailing.

2. As the sample used in this
   analysis is not the exact
   sample of the 1989 SCF, the
   weight variable are re-
   calculated by multiplying the
   selected sample size and then
   dividing the sum of weight.

3. According to the survey
   questions, respondents were
   asked whether the interest
   rates of their mortgages are
   variable. If the answer is
   "yes", the respondent is
   classified as an ARM borrower,
   otherwise, as a FRM borrower
   based on the assumption of the
   mutual exclusion of these two
   types of mortgages.

4. Probabilities are calculated
   when one specific variable
   changes, holding other
   variables at weighted sample
   means. The probability of
   holding ARMs at the sample mean
   of each variable equals to
   .182.

Consumer Losses from Price Dispersion
in the Consumer Electronics Market

Consumer information is important in making purchase decisions for new products such as consumer electronics. However, technological change, the costs of information acquisition and an unawareness of the benefits from information may result in a consumer information gap. As a result, there may be considerable price dispersion for products of comparable quality. The purpose of this study was to estimate price dispersions for consumer electronic products in the 1987 to 1991 time period and the consumer loss from such dispersions. Data for seven consumer electronic products were obtained and indicated the existence of a consumer information gap. Price dispersions ranged from 6 to 35 percent in the five year period while the consumer loss ranged from $16 million to $2.0 billion.

Adriana Jannuzzi and Rachel Dardis, University of MD[1]

Introduction

Consumer information is important in making purchase decisions for new products such as consumer electronics. However, technological change for such products combined with the costs of information acquisition and an unawareness of the benefits from information may result in a consumer information gap.

The objective of this study was to estimate price dispersion for consumer electronic products and the consumer loss from such dispersions in the 1987-1991 time period. Data on price dispersions for seven consumer electronic products were obtained from Consumer Reports. The consumer loss was based on the price dispersion for products of comparable quality, sales of consumer electronic products and the price elasticity of demand for such products.

This study builds on recent studies of market efficiency in that it focuses on the consumer loss from inefficient markets. The results of this research should be useful to consumer educators and policy makers who are concerned with the need for consumer information programs and the consequences of the consumer information gap.

Previous Research

There have been numerous empirical studies reported in the literature on the relationship between product price and quality (Geistfeld 1988). Most of these studies used data from Consumer Reports. Low correlations between price and quality were obtained in many instances and were attributed to inefficient markets. Hjorth-Andsersen (1992) disputed this conclusion and stated that other factors might be responsible for low price-quality relationships. He identified the following measurement problems : a) lack of precision with respect to prices and quality, b) selection of product characteristics by testing agencies and c) the use of an overall quality measure since negative correlations between different characteristics might affect the price quality results. Hjorth-Andersen also argued that certain characteristics may cost more and that price differences may be related to such cost differences. Finally, price quality data may pertain to periods of transition when firms are developing new and improved models. Consumers will benefit from such developments in the long-run though they should be aware of possible price disparities in the short-run.

Oxenfeldt (1950) and Maynes and Assum (1982) used Consumer Reports data to examine price dispersion for products of comparable quality. Oxenfeldt compared prices for brands with the same quality grade and estimated the price difference for the

most expensive and least expensive brands. Maynes and Assum examined prices for products in the 50th and 75th quality percentile and compared the highest price with the lowest price. They found that the highest price exceeded the lowest price by more than 50 percent in eleven out of seventeen instances.

Several studies developed alternative measures to evaluate market efficiency and these studies also relied on data from Consumer Reports. Hjorth-Andersen (1984) based his measure on the loss to consumers from purchasing inefficient product variants. He estimated that 12.8 percent of present expenditures on consumer products could be saved if inefficient variants were eliminated. A later study by Kamakura, Ratchford and Agrawal (1988, p. 300) focused on multiple product characteristics and used linear programming techniques to find the "best possible linear combination (h_j) of existing brands in the market, offering the highest amount possible of each characteristic (X_i) .... at the lowest price" (Kamakura et al. 1988, p. 300). The welfare loss was the difference between what consumers paid for a particular set of automobile attributes and the minimum estimated price. The welfare loss from the purchase of price-inefficient automobiles was very small and amounted to less than 0.1 percent of total sales.

A third study by Ratchford and Gupta defined market efficiency as the "aggregate amount which consumers lose due to not choosing the maximum brand" (Ratchford and Gupta 1990, p. 389). They estimated consumer losses for fourteen product categories under a variety of assumptions and found that losses were affected by a variety of factors and not just by price-quality relationships. This study was discussed by Maynes (1992) who contended that many of the assumptions about consumer search were unrealistic. Thus, many consumers might be unaware of the benefits from information and have little reason to search. Maynes concluded that price quality correlations would have been important determinants of losses in the Ratchford/Gupta study if they had made more realistic assumptions about the consumer's search process. In response Ratchford and Gupta (1992,

p. 289) stated that there were problems in constructing measures of market efficiency and that price-quality correlations might not be the best measure. They believed that it was more appropriate to "concentrate on measures of consumers' ability to buy a given bundle of attributes at lowest cost" and cited previous studies by Maynes and Assum (1982), Hjorth-Andersen (1984) and Kamakura et al. (1988) as examples.

Gupta and Ratchford (1992) also estimated the efficiency of consumer choices for new automobiles. They constructed quality indexes for all new cars purchased based on consumer preferences and stated that a brand was inefficient if there were another lower priced brand available of the same or higher quality. They estimated that the average buyer could save about 10 percent of the purchase price if they bought cheaper brands which yielded the same utility. They concluded that most automobile buyers in their sample were not affected greatly by inefficient purchases though some buyers had large losses.

Procedure

The welfare loss model is discussed in the first section followed by price dispersion estimates and the demand analysis which was used to obtain the price elasticity of demand for consumer electronic products.

The model used to estimate the loss in consumer welfare is based on the change in consumer surplus when the consumer pays a higher price for a product due to lack of information. The change in consumer surplus has two components. The first component is the cost difference and is equal to $(P_2-P_1)Q_2$ where P_2 is the price paid by uninformed consumers, P_1 is the price paid by informed consumers, and Q_2 is the market quantity. The second component is the deadweight loss or the loss incurred by consumers who leave the market due to higher prices. It is equal to $1/2 \, dP/dQ$ where dP is equal to P_2-P_1 and dQ is the reduction in market quantity due to the higher price.

Data for P_1 and P_2 were obtained from Consumer Reports while sales of consumer electronics (P_2Q_2) were obtained from the Electronic

Industries Association. The same price-elasticity of demand was used for all consumer electronic products since they were similar in nature and it was obtained from the results of the demand analysis. The price dispersion was equal to $(P_2 - P_1)/P_2$. The price P_2 was the average price of all brands of the same quality while the price P_1 was the average price of the two lowest priced brands. This estimate was based the procedure used by Cecchini, Catinat and Jacquemin (1988) to calculate the gains in European economic welfare due to the 1992 market integration. It was assumed that market integration in some protected sectors would "lead to a price level equal to the average of the prices obtaining in the two EC countries with the lowest levels at the moment" (Cecchini et al. 1988, p. 81). This was compared to the average EC price before integration.

Price and quality data for all brands were obtained from Consumer Reports. Prices paid were used in preference to list prices in all instances to allow for discounting. Price data for 1990 and 1991 were also based on surveys of retail prices in a six months period by Consumers Union. Quality data were based on numerical quality points or scores as well as the point spread needed for one brand to be significantly superior or inferior to other brands. Brands which fell within the same point spread was assigned to the same quality group commencing with brands with the highest scores. Discontinued brands were eliminated since they were no longer available for purchase. This procedure resulted in several quality groups in some instances. However, each quality group had to contain at least four brands following the procedure used by Oxenfeldt (1950) in order to obtain some measure of price dispersion. The price P_2 was the average price of all brands in a given quality group while the price P_1 was the average price of the two lowest priced brands. The fact that there were several quality groups for one product category meant that there were several price dispersion estimates. In such instances, an average price dispersion was used.

The demand analysis was based on annual data from 1974 to 1991.

The dependent variable was the per capita consumption of consumer electronic products in the United States. Selection of the independent variables was based on previous research (Lippitt, 1959; Houthakker and Taylor, 1970; Grieves, 1979; Olney, 1990). The major variables were income, relative price and the lagged dependent variable which was included to account for the impact of last year's consumption on current consumption. All data were converted to constant 1980 dollars using the Consumer Price Index for all items.

Results

The results of the demand analysis were satisfactory. The coefficients of the independent variables, in particular the relative price variable, were significant in most instances. The short-run price elasticities ranged from -0.59 to 1.10 while long-run price elasticities ranged from -1.44 to -1.46. This means that consumers are more responsive to changes in the prices of consumer electronics in the long-run than in the short-run. Some of the possible reasons for this could be that consumers anticipate future improvements in technology, wish to acquire more information before they purchase a product ("bandwagon effect"), or expect prices to decline as production increases. Consumer losses based on two price elasticities (-0.59 and -1.46) are reported in this paper.

Price dispersion data are given in Table 1 for seven consumer electronic products in the 1987 to 1991 time period. The average price dispersion ranges from 0.06 for VCRs in 1989 to 0.35 for CD players in 1987. This means that consumers who purchased these products could have paid from 6 to 35 percent less on the average if they had purchased the two lowest priced products. The price dispersion is random and exhibits no specific patterns between products or over time. Sales of the consumer electronic products are given in the last column. Color TVs have the largest sales followed by VCRs and camcorders.

The consumer loss from price dispersion is given in Table 2. Data

Table 1
Average Price Dispersion for Consumer Electronic Products

Product	Year	Price Dispersion	Sales
Camcorder	1987	0.16	1651
	1990	0.19	2260
	1991	0.21	2024
CD Player	1987	0.35	547
	1989	0.17	654
	1990	0.16	654
	1991	0.29	697
Color TV	1987	0.21	6137
	1988	0.15	5717
	1989	0.14	6447
	1991	0.27	6090
Reveiver	1988	0.27	515
	1989	0.29	567
	1990	0.16	481
	1991	0.14	528
TV/VCR	1990	0.12	130
VCR	1989	0.06	2586
	1990	0.12	2382
	1991	0.13	2290

Table 2
Consumer Loss for Consumer Electronic Products ($million)

Product	Year	Cost difference	Deadweight loss .59	Deadweight loss 1.46	Consumer loss .59	Consumer loss 1.46
Camcorder	1987	264	12	31	276	295
	1990	429	24	59	453	489
	1991	425	26	65	451	490
CD Player	1987	191	20	49	211	240
	1989	111	5	14	117	125
	1990	105	5	12	109	117
	1991	202	17	43	219	245
Color TV	1987	1289	80	197	1369	1486
	1988	857	38	94	895	951
	1989	902	37	92	940	995
	1991	1644	131	324	1775	1968
Receiver	1988	139	11	27	150	166
	1989	164	14	35	178	199
	1990	77	3	9	81	86
	1991	74	3	7	77	81
TV/VCR	1990	16	0	1	16	17
VCR	1989	155	3	7	158	162
	1990	286	10	25	296	311
	1991	298	11	28	309	326

are given for the cost difference as well as the deadweight loss. The - consumer loss is the sum of these two components. The cost difference accounts for the greatest part of the consumer loss in all instances. It ranges from $16 million for TV/-VCcombinations in 1990 to $1,968 million for color TVs in 1991. This range reflects differences in the average price dispersion and sales. The deadweight loss is affected by these two factors as well as the price elasticity of demand. The greater the price elasticity of demand is the greater the deadweight loss is.

Discussion

The U.S. consumer has benefitted from increased choice and reduced prices for consumer electronic products in the past two decades. However, the results of this study indicate that these benefits could have been increased if the consumer had been more informed about product quality. It appears that there was a consumer information gap in the consumer electronics market in the 1987 - 1991 time period. Consumers, on the average, could have paid from 6 to 35 percent less if they had purchased the two lowest priced products.

This research differs in several respects from the studies reviewed earlier. First, the price dispersion is based on the average price of all brands of the same quality and the average price of the two lowest priced brands. This method is similar in concept to that used by Cecchini et al. (1988) and differs from the maximum price dispersion approach used by Oxenfeldt (1950) and Maynes and Assum (1982). The average price was designed to reflect the range of prices that consumers might pay for similar quality consumer electronic products. The use of the two lowest priced brands was a conservative assumption and was designed to ensure that low priced products were available as well as provide for some differences in consumer tastes.

