FS-00-06 July 2000

FOOD DEMAND ELASTICITIES OF THE U.S. HISPANIC COMMUNITY

Bruno A. Lanfranco, Glenn W.C. Ames, and Chung L. Huang

FS 00-06 July, 2000

FOOD DEMAND ELASTICITIES OF THE U.S. HISPANIC COMMUNITY

Bruno A. Lanfranco, Glenn W.C. Ames, and Chung L. Huang(*)

Paper presented at

IAAE XXIV Conference

Berlin 2000

August 13-18, 2000

(*) Graduate Research Assistant, Professors respectively, Department of Agricultural and Applied Economics, The University of Georgia. 315 Conner Hall. Athens, GA. 30602-7509; Ph:(706)542-0757; Fax:(706)542-0739; email: games@agecon.uga.edu

Dept. of Agricultural & Applied Economics
College of Agricultural & Environmental Sciences
University of Georgia

FOOD DEMAND ELASTICITIES OF THE U.S. HISPANIC COMMUNITY

Bruno A. Lanfranco, Glenn W.C. Ames, and Chung L. Huang

Department of Agricultural and Applied Economics

University of Georgia

Athens, GA 30602-7509

games@agecon.uga.edu

ABSTRACT

Hispanics are the fastest growing ethnic community in the United States. By 2010, Hispanics will comprise 15.5% of the U.S. population. Moreover, Hispanic's buying power, estimated at $350 billion, grew at a compound annual rate of 7.5% between 1990-97. The primary reasons why the Hispanic market is the leading growth sector for food in the U.S. are income growth, and high birth and immigration rates.

Income and household size elasticities for nine main food groups - grains, vegetables, fruits, milk, meat, legumes, fats, sugars, and beverages - were estimated from Engel curves for Hispanic households in the U.S. Income demand elasticities were very inelastic with point elasticity estimates smaller than +0.5 in absolute value. Household size elasticities were relatively higher. As the size of the Hispanic household increased, the demand for meats - beef, pork and chicken - increased substantially, ceteris paribus.

The educational level of the household heads appeared to be one of the most important variables explaining the demand for food among Hispanic consumers, particularly for grains, fruits, and legumes. Other socioeconomic characteristics such as home-tenure status, age, and national origin, were also significant in explaining the demand for food.

Consistent with program goals, government income subsidies (Food Stamps or Women, Infants, and Children (WIC) Certificates) received by low-income Hispanic households increased the demand for specific food groups, such as milk and fruits. Food processors and retailers now perceive the emergent Hispanic communities as a primary sector of the U.S. food economy.

Keys: Food demand, Hispanic households, elasticities.

FOOD DEMAND ELASTICITIES OF THE U.S. HISPANIC COMMUNITY

Bruno A. Lanfranco, Glenn C. W. Ames, and Chung L. Huang (*)

ABSTRACT

Hispanics are the fastest growing ethnic community in the United States. By 2010, Hispanics will comprise 15.5% of the U.S. population. Moreover, Hispanic's buying power, estimated at $350 billion, grew at a compound annual rate of 7.5% between 1990-97. The primary reasons why the Hispanic market is the leading growth sector for food in the U.S. are income growth, and high birth and immigration rates.

Income and household size elasticities for nine main food groups - grains, vegetables, fruits, milk, meat, legumes, fats, sugars, and beverages - were estimated from Engel curves for Hispanic households in the U.S. Income demand elasticities were very inelastic with point elasticity estimates smaller than +0.5 in absolute value. Household size elasticities were relatively higher. As the size of the Hispanic household increased, the demand for meats - beef, pork and chicken - increased substantially, *ceteris paribus*.

The educational level of the household heads appeared to be one of the most important variables explaining the demand for food among Hispanic consumers, particularly for grains, fruits, and legumes. Other socioeconomic characteristics such as home-tenure status, age, and national origin, were also significant in explaining the demand for food.

Consistent with program goals, government income subsidies (Food Stamps or Women, Infants, and Children (WIC) Certificates) received by low-income Hispanic households increased the demand for specific food groups, such as milk and fruits. Food processors and retailers now perceive the emergent Hispanic communities as a primary sector of the U.S. food economy.

