

# Two-Earner Households and Expenditures on Time-Saving Services: Impacts of Economic Recession in Taiwan

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**Abstract:** The objective of this study is to examine how Taiwanese consumer attitudes and behavior towards time-saving services would change due to the ongoing economic crisis of 2008. Survey results show the mean monthly expenditures on food away from home and personal care were NT\$2,618 and NT\$924 after economic crisis, respectively. Those two figures were lower than NT\$4,872 and NT\$1,019 before economic recession occurred. 64 percent of working wives prepared more home-cooking meals for dinner. 52 percent of working wives were more willing to go online shopping for a cheaper price after economic recession occurred. The estimation results of Tobit analysis indicate that households with wives working less hours purchased less meals away from home. Households with husbands working more hours, however, spent less for food away from home. The unearned income and wage rates of the wife and husband were not significant in determining household expenditures on food away from home. The results show also families with working wives aged 31-40 and over 51 spent more on food away from home than those with working wives aged 21-30. Families with wives attaining some graduate education or more spent more on food away from home and personal care than those with wives who received some college education or were college graduates. And, home owners spent more on meal purchases and personal care than renters.

Key words: Time-Saving Services, Household Production Function, Tobit Analysis, Economic Recession, Taiwan

## I . Introduction

The participation rate of women in the labor force has increased dramatically in Taiwan over the past decades. In 2008, labor force participation rate of women has increased to 49.7 percent in Taiwan. There are 4,680,000 women who are now in labor force in Taiwan. To ease time pressure, working women often substitute paid labor for household labor in household production. However, Taiwan's economy has been undermined by the global economic slump since 2008. The economic crisis is expected to lead to an increase in the number of people joining the ranks of the unemployed or workers taking unpaid leave or salary cut, presenting ongoing potential hardship. One would expect the recession to have an impact on the demand for time-saving services (such as the purchase of meals away from home, domestic services, child care, and personal care).

The objective of this study is to examine how Taiwanese consumer attitudes and behavior towards time-saving services would change due to the ongoing economic crisis of 2008. Service

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categories examined are food away from home (restaurant dinners out and take-out food) and personal care. The opportunity cost of time and time spent in the labor force, as well as characteristics of two-earner families are examined. The analysis is confined to two-earner households in which both husband and wife worked since data on the opportunity cost of time were needed for both family members. Thus, the separate impact of all work related variables on service expenditures could be investigated. Becker's model of household production which explicitly accounts for time constraints and the opportunity cost of time provides the appropriate theoretical framework for this study. Tobit analysis is used to perform the regression estimation. The findings would provide significant implications for policy makers and marketers to better cope with global economic downturn.

In the first section a review of related research is provided. It is followed by a presentation of the theoretical framework used in this study. The third section describes methods and procedures. The estimation results are given and discussed in the fourth section, followed by the summary and conclusion in the last section.

## II. Review of Literature

In this section, we present a review of empirical studies concerning the influence of wife's employment status on household expenditures on time-saving durables and services. The mixed results are found in the empirical research. Some authors have found the lack of a significant

relationship between a wife's working status and ownership of time-saving durables and the use of paid labor as substitute for household labor (Strober and Weinberg, 1977, 1980; Nickols and Fox, 1983; Weinberg and Winer, 1983; Belante and Foster, 1984). Some studies, however, have found that a wife's employment status has positive impact on the purchase of meals away from home (Waldman and Jacobs, 1978; Vickery, 1979; Kim, 1989; Jacobs, Shipp and Brown, 1989). More recent literature were limited on this issue. One would expect the issue to be re-examined to reflect the impact of economic recession on consumption patterns when consumers have less income but more time.

Strober and Weinberg (1977) examined working wife and non-working wife families with respect to major family expenditures including time-saving durables, other durables, hobby and recreation items, vacations, and college education, using data from the 1968 Michigan Survey Research Center 1967-70 Panel Survey of Consumer Finances. The results of stepwise discriminant and OLS regression analyses show the employment status of wife was not significant in explaining either purchase decisions or expenditure decisions once total family income and other factors were held constant.

