

# Factors Affecting Household Expenditures for Services

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## 〈요 약〉

지금까지, 일반적으로 재화의 소비자 수요에 관한 연구가 서비스의 소비자 수요에 관한 연구보다 강조되어 온 경향이 있으나, 급증하는 서비스 분야의 중요성에 비추어 볼 때, 가계의 가계 생산 시간 절약에 기여할 수 있는 서비스 지출에 영향을 미치는, 소득, 가계의 경제적·사회적 구조 그리고 여성의 노동시장 참여증가의 효과를 연구하는 것은 매우 필요한 일이라 생각된다.

본 연구의 결과는 가계 및 개인을 포함하는 소비자 행동의 이해 증진을 통해서 성공적인 마케팅 전략의 개발을 도모하는 관련 서비스 업계와, 소비자 행동과 가계의 소비행태에 관심이 있는 소비자 및 가계 경제학자들에게 유용한 정보를 제공할 것이다.

아울러, 본 연구는 수요 함수 및 탄력성의 측정을 통해서 각 서비스의 특성을 규명하는데 유용한 정보를 제공하므로, 서비스 관련 공공 정책의 수립에 도움을 줄 수 있을 것이다.

## I. Introduction

The changes in the economic and sociodemographic structure of the U.S. population, an increased number

of woman participating in the labor force (consequently, the increased number of households with multiple wage earners), and a greater diversity in household patterns have been recognized as important factors

affecting consumers and consumption behavior, during the past two decades (Senauer, 1983).

Until now, studies of consumer demand for goods are generally more emphasized than are studies of demand for services. However, based on the increased importance of the service sector, it is necessary to study the effects of increasing income, of the changing economic and sociodemographic structure of households, and of increases in the female labor supply, on household expenditure for services.

Two of the most studied aspects of household expenditure for services are household expenditures for Food Away From Home (Prochaska and Schrimper, 1973; Sexauer, 1979; Redman, 1980; Goebel and Hennon, 1981; Derrick, Dardis, and Lehfeld, 1982; Kinsey, 1983; Lee and Brown, 1986; McCracken and Brandt, 1987); and the effects of increased labor force participation by married women on expenditure patterns (Strober and Weinberg, 1977; Strober, 1977; Vickery, 1979; Ortiz, MacDonald, Ackerman, and Goebel, 1981; Weinberg and Winer, 1983; Bellante and Foster, 1984; Bryant, 1988; Weagley and Norum, 1989; Jacobs, Shipp, and Brown, 1989; Soberon-Ferrer and Dardis, 1991).

However, most of the research has limited explanatory power in describing the household behavior for services because it deals with limited interests, such as cooking and cleanup, and limited segments of the population (e.g., two-earner households). Therefore, it is useful to conduct a more comprehensive analysis which considers various household activities (e.g., domestic service, child care service, and personal care service) among the whole population.

Basically, the intent of this study is, first, to provide useful information to relevant service industries which are interested in knowing more about the consumer behavior of households or individuals so that they can develop and achieve their marketing goals. Second, the study results will help consumer economists or family

economists who are interested in consumer behavior and who are concerned about household consumption patterns. Third, these results might be of value in the formulation of some service-related public policies because this research will provide useful information about the characteristics of each service through the development of the demand functions and the estimation of elasticities.

## II. Theoretical Model

### Household Production Model

The household production model tries to explain a wide range of important phenomena about consumer behavior, where the traditional neoclassical model does not capture the behavior under study. In this framework, market goods, time, and human capital are used as inputs into the production of commodities of the nonmarket sector. Therefore, a household produces utility yielding commodities, in order to maximize household utility subject to both the income constraint and the time constraint.

Formally, the household utility function from the household production perspective is,

$$U = u(Z_1, Z_2, \dots, Z_n) \quad (1)$$

where  $Z = (Z_1, Z_2, \dots, Z_n)$  is the vector of quantities of the commodities or services produced by the household.

Within the household, a vector of market goods  $x_i$ , and a vector of quantities of its own time  $t_i$  are used in producing the commodity. Therefore, the production function is expressed as

$$Z_i = z_i(x_i, t_i, E) \quad (2)$$

where  $E$  is a vector of variables related to the

environment in which the production takes place.

The household faces production function constraints which include income constraint and time constraint.

