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Research Article

ANALYSIS OF U.S. HOUSEHOLD FINAL CONSUMPTION EXPENDITURE USING LA/AIDS APPROACH

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ABSTRACT

The main objective of this article is to analyze the U.S. household final consumption expenditure using a Linear Approximate Almost Ideal Demand System (LA/AIDS) model for the period of 1989 through 2015. The six major groups of goods and services are (1) food and alcoholic beverage, (2) housing, (3) apparel and service, (4) transportation, (5) health care, (6) and other goods and services. The LA/AIDS model has been used through homogeneity and symmetry restrictions by using the seemingly unrelated regressions (SUR) method. The results show that price parameters are homogeneous of degree zero, and confirm the symmetry hypothesis for the nominal price parameters of goods and services with exception of the cross-price parameters between food and beverage expenditure and health care expenditure. The uncompensated own-price elasticities with negative signs in all groups are statistical significant with exception of uncompensated own-price elasticity demand for apparel and service. The estimated expenditure elasticities showed that medical care (not significant) and food and beverages can be considered as necessary goods whilst apparel and services, transportation, and other goods and services are close to being considered as luxury goods and services. Of the major six groups covered in this study, housing has a unit expenditure elasticity. Furthermore, the compensated own-price elasticities of all groups are relatively inelastic, and statistically significant with exception of compensated own-price elasticities for food and beverages and apparel and services.

INTRODUCTION

The *consumer behavior studies have occupied a major place in government policy. They are interested to know, which goods and services have a major place in household budget? What goods and services are* reasonably *necessary or luxury? According to microeconomic theory, demand changes* because of *changes* in price, *other* factors determining it being held constant, and the question is how the government changes the economy through changes in price as a policy tool. In fact, government and policy makers can choose the best economic policy such as *rationing of goods, subsidize or exemption with answering to these questions. In analyzing the consumer behavior, the Almost Ideal Demand System (AIDS) model of Deaton and Mullebauer (1980a) is one of the most widely used flexible demand specification. Despite many empirical literatures on this topic, few studies have considered the simultaneous impact of total household consumption expenditures, own- and cross-price on household demand. Moreover, Weisskoff (1971) and Sener (1977) incorporated price and family size in any study of consumption expenditure in developing countries.*

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The limited literature on estimation of demand systems from budget data includes Tsujimura and Sato (1964) on Japan, Bhattacharya (1967), Joseph (1968) on India, Muellbauer (1977) and Pollak and Wales (1978) on British data. This article differs from the above in investigating the impact on budget share, rather than quantities. *The aim of this article is to analyze the U.S. household final consumption expenditure using a linear approximate almost ideal demand system (LA/AIDS) model for the period of 1989 through 2015.* In two next section of this article, I briefly review the related literature, and discuss the LA/AIDS model, respectively. Then I describe database for estimating LA/AIDS model for the *six major groups of goods and services including food and alcoholic beverage, housing, apparel and service, transportation, healthcare, and other goods and services, and test symmetry and homogeneity hypothesis by using the seemingly unrelated regressions (SUR)* method. The results are analyzed and *then add a short separate conclusion section at the end.*

REVIEW OF RELATED LITERATURE

The AIDS model gives an arbitrary first-order approximation to any demand system and has many desirable qualities of demand systems. For instance, it satisfies the axioms of order,

aggregates over consumers without invoking parallel linear Engel curves, is consistent with budget constraints, and is simple to estimate. The AIDS model introduced primarily by Deaton and Muellbauer (1980b) to analyze consumer behavior. They used annual data of UK for the period of 1954-1974 for eight nondurable groups of consumers' expenditures, including, food, clothing, housing services, fuel, drink and tobacco, transport and communication, other goods, and other services. In the first step, the AIDS model was estimated using Stone's index for each good separately by ordinary least squares (OLS) and without any constraints on the parameters. The results showed that food and housing are necessities while the other goods are luxuries. Many coefficients were significantly different from zero; twenty-two out of sixty-four parameters have t-value larger than 2. The results of total expenditure and own-price elasticity showed that only food has a positive price elasticity. In the second step, the system is re-estimated, equation by equation, and again using Stone's index, to test the homogeneity condition. The results showed that for four commodity groups where homogeneity hypothesis is rejected. In fact, the model has serial correlation through the imposition of homogeneity. The explanation of such things may require other variables such as stocks, lagged dependent variables, or time trends which can perhaps be proxies by the absolute price level. In the third step, they estimated the AIDS model using likelihoods method to test symmetric and homogeneity hypothesis. The results showed that symmetric hypothesis is rejected in the AIDS model. The fact that homogeneity hypothesis cannot be rejected at the 5 percent level, and it reflects the importance of the time trends in the housing, clothing, transport and communication equations (Deaton and Muellbauer, 1980b).

