# Does Consumer Knowledge Affect Meat Consumption in the US?

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*Abstract:*

We investigate the roles of consumer knowledge and sociodemographic factors in the consumption of meat products at home and away from home. Results indicate that health knowledge decreases consumption of beef and pork and increases consumption of poultry at home and away from home but does not affect fish consumption.

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*Keywords:* Censored dependent variables; diet knowledge; maximum simulated likelihood; meat demand; simultaneous-equations system

## Introduction

Over the past decade, the American diet has changed toward healthier eating and food manufacturers have responded by providing foods, new or reformulated, with added healthy attributes and health claims. Consumer awareness of the basic ingredients found in foods was heightened after passage of the 1990 Nutritional Label and Education Act (NLEA). The NLEA requires mandatory food labeling on most packaged foods but not on fresh meats. Labels for fresh or frozen non-processed meats often contain little or no nutritional information. Thus, consumers who purchase fresh or frozen non-processed meats such as beef, pork, chicken and fish normally rely on personal dietary knowledge.[1]

For many consumers, meat is the main course of each meal. The US tops the world in per capita consumption of meats. Americans ate almost 200 pounds, boneless weight, of beef, pork, chicken, and fish per person in 2003 (USDA-ERS). The purpose of this study is to determine whether dietary knowledge and socioeconomic/demographic factors influence consumption of beef, pork, chicken, and fish products by type and location.

Although a great deal of information is available about beef, pork, chicken, and

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fish production, relatively little is known about the impact of dietary knowledge on the uses of these products. Lin et al. (2003) postulate that the changing racial and ethnic landscape in the US, the graying of Americans, and the growing popularity of eating out are more likely to influence future demands for beef, pork, chicken, and fish.

Null (1978, p 17) notes that "nutritional awareness is the first step to good health." As obesity rates continue to climb, good diets have become more important in a society where the views on dietary information about meat consumption are mixed. The new US Dietary Guidelines place major emphasis on fruits and vegetables, whole grains, and low-fat dairy products. However, little information is available as to how dietary guidelines influence consumers' decisions to purchase certain foods.

The role of dietary knowledge in food consumption has received increasing attention in the literature (see, e.g., Kaabia et al., 2001 and Kinnucan et al., 1997, and literature cited therein). This study is the first, to our knowledge, to examine whether dietary knowledge affects consumption of beef, pork, chicken, and fish at home differently than it affects those products' consumption away from home. Unlike most previous studies, we endogenize dietary knowledge by hypothesizing that knowledge is affected by factors which may or may not directly influence meat and fish consumption. Further, food consumption data from cross-section surveys often contain a notable proportion of observations not consuming specific foods.

Because statistical procedures not accommodating censoring or endogeneity can produce biased estimates, we developed a system of censored dependent variable equations with an endogenous regressor. Econometric specifications of this type have not been documented in the empirical literature. In addition to knowledge, the effects of other socio-demographic variables are also examined. The data used in the analysis comes from USDA food consumption surveys − the 1994-96 Continuing Survey of Food Intakes by Individuals (CSFII) and the companion Diet and Health Knowledge Survey (DHKS).

**Econometric model**

We develop a simultaneous-equations system

$$\begin{aligned} d_0 &= z'\alpha + u_0 \\ \log y_i &= \max(0, x'\beta_i + \gamma_i d_0 + v_i),\ i = 1,\ldots,m, \end{aligned} \tag{1}$$

where $z$ and $x$ are vectors of exogenous variables, $\alpha$ and $\beta_i$ are vectors of parameters, $\gamma_i$ are scalar parameters, and the error terms $[u_0, v'] \equiv [u_0, v_1, \ldots, v_m]'$ are distributed as normal $\mathrm{N}\ (0, \Sigma)$, where

$$\Sigma = \begin{bmatrix} \Sigma_{11} & \Sigma_{12} \\ \Sigma_{21} & \Sigma_{22} \end{bmatrix}, \tag{2}$$

such that $\Sigma_{11}$ is $1 \times 1$, $\Sigma_{21} = \Sigma'_{12}$ is $m'\ 1$, and $\Sigma_{22}$ is $m'\ m$. The model (1) is an extension of Amemiya's (1974) multivariate Tobit system in that an endogenous regressor is present in the censored equations. Using properties of the multivariate normal distribution (Kotz et al., 2000), the error vector $v$ can be conditioned on $u_0$ and, after algebraic manipulation, equations (1) can be expressed as a conditional system