The income constraint:

$$I = \sum_{i=1}^n p_i x_i \quad (3)$$

and the time constraint :

$$T = t_w + \sum_{i=1}^n t_i \quad (4)$$

where  $p_i$  : the price of the market good input

$x_i$  : quantity of the market good input used in producing  $Z_i$

$t_w$  : the household's time spent in the labor market

$t_i$  : the household's time spent in producing  $Z_i$

The income constraint and the time constraint can be combined into the household's "full income" constraint.

$$S = wT + V = \sum_i (wt_i + p_i x_i) \quad (5)$$

where  $w$  : wage rate

$V$  : household's non-labor income

### Utility Maximizing Framework

A basic home production model for a specific commodity can be expressed as

$$U = U[Z_s(x_s, t_s; E), Z_o(x_o, t_o; E)] \quad (6)$$

st,  $T = t_w + t_s + t_o$  and

$$I = p_s x_s + p_o x_o$$

Then, the household's "full income" constraint

$$S = wT + V = wt_s + wt_o + p_s x_s + p_o x_o \quad (7)$$

where  $Z_s$  = a single home produced commodity

$x_s$  = direct inputs in production of  $Z_s$

$t_s$  = time spent in producing  $Z_s$

$E$  = environmental variables

$Z_o$  = all other home produced commodities

$x_o$  = direct inputs in other home production

$t_o$  = time spent in other home production

$p_s$  = price of direct inputs in  $Z_s$

$p_o$  = price of direct inputs in  $Z_o$

$w$  = wage rate

$t_w$  = time spent in the labor market

$V$  = non-labor income

This is one period model where all prices are exogenous. In addition, there are several underlying assumptions: (1)  $Z_s$  and  $Z_o$  are assumed to be concave and monotonically increasing; (2) the price of non-market time is assumed to be equal to the market wage; and (3) consumers are assumed to be rational and utility maximizers.

Finally, the Lagrangian function is expressed as

$$L = U[Z_s(x_s, t_s; E), Z_o(x_o, t_o; E)] + \lambda (wT + V - p_s x_s - wt_s - p_o x_o - wt_o) \quad (8)$$

### III. Specification and Definition of Variables

Based on the household production approach to consumer demand, the  $j$ th household's expenditure for a single home produced commodity ( $Z_s$ ) can be expressed as a function of  $p$ ,  $w$ ,  $t_w$ ,  $V$ , and  $E$ .

$$p_s x_s = f_s(p_i, w_i, t_{w_i}, V_i; E_i) \quad (9)$$

There are several issues to consider in this specification. Because this study utilizes the cross-sectional data set, prices are assumed to be relatively constant.<sup>1)</sup> Under this assumption, this study has some difficulties in reflecting the differences in service costs and service availability among geographic areas; however, variables related to location might play an important role in this regard.

Based on the review of literature, to impute the opportunity cost of time as a wage rate for a whole population does not seem to be a good way to include a time component in the analysis of household expenditures for services because the imputed results obtained by econometric methods such as Heckman's procedure are quite likely to vary depending on the selection of data and the selection of explanatory variables. Furthermore, empirical research has shown that Heckman's procedure overestimates the imputed wage rates for non-labor force participants (Duncan, 1992). In this study, the reflection of the component of a wage rate will therefore be conducted by the use of labor income, which is easily observable. The time component of this research will be represented by total hours of market work of the homemaker<sup>2)</sup> and the composition of earners within household.

Based on the above discussion, the *j*th household's demand for the *i*th service may be reexpressed as

$$EXP_{ij} = f_i(t_{wj}, wt_{wj}, V_j; E_j) \quad (10)$$

where  $EXP_{ij}$  : *j*th household's expenditures on service *i*

$t_w$  : hours of market work of homemaker

$wt_w$  : labor income of household

$V$  : non-labor income of household

$E$  : environmental variables

This equation specifies expenditures on service *i* as a function of hours of market work, labor income, non-labor income, and environmental variables. The variables that represent the environment (*E*) might include education level, race, age, household size and composition, and geographic location, etc.

In this equation, the income variable is specified as labor income and non-labor income, because many previous empirical results have shown that labor income and non-labor income have had considerably different impact on expenditure for services such as child care (Michalopoulos, Robins, and Garfinkel, 1992). Although hours of market work in this equation can be considered an exogenous or an endogenous variable - researchers have assumed it to be both-, it seems to be more reasonable to assume that it is endogenous because it is a choice variable in most cases. Given this assumption, the simultaneous system should be used, with hours of market work as an instrumental variable.

### Classification of Services

The main focus of this research is to investigate time-saving service expenditures from the perspective of household production approach. Consequently, the selection of the service categories should be time-saving services, as they will then be useful in investigating the impact of the homemaker's employment on household expenditures for services. In light of previous relevant empirical research (Bellante and

1) Furthermore, price information is not available in this data set. Regional CPI (Consumer Price Index) might be used as a proxy for the price; however, this information is only available for urban households.

2) In this study, homemaker was defined as the wife in all husband-wife type households and was defined as a household head in other types of households, including single parent and single consumer households.

Foster, 1984; Soberon-Ferrer and Dardis, 1991) and the household production approach, five services are selected.