A later study by Weinberg and Winer (1983) was designed to update and replicate the study by Strober and Weinberg (1977), using data from the 1977 Michigan Survey Research Center Survey of Consumer Credit. The results were

in agreement with the earlier study by Strober and Weinberg, and indicated that working wife households did not differ significantly from non-working wife households with respect to purchase decisions or expenditures. Strober and Weinberg (1980) used data from a 1977 Survey of 2,000 married women in husband-wife families who were members of a Market Facts Consumer Mail Panel to examine the impact of wives' working status on both the purchase and ownership of time-saving durables (microwave oven, dishwasher, dryer, etc.). The authors concluded that wife's employment status was not a significant determinant of the purchase or ownership of time-saving durables once income and family life cycle were held constant.

Waldman and Jacobs (1978) used U.S. data from 1972-73 Consumer Expenditure Survey (CES) conducted by the Bureau of Labor Statistics. The study found that families of working wives spent significantly more than families of non-working wives on domestic and household services. Vickery (1979) examined expenditure patterns of husband-wife families using U.S. data from 1972 Consumer Expenditure Survey. The results of multivariate regression analyses indicated that the families where the wives either worked full time or part time spent significantly more money on domestic services and materials used in housekeeping, dry cleaning, laundry, and clothing repair than did non-working wife families, after controlling for the effects of income and other factors.

Kinsey (1983) used data for about 5,000 households from the Panel Study of Income Dynamics to analyze the effect of labor force participation of wives on household expenditures on food away from home. The independent variables were the incomes of husband, wife and children, transfer income and household size and race. Tobit analysis was used since 26 percent of households had no food-away-from-home expenditures. The results indicated that all income sources, except that earned by full-time working wives, increased the marginal propensity to consume.

Using data from a study of household production activities from 1977 to 1979, Nichols and Fox (1983) examined the substitution of purchased services for household labor. Purchased services included housecleaning, dry cleaning and laundry, and child care. Stepwise regression analysis was used. The results indicated that purchase of housecleaning and laundry or dry cleaning services was positively affected by family income instead of wife's working status. In contrast to other purchased services, wife's working status had a positive effect on purchase of child care, with other effect from age of younger child, family income, etc. Hence, purchase of child care appeared to be major strategy used by many working-wife families.

A study by Bellante and Foster (1984) focused on the relationship between wife's employment status and expenditures on time-saving services using data from the 1972-73 BLS Consumer

Expenditure Survey. The results of the OLS regression analysis indicated that there existed significant differences in expenditure levels for child care, clothing care, food away from home, and total services between working-wife and nonworking-wife families. In addition, the number of weeks worked by the wife had a significant and positive impact on expenditures on food away from home, child care, and total services.

A study by Jacobs, Shipp, and Brown (1989) examined the effect of the wife's employment on household expenditures for child care, food away from home, women's apparel, purchase of new vehicles, purchase of used vehicles, gasoline and motor oil, public transportation and shelter for husband-wife households using data from the 1984-86 Interview portion of the Consumer Expenditure Survey. Multivariate Tobit regression analysis was used since some households had no expenditures for some items during the interview period. The results indicated that households with part-time or full-time working wives spent significantly more on child care and food away from home than non-working wife households.

Kim (1989) investigated the effects of a wife's working status on time-saving consumption: durables, convenience foods, and meal purchases, using data from a 1982-1983 Canadian survey. The results show the wife's working status significantly increased the likelihood of the family's ownership of several time-saving durables and the purchase of meals away from home to copy

with time pressures.

Byrne, Capps, and Saha (1996) examined the two-step decision (to consume and of how much to spend) process for food-away-from-home consumption using the 1982-1989 National Panel Diary data. In the first stage, a probit regression was estimated to determine probability for food-away-from-home consumption. A nonlinear least squares estimation procedure was employed in the second stage. The results indicated income elasticity was about 0.20, suggesting that food away from home is a necessity for U.S. households. Urbanization level had a positive impact on food away from home expenditures. Unmarried households spent less on food away from home than married households. Education level of the household head displayed a positive relationship to decision to eat out, while it was less important for expenditure levels.

### III. Theoretical Framework

Becker's model of household production, which explicitly accounts for time constraints and the opportunity cost of time, provides an appropriate theoretical framework for this study. One would, however, apply the rationale from the model to interpret the demand for time-saving services with a reverse approach on investigating the impact of economic recession on consumption patterns when consumers now have less income but more time.