FOOD DEMAND ELASTICITIES OF THE U.S. HISPANIC COMMUNITY

Introduction

Hispanics are the fastest growing ethnic community in the United States. Mexicans represent about 60% of the Latin American emigration to the United States, although immigrants from Central/South America grew from 1.7 million in 1980 to 3.8 million in 1994 (Chambers, 1998). By 2010, the Hispanic or Latino population is expected to comprise 15.5% of the U.S. population, and by 2020, more than one in five children will be of Hispanic origin, according to U.S. Census Bureau population projections. Latinos buying power grew at a compound annual rate of 7.5% between 1990-97. Today, the Hispanics purchasing power is estimated be $350 billion nationwide. Income growth combined with high birth and immigration rates are the primary reasons why the Hispanic market is considered to be the leading growth market for food in the United States (Fan and Zuiker, 1998).

Objectives

The primary objective of this paper was to analyze the demand for food among the Hispanic population in the U.S. for nine main food groups: grains, vegetables, fruits, milk, meat, legumes, fats, sugar, and beverages and three meat subgroups, beef, pork and chicken. A secondary objective was to determine the extent to which demographic and socioeconomic characteristics of the Hispanic population influences household's food demand, differences in national origin among groups in the Hispanic community were hypothesized to influence food demand patterns. Engel curves were estimated for the nine food groups using different functional forms. The corresponding income and household size elasticities were computed and presented with their respective confidence intervals.

Construction of the Variables in the Data Set

Three cross-sectional data sets were constructed with information from Hispanic households participating in each of the three years of the USDA's 1994-96 Continuing Survey of Food Intakes by Individuals (CSFII94-96). Only households of Hispanic origin that participated in the 1994-96 two-day survey and provided information about food consumption were selected for analysis. The total sample consisted of 643 households. Demand for food was measured as the quantity consumed, in grams per week, for each of the food groups and three subgroups. Household income was constructed from reported annual, before-tax household income for the previous calendar year. It was transformed into weekly income (INCWEEK) by dividing the annual amount by 52.

As a measure of household size, the use of equivalent scales has been widely explored in the academic literature. Different approaches to measuring household size use different weights or scales, and there has been no consensus in how they should be calculated (Deaton 1997). In this study, the so-called Amsterdam scale, based on nutritional studies (Stone, 1954) as a variable that acts as a proxy for household size (AMSCALE). The main reason for this choice was its simplicity. This scale represents household members in relation the reference unit, an adult male, 18 years old and over. Each adult female is represented by 0.90 equivalent adult males; males and females from 14-17 years are 0.98 and 0.90 equivalent adult males, respectively, and individuals under 14 years old from both sexes are valued as 0.52 equivalent adult males, in terms of the Amsterdam Scale (Deaton and Muellbauer, 1980). Although it could be argued that different scales should be used for different food groups, the same is true for using the number of household members as the measure for household size.

Information about national origin allowed the classification of the households into four categories: Mexican (O_MEX), which includes persons classified as Mexican-American or Chicano; Puerto Rican (O_PRICAN); Cuban (O_CUBAN), and persons of Other Spanish/Hispanic origin. Dummy variables representing national origins were used to take into account possible differences among these groups in expenditure patterns. The dummy for Other Spanish/Hispanic consumers was dropped to avoid collinearity problems in presence of a constant term. Since the Hispanic population is not evenly distributed in the U.S., region is represented by three dummy variables: Northeast (R_NEAST), South (R_SOUTH) and Midwest (R_MWEST). The value by default is the West region.