Second, the consumer loss is based on the change in consumer surplus due to the estimated price dispersion for brands of comparable quality. It is similar in concept to

the welfare loss estimated by Kamakura et al. (1988) though it is based on actual data for the two most efficient products rather than estimated data for the most efficient linear combinations of products. In addition it includes the deadweight loss. Neglect of this component will result in an underestimate of the consumer loss. The greater the price dispersion and the price elasticity of demand are the greater the underestimate of the consumer loss will be.

Several limitations of the study must also be acknowledged. First, the analysis relied on price and quality data from Consumer Reports so the results are dependent on the degree to which Consumers Union (CU) data are representative. However, CU data have been used extensively by researchers and are considered to provide unbiased and objective information about product quality. The price data used in this study were based on prices paid, not list prices, and included price discounts. In the case of 1990 and 1991 the price data were based on prices paid as well as prices obtained in a survey of retail sources during a six month period. Second, the selection of comparable quality brands was based on the judgment of CU researchers that brands which fell with the same quality point spread did not differ significantly in quality. The quality points assigned to each product by CU researchers were based on the product's performance on a set of selected attributes. Thus, it was an overall quality measure. It is recognized that there has been considerable debate in the literature concerning the use of such a measures. Third, the use of CU prices to obtain an average price for all brands was based on the assumption that brands evaluated by CU were of equal importance. If this assumption is unwarranted the price dispersion and consumer losses will change. Consumer losses will be underestimated if high priced brands dominate while they will be overestimated if low priced brands dominate.

The rapid technological changes, which have occurred in the consumer electronics industry, must be borne in mind in interpreting the results of this study. Thus, Hjorth-Andersen noted that there may be poor

price quality relationships when the industry is in a period of transition and firms are developing new and improved models. Some short-run losses may be inevitable in such a transition period due to low price-quality correlations. It is also important to consider the costs of information acquisition. It was not possible to incorporate such costs in the present study due to lack of data. However, this does not mean that they are zero. It is possible that the marginal costs of search may exceed the marginal benefits from search for some consumers. However, one questions if price dispersions of 20 percent or more are acceptable. Their existence may be due to the fact that the consumer is unaware of the benefits from search. It is important for consumer educators to communicate the potential gains from information to consumers and for both educators and policy makers to facilitate the acquisition of information in the marketplace through accessible information programs.

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Endnotes
1. Rachel Dardis is Professor, Department of Economics, Adriana Jannuzzi was a graduate student, Department of Textiles and Consumer Economics.

Consumer Protection Regulation: The Case
of Direct Supervision Requirements in Dental Hygiene

There has been a long-term trend for states to permit dental hygienists to perform more functions under general supervision. General supervision is supposed to reduce costs and increase access to consumers. Organized dentistry is trying to reverse the trend, arguing direct supervision better protects consumers. This study examined the hypothesis that direct supervision requirements are related to actual supervision of dental hygiene and/or to fees for services.

John E. Kushman, University of Delaware[1]

Motivation

There has been a long-term trend for states to permit dental hygienists to perform more functions under general supervision. General supervision means that the hygienist may practice without the presence of the dentist. General supervision is supposed to reduce costs and increase access to patients. Recently, however, there has been a movement in some states back toward requiring direct supervision. Direct supervision generally requires that the dentist be present in the facility for the hygienist to do some procedures. The American Dental Association and state components support direct supervision as protecting consumer safety and health.

It is striking that arguments for direct supervision come from organizations previously supporting general supervision. The reversal coincides with falling incomes for dentists and pressure from hygienists for independent practice. Proponents of direct supervision do not give the mechanism whereby it promotes consumer welfare. No one has presented evidence of such a connection.

This study spells out a possible chain between direct supervision regulations and consumer welfare. It tests whether the first link in the chain holds. If the first link from regulation to consumer welfare fails, there is no positive effect of regulation on consumer welfare.

On one hand, if direct supervision requirements have a positive effect on some aspect of consumer welfare and no negative effects, direct supervision requirements are beneficial. If, on the other hand, direct supervision requirements have no effect on consumer welfare, it is difficult to justify imposing more regulations on dentists, hygienists, and dental boards. If direct supervision requirements have negative effects on consumer welfare, they are undesirable. A mix of positive and negative effects on consumer welfare is indeterminate for policy in the absence of weights for the different effects.

Regulation and Welfare

Determining whether the argument for direct supervision requirements may be valid requires a clear statement of the hypothesis. Those who favor the requirement have made vague claims. Empirical tests require a specific argument. This study looks at private practice in general dental offices, the main area of hygienists' employment.

The first step in the argument is distinguishing among structure, process, and outcome in health care. This distinction was first developed by Donabedian (1980) for assessments of health care.

According to Donabedian, the structure of health care is the settings and circumstances in which care is given, the instruments used to give it, and the qualifications or credentials of the personnel who deliver it. An example of

"structure" in dentistry is the presence or absence of emergency drugs in a practice. This is part of the circumstances in which care is delivered. Whether the care is given by a person with an RDH credential, by a person with a DDS credential, or by some combination of these persons is an element of structure. This particular aspect of structure is crucial in the direct supervision requirement.

Donabedian defined process of health care as the actions undertaken on behalf of the patient. In the case of dental hygiene treatment, whether or not x-rays are taken is an element of process. Probing periodontal pockets is an element of process. Taking a medical history at every visit is a different process from taking one only for new patients.

Donabedian's outcomes are the real determinants of consumer welfare. In dental hygiene, outcomes are primarily increasing oral health and maintaining tissues in a functional state. Donabedian confined outcomes to medical aspects of care. In this study, outcomes are expanded to include prices paid for services. Prices paid affect consumer welfare and should be included in a discussion of consumer protection.

Donabedian defined structure, process, and outcome as different aspects of health care that could be assessed. He presumed, as have nearly all investigators who followed, that "better" structure would lead to "better" process and "better" process would lead to "better" outcomes. Evidence from the DEMCAD study of private dental offices suggests that, for general dentistry overall, this linkage is valid. (Crall and Morris, 1988) Structure, process, and outcomes are positively related. Structure, however, affects outcomes through its impact on process. Structure does not affect outcome directly.

Direct supervision requirements are structural requirements. They require a person with a DDS credential be present when a service is performed. They do not require that any particular service be performed or that any particular improvement in health be achieved.

The hypothesized cause and effect chain between direct supervision regulations and better outcomes is in Figure 1.

In Figure 1, the chain begins with the direct supervision regulation. This regulation states that the dentist must be present in the office when the hygienist performs a procedure. Justifying the

Figure 1

**Direct Supervision Regulation
and
Consumer Protection**
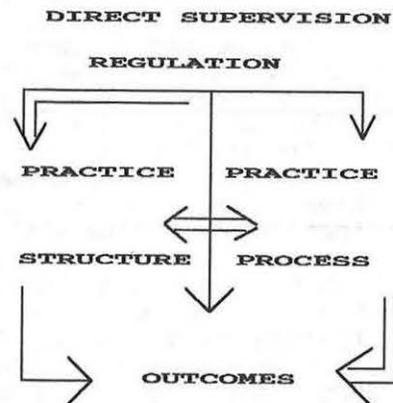
regulation must presume additional connections. First, it is presumed that, if the DDS is present in the office, the DDS will make available some additional skills in an emergency. Second, it is presumed that, if the DDS is present during a particular procedure, the DDS will make additional skills available during that procedure and related procedures. The DDS is not likely to add manual skills to most dental hygiene tasks. The hygienist has more education and practice in manual skills for hygiene tasks. The direct supervision hypothesis must be that the DDS adds skills in decision making, and that these skills will be used more if the DDS is present more. Decisions are part of assessment, diagnosis, treatment planning, and evaluation of services. The upper left-hand part of Figure 1 shows the presumed causal relationship between a direct supervision regulation and the DDS's involvement in decision making. Emergency and nonemergency

situations are distinct.

The upper left part of Figure 1 is the critical link between regulation and outcome. It is a link between structural regulation and the structure of care. There is no question whether someone will make decisions in an emergency. The question is whether that person has a DDS credential. In nonemergency situations, there is no question that someone will be first to see the patient or that someone will evaluate the medical history (however well or poorly). The question is whether that person will have the DDS credential. According to the hypothesis, the immediate effect of a direct supervision regulation is increasing the likelihood that a person with the DDS credential will be involved. This is an effect on structure of care. The process of care is the same, but the credentials of those involved are different.

Justifying direct supervision regulations also must presume that participation of someone with the DDS credential in decision making will affect what is actually done for the patient--the process of care. Participation of a DDS in decision making may be supposed to affect what is done for the patient in thoroughness, reliability, critical analysis, or efficiency. The connection to process in Figure 1 is the double horizontal line between PRACTICE STRUCTURE and PRACTICE PROCESS. The hypothesis is that structure affects process, but different process may require different structure. Causation can go both ways.

Practice process, what is actually done for patients, presumably is the primary determinant of outcomes. Double lines at the bottom right of Figure 1 indicate this final link. What is done for patients should be the primary determinant of patient health and safety and the cost and price of services.

In Figure 1, double lines indicate the primary cause and effect chain from a direct supervision (structural) regulation to the structure of practice, from the structure of practice to the process of practice, and from the process of practice to outcomes. This study focuses on the validity of the first primary link, from direct supervision regulations to practice structure. This link is in the upper left corner of the figure. If regulations of structure do not affect practice structure, the primary chain from regulation to outcome fails.

Other cause and effect relationships are possible among the elements of Figure 1. For instance, direct supervision regulations may create an atmosphere of responsibility and awareness that will directly affect the process of care. More awareness and a greater feeling of responsibility could affect thoroughness, reliability, critical analysis, and efficiency. The single line in the upper right corner of Figure 1 represents this type of relationship. This relationship is probably secondary in importance to the relationship through practice structure.

Likewise, direct supervision regulations might have some effect on accessibility of services and prices directly. The single line from regulations at the top of Figure 1 to outcomes at the bottom represents this possibility. Again, this type of effect is not obvious and, if present, is likely to be of secondary importance. If the DDS is present more for dental hygiene services as a result of direct supervision regulations, but the process of care is unchanged, costs and prices of services still could be higher. The single line in the lower left of Figure 1 also represents a potential relationship between structure and outcomes.

Evidence on Regulations and Structure

This study tested the hypothesis that direct supervision regulations affect practice structure. Technical aspects of the statistical analysis are omitted for brevity. This section gives data sources, a general description of techniques, and results. Details are available from the author on request.

Data on regulations were provided by the American Dental Hygienists Association, Government Affairs Division. The data were created to reflect regulations in the

latter half of 1986. Government Affairs Division staff checked regulations for each state and the District of Columbia for 26 services. For office practices, ADHA's Government Affairs Division determined whether each service required the presence of someone with the DDS credential. For this study, 14 services were selected where most states permitted the procedure but there was some variation in whether a DDS was required to be present.

Data on the actual structure of practices came from a 1986 ADHA Practices and Procedures Survey. (American Dental Hygienists Association, March 1988) The survey was conducted by mail in July and August, 1986. A questionnaire with 80 close-ended items was mailed to 10,507 hygienists in a national random sample. The sample was constructed to assure adequate representation by state. Adequate representation by state is important to this study, since regulations vary by state. There were over 3,000 useable responses.

A subsample of the questions from the Practices & Procedures Survey dealt with supervision as practice structure. This study analyzed the questions on supervision in conjunction with the data on state regulations. Statistical analysis was with the LIMDEP computer program. (Greene, October 1986)

In general, the analysis estimated a functional relationship between the extent of DDS involvement and whether the hygienist had a bachelor's degree, weekly hours of work of the hygienist, years since the hygienist was certified to practice, and a measure of direct supervision requirements. The effects of the bachelor's degree, hours of work, and years since certification were controlled by using multivariate analysis.[2] These variables should represent nonregulatory influences on the discretion dentists extend to hygienists.

The test was that, after controlling for associations with the bachelor's degree, hours of work, and years of certification, there was a positive association between direct supervision regulations and the extent of DDS involvement.[3]

The survey of practices and procedures included a general question about extent of involvement hygienists perceived dentists having. There was a statistically significant positive relationship with structural regulations. Where the state has more direct supervision requirements, the hygienist perceives more DDS involvement or supervision.

Analysis of several additional questions determines exactly where the dentist's greater involvement occurs when regulations require more direct supervision. Some questions deal with health histories and the new patient's entry into the dental practice. There is no evidence of a positive relationship between direct supervision requirements and whether the new patient sees the dentist or the hygienist first. There is no evidence that more direct supervision requirements make it more likely that the dentist will be involved in taking health histories. These are critical aspects of new patient care.

