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On the Effect of the Great Recession on US Household Expenditures for Entertainment[♦]

Liping Gao^{*}, Hyeongwoo Kim[†], and Yaoqi Zhang[‡]

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Abstract

This paper empirically investigates potential effects of economic recessions on consumers' decision making process for recreational activities using the Consumer Expenditure Survey (CES) data during the Great Recession. We employ the Probit model to study how changes in income affect the likelihood of making non-zero expenditures on entertainment activities. We also use the Tobit model to assess the income effect on those activities in the presence of censored observations. We found overall statistically significant effects of recessions on leisure activities, which may explain sluggish adjustments of leisure consumption during recessions.

Keywords: Entertainment; Consumer Expenditure Survey; Probit Model; Tobit Model

JEL Classifications: D12; J01; P46

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1 Introduction

This paper empirically investigates potential effects of economic recessions on US household expenditures for entertainment activities using the Consumer Expenditure Survey (CES) data in 2003, 2006, 2008, and 2010.

US households cumulatively spend at least 120 billion hours and more than \$200 billion on legal forms of entertainment each year (Vogel, 2001). Total household entertainment spending rose by 58% (on average \$784) from 1995 to 2011, which is mostly due to in-home and mobile electronic entertainment, not from location-based entertainment and sporting event venues (White, 2012).

Entertainment can be defined as anything that stimulates, encourages, or otherwise generates a condition of pleasurable diversion at the most fundamental level (Vogel, 2001). It can also be defined through its satisfied effect and happy psychological state (Moore et al., 1995; Vogel, 2001; Parr and Lashua, 2004). Leisure activities are supposed to provide life satisfaction and improve personal wellbeing (Weagley and Huh, 2004b; van der Meer, 2008).

From an economic perspective, sociologists examined the leisure-time-related industries relying on the rate of technological development throughout the economy and demand and supply of leisure (Vogel, 2001). Dardis et al. (1994) pointed out that economic and social environment changes have influenced leisure activities and expenditures in the US.

A number of studies have examined consumer's decision making processes for entertainment and leisure activities. For example, Sung et al. (2001), Hong et al. (2005), and Zheng and Zhang (2011) studied demand for travel activities in the US. Jara-Díaz et al. (2008) used a time allocation model to estimate leisure values. Typically, quantitative

evaluations of leisure satisfaction are implemented through ordered Probit models, see for example, Ateca-Amestoy et al. (2008) and Bilgic et al. (2008).

Patterns of work and leisure have changed dramatically during the past decades in the US (Weagley and Huh, 2004a; Bilgic et al., 2008). Some studies on the economic effect of recessions on entertainment are recently conducted. In the present paper, we investigate whether economic downturns influence the consumption function for entertainment goods and services. For this purpose, we use 2008 and 2010 CES data for recession years, while 2003 and 2006 CES data are used as economic boom years. Comparing estimated consumption functions across booms and recessions, we attempt to see whether meaningful changes occurred in those years.

We note substantial degree censored observations in all years, which leads us to employ the Tobit model instead of the ordinary least squares (OLS) estimator, which is a biased estimator. Even though the Tobit model is useful to quantify the effects of socio-economic variables on the expenditure for entertainment activities, it does not answer the question of how those variables affect the propensity of paying (or not paying) for entertainment activities. Since substantial portion of households, sometimes even majority households, report zero expenditure, this seems to be a meaningful question, so we also employ the Probit model by transforming the expenditure data to a dichotomous variable.

We found statistically significant effects of recessions on recreational activities via changes in the income coefficient and in the intercept both from the Probit and the Tobit model estimations. For example, income coefficients became smaller during recession years for two out of the three recreation expenditure categories, implying slower adjustments of consumption expenditures during recessions. We also observed substantial decreases in intercept estimates for Fees and Admissions (F&A) in 2008 and 2010 relative to 2003 and 2006. This may imply exogenous changes (decreases) across

those years outside our model specification. We also found non-negligible changes in coefficients of some socio-economic variables including the number of children, family size, and the marital status.

The rest of the present paper is organized as follows. Section 2 provides a data description and preliminary test results. In Section 3, we provide our main empirical findings and Section 4 concludes.

2 Data

We notice that the level of entertainment expenditures declined substantially in 2010 in both real and nominal terms. As can be seen in Table 1, we observed overall increases in expenditures in 2008 from 2006 both in real and nominal terms except F&A in real term. Furthermore, the median nominal household income decreased from 2008 to 2010 but not in 2008 from 2006, while decreases in real income were observed in both years.

As we can see in Figure 1, GDP per capita actually exhibited a positive growth rate in 2008 and in 2010, while median household income growth rate slowed down in 2008 and became negative in 2009 and 2010. So it is not quite clear if the Great Recession in 2008 is consistent with the dynamics of the US household income. This concern led us to use 2010 in addition to 2008 as recession years relative to 2003 and 2006 as boom years.

Table 1 and Figure 1 around here

We obtained data from the Consumer Expenditure Survey (CES) of the Bureau of Labor Statistics by the U.S. Census Bureau. "Household" is used instead of "consumer unit" in the CES. In the survey, household disposable income is assessed as the personal

income after federal, state, and local taxes for all people in the household in the sample. In this paper, we use the CES data in 2003, 2006, 2008, and 2010, which covers five quarters in each survey year.

The dependent variable is the household expenditure on entertainment. Entertainment expenditures are classified into the following three: (1) Fees and Admissions (F&A); (2) Televisions, Radios and Sound Equipment (TRS); (3) Other Equipment and Services (OES). See Table 2 for details.

Table 2 around here

We report preliminary statistics of entertainment expenditures of sampled households in 2003, 2006, 2008, and 2010 in Tables 3. Overall, TRS expenditures account for about 40% of the total entertainment expenditures, and about the same proportion of expenditures are shared by OES. F&A accounts for about 25% of the total entertainment expenditures.

Families with children account approximately for 30% of the total households. The “White” population accounts for about 80% of the total population. More than 90% of the total population reside in urban areas. The majority of households are married and have received a college education.

Tables 3 around here

The most notable characteristic is an issue of high degree censored observations as we can see in Figure 2. Roughly over 50% of households spend no money for F&A activities. As to TRS, 18.26%, 16.14%, 15%, and 16.59% of households report \$0 in 2003,

2006, 2008, and 2010, respectively. About 45% of households don't spend any money for OES activities.

Clearly, estimated nonparametric (kernel) densities are quite different from estimated distribution with a normal density assumption, which implies a severe bias in ordinary least squares (OLS) estimates. To correct the bias, we employed the Tobit model and reported coefficient estimates of explanatory variables in comparison with those from the OLS method.

In what follows, however, we first present results from the Probit model to understand how much each variable affects the propensity of spending non-zero expenditures on entertainment activities. We believe this is important because non-negligible portion of households, sometimes majority households, report zero expenditure for these recreational activities.

Figure 2 around here

3 Empirical findings

We first employ the Probit model to estimate the likelihood of non-zero expenditures on entertainment, and marginal effects of explanatory variables on the probability, which measures changes in the probability due to one unit change in explanatory variables. Then, we report Tobit analysis results in comparison with those of the OLS.