Other variables were hypothesized to influence food demand. The tenure status of the household dwelling was considered through a simple binary variable (T_OWNER), accounting for dwelling owners. Four binary variables account for differences in education of the household head: G_ELEM accounts for individuals who completed or attended one or more years of elementary school; G_HIGH variable correspond to individuals with one or more year of high school, have a high school degree or a General Education Degree (GED); households whose household head declared having one to four years of College are identified by variable G_COLL, and those with five or more years of college correspond to G_GRAD. The value by default corresponds to persons who never attended school. Another set of dummy variables allows for shifts in food demand due to urbanization status. Two variables account for households located in Metropolitan Statistical Area, that is Central City location (U_MSAINC), and Outside Central City (U_MSAOUT). The default identifies households located outside the Metropolitan Statistical Area or non-MSA. Binary variables for two income transfer payments for low-income households were also considered in this study; these included the Women, Infants and Children or WIC Program and the Food Stamp Program (FS_RCV12).

Characterization of the Sample of Hispanic Population Dataset

The CSFII94-96 survey includes information about 8067 U.S. households nationwide, surveyed between 1994 and 1996. A total of 643 out of 727 households who identified themselves as of Hispanic origin in the 1994-96 survey, were included in the data set. Households of Mexican origin, the vast majority of the Latin population in the United States, accounted for 43.9% of the sample; Puerto Ricans averaged 11.0%, Cubans 2.6%, and households of other Hispanic origin accounted by the remaining 42.5%. These categories include not only recent immigrants but also households of Hispanic origin with more than one generation in the U.S.

Fifty-one percent of the households sampled were located in the Western region of the U.S. The Southern region accounted for 26.0%. Traditionally, Latino immigrants settled down in the West, with the South being the second most important region (Schmid, April 10, 1998). Fan and Zuiker (1998) reported the same ranking order, but with the South following more closer to the leading Western region, which is again consistent with Schmid's observation (April 10, 1998) that the Southern states experienced a dramatic growth in the Latino population during the 1990-96 period. The Northwest region accounted for 15.1% of the households sampled followed by the Midwest region with only 7.6%. Households located in suburban areas (outside central city) represented more than 40% of the sample. Households living in central city averaged about 36% of the sample, while households living outside the metropolitan statistical area constituted the smallest urbanization status group with about 21%.

The average household consisted of four individuals, ranging normally from one to eight members. On the average, almost 52% of the households have no children 5 years of age or younger. The average household head was 41 years old, with 73% ranging from 25 to 55 years old; almost 62% of the households were headed by men.

Twenty-seven percent of the household heads reported that he or she received primary education; 41.1% attended at least one year of high-school; while 23.5% of the households responded that they attended at least one year of college; only 6.5% attended Graduate School. On the average, about 54% of the respondents claimed to be fully employed the week preceding the survey. The unemployment level for the sample household heads was very high, 30% to 36% depending on the year of the sample.

Annual income can be expressed as a percentage of the poverty threshold defined by the Federal Government. Approximately 48% of the selected households were categorized as having an annual income equal to 130% of the poverty threshold (approximately $16,036 in 1996 for a family of four). A total of 144 households (22%) received some food stamps (cash subsidies from the government, worth $73 per person) for at least one month in the previous calendar year. The average benefit per four-person household was $292 per month in 1996). For households with annual total income above $25,000, the percentage of households receiving food stamps was, on average, below 10%, although important variations were observed in particular years. Households with total income above $50,000 did not receive food stamps. The percentage of households receiving WIC benefits was never more than 20%.

Methodology and Statistical Procedures

We are limited to the estimation of Engel curves when all we have are cross-sectional data from household budget surveys, which do not contain observations in price variations (Sadoulet and De Janvry, 1995). Income elasticities obtained from the cross-sectional analysis can be used to express consumption patterns. Several functional forms with different theoretical and empirical strengths and weaknesses have been used to estimate Engel curves. Properties of these models have been widely discussed in the literature (Prais and Houtakker, 1955; Deaton and Muellbauer, 1980; Holcomb, Park and Capps, 1995; Sadoulet and De Janvry, 1995).