$$\log y_i = \max(0, x'\beta_i + \gamma_i d_0 + a_i u_0 + \varepsilon_i),\ i = 1,\ldots,m, \tag{3}$$

where $a_i$ is an element of the $m$-vector $\Sigma_{21}\Sigma_{11}^{-1}u_0$, $u_0 = d_0 - z'\alpha$ and $\varepsilon \equiv [\varepsilon_1,,,\varepsilon_m]' \sim \mathrm{N}\ (0, \Omega)$, such that $\Omega \equiv \Sigma_{22} - \Sigma_{21}\Sigma_{11}^{-1}\Sigma_{12}$. The conditional system can be estimated following the more familiar censored system procedure (Amemiya, 1974), with probability integrals evaluated by simulation (Hajivassiliou, 1993). To examine the effects of explanatory variables, marginal effects are calculated. Define from (3) the composite error terms $\varepsilon_i^* \equiv a_i u_0 + \varepsilon_i$ such that $\varepsilon^* \equiv [\varepsilon_1^*, ..., \varepsilon_m^*]' \sim \text{N}\ (0, \Omega^*),$ where $\Omega^* \equiv \Sigma_{21}\Sigma_{11}^{-1}\Sigma_{11}^{-1}\Sigma_{12} + \Sigma_{22} - \Sigma_{21}\Sigma_{11}^{-1}\Sigma_{12}$. Based on $\varepsilon_i^* \sim \text{N}\ (0, \omega_i^2),$ where $\omega_i^2$ is the *i*th diagonal element of $\Omega^*$, the probability of a positive observation and the conditional mean for $y_i$ are, respectively,

$$\Pr(y_i > 0) = \Phi[(x'\beta_i + \gamma_i d_0) / \omega_i] \tag{4}$$

$$E(y_i \mid y_i > 0) = \exp(x'\beta_i + \gamma_i d_0)\exp(\omega_i^2 / 2)\left\{\frac{\Phi[\omega_i - \log(-x'\beta_i - \gamma_i d_0) / \omega_i]}{\Phi[\quad - \log(-x'\beta_i - \gamma_i d_0) / \omega_i]}\right\}. \tag{5}$$

Derivation of equation (5) draws upon the distribution $\varepsilon_i^* \sim \text{N}\ (0, \omega_i^2)$ and the truncated mean of the lognormal random variable $\exp(\varepsilon_i^*)$ (Johnson et al., 1994). The unconditional means of $y_i$ is $E(y_i) = \Pr(y_i > 0)E(y_i \mid y_i > 0),$ using equations (4) and (5). Marginal and discrete effects of variables can be derived from (4), (5) and the unconditional mean.

**Data**

Data are drawn from the 1994–96 Continuing Survey of Food Intakes by Individuals (CSFII) and its companion Diet and Health Knowledge Survey. In the CSFII, two nonconsecutive days of dietary data for 15,303 individuals of all ages were collected through in-person interviews using 24-hour recalls. The amounts of each food item consumed as well as where it was prepared were reported so consumption at home and away from home can be identified. Upon collection of first-day intakes, an adult aged ≥ 20 or older was randomly selected from each household to participate in the DHKS. The DHKS covers a wide range of diet and health questions. From 7842 eligible households, 5765 adults completed the survey.

The explanatory variables include household income (as a percentage of the poverty threshold), household size, household structure, gender, age, race, ethnicity, location, and season. We hypothesize that dietary knowledge affects meat consumption, and thus this variable is endogenized in the system of equations. In addition to income, gender, age, race and ethnicity, dietary knowledge is hypothesized to be affected by education, exercise, smoking, whether the respondent is a meal planner, and whether anyone in the household is on a special diet. The dietary knowledge variable is constructed as the sum of binary indicators from ten questions representing both general and specific knowledge.

To support the use of the CSFII data, the Agricultural Research Service created the Food Commodity Intake Database (FCID), which provided data on the edible amount of agricultural food commodities contained in each food reported in CSFII. Over 500 food commodities were listed in the FCID. We include beef, pork, poultry and fish (fresh/salt water finfish and shellfish) consumed at home and away from home. Excluding observations with missing values, the sample contains 5195 adults. The proportions of consuming individuals range from 19.3% for fish to 71.2% for beef consumed at home, and from 11.2% for fish to 42.6% for beef consumed away from home. Among those consuming, an individual on average consumes 0.77 kg of beef, 0.46 kg of pork, 0.59 kg of poultry, and 0.20 kg of fish per day at home. The amount consumed away from home is much lower, ranging from 0.11 kg per day for fish and pork to 0.36 kg for beef. The dietary knowledge score has an average of 6.7 (out of 10).