3.1 Probit model

Let $u_{1,i}$ denotes an unobservable level of utility of an agent i from spending a strictly positive amount of money on recreational activities, while $u_{0,i}$ is the level of utility when the agent does not consume any entertainment services. Employing the random utility model framework, we describe consumers' decision making processes as follows.

$$y_i^* = u_{1,i} - u_{0,i} = x_i' \beta + \varepsilon_i, \quad (1)$$

where x_i is a $k \times 1$ vector of characteristic variables of i including an intercept, β is its associated vector of coefficients, and ε_i is assumed to be normally distributed. Then, realized outcome (y_i) is the following.

$$y_i = \begin{cases} 1, & \text{if } y_i^* > 0 \\ 0, & \text{Otherwise} \end{cases} \quad (2)$$

We estimate β in the latent equation (1) by the conventional Probit model estimation method in what follows. We also report the marginal effect that measures the effect of changes in x_i on the change in the probability of $y_i = 1$. Since the marginal effect changes depending on the location of i , we report average marginal effects. All results are provided in Tables 4, 5, and 6.

3.1.1 Major Findings

For F&A category, we found statistically significant decreases in intercept estimates in recession years (2008 and 2010) compared with the boom years (2003 and 2006), which implies that there is a negative effect of exogenous variables that are not included in our model.

We note that the income coefficient estimates in recession years are smaller than those of 2003 and 2006 for TRS and of 2003 for OES categories. These changes imply

slow adjustments of consumption expenditures during recessions, since lower values for the income coefficient imply smaller adjustments in leisure consumption given the changes in income. This may explain why leisure expenditures did not decrease much when the economy went into downturns.

Interestingly, we obtain higher intercept estimates for TRS and OES categories in 2008 and 2010 (recessions) than those in 2003 and 2006, which seem to be at odds with our prior belief on recession effects. Our conjecture is that consumers increased their spending on entertainment-related equipment such as iPods and iPads which became very popular since the mid-2000s. Because our model does not include proxy variables for such technological innovations, those potentially positive effects on expenditures might have been included in the intercept, dominating negative effects from recessions.

3.1.2 Specific Findings

For the F&A category, as expected, "Income" has a statistically significant positive impact for both recession and boom years. That is, entertainment is a normal good/service. "Family with children" and "Married" have all positive and statistically significant, which seems reasonable because F&A includes membership fees and admissions for entertainment activities. "White", "Male", "College", and "Urban" all have significantly positive coefficients, which might be the case as those characteristic variables are highly correlated with "Income".

Other variables overall have correct signs based on conventional wisdom but are not always statistically significant.

Marginal effects are consistent with the Probit coefficient estimates. With one unit increase in income, the probability of spending on F&A goes up by about 0.22%, 0.22%, 0.22%, and 0.21% in 2003, 2006, 2008, and 2010, respectively. Households with an

additional adult older than 64 exhibited a decrease in the probability of making strictly positive expenditure by about 1.22% in 2006. Households with one more child reduced the probability by about 0.43% in 2003. On the contrary, an increase in the Family size resulted in an increase in the probability of spending on F&A by about 0.06% in 2003.

Moreover, Family with children, being married (Married), white people (White), and people with a college education (College), being male (Male), or being urban (Urban) all increase the probability of spending on F&A. For example, "Male" has the probability about 3.28%, 1.35%, 1.43%, and 1.4% higher than female in 2003, 2006, 2008, and 2010, respectively.

For the TRS category, "Income" has a significantly positive effect in all cases. "Family size", "Family with children" and "Married" have statistically significantly positive coefficients in all cases. Since this category includes TVs, radios, and other sound equipment, it seems reasonable to see these family-related characteristic variables.

As in the case for F&A, "White" and "College" have highly significant positive coefficients, while "Urban" has mostly insignificant coefficients with an exception of 2003. "Number of children" has significantly negative coefficients in all cases, which seems at odds with coefficient estimates for "Family with children" that are all significantly positive.¹

"Male" has significantly negative coefficients except 2003. Other variables such as "Number of elderly people" and "Age" did not exhibit qualitatively consistent estimates.

Marginal effects are consistent with the Probit coefficient estimates. With one unit increase in income, the probability of spending on TRS goes up by about 0.16%, 0.17%, 0.12%, and 0.13% in 2003, 2006, 2008, and 2010, respectively. But household with

¹ There may be unobserved nonlinearity in the true data generating process.

one more adult older than the age of 64 decreased the probability by about 1.84% in 2003 and 1.14% in 2008. Male exhibited a higher probability about 0.35% in 2003, compared with Female for expenditures spending on TRS. Urban shows a higher probability (approximately 2.02% and 0.96%) than Rural in 2003 and 2006.

Family with children, being married (Married), white people (White), and people with a college education (College), or being male (Male) increases the probability of spending on TRS, but with different degree. However, having one more child decreases the probability of expenditure on TRS about 2.82%, 2.68%, 2.10%, and 1.55% for 2003, 2006, 2008, and 2010, respectively.

For the OES category, "Income" again has all significantly positive effects in all cases. "White" and "College", which are correlated with "Income", also exhibited statistically significant positive coefficients. Family related variables such as "Married", "Family size", and "Family with children" also have positive coefficients that are highly significant. This seems to make sense because OES includes household expenditures for family oriented activities that involve playground equipment, hunting, fishing, and camping.

We note that "Number of elderly" and "Age" exhibit highly significant but negative effects for all cases, which might be the case that people may start reducing their expenditures on those family-oriented activities as they grow older. "Urban" also has negative coefficients, which may happen if recreational activities such as hunting and fishing cost more to urban residents than to rural area residents.

Marginal effects are again in line with the Probit coefficient estimates. An increase income increases the probability by about 0.18%, 0.13%, 0.12%, and 0.13% in 2003, 2006, 2008, and 2010 respectively. One additional child significantly increases the probability about 0.76% in 2003, but insignificantly in 2006, 2008, and 2010.

The marginal effect is negative for the Number of adults older than 64, Male, and Urban, and but positive for others. For example, White people have a higher probability about 17.56%, 20.95%, 19.27%, and 17% than non-White people for 2003, 2006, 2008, and 2010 respectively. Urban residents show a lower probability about 5.64%, 4.68%, 8.31%, and 3.98% than rural residents for 2003, 2006, 2008, and 2010, respectively.

Tables 4, 5, and 6 around here

3.2 Tobit model

We also employ the Tobit model to investigate quantitative effects of changes in the characteristic variables on the amount of expenditures on recreational activities. We employ the model described in equation (1) but modify the determination of the realized outcome (y_i) as follows.

$$y_i = \begin{cases} y_i^* & \text{if } y_i^* > 0 \\ 0 & \text{Otherwise} \end{cases} \quad (2)$$

Note that the ordinary least squares (OLS) estimator is biased due to the censored observation. In the presence of substantial degree censoring, the OLS tends to underestimate the true coefficients. We report and compare estimates for β using both the Tobit and the OLS methods in what follows.

For comparison with the Tobit model, we also analyze the data with the OLS regression for all entertainment expenditures and report results in Tables 7, 8, and 9. The OLS intercept estimates are greater than those of the Tobit model because observations are censored at 0. Reflecting the same problem, the OLS coefficient estimates are smaller than those of the Tobit model, which implies the downward bias

of the OLS estimator in presence of censored observations. Our results in Tables 7 through 9 and Figure 2 show that this is indeed the case.