In this study, a semi-logarithmic model is selected for the estimation of Engel curves. The semi-logarithmic model has been accepted by researchers as one of the most adequate methodologies for studying demand for foods. This model is linear in the parameters and could be estimated by

Ordinary Least Squares (OLS). However, since most of the households reported "zero" consumption for at least one food category, a potential selectivity bias problem could arise, and estimation of this model by OLS gives inconsistent estimates of the parameters (Maddala, 1983, pp.257-267). To deal with this potential problem, we estimated the model using both the so-called two-step Heckman's procedure (HP) and a Sample Selection (SS) or Type II Tobit method, in addition to OLS. Further discussion about these methods and some other variations can be found in Heckman (1979), Amemiya (1983), Maddala (1983), Davidson and MacKinnon (1993), Holcomb, Park and Capps (1995). In all cases we tested for heteroscedasticity using a simple Lagrangian Multiplier test on squared fitted values and the general White test (Green, 1995, p. 549-555). Whenever necessary, the standard errors of the regression coefficients were heteroscedastic-consistently obtained using the White-Eickerd formula. The mathematical formulation of the semi-logarithmic equation is as follows:

$$Q_i = \beta_0 + \beta_1.LnINCWEEK + \beta_2.LnAMSCALE + \beta_3\ LnAGE + \beta_4\ S\_FEM + \beta_5.O\_MEX + \beta_6.O\_PRICAN + \beta_7.O\_CUBAN + \beta_8.R\_NEAST + \beta_9.R\_MWEST + \beta_{10}.R\_SOUTH + \beta_{11}.U\_MSAINC + \beta_{12}.U\_MSAOUT + \beta_{13}.G\_ELEM + \beta_{14}.G\_HIGH + \beta_{15}.G\_COLL + \beta_{16}.G\_GRAD + \beta_{17}.T\_OWNER + \beta_{18}.FS\_RCV12 + \beta_{19}.WIC.$$

Where Q_i is quantity consumed of the ith food group (grains; vegetables; fruits; milk; meat; legumes; fats; sugar; beverages) or subgroup (beef; pork; chicken). The prefix Ln stands for the natural logarithm of the variable.

Income and household size elasticities for the sample means were calculated from the estimated regression coefficients. For the semi-logarithmic model, income elasticities for the i^{th} food group were estimated as the ratio between the corresponding estimated coefficient for logarithm of income (β_1) and the sample mean of the demanded quantity (Q_i). Confidence intervals for both income and household size elasticities are presented at 90% significance level. We used the delta method (Green, 1997), which allows us to specify the limiting normal distribution for functions of random variables. Since the elasticities are expressed as ratios of normally distributed random variables, we can construct confidence intervals for these elasticities using linear Taylor Series approximations (see Dorfman, Kling and Sexton, 1990).

Results and Discussion

For the sake of brevity, the estimated regression coefficients utilized in the construction of the income and household elasticities are presented. In general, the estimated coefficients of household size showed better statistical significance than the coefficient estimates of income, for most of the food groups. However, as pointed out by Dorfman, Kling and Sexton (1990), "precision of estimation of regression coefficients neither implies nor guarantees similar precision of elasticity estimates."

The income elasticities of the nine main food groups and the three subgroups of meats are reported in Table 1. For each category, we present the elasticities computed from the three different estimation methods, with their corresponding confidence intervals at the 90% level, for each year of study. We can see that when the model was estimated using the HP, the computed elasticities were consistently higher in absolute value than with the other two methods, OLS and SS, which in general provided very similar estimates. Nevertheless, for some food groups, the estimated elasticity values are not precise, at least for some years, since the 90% confidence intervals show wide ranges. In these situations, it is difficult to make valid inferences about the consumers' behavior. In other cases, observed differences among years, not only in magnitude but also in sign, suggest that some year-specific factors, not accounted for in the models, were probably affecting the demand for food in this particular time. Only information about physical quantities consumed was available in this study.

As a general result, we can observe that demand for all nine major food groups was very inelastic in terms of income variation, with elasticity point estimates smaller than 0.5 in absolute value. We find some exceptions with fruits (0.58 in 1995), legumes, nuts and seeds (0.56 in 1994), fats (1.55

in 1995), sugar (0.88 in 1996), and beverages (0.66 in 1996). In all these cases, the model was estimated using the HP method. Only for the fats group we did find a value outside 0.5 in absolute value (0.65 in 1995), using the SS method. With respect to the observed ranges, for the grains category, the values of income elasticity in the confidence intervals were always less than unity, in absolute value. The income elasticities for fruits, milk, meat, legumes, fats, and sugar reached unity in the lower bound of the confidence intervals in the 1994 sample, when using the HP method. Beverages observed the same behavior with the HP method in 1995. Vegetables and fruits showed values greater than one in the upper bound for 1995 for HP method, while elasticities for fats and sugar were greater than one for the latter two years of the series, respectively.

