Review of Household Demand Elasticities in Argentina

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Abstract
Demand elasticities are widely used in economic studies to predict the demand for goods. In recent years several studies have estimated price and income elasticities of household goods consumed in Argentina. However, the review of these papers shows that (a) virtually all estimates come from the Survey of Household Expenditure of 1996 (ENGHo'96) and, therefore, do not reflect changes in consumers' behavior after the country moved towards a flexible currency exchange rate, (b) demand functions other than LINQUAD and log-log have not been explored, which - in our view - do not represent correctly the demand for all goods consumed by the population, and (c) despite sharing a common information source and, in many cases, the same functional form, the resulting estimates are highly variable between studies.[1] For these reasons, we review the already computed demand elasticities and compare them with updated estimates from ENGHo'04 data. We propose specific demand functions for each article and a simple aggregation procedure in order to cover all items consumed by the population.

KeyWords: Demand Elasticities, Argentina

1. Introduction

In economics, elasticity is defined as the function that measures the sensitivity of one variable to changes in another variable. In particular, own-price and income elasticities measure the percentage change in quantity demanded of a good after a small change in the price of the same good or in the consumer's income, respectively. Price and income elasticities are widely used in economic studies to estimate the demand for goods. For example, in the System of National Accounts of Argentina the gross production value of several activities (e.g. bars and restaurants, repair of home appliances, taxis, etc.) are estimated by demand indices (DNCN 1999), that is by functions whose parameters are own-price and income elasticities.

In recent years, several studies have estimated price and income elasticities of specific goods or groups of goods. In Argentina, for example, Barges and Casella (2002) estimated the elasticity of demand of 18 classes of foods, Lema et al. (2007) analyzed the elasticities of 11 classes while Rossini et al. (2008) analyzed another 10; Galetto et al. (2005) conducted a specific study on cheeses, and even the U.S. Department of Agriculture (Seale et al. 2003 and 2006, Muhammad et al. 2011) maintains a database of demand elasticities of 8 classes of foods and 8 non-food items, covering approximately

[1]By law we mean Convertibility Law No. 23.928/91 which established an exchange rate of one dollar per weight.

100 countries.[2] A remarkable paper for its completeness is González Rozada (2000), who estimated the elasticities of 69 food and non-food items, although this review is hardly known because it remained as an internal report of the BID 826 OC/AR project.[3]

2. Objectives

The reviewed literature reveals that (a) virtually all estimates come from the 1996 Survey of Household Expenditure (hereafter ENGHo'96) and, therefore, do not reflect economic changes following the revocation of the Convertibility Law (Law Nr. 23.928/91), (b) the prevailing demand functions are LINQUAD and log-log, and (c) despite sharing a common information source and, in many cases, the same functional form, the resulting estimates are remarkably variable among studies.

Therefore, the aim of this paper is to review previous demand elasticities using the 2004 Survey of Household Expenditure (hereafter ENGHo'04) and to extend the estimates to items consumed by households not included in the mentioned papers. To do so, we shall estimate the parameters of the demand function of each single item of the ENGHo'04 and group items into classes by a simple procedure. These classes cover presumably all goods and services consumed by the population although some rare items were excluded from the study.

3. Materials and Methods

3.1 The Demand Function

Consider a single Marshallian demand function represented by a broken hyper-plane, that is, a function in which each individual demands positive amounts of a certain good or service in the price range $0 \le x_1 \le x_1^*$ and income range $x_2 \ge 0$, and does not demand it if $x_1 > x_1^*$.[4] Then,

$$q_i = (\beta_0 + \beta_1 x_{i1})\, \delta_{x(1)\le x(1)^*} + (\beta_2 + \beta_3 x_{i1})\, (1 - \delta_{x(1)\le x(1)^*}) + \beta_4 x_{i2} + \beta_5 x_{i3} + \ldots + \beta_{j+2} x_{ij} + \ldots,$$