#### *Household Production Model*

The traditional theory of choice views a

household as a consuming unit which attempts to maximize utility derived directly from goods and services purchased at given prices in the market place with a fixed level of income. Any variation in demand for market goods or services which are not directly related to changes in real income and relative prices are attributed to changes in "tastes" of the household. However, no useful or well-developed theory of tastes has been developed yet which means that the traditional theory of choice is somewhat limited.

The household production model (Becker 1965) addresses this problem by incorporating time constraints, time costs and other environmental variables in the household decision process. The new approach of consumption theory emphasizes the facts that household attempts to maximize welfare which is not derived directly from market goods or services but from the commodities which are generated by market goods and services as well as from time inputs by household members. The use of the household production model provides more insight into unexplained variations in the demand for household goods or services which have formerly been attributed to differences in tastes.

The characteristics of the household production model are as follows:

$$\text{Utility Function : } U = h(Z_1, Z_2, \dots, Z_n) \quad (3.1)$$

$$\text{Production Function : } Z_i = z_i(x_i, t_i, E) \quad (3.2)$$

$$\text{Market Goods Constraint : } \sum_i p_i x_i = \omega t_\omega + V \quad (3.3)$$

$$\text{Time Constraint : } T_k = t_{\omega k} + \sum_i t_{ik}, \quad k=1, 2, \dots, m \quad (3.4)$$

where

$Z_i$  = commodity produced in the household,  
 $i = 1, 2, \dots, n$

$x_i$  = vector of market goods used in the production of  $Z_i$

$t_i$  = vector of time inputs used in the production of  $Z_i$

$t_{ik}$  = time spent in the production of  $Z_i$  by individual  $k, k = 1, \dots, m$

$t_\omega$  = vector of time inputs used in market production

$t_{\omega k}$  = time spent in market production by individual  $k$

$T_k$  = total time available to each household member for household and market production,  $T_1 = T_2, \dots, = T_m$

$p_i$  = price vector for  $x_i$

$\omega$  = wage rate vector

$V$  = unearned income, and

$E$  = technology of household production.

The market goods and time constraints may be combined into one resource constraint if one substitutes  $T_k - \sum_i t_{ik}$  for  $t_{\omega k}$  in Eq.(3.3). Then

$$\begin{aligned} \sum_i p_i x_i &= \omega t_\omega + V \\ &= \omega(T - \sum_i t_i) + V \\ &= \omega T - \omega \sum_i t_i + V. \end{aligned} \quad (3.5)$$

$$\text{Thus, } \sum_i (p_i x_i + \omega t_i) = \omega T + V = S \quad (3.6)$$

where  $T$  is a vector of total time available to the

household and S is the "full income" of the household if all time is devoted to market production.

*Equilibrium conditions*

Maximization of the utility function subject to the constraints of the production function and "full income" with respect to commodities ( $Z_i, Z_j$ ) and factors of production, respectively, yields the first order conditions. This derivation is discussed in the following.

Let the lagrangian  $L$  be

$$L = U(Z_1(x_1, t_1), Z_2(x_2, t_2), \dots, Z_n(x_n, t_n)) - \lambda(\omega \sum_i t_i + \sum_i p_i x_i - \omega T - V). \quad (3.7)$$

The first order conditions with respect to commodities ( $Z_i, Z_j$ ) are as follows.

$$\frac{\partial L}{\partial Z_i} = \frac{\partial U}{\partial Z_i} - \lambda(\omega(dt_i/dZ_i) + p(dx_i/dZ_i)) = 0. \quad (3.8)$$

$$\frac{\partial L}{\partial Z_j} = \frac{\partial U}{\partial Z_j} - \lambda(\omega(dt_j/dZ_j) + p(dx_j/dZ_j)) = 0. \quad (3.9)$$

$$\frac{\frac{\partial L}{\partial Z_i}}{\frac{\partial L}{\partial Z_j}} = \frac{MU_i}{MU_j} = \frac{\omega(dt_i/dZ_i) + p(dx_i/dZ_i)}{\omega(dt_j/dZ_j) + p(dx_j/dZ_j)} \quad (3.10)$$

The ratio of the marginal utilities of any two commodities  $Z_i$  and  $Z_j$  must equal the ratio of their marginal costs.