With respect to the three subgroups of the meat category, we find that the demands for beef and pork computed from the regressions estimated with the HP method were always very elastic. In particular, pork shows extremely high magnitudes in 1995 and 1996. Nevertheless, the same models estimated by OLS and SS gave a totally different result, with point estimate values suggesting a relatively inelastic demand. Income elasticities for chicken were close to one in 1995 and 1996, and less than unity (0.44) in 1996, using with HP method.

When analyzing the estimated household size elasticities presented in Table 2, we observe similar patterns in the data as those found with the income elasticities. Again, estimates coming from the HP regressions were higher, in absolute value, than those obtained from OLS and SS, which in general provided more comparable values. From these results, we can conclude that household size component seemed to have a greater effect on demand for particular food groups than income. Household size elasticities were in general positive and greater than income elasticities, for all food groups, regression estimation methods, and years. Setting aside some minor exceptions, the point estimates of household size elasticity ranged from 0.45 to 0.75 for grains; 0.22 to 0.49 for vegetables;

0.38 to 1.54 for fruits; 0.52 to 1.59 for milk; 0.38 to 0.72 for meat; 0.72 to 2.18 for legumes, nuts, and seeds; -0.42 to 0.42 for fats; 0.42 to 1.59 for sugar; and 0.22 to 0.59 for beverages.

Analyzing the meat subcategories, we observe that while OLS regressions provided elasticity values lower than one, the household size elasticities estimated from HP regressions were higher. The SS model gave household size elasticities greater than one for pork in all three years, and for beef and chicken in both 1995 and 1996. Thus, as the relative size of the Hispanic household increased, the demand for meats increased more substantially, *ceteris paribus*.

From the different socio-economic characteristics considered in this study, the educational level of the household heads appeared to be one of the most important variables explaining demand for food of Hispanic consumers, particularly for some food groups, such as grains, fruits, and legumes, nuts and seeds. Other characteristics such as region, location, home-tenure status, age of the household head, and national origin, were also significant for some food groups in particular years.

Conclusions

There are some limitations in this study. The lack of information about expenditures on specific food groups prevents us making inferences about budget shares among the food groups. Thus, we limited our demand analysis to physical quantities consumed. On the average, the demand for particular food groups appears to be relatively inelastic with respect to income, and moderately to unitary elastic with respect to household size. These results are consistent with demand studies previously undertaken for the whole U.S. population, and suggest that Engel's Law holds for individual food categories with regard to Hispanic consumers in the U.S. However, the confidence intervals for the elasticities show that these are not precise estimates. In some extreme cases, the confidence intervals range from negative values (inferior goods) to positive values greater then one (luxury goods). One possible explanation for these results is that even the subgroups beef, pork, and chicken represent broad categories with different quality characteristics which are lost when estimated as aggregate commodities.

The education level of the household head should also be regarded as an important factor determining the demand for food, in addition to income and household size. Educational level influences the composition of the diet as households become more aware of healthy eating habits. Government subsidies received by households (Food Stamps or WIC programs) may also have some significant influence in the demand for specific food groups, such fats, sugar, and meats, especially pork. A recent study carried out by Wilde, McNamara and Ranney (1999) for the whole U.S. population suggested that household participation in Food Stamps and WIC programs affect the demand for meats, sugar, and total fats. Our study, although not conclusive, showed some evidence that support this claim for Hispanic consumers. In particular, pork consumption appears to be higher for households participating in either one of these programs. Total fats also seem to be affected in the same way, but we found the opposite effect for sugars.

References

Amemiya, T., 1985. Advanced Econometrics. Harvard University Press, Cambridge, MA.