Other questions dealt with return of the recall patient to the practice for a examination, assessment, and treatment plan. Like the results for the new patient, there is no evidence that the recall patient is more likely to see the dentist first in states with more direct supervision requirements. On other questions, there is evidence of more DDS involvement with more direct supervision requirements. The dentist is more likely to be involved in assessment and decisions regarding the recall patient's dental hygiene treatment needs if there are more direct supervision requirements. The dentist is more likely to examine the patient who has been treated first by the hygienist. The dentist is more involved in inspection and diagnosis of the patient when there are more direct supervision requirements.

The ADHA Practices and Procedures questionnaire contained information on many specific tasks and services for new and recall patients beyond the general questions about entry into care or return to care. This study analyzed whether the dentist was more likely to be involved in each specific area. One tabular question dealt with who usually was involved in 17 separate procedures for a new patient. Where

the state has more direct supervision regulations, the dentist is more likely to be involved in determining the need for premedication for hygiene treatment, conducting the soft tissue exam, determining which radiographs are taken, probing and evaluating periodontal tissues, and determining hygiene recall. There is no evidence that the dentist is more likely to be involved in the other tasks, including evaluating the medical history, taking vital signs, and establishing the dental hygiene treatment plan.

Another tabular question dealt with services for the **recall** patient. There are 27 specific procedures in this question. There is striking similarity between the results for the recall patient and results for the new patient. The extent of direct supervision regulations has no significant relationship to whether the dentist or hygienist is first to see and treat the patient and no relationship to DDS involvement in services associated with that entry. There is evidence of a relationship between direct supervision requirement and DDS involvement in key services for the recall patient. These are generally the same services in which a relationship was found for the new patient.

Direct supervision requires that the DDS be <u>present</u> when a procedure is done. It does not require that the DDS participate in the procedure. There is a presumption, of course, that involvement is more likely if the DDS is present. That involvement may affect services in addition to those for which the presence is required. If the DDS is present and supervising one procedure, the DDS is more likely to supervise a second procedure in conjunction with the first. The second procedure may not be one for which that state requires supervision. A link between direct supervision regulations and DDS presence is crucial to any effect.

A survey question asked how frequently the DDS was present when the hygienist performed specific services. This also was a tabular question, with 15 procedures. A statistically significant relationship was found between direct supervision regulations and the

proportion of the time the DDS was present for each service. The regulations produce more frequent DDS presence, and that leads to more DDS involvement.

It is desired by proponents of direct supervision that the DDS be involved in checking and evaluating dental hygiene services before the patient is dismissed. A tabular question on 15 specific procedures asked whether the DDS checked and evaluated the services. For every specific service, there was statistically significant evidence of a positive relationship between direct supervision requirements and the frequency with which the DDS checked and evaluated the service.

IV. Direct Supervision Requirements and Prices

This study tested for an association between the extent to which a state has direct supervision requirements and the price of dental hygiene services. The data on state supervision requirements were from ADHA's Government Affairs Division. They were described in the previous section. The price data were fees for adult prophylaxis, alone or including an examination. The price data were from a 1986 survey of dental hygienists who graduated in 1982. This survey was part of an ongoing longitudinal study of dental hygienists. (Boyer, June 1987) The 1986 survey included many questions on service fees. The survey also included information on the dental practice and the hygienist. The data on state supervision regulations were matched with the survey data for analysis. The 1986 survey data contained information on size of city and whether the dental practice was group or solo. These factors may affect costs, and they were added to the analysis. The individual hygienist respondent to the longitudinal study was the unit of analysis.

Because fees may be determined by general supply and demand and cost of business factors, aside from state regulations, other variables were added to the analysis. The number of dentists per capita and per capita income in the state were added. (Bureau of the Census, US Department of Commerce, 1986, p. 518; 1988 p. xxiv).[4]

Classical regression analysis was used to explain fees by various combinations of state and practice characteristics. Multivariate regression was used to account for the influences of other factors and isolate the relationship of fees to state regulations. The hypothesis was that there would be a positive association between the extent of direct supervision restrictions in a state and fees. States with more direct supervision restrictions would have higher production costs and higher fees, other things constant.

The dependent variable in one set of regressions was the adult prophylaxis fee from the 1986 survey of hygienists. In another set of regressions, the dependent variable was the sum of the adult prophylaxis and adult examination fees. In many offices the prophylaxis and examination are sold as a package, so that the sum of their fees is the package price. The regressions performed better for the prophylaxis fees alone, suggesting that this was the better price variable.[5]

Regardless of what combination of other factors were used in the regression equations, which fee variable was used, or how the extent of supervision regulations was measured, there was no evidence of a positive relationship between supervision regulations and fees. This is somewhat surprising. If more supervision regulations result in more involvement of the DDS in hygiene procedures, they also would seem likely to result in higher costs and prices.

One possible explanation for the lack of a significant relationship between fees and supervision regulations is the data. Although the longitudinal study data in general are excellent, and the data set is well maintained, many respondents did not provide price data. The longitudinal study also has many fewer hygienist respondents than, for instance, the Practices and Procedures survey. Still, there were 350 to 400 usable responses in the price data for each regression. This is a sufficiently large number to detect any strong relationship. Another possibility is that the effect of more direct supervision requirements is primarily to reduce the idle or queuing time of the DDS input in the dental firm. This reduction in idle or queuing time may have little or no opportunity cost. To the extent, however, that more direct supervision requirements are associated with more time for the DDS in the practice, there would be an opportunity cost.

Conclusions

This study found convincing evidence that an increase in state regulatory requirements for DDS presence during dental hygiene procedures increases DDS involvement in many hygiene activities. A number of these procedures include key decision points in care, like determining need for premedication for treatment and checking and evaluating completed services. The evidence strongly supports the hypothesis that stronger structural regulatory requirements lead to "better" structure in practice.

This conclusion does not extend, however, to some activities where a dentist's involvement might be desirable. For instance, the extent of direct supervision requirements has no statistically significant association with whether a patient sees the dentist or hygienist first. The is no statistically significant association with whether a dentist will be involved in taking a patient's health history. These can be deadly serious aspects of care.

Data on service prices are scarcer and less reliable than data on DDS involvement in hygiene activities. The available data, however, show no statistically significant association between direct supervision requirements and price. This is puzzling, since direct supervision would seem to use resources with opportunity costs. The nature of the dental firm, where all inputs, including patients and dentists, have idle or queuing time may explain the absence of a price effect. More direct supervision requirements may primarily use dentists' time that would otherwise be idle. Another hidden effect could be more queuing time for patients, which increases the unmeasured time price of care. There should be

further investigation of a price effect.

This study establishes the first critical link between structural regulation and consumer welfare in dental hygiene. Whether more structural regulation leads to better consumer outcomes is a question that requires more and different data. The findings reported here are necessary but not sufficient for more structural regulation to produce more consumer welfare.

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Endnotes

1. Professor, Textiles, Design, Consumer Economics. A grant from the American Dental Hygienists Association supported this research.

2. Bivariate probit, ordered probit, and two-limit Tobit were used, depending on how the dependent variable measured DDS involvement. The explanatory variables were a dummy variable for the bachelor's degree, the weekly hours of work for the hygienist, years since certification to practice, and either a dummy variable for direct supervision of prophylaxis or a weighted combination of direct supervision variables for various services. The weights reflected the proportion of the day a typical hygienist spends in each service. Weights were derived from Boyer (June 1987).

3. Each model was estimated with a dummy variable for direct supervision of prophylaxis and, separately, with a weighted combination of direct supervision requirements over 14 services. The criterion for being reported as "statistically significant" in this study is that the supervision regulation variables were significant at 2.5% or less in a one-tail test. The regulation hypothesis implies the direct supervision coefficient is positive. In general, there was very close agreement between the two runs. Significance was frequently as strong as 0.5%.

4. Dentists per capita were lagged, so there should be no simultaneous equations bias. The lagged dentists variable is an instrument for the comtemporaneous supply of dentist and hygiene services.

5. The coefficient of determination for equations with the sum of fees as dependent variable was 0.04 to 0.05. The runs with the prophylaxis fee as dependent variable had coefficients above 0.20.

Warranty Law: Appropriate for the 1990's?

Based on previous studies, this paper evaluates federal and state warranty policy to determine its suitability for the 1990's. This paper finds that although existing policy does not give the consumer substantial warranty protection, the chances of stronger legislation are somewhat remote, except in the area of service contracts. The paper concludes with suggestions for features that might be considered for inclusion in service contract legislation.

John R. Burton, University of Utah[1]

Introduction

During the 1970's, the concept of *sunset* as applied to regulations, laws and regulatory agencies became popular. The reasoning behind sunset was that laws and agencies needed to be continuously evaluated in order to determine their net benefit for society. Those policies whose costs exceeded their benefits would be sunseted. A landmark piece of consumer legislation, the Magnuson-Moss Warranty Act, was passed in 1975 and although there was a flurry of evaluations of this law in the years immediately subsequent to its passage, the literature shows little has been done in recent years. It may be time to take another look at Magnuson-Moss (referred to as "the Act" in this paper) as well as state warranty action in the context of the changing economic, social and political environment of the 1990's.

The Act was passed in response to considerable consumer dissatisfaction with automobile and appliance warranties. This dissatisfaction was documented in Congressional hearings in the early 1970s. As with most legislation, there was a lot of compromise on the road to its passage, and the final law fell short of what many consumerists would have wanted. The primary objectives of the Act were to provide information through mandated disclosures and labeling (this supposedly would increase competition among companies to offer better warranties); to improve the quality of warranties by providing for full warranties; and to create procedures for consumer remedies through informal dispute resolution programs

(Pridgen, 1989). The Act might also be considered consumer protection legislation, since it was intended to help the consumer avoid many of the deceptions that haunted the selling practices and content of pre-Act warranties. Have these goals been met and do they give *real* warranty protection to the consumer in the 1990's?

Information

A problem with pre-Act warranties was not that they lacked information. The problem was that the information contained in the document typically could not be understood by the consumer. Although an objective of the Act was to simplify warranty language and a post-Act report by the FTC (Schmitt, et. al., 1980) indicated this objective was minimally attained, a more extensive study by Shurptrime and Moore (1980), found that the typical warranty was still incomprehensible. Another way the Act was to improve information dissemination was to standardize warranties. Some warranty terms were standardized and coverage (other than for length and for the parts of the good) of full warranties was standardized. Since the vast majority of warranties are limited, the benefits of standardization of coverage is minimal.

If the objective of competition was supposed to be realized through information, the Act may have fallen short of its goal for certain categories of products. This author reviewed warranty protection for automobiles and certain electronic entertainment and kitchen/laundry durable goods in an effort to

determine if competition was present in these markets. A review of automobile warranties summarized in Consumers Digest (Krebs, 1992), shows little variation among the warranties, offered by foreign and domestic automobile manufacturers. With minor variations within warranties and with few exceptions among manufacturers, the major manufactures offered three-year/thirty-six thousand mile warranties.

In order to gauge the variability of warranties for durable goods other than automobiles, warranty coverage of fourteen household durable goods that were recently (1992-1994) tested in Consumer Reports were examined. For entertainment goods, with the exception of 27 inch televisions, most warranties were identical. For the seven kitchen/laundry appliance (including room air conditioners), the warranties for four of the goods were nearly homogeneous, while the other three (dishwashers, refrigerators, and clothes dryers) were somewhat varied. Even within each of these products categories, when the warranty is either better or worse than the typical warranty, there are not substantial differences.

The review of the automobile warranty data and the warranty data for other household products, appears to indicate that competition among manufacturers regarding warranty coverage is minimal. One explanation might be that manufacturers may just be responding to consumer demand in not using warranty coverage as a competitive tool. A Wall Street Journal (1984) article states that although warranties have been used as an alternative to price competition, only 7% of major appliance consumers purchased a brand primarily because of the warranty protection offered. In evaluating warranties as a market signal, Gerner and Bryant (1981) assert that although consumers may spend some time learning about product warranties for a general category of products, they are reluctant to spend much time and energy in evaluating actual warranty provisions on a specific appliance.

If warranties are a competitive tool, they should serve as a signal

of quality. That is, there should be a positive correlation between warranty coverage and product quality. Using Consumer Reports data, Wiener (1988) and Kelley (1988) both tested whether warranties served as an accurate market signal. While Wiener found they were market signals in the post-Act era and not in the pre-Act era, Kelley (1988) found they served as a market signal for both periods.

Quality

There was hope that by creating a two-tiered warranty system (full and limited warranties) manufacturers would compete by offering full warranties. The results are mixed. Post-Act studies by National Association of Service Managers (Maketing News, 1978) and by McDaniel and Rao (1980), found that there was less warranty coverage after the Act. Wiener (1988) also found that warranty coverage significantly declined in the post-Act era. However, Schmitt, et. al. (1980) in an FTC study, reports some improvement in warranty coverage.