1. Food away from home: meals purchased in restaurants, cafeterias, and schools
2. Child care: outlays on baby-sitters and child care centers
3. Domestic services: cleaning, laundering, cooking, and other domestic services
4. Clothing care: dry-cleaning and laundry sent out, and clothing repair and alterations
5. Personal care: barbershop and beauty parlor services

#### Determinants of Household Expenditures for Services

Possible determinants of household expenditures for services are summarized as several categories. First, there are household production variables. These variables involve the hours of market work of the homemaker of the household, labor income, and non-labor income of household. The hours of market work of the homemaker of the household is selected in order to reflect differences in the time components for homemakers. If time-saving services are assumed to be substitutes for hours of homemaker's non-market time, there will be a positive relationship between hours of market work and household expenditure for services.

At the same time, several dummy variables to represent earner composition within the household are included in order to reflect both differences in life styles and time components of household work by all household members. And, labor income and non-labor income are believed to affect household expenditure for services positively, but differently.

Second, there are several homemaker's characteristics which reflect the differences in household productivity

and preferences for consumption of services. The homemaker's characteristics of this study includes age, education, and sex. Although it is difficult to predict the relationships between these variables and service expenditures in a critical manner, the expenditure behavior will generally vary depending on the age of the homemaker; the significant age group for the explanation of a specific service will be different depending on the service category. Education is assumed to increase efficiency in all non-market activities; consequently, higher levels of education will likely increase the household's real income (Michael, 1972; Michael, 1973; Michael and Becker, 1973). In short, the expenditure for services will be higher in higher level of education. In addition, male homemakers will spend more on expenditures on services partly because of social norm and partly because of less specialization on household work than female homemakers.

Third, the race and the retirement status of the head of household are hypothesized to affect expenditures for services. This variable might reflect the differences in tastes and preferences for consumption of various services. Generally, black families will spend less on FAFH and more on personal care and clothing care (Dardis, Derrick, and Lehfeld, 1981; Derrick, Lehfeld, and Dardis, 1982; Bellante and Foster, 1984; McCracken and Brandt, 1987; Soberon-Ferrer and Dardis, 1991). The retirement status of the head of household will be an important factor in explaining household expenditures for services because retirement is an important event in an income-earner's life, and consequently, might change one's lifestyle abruptly.

Fourth, variables related to the household type, and household size are believed to affect the household expenditure for services. The household type variables of this research are composed of several dummy variables, which are mainly classified by the marital status and the presence of children. Basically, the

household type variables are believed to capture the effects of household composition on household expenditures for services. Generally, the presence of younger children might have a negative effect on household expenditures for services, such as FAFH, holding family size constant, because of the reduced number of meals eaten away from home. However, the presence of children (especially younger children) is hypothesized positively to affect the expenditures for child care. Married households will spend less on household expenditures for services such as FAFH because of the decreased need for social dating, and they will spend less on household expenditures on services such as clothing care because of the specialization of household work and market work between husband and wife, especially in the case of households with non-working wives. For household size, the number of household members will have a positive effect on all service expenditures but a decreasing rate.

Fifth, it is hypothesized that there are differences in expenditures for services depending on homeownership. However, the expected direction is slightly ambiguous. Based on the arguments of Garman and Fogue (1988), renters will spend more on nonshelter expenditures such as FAFH, personal care, and clothing care because the cash outflow of homeowners is generally greater than that of renters. However, according to the empirical results of the study of Soberon-Ferrer and Dardis (1991), in the case of full-time working-wife households, homeownership was positively related to expenditures for personal care and FAFH.

Finally, variables related to location such as geographic region (i.e., northeast) and whether the residence is in a rural or urban setting, are believed to affect household expenditures for services. These variables might reflect the differences of service costs and service

availability. The only possible variable of this research, in this regard, is the variable which represents the classification of urban/rural. Generally, the households in urban areas will spend more on services than those in rural areas.

Based on the assumption that a homemaker's market hours are endogenous, the hours of market work of the homemaker of household can be specified as a function of an income variable composed of both the non labor income of the household and the labor income of other family members; years of homemaker's education; homemaker's age; homemaker's age squared; the interaction between homemaker's age and homemaker's education; race; marital status; household size; the presence of a child; the age of youngest child;<sup>3)</sup> household tenure; and urbanity of residence.

The homemaker's age and education variables are regarded as proxy variables for the wage rate. In specifying the hours of market work for homemakers, the hours for female homemakers and the hours for male homemakers are estimated separately since female's labor force participation behavior is assumed to be clearly different from male's labor force participation behavior.

In addition, if homemaker's hours of market work are assumed to be endogenous, it is necessary to use other family members' labor income instead of the household's total labor income. Doing so is useful in removing the wage rate effect implicit in the income effect, and thus, in defining the characteristics of each service more accurately.