Chambers, R., 1998, April 19. Wages are driving force behind latest emigration. The Atlanta Journal-Constitution, Special Report: 1998 Southern Economic Survey, p. P6.

Davidson, R., and MacKinnon, J., 1993. Estimation and Inference in Econometrics. Oxford University Press, New York.

Deaton, A., 1997. The Analysis of Household Surveys: A Microeconometric Approach to Development Policy. The Johns Hopkins University Press, Baltimore, MD.

Deaton, A., and Muellbauer, J., 1980. Economics and Consumer Behavior. Cambridge University Press, Cambridge.

Dorfman, J.H., Kling, C.L., and Sexton, R.J., 1990. Confidence intervals for elasticities and flexibilities: reevaluating the ratios of normals case. Am. J. Agric. Econ. 72(4):1006-17.

Fan, J.X., and Zuiker, V.S., 1998. A comparison of household budget allocation patterns between Hispanic Americans and non-Hispanic white Americans. J. Family and Econ. Issues 19(2):151-174.

Green, W.H., 1997. Econometric Analysis. Prentice Hall, 3rd edition. London.

Heckman, J.J., 1979. Sample selection bias as a specification error. Econometrica 47:153-162.

Holcomb, R.B., Park, J.L., and Capps, O., Jr., 1995. Revisiting Engel´s law: examining expenditure patterns for food at home and away from home. J. Food Distr. Res., Sept:1-8.

Maddala, G.S. ,1983. Limited Dependent and Qualitative Variables in Econometrics. Cambridge University Press, Cambridge, UK.

Prais, S.J., and Houthakker, H.S., 1955. The Analysis of Family Budgets. Cambridge University Press, Cambridge.

Sadoulet, E. and De Janvry, A., 1995. Quantitative Development Policy Analysis. The Johns Hopkins University Press, Baltimore, MD.

Schmid, R.E., 1998, April 10. New wave of immigrants flooding America´s shores. The Atlanta Journal-Constitution, Special Report: 1998 Southern Economic Survey, p. A14.

Stone, J.R.N., 1954. The Measurement of Consumer's Expenditure and Behavior in the United Kingdom, 1920-1938. Vol I, Cambridge University Press, Cambridge, UK.

U.S Department of Agriculture, 1998. CSFII/DHKS 1994-96. Continuing Survey of Food Intakes by Individuals and Diet and Health Knowledge Survey on CD-ROM. Food Surveys Research Group, Beltsville Human Nutrition Research Center, Agricultural Research Center. Washington, D.C.

Wilde, P.E., McNamara, P.E., and Ranney, C.K., 1999. The effect of income and food programs on dietary quality: a seemingly unrelated regression analysis with error components. Am. J. Agric. Econ., 81(4):959-971.

Table 1. Income Elasticity at the Mean for Hispanic Consumers (1994-96)