In another study, Balancifori and Green (1983) considered the effects of variables other than price and expenditures that would enable them to determine the model of other states by linking it to theories consumption habits provided by Pollack and Walles (1969). Using dynamic-linear an AIDS model, they made an estimation of 11 aggregated product groups. The expenditure and price elasticity were obtained as respectively 0.37 and -0.32 for solely food-relevant values. Blanciforti, Green and King (1986), examined the post-war consumer behavior of the U.S. with the AIDS model. Food expenditure elasticity was found as 2.06 with no autocorrelation and as 1.11 with autocorrelation.

Winters (1984) applies the AIDS model to explain import allocation of the United Kingdom, in the period of 1952 through 1979. As usual, the theoretical homogeneity and symmetry restrictions from demand theory are rejected. One of the reasons that Winters advances to explain this phenomenon is dynamic misspecification. Another reason advanced in literature on demand models (Laitinen, 1978; Meisner, 1979) is that asymptotic tests of homogeneity and symmetry are biased towards rejection of the null hypothesis when the number of budget categories is large as compared with the number of observations, so that the number of degrees of freedom, i.e., the number of observations minus the total number of parameters to be estimated, is relatively small.

Green and Alston (1990) estimated elasticity using Stone index in AIDS model. Huang and David (1993) investigated the effect of urbanization on demand for rice, and wheat in nine Asian countries. Wellman (1992) estimated U.S. fish demand through the development of a variation of the AIDS model for disaggregate fish products at the retail level. Price and expenditure elasticities, as well as elasticities of substitution between fish products and other protein commodities, determined from this work may be used in the context of fisheries management and market development and promotion. Results indicate that apart from shellfish, demand for the various fish products is relatively inelastic. Cross-price elasticities are generally moderate while expenditure elasticities are large and positive for fresh fish and shellfish. Demographic effects, especially geographical division, season, race, occupation, age-sex household composition, and price-income interaction, as a proxy for quality, are highly significant variables.

Fan *et al.* (1995) estimated a complete demand system of Chinese rural households using a two-stage LES[1]-AIDS model and pooled provincial and time series data from 1982 to 1990. They found that demand for food, clothing, fuel, housing, and other commodities are price-inelastic. Housing and other commodities are luxury goods, while clothing and food are necessities. Also within the food group, price elasticity ranges from -0.005 to -0.63. The results showed that expenditure elasticities are lower for grains and higher for meat, tobacco, and alcohol.

Paraguas *et al.* (2006) used Rotterdam and first difference LA/AIDS models to estimate the elasticities for beef, pork, poultry, and mutton in Malaysian market demand for meats. Both models were accepted, but further diagnostic tests revealed that the first difference LA/AIDS are more appropriate than the Rotterdam model. Also, the elasticities from the first difference LA/AIDS model were found to be more reliable than the Rotterdam model.

ÖZÇELİK (2009) used data of the household income and consumption expenditure surveys conducted by the Turkish Statistical Institute for 2003, and estimated price elasticity under twelve product groups within the framework of the AIDS approach in Turkey. The price elasticity was obtained and the product groups included: food and non-alcoholic beverages; alcoholic beverages, cigarette and tobacco; clothing and footwear; housing and rent; furniture, houses appliances and home care services; health; transportation; communication; entertainment and culture; educational services; restaurant and hotels; and other goods and services. Price elasticities were found in line with the parameters estimated from the AIDS model. Findings for the price elasticities of AIDS model are consistent with economic theory. While communication has the lowest price demand elasticity, housing and rent has the highest price demand elasticity. Therefore, consumers are more sensitive in housing and rent rather than communication. With the help of the studies relevant to the analysis of consumption expenditures, producers will gain knowledge about the structure of consumer demand, while consumers will gain knowledge about learning and determining consumption patterns.