〈Table 1〉 shows the definition of variables used in this research, including the specification and the definition of each variable, and unit of analysis.

3) If a household has no children, age of youngest child is set to be zero.

(Table 1) Definition of Variables

VARIABLE NAME	DEFINITION	UNIT OF ANALYSIS
FAFH	Annual expenditures on food away from home*	dollars
CHDCARE	Annual expenditures on child care services*	dollars
DOMCARE	Annual expenditures on domestic services*	dollars
CLOCARE	Annual expenditures on clothing care services*	dollars
PERCARE	Annual expenditures on personal care services*	dollars
MKTHRS	Annual hours of market work of the homemaker	hours
EC	Earned composition	
EC1	0 full-time, 0 part-time	dummy
EC2	1 full-time, 0 part-time	dummy
EC3	2 or more full-time, 0 part-time	dummy
EC4	1 full-time, 1 part-time	dummy
EC5	0 full-time, 1 part-time	dummy
EC6	Other full-time/part-time combinations	dummy
FINCOME	Labor income of household -homemaker's labor income	dollars
NLINCOME	Non-labor income	dollars
AGE	Age of the homemaker	
AGE1	Less than 25	dummy
AGE2	25-34	dummy
AGE3	35-44	dummy
AGE4	45-54	dummy
AGE5	Greater than 54	dummy
ED	Education of the homemaker	
ED1	Less than high school graduate	dummy
ED2	High school graduate	dummy
ED3	Some College	dummy
ED4	College Graduate	dummy
ED5	Some graduate education	dummy
MALE	1 if the homemaker is male	dummy
WHITE	1 if the household head is white	dummy
RETIRED	1 if the household head is retired	dummy
CHD02	1 if the presence of children ages 0-2	dummy
CHD35	1 if the presence of children ages 3-5	dummy
HT	Household type	
HT1	H/W only	dummy
HT2	H/W, oldest child < 6	dummy
HT3	H/W, 6 < oldest child < 18	dummy
HT4	H/W, oldest child > 17	dummy
HT5	Other H/W consumer units	dummy
HT6	Single parent with children	dummy
HT7	Single consumers	dummy
HT8	Other consumer units	dummy
HS	Household size	number
HSQ	Household size squared	number
HO	Homeownership (1 if the household is homeowner)	dummy
UR	Urban/rural (1 if household is located in urban)	dummy

\* All annual expenditures for time-saving services used in this research are imputed based on one quarter of data.

#### IV. Data and Methodology

The data for this research is a quarterly interview panel survey of the Consumer Expenditure Survey (CES) which was conducted by the Bureau of Labor Statistics (BLS). The CES is a national probability sample of households chosen to represent the total civilian noninstitutional population. The sample of the panel is approximately 5,000 households.

Households reporting incomplete income are eliminated from the study data set because it is nonsensical to impute income. After removing them, the total number of observation for the 1990-1991 CES turns out to be 4,478.

In order to investigate the relationship between the explanatory variables and the household expenditure on service, tobit analysis is adopted because a high proportion of households has zero expenditure for a specific service category. Tobit technique utilizes information from both consuming and nonconsuming households in order to estimate simultaneously the relationship of the explanatory variables to the probability that a specific service will be purchased and to the magnitude of the purchase. Tobit estimates are a maximum likelihood procedure which produces the estimator of the model parameters derived from maximizing the likelihood of observing the given sample values.

If each observation is assumed to be independent, the likelihood function is derived by choosing the appropriate probability statement for each observation, and multiplying it by the appropriate probability statement for every other observation in the sample. Then the likelihood function can be written as follows,

$$\prod_{y_i > 0} [1 - F(\beta'x_i/\sigma)] \prod_{y_i = 0} \frac{1}{(2\pi\sigma^2)^{0.5}} \exp \left[ -0.5 \frac{(y_i - \beta'x_i)^2}{\sigma^2} \right] \quad (11)$$

Tobit analysis decomposes two different effects

through the estimation of the elasticity of the probability of consumption and the conditional elasticity associated with actual expenditure.

The total elasticity which is decomposed by the elasticity of the probability of consumption and the elasticity of expected consumption of the present consumers, can be expressed as follows.

$$\eta_i = \frac{\partial F\left(\frac{\beta'x_i}{\sigma}\right)}{\partial x_i} \frac{x_i}{F\left(\frac{\beta'x_i}{\sigma}\right)} + \frac{\partial E(y^*)}{\partial x_i} \frac{x_i}{E(y^*)} \quad (12)$$

#### V. Results and Discussion

〈Table 2〉 shows the descriptive profile for dependent variable and 〈Table 3〉 shows the descriptive profile for independent variables.