**Results**

The system, consisting of the dietary knowledge equation and the demand equations for beef, pork, poultry and fish at home and away from home, is estimated by maximum simulated likelihood. Parameter estimates are not reported due to space considerations but are summarized in this section. Based on estimates of the error correlations, the hypothesis of exogenous dietary knowledge is rejected at the 1% level for all but fish both at and away from home. The error correlations are significant, at the 5% level or lower, among demand equations except between beef and fish away from home. Endogeneity of knowledge and simultaneity of all consumption equations are also confirmed by likelihood-ratio tests ($P < 0.001$).

Parameter estimates for the knowledge equation suggest that men on average are less knowledgeable about diet and health than women. Younger individuals, in age categories 20–30, 31–40, 41–50 and 51–60, are more knowledgeable than their older (age > 60) counterparts. Blacks are less knowledgeable than Whites, as are Hispanics compared to non-Hispanics. Income contributes to knowledge, as reflected in its positive coefficient. While it may be hard to contemplate how education might directly affect meat consumption, our hypothesis is that education might contribute to dietary knowledge, which in turn affects meat consumption. The education variables are therefore used exclusively in the dietary knowledge equation. All three education variables (high school, high school and some college) have positive coefficients and their values suggest that dietary knowledge improves with an individual's educational level. Residing in households with member(s) on a special diet and regular exercise are also related to better dietary knowledgeable.

Statistical significance of parameter estimates in the demand equations are more sparse, notably so in the fish at home and away from home equations, and the poultry away from home equation (for which zero observations are the most notable.)

We focus our discussion on the marginal effects (Table 1), which allow more in-depth examination of the effects of explanatory variables. These marginal effects are derived from the probabilities, conditional means and unconditional means described previously. Statistical significance of these marginal effects is also determined with standard errors (not reported) calculated by mathematical approximation. Note that because of the "Tobit parameterization", the qualitative effects and statistical significance of each explanatory variable on the probability, conditional level and unconditional level are the same, except for a few exceptions which are likely the artifacts of numerical approximations.

According to the estimated marginal effects, higher income induces more consumption of all four products at home and beef away from home, but does not affect consumption of pork, poultry or fish away from home. All else equal, a 10% increase in income above the poverty level increases the probability of beef consumption by 3%, the conditional level by 0.05 kg, and the unconditional level by 0.02 kg. The marginal effects of income on pork and poultry at home and beef away from home are positive but the magnitudes are much smaller.

Dietary knowledge diverts consumption from red meats to white meats, by decreasing the consumption of beef and pork and increasing the consumption of poultry, both at home and away from home. These results are consistent with the findings reported in the literature. Dietary knowledge has been found to promote fish consumption in Spain (Kaabia et al., 2001). As stated earlier, dietary knowledge is found to be exogenous in fish consumption equations and does not affect fish consumption, either at home or away from home.

Our results are not unexpected. Fish and shellfish contain high-quality protein and other essential nutrients, are low in saturated fat, and contain omega-3 fatty acids, which reduce the risk of death from heart disease. However, many fish are found to be contaminated with mercury and other chemicals (USHHS and USEPA; UK Food Standards Agency, 2005). Therefore, better dietary knowledge may affect consumption of some fish positively and some others negatively, resulting in an ambiguous effect on total fish consumption. It is also important to note that the dietary knowledge variable specified in this study does not contain specific knowledge of fish consumption, which is missing in the DHKS survey. The relationship between dietary knowledge and fish consumption clearly depends on the definition of knowledge as well as the classification of fish; however, the relationship between dietary knowledge and meat and poultry consumption has been well established.

Compared to women, men consume more beef, pork and poultry at home and away from home and more fish away from home. The effects of all four age variables are positive on beef and pork at home and away from home, suggesting that younger individuals (multiple groups) consume more red meats than their older (age ≥ 61) counterparts. At-home consumption of poultry is also higher among individuals aged 20−50, compared to those of age 51 or older. Age is not a factor in the consumption of fish at or away from home. Compared to white individuals, Blacks consume more poultry at home and pork, poultry and fish away from home. Corroborating the documented importance of fish in Asian diets (Bean, 2003), we find that Asians consume more fish both at home and away from home, compared to Whites.