The results of the Tobit model are consistent with those of the Probit model. Intercept decreases in 2008 and 2010 from 2003, which implies a negative effect of exogenous variables that are not covered by the model for F&A in 2008 and 2010 (Table 7). Changes in the income coefficient are also in line with the patterns observed in Probit model estimations. That is, we note that the income coefficient estimates in recession years are smaller than those of 2003 and 2006 for TRS and OES categories (Table 8 and Table 9), which implies sluggish adjustments in consumer behavior.

Income coefficient estimates are statistically significantly positive in all expenditure categories. Put it differently, F&A, TRS, and OES all exhibit a property of normal goods.

For F&A expenditure, "Male", "White", "College", and "Urban" have significantly positive coefficients, which probably is due to the fact that they are highly correlated with "Income". "Number of children" and "Family with children" both show significantly positive coefficients for this family-oriented leisure activities.

For TRS, "Married", "White", and "College", which are highly correlated with "Income", all have positive coefficients. "Number of elderly" and "Number of children" have significantly negative coefficients, which is at odds with "Family size". It is not very obvious why "Number of children" and "Family with children" exhibit opposite signs in the results, even though a nonlinear relationship between TRS consumption and the number of children may create such seemingly inconsistent estimates.

For OES, "Married", "White", and "College" have significantly positive coefficients, which may be the case as they are income-related factors. "Number of children" and "Family with children" are insignificant, and "Number of elderly" and

“Age” have significantly negative coefficients, which might be the case because OES involves lots of outdoor activities such as camping and hunting.

Tables 7, 8, and 9

4 Conclusions

This paper examined potential effects of the Great Recession on household consumption for entertainment activities in the U.S. using the CES data in 2003, 2006, 2008, and 2010. We attempt to understand consumers’ response to financial distress by estimating reduced-form consumption functions in recession years, 2008 and 2010, in comparison with 2003 and 2006 as the benchmark of the boom.

Facing substantial degree censoring in the data, we employed the Probit model to understand the role of changes in the household income on the likelihood of making non-zero expenditure on entertainment activity, controlling the effects of other socio-economic variables. Further, we implemented the Probit analysis to quantify the effect of changes in the income, correcting for the bias due to censored observations, on the amount of leisure expenditure during recession years in comparison with economic booms.

Income has significantly positive coefficients for all three types of entertainment activities across all years. However, the role of income on entertainment activities is not independent from business cycle, since we found statistically significant effects of recessions.

Recessionary effects were observed from decreases in the intercept (F&A) and/or from decreases in the income coefficient (TRS and OES) during recession years. We note that a decrease in the income coefficient during recessions implies slow adjustment of

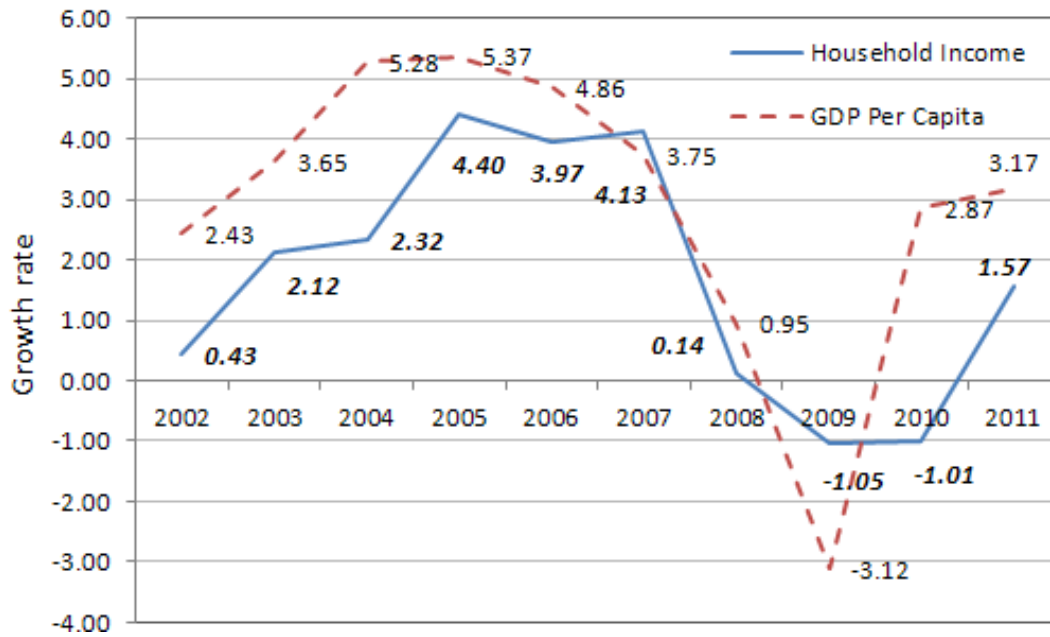
consumption expenditure when the income growth slows down. This may help explain seemingly puzzling observations that leisure spending often does not decrease much during economic recessions (see Paulin (2012) for similar observation for travel expenditure). Economic downturns tend to generate financial distress, which will negatively affect consumers' welfare. Rational consumers will re-allocate available resources to entertainment activities to improve their wellbeing. Our results may be consistent with this view.

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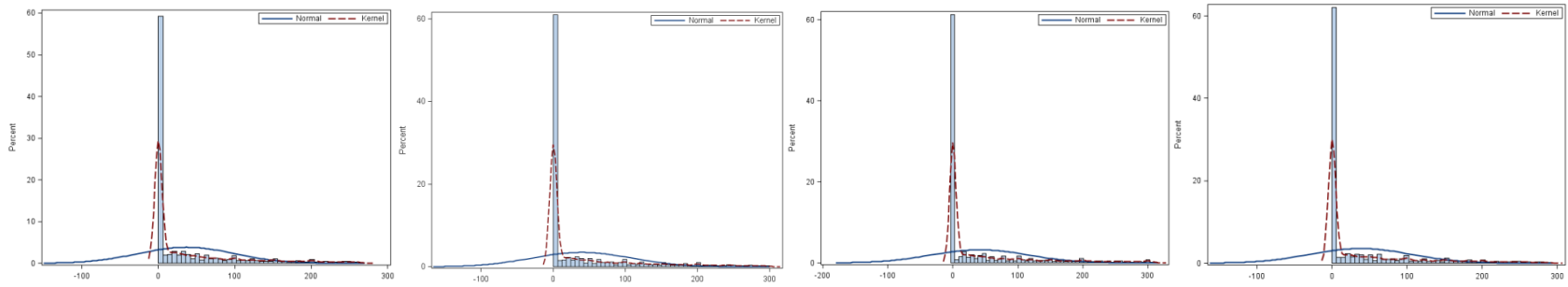
Figure 1: US Income Growth Rates