〈Table 4〉 shows the results of tobit regressions of the empirical model. In the cases of food away from home and clothing care services, there was a significant positive relationship between hours of homemaker's market work and household expenditure for each of the services, as was hypothesized. Therefore, these time saving services are considered to be substitutes for the hours of a homemaker's non-market time.

However, hours of homemaker's market work were negatively related to expenditures for domestic care service. Also, hours of homemaker's market work had insignificant impacts on expenditures for child care and personal care services.

These results are unexpected because the increase in hours of homemaker's market work is expected to increase these time saving service expenditures. Several factors may account for such results. First, the assumption about homemaker's market hours seems to affect the results. The expenditure equation presented in 〈Table 4〉 were estimated based on the assumption that a homemaker's market hours are endogenous. However, if one assumes that a homemaker's market



〈Table 2〉 Annual Service Expenditures by Service Category

Service category	Households with service expenditures		Mean annual expenditures
	Number	Percentage	Expenditure
1990-1991			
Food away from home	3,693	82.5	1,200.71
Child care	531	11.9	1,997.48
Domestic services	303	6.8	1,251.02
Clothing care	1,579	35.3	215.89
Personal care	3,536	79.0	310.80
Total services	4,201	93.8	1,740.97

1. "Mean" refers to households with expenditures greater than zero.
2. Expenditures on total services in this research refers to the sum of expenditures on food away from home, child care service, domestic services, clothing care service, and personal care service.

hours are exogenous, the empirical results show that child care and personal care services are considered to be substitutes for the hours of a homemaker's non-market time—a quite different result.

Secondly, the significance of this variable may also depend on both the selection of variables in the hours equation and the estimation technique of the hours equation. For example, the empirical results using Heckman's procedure were different from those using tobit. This study utilized tobit for the specification of hours equation because tobit is a simultaneous procedure and because the estimated variance-covariance matrix of Heckman procedure is generally biased.

Finally, the use of an earner composition variable may decrease the impact of homemaker's market hours on expenditures for time-saving services. For example, in the case of child care and personal care services, the earner composition variables show reasonably that these services may be substitutes for a household's non-market time.

Generally, the empirical results on earner composition reasonably showed that differences in time components depended upon earner composition. For

example, the households with 2 or more full-time and 0 part-time earners spent significantly more on child care, clothing care and personal care services than the households with 1 full-time and 0 part-time earners.

Both the non-labor income of the household and other family members' labor income had a significant and positive impact on expenditures for most time-saving services. However, in the case of child care service, non-labor income of the household had an insignificant impact on expenditures for child care. This result confirmed the fact that labor income and non-labor income each have a considerably different impact on expenditure for child care service (Michalopoulos, Robins, and Garfinkel, 1992).

Although the significant age group for the explanation of a specific service was different depending on the service category, the age of the homemaker was significant in all time-saving services. For example, in the case of personal care service, the expenditure of households with young homemakers (i.e. homemaker ages less than 35) was significantly lower than the expenditure of households with older homemakers (i.e. homemakers aged more than 54). This result seems

〈Table 3〉 Descriptive Statistics of Independent Variables

Variables	Mean	STD. DEV	Frequency	Percent
MKTHRS	1,185.97	1,030.84	-	-
Earner composition				
EC1	-	-	845	18.9
EC2	-	-	1,304	29.1
EC3	-	-	1,162	25.9
EC4	-	-	511	11.4
EC5	-	-	288	6.4
EC6	-	-	368	8.2
NLINCOME	5,836.34	10,978.80	-	-
FINCOME	15,307.10	22,511.10	-	-
Age				
AGE1	-	-	364	8.1
AGE2	-	-	1,073	24.0
AGE3	-	-	1,070	23.9
AGE4	-	-	610	13.6
AGE5	-	-	1,361	30.4
Education				
ED1	-	-	935	20.9
ED2	-	-	1,526	34.1
ED3	-	-	1,087	24.3
ED4	-	-	529	11.8
ED5	-	-	401	9.0
Male	-	-	1,043	23.3
White	-	-	3,850	86.0
Retired	-	-	749	16.7
Children composition				
CHD02	-	-	525	11.7
CHD35	-	-	514	11.5
Household type				
HT1	-	-	894	20.0
HT2	-	-	332	7.4
HT3	-	-	674	15.1
HT4	-	-	383	8.6
HT5	-	-	192	4.3
HT6	-	-	274	6.1
HT7	-	-	1,208	27.0
HT8	-	-	521	11.6
HS	2.63064	1.5430	-	-
HO	-	-	2,796	62.4
UR	-	-	4,018	89.7