Year	*1994*			*1995*			*1996*		
Method	OLS	HP	SS	OLS	HP	SS	OLS	HP	SS
Grain	-.14232	-.05051	-.12917	-.04072	-	-	.17023	.18658	.15520
	(-.4155, .1309)	(-.2350, .1340)	(-.3748, .1165)	(-.1946, .1132)			(-.1682, .5086)	(-.1815, .5547)	(-.1417, .4521)
Vegetables	-.12656	-.32360	-.09552	.12699	.33124	.17523	.16311	.17098	.16029
	(-.3737, .1206)	(-.9396, .2924)	(-.3081, .1171)	(-.1598, .4137)	(-.9831, 1.646)	(-.1640, .5145)	(-.1531, .4794)	(-.2964, .6384)	(-.1758, .4964)
Fruits	-.12596	-.38224	-.09534	.02108	.57527	.12862	.00794	.00492	-.01327
	(-.4147, .1627)	(-1.151, .3861)	(-.3741, .1834)	(-.1435, .1857)	(-.6101, 1.761)	(-.1696, .4269)	(-.1446, .1605)	(-.1477, .1575)	(-.2086, .1821)
Milk	-.06368	-.35516	-.04881	-.17040	.24132	-.13421	-.11299	-.11990	-.12215
	(-.2329, .1055)	(-1.020, .3096)	(-.2284, .1308)	(-.4945, .1537)	(-.2902, .7729)	(-.4218, .1534)	(-.3503, .1244)	(-.3635, .1237)	(-.3654, .1211)
Meat	-.07000	-.15725	-.08013	.07621	.08011	.07054	.20585	.36180	.19391
	(-.2593, .1193)	(-1.051, .7369)	(-.3167, .1564)	(-.1335, .2859)	(-.1382, .2984)	(-.1180, .2590)	(-.1955, .6072)	(-.3102, 1.034)	(-.1968, .5846)
Beef	.03191	5.58559	-.10636	.26302	8.14336	.44043	.19569	1.46500	.12905
	(-.2680, .3318)	(-16.83, 28.01)	(-.6175, 1.740)	(-.6158, 1.142)	(-17.62, 33.91)	(-1.024, 1.905)	(-.3869, .7783)	(-2.621, 5.551)	(-.4976, .7557)
Pork	.34299	1.76734	.30370	-.39130	-58.9124	.34955	-.09830	-87.3222	-.43826
	(-1.035, 1.721)	(-11.67, 15.20)	(-1.132, 1.740)	(-2.283, 1.501)	(-347.3, 229.5)	(-1.608, 2.307)	(-.7950, .5984)	(-521.8, 347.2)	(-2.950, 2.074)
Chicken	-.11774	.96011	.17884	.14522	1.06917	.00859	.14522	.44149	-.04416
	(-.5090, .2735)	(-3.732, 5.652)	(-.5195, .8772)	(-.3360, .6264)	(-2.896, 5.034)	(-.3304, .3476)	(-.3360, .6264)	(-3.234, 4.117)	(-.5817, .4933)
Legumes	.08609	.56003	-.10229	-.10297	-.24949	-.10678	.07060	-.19216	.04083
	(-.2366, .4088)	(-1.124, 2.244)	(-.5118, .3072)	(-.4468, .2409)	(-1.177, .6777)	(-.5121, .2986)	(-.2177, .3589)	(-.9173, .5330)	(-.2588, .3405)
Fats	.22264	-.30732	.42103	.39108	1.54861	.64957	.21998	.27637	.16996
	(-.3512, .7965)	(-1.594, .9793)	(-.5917, 1.434)	(-.5172, 1.299)	(-2.577, 5.674)	(-.8152, 2.114)	(-.3209, .7608)	(-3.054, 3.607)	(-.3014, .6413)
Sugar	.12953	-.28331	.25990	-.13608	.37596	.00276	.24215	.88088	.12853
	(-.2643, .5234)	(-1.155, .5883)	(-.4415, .9613)	(-.6483, .3762)	(-1.454, 2.206)	(-.2943, .2999)	(-.6298, 1.114)	(-2.127, 3.889)	(-.4742, .7312)
Beverages	.06420	-.09499	.062048	.03473	-.40572	.08458	.22943	.65520	.16304
	(-.1340, .2624)	(-.4670, .2771)	(-.1256, .2497)	(-.1605, .2299)	(-1.608, .7966)	(-.1476, .3167)	(-.1625, .6214)	(-.4083, 1.719)	(-.1458, .4718)

References: OLS – Ordinary Least Squares; HP – 2-Step Heckman's Procedure; SS – Sample Selection or Type II Tobit Method

Table 2. Household Size Elasticity at the Mean for Hispanic Consumers (1994-96)