Similarly, we have the first order conditions with respect to factors ( $f_{ik}, f_{jv}$ ) of production as follows.

$$\frac{\partial L}{\partial f_{ik}} = \frac{\partial U}{\partial Z_i} \cdot \frac{\partial Z_i}{\partial f_{ik}} - \lambda p f_{ik} = 0. \quad (3.11)$$

$$\frac{\partial L}{\partial f_{jv}} = \frac{\partial U}{\partial Z_j} \cdot \frac{\partial Z_j}{\partial f_{jv}} - \lambda p f_{jv} = 0. \quad (3.12)$$

$$\frac{\frac{\partial U}{\partial Z_i} \cdot \frac{\partial Z_i}{\partial f_{ik}}}{\frac{\partial U}{\partial Z_j} \cdot \frac{\partial Z_j}{\partial f_{jv}}} = \frac{MU_i MP_{ik}}{MU_j MP_{jv}} = \frac{p f_{ik}}{p f_{jv}}, \quad (3.13)$$

where  $f_{ik}$  is the factor  $k$  (either goods or time) used in the production of  $Z_i$  and  $f_{jv}$  is the factor  $v$  (either goods or time) used in the production of  $Z_j$ . When both factors are used in the same production function ( $i = j$ ) the ratio of the marginal products is equal to the ratio of factor prices. If the same factor is used in several production functions ( $k = v$ ) then the utility value of the marginal product of this factor will be the same for all commodities.

*Substitution of Paid Labor for Household Labor*

This household production function model provides a rationale for the substitution of paid labor for household labor as follows:

1. An increase in  $\omega$ , other factors constant, will encourage the substitution of  $x_i$  for  $t_i$  in household production, since it will increase the opportunity cost of time spent in household production.
2. An increase in  $t_w$ , other factors constant, will encourage the substitution of  $x_i$  for  $t_i$  in household production, since it will decrease the amount of time available for household production.
3. An increase in  $V$ , other factors constant, will increase the demand for  $Z_i$  assuming  $Z_i$  is

a normal good. Thus, an increase in  $V$  will encourage the substitution of  $x_i$  for  $t_i$  in household production, since the total time available for market and household production is limited.

Thus, the opportunity cost of time, time spent in market production and unearned income will affect the substitution of paid labor for household labor.

#### IV. Methods and Procedures

This section presents the methodology and procedures used to examine the impact of household production and socio-economic/demographic characteristics of households on expenditures for time-saving services.

##### *Dependent Variables*

For Tobit analysis, the dependent variables are monthly expenditures for service categories: food away from home (meals prepared away from home, including restaurant dinners out and take-out food) and personal care including haircuts.<sup>1)</sup>

##### *Independent Variables*

The independent variables selected are based on Becker's model of household production and socioeconomic/demographic characteristics of households, which would affect expenditures on services.

##### *Household Production Variables*

Household production variables are the major explanatory variables examined in this analysis. They include the opportunity cost of time, time spent in market production, and unearned income. These variables are hypothesized to be positively related to expenditures on services based on the household production model. The five household production variables are hourly wage rate of wife, total number of hours worked per month by wife, hourly wage rate of husband, total number of hours worked per month by husband, and annual unearned income. According to the household production model, the hourly wage rate of wife and husband represent the opportunity cost of time, while the total number of hours worked per month by wife and husband reflect the time constraint in household production. These four variables comprise the earned income of the household.

##### *Age of Wife<sup>2)</sup>*

Four age categories are used for age of wife: (1) 21-30, (2) 31-40, (3) 41-50, and (4) over 51. Dummy variables are assigned to each category except for the 21-30 age group which is the reference category to avoid resulting linearly dependence in the data matrix. The results for three older age groups are thus relative to the reference group.

##### *Education of Wife*

Education of wife is included to allow for variations in tastes and preferences. Education is

1) From the data collected for this study, we found a very low ratios of households with expenditures on domestic services, child care, and clothing care. One would need a nation-wide dataset to conduct the analysis of expenditures on those time-saving services as done in previous studies.