(Table 4) Results of Tobit Regression for Service Expenditures

INDEPENDENT VARIABLES	DEPENDENT VARIABLE: Expenditures on each service category				
	FAFH	CHDCARE	DOMCARE	CLOCARE	PERCARE
INTERCEPT	-354.567 (288.70)	-5701.58 (1136.9)***	-9049.38 (1295.46)***	-319.995 (62.66)***	91.187 (41.62)**
MKTHRS	0.13589 (0.0564)**	0.27990 (0.47398)	-0.39414 (0.1287)***	0.02423 (0.0123)**	0.00859 (0.0078)
EC1	-478.673 (143.13)***	-2734.68 (643.05)***	101.11 (414.17)	-116.275 (31.04)***	-63.702 (20.51)***
EC3	112.455 (106.13)	2222.42 (267.74)***	241.243 (289.43)	52.393 (20.88)**	39.382 (15.30)**
EC4	210.641 (125.67)*	1031.32 (292.02)***	-69.608 (343.81)	-1.8413 (24.81)	9.0324 (18.16)
EC5	-321.483 (146.81)**	-1750.16 (680.34)**	-715.031 (510.33)	-58.090 (31.09)*	-4.9454 (21.38)
EC6	236.564 (154.90)	606.499 (413.36)	-174.351 (435.09)	25.1587 (30.45)	45.139 (22.35)
FINCOME	0.02285 (0.0020)***	0.02246 (0.0076)***	0.02975 (0.0043)***	0.00442 (3.6E-04)***	0.00296 (2.9E-04)***
NLINCOME	0.02954 (0.0037)***	0.00840 (0.0185)	0.02979 (0.0067)***	0.00378 (6.8E-04)***	0.00324 (5.3E-04)***
AGE1	246.145 (147.61)*	40.2543 (465.26)	-2826.01 (1019.88)***	-137.685 (31.55)***	-77.259 (21.98)***
AGE2	42.314 (98.35)	343.079 (238.10)	-1076.84 (294.60)***	-26.601 (19.24)	-37.832 (14.33)***
AGE4	210.611 (117.71)*	-1347.26 (436.26)***	-73.421 (311.27)	7.3973 (22.52)	29.777 (17.12)*
AGE5	-96.242 (149.91)	-274.568 (747.47)	-93.420 (383.74)	-47.285 (30.25)	54.876 (21.39)**
ED1	-401.369 (99.12)***	-507.742 (322.19)	-418.469 (330.5)	-65.293 (21.90)***	-70.028 (14.22)***
ED3	121.582 (87.46)	483.079 (243.04)**	865.572 (257.33)***	115.566 (17.39)***	67.680 (12.72)***
ED4	270.463 (111.63)***	754.838 (325.42)**	1602.02 (289.72)***	219.739 (20.85)***	86.018 (16.15)***
ED5	950.241 (124.92)***	1546.6 (380.88)***	2339.9 (300.90)***	180.956 (23.41)***	100.974 (18.13)***
MALE	527.658 (90.87)***	597.903 (468.62)	862.565 (253.97)***	41.397 (18.13)**	13.697 (13.14)
WHITE	362.83 (100.08)***	652.22 (274.80)**	1930.06 (450.83)***	-44.080 (19.38)**	-63.870 (14.31)***
RETIRED	90.257 (153.96)		-509.745 (389.27)	53.005 (32.65)	37.195 (21.60)*

(Table 4) 계속

INDEPENDENT VARIABLES	DEPENDENT VARIABLE: Expenditures on each service category				
	FAFH	CHDCARE	DOMCARE	CLOCARE	PERCARE
CHD02		1703.56 (244.52)***			
CHD35		2846.18 (225.34)***			
HT2(CHT1)	323.171 (169.27)*	760.579 (374.97)**	114.156 (541.22)	-25.698 (33.65)	-21.578 (24.54)
HT3(CHT2)	70.317 (164.73)	446.753 (329.29)	-44.439 (530.07)	-41.007 (33.20)	9.2663 (23.82)
HT4(CHT3)	254.534 (175.52)	789.91 (568.49)	-1203.39 (562.53)**	31.647 (34.48)	-9.1927 (25.29)
HT5(CHT4)	-109.774 (218.61)	2812.36 (455.83)***	305.875 (652.42)	-43.761 (44.87)	-25.155 (31.46)
HT6	125.611 (177.72)		708.877 (594.61)	-65.487 (37.43)*	-62.421 (26.11)**
HT7	-132.999 (143.80)		768.678 (520.88)	-51.557 (30.23)*	-96.904 (20.62)***
HT8	-82.999 (134.23)		407.77 (411.10)	-45.757 (26.59)*	41.560 (19.22)**
HS	-146.129 (103.88)	-516.226 (266.33)*	371.201 (638.04)	31.031 (24.72)	5.0246 (15.15)
HSQ	7.0639 (9.1829)	8.2357 (22.73)	-59.442 (72.32)	-0.5959 (2.4072)	-1.2067 (1.3529)
HO	236.326 (82.80)***	332.265 (269.60)	1407.91 (269.23)***	9.7866 (16.58)	39.784 (11.92)***
UR	131.637 (110.31)	700.922 (305.36)**	395.779 (315.21)	166.632 (25.44)***	73.616 (16.01)***
LL	-34046.6 2103.19	-5312.34 2767.42	-3377.73 2791.25	-12727.6 346.826	26041.4 304.547
Scale( $\sigma$ )	(24.781)	(92.626)	(131.22)	(6.6927)	(3.7517)