Year	*1994*			*1995*			*1996*		
Method	OLS	HP	SS	OLS	HP	SS	OLS	HP	SS
Grain	.45663	.46427	.44856	.66976	-	-	.74564	.73721	.75069
	(-.2403, 1.154)	(-.2433, 1.172)	(-.2412, 1.138)	(-.4752, 1.815)			(-.4638, 1.955)	(-.4594, 1.934)	(-.4621, 1.964)
Vegetables	.28220	-.01906	.29638	.27142	.22146	.32410	.46480	.48778	.49288
	(-.1933, .7577)	(-.4379, .4760)	(-.2182, .8109)	(-.2324, .7753)	(-.5988, 1.042)	(-.2712, .9194)	(-.3905, 1.320)	(-.4196, 1.395)	(-.4121, 1.398)
Fruits	.38254	-.49166	.55926	.40424	1.53957	.49125	.53341	.56754	.57104
	(-.3958, 1.161)	(-1.613, .6295)	(-.5623, 1.681)	(-.3466, 1.155)	(-1.394, 4.473)	(-.4165, 1.399)	(-.4583, 1.525)	(-.7855, 1.921)	(-.5008, 1.643)
Milk	.52139	.73385	.54983	.76715	1.59539	.77431	.84607	-1.13681	.88625
	(-.3070, .3498)	(-.4328, 1.901)	(-.3291, 1.429)	(-.5853, 2.120)	(-1.234, 4.424)	(-.5746, 2.123)	(-.4606, 2.153)	(-.6486, 2.922)	(-.4825, 2.255)
Meat	.49915	.37620	.52351	.44947	.46115	.46149	.70576	.39285	.72360
	(-.4212, 1.420)	(-1.419, 2.172)	(-.4356, 1.483)	(-.2746, 1.174)	(-.2890, 1.211)	(-.2812, 1.204)	(-.5627, 1.974)	(-.4321, 1.218)	(-.5798, 2.027)
Beef	.21274	-4.95684	.20561	.47657	21.19178	1.41486	.79249	-4.98064	1.44802
	(-.4706, .8961)	(-25.54, 15.63)	(-.6597, 1.071)	(-1.052, 2.005)	(-45.70, 88.09)	(-2.955, 5.784)	(-1.376, 2.961)	(-19.15, 9.186)	(-2.559, 5.455)
Pork	.36638	2.42176	1.27549	.45790	-31.91810	1.54743	.11901	-99.5791	1.01767
	(-1.119, 1.852)	(-35.31, 40.15)	(-3.869, 6.420)	(-1.714, 2.630)	(-122.8, 186.7)	(-5.842, 8.937)	(-.6581, .8962)	(-595.6, 396.5)	(-4.261, 6.296)
Chicken	.31287	-1.66649	.67272	.69911	-.76238	1.05867	.69911	3.02040	1.28047
	(-.6124, 1.238)	(-14.16, 10.83)	(-1.240, 2.585)	(-1.091, 2.489)	(-7.163, 5.638)	(-1.622, 3.780)	(-1.091, 2.489)	(-8.405, 14.45)	(-2.451, 5.012)
Legumes	.75195	.09062	1.05539	.72390	1.33916	1.08789	.98273	2.18811	1.14887
	(-1.238, 2.742)	(-1.758, 1.757)	(-1.746, 3.857)	(-1.146, 2.594)	(-4.241, 6.919)	(-1.678, 3.853)	(-1.427, 3.392)	(-3.411, 7.788)	(-1.664, 3.961)
Fats	-.25332	.41650	-.32440	-.02011	-.41466	-.18915	.29287	.29299	.18719
	(-.9282, .4215)	(-1.170, 2.003)	(-1.195, .5466)	(-.3524, .3122)	(-1.866, 1.036)	(-.7895, .4112)	(-.4523, 1.038)	(-2.516, 3.102)	(-.4282, .8026)
Sugar	.44683	1.36805	.42370	.72156	.85782	.78386	1.20270	-.98479	1.58532
	(-.7284, 1.622)	(-2.138, 4.874)	(-.7117, 1.559)	(-1.251, 2.692)	(-1.484, 3.199)	(-1.361, 2.929)	(-2.636, 5.041)	(-7.217, .248)	(-3.447, 6.617)
Beverages	.33297	.21960	.29668	.58806	.94139	.58786	.49608	-.01576	.51895
	(-.2593, .9253)	(-.2622, .7014)	(-.2589, .8523)	(-.4794, 1.656)	(-.8540, 2.737)	(-.4823, 1.658)	(-.3082, 1.300)	(-.4281, .3966)	(-.3264, 1.364)

References: OLS – Ordinary Least Squares; HP – 2-Step Heckman's Procedure; SS – Sample Selection or Type II Tobit Method