where q_i is the quantity of a certain good or service demanded by the ***i***-th individual, x_{i1} is the price of that good, x_{i2} is the income of the individual, x_j for all $4 < j < j'$ is the price of the j-th substitute good and x_j for all $j \ge j'$ is the price of the ***j***-th complementary good, the β_j are fixed but unknown parameters of the demand function and $\delta_{x(1)\le x(1)^*}$ is a Kronecker delta that equals 1 if x_{i1} lies in the interval $0 \le x_1 \le x_1^*$, or 0 otherwise. Substitute and complementary goods also have break-points, but for brevity we omit the corresponding terms in the above expression. In practice, the full model is reduced to

$$q_i = \beta_0 + (\beta_2 - \beta_0)\, \delta_{x(1)\ge x(1)^*} + \beta_1 x_{i1} + (\beta_3 - \beta_1)\, x_{i1} \delta_{x(1)\ge x(1)^*} + \beta_4 x_{i2} + \varepsilon_i$$

where ε_i is a random variable distributed $\varepsilon_i \sim N(0,\sigma^2)$ that represents all terms of x_{ij} for $j > 2$ under the condition that the associated parameters $\beta_j \approx 0$ or that $\mathbf{x}_j'\mathbf{x}_{j'}$ for all $j' > 2$, and the δ changes direction for expository clarity. Then, an equivalent form (and consistent with

[2] García Arancibia et al. (2011) also presented an interesting study on the determinants of food consumption away from home, but without calculating demand elasticities.
[3] This is a preliminary estimate of elasticities in the arc from publicly accessible information
[4] Recall that consumer theory is an individual theory.

the notation commonly used in the literature) of the previous function in the positive demand interval is

$$q_i(x, y \mid x \leq x_0) = \alpha_0 + \alpha_1 x_i + \alpha_2 y_i + \varepsilon_i\,,\ \varepsilon_i \sim N(0,\sigma^2), \quad (1)$$

in which $\alpha_0 = \beta_0$, $\alpha_1 = \beta_1$ and $\alpha_2 = \beta_4$ and the variables x and y are the price of the aforementioned good and the consumer's income, respectively, in the intervals $q_i \geq 0$, $x_i \geq 0$ and $y_i \geq 0$. The threshold price is now $x_0 = x_1^*$, and the function (1) is conditional on $x \leq x_0$. This demand function satisfies economic theory if $\alpha_1 \leq 0$ and $\alpha_2 \geq 0$.[5] On this basis, the own-price elasticity of demand for the i-th individual, conditional on x and q, is

$$\lambda(x_i,q_i) = (\partial q_i/\partial x_i)\, x_i q_i^{-1} = \alpha_1\, x_i/q_i$$

for all $0 \leq x \leq x_0$ and $y \geq 0$, and $\partial \varepsilon_i/\partial x_i = 0$ or in terms of the independent variables,

$$\lambda(x_i,q_i) = [1 + (\alpha_0/\alpha_1)\, x_i^{-1} + (\alpha_2/\alpha_1)\, y_i x_i^{-1}]^{-1}. \quad (2)$$

The income elasticity of demand is $\lambda(y_i,q_i) = \alpha_2\, y_i/q_i$, or more explicitly

$$\lambda(y_i,q_i) = [1 + (\alpha_0/\alpha_2)\, y_i^{-1} + (\alpha_1/\alpha_2)\, x_i\, y_i^{-1}]^{-1}, \text{ for all } y > 0 \text{ and } \partial \varepsilon_i/\partial y_i = 0. \quad (3)$$

Note that under this specification the elasticity of demand is a function of the price faced by each individual as well as its income, unlike the functions specified in most studies (e.g. González Rozada 2000) in which the demand elasticities are constant.