The Theoretical Specification of the LA/AIDS Model

The AIDS model is derived from the PIGLOG class of cost function, which defines the minimum expenditure necessary to attain a specific utility level at given prices. The general

[1]. Linear Expenditure System (LES).

form of PIGLOG function is defined as below. The AIDS model is based on a first specification of a cost/expenditure function c (u, p):

(1) $\ln c(u,P) = (1-u)\ln\{a(P)\} + u\ln\{b(P)\}$

where u stands for utility level and P is a vector of price. In that function, $a(P)$ and $b(P)$ are linear homogenous concave function and define by Deaton and Muehlhauser (1980a) as follows

(2) $lna(P) = \alpha_0 + \sum_{k=1}^{n}\alpha_k lnp_k + \frac{1}{2}\sum_{j=1}^{n}\sum_{k=1}^{n}\gamma_{jk}\, lnp_j lnp_k$

(3) $lnb(P) = lna(P) + \beta_0\pi_k P_k^{\beta_k}$

if $0 \le u < 1$, $a(P)$ equals to the expenditure needed to achieve the level of utility at $u = 0$ and $b(P)$ equals to the expenditure to achieve the level of utility possible at $u = 1$. I rewrite equation (1) as below

(4) $\ln c(u,P) = \alpha_0 + \sum_{k=1}^{n}\alpha_k lnp_k + \frac{1}{2}\sum_{j=1}^{n}\sum_{k=1}^{n}\gamma_{jk}\, lnp_j lnp_k + u\beta_0\pi_k P_k^{\beta_k}$

where $\alpha_k, \beta_k, \gamma_{jk}$ are parameters. Demand function are derived based on equation (4). According to Shephard's lemma, derivatives of the expenditure function with respect to prices are the Hicksian demand functions or compensated demand. Then I can calculate the elasticity of expenditure function with respect to prices and budget share equations as

(5) $\frac{\partial lnc(u,P)}{\partial lnP_i} = w_i = \alpha_i + \sum_{j=1}^{n}\gamma_{ij} lnp_j + \beta_i u\beta_0\pi_k P_k^{\beta_k}$

So that $\gamma_{ij} = \frac{1}{2}(\gamma_{ij} + \gamma_{ji})$. I calculate utility in terms of price and total expenditure using equation (4) and substitute them in equation (5). As a result, the AIDS budget share equations for estimation are given by Deaton and Muellbauer (1980a) as

(6) $w_{it} = \alpha_i + \sum_{j=1}^{n}\gamma_{ij}\, lnp_{jt} + \beta_i \ln\left(\frac{x_t}{P_t}\right) + u_{it}$

where, in time *t*, w_{it} is the budget share of good i, α_i is the constant coefficient in the i^{th} share equation, γ_{ij} is the slope coefficient associated with the j^{th} good in the i^{th} share equation, p_{jt} is the price of commodity j, x_t is total expenditure on the system of goods, u_{it} is a random disturbance, and P_t is a price index defined by

(7) $lnP_t = \alpha_0 + \sum_{k=1}^{n}\alpha_k lnp_{kt} + \frac{1}{2}\sum_{j=1}^{n}\sum_{k=1}^{n}\gamma_{jk}\, lnp_{jt} lnp_{kt}$

One advantage of the AIDS model is that the homogeneity and symmetry restrictions are easily imposed and tested. Then adding up, homogeneity, and symmetry conditions are $\sum_i \alpha_i = 1$, $\sum_i \gamma_{ij} = 0$, $\sum_i \beta_i = 0$, and $\gamma_{ij} = \gamma_{ji}$. Using the price index in equation (7) may make the estimation of the AIDS difficult. Then, Stone's price index P^* is often used instead of P where

(8) $lnP_t^* = \sum_{k=1}^{n} w_{kt} lnp_{kt}$

The resulting linear approximate almost ideal demand system (LA/AIDS) is not an integrable demand system in general. The relation between two price indexes may be represents as

(9) $lnP_t = lnP_t^* + \xi_t$

where ξ_t is a random variable with $E(\xi_t) = \xi_0$. Using P_t^* instead of unobservable P_t causes some errors in variables problem and the estimates of the AIDS parameters (γ_{ij} and β_i) obtained by seemingly unrelated regression (SUR) or OLS method will be inconsistent. This can be seen in the LA/AIDS estimating equation.