One of the prime indicators of change in quality pre- and post-Act would be whether warranty disclaimers would be minimized. According to Consumer Reports (1984) disclaimers that significantly weaken warranty protection still abound. The most substantive disclaimer consists of manufacturers using express warranties to disclaim any implied warranty (this is not permitted in seven states). The common disclaimer of consequential damages is also problematic.

Although disclosure is a primary objective of the Act, according to Brickey, "The restrictive approach of the Act raises fundamental questions regarding the wisdom of selecting disclosure as the primary mechanism for achieving the stated legislative goals" (1978, p. 85).

Dispute Resolution

The Act permits manufacturer-run informal dispute resolution programs and most states recognize them. However, thirteen states have established their own arbitration

programs. A California study (California Department of Consumer Affairs, 1991) of over 3000 consumers reported that only a little over half of consumers who *received a decision in their favor* in arbitration were satisfied with the process. Consumer Reports (January, 1993) found 14% automobile arbitration cases handled by the Better Business Bureau, 9.6% handled by Chrysler, and 30% handled by Ford, resulted in consumers receiving a car replacement or refund, while in 55% of the cases presented before state-run arbitration panels, the consumer won a refund or replacement car. Consumer Reports (January, 1993) reported that, "Consumers are much more likely to get satisfaction from a state-run arbitration program than from a manufacturer or a private arbitrator" (p.40). For an extensive discussion of informal dispute resolution, this author refers the reader to a presentation by Donna Selnick that is published in these proceedings.

Consumer Protection

There are two substantial consumer problems with warranties that seem to fall between the cracks of the Act's protection--so called "*secret*" warranties which are not mentioned in the Act, and *service contracts* which are addressed to a limited degree. Secret warranties (warranty extensions or good-will adjustments), are currently a substantial consumer problem according to Ditlow (Common Cause, 1991) and Abrams (Modern Maturity, 1991). The meek may inherit the earth but the squeaking wheel will get secret warranty coverage. This discriminatory practice of awarding service only to those who complain is regulated only in Virginia and Connecticut where manufacturers are required to notify consumer of post-warranty adjustment programs.

A consumer problem that is greater than secret warranties is service contracts. Although the Act permits some service contract rule making by the FTC, the FTC has not promulgated any (Pridgen, 1989).

Service contracts are purchased by 50% of the auto buyers who pay from about $300 to $900 to enhance the profits of the sellers (Consumer Reports, April, 1990). More than 90% of all major appliance dealers offer service contracts with sales of over one billion dollars a year (Moreau, January, 1989). They are extremely profitable for the seller with typical profits ranging from 100% to 600% (Consumer Reports, January, 1994; April, 1990; Henry, 1988; Moreau, January, 1989). The loss ratios are from 4% to 15% on appliances (Consumer Reports, January, 1991) and are not much higher for automobiles. Often when an item has a high profit margin, it is an indication of market failure, either because of insufficient information on the part of the consumer, deception on the part of the seller, or both. Since service contracts are a high-profit good, there are great incentives to overstate both the need for the coverage and the extent of the coverage itself. One may speculate, that since service contracts are so profitable, there is an increased incentive for retailers not to carry goods with generous warranties and for manufacturers to minimize their own warranties.

Not only do sellers exaggerate the protection of service contracts, they contain "exclusions galore" (Consumer Reports, April 1990) and consumers often find it difficult to get claims paid (Consumer Reports, April 1990; Thomas 1990). One of the greatest problems with service contracts is the high rate of failure for non-manufacturer sponsored contracts (Center for Policy Alternatives, 1978; Thomas, 1990; Del Prete, 1991). In addition, service contracts often overlap with the express and implied warranties and therefore do not give as much protection as a consumer might assume (Center for Policy Alternatives, 1978).

Because the purchase of service contracts is so economically detrimental to the consumer, Consumer Reports (April 1990, January 1991, January, 1994) and Changing Times (Henry, 1988; Moreau, January 1989) strongly advise against their purchase. According to testimony of Congressman Chandler of Washington (Congressional Record, 1989, p. 8019), Attorneys General of several

states view service contracts as a "serious consumer problem." Service contract legislation on the Federal level was attempted in 1989 when Congressman Chandler introduced a rather weak bill that would subject service contracts to an excise tax unless they comply with certain requirements (Congressional Record, 1989, p. 8019). This bill failed. For an extensive discussion of the sleazy practices involved in service contracts sales, see Future Shop (Snider & Ziporyn, 1992).

Summary of the Evaluation of Magnuson-Moss

From the studies mentioned here and others not mentioned, it appears the Act has given only minimal fulfillment to its objective of improving warranty protection for the consumer. (For a more detailed evaluation of the Act from a consumerist perspective, see Burton (In press). If the Act is weak as has been argued here, should it be amended to give greater consumer protection? And, is the political environment conducive to more warranty regulation? For passage of new warranty legislation, there will need to be a mix of consumer dissatisfaction with the performance and reliability of warranted goods, discontent with warranty promises that have been expanded beyond what the warrantor is either willing or able to service, and the creation of a political environment conducive to consumerism.

Other than the Chandler bill on service contracts, there has been little or no substantive warranty legislation proposed on the federal level since 1975. As noted above, some states have enacted substantive warranty protection laws (e.g., California's Song-Beverly Consumer Warranty Act of 1970 and its amendments); however, consumers in many other states have been left vulnerable by the weaknesses of the Act.

In January 1993, this author contacted several national consumer activists organization and found that they do not have warranty protection on their agenda (Burton, in press). Health care, telemarketing, smoking, and automobile safety seem to have a greater priority than does warranty coverage. Even Consumer Reports has not had a major article on warranties (other than service contracts) since 1984. If one were to examine the durable goods evaluations on Consumer Reports for the 1990's, one would see little emphasis placed on warranties as an attribute of product quality. Possibly, consumers might feel more satisfied with warranty service or as Consumer Reports points out in a recent issue (January, 1994) that the quality of durable goods has increased in recent years.

If there is little grass roots demand for warranty legislation and consumer groups and consumer advocates in Congress have little interest in a warranty agenda, then what type of warranty legislation, if any, is possible for the 1990's? The best bet for any legislative action might be for service contracts regulation. This is the most visible consumer problem related to warranties and visible problems that affect many consumers in a substantive way are most likely go get action. Also, there are precedents for advocating action on service contracts. An MIT warranty study (Center for Policy Alternatives, 1978) recommended that the FTC should write comprehensive disclosure statements for service contracts under the authority granted in the Act. The Consumer Federation of America and United States Public Interest Research Group (a Nader group) have agreed in the past that congressional action is needed on service contracts (Congressional Record, 1989, p. 8019). Based on his research, Kelley (1991) suggests the FTC should consider promulgating rules for extended warranties.

Proposed Legislation and/or Regulation

The remainder of this paper is devoted to proposals for policies that federal and/or state governments might embrace to increase consumer protection in the area of service contracts. The elements of these proposal are based on a variety of consumer laws and regulations (warranty, credit, insurance, bankruptcy, energy, consumer protection) as they might be applied

to warranty laws and regulations. Also several proposals are based on one of the strongest state laws for service contracts--California's Song Beverly Warranty Law.

Regulation

Although in some states service contracts are under the jurisdiction of insurance departments and in others, licensing or registration is required, regulation of service contract sellers has fallen between the cracks in most states. Recommendations: Require service contract to be governed under insurance law or licensed with some rigid performance requirements.

Reserve Requirements

Many service contract companies have gone out of business leaving many contract holders with worthless pieces of paper. Recommendations: Require sufficient reserves similar to the requirements for other types insurance policies.

Bankruptcy Laws

Presently, when a service contract company goes bankrupt, the holders of the contracts follow creditors in recovering for premiums paid. Recommendation: Rewrite bankruptcy laws so that the consumer would have a higher priority in gaining access to the assets of the bankrupt firm.

Readability

While some states have mandated readability for insurance contracts, service contracts are still often incomprehensible. Recommendation: Mandate standards of readability and standardize terminology specific to service contracts.

Lemon Clause

An often cited problem of service contract is that there are inordinate delays in making the repairs. Recommendation: Mandate lemon clauses as in full warranties. The consumer right to a refund or replacement might give the insurer an incentive to make the repairs.

Reasonable Repair Coverage

As with standard warranties, service contracts often have disclaimers and exclusions to the extent that they do not cover what a consumer would reasonably expect to be covered. Recommendation: Reasonable standards of coverage would take precedent over contract exclusions. For example, it would be considered unreasonable for the insurer to disclaim a repair of a part which is an essential component of the insured product.

Cancellation

As unilateral cancellation is a problem with medical insurance, it is also a problem with service contracts, often leaving the insured with no coverage for a lemon. Recommendation: Permit cancellation by the insurer only under very narrowly defined conditions.

Depreciation

Hidden in some contracts are clauses that diminish warranty coverage by a pro-rated depreciation schedule based on usage. That is, the more the insured product has been used, the greater the deductions for coverage. Recommendation: Eliminate such provision since they are not what a consumer would reasonably expect.

Liability for Non-performance

Often the seller of a service contract is not the insurer but only a broker. The incentive to sell a particular contract may be contingent more on the profit than the service rendered. Recommendation: Make the seller liable for any unfulfilled promises made in the contract.

Incentives for Non-compliance

Under a complex system of kickback described by Deneen (1993), sellers of goods who self-insure through the use of administrators (similar to health insurance) often minimize service under the contract in order to maximize profits. Recommendation: Although this may be illegal in some states, more explicit laws are needed to prevent such practices.

Multi-tiered Warranties

Although there is standardization under the Act for full warranties, this principle does not apply to service contracts. If tiers of service contracts were

established, then consumers would have some standard of comparison and competition might be encouraged. Recommendation: Establish a multi-tiered system (e.g., limited, intermediary levels, full) with each tier meeting certain standards.

Dispute Resolution

Although the Act requires informal dispute resolution for warranties conflicts, this principle is not carried over to service contract even though many have disputes with the service contract that go unresolved. Recommendations: Establish informal dispute settlement procedures similar to those under the Act.

Restraint of Trade

The seller of durable goods has an incentive to discriminate against manufacturers who offer generous warranties and may not carry a product that reduces the opportunity of selling profitable service contracts. Recommendation: Anti-trust laws might be expanded to include sellers of durable goods who refuse to sell certain brands because they have generous warranties.

Availability

Although the Act requires that warranties be available prior to purchase, this does not apply to service contracts. Most people are not privy to the coverage of the service contract until after purchase. Recommendation: Require pre-purchase availability similar to requirements of the Act.

Cooling-off Period

Sales which are made under pressure, such as door-to-door sales or telephone solicitations, are typically subject to cooling-off periods under state and federal laws and regulations. Recommendations: Because service contracts are often sold under pressure with little consumer understanding this might also be applied in these situations..

Disclosures

If the consumer is to make a rational decision he/she must be fully informed, yet many service contracts do not give essential information and when it is given, it may be deceptive or confusing. For a more comprehensive discussion of the importance of disclosure in service contracts, see Kelley (1991). Listed are items that should be disclosed in a service contract:

Disclosure of full cost of service contracts--this would include all amounts paid for the contract plus any credit costs for financing the contract as in truth-in-lending provisions.

Statement of deductibles and co-payments--deductible and co-payments should be prominently stated in the contract..

Statement of who is the actual insurer--since different types of insurers differ in reliability, the consumer should be informed if the insurer is the manufacturer, seller (directly or through an administrator), or a third-party insurer.

Statement of transferability--the insured rights for contract transferability and any fees involved should be clearly stated.

Statement of who may make the repairs--the insured should be informed as to who will be reimbursed for making insured repairs.

Statement of termination--the insured should be informed as to circumstances under which either the insurer or the insured may cancel the contract. Also, the refund schedule for cancellation should be included in the contract.

Instructions on how to contact the insurer--clear instruction for contacting the insurer and the procedures required to obtain service should be included.

Listing of net coverage of the policy--net coverage (service contract coverage minus manufacturer's warranty coverage) of the policy should not only be stated in writing but also visually by a bar graph which should be prominently displayed in the contract. See Figure 1.

Figure 1.