3.2 Computing Elasticities at the Average Price and Income

In the previous section we obtained expressions for the own-price and income elasticities of a single good or service. We now want to compute the own-price elasticity at the average price of the good and the income elasticity at the average income of all individuals. Therefore, let's write the own- price elasticity as

$$\lambda_{\bar{x}} = [\partial q(x,y)/\partial x]_{\bar{x}}\ \bar{x}/\ \bar{q} = \alpha_1\, [(n_1\ \bar{x}_1 + n_2\ \bar{x}_2) / (n_1+n_2)]\ [(n_1\ \bar{q}_1 + n_2\ \bar{q}_2) / (n_1+n_2)]^{-1}$$

where n_1 is the number of individuals who demand the referred good or service and its complement $n_2 = N - n_1$ is the number of individuals in the population that do not demand it. Of course, the price $\bar{x}_2$ is not observable and the amount of good demanded at that price is $\bar{q}_2 = 0$. So, the quantity demanded at the mean price and the mean income is

$$\bar{q} = \alpha_0 + \alpha_1\ \bar{x} + \alpha_2\ \bar{y}, \text{ for all } 0 < \bar{x} < x_0,\ \ \bar{y} > 0,$$

x_0 being the threshold price at which demand is null.Then, $\bar{x} = (\bar{q} - \alpha_0 - \alpha_2\ \bar{y}) / \alpha_1$ and

$$\lambda_{\bar{x}} = \alpha_1\, (\bar{q} - \alpha_0 - \alpha_2\ \bar{y}) / (\alpha_1\ \bar{q}).$$

After canceling factors conveniently and multiplying by the ratio of prices $\bar{x}_1/\ \bar{x}_1$, we rewrite the expression of $\lambda_{\bar{x}}$ as

$$\lambda_{\bar{x}} = 1 - [\alpha_2\ \bar{y}\, (\bar{x}_1 / v\,) + \alpha_0\, (\bar{x}_1 / v\,)] \quad (4)$$

[5] Actually, α_2 can be equal to or less than 0, but this situation is seldom verified in practice.

where $v = \bar{x}_1 \ \bar{q}$ and $\bar{q} = \bar{q}_1 \, n_1/N$. The main advantage of expression (4) is that it does not require knowledge of the unobserved price $\bar{x}_2$. However, it does require knowledge of the ratio n_1/N, which in practice may be easily estimated by sampling. Replacing the first term between brackets in (4) by $\lambda_{\bar{y}}$ and rearranging conveniently we find that

$$\lambda_{\bar{y}} = 1 - (\lambda_{\bar{x}} + \alpha_0 \ \bar{x}_1 / v). \qquad (5)$$

The expressions (4) and (5) not only allow us to find $\lambda_{\bar{x}}$ and $\lambda_{\bar{y}}$ ignoring $\bar{x}_2$, but also to aggregate several goods by adding up their values and re-expressing them in terms of one of them.[6] To do so consider, for example, two goods identified with the subscripts j and j'. The aggregated own-prices and income elasticities of this two-items-class may be obtained in the following fashion

(i) Estimate $\boldsymbol{\alpha}_j' = [\alpha_{0j},\alpha_{1j},\alpha_{2j}]$ and $\boldsymbol{\alpha}_{j'}' = [\alpha_{0j'}, \alpha_{1j'}, \alpha_{2j'}]$ by regression of q_i on x_i and y_i. Call the estimate of α_j, a_j. Check that the demand functions of both goods are close enough so as not to reject that they are perfect substitutes. In other words, that $\mathbf{R}(\boldsymbol{\alpha}_j' - \boldsymbol{\alpha}_{j'}') \sim N(\mathbf{0},\sigma^2\mathbf{I})$.

(ii) If j and j' are close substitutes, compute the total expenditure (on an average individual) of both goods as the sum

$$v = \bar{p}_j \ \bar{q}_j + \bar{p}_{j'} \ \bar{q}_{j'}.$$

Then choose a reference price, which may be the price of the main good of the class or the average price of both goods. Let's choose $\bar{p}_j$.

(iii) Estimate the class own-price elasticity and income elasticity through (4) and (5) but replacing the true parameters of the demand function of j by their estimates and $\bar{x}_1$ by $\bar{p}_j$. For reasons which will become apparent hereinafter, re-estimate a_0 by

$$\hat{a}_{0j} = 1 - (\lambda^*_{\bar{x}} + \lambda^*_{\bar{y}}).$$

where the asterisk stands for the estimate of the corresponding true parameter.