(10) $w_{it} = \alpha_i^* + \sum_{j=1}^{n}\gamma_{ij}\, lnp_{jt} + \beta_i \ln\left(\frac{x_t}{P_t^*}\right) + u_{it}^*$

with $u_{it}^* = u_{it} - \beta_i(\xi_t - \xi_0)$ and $\alpha_i^* = \alpha_i - \beta_i\xi_0$ and COV $(u_{it}^*, lnP_t^*) \neq 0$. Equations (6) through (9) can be solved to express ξ_t as a function of parameters, prices, total expenditure, and the disturbances in the AIDS model:

(11) $\xi_t = \alpha_0(1 + \sum_{k=1}^{n}\beta_k lnp_{kt}) + \sum_{k=1}^{n}\beta_k lnp_{kt}\,(\sum_{k=1}^{n}\alpha_k lnp_{kt} - lnx_t)$
$-\frac{1}{2}\sum_{j=1}^{n}\sum_{k=1}^{n}\gamma_{jk}\, lnp_{jt} lnp_{kt} \times \left(1 - \sum_{k=1}^{n}\beta_k lnp_{kt}\right) - \sum_{k=1}^{n} u_{kt} lnp_{kt}$

It is clear that ξ_t can never be a constant since the disturbances from all the equations influence it; even the expected value of ξ_t need not be constant, because it depends on the values taken by prices.

Data

In this research article, I estimate LA/AIDS model using US household final consumption expenditure annual data. The data consists of household's food and alcoholic beverage expenditure (FE), household's housing expenditure (HE), household's apparel and service expenditure (AE), household's transportation expenditure (TE), household's health care expenditure (CE), household's other goods and services (OE), and total household's final consumption expenditure in U.S. economy (TE). I calculate the share of these six major groups of goods and services in total household's final consumption expenditure. Also, the data consists of U.S. consumer price index (1982-84=100) by food and beverages (FP), housing (HP), apparel (AP), transportation (TP), health care (CP), and other goods and services (OP) for U.S. urban consumers. The data period covers from 1989 to 2015. The survey data are collected from the U.S. Bureau of Labor Statistics website. More detailed description of the data can be found in Table 1.

Table 1 Data Description

Data	Description
FE	Household's Food and Alcoholic Beverage Expenditure
HE	Household's Housing Expenditure
AE	Household's Apparel and Service Expenditure
TE	Household's Transportation Expenditure
CE	Household's Health Care Expenditure
OE	Household's Other Goods and Services Expenditure
FP	Consumer Price Index: Food and Beverages (1982-84=100)
HP	Consumer Price Index: Housing (1982-84=100)
AP	Consumer Price Index: Apparel and Service (1982-84=100)
TP	Consumer Price Index: Transportation (1982-84=100)
CP	Consumer Price Index: Health Care (1982-84=100)
OP	Consumer Price Index: Other Goods and Services (1982-84=100)
SF	Share of Household's Food and Alcoholic Beverage Expenditure
SH	Share of Household's Housing Expenditure
SA	Share of Household's Apparel and Service Expenditure
ST	Share of Household's Transportation Expenditure
SC	Share of Household's Health Care Expenditure
SO	Share of Household's Other Goods and Services Expenditure
TE	Total Household Final Consumption Expenditure
Ag	Age of Reference Person

Table 2 presents the descriptive statistics of all variables. The share of household's food and alcoholic expenditure (SF), share of household's housing expenditure (SH), share of household's apparel and service expenditure (SA), share of household's transportation expenditure (ST), share of household's health care expenditure (SC), and share of other household's goods and services expenditure (SO) in total household final consumption expenditure has been, on

average, 14.33%, 32.72%, 4.41%, 17.95%, 5.93%, 24.65%, respectively.