WARRANTY GUIDE--AUTOMOBILES
(SAMPLE)
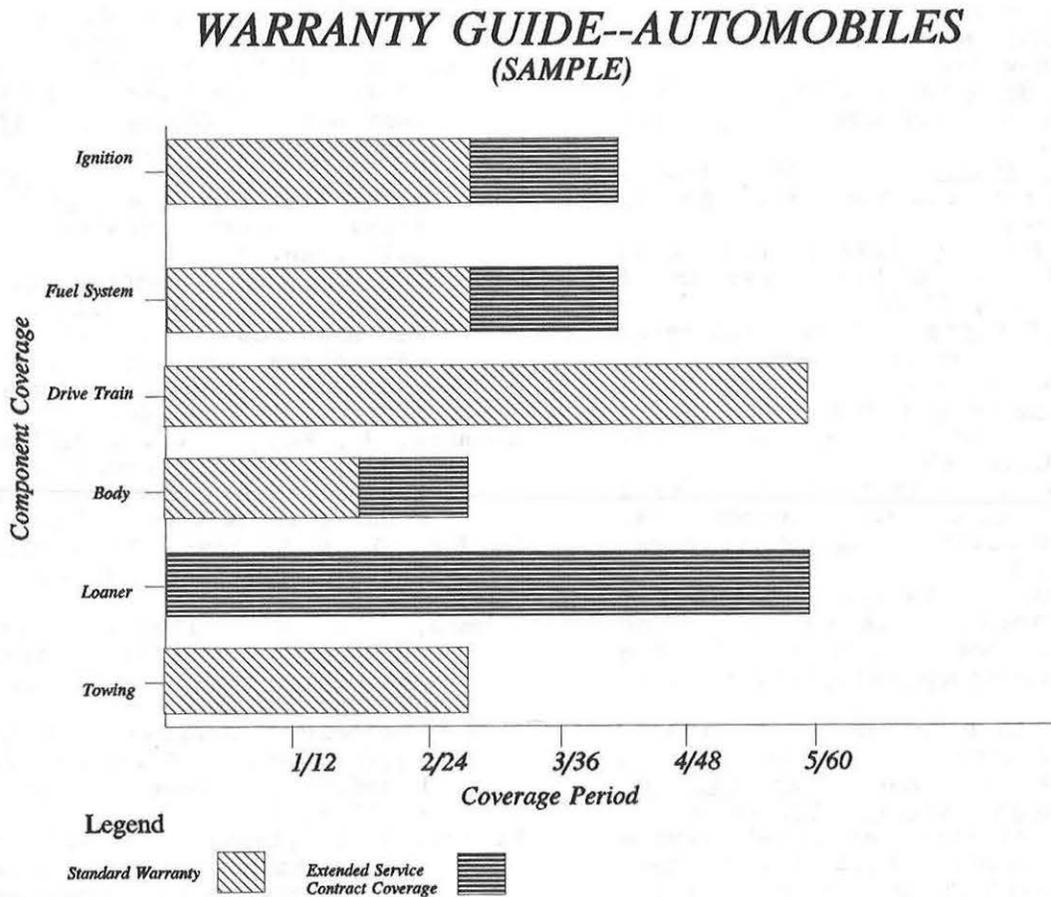
Summary

Although Magnuson-Moss was passed in the 1970's to cure the ills of consumer product warranties, it has only partially fulfilled this objective according to the evaluative studies reported in this paper. However, there seems to be little interest on the part of consumers or consumer groups to rectify the shortcomings of the Act. The one exception might be service contracts where consumer problems are most blatant. Yet, if service contracts are to be legislated effectively, many policy principles should be considered in drafting such legislation.

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Endnote
1. Professor, Family and Consumer Studies.

Store Type Patronage for Grocery Purchases:
A Study of the Quebec Market

Do shoppers patronize more than one store type to complete their household weekly grocery purchases? To answer this question, an indirect utility model is used. To test the model, a choice variable including different shopping patterns is estimated using the Multinomial Logit model. Not only results indicate that shoppers use different shopping patterns including some patterns with more than one store type, but they also show that shopper preferences for store attributes, household characteristics, and shopper traits affect the probability of choosing a specific pattern.

JoAnne Labrecque, Ecole des Hautes Etudes Commerciales[1]

Introduction

In Quebec, as in the rest of Canada and the United States, the last thirty years have been characterized by significant demographic changes. The proportion of married women in the labor force has progressively increased as the average family gross income and the average level of education; the average number of persons per household has significantly decreased (Labrecque, 1991). These changing household demographics have altered household time and money constraints. They have also modified the composition of food shoppers. Males, working females and singles frequent supermarkets in larger numbers than in the past (Zeithaml, 1985; Donegan, 1986).

At the same time, there has been a real transformation in the structure of the American and Canadian food retail industries. From uniform industries characterized by reasonably standardized stores, these industries evolved to include various new store types, such as combination stores, hypermarkets, warehouse stores, super warehouse stores and wholesale membership clubs (Tigert, 1980; Heller, 1986).

Together, the demographic changes and the changes in the midst of the different food retail industries may have affected how households organize their grocery shopping activities.

Little attention has been paid in the literature to the organization of household grocery shopping activities. While some research has been done on the impact of demographic changes on specific aspects of shopping activities that relate to grocery purchases (Zeithaml, 1985; Kolodinsky, 1990), no research has studied whether households have adjusted their grocery shopping activities to benefit from the different values offered by the different store types.

This paper investigates whether or not, following a greater diversification of store types, households chose to patronize stores of different types to complete all of their major grocery purchases for a given period. The paper also presents an empirical estimation of an indirect utility model which includes the notion that in addition to household characteristics, shopper time value and shopper preferences for store attributes affect costs and benefits derived from shopping at different store types.

Literature Review

Most economists who have investigated household grocery shopping have focused on the relationship between price paid for weekly grocery purchases and amount of search. Both Doti and Sharir (1981) and Carlson and Geiseke (1983) have investigated how households allocate their time and money resources when shopping for food. Doti and Sharir (1981) developed a model to explain the determinants of time spent in a store visit, the size of a purchase, and the number of

store visits made during a period at a given store. They found evidence that in-store time is positively related to the size of a purchase (dollars) and to efficiency in search, and is negatively related to hours of work. As for Carlson and Geiseke (1983), they looked at the relationship between the price paid for weekly grocery purchases and the amount of search. Their results indicate a negative relation between price paid for weekly grocery purchases and amount of search. The authors also looked at the interdependence of prices paid, quantities purchased and search effort. They found evidence that weekly grocery expenditures has a positive effect on amount of search undertaken.

Marketers know little about store type patronage. Past efforts to investigate retail patronage have focused mainly on explaining selection of an individual outlet. A large portion of patronage studies concentrate on finding determinant attributes of store choice (Nevin and Houston, 1980; Pessemier, 1980; Hirschman, Greenburg and Robertson, 1978; Doyle and Fenwick, 1974; Lindquist, 1974; Rich and Portis, 1964; Fisk, 1961). According to these studies, retail outlets with strong value on attributes considered as important by consumers are more preferred and more patronized. Another portion of patronage research uses choice axioms to estimate probabilities of store choice or probabilities of shopping center choice (Stanley and Seawell, 1976; Arnold, Oum and Tigert, 1983; Gautschi, 1981).

Grocery store patronage studies presented in the marketing literature have referred to either one of these approaches to explain consumer store choice. Most previous studies on grocery store patronage have restricted their analysis to the usual store at which consumers shop for most of their weekly grocery purchases or to the store visited on the last major shopping trip. Approaching the store choice problem from this angle presumes that most shoppers do most of their weekly grocery shopping at one store type or on one store visit. Considering the greater diversification of food

stores, this presumption could now be too strong to describe grocery shopping behavior.

Specification of the Choice Set

With the proliferation of new store types, a store classification including only the three traditional types — supermarket, specialty shop, and convenience store — became too simple and imprecise. To reflect changes in the food retail industry, some authors (Heller, 1986; Tigert, 1980) have proposed a store typology including up to ten categories. Such an extensive typology is not necessary in this analysis since the empirical data used for this investigation are related to the Quebec food retail industry, an industry which does not show as much diversification as that found in the American retail food industry.

For the purpose of this analysis, a store typology which includes the following five types is adopted: 1) superstore (SS); 2) traditional supermarket (SM); 3) economy store (ECON); 4) specialty shop (SP); and 5) convenience store (CON). Whether a store belongs to one type or another depends on its value on a set of five attributes: 1) operating hours; 2) product-mix; 3) selling area; 4) bagging service and 5) variety.

As Figure 1 shows, stores are classified according to a multi-step procedure. Although stores classified into two different categories may be similar on some attributes, these categories are mutually exclusive, and they are collectively exhaustive.

Model and Estimation

This section summarizes an indirect utility model which was proposed to explain store type patronage (Labrecque, 1991). The model identifies the factors determining store type patronage. It does not consider the number of visits made at each type and it is based on a few assumptions. Households are assumed to be partly rational utility maximizers. They are also presumed to be familiar with the attributes that characterize each store type. Household characteristics are considered to be predetermined.

232

Figure 1

DEFINITION OF STORE TYPES

ALL STORES

```
                    ┌──────────────┬──────────────────────┐
                    │ YES          │              NO       │
1. REGULAR HOURS    │              │                       │
                    │              │                       │
                    │              │                       │
2. FULL-LINE OF  ┌──┴───┬──────┐  ┌──┴───┬──────┐
   GROCERY P.    │ YES  │  NO  │  │ YES  │  NO  │
   & MEAT        │      │      │  │      │      │
                 │      │      │  │      │      │
3.SELLING     ┌──┴──┬─────┐    5.WIDE VARIETY ┌──┴──┬─────┐
  AREA >       │ YES │ NO │      OF P. CAT &   │ YES │ NO │
  35,000       │     │    │      SHALLOW P.    │     │    │
  SQ.FT.       .     │    │      LINES         .     .
              .   ┌──┴──┬─────┐                .     .
4.BAGGING     .   │ YES │ NO │                 .     .
  SERVICE     .   │     │    │                 .     .
              .   │     │    │                 .     .
  SUPERSTORES     │     │                CONVENIENCE .
              SUPERMARKETS  ECONOMY STORES          SPECIALTY
```

Finally, the market is assumed to be "closed" in the sense that there are no new players entering or leaving the market.

Given their purchase intentions and based on their evaluation of the costs associated with and the benefits derived from shopping at stores of each type, households choose to shop at one or at more than one store type. The costs associated with shopping at stores of a particular type include: 1) the money costs other than the price paid for groceries; and 2) the time costs that households incur to acquire the desired items at stores of this particular type. The benefits derived from shopping at stores of a particular type correspond to the value that a household gets from using the service offered at the stores of that type.

Given their purchase intentions and their evaluation of the costs and benefits derived from shopping at stores of each type, households choose to shop at the store type combination from which they derive the largest net benefit, i.e. for which the difference between the shopping benefits (B) and the shopping costs (C) is the largest.

$$Max\ (B - C) \qquad (1)$$

The arguments of the indirect utility of shopping at a given store type are the variables which determine shopping benefits and costs incurred for shopping at stores of that type. A discussion identifying the factors which affect household costs and benefits derived from shopping at each store type is detailed in Labrecque (1991). Here, only the main equations are reported. In the following equations, indices are used to identify shoppers (i=1,2, ...,I), store types (j=1,2,...,J), total number of stores of a given type j (k=1,2,...,K_j), and the attributes (l=1,2,...,L).

Variables that affect shopping costs

Shoppers incur two different categories of costs when they shop for groceries. These are: 1) money costs (C^M); and 2) time costs (C^T).

$$C = C^M + C^T \qquad (2)$$

Money costs ($C^M_{ij.}$) incurred by shopper i to shop at type j corresponds to the sum of all travel costs ($\Sigma\ c^m_{ijk}$) incurred to get to

233

each of the K_j stores of type j, which are a function of household characteristics.

$$C^M_{ij.} = \underset{k}{\Sigma}\ c^m_{ijk}, \qquad (3)$$

where k ranges from 1 to K_j, and

$$c^m_{ijk} = f(H_i) \qquad (4)$$

Time costs ($C^T_{ij.}$) incurred by shopper i to shop at type j is equivalent to shopper i's marginal value of time (w_i), multiplied by the overall amount of time spent (t^t_{ijk}) to complete a shopping trip at each of the K_j stores of type j , which is a function of household charcateristics (H_i) and a function of the store value ($a_{jkl}, l=1,\ldots,L$) on a set of L attributes.

$$C^T_{ij.} = w_i(\underset{k}{\Sigma}\ t^t_{ijk}), \quad k=1,\ldots,K_j \ (5)$$
and,
$$t^t_{ijk} = f(a_{jkl}, H_i) \qquad (6)$$

Thus, the total costs ($C_{ij.}$) incurred by shopper i to shop at the K_j stores of type j is determined by shopper i's marginal value of time (w_i), the store value (a_{jkl}, where $l=1,\ldots,L$) on a set of L attributes, and shopper i's household characteristics (H_i). Formally this can be expressed as

$$C_{ij.} = f(w_i, a_{jkl}, H_i) \qquad (7)$$

where k ranges from 1 to K_j, and l from 1 to L.