3.3 The Demand Function in Terms of Indices

If we rewrite the demand function (1) of the average individual but dividing both sides of the equation by the quantity consumed in the referential year, and multiply conveniently by x_0/x_0 and y_0/y_0 on the right hand side we obtain

$$q/q_0 = \alpha_0/q_0 + \alpha_1 \, (x_0/q_0) \, (x/x_0) + \alpha_2 \, (y_0/q_0) \, (y/y_0)$$

or, in terms of elasticities,

$$q/q_0 = \alpha_0/q_0 + \lambda_{x(0)} \, (x/x_0) + \lambda_{y(0)} \, (y/y_0). \qquad (6)$$

[6] We define aggregation as the grouping of assets in higher-order categories. In the context of this paper we restrict the definition to the grouping of substitutes.

where we omit the tilde on x, y and q for readability. The ratio q/q_0 is an index of the quantity demanded, x/x_0 is a price index and y/y_0 is an index of individual income, and λ_{x0} and λ_{y0} are the own-price and income elasticities, respectively, at a certain base year.[7] Note that at the base year $q = q_0$, so that

$$\alpha_0 = (1 - \lambda_{x(0)} - \lambda_{y(0)})\, q_0.$$

3.4 Estimating the Parameters of the Demand Function

We selected 1,070 items consumed by a sample of 39,139 households from ENGHo'04.For each item, we fitted a demand function by generalized least squares following the procedure below:

(a) First we divided the income and the expenditures of each household by the number of individuals within it. As some households did not record income we built two separate data sets, one excluding those households and another with the missing incomesreplaced by the total expenditure. The econometric model proposed was

$$\mathbf{q}_j = \mathbf{X}_j\boldsymbol{\alpha}_j + \boldsymbol{\varepsilon}_j \text{ where } \boldsymbol{\varepsilon}_j \sim N(\mathbf{0},\sigma_j^2\mathbf{I}),\ \mathbf{q}_j \geq \mathbf{0} \text{ and } \mathbf{X}_j \geq \mathbf{0}, \qquad (7)$$

and $\mathbf{q}_j$ is a vector of $n\times1$ quantities acquired for the j-th item, $\mathbf{X}_j = [\mathbf{1},\mathbf{x}_j,\mathbf{y}]$ is a matrix whose first vector is $\mathbf{1}_{n\times1}$, the second is a vector of prices (that is prices paid by the i-th individual for the j-th item) and the third is a vector of individual incomes y_i; $\boldsymbol{\alpha}_j$ is the vector of parameters to be estimated and $\boldsymbol{\varepsilon}_j$ is a vector of n independent and identically distributed errors.

(b) Then,we computed the elasticity of single itemsaccording to (2) and (3). As both the own-price and the income elasticities are specific to each individual, we estimated their mean values as a weighted average of the elasticities of all individuals, the weights being the number of individuals of each family multiplied by the expansion factor of each family.[8] We noticed that the empirical distribution of the individual elasticities was markedly asymmetric with heavy tails on the side of the expected sign of the associated regression coefficient (negative for positive α_1 and α_2) but only a few values on the opposite side. At this point we obtained estimated own-price and income elasticities for 1,070 items of the ENGHo'04.

(c) All items were grouped into classes. To do this we compared all items classified at six digits of the ENGHo'04 descriptor and grouped them into pre-defined or new categories. For this purpose, we first considered the four-digits-class definitions provided by the ENGHo'04 classifier. Then, we selected one or a few typical items of each class, and compared the distance between the estimated parameters of demand of other difficult to categorize items with those of the typical items. For such comparisons we used the test statistic

$$(\mathbf{Ra}_{j'} - \boldsymbol{\alpha}_j)'[\mathbf{R}(\mathbf{X}'\mathbf{X})^{-1}\mathbf{R}']^{-1}(\mathbf{Ra}_{j'} - \boldsymbol{\alpha}_j)/\sigma^2 \sim \chi^2_{(q)}$$

where $\mathbf{R} = \mathbf{I}_k$, $\mathbf{a}_{j'}$is the vector of estimated parameters of an item to be included in a certain class, and $\boldsymbol{\alpha}_j$is a theoretical vector of “true” parameters deduced from the

[7] We call base-year to a benchmark year, usually the ENGHo’s year.