Table 2 Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Minimum	Maximum
FP	27	182.261571	37.409911	124.891666	246.804333
HP	27	181.106719	35.725497	123.008333	238.060333
AP	27	125.888509	5.414118	118.583333	133.658333
TP	27	163.440126	32.213783	114.100000	217.411583
CP	27	300.406768	95.035698	149.070833	461.461666
OP	27	285.765207	84.251453	147.675000	414.897500
SF	27	0.1433543	0.007683	0.1327244	0.1613731
SH	27	0.3272167	0.009783	0.3095685	0.3443185
SA	27	0.0441208	0.008780	0.0313795	0.0584975
ST	27	0.1795186	0.010119	0.1560749	0.1950982
SC	27	0.0592515	0.007799	0.0505899	0.0802275
SO	27	0.2465381	0.009189	0.2329237	0.2620038
TE	27	4690604.93	1405196.69	2664680.0	7186766.0

Empirical Results

Properties of the Demand Function

The properties of a demand function, which can be used to restrict an empirical demand system, include: aggregation, the cross-price derivatives are symmetric, homogeneous of degree zero in prices and total expenditure, and their compensated price responses form a negative semi definite matrix. To adhere to the adding-up property of demand functions, one of the six share equations were dropped for estimation purposes and the restriction was imposed in the system.

The LA/AIDS model has been employed through homogeneity and symmetry restrictions by using SUR method. For estimated model, *expenditure elasticities, as well as uncompensated and compensated own- and cross-price elasticities* are calculated. The nonlinear iterated seemingly unrelated regressions (ITSUR) parameters estimates and corresponding p-value for the LA/AIDS demand are reported in Table 3. As shown in Table 3, each share equations have nine individual parameters including one parameter for intercept term, six nominal price parameters for six major groups of goods and services covered in this study, one parameter for total expenditure as a proxy for household income, and one parameter for age of reference person as a demographic variable in the model. As a result, 18 parameters (33.3%) out of 54 parameters are significant.

expressed have no effect on purchases (Deaton and Meulbauer, 1999). Practically the homogeneity restriction implies that if all prices and income are multiplied by a positive constant, θ, the quantity demanded must remain unchanged. The null hypothesis is therefore that the prices are homogeneous of degree zero, whereas the alternative hypothesis indicates non-homogeneous prices. In Table 4, g_{ij} *is* price parameters for good *j* in equation *i (i=1, 2, …, 6).* As shown in Table 4, p-value for testing homogeneity restrictions are greater than 5 percent. Therefore, price parameters are homogeneous of degree zero in LA/AIDS model, and confirms the previous studies (i.e., Deaton and Muellbauer, 1980b).

Additionally, the symmetry restriction, in turn, restricts cross-price derivatives of the demand functions to be identical. As shown in Table 4, p-value for testing symmetry restrictions are greater than 5 percent with exception of the cross-price parameters between two goods and services includes food and beverage expenditure and health care expenditure.

Elasticities

Uncompensated or Marshallian price elasticities contain both the income and price effects. The uncompensated own- and cross-price elasticities were calculated at their sample means, and shown in Table 5. The uncompensated own-price elasticities also carry a priori expected negative signs in all groups and are statistical significant with exception of uncompensated own-price elasticity demand for apparel and service. As shown in Table 5, uncompensated cross-price elasticities demand for most goods and services are not significant.

The calculated expenditure elasticities demand for six major groups of goods and services, which are positive and statistically significant at 5 percent level with exception of expenditure elasticity demand for U.S. household's healthcare expenditure, indicate that all six goods and service can be considered as normal to luxury goods, as expected a priori. Expenditure elasticities greater than one, indicating that they can be considered luxury goods and services. Although the expenditure elasticity demand for some goods and services is less than one, it is close enough to one, which