Variables that Affect Shopping Benefits

The benefits ($B_{ij.}$) that shopper i derives from shopping at the K_j stores of type j depends upon the total value (b_{ijk}) that shopper i gets from using the service — defined in terms of store attributes — procured at each of the K_j stores k of type j

$$B_{ij.} = \underset{k}{\Sigma}\ b_{ijk} \qquad (8)$$

where the sum ranges from k=1 to K_j.

More specifically, the value (b_{ijk}) that shopper i gets from using the service procured at each of the

K_j stores k of type j depends upon the value of that store on each of the L attributes ($a_{jkl}, l=1,\ldots,L$), and upon shopper i's preference (F_{il}) for each of the L attributes. Thus, we obtain the following expression for $B_{ij.}$:

$$B_{ij.} = f(a_{jkl}, F_{il}) \qquad (9)$$

where k ranges from 1 to K_j, and l from 1 to L.

Equations (7) and (8) can now be combined to determine the arguments of the indirect utility function ($I_{ij.}$) that household i associates with shopping at the K_j stores of type j.

$$I_{ij.} = f(w_i, a_{jkl}, F_{il}, H_i) \qquad (10)$$

Empirical Application

Data Set

The data for the study were collected using telephone and mail surveys. Interviewed households were randomly selected in three suburban areas of the metropolitan Montreal. These three areas were selected since they provide a good mix of all shopping alternatives considered - notably superstores, supermarkets, economy stores, specialty shops and convenience stores. The person selected to answer the questionnaires in each household was major grocery shoppers 18 years of age and over. Both, French and English households were eligible to the survey. The purpose of the phone survey was to explain to the household respondents the procedure for the mail survey and to obtain demographic information to validate the mail sample. The mail survey was designed to collect information on grocery shopping activities for a one-week period and general information on grocery shopping habits. The final sample contains 569 observations (Labrecque, 1991).

Selection and Measurement of the Dependent Variables

The dependent variable is a choice variable that includes five different shopping patterns, which refer to specific combinations of store types that households may choose to do their weekly grocery

purchases - PATTERN. The selection of the five different shopping patterns was made according to the following rules. First, patterns for which there was no observation were rejected. Second, to decide about whether or not the store type combinations including convenience store and specialty shop should be considered in the empirical analysis, two t tests were calculated. The t test was significant in the case of specialty shops only. Accordingly, convenience store was not considered in the empirical analysis. Patterns including convenience store were added to the equivalent patterns which did not include convenience stores. Third, when they could not be included to a more general pattern, patterns which had only a few observations were excluded from the analysis . A total of six patterns were identified. Table 1 lists the frequency and the proportion of shoppers who chose each of these six patterns in the final sample. Since only nine shoppers chose the pattern SS+SP, those observations were excluded from the empirical analysis.

Table 1
Frequency and Proportion of Shoppers who Chose Each of the Patterns Included in the Empirical Analysis

PATTERN	FREQUENCY	PROPORTION
SS	34	.06
SS+SP	9	.02
SM	279	.49
SM+SP	150	.26
SS+SM	67	.12
SS+SM+SP	30	.05
TOTAL	569	1.0

Selection and Measurement of the Independent Variables

The choice of the independent variables selected for the empirical estimation was based on the indirect utility model and on availability of data. Since stores are classified into types based on their value on all of their attributes, store attributes cannot be included in the right-hand side of the equation used to estimate store type patronage. The list of the independent variables, is given in Table 2.

For unemployed shoppers, reservation wage rate is calculated following the procedure proposed by Zick and Bryant (1983). As discussed by some authors (Chiswick, 1982; Ferber and Birnbaum, 1980; Hill,

Table 2
Summary Statistics

VARIABLE	DEFINITION	MEAN/PROPORTION
WAGE	wage rate of shopper	10.37
FAMINC	total family income	35,625
AGE	age of shopper	38.04
ED	education of shopper	13.62
KID6	children under age 7	0.24
KID18	children over age 6 and under 19	0.31
MARRIED	shopper is married	0.74
OWN	owns a home	0.57
FREEZER	owns a freezer	0.54
MICRO	owns a microwave	0.50
HOURS	hours worked per week by shopper	21.73
QUALITY	degree to which product quality and product variety is important	.01
SERVICE	degree to which service is important	-.005
PRICE	degree to which price is important	-.017
AWARE	how well-informed shopper is about prices	.048
PRAGMATIC	brand loyalty of shopper	.009
CONVIV	degree to which shopper is fond of feasting	.01
INDIVID	degree to which shopper likes personalized service	.011
BROWSER	degree to which shopper enjoys shopping	-.028
ACTIVE	degree to which shopper chooses saving time strategies in food preparation	.006

1980; and Zick and Bryant, 1983), use of the market wage rate to represent the opportunity cost of full-time homemakers undertakes the individual's true opportunity cost.

The preference variables are factors derived from a factor analysis done on shopper preferences for a set of 14 store attributes. Scores on these 14 store attributes were factor analyzed using the - VARIMAX method. Three factors were identified: QUALITY, SERVICE and PRICE. The shopper personality traits are also factors derived from a factor analysis. Respondents' answers to thirty-one statements on shopping and meal preparation opinions and habits were factor analysed using the VARIMAX method. Six factors were identified: AWARE, PRAGMATIC, CONVIV,

INDIVID, BROWSER, and ACTIVE (See Table 2 for definitions).

Estimation

The problem being investigated in this analysis corresponds to a situation where each decision maker is confronted with a choice from a set $C = \{1, 2, \ldots, J\}$ of available alternatives, indexed by k. The dependent variable is then restricted to integer values 1 to J. In such cases, instead of being interested in estimating the numerical value of the endogenous variable, we are interested in analyzing the underlying probability — P_k — that the decision maker presented with the set C will choose alternative k.

The Multinomial Logit model has been employed in marketing and economics to represent this probability. The model posits that there is an underlying latent variable Y^*_k which can be defined to denote the level of indirect utility associated with the k-th choice. The utility Y^*_k is specified as

$$Y^*_k = v_k + e_k, \qquad (11)$$

where v_k is a deterministic component which is a function of a vector of N characteristics for the decision maker, and e_k is a random component of the utility associated with the k-th choice. The deterministic component — v_k — is a scale value which in most applications has been assumed to have an additively separable linear form that can be represented as follows:

$$v_k = x\beta_k =$$
$$x_1\beta'_1 + x_2\beta'_2 + \ldots + x_N\beta'_N, \qquad (12)$$

where the x's are characteristics of the decision maker. The β's represent the importance weight of parameters to be estimated. The term e_k is a stochastic component which reflects the unobserved variations in decision maker's taste toward alternative k. Given the set C of J choices, the decision maker i will choose the alternative with the highest utility. McFadden (in Maddala, 1983) showed that the k-th choice probability is expressed as:

$$\text{Prob (k is chosen)} = \qquad (13)$$
$$\frac{\exp(x\beta_k)}{\Sigma \ j_{\epsilon C} \ \exp(x\beta_j)}$$

When the number of alternatives is larger than 2, as in this analysis, the model can be thought of as being applied to the analysis of J separate populations. The model is then used to estimate the probability that a decision maker belongs to one of the J populations. Each decision maker chooses one and only one element of C. The estimation produces a different set of coefficient estimates β_k for each possible value of the dependent variable but one. SAS, which is the statistical package used for this empirical estimation, chooses the normalization of $\beta_j = 0$ and gives a set of coefficient estimates for each alternative but the basic alternative. Since, for this empirical estimation, SM (supermarket) represents the basic choice alternative or pattern, the β's coefficient estimates for a given pattern then indicate the effect of each of the independent variables on the log of the probability of choosing the given pattern relative to their effect on the probability of choosing SM. Thus, relevant hypotheses to this empirical work are hypotheses about the effect of each independent variable on the probability of choosing a given pattern relative to the probability of choosing supermarket. [The hypotheses are summerized in Table 3]. Given the characteristics of stores defining each shopping pattern, hypotheses about the effect of the independent variables were formulated based on their expected effect on cost and benefit derived from shopping at stores included in a particular pattern. For example, the degree to which shopper likes personalized service - INDIVID - is expected to increase the probability of selecting the pattern SM+SP relative to choosing SM only, and is expected to have a negative effect on the probability of selecting the other patterns relative to SM only. Given that only supermarkets and specialty shops offer personalized service, these hypotheses were formulated.

Results and Discussion

Table 3 presents the results of the Logit estimation. These results are of many interests. The chi square test is significant and shows that to complete weekly grocery purchases, shoppers refer to different patterns, some including stores of one type only - SS or SM - some including stores of different types - SM+SP, SS+SM and SS+SM+SP. To find patterns made up of both SS and SM is a surprising result. Although superstores and supermarkets differ on their attributes, they both offer similar product mix, unlike specialty shops and convenience stores. For this reason, shoppers were expected to consider the former more like substitute stores than complementary stores. This suggests that not only stores compete within types, but they also compete across types.

The results also indicate that both shopper preference for store attributes and household characteristics affect the probability of selecting a given pattern. While shoppers who attach importance to quality are more likely to select a pattern that include specialty shop (SM + SP or SM + SS + SP), shoppers who pay attention to service are less likely to select a pattern that comprehends SS (SS, SS+SM or SS+SM+SP). As expected, as family income increases, the probability of shopping at SS rather than shopping at SM decreases. As expected, education has a positive effect on the probability of shopping at SM+SP and a negative effect on the probability of choosing a pattern which includes SS in addition to SM (SS+SM or SS+SM+SP). Showing low brand loyalty (PRAGMATIC) increases the probability of shopping at SS, but decreases the probability of shopping at SS+SM rather than shopping at SM only. This latter result was unexpected and may be explained by the fact that shoppers who choose this pattern invest in the search of low prices for their preferred brands. As expected, being fond of feasting (CONVIV) increases the probability of selecting a pattern which includes SP (SM+SP or SS+SM+SP). As expected, attaching importance to service decreases the probability of selecting a pattern including SS (SS, SS+SM or SS+SM+SP) rather than choosing SM only. Being time conscious (ACTIVE) increases the probability of shopping at SS + SM

Table 3
Expected Effect of the Parameters and Logit Estimation - PATTERN

INDEPENDENT VARIABLES		ln P_1/P_5		ln P_2/P_5		ln P_3/P_5		ln P_4/P_5
INTERCEPT		2.080(1.871)		-3.417(.900)		-1.864(1.190)		-4.915(1.914)
WAGE	-	-.006(.041)	+	.020(.017)	-	-.001(.028)	-	.009(.039)
QUALITY	?	.327(.278)	+	.256(.140)b	?	-.093(.159)	+	.663(.474)c
SERVICE	-	-.500(.268)b	?	-.099(.145)	-	-.337(.186)b	-	-.572(.276)b
PRICE	?	-.397(.319)	-	-.110(.152)	+	.251(.246)	+	.293(.443)
FAMINC	-	-.00003(.00002)c	+	-.000007(.00001)	-	-.000008(.00001)-		-.000004(.00002)
HOURS	0	.011(.013)	+	.006(.007)	-	.015(.010)c	+	.031(.014)b
AGE	-	-.099(.033)a	+	.002(.012)	+	.030(.016)b	+	.031(.027)
ED	-	-.119(.114)	+	.152(.056)a	-	-.174(.72)a	-	-.162(.106)c
KID6	+	.086(.332)	-	.148(.188)	+	.449(.255)b	+	.389(.378).
KID18	+	.358(.275)c	-	.140(.140)	+	.126(.189)	+	.594(.221)a
MARRIED	?	.305(.537)	+	.467(.316)	+	.576(.461)	+	1.271(.842)c
OWN	?	1.202(.576)b	?	.164(.297)	?	.518(.403)c	?	.437(.611)
FREEZER	-	-.466(.459)	-	-.130(.240)	+	.466(.341)c	+	1.070(.572)b
MICRO	?	-.120(.464)	?	-.142(.245)	?	.155(.340)	?	-.187(.497)
AWARE	-	-.236(.267)	-	-.159(.142)	-	-.220(.194)	-	.287(.312)
PRAGMATIC	+	.434(.252)b	-	-.158(.141)	+	-.252(.190)c	-	-.047(.266)
CONVIV	0	.070(.259)	+	.492(.141)a	+	.201(.194)	+	.496(.306)c
INDIVID	-	-1.005(.314)a	+	.192(.153)	-	-.701(.208)a	-	-.532(.294)b
BROWSER	+	.394(.269)c	+	.070(.135)	+	.210(.186)	+	.365(.279)c
ACTIVE	-	-.039(.282)	+	.122(.144)	-	.466(.213)b	-	.228(.320)

P_1 = SS, P_2 = SM + SP, P_3 = SS + SM, P_4 = SS + SM + SP, P_5 = SM
Log likelihood -601.7   Chi square 231.14
a = Significant at the .01 level ; b = Significant at the .05 level; c = Significant at the .10 level

237

rather than at SM only. This result was unexpected and may be explained by the fact that shoppers who feel more time constrained shop at different store types for their time convenience.