2) Family composition variables should also be included to represent stages in the family life cycle.

also expected to increase efficiency in home production and, in turn, household's real incomes which should increase expenditures on services. Finally, education may affect leisure activities and hence the substitution of paid labor for household labor. Four categories are used for education of wife. They are (1) less than high school graduate, (2) high school graduate, (3) some college or college graduate, and (4) some graduate education or more. Dummy variables are assigned to each category except for some college category which is the reference group. The results of three dummy variable categories are thus interpreted relative to the reference group.

#### *Home Ownership*

There are two categories: (1) owning home throughout the year, and (2) renting home throughout the year or part of the year. A 0,1 dummy variable is used with homeowners receiving a value of one and renters a value of zero. It is hypothesized that homeowners would spend more on service expenditures than did renter households.

#### *Data*

To examine how Taiwanese consumer attitudes and behavior towards time-saving services would change due to the ongoing economic crisis of 2008, we designed a questionnaire containing questions in two parts. The first part is designed to collect data on expenditures for food away from home and personal care. Related information on meals prepared at home and online

shopping which are time-demanding but money-saving were also gathered. The second part contains questions to collect demographic and socioeconomic data. We distributed the questionnaire and collected it few days later so that the respondent could have enough time to fill out the questionnaire. A total of 320 questionnaires were given out for data collection in late 2008 and early 2009.

#### *Tobit Analysis*

Tobit analysis is used to examine the impact of explanatory variables on household expenditures on services. Tobit analysis is required in the case of a censored sample, i.e. complete data are available for the independent variables while missing or zero observations exist for the dependent variable (Tobin, 1958; Amemiya, 1973; and Maddala, 1983). Under such circumstances, OLS analysis will lead to biased and inconsistent estimates of parameters and associated variances. In contrast, Tobit analysis can provide better and more appropriate estimation procedure since data from the entire sample (both purchasers and non-purchasers) are included in Tobit analysis.

#### *Tobit Model*

The Tobit model is originally proposed by Tobin (1958) for estimating equations with dependent variables that are continuous over some range, but truncated at either the upper or lower end, or both. In this study, there is a lower bound of zero for the dependent variables, which means that some households did not purchase the



selected service. Complete data are available for all the independent variables.

The Tobit model is defined as follows:

$$y_i^* = \beta'x_i + \mu_i, \quad i = 1, 2, \dots, N \quad (4.1)$$

$$\begin{aligned} y_i &= y_i^* & \text{if } y_i^* > 0 \\ &= 0 & \text{if } y_i^* \leq 0 \end{aligned} \quad (4.2)$$

where

$\beta$  is a  $k \times 1$  vector of unknown parameters

$x_i$  is a  $k \times 1$  vector of known independent variables

$y_i$  is the dependent variable

$\mu_i$  is an independently distributed error term, which is assumed to be normal with zero mean and constant variance  $\sigma^2$ , and

$N$  is the number of observations.

It is assumed that  $y_i$  and  $x_i$  are observed for  $i = 1, 2, \dots, N$  but  $y_i^*$  are unobserved if  $y_i^* \leq 0$ . The question is how to estimate  $\beta$  and  $\sigma^2$  on the basis of  $N$  observations. The censored normal regression model is generally estimated by maximum likelihood procedures.

## V. Estimation Results

In this section, we present the results for the multivariate analysis of household expenditures on services. Monthly service expenditures and other related information concerning service expenditures are reported first. It is followed by a profile of samples regarding the independent variables. The estimation results of the Tobit analysis are then presented.

### *Monthly Service Expenditures by Service Categories*

The percentage of households reporting

expenditures on selected services and monthly expenditures for these households are given in Table 1. 75 percent of households had experiences on food away from home after economic recession, down from 78 percent before economic recession. 50 percent of households had expenditures on personal care, compared with 52 percent before economic recession. The mean monthly expenditures on food away from home and personal care were NT\$2,618 and NT\$924 after economic recession, respectively. Those two figures were lower than NT\$4,872 and NT\$1,019 before economic recession occurred.

### *Related Information concerning Service Expenditures*

64 percent of working wives reported that they prepared more home-cooking meals for dinner after economic recession. 52 percent of working wives reported that they are more willing to go surfing on the internet for a cheaper price when doing on-line shopping after economic recession occurred.