There is some evidence of regional differences. Specifically, individuals residing in the Midwest consume more beef but less fish at home, but less poultry and fish away from home, than individuals in the Northeast. Individuals from the South and West consume more fish at home, and less poultry and fish away from home, than those in the Northeast.

Urbanization also plays a role, with individuals residing in rural areas consuming more beef at home and pork away from home than those residing in the city. Compared to those residing in single-headed households without children, individuals from dual-headed households (with or without children) consume less poultry at home. Finally, seasonal variations are also present, with more consumption of pork at home during April–June and pork away from home during January–March and April–June, and less consumption of poultry away from home during July–September.

## Concluding remarks

The roles of dietary knowledge have received increasing attention in the food consumption literature. We investigate the effects of dietary knowledge, as well as sociodemographic variables, in the consumption of beef, pork, poultry and fish both at home and away from home. As in other survey data, the current study contains observations with zero consumption. In addition, dietary knowledge is likely to vary across individuals with different sociodemographic profiles, which likely affect consumption of meat and fish. The issues of censored dependent variables and endogenous dietary knowledge are addressed by developing a simultaneous-equations system, estimated with the maximum simulated likelihood procedure.

Education, among others, contributes to dietary knowledge which in turn affects consumption. Income has positive effects on the consumption of all meat products at home and beef away from home. Gender and ages are also contributing factors, and seasonal and regional variations are present. Dietary knowledge does not significantly affect consumption of fish at or away from home, a result which may be due to the fact that fish are too broadly defined (such that, for instance, fish with healthy attributes are not distinguished from fish that are potentially contaminated), and that dietary knowledge specified in this study does not include knowledge specific to fish due to lack of data.

However, our findings on the effects of dietary knowledge on meat and poultry consumption are more definitive, as established in the literature. Specifically, dietary knowledge is found to divert consumption away from red meats such as beef and pork to white meats (poultry), both at home and away from home.

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**Table 1. Marginal Effects of Explanatory Variables on Probabilities, Conditional Levels and Unconditional Levels**

| | Beef at Home | | | Pork at Home | | | Poultry at Home | | |
|---|---|---|---|---|---|---|---|---|---|
| Variable | Prob. | Level (C) | Level (U) | Prob. | Level (C) | Level (U) | Prob. | Level (C) | Level (U) |
| | | | | Continuous variables | | | | | |
| Income (%) | 0.026*** | 0.471*** | 0.156*** | 0.008** | 0.070** | 0.012** | 0.015** | 0.063** | 0.027** |
| HH size / 10 | −0.024 | −0.441 | −0.146 | −0.041 | −0.346 | −0.060 | −0.002 | −0.008 | −0.004 |
| Knowledge | −0.052*** | −0.954*** | −0.316*** | −0.024*** | −0.196*** | −0.034*** | 0.039*** | 0.172*** | 0.072*** |
| | | | | Discrete variables | | | | | |
| Male | 0.060*** | 1.093*** | 0.365*** | 0.033*** | 0.279*** | 0.049*** | 0.046*** | 0.200*** | 0.085*** |
| Age 20−30 | 0.126*** | 2.440*** | 1.017*** | 0.040*** | 0.321*** | 0.067*** | 0.071*** | 0.287*** | 0.142*** |
| Age 31−40 | 0.091*** | 1.730*** | 0.669*** | 0.027** | 0.215** | 0.042** | 0.059*** | 0.245*** | 0.117*** |
| Age 41−50 | 0.056*** | 1.041*** | 0.378*** | 0.035*** | 0.285*** | 0.058*** | 0.042*** | 0.175*** | 0.081*** |
| Age 51−60 | 0.052*** | 0.970*** | 0.351*** | 0.029*** | 0.235*** | 0.046*** | 0.012 | 0.052 | 0.023 |
| Black | −0.014 | −0.257 | −0.083 | 0.005 | 0.042 | 0.007 | 0.044*** | 0.181*** | 0.085** |
| Asian | −0.033 | −0.588 | −0.178 | −0.013 | −0.113 | −0.018 | 0.005 | 0.020 | 0.008 |
| Other | 0.000 | −0.008 | −0.003 | −0.051*** | −0.515*** | −0.054*** | −0.010 | −0.045 | −0.018 |
| Hispanic | 0.017 | 0.303 | 0.104 | −0.011 | −0.095 | −0.015 | 0.011 | 0.046 | 0.020 |
| Midwest | 0.043*** | 0.795*** | 0.279*** | 0.006 | 0.054 | 0.010 | 0.006 | 0.028 | 0.012 |
| South | 0.025* | 0.457* | 0.155* | 0.010 | 0.086 | 0.015 | 0.008 | 0.035 | 0.015 |
| West | 0.022 | 0.402 | 0.138 | 0.000 | −0.001 | 0.000 | −0.004 | −0.017 | −0.007 |
| Rural | 0.019 | 0.339 | 0.115 | −0.003 | −0.024 | −0.004 | −0.015 | −0.066 | −0.027 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Suburb | 0.007 | 0.127 | 0.042 | −0.002 | −0.017 | −0.003 | −0.001 | −0.006 | −0.003 |
| HH type 1 | 0.001 | 0.026 | 0.009 | 0.013 | 0.109 | 0.020 | −0.031* | −0.135* | −0.055* |
| HH type 2 | −0.003 | −0.058 | −0.019 | 0.009 | 0.077 | 0.014 | −0.021* | −0.090* | −0.037* |
| HH type 3 | 0.039 | 0.733 | 0.264 | 0.029* | 0.231* | 0.047 | −0.002 | −0.007 | −0.003 |
| Jan–Mar | 0.021 | 0.387 | 0.132 | 0.007 | 0.057 | 0.010 | 0.001 | 0.003 | 0.001 |
| Apr–May | 0.019 | 0.345 | 0.117 | 0.012* | 0.103* | 0.019 | 0.003 | 0.015 | 0.006 |
| Jun–Sept. | 0.004 | 0.076 | 0.025 | 0.005 | 0.044 | 0.008 | −0.009 | −0.041 | −0.017 |