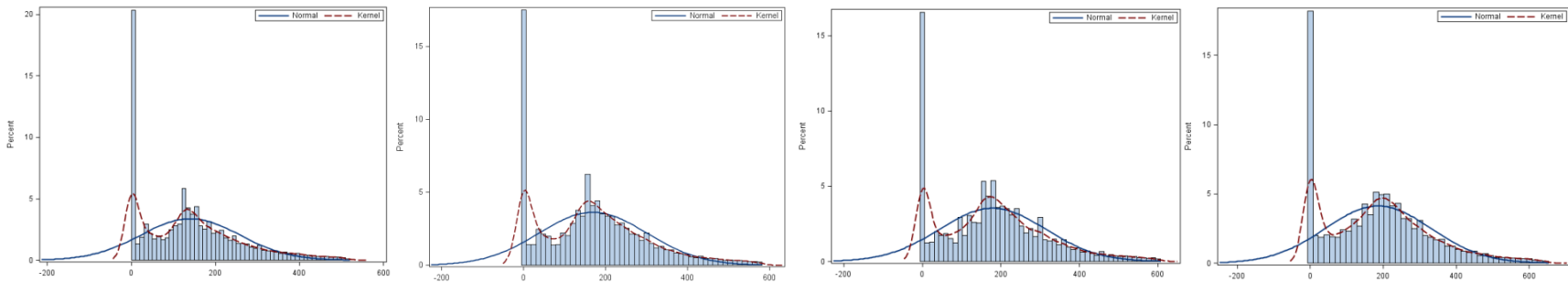
Note: Median household income data is from the US Census Bureau. The GDP per capita data is obtained from the FRED.

Figure 2. Kernel Densities of Expenditures in 2003 (left), 2006 (left-middle), 2008 (right-middle), and 2010(right)

(a) Fee



(b) Television



(c) Other equipment and services

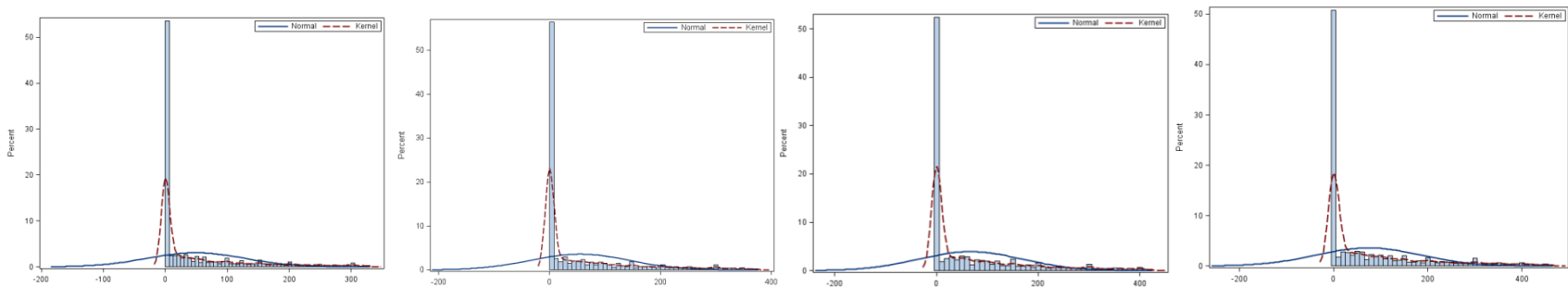


Table 1. Recreation Expenditures and Household Income

	<i>Nominal</i>				<i>Real</i>			
	2003	2006	2008	2010	2003	2006	2008	2010
F&A	130	156	161	148	130	142	137	125
TV	191	235	256	240	191	214	218	203
Other	183	190	225	193	183	173	193	163
Income	41,694	48,261	49,737	49,485	41,694	44,007	42,515	41,751

Note: Median income data is from the US Census Bureau. Real variables are obtained by deflating nominal variables by 2011 CPI-U.

Table 2. Definition of Entertainment Expenditures

Entertainment

Fees and admissions

Miscellaneous recreational expenses on out-of-town trips
Membership fees for clubs, swimming pools, social or other recreational organizations, service
Fees for participant sports, participant sports on out-of-town trips, recreational lessons or other instructions
Management fees for recreational facilities
Admission fees for entertainment activities, sporting events on out-of-town trips
Entertainment expenses on out-of-town trips
Admission fees to sporting events (single admissions and season tickets)
Miscellaneous entertainment services on out-of-town trips

Televisions, radios, and sound equipment

Cable, satellite, or community antenna service, satellite radio service, satellite dishes
Televisions, video cassettes, tapes, and discs, video and computer game hardware and software
Streaming or downloaded video files, radio, tape recorder and player, digital audio players
Sound components, component systems, and compact disc sound systems
Accessories and other sound equipment including phonographs
Records, CDs, audio tapes, streaming or downloaded audio files
Repair of television, radio, and sound equipment, excluding installed in vehicles
Rental of televisions, VCR, radio, and sound equipment
Musical instruments, supplies, and accessories
Rental and repair of musical instruments, supplies, and accessories
Installation for TVs, satellite TV equipment, sound systems, other video or sound systems

Other equipment and services

Toys, games, arts, crafts, tricycles, and battery powered riders, playground equipment
Pets, pet supplies and medicine for pets, pet services, veterinarian expenses for pets
Docking and landing fees for boats and planes
Rental of non camper-type trailer, boat or non camper-type trailer
Outboard motor, boat without motor or non camper-type trailer, boat with motor (net outlay), bicycles
Trailer-type or other attachable-type camper (net outlay)
Purchase of motor home, other vehicle
Ping-Pong, pool tables, other similar recreation room items
Hunting and fishing, winter/water/other sports, health and exercise equipment
Photographic film, film processing, photographic equipment, professional photography fees
Rental and repair of photographic equipment, sports, and recreation equipment
Rental of all boats and outboard motors, motor home, other RV's
Rental of all campers, other vehicles on out-of-town trips
Online entertainment and games, live entertainment for catered affairs

Reference: Consumer Expenditure Survey.