\* significant at the .10 level for a single test

\*\* significant at the .05 level for a single test

\*\*\* significant at the .01 level for a single test

Standard errors in parentheses

Note: Levels of significance are not valid for more than one test at a time.

In the case of child care service, different classification of household type variables is used because households with no children are eliminated from the analysis of child care service. The definition of household type variables for child care service are

CHT1: H/W, oldest child < 6

CHT2: H/W, 6 < oldest child < 18

CHT3: H/W, oldest child > 17

CHT4: single parent with children

CHT5: all other consumer units (reference group)

to reflect the youth-dominated culture of the United States, because personal care expenditures increase with age.

Higher levels of homemaker education increased household expenditures for all time-saving services, while lower levels of homemaker education decreased household expenditures for time-saving services. This result shows that higher levels of education increase the household's real income because education is likely to increase efficiency in all non-market activities (Michael, 1972; Michael, 1973; Michael and Becker, 1973).

As was hypothesized, households with male homemakers spent significantly more on food away from home, domestic care, and clothing care services than households with female homemakers. This seems to be a reasonable result because female homemakers are assumed to be more likely to specialize in these services than do male homemakers, based on social norms.

Race was a significant determinant in all time-saving services. White families spent more on food away from home, child care, and domestic care services than did black families. On the other hand, white families spent less on clothing care and personal care services, as was hypothesized.

The retirement status of the head of household was insignificant, in all cases, except in the case of personal care service. In the case of personal care service, the households with retired heads had significantly lower expenditures than households with non-retired heads. Consequently, this variable didn't seem to reflect very well abrupt changes of lifestyle in this data set, and it was difficult to confirm the previous empirical results such as the one of McCracken and Brandt(1987) or the one of Peterson(1991).

To measure expenditures for child care service, variables which represent the presence of younger children were used. As was expected, the variables(i.

e. the presence of children ages 0-2 and the presence of children ages 3-5) were very significant in explaining child care service.

The empirical results of household type variables reasonably showed that the presence of younger children had a negative effect on household expenditure for FAFH, while it had a positive effect on household expenditure for child care service. Single parent households had a high demand for child care service because the burden of caring for children was probably more severe than in other households. The presence of older children reduced the demand for domestic care, because the older child might be an important helper in the household's domestic care. On the other hand, single person households had a high demand for domestic care services, probably because the burden for domestic care on single person households was greater than on other types of households. However, the empirical results could not confirm that married households spent less than unmarried households on FAFH or clothing care based on the decreased need for social dating or the specialization of household work and market work between husband and wife.

Household size turned out to be an insignificant variable in all cases, except the in case of child care service. The number of household members had a negative effect on expenditures for child care service, probably because the increase in the number of household members may be decrease the burden to take care of young children, and thus, households are less likely to spend on child care service.

Homeowners spent significantly more on domestic care and personal care services than renters. Although the positive relation of homeownership to expenditures for personal care confirmed the empirical results of Soberon-Ferrer and Dardis (1991), this result was contradictory to the arguments of Gorman and Fargue (1988).<sup>49</sup> Therefore, it is difficult to confirm that renters spend more on nonshelter expenditures such as

〈Table 5〉 Results of Estimated Elasticities

	Market participation elasticity	Quantity elasticity	Total elasticity <sup>2)</sup>
<u>FAFH</u>			
FINCOME	0.225	0.067	0.292
NLINCOME	0.090	0.035	0.125
MKTHRS	0.086	0.032	0.118
<u>CHDCARE</u>			
FINCOME	0.103	0.084	0.187
<u>DOMCARE</u>			
FINCOME	0.036	0.074	0.110
NLINCOME	0.015	0.028	0.043
MKTHRS	-0.020	-0.072	-0.092
<u>CLOCARE</u>			
FINCOME	0.165	0.087	0.252
NLINCOME	0.036	0.029	0.065
MKTHRS	0.052	0.038	0.090
<u>PERCARE</u>			
FINCOME	0.250	0.222	0.272
NLINCOME	0.089	0.024	0.113

1. Elasticities are estimated for variables significant in the tobit estimation.
2. Total elasticity is the sum of market participation elasticity and quantity elasticity.
3. The elasticities are evaluated at the values of the sample mean for all relevant variables.