Table 1 continued

| Variable | Fish at Home | | | Beef away from Home | | | Pork away from Home | | |
|---|---|---|---|---|---|---|---|---|---|
| | Prob. | Level (C) | Level (U) | Prob. | Level (C) | Level (U) | Prob. | Level (C) | Level (U) |
| | | | | Continuous variables | | | | | |
| Income (%) | 0.015*** | 0.083*** | 0.020*** | 0.020** | 0.263** | 0.190** | 0.005 | 0.077 | 0.034 |
| HH size / 10 | −0.049 | −0.279 | −0.067 | 0.062 | 0.839 | 0.604 | 0.010 | 0.147 | 0.065 |
| Knowledge | 0.000 | 0.000 | 0.000 | −0.104*** | −1.392*** | −1.002*** | −0.105*** | −1.597*** | −0.706*** |
| | | | | Discrete variables | | | | | |
| Male | 0.013 | 0.072 | 0.017 | 0.081*** | 1.077*** | 0.780*** | 0.049*** | 0.750*** | 0.333*** |
| Age 20−30 | −0.004 | −0.024 | −0.006 | 0.132*** | 1.335*** | 1.241*** | 0.065*** | 1.001*** | 0.487*** |
| Age 31−40 | −0.001 | −0.008 | −0.002 | 0.119*** | 1.320*** | 1.152*** | 0.078*** | 1.211*** | 0.595*** |
| Age 41−50 | 0.004 | 0.021 | 0.005 | 0.080*** | 0.984*** | 0.793*** | 0.090*** | 1.385*** | 0.691*** |
| Age 51−60 | 0.000 | −0.001 | 0.000 | 0.088*** | 1.061*** | 0.869*** | 0.079*** | 1.218*** | 0.599*** |
| Black | 0.006 | 0.032 | 0.008 | 0.004 | 0.047 | 0.034 | 0.055*** | 0.856*** | 0.414** |
| Asian | 0.082* | 0.398** | 0.138 | −0.070 | −0.980 | −0.625* | −0.038 | −0.566 | −0.231 |
| Other | 0.045 | 0.230 | 0.069 | −0.026 | −0.352 | −0.242 | −0.069* | −1.023* | −0.390** |
| Hispanic | −0.007 | −0.038 | −0.009 | 0.001 | 0.014 | 0.010 | −0.035* | −0.525* | −0.218* |
| Midwest | −0.019** | −0.109** | −0.025** | 0.052*** | 0.677*** | 0.514*** | 0.040*** | 0.611*** | 0.282*** |
| South | −0.016* | −0.093* | −0.022* | 0.024 | 0.315 | 0.230 | 0.020 | 0.304 | 0.136 |
| West | −0.020** | −0.115** | −0.026** | 0.033* | 0.429* | 0.322* | −0.016 | −0.238 | −0.103 |
| Rural | −0.007 | −0.041 | −0.010 | 0.042*** | 0.544*** | 0.408*** | 0.029** | 0.446** | 0.203** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Suburb | −0.005 | −0.026 | −0.006 | 0.010 | 0.139 | 0.100 | −0.006 | −0.088 | −0.039 |
| HH type 1 | 0.000 | −0.001 | 0.000 | 0.034 | 0.449 | 0.333 | 0.019 | 0.290 | 0.131 |
| HH type 2 | 0.014 | 0.081 | 0.020 | 0.013 | 0.174 | 0.126 | 0.030** | 0.454** | 0.204** |
| HH type 3 | 0.002 | 0.012 | 0.003 | 0.040 | 0.515 | 0.397 | 0.022 | 0.332 | 0.153 |
| Jan–Mar | 0.006 | 0.032 | 0.008 | 0.002 | 0.024 | 0.017 | 0.030** | 0.459** | 0.210** |
| Apr–May | 0.003 | 0.018 | 0.004 | −0.006 | −0.075 | −0.054 | 0.023* | 0.353* | 0.160* |
| Jun–Sept. | −0.001 | −0.006 | −0.001 | 0.002 | 0.028 | 0.020 | 0.004 | 0.067 | 0.030 |