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Endnote

[1]. Assistant Professor, Department of Marketing.

Determinants of Consumer Expenditure Patterns

This study used eleven years of Consumer Expenditure Survey data to
analyze household expenditure patterns and the determinants of a
household's probability to be in certain expenditure patterns. Six
expenditure patterns were identified using cluster analysis method.
By employing a multi-nomial logit model, the marginal effects of the
determinants were quantified and discussed.

Jessie X. Fan, The University of Utah[1]
Kathryn Stafford, The Ohio State University[2]

In neoclassical consumer theory, consumer behavior is frequently presented in terms of preferences, on the one hand, and possibilities on the other. On the preference side, we usually consider a consumer faced with possible consumption bundles in his/her consumption set. The consumer also is assumed to have preferences on the consumption bundles. On the other side, choices are limited within the consumer's available resources. The single most important type of opportunity set is that which arises when the household has an exogenous budget, which is spent within a given period on some or all of commodities and services (Deaton & Muellbauer, 1980; Varian, 1992).

While consumers' financial resources, such as income, are measurable, consumer preferences are usually approximated by their demographic characteristics in empirical research. The assumption underlying this approach is that consumers who share similar characteristics may share similar taste and preferences when making expenditure decisions. To economists, it is interesting to find out whether there exist certain types of consumer preferences and what makes a consumer more likely to be in certain expenditure patterns than others. To marketing practitioners, understanding consumer expenditure patterns and their determinants can help them better identify market segments and better serve different types of consumers. To family economics educators, recognizing consumer expenditure patterns can help them to better understand the needs and expenditure habits of

households belonging to certain expenditure patterns.

Therefore, the purpose of this study was to use household level expenditure data to identify consumer expenditure patterns, and to describe how consumption patterns vary from type to type. This study also determined which consumer characteristics were important in predicting which consumer would belong to each expenditure pattern type.

Review of Literature

Empirically, there have been two distinct ways to identify consumer expenditure patterns. The first is the use of nonparamatric multivariate techniques such as factor analysis and cluster analysis to identify households with homogeneous preferences with respect to expenditure or budget allocation patterns. The second approach is parametric. By assuming a flexible and well-behaved utility function, empirical data are used to estimate demand equations derived from the utility function, thus the parameters specified in the utility function are indirectly identified.

Examples of research using a nonparametric technique are several University of Illinois dissertations, including a study by Cha (1991) on expenditure patterns of poor households and a study by Chung (1991) on expenditure patterns of older and younger consumers. Both studies employed cluster analysis to identify consumption pattern types, and a multi-nomial logit analysis to test their hypotheses. Other than the samples, the difference between the

two studies was that cluster analysis was performed on the original budget share in Chung's study (1991), while it was performed on three factor scores computed from budget shares for 31 commodities in Cha's study (1991). The justification for the use of the factor scores of budget shares was Lancaster's characteristic model (Lancaster, 1966), where households are considered to derive utility from characteristics of goods instead of goods themselves. However, the study ignored the fact that Lancaster's characteristic model is defined in commodity space, where the unit of characteristics is compatible across commodities, while factor scores defined in either budget share or expenditure space do not have such compatibility. Although the argument is that the same characteristic in different commodities could have a similar hedonic price, the use of a small number of factor scores defined in budget share space certainly caused information loss and was thus not an efficient way to handle this problem, unless the number of commodities involved was too large to be used in cluster analysis. Since 31 commodities were involved in Cha's study, it was possible that the handling of this problem was partly due to limitations in computational capacity. However, both studies shared a major limitation that the marginal effects of demographic variables were not quantified in the multi-nomial logit analysis.

A example of a study using the parametric approach was the study by Montalto (1993) on relative bargaining power of spouses, where the utility functions of the husband and wife were specified as Stone-Geary form and estimated using food consumption data and Linear Expenditure System functions.

While nonparametric techniques can provide useful information about household expenditure patterns, it cannot provide detailed numerical information for rigorous household budget allocation model analysis. On the other hand, although the parametric approach can numerically estimate the utility function and is thus very useful for further parametric analysis, the assumption imposed on the functional form of the utility function is sometimes either too restrictive to get plausible estimates or so flexible it causes computational problems. Given that both methods have their advantages and disadvantages, the choice of which method to use depends largely on the purpose of the study. Since the purpose of this study was to identify a certain number of consumer expenditure patterns, the nonparametric method seemed to be more appropriate.

Analytical Method

To identify consumer expenditure patterns, cluster analysis was employed to find the natural groupings of households with homogeneous preferences. Cluster analysis is a multivariate technique with which households can be naturally grouped based on similarities in their budget allocation patterns through maximizing within group similarities and between group differences (Johnson & Wichern, 1988).

The similarity measurement is defined by the Euclidian distance $d(X_1, X_2)$ between two p-dimensional observations X_1 and X_2:

$$d(X_1, X_2) = \sqrt[2]{(X_1 - X_2)'(X_1 - X_2)}. \quad (1)$$

The centroid method of measuring similarity was employed since this method is more robust to outliers than most other hierarchical methods. This method defines the distance D_{KL} between two clusters K and L by

$$D_{KL} = \|\overline{X}_K - \overline{X}_L\|^2, \quad (2)$$

where X_1 and X_2 are mean vectors of cluster K and L. Two clusters are merged when the squared Euclidean distance between their centroids or means is the smallest compared to other clusters.

The cluster analysis yielded m groups of households with homogeneous expenditure patterns where each household belonged to one and only one cluster. To further investigate the relationship between cluster membership and household demographic characteristics, a multi-nomial logit analysis was performed to determine which consumer characteristics were

important in predicting cluster membership. Following Maddala (1983), the multi-nomial logit model was specified as:

$$\log\left(\frac{P_i}{P_m}\right) = \beta_i' x, \qquad i=1,2,\ldots,m-1$$

(3)

where P_i denoted the probability a certain observation fell into the ith cluster, and x was a set of independent variables with β as corresponding regression coefficients. Because

$$\sum_{i=1}^{m-1} \frac{P_i}{P_m} = \frac{1-P_m}{P_m} = \frac{1}{P_m} - 1,$$

(4)

and by further denoting

$$G(\beta_i' x) = e^{\beta_i' x},$$

(5)

it could be derived that

$$P_m = \left[1 + \sum_{i=1}^{m-1} G(\beta_i' x)\right]^{-1},$$

(6)

and

$$P_i = \frac{G(\beta_i' x)}{1 + \sum_{i=1}^{m-1} G(\beta_i' x)} \qquad i=1,2,\ldots m-1$$

(7)

Thus, $(m-1)$ binary logit equations were fit simultaneously and the sum of the m predicated probabilities was restricted to be 1. The marginal effect of an independent variable b_k on a household's probability of inclusion in cluster i was computed as

$$\frac{\partial P_i}{\partial x_k} = e^{\beta_i' x} \beta_{ik} P_m - P_m P_i \sum_{j=1}^{m-1} e^{\beta_j' x} \beta_{jk},$$

(8)

and the marginal effect of independent variable x_k on P_m calculated using the formula:

$$\frac{\partial(P_m)}{\partial(x_k)} = 1 - \sum_{i=1}^{m-1} \frac{\partial(P_i)}{\partial(x_k)}.$$

(9)

The dependent variables of the multi-nomial logit analysis were the log-odds ratios of being in cluster i versus cluster m as discussed above.

The Data

The data set used in this study was 1980-1990 Consumer Expenditure Survey (CES). The CES data set, collected yearly since 1980 by the Bureau of Labor Statistics (BLS), provided very detailed information on household expenditures and household demographic characteristics. For this study, only urban households that completed the CES interview for an entire calendar year were selected. For detailed information about data construction, refer to Fan (1993). The sample periods in this study were annually from 1980 to 1990. Thirteen mutually exclusive summary expenditure categories were selected for this study: (1) Food at home; (2) Food away from home; (3) Shelter; (4) Fuel and utilities; (5) Household equipment and operation; (6) Apparel and upkeep; (7) Entertainment; (8) Transportation; (9) Education; (10) Health care; (11) Alcoholic beverages; (12) Tobacco; and (13) Personal care.

To construct a consistent data set, all of the expenditure categories of interest were created or modified following the category definitions defined in 1990. The final total sample size was 8651 households who were interviewed for a whole calendar year during 1980 to 1990. A list of definitions of variables is provided in Table 1.

Results and Discussion

Results of cluster analysis
    The cluster analysis identified six expenditure patterns. Since the cluster analysis technique put more weights on big budget share items, the variances of big budget share categories such as food at home were better explained than small budget share categories such as alcohol and tobacco. This characteristic was not a severe drawback for analyzing household decision making in budget allocation since big budget share items figured more prominently in the household decision making process.

Table 1
List of Variables

Variables	Description
FDHOME:	Food at home
FDAWAY:	Food away
SHELTER:	Shelter
UTILITY:	Utility
HOUSEO:	Equip. & oper.
APPAREL:	Apparel
ENTERT:	Entertainment
TRANSP:	Transportation
HEALTH:	Health care
EDUCAT:	Education
ALCHOL:	Alcohol
TOBACC:	Tobacco
PERSCA:	Personal care
FINCATAX:	Ann. income
PERINCOM:	Per cap. inc.
TOTEXPN;	Ann. tot. exp.
PEREXPN:	Per cap. exp.
AGE_REF:	Age of the ref.
FEMALE:	Female ref.=1
LESHIGH:	< high school=1
HIGHSCH:	High school=1
SOMECOL:	Some college=1
COLLEGE:	>= college=1
SELFEMP:	Self employed=1
WHITCOLR:	White collar=1
FAM_SIZE:	Family size
NO_EARNR:	Number of earners
RENTER:	Rented housing
HOUSEWM:	Owner w/mortgage
HOUSENWM:	Owner w/o mort.
NUMLE05:	# of members <= 5
NUM0617:	# of members 6-17
NUM1864:	# of members 18-64
NUMGE65:	# of members >= 65
DYEAR:	1-11. yr. 1980-90
NOREAST:	Northeast=1
MIDWEST:	Midwest=1
SOUTH:	South=1
WEST:	West=1
CITY1-5:	Metro. size dummies

In Table 2, the means and standard deviations of budget shares are presented for each of the six clusters. The mean budget shares for each cluster indicated that every cluster represented a distinguishable pattern of budget allocation. These clusters were named according to their dominant budget share or shares as: (1) Food and Utility dominated, (2) Shelter dominated, (3) Health Care dominated, (4) Transportation dominated, (5) Education dominated, and (6) Pleasure dominated.

Table 2
Mean (Std. Dev.) Budget Shares: by Cluster[a]

Budget Shares	C(1)	C(2)	C(3)	C(4)	C(5)	C6)
FDHOME	.31	.14	.18	.16	.13	.13
	(.08)	(.07)	(.07)	(.06)	(.05)	(.05)
FDAWAY	.03	.05	.03	.06	.06	.07
	(.03)	(.04)	(.03)	(.05)	(.04)	(.05)
SHELTER	.15	.38	.12	.14	.15	.20
	(.09)	(.09)	(.08)	(.07)	(.08)	(.06)
UTILITY	.18	.09	.15	.11	.10	.09
	(.09)	(.05)	(.08)	(.05)	(.04)	(.04)
HOUSEO	.03	.04	.05	.04	.04	.10
	(.04)	(.04)	(.05)	(.04)	(.04)	(.07)
APPAREL	.05	.05	.03	.06	.06	.08
	(.04)	(.03)	(.03)	(.04)	(.04)	(.05)
ENTERT	.04	.05	.04	.06	.05	.09
	(.03)	(.03)	(.03)	(.04)	(.04)	(.07)
TRANSP	.10	.11	.10	.23	.12	.13
	(.06)	(.06)	(.06)	(.06)	(.05)	(.05)
EDUCAT	.01	.02	.01	.02	.21	.02
	(.02)	(.02)	(.02)	(.03)	(.09)	(.02)
HEALTH	.05	.05	.26	.06	.06	.05
	(.05)	(.05)	(.10)	(.04)	(.05)	(.04)
ALCHOL	.01	.01	.01	.02	.01	.02
	(.02)	(.02)	(.02)	(.02)	(.02)	(.03)
TOBACC	.02	.01	.01	.02	.01	.01
	(.02)	(.02)	(.02)	(.02)	(.02)	(.02)
PERSCA	.01	.01	.01	.01	.01	.01
	(.02)	(.01)	(.01)	(.01)	(.01)	(.01)

a Cluster (1) - (6) were named Food and Utility dominated; Shelter dominated; Health Care dominated; Transportation dominated; Education dominated and Pleasure dominated, respectively.