Table 3 Nonlinear ITSUR Parameter Estimates - LA/AIDS Model

Variables	Intercept Term	FP	HP	AP	TP	CP	OP	TE	AG
SF	0.47309	0.07789*	-0.00845	-0.00974	-0.00202	-0.05014*	-0.00755	-0.03136*	0.002022
	(0.1688)	(0.0183)	(0.8072)	(0.2100)	(0.8407)	(0.0019)	(0.5112)	(0.0383)	(0.9817)
SH	1.53752*	-0.00845	-0.02779	-0.01372	-0.03249	0.10955*	-0.02711	-0.00313	-0.31618*
	(0.0424)	(0.8072)	(0.6678)	(0.3703)	(0.2642)	(0.0003)	(0.2610)	(0.9262)	(0.0961)
SA	-0.00895	-0.00974	-0.01372	0.00352*	0.00050	-0.00292	-0.00929	0.00886	-0.00468
	(0.9711)	(0.2100)	(0.3703)	(0.0001)	(0.9485)	(0.7082)	(0.2282)	(0.4354)	(0.9283)
ST	1.89637*	-0.00202	-0.03249	0.00050	0.00443	-0.02136	0.05093*	0.01444	-0.48249*
	(0.0023)	(0.8407)	(0.2642)	(0.9485)	(0.8852)	(0.1199)	(0.0295)	(0.6937)	(0.0056)
SC	-2.24816*	-0.05014*	0.10955*	-0.00292	-0.02136	-0.03453*	-0.00060	-0.04649*	0.71814*
	(0.0001)	(0.0019)	(0.0003)	(0.7082)	(0.1199)	(0.0674)	(0.9652)	(0.0078)	(0.0001)
SO	-0.82030	-0.01562	-0.03057	-0.00441	0.05528*	-0.00605	0.00138	0.06303*	0.113633
	(0.1173)	(0.2332)	(0.2369)	(0.5827)	(0.0294)	(0.6778)	(0.9527)	(0.0723)	(0.4205)

*. Significant Parameters.

Table 4 presents the Wald test statistics for testing homogeneity and symmetry restrictions in the LA/AIDS household demand model for U.S. economy. The homogeneity restriction implies that the sum of the nominal price parameters in each share equation adds up to 0. The homogeneity restriction is also known as the "absence of money illusion" since the units in which prices and outlay are

is the cut-off point between luxury and necessary products. The relative low expenditure elasticities demand can be considered as necessity goods and services. In this study, as expenditure elasticity demand for medical care (not significant) and food and beverages are lower than one, respectively, they are considered as necessary goods and services.

Table 4 The Wald Test Statistics for Testing Homogeneity and Symmetry Restrictions

Restrictions	Wald Test	P-Value
g11+g12+g13+g14+g15+g16=0	-159.944	0.4832
g21+g22+g23+g24+g25+g26=0	-209.343	0.3372
g31+g32+g33+g34+g35+g36=0	-99.071	0.6712
g41+g42+g43+g44+g45+g46=0	-224.974	0.314
g51+g52+g53+g54+g55+g56=0	-114.879	0.6045
g61+g62+g63+g64+g65+g66=0	-194.79	0.3427
g12=g21	16.051	0.3376
g13=g31	27.125	0.6802
g14=g41	-29.287	0.1613
g15=g51	110.092	0.0018*
g23=g32	30.533	0.5655
g24=g42	-26.138	0.1775
g25=g52	46.351	0.0669
g34=g43	12.043	0.7676
g35=g53	120.467	0.0977
g45=g54	31.408	0.0887

**. Reject null hypothesis at 5 percent level.*

Furthermore, expenditure elasticity demand for U.S. household's housing is approximately equals to one. As the expenditure elasticity demand for other goods and services is greater than one, they can be considered as luxury goods and services (See Table 5).

using SUR method. The results showed that price parameters are homogeneous of degree zero in LA/AIDS model. Additionally, the results accept the symmetry restrictions for goods and services with exception of the cross-price parameters between two goods and services includes food and beverage expenditure and health care expenditure.