Table 3. Summary of the variables in 2003, 2006, 2008, and 2010

Variable	2003 (N=40374)	2006 (N=35832)	2008 (N=34485)	2010 (N=35298)
	Mean (Std Dev)	Mean (Std Dev)	Mean (Std Dev)	Mean (Std Dev)
Total expenditure (\$)	503.12 (1656.64)	580.36(1563.03)	641.52 (1429.30)	580.58 (1518.27)
F&A	129.75 (429.76)	234.85 (475.56)	160.57 (498.72)	147.78 (571.05)
TRS	190.82 (383.59)	189.82 (392.30)	255.54 (415.48)	240.08 (323.20)
OES	182.54 (1496.61)	182.54 (1357.15)	225.41 (1184.24)	192.72 (1289.13)
Income after tax (\$)	41694.00 (47255.95)	48260.95 (55544.85)	49736.83 (58141.69)	49484.55 (59900.82)
Family size	2.53 (1.50)	2.55 (1.51)	2.52 (1.49)	2.51(1.53)
No. of adult>64 years old	0.31 (0.61)	0.31 (0.61)	0.33 (0.63)	0.33(0.62)
No. of children	0.68 (1.09)	0.67 (1.08)	0.65 (1.08)	0.63 (1.07)
Age	48.48 (17.55)	49.03 (17.27)	49.63 (17.33)	49.64 (17.38)
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Family type				
Family with child	12828 (31.77)	11412 (31.85)	10699 (31.03)	10338 (29.29)
Family without child	27546 (68.23)	24420 (68.15)	23786 (68.97)	24960 (70.71)
Marital status				
Married	21285 (52.72)	19165 (53.49)	18414 (53.40)	18013 (51.03)
Not-married	19089 (47.28)	16667 (46.51)	16071 (46.60)	17285 (48.97)
Gender				
Male	20317 (50.32)	16627 (46.40)	161519 (46.83)	16543 (46.87)
Female	20057 (49.68)	19205 (53.60)	18334 (53.17)	18755 (53.13)
Race				
White	33431 (82.80)	29433 (82.14)	28199 (81.77)	28390 (80.43)
Not-White	6943 (17.20)	6399 (17.86)	6286 (18.23)	6908 (19.57)
Education				
Attend college	23272 (57.64)	21086 (58.85)	208499 (60.46)	21352 (60.49)
Never attend college	17102 (42.36)	14746 (41.15)	13636 (39.54)	13946 (39.51)
Location				
Urban	36616 (90.69)	33774 (94.26)	32515 (94.29)	33395 (94.61)
Rural	3758 (9.31)	2058 (5.74)	1970 (5.71)	1903 (5.39)
Season				
1 st quarter	8086 (20.03)	7786 (21.73)	6914 (20.05)	7198 (20.39)
2 nd quarter	8196 (20.30)	7009 (19.56)	6942 (20.13)	7135 (20.21)
3 rd quarter	8072 (19.99)	6988 (19.50)	6794 (19.70)	7059 (20.00)
4 th quarter	8044 (19.92)	7084 (19.77)	6895 (19.99)	7037 (19.94)
5 th quarter	7976 (19.76)	6965 (19.44)	6940 (20.12)	6869 (19.46)

Note: Standard deviation and percentage of frequency are in parenthesis.

Table 4. Probit Model Estimations: Fees and Admissions

Variable	Probit ₀₃	ME ₀₃	Probit ₀₆	ME ₀₆	Probit ₀₈	ME ₀₈	Probit ₁₀	ME ₁₀
Income	0.0063 (0.0002)	0.0022 (0.0004)	0.0063 (0.0002)	0.0022 (0.0004)	0.0063 (0.0002)	0.0022 (0.0004)	0.0061 (0.0002)	0.0021 (0.0004)
No. of adults>64 years old	0.0357 (0.0153)	0.0124 (0.0022)	-0.0353 (0.0161)	-0.0122 (0.0022)	0.0101 (0.0161)	0.0035 (0.0007)	0.0381 (0.0158)	0.0131 (0.0025)
No. of children	-0.0125 (0.0130)	-0.0043 (0.0008)	0.0086 (0.0133)	0.0030 (0.0005)	0.0408 (0.0140)	0.0140 (0.0027)	0.0186 (0.0134)	0.0064 (0.0012)
Age	-0.0093 (0.0005)	-0.0032 (0.0006)	-0.0076 (0.0006)	-0.0026 (0.0005)	-0.0070 (0.0006)	-0.0024 (0.0005)	-0.0086 (0.0006)	-0.0030 (0.0006)
Family size	0.0016 (0.0097)	0.0006 (0.0001)	-0.0218 (0.0097)	-0.0075 (0.0014)	-0.0383 (0.0103)	-0.0132 (0.0025)	-0.0293 (0.0094)	-0.0101 (0.0019)
Family with children	0.1733 (0.0194)	0.0601 (0.0105)	0.1212 (0.0203)	0.0420 (0.0077)	0.1437 (0.0214)	0.0494 (0.0094)	0.1521 (0.0210)	0.0524 (0.0099)
Male	0.0945 (0.0136)	0.0328 (0.0057)	0.0390 (0.0143)	0.0135 (0.0025)	0.0415 (0.0146)	0.0143 (0.0027)	0.0406 (0.0144)	0.0140 (0.0026)
Married	0.0406 (0.0177)	0.0141 (0.0025)	0.0927 (0.0183)	0.0321 (0.0059)	0.1037 (0.0189)	0.0356 (0.0068)	0.0961 (0.0184)	0.0331 (0.0062)
White	0.3859 (0.0181)	0.1338 (0.0234)	0.3406 (0.0189)	0.1179 (0.0215)	0.3528 (0.0191)	0.1213 (0.0230)	0.2979 (0.0183)	0.1026 (0.0193)
College	0.5886 (0.0139)	0.2041 (0.0357)	0.5569 (0.0148)	0.1928 (0.0352)	0.5648 (0.0153)	0.1941 (0.0368)	0.5780 (0.0152)	0.1991 (0.0375)
Urban	0.2243 (0.0231)	0.0778 (0.0136)	0.1507 (0.0305)	0.0522 (0.0095)	0.1891 (0.0316)	0.0650 (0.0123)	0.3188 (0.0326)	0.1098 (0.0207)
1 st quarter	0.1143 (0.0209)	0.0396 (0.0069)	0.0386 (0.0218)	0.0134 (0.0024)	0.0171 (0.0226)	0.0059 (0.0011)	0.0909 (0.0224)	0.0313 (0.0059)
2 ^{ed} quarter	-0.0378 (0.0208)	-0.0131 (0.0023)	0.0390 (0.0224)	0.0135 (0.0025)	-0.0250 (0.0226)	-0.0086 (0.0016)	0.0383 (0.0225)	0.0132 (0.0025)
3 rd quarter	0.0164 (0.0209)	0.0057 (0.0010)	0.1254 (0.0224)	0.0434 (0.0079)	0.0804 (0.0227)	0.0276 (0.0052)	0.0882 (0.0225)	0.0304 (0.0057)
4 th quarter	0.0277 (0.0209)	0.0096 (0.0017)	0.0651 (0.0223)	0.0226 (0.0041)	0.0351 (0.0226)	0.0121 (0.0023)	0.0587 (0.0225)	0.0202 (0.0038)
Intercept	-0.8506 (0.0436)	-	-0.8369 (0.0501)	-	-0.9240 (0.0514)	-	-0.9746 (0.0511)	-

Note: Standard errors are in parenthesis. ME denotes the marginal effect.