Table 1 continued

| | Poultry away from Home | | | Fish away from Home | | |
|---|---|---|---|---|---|---|
| Variable | Prob. | Level (C) | Level (U) | Prob. | Level (C) | Level (U) |
| | | | Continuous variables | | | |
| Income % | 0.002 | 0.009 | 0.007 | 0.011 | 0.059 | 0.023 |
| HH size / 10 | 0.017 | 0.076 | 0.061 | −0.060 | −0.327 | −0.126 |
| Knowledge | 0.078*** | 0.344*** | 0.278*** | 0.010 | 0.055 | 0.021 |
| | | | Discrete variables | | | |
| Male | 0.101*** | 0.440*** | 0.357*** | 0.029** | 0.160** | 0.062** |
| Age 20−30 | 0.027 | 0.114 | 0.096 | −0.022 | −0.124 | −0.045 |
| Age 31−40 | 0.032 | 0.138 | 0.116 | −0.004 | −0.024 | −0.009 |
| Age 41−50 | 0.005 | 0.022 | 0.018 | 0.002 | 0.012 | 0.005 |
| Age 51−60 | 0.002 | 0.008 | 0.007 | −0.002 | −0.012 | −0.005 |
| Black | 0.104*** | 0.397*** | 0.382*** | 0.038** | 0.200** | 0.084** |
| Asian | 0.026 | 0.111 | 0.095 | 0.167*** | 0.783*** | 0.461*** |
| Other | 0.030 | 0.126 | 0.109 | 0.083 | 0.420 | 0.204 |
| Hispanic | 0.049** | 0.203** | 0.179** | 0.006 | 0.035 | 0.014 |
| Midwest | −0.039** | −0.174** | −0.135** | −0.042*** | −0.233*** | −0.084*** |
| South | −0.036** | −0.160** | −0.126** | −0.034*** | −0.190*** | −0.071*** |
| West | −0.034* | −0.152* | −0.118* | −0.030** | −0.168** | −0.061*** |

| | | | | | | |
|---|---|---|---|---|---|---|
| Rural | −0.011 | −0.049 | −0.039 | −0.016 | −0.088 | −0.033 |
| Suburb | 0.007 | 0.030 | 0.024 | −0.011 | −0.058 | −0.022 |
| HH type 1 | −0.033 | −0.148 | −0.116 | −0.004 | −0.024 | −0.009 |
| HH type 2 | −0.006 | −0.028 | −0.022 | 0.020 | 0.107 | 0.042 |
| HH type 3 | −0.007 | −0.030 | −0.024 | 0.003 | 0.014 | 0.006 |
| Jan–Mar | −0.005 | −0.021 | −0.017 | 0.006 | 0.034 | 0.013 |
| Apr–May | −0.016 | −0.071 | −0.056 | 0.007 | 0.040 | 0.015 |
| Jun–Sept. | −0.040*** | −0.181*** | −0.141*** | −0.009 | −0.048 | −0.018 |

Note: "Level (C)" and "Level (U)" indicate conditional and unconditional levels of consumption, respectively. HH type 1, type 2 and type 3 indicate, respectively, the individual resides in a dual-headed household with children, dual-headed household without children, and single-headed household with children (reference = single-headed household without children). Asymptotic standard errors in parentheses. *** < 0.01, ** < 0.05, * < 0.10.