### *Sample Profile*

The mean values and percent distribution (descriptive statistics) for the independent variables are given in Table 2. The mean values are reported for continuous variables while the percent distribution is given for the categorical variables. The mean hourly wage for wives was NT\$172.08 compared to NT\$360.44 for husbands. The mean number of hours worked per month by wives and husbands was 116.76 and 135.74, respectively. Annual unearned income was NT\$91,857 on average.

**Table 1. Monthly Service Expenditures by Service Category N=320**

Service Category (Before or After Economic Recession)	Households with Service Expenditures (Percent)	Expenditures Mean (NT\$)
Food Away From Home(before)	78	4,872/month
Food Away From Home(after)	75	2,618/month
Personal Care (before)	52	1,019/month
Personal Care (after)	50	924/month

**Table 2. Descriptive Statistics of Independent Variables N=320**

Variable	Definition	Mean or Percentage
UNINC	Annual Unearned Income (NT\$)	91,857
WAGEW	Hourly Wage Rate of Wife (NT\$)	172.08
HOURW	Number of Hours Worked per Month by Wife	116.76
WAGEH	Hourly Wage Rate of Husband (NT\$)	360.44
HOURH	Number of Hours Worked per Month by Husband	135.74
Age of Wife		
AGEW1	21 to 30 Years Old	50.8%
AGEW2	31 to 40 Years Old	16.7%
AGEW3	41 to 50 Years Old	25.4%
AGEW4	Greater Than 51	7.1%
Education of Wife		
EDUW1	Less Than High School Graduate	11.9%
EDUW2	High School Graduate	23.0%
EDUW3	Some College or College Graduate	56.4%
EDUW4	Some Graduate Education or More	8.7%
Home Ownership		
OWNER	Own throughout Year	87.3%
RNTER	Rent Part or All of Year	12.7%

The dominant age group for wives was 21-30 years (50.8 percent) followed by 41-50 years (25.4 percent). The dominant education category for wives was some college or college graduate (56.4 percent) followed by high school graduate (23.0 percent). The great majority of families owned their own homes (87.3 percent).

#### *Results of Tobit Analysis*

The estimation results of Tobit regression analysis and related statistical tests are given in Table 3. Asymptotic t-tests were used to test the significance of individual variables.

#### *Food Away From Home*

*Household Production Variables.* The estimated parameter of HOURW (the number of hours worked by wife) was positive and significant at 5 percent level for food away from home as hypothesized. The more hours the wives worked, the more households spent on food away from home. Working wives with less time available for household production (such as food away from home) would, thus, increase paid labor for household labor as illustrated by the Becker's model. The estimated parameter of HOURH (the number of hours worked each month by

husband), however, was found to be negative and significant at 10 percent level for food away from home. The unearned income and wage rates of wife and husband were not significant in determining expenditures on food away from home.

*Age of Wife.* The results for age of wife indicate the effect of family life cycle on service expenditures. The estimated parameters of AGEW2 and AGEW4 were positive and significant at 1

and 10 percent level, respectively. The finding indicates families with working wives aged 31-40 and over 51 spent more on food away from home than those with wives aged 21-30 (the reference group).

*Education of Wife.* The estimated parameters of EDUW1 and EDUW2 were negative but not significant in determining household expenditures on food away from home. The estimated parameter of EDUW4 (Some Graduate Education or

**Table 3. Results of Tobit Analysis for Service Expenditures<sup>a</sup>**

Independent Variable	Dependent Variable	
	Food Away From Home	Personal Care
Intercept	337.39 (0.38)	358.87 (1.06)
Household Production		
UNINC	-0.00 (-0.04)	0.00 (1.10)
WAGEW	0.23 (0.29)	0.43 (1.44)
HOURW	1.77 (2.12)**	0.46 (1.50)
WAGEH	0.83 (0.99)	-0.37 (-1.17)
HOURH	-1.50 (-1.81)*	0.07 (.24)
Age of Wife (21-30) <sup>b</sup>		
AGEW2	2435.76 (2.67)***	417.61 (1.20)
AGEW3	1261.49 (1.28)	308.82 (0.83)
AGEW4	2413.66 (1.92)*	702.10 (1.48)
Edu of Wife (H.S. Grad)		
EDUW1	-1162.82 (-0.95)	-130.08 (-0.29)
EDUW2	-88.94 (-0.10)	61.83 (0.19)
EDUW4	3121.09 (2.84) ***	821.94 (1.99)**
Home Ownership (Renter)		
OWNER	2.99 (2.82)***	1.53 (3.73) ***
Log likelihood function	-551.48	-538.73
Likelihood Ratio Statistics <sup>c</sup>	38.98***	28.30***