The uncompensated own-price elasticities also carry a priori expected negative signs in all groups and are statistical significant with exception of uncompensated own-price elasticity demand for apparel and service. Similar, in a sense, to previous estimates, the calculated expenditure elasticities showed that medical care (not significant) and food and beverages can be considered as necessary goods whilst apparel and services, transportation, and other goods and services are close to being considered as luxury goods and services. Of the major six groups covered in this study, housing has a unit expenditure elasticity. In terms of the compensated own-price elasticities, all groups are relatively inelastic, carry negative signs as expected a priori, and are statistically significant with exception of compensated own-price elasticities for food and beverages and apparel and services.

Table 5 Uncompensated (Marshallian) and Expenditure Elasticities - LA/AIDS Model

Variables	SF		SH		SA		ST		SC		SO	
	elasticity	Pr > |t|	elasticity	Pr > |t|	elasticity	Pr > |t|	elasticity	Pr > |t|	elasticity	Pr > |t|	elasticity	Pr > |t|
FP	**-0.32023**	0.0988*	0.02312	0.9244	-0.08794	0.1604	-0.02317	0.8604	-0.18108	0.1533	-0.20991	0.1886
HP	-0.01986	0.8462	**-1.08134**	0.0001*	-0.04281	0.4270	-0.09968	0.2733	0.34215	0.0054*	-0.08971	0.4210
AP	-0.34586	0.1296	-0.38630	0.4144	**-0.18479**	0.3507	0.01974	0.9285	-0.22097	0.4883	-0.06616	0.8430
TP	-0.06138	0.6394	-0.21112	0.3113	0.01016	0.8376	**-0.97200**	0.0001*	-0.18098	0.2983	0.34150	0.0230*
CP	-0.35698	0.2459	2.14316	0.0016*	-0.12106	0.5827	-0.39304	0.4294	**-0.97766**	0.0810*	-0.57413	0.3161
OP	-0.19006	0.1037	-0.20584	0.2766	-0.01426	0.8286	0.21721	0.1227	-0.19962	0.1991	**-0.81067**	0.0016*
TE	0.78128	0.0001*	0.99045	0.0001*	1.20078	0.0001*	1.08041	0.0001*	0.21539	0.4285	1.25565	0.0001*

**. Significant Elasticities.*

Table 6 Compensated (Hicksian) Elasticities - LA/AIDS Model

Variables	SF		SH		SA		ST		SC		SO	
	elasticity	Pr > |t|	elasticity	Pr > |t|	elasticity	Pr > |t|	elasticity	Pr > |t|	elasticity	Pr > |t|	elasticity	Pr > |t|
EP	**-0.20823**	0.2743	0.27877	0.2293	-0.05347	0.4059	0.11709	0.3780	-0.13479	0.2696	0.09966	0.4673
HP	0.122128	0.2293	**-0.75725**	0.0011*	0.00089	0.9875	0.07813	0.4190	0.40084	0.0011*	0.15448	0.2454
AP	-0.17372	0.4059	0.00662	0.9875	**-0.13181**	0.5239	0.23530	0.2901	-0.14982	0.6250	0.22988	0.5532
TP	0.09350	0.3780	0.14241	0.4190	0.05783	0.2901	**-0.77805**	0.0017*	-0.11696	0.4705	0.60787	0.0018*
CP	-0.32610	0.2696	2.21364	0.0011*	-0.11156	0.6250	-0.35437	0.4705	**-0.96489**	0.0778*	-0.52102	0.3943
OP	-0.01006	0.9198	0.20503	0.2454	0.04114	0.5532	0.44262	0.0018*	-0.12522	0.3943	**-0.50110**	0.0604*

**. Significant Elasticities*.

On the other hand, compensated or Hicksian elasticities are reduced to contain only price effects, and are therefore compensated for the effect of a change in the relative income on demand. By using the parameters estimates in Table 3, the compensated own- and cross-price elasticities, as well as the corresponding p-value, were calculated at their sample means. As shown in Table 6, compensated own-price elasticities of all goods and services is relatively inelastic, carry negative signs as expected a priori, and are statistically significant with exception of compensated own-price elasticities for food and beverages and apparel and services. Also, compensated cross-price elasticities are not significant for most goods and services.

CONCLUSIONS

In this article, a system-wide demand approach was used to estimate the demand relations for U.S. household final consumption expenditure. *The LA/AIDS model has been estimated through homogeneity and symmetry restrictions by*

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