Table 5. Probit Model Estimations: Televisions, Radios, and Sound Equipment

Variable	Probit ₀₃	ME ₀₃	Probit ₀₆	ME ₀₆	Probit ₀₈	ME ₀₈	Probit ₁₀	ME ₁₀
Income	0.0067 (0.0003)	0.0016 (0.0006)	0.0076 (0.0003)	0.0017 (0.0008)	0.0056 (0.0002)	0.0012 (0.0005)	0.0056 (0.0002)	0.0013 (0.0005)
No. of adults>64 years old	-0.0752 (0.0177)	-0.0184 (0.0071)	0.0004 (0.0194)	0.0001 (0.0000)	-0.0521 (0.0195)	-0.0114 (0.0045)	0.0135 (0.0191)	0.0032 (0.0012)
No. of children	-0.1153 (0.0161)	-0.0282 (0.0109)	-0.1193 (0.0167)	-0.0268 (0.0118)	-0.0958 (0.0177)	-0.0210 (0.0083)	-0.0663 (0.0160)	-0.0155 (0.0057)
Age	0.0005 (0.0006)	0.0001 (0.0000)	-0.0013 (0.0007)	-0.0003 (0.0001)	0.0016 (0.0007)	0.0003 (0.0001)	0.0027 (0.0006)	0.0006 (0.0002)
Family size	0.1137 (0.0119)	0.0277 (0.0108)	0.0776 (0.0121)	0.0174 (0.0076)	0.0843 (0.0128)	0.0185 (0.0073)	0.0637 (0.0112)	0.0149 (0.0055)
Family with children	0.1199 (0.0239)	0.0293 (0.0113)	0.1048 (0.0259)	0.0235 (0.0103)	0.0792 (0.0272)	0.0173 (0.0069)	0.0632 (0.0258)	0.0147 (0.0055)
Male	0.0145 (0.0158)	0.0035 (0.0014)	-0.0563 (0.0173)	-0.0126 (0.0056)	-0.0673 (0.0176)	-0.0147 (0.0058)	-0.0710 (0.0169)	-0.0166 (0.0061)
Married	0.1607 (0.0207)	0.0392 (0.0152)	0.2359 (0.0219)	0.0529 (0.0233)	0.1769 (0.0229)	0.0388 (0.0153)	0.1900 (0.0217)	0.0443 (0.0164)
White	0.2127 (0.0193)	0.0519 (0.0201)	0.1632 (0.0210)	0.0366 (0.0161)	0.2355 (0.0209)	0.0516 (0.0204)	0.2072 (0.0200)	0.0483 (0.0179)
College	0.3064 (0.0159)	0.0748 (0.0290)	0.2737 (0.0174)	0.0614 (0.0270)	0.2303 (0.0180)	0.0505 (0.0199)	0.2580 (0.0174)	0.0602 (0.0223)
Urban	0.0826 (0.0254)	0.0202 (0.0078)	0.0427 (0.0348)	0.0096 (0.0042)	-0.0632 (0.0372)	-0.0139 (0.0055)	-0.0283 (0.0363)	-0.0066 (0.0024)
1 st quarter	0.0560 (0.0246)	0.0137 (0.0053)	0.0285 (0.0262)	0.0064 (0.0028)	-0.0745 (0.0273)	-0.0163 (0.0065)	0.0435 (0.0265)	0.0101 (0.0038)
2 ^{ed} quarter	-0.0603 (0.0240)	-0.0147 (0.0057)	-0.0447 (0.0266)	-0.0100 (0.0044)	-0.0526 (0.0274)	-0.0115 (0.0046)	-0.0021 (0.0263)	-0.0005 (0.0002)
3 rd quarter	-0.0849 (0.0240)	-0.0207 (0.0080)	-0.0192 (0.0268)	-0.0043 (0.0019)	-0.1075 (0.0273)	-0.0236 (0.0093)	-0.0662 (0.0261)	-0.0154 (0.0057)
4 th quarter	-0.0642 (0.0241)	-0.0157 (0.0061)	-0.0031 (0.0267)	-0.0007 (0.0003)	-0.0869 (0.0272)	-0.0190 (0.0075)	-0.0419 (0.0262)	-0.0098 (0.0036)
Intercept	-0.0106 (0.0490)	-	0.2321 (0.0578)	-	0.3410 (0.0601)	-	0.1621 (0.0573)	-

Note: Standard errors are in parenthesis. ME denotes the marginal effect.

Table 6. Probit Model Estimations: Other Equipment and Services

Variable	Probit ₀₃	ME ₀₃	Probit ₀₆	ME ₀₆	Probit ₀₈	ME ₀₈	Probit ₁₀	ME ₁₀
Income	0.0050 (0.0002)	0.0018 (0.0003)	0.0035 (0.0002)	0.0013 (0.0002)	0.0035 (0.0001)	0.0012 (0.0002)	0.0037 (0.0001)	0.0013 (0.0002)
No. of adults>64 years old	-0.0811 (0.0151)	-0.0286 (0.0047)	-0.1075 (0.0157)	-0.0386 (0.0054)	-0.1256 (0.0157)	-0.0442 (0.0072)	-0.0930 (0.0154)	-0.0334 (0.0048)
No. of children	0.0217 (0.0130)	0.0076 (0.0012)	-0.0096 (0.0131)	-0.0034 (0.0005)	0.0084 (0.0140)	0.0030 (0.0005)	0.0014 (0.0132)	0.0005 (0.0001)
Age	-0.0041 (0.0005)	-0.0014 (0.0002)	-0.0047 (0.0006)	-0.0017 (0.0002)	-0.0046 (0.0006)	-0.0016 (0.0003)	-0.0048 (0.0006)	-0.0017 (0.0002)
Family size	0.0439 (0.0096)	0.0155 (0.0025)	0.0684 (0.0095)	0.0245 (0.0034)	0.0659 (0.0102)	0.0232 (0.0038)	0.0618 (0.0092)	0.0222 (0.0032)
Family with children	0.1694 (0.0194)	0.0598 (0.0098)	0.0904 (0.0201)	0.0324 (0.0045)	0.1137 (0.0214)	0.0400 (0.0065)	0.1126 (0.0208)	0.0405 (0.0058)
Male	-0.1120 (0.0136)	-0.0395 (0.0065)	-0.1118 (0.0142)	-0.0401 (0.0056)	-0.1402 (0.0145)	-0.0493 (0.0080)	-0.1395 (0.0142)	-0.0501 (0.0072)
Married	0.2529 (0.0175)	0.0892 (0.0146)	0.2405 (0.0179)	0.0863 (0.0120)	0.2597 (0.0185)	0.0914 (0.0148)	0.2528 (0.0179)	0.0908 (0.0130)
White	0.4979 (0.0178)	0.1756 (0.0287)	0.5840 (0.0187)	0.2095 (0.0291)	0.5479 (0.0188)	0.1927 (0.0313)	0.4731 (0.0179)	0.1700 (0.0243)
College	0.3153 (0.0139)	0.1112 (0.0182)	0.2672 (0.0147)	0.0959 (0.0133)	0.2841 (0.0152)	0.0999 (0.0162)	0.2166 (0.0149)	0.0778 (0.0111)
Urban	-0.1598 (0.0227)	-0.0564 (0.0092)	-0.1304 (0.0298)	-0.0468 (0.0065)	-0.2363 (0.0312)	-0.0831 (0.0135)	-0.1107 (0.0309)	-0.0398 (0.0057)
1 st quarter	0.1265 (0.0209)	0.0446 (0.0073)	0.0390 (0.0215)	0.0140 (0.0019)	0.0124 (0.0225)	0.0044 (0.0007)	0.0100 (0.0221)	0.0036 (0.0005)
2 ^{ed} quarter	-0.1810 (0.0207)	-0.0638 (0.0104)	-0.1227 (0.0221)	-0.0440 (0.0061)	-0.2136 (0.0224)	-0.0751 (0.0122)	-0.1892 (0.0221)	-0.0680 (0.0097)
3 rd quarter	-0.1582 (0.0208)	-0.0558 (0.0091)	-0.1244 (0.0221)	-0.0446 (0.0062)	-0.1338 (0.0225)	-0.0471 (0.0076)	-0.1762 (0.0221)	-0.0633 (0.0090)
4 th quarter	-0.1464 (0.0208)	-0.0516 (0.0084)	-0.1722 (0.0220)	-0.1618 (0.0086)	-0.1822 (0.0224)	-0.0641 (0.0104)	-0.1953 (0.0221)	-0.0702 (0.0100)
Intercept	-0.5162 (0.0431)	-	-0.5989 (0.0492)	-	-0.3379 (0.0507)	-	-0.3594 (0.0494)	-

Note: Standard errors are in parenthesis. ME denotes the marginal effect.