FAFH, personal care, and clothing care because the cash outflow of homeowners is generally greater than that of renters.

Finally, there were no significant differences in the cost and availability of FAFH and domestic care services between urban and rural areas; there were, however, significant differences in cost and availability of child care, clothing care and personal care services.

〈Table 5〉 provides market participation elasticity, quantity elasticity, and total elasticity, which is the sum of the market participation elasticity and the quantity elasticity.

The market participation effect of three variables (i.

e. FINCOME, NLINCOME, MKTHRS) was more important than the quantity effect in most cases. However, in the case of domestic care services, the quantity effect was more important than the market participation effect. For the elasticity of other family members' labor income, the elasticity for personal care service was highest among the five services. The elasticity of other family members' labor income for personal care service was 0.272 which implies that a 10 percent increase in other family members' labor income is associated with a 2.72 percent increase in expenditures for clothing care service. On the other hand, the elasticity of other family members' labor

4) Renters spend more on nonshelter expenditures such as FAFH, personal care, and clothing care because the cash outflow of homeowners is generally greater than that of renters.

income for domestic care service was lowest among the five time-saving services.

Generally, the estimated elasticities indicated that the impact of non-labor income on time-saving services was smaller than the impact of other family members' labor income on those services.

The income elasticities estimated in this research were generally lower than those of previous empirical research. These differences might come from differences in empirical specification and in measurement method. However, it is important to note that the elasticity of other family members' labor income was not taken to be analogous to total household income which is frequently used as an income variable in most empirical research. Rather, this study used other family members' labor income instead of the household's total labor income in order to remove the wage rate effect implicit in the income effect, and thus, to define the characteristics of each service more accurately.

The elasticities classified by several groups showed that a group with a comparatively lower elasticity is less likely to change its expenditure behavior for time-saving services in response to a change in total household income or homemaker's market hour, and consequently, showed the relative importance of time-saving services for specific groups.

In addition, income components, including labor income and non-labor income, were used instead of total household expenditures, based on household production theory. However, the use of a total expenditure variable may be better for the study of household demand than would be the use of an income variable, because income components tend to have greater variations than expenditure components.

## VI. Conclusions and Implications

The demand for household expenditures for time-saving services was explained by time components,

labor income, non-labor income and environmental variables suggested by the household production model. The household production model emphasized the allocation of time between market and nonmarket work and, thus, included hours of homemaker's market work as an independent variable.

However, the impact of this variable on household expenditures for time-saving services varied depending on the assumption about homemakers' market hours, the selection of variables in the hours equation, and the estimation technique of the hours equation. If one assumed that a homemaker's market hours are endogenous, the hours of homemaker's market work had significant, positive impacts on expenditures for FAFH and clothing care services, and thus, these time-saving services were considered to be substitutes for the hours of a homemaker's non-market time. However, if one assumed that a homemaker's market hours are exogenous, the empirical results showed that child care and personal care services were considered to be substitutes for the hours of a homemaker's non-market time.

At the same time, the empirical results on earner composition reasonably showed that differences in time components depended upon earner composition. The importance of these variables, including homemaker's hours of market work and earner composition variables, confirmed that time component is one of the most important factors in determining the household demand for time-saving services. However, the fact that there were negative relationships between household expenditures for domestic care services and hours of homemaker's market work seems to be difficult to justify. Only, we might infer the time pressure is more likely to be associated with the purchase of FAFH, child care, clothing care, and personal care services than domestic care services.

In terms of the decomposition of tobit elasticities, the market participation elasticity was more important

than the quantity elasticity in most cases. This means that the total market response is more likely to be explained by entry to and exit from the markets of these services, than by the quantity of changes in households with current consumption. This result implies that marketing efforts may be efficiently conducted by targeting households with no current consumption for these services.

The results of elasticities for several groups implied that policy-makers should pay special attention to the relative importance of these services for a specific group, because doing so might be one of the most efficient ways to make an adequate, service related public policy, in terms of its cost and availability. For example, the need for child care services of households with both husband and wife employed and an oldest child aged less than 6 is stronger than any other groups. Policy-makers should thus consider the effects of child care policy for the group since they have more difficulty changing their expenditure behavior.

Although this research had several theoretical and empirical limitations including the use of a partial demand system, a high possibility of multicollinearity, arbitrary classifications of time-saving services and several demographics, and a lack of available data, this study provided useful information about consumer behavior and the patterns of household consumption of services. In addition, if data consistency is guaranteed over time, an investigation into change in consumer behavior for these services will be a valuable and interesting research topic.

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