<sup>a</sup> Asymptotic t-ratios are in parenthesis <sup>b</sup> Reference group is in parenthesis.

<sup>c</sup> Calculated as  $\chi^2 = -2[(\text{Log Likelihood of Model with Slopes} = 0) - (\text{Log Likelihood of Full Model})]$

\* Significant at 0.10 level \*\* Significant at 0.05 level \*\*\* Significant at 0.01 level

More) was positive and significant at 1 percent level, indicating families with wives attaining some graduate education or more spent more on food away from home than the reference group (Some College or College Graduate).

*Home Ownership.* The estimated parameter of OWNER (Home Owner) was positive and significant at 1 percent level, suggesting home owners spent more on food away from home than renters. The reason may be greater savings by renters in order to finance home ownership at a later time period.

*Significance of Model.* The likelihood ratio statistics  $39.98 > \chi^2(12)$  was significant at 1 percent level, indicating that the model is significant in explaining variations in expenditures on food away from home (restaurant dinners out and take-out food).

*Personal Care.* The estimated parameter of EDUW4 (Some Graduate Education or More) was positive and significant at 5 percent level, indicating families with wives attaining some graduate education or more spent more on personal care than the reference group (Some College or College Graduate). The estimated parameter of OWNER (Home Owner) was positive and significant at 1 percent level, indicating home owners spent more on personal care than renters. Household production variables and wage and education of wife were not significant in determining household expenditures on personal care.

## VI. Summary and Conclusions

In this study we examine how Taiwanese consumer attitudes and behavior towards time-saving services would change due to the ongoing economic crisis of 2008. The opportunity cost of time and time spent in the labor force, as well as characteristics of two-earner families are examined. The analysis is confined to two-earner households in which both husband and wife worked since data on the opportunity cost of time were needed for both family members. Thus, the separate impact of all work related variables on service expenditures could be investigated. Service categories examined are food away from home and personal care. Becker's model of household production which explicitly accounts for time constraints and the opportunity cost of time provides the appropriate theoretical framework for this study. Tobit analysis is used to perform the regression estimation. A total of 320 questionnaires were given out for data collection and analysis in late 2008 and early 2009.

Survey results show 75 percent of households had experiences on food away from home after economic recession, down from 78 percent before economic recession. 50 percent of households had expenditures on personal care, compared with 52 percent before economic recession. The mean monthly expenditures on food away from home and personal care were NT\$2,618 and NT\$924 after economic recession, respectively. Those two figures were lower than NT\$4,872 and NT\$1,019 before economic

recession occurred. 64 percent of working wives reported that they prepared more home-cooking meals for dinner after economic recession. 52 percent of working wives reported that they are more willing to go surfing on the internet for a cheaper price when doing online shopping after economic recession occurred.

The estimation results of the Tobit analysis indicate that households with wives working more hours purchased more meals away from home. However, it is found that households with husbands working more hours spent less for food away from home. The unearned income and wage rates of the wife and husband were not significant in determining household expenditures on food away from home. The results show also families with working wives aged 31-40 and over 51 spent more on food away from home than those with working wives aged 21-30. Families with wives attaining some graduate education or more spent more on food away from home and personal care than those with wives who received some college education or were college graduates. And, home owners spent more on meal purchases and personal care than renters.

Taiwan's economy has been undermined by the global economic slump since 2008. The economic recession has brought about more households with less earnings and more free time, which would have an impact on the demand for time-saving services such as food away from home and personal care. This study provides the

preliminary results on how Taiwanese consumer attitude and behavior towards time-saving services would change. To develop a better understanding of the changes in consumer behavior and factors causing such changes during the period of economic recession, we would need a nationwide survey dataset in further research.

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