Table 7. Tobit Model Estimations: Fees and Admissions

Variable	Tobit ₀₃	OLS ₀₃	Tobit ₀₆	OLS ₀₆	Tobit ₀₈	OLS ₀₈	Tobit ₁₀	OLS ₁₀
Income	0.0036 (0.0001)	0.0022 (0.0000)	0.0041 (0.0001)	0.0025 (0.0000)	0.0040 (0.0001)	0.0023 (0.0000)	0.0046 (0.0001)	0.0027 (0.0001)
No. of adults>64 years old	0.0038 (0.0085)	-0.0066 (0.0048)	-0.0143 (0.0100)	0.0002 (0.0054)	-0.0135 (0.0106)	-0.0133 (0.0057)	0.0388 (0.0120)	0.0203 (0.0065)
No. of children	0.0184 (0.0070)	0.0276 (0.0040)	0.0423 (0.0081)	0.0438 (0.0045)	0.0523 (0.0090)	0.0407 (0.0049)	0.0445 (0.0099)	0.0415 (0.0055)
Age	-0.0019 (0.0003)	0.0011 (0.0002)	-0.0017 (0.0004)	0.0011 (0.0002)	-0.0009 (0.0004)	0.0017 (0.0002)	-0.0033 (0.0004)	0.0006 (0.0002)
Family size	-0.0060 (0.0053)	-0.0127 (0.0030)	-0.0231 (0.0060)	-0.0226 (0.0033)	-0.0279 (0.0067)	-0.0206 (0.0036)	-0.0247 (0.0071)	-0.0213 (0.0038)
Family with children	0.0792 (0.0106)	0.0284 (0.0061)	0.0528 (0.0123)	0.0184 (0.0069)	0.0999 (0.0137)	0.0495 (0.0076)	0.1033 (0.0154)	0.0427 (0.0086)
Male	0.0539 (0.0074)	0.0179 (0.0042)	0.0323 (0.0087)	0.0152 (0.0048)	0.0204 (0.0094)	0.0013 (0.0052)	0.0261 (0.0107)	0.0039 (0.0059)
Married	0.0570 (0.0098)	0.0267 (0.0055)	0.0878 (0.0113)	0.0309 (0.0062)	0.0985 (0.0123)	0.0361 (0.0067)	0.0777 (0.0138)	0.0145 (0.0075)
White	0.1871 (0.0103)	0.0446 (0.0055)	0.1949 (0.0120)	0.0484 (0.0063)	0.1948 (0.0129)	0.0392 (0.0067)	0.1748 (0.0140)	0.0270 (0.0074)
College	0.2897 (0.0080)	0.0763 (0.0044)	0.3197 (0.0094)	0.0841 (0.0050)	0.3585 (0.0104)	0.0973 (0.0055)	0.3844 (0.0119)	0.0785 (0.0062)
Urban	0.1366 (0.0132)	0.0468 (0.0071)	0.1284 (0.0194)	0.0519 (0.0102)	0.1683 (0.0216)	0.0596 (0.0110)	0.2343 (0.0258)	0.0520 (0.0129)
1 st quarter	0.0298 (0.0113)	-0.0004 (0.0065)	0.0134 (0.0134)	0.0030 (0.0074)	0.0245 (0.0146)	0.0119 (0.0080)	0.0333 (0.0167)	-0.0038 (0.0091)
2 ^{ed} quarter	-0.0168 (0.0114)	-0.0044 (0.0065)	0.0203 (0.0137)	0.0085 (0.0075)	0.0046 (0.0146)	0.0091 (0.0080)	0.0529 (0.0167)	0.0252 (0.0092)
3 rd quarter	0.0201 (0.0114)	0.0117 (0.0065)	0.0748 (0.0136)	0.0302 (0.0075)	0.0717 (0.0146)	0.0339 (0.0080)	0.0553 (0.0167)	0.0156 (0.0092)
4 th quarter	0.0127 (0.0114)	0.0034 (0.0065)	0.0366 (0.0136)	0.0143 (0.0075)	0.0419 (0.0146)	0.0203 (0.0080)	0.0435 (0.0168)	0.0133 (0.0092)
Sigma	0.6243 (0.0033)	-	0.6930 (0.0039)	-	0.7337 (0.0042)	-	0.8384 (0.0048)	-
Intercept	-0.7925 (0.0246)	-0.1559 (0.0135)	-0.8732 (0.0315)	-0.1709 (0.0168)	-1.0174 (0.0347)	-0.2081 (0.0181)	-1.0843 (0.0397)	-0.1442 (0.0206)

Note: Standard errors are in parenthesis.