About 14.1% of the sample households belonged to the Food and Utility dominated cluster. On average, households in this expenditure type allocated 31.4% of their total budget to food at home, 103.0% higher than the mean budget share for food at home for all other

five clusters combined (0.155). Households in this cluster also spent a large portion of their budget on fuel and utilities (0.175), about 72.2% higher than the mean utility budget share for all other households. It is interesting to notice that this group also had the largest mean budget share for tobacco products (0.024), 80.8% higher than the mean of all other groups combined. Households in this cluster had the lowest mean annual after-tax income at $12,475. About half of the household reference persons had a lower than high school education. While their mean family size was 3.19, largest among all clusters, their mean number of earners was only 1.08, the second lowest among all clusters. Apparently, households in this *Food and Utility dominated* group had to spend most of their budget to satisfy their basic needs. Their budget allocation pattern was dominantly home-bounded.

The second cluster was the *Shelter dominated* cluster. The households in this cluster allocated about 38.0% of the budget to shelter, on average, which was about 58.0% higher than all other clusters combined. About 27.1% of the sample households belonged to this cluster. Households in this cluster had a mean after-tax income of $21,292 per year, lower than the mean income of *Transportation*, *Education* and *Pleasure* dominated clusters, but higher than *Food and Utility* and *Health Care* dominated clusters. However, their mean per capita income was the second highest at $10,840 a year, only lower than the mean per capita income of the *Pleasure dominated* cluster. A typical household reference person in this cluster was fairly well educated, relatively young, and was likely to be a renter or homeowner with a mortgage. In fact, only 8.0% of the households in this group were homeowners without mortgages, compared to the overall sample frequency of 25.2%.

Only 7.7% of the sample households belonged to the *Health Care dominated* cluster. While these households allocated a significantly smaller proportion of their budget to shelter, apparel, entertainment, transportation, alcohol and tobacco

than households in all other clusters, their mean budget share for health care (0.257) was about five times the mean health care budget share for all other clusters combined (0.051). The demographic profile of this cluster showed that households in this group had a mean age of reference person at about 68, much higher than the mean age of reference person in any other clusters. In addition, the budget shares for apparel, entertainment, alchohol, transportation and tobacco also were the lowest among all clusters.

The *Transportation dominated* cluster, shared by 24.3% of the sample households, was distinguished by a high mean budget share for transportation, while all other budget shares were fairly balanced. Households in this cluster had a highest mean number of earners at 1.77 earners per household. About 38.4% of the reference persons had a high school degree, the highest proportion among all clusters, but the proportion with more than a high school education was less than that of the *Shelter*, *Education*, and *Pleasure* dominated clusters.

Only 3.8% of the whole sample were included in *Education dominated* cluster, where a mean of 21.4% of the household budget was allocated to educational expenses, about 10 times higher than the mean budget share for education of all other clusters combined. In tradeoff, households in this cluster allocated a relatively small proportion of their budget to other expenditure categories, especially food at home. Households in this cluster had the highest mean expenditure to income ratio, while their mean after-tax income was the second highest among all clusters. About 33.5% of the household reference persons in this cluster had at least a college degree, the highest percentage among all groups. It is possible that households in this cluster spent more money on education than other groups because the highly educated were likely to value education more than people with low levels of education, and therefore, were more willing to invest in their own or their children's human capital development.

The last cluster was named *Pleasure dominated*, given that

households in this cluster spent a larger proportion of their budget on food away from home, household equipment and operation, apparel, entertainment, and alcoholic beverages than any other clusters. About 22.8% of the sample households belonged to this cluster. Households in this cluster had the highest mean annual after-tax income, per capita income, total expenditure and per capita expenditure. On average, the reference persons of households in this cluster were relatively young and highly educated. Their budget allocation pattern reflected a social-oriented life style.

In general, households in *Pleasure dominated*, *Education dominated*, *Transportation dominated* and *Shelter dominated* clusters were economically better-off than households in the *Food and Utility dominated* cluster. It is hard to judge the economic status of the households in the *Health Care dominated* cluster. Because most of them were retired, they might have high levels of assets despite low levels of total expenditure.

Results of logit analysis

The overall Cragg-Uhler R^2 for the multi-nomial logit analysis was 0.91, indicating cluster inclusions were well explained by the sets of independent variables. Most of the independent variables had significant effects on the dependent variable. To better understand the average effect of economic and demographic characteristics on the probability of cluster membership, the calculated sample mean marginal effects of the independent variables are presented in Table 3.

Total expenditure had a large marginal effect on a household's probability of inclusion in certain expenditure patterns. On average, a $1,000 increase in a household's total expenditure would decrease the household's probability of being in the *Food and Utility dominated* cluster by 24%, decrease the probability of being in the *Health Care dominated* cluster by 3.1%, and increase the probability of being in *Pleasure dominated*, *Shelter dominated*, *Transportation dominated*, and *Education dominated* clusters by about 15.4%, 4.6%, 1.0% and 3.1%,

respectively, holding everything else equal.

Table 3
Mean Marginal Effects of Demographic Variables on Probabilities of Cluster Inclusion[a]

Variables	C(1)	C(2)	C(3)	C(4)	C(5)	C(6)
ASIAN**[a]	-.02	.03	-.00	.01	.05	-.07
BLACK	.02	-.01	-.00	.01	.00	-.01
HISPANIC**	.02	.05	-.02	-.03	.01	-.03
LN(TOTEXP)***	-.22	-.01	-.02	-.04	.05	.23
AGE_REF***	.00	-.01	.00	.00	.00	-.00
FEMALE***	.00	.04	-.00	-.01	.00	.01
HIGHSCH	-.02	-.02	-.01	.01	.01	.03
SOMECOL***	-.03	.00	-.01	-.03	.03	.05
COLLEGE***	-.02	.04	-.02	-.07	.04	.02
FULTIME*	-.00	-.02	.09	.01	-.01	.03
SELFEMP*	-.02	.03	.06	-.06	-.00	-.00
WHITCOL	-.01	.01	.00	-.02	-.00	.01
NO_EARNR**	-.03	-.02	-.01	.06	-.00	.01
NUMLE05***	.05	-.02	.05	-.06	-.01	.04
NUM0617***	.07	-.03	-.00	-.02	.01	-.03
NUM1864***	.08	-.05	.01	.03	.01	-.08
NUMGE65***	.06	-.08	.09	-.01	-.01	-.05
HOUSEWM***	.02	-.06	.01	.06	-.02	-.01
HOUSENWM**	.03	-.16	.04	.13	-.01	-.04
MIDWEST***	-.03	-.03	.01	.01	-.00	.04
SOUTH***	-.03	-.04	.03	.03	-.01	.01
WEST***	-.04	.04	-.00	.01	-.02	.01
CITY2***	-.04	-.01	.02	-.02	.01	.03
CITY3***	-.05	-.04	.02	-.02	.02	.08
CITY4***	-.07	-.07	.08	-.01	.01	.07
CITY5***	-.09	-.10	.10	-.03	.01	.10
CITYM	.02	-.02	.02	-.01	-.00	.06
DYEAR***	.00	.01	.01	-.01	-.00	-.00

a*** = 99% significance level,** = 95% significance level, * = 90% significance level

The results of the multi-nomial logit analysis also suggested that education was a very important factor in determining household expenditure patterns. Households with higher education were more likely to be in *Education dominated* and *Pleasure dominated* clusters than households

with lower levels of education. The mean marginal effects of the variable COLLEGE indicated that on average, if a reference person had at least a college degree, then this household was about 2.4% more likely to be in the *Pleasure dominated* cluster, and 3.8% more likely to be in the *Education dominated* cluster than a household with a reference person with a less than high school education. This implies that education could not only enhance an individual's opportunities for getting higher pay jobs, as suggested by human capital theory (Becker, 1965), but also change individuals' perceptions of value and thus influence their expenditure pattern, in ways other than via money income.

The results of the multi-nomial logit analysis suggested that Asian-Pacific households were more likely to be in *Shelter dominated* and *Education dominated* clusters, but less likely to be in the *Pleasure dominated* cluster than White households, ceteris paribus. On average, Asian-Pacific households were 5.3% more likely to be in the *Education dominated* cluster, 3.4% more likely to be in the *Shelter dominated* cluster, and 7.3% less likely to be in the *Pleasure dominated* expenditure patterns than average White households. The results also suggested that Hispanic households were slightly more likely to be in the *Food and Utility dominated* expenditure cluster than White households, holding other things equal. Hispanic households were also about 1.7% less likely to be in the *Health Care dominated*, 2.6% less likely to be in the *Transportation dominated*, and 3.2% less likely to be in the *Pleasure dominated* cluster than White households, everything else equal. When economic and demographic variables other than ethnicity were controlled, Black households were not very different from White households in terms of probability of inclusion in expenditure clusters.

Total expenditure, education, family composition and ethnicity variables exhibited significant marginal effects on households' probability of inclusion in certain expenditure patterns. On average, an increase in family size, no matter

what age category that additional person might be in, would increase the household's probability of falling in the *Food and Utility dominated* cluster, especially when this additional person was an adult. The reason for this is very straightforward: if an additional person were added to the household without bringing any extra income, the household had to reallocate its budget to purchase more necessities such as food, since food was the primary need before everything else. In general, a change in family size worked in the opposite way of a change in total expenditure. The only exception was the marginal effect on the probability of being in the *Education dominated* cluster, where total expenditure and number of adults and number of members age 6 to 17 had the same sign; they increased the probability of being in the *Education dominated* cluster. However, an additional child less than six decreased the probability of a household's being in the *Education dominated* cluster by about 1.4%.

Regional differences also existed. Compared to households living in the Northeast, households residing in the Midwest were about 3.2% less likely to be in the *Food and Utility dominated* cluster, and about 4.3% more likely to be in the *Pleasure dominated* cluster, on average, holding other things equal. Households in the South were also about 2.6% less likely to be in the *Food and Utility dominated* cluster, but about 3.5% more likely to be in the *Health Care dominated* cluster than households residing in the Northeast, everything else equal. Households living in the West were about 4.4% more likely to be in the *Shelter dominated* group, and about 4.1% and 1.6% less likely to be in *Food and Utility dominated* and *Education dominated* clusters than households in the Northeast, respectively, everything else identical.

Implications and Conclusions

The cluster analysis, performed on 13 budget shares, identified six expenditure patterns. They were: *Food and Utility dominated, Shelter dominated, Health care dominated,*

Transportation dominated, Education dominated and Pleasure dominated clusters. The results of the multinomial logit analysis indicated that total expenditure, education, family composition and ethnicity had significant effects in predicting consumer expenditure patterns.

By understanding and recognizing preference differences among households with different economic and demographic characteristics, the production sector can better identify market segments for their line of products, so that more information can be provided to the specific market segment to increase market efficiency. For example, by knowing that White and Black households were more likely to be in Pleasure dominated expenditure pattern than Asian and Hispanic households, marketers could disproportionately targeting the White and Black market when making advertising decisions. However, housing project developers probably should disproportionately targeting the Asian and Hispanic market, given Asian and Hispanic Americans were more likely to spend a larger budget share on shelter than both White and Black households. On the other hand, consumer needs could be better identified and product design could be more customized.

The results of this study may also be used by consumer educators and financial planners to help those households who are at a relative economic disadvantage and in financial trouble. The information provided in this study is especially useful to them to understand expenditure pattern differences and their determinants when helping whose households who are in financial trouble. Using the information provided in this paper, educators could first determine their clients' expenditure pattern, then analyze the causes of their trouble by looking at why they are in that specific expenditure pattern and how they could improve their financial situation.

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Endnotes
1. Assistant Professor, Family and Consumer Studies.
2. Associate Professor, Consumer and Textile Sciences Department.