Table 8. Tobit Model Estimations: Televisions, Radios, and Sound Equipment

Variable	Tobit ₀₃	OLS ₀₃	Tobit ₀₆	OLS ₀₆	Tobit ₀₈	OLS ₀₈	Tobit ₁₀	OLS ₁₀
Income	0.0016 (0.0000)	0.0013 (0.0000)	0.0016 (0.0000)	0.0013 (0.0000)	0.0014 (0.0000)	0.0012 (0.0000)	0.0011 (0.0000)	0.0009 (0.0000)
No. of adults>64 years old	-0.0296 (0.0051)	-0.0231 (0.0044)	-0.0157 (0.0053)	-0.0160 (0.0046)	-0.0176 (0.0056)	-0.0139 (0.0049)	-0.0208 (0.0043)	-0.0206 (0.0037)
No. of children	-0.0178 (0.0043)	-0.0063 (0.0037)	-0.0241 (0.0044)	-0.0126 (0.0038)	-0.0212 (0.0048)	-0.0129 (0.0043)	-0.0121 (0.0037)	-0.0068 (0.0031)
Age	0.0001 (0.0002)	0.0002 (0.0002)	-0.0004 (0.0002)	-0.0002 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0010 (0.0002)	0.0007 (0.0001)
Family size	0.0297 (0.0032)	0.0175 (0.0027)	0.0236 (0.0032)	0.0146 (0.0028)	0.0266 (0.0036)	0.0181 (0.0031)	0.0206 (0.0026)	0.0144 (0.0022)
Family with children	0.0221 (0.0064)	0.0155 (0.0055)	0.0329 (0.0067)	0.0278 (0.0059)	0.0203 (0.0074)	0.0172 (0.0065)	0.0070 (0.0057)	0.0043 (0.0050)
Male	0.0165 (0.0045)	0.0138 (0.0039)	0.0069 (0.0047)	0.0105 (0.0041)	0.0098 (0.0051)	0.0135 (0.0045)	0.0107 (0.0039)	0.0138 (0.0034)
Married	0.0319 (0.0059)	0.0144 (0.0050)	0.0476 (0.0060)	0.0255 (0.0053)	0.0526 (0.0066)	0.0363 (0.0058)	0.0547 (0.0050)	0.0414 (0.0043)
White	0.0405 (0.0060)	0.0182 (0.0050)	0.0339 (0.0062)	0.0170 (0.0053)	0.0547 (0.0066)	0.0317 (0.0057)	0.0332 (0.0050)	0.0176 (0.0043)
College	0.0627 (0.0047)	0.0326 (0.0040)	0.0655 (0.0050)	0.0393 (0.0043)	0.0625 (0.0054)	0.0416 (0.0047)	0.0599 (0.0042)	0.0408 (0.0036)
Urban	0.0361 (0.0076)	0.0266 (0.0065)	0.0361 (0.0101)	0.0305 (0.0087)	0.0117 (0.0108)	0.0160 (0.0095)	0.0186 (0.0087)	0.0197 (0.0074)
1 st quarter	0.0028 (0.0069)	-0.0015 (0.0059)	-0.0052 (0.0072)	-0.0065 (0.0063)	-0.0019 (0.0078)	0.0023 (0.0069)	0.0087 (0.0061)	0.0059 (0.0053)
2 nd quarter	-0.0591 (0.0069)	-0.0519 (0.0059)	-0.0621 (0.0074)	-0.0561 (0.0064)	-0.0618 (0.0078)	-0.0562 (0.0069)	-0.0444 (0.0061)	-0.0427 (0.0053)
3 rd quarter	-0.0615 (0.0069)	-0.0521 (0.0059)	-0.0640 (0.0074)	-0.0595 (0.0064)	-0.0648 (0.0079)	-0.0551 (0.0069)	-0.0513 (0.0062)	-0.0455 (0.0053)
4 th quarter	-0.0398 (0.0069)	-0.0333 (0.0059)	-0.0469 (0.0074)	-0.0442 (0.0064)	-0.0511 (0.0078)	-0.0435 (0.0069)	-0.0455 (0.0062)	-0.0413 (0.0053)
Sigma	0.4245 (0.0017)	-	0.4259 (0.0018)	-	0.4506 (0.0019)	-	0.3548 (0.0015)	-
Intercept	-0.0984 (0.0145)	0.0421 (0.0123)	-0.0144 (0.0165)	0.0939 (0.0143)	-0.0113 (0.0179)	0.0956 (0.0156)	-0.0278 (0.0139)	0.0722 (0.0119)

Note: Standard errors are in parenthesis.

Table 9. Tobit Model Estimations: Other Equipment and Services

Variable	Tobit ₀₃	OLS ₀₃	Tobit ₀₆	OLS ₀₆	Tobit ₀₈	OLS ₀₈	Tobit ₁₀	OLS ₁₀
Income	0.0067 (0.0003)	0.0028 (0.0002)	0.0054 (0.0002)	0.0026 (0.0001)	0.0035 (0.0002)	0.0016 (0.0001)	0.0047 (0.0002)	0.0023 (0.0001)
No. of adults>64 years old	-0.0614 (0.0279)	0.0087 (0.0174)	-0.1599 (0.0276)	-0.0429 (0.0164)	-0.1201 (0.0229)	-0.0227 (0.0143)	-0.1321 (0.0247)	-0.0410 (0.0153)
No. of children	0.0043 (0.0231)	0.0182 (0.0147)	-0.0190 (0.0221)	0.0177 (0.0135)	0.0281 (0.0192)	0.0429 (0.0124)	0.0229 (0.0203)	0.0408 (0.0129)
Age	-0.0060 (0.0010)	-0.0003 (0.0006)	-0.0055 (0.0010)	0.0002 (0.0006)	-0.0045 (0.0008)	-0.0001 (0.0005)	-0.0046 (0.0009)	0.0003 (0.0006)
Family size	0.0629 (0.0174)	-0.0039 (0.0109)	0.0770 (0.0164)	-0.0071 (0.0099)	0.0610 (0.0144)	-0.0061 (0.0091)	0.0612 (0.0145)	-0.0081 (0.0091)
Family with children	0.1061 (0.0342)	-0.0166 (0.0220)	0.0382 (0.0337)	-0.0155 (0.0208)	0.0277 (0.0292)	-0.0158 (0.0190)	-0.0044 (0.0315)	-0.0580 (0.0203)
Male	-0.0778 (0.0245)	0.0145 (0.0154)	-0.1024 (0.0243)	-0.0042 (0.0146)	-0.1088 (0.0205)	-0.0117 (0.0130)	-0.1189 (0.0223)	-0.0081 (0.0139)
Married	0.3280 (0.0319)	0.0539 (0.0200)	0.3053 (0.0311)	0.0492 (0.0187)	0.3341 (0.0265)	0.1103 (0.0168)	0.3124 (0.0284)	0.0729 (0.0178)
White	0.6462 (0.0344)	0.0796 (0.0200)	0.7650 (0.0345)	0.1050 (0.0189)	0.6312 (0.0285)	0.1309 (0.0167)	0.5346 (0.0297)	0.0763 (0.0174)
College	0.3905 (0.0256)	0.0522 (0.0159)	0.3046 (0.0257)	0.0255 (0.0152)	0.3100 (0.0219)	0.0701 (0.0137)	0.2587 (0.0238)	0.0465 (0.0147)
Urban	-0.2270 (0.0404)	-0.0585 (0.0257)	-0.1852 (0.0504)	-0.0549 (0.0309)	-0.2175 (0.0425)	-0.0550 (0.0276)	-0.1048 (0.0482)	-0.0150 (0.0304)
1 st quarter	0.1333 (0.0368)	0.0219 (0.0235)	0.0786 (0.0365)	0.0380 (0.0222)	0.0235 (0.0311)	0.0080 (0.0200)	0.0193 (0.0340)	0.0086 (0.0216)
2 ^{ed} quarter	-0.2514 (0.0375)	-0.0644 (0.0234)	-0.0958 (0.0379)	0.0134 (0.0228)	-0.1744 (0.0316)	-0.0261 (0.0199)	-0.1778 (0.0346)	-0.0244 (0.0216)
3 rd quarter	-0.1784 (0.0375)	-0.0265 (0.0235)	-0.0960 (0.0380)	0.0163 (0.0228)	-0.0544 (0.0315)	0.0242 (0.0200)	-0.1765 (0.0347)	-0.0311 (0.0217)
4 th quarter	-0.1913 (0.0375)	-0.0452 (0.0235)	-0.1582 (0.0380)	0.0004 (0.0227)	-0.1683 (0.0316)	-0.0341 (0.0200)	-0.1724 (0.0347)	-0.0164 (0.0217)
Sigma	1.6466 (0.0102)	-	1.9524 (0.0104)	-	1.6461 (0.0086)	-	1.8052 (0.0094)	-
Intercept	-1.5696 (0.0792)	0.0235 (0.0489)	-1.6378 (0.0860)	-0.0072 (0.0509)	-1.1567 (0.0724)	0.0065 (0.0453)	-1.2719 (0.0786)	-0.0068 (0.0487)

Note: Standard errors are in parenthesis.