[8] The expansion factor is a proportionality constant that relates the total expenditure of each household in the sample to the total expenditure of similar households in the population.

elasticities of typical items of the class and/or from the bibliography.However, in many cases, the final decision on the inclusion of an item in a certain class (or the definition of new classes) reliedon personal judgments about the nature (whether it is a substitute or not) of the goods of that class. At the end of this stage all the 1,070 items were assigned to one of the approximately 100 classes described in the appendix.

(d) Finally, we estimated class elasticities after the expressions (4) and (5) and the estimator $\hat{a}_{0j}$. The chosen a_0 and $a_2$estimators were those of the main item, except in cases where none of the items is clearly predominant so one of them was chosen as the typical item.

The estimator $\mathbf{a}_j$, its covariance matrix and all the mentioned tests where programmed in the matrix language of the free software Euler Math Toolbox v.18 developed by Rene Grothmann, associate professor of Katholische Universität Eichstätt (Germany).

4. Results

Table 1 shows the price and income elasticities of more than 100 classes of items estimated according to the procedure described above.[9] We omit, due to its extent, to present here the parameter estimates and other statistics of the 1,070 regressions. These estimates are available upon request. It suffices to say that almost all regressions fitted the observations and that the regression coefficients of most of themshowed the sign expected according to the theory of demand. The same protocol was carried out tofit other functional forms, for example LOG-LOG, but without success since most of the regression coefficients showed signs opposite to those suggested by the theory and non-significant values.

5. Conclusions

The signs of the elasticities presented in the appendix are consistent with economic theory although, in general, price elasticities appear highly variable (considered in absolute value) to those found by other authors. We attribute these discrepancies to three possiblecauses: (a) the definition of classes followed by each author, (b) the analytical form chosen to represent the demand function, and (c) changes in consumers' behaviour due to the time passed. We discuss these three possibilities by comparing our findings with those of González Rozada (2000), as we believe this is the most complete and comprehensive text among the ones consulted.

5.1 Grouping Items into Classes

Due to the large amount of goods and services consumed by households, almost all the papers actually present class-elasticities under the assumption that the differences in elasticity within each class are smaller than among classes. However, the properties of the original elasticities do not transfer to aggregate elasticities, and the grouping criteria may even introduce undesirable properties to the aggregated elasticities.

González Rozada(2000), for example, grouped items into classes already defined in the ENGHo'96 item-classifier, whichin turn implies the assumption that all the items that make up each class follow the same demand function. As this is clearly false, the

[9] We refer to classes of items in a loose sense, not necessarily 4-digit categories of ENGHo'04.

elasticities obtained for many classes (i) appear artificial (since they do not put together substitute goods) and (ii) vary over time even if the elasticities of the items that compose them remain constant, which is certainly undesirable.[10] Point (ii) is especially important since the ultimate goal of the authorwas to compute indices to estimate demand over time. For a formal proof of these assertions consider two demand functions, $q_1(x_1,y)$ and $q_2(x_2,y)$, and let

$$z = \theta_1 x_1 + \theta_2 x_2, \text{ where } \theta_1 + \theta_2 = 1,\ 0 \leq \theta_1 \leq 1, \text{ and } 0 \leq \theta_2 \leq 1.$$

The new variable z is a weighted average of the prices x_1 and x_2 which are in turn average prices (we omit the tildes for readability) of specific items consumed by households. Then the class-price elasticity is

$$\lambda_z = [\partial(q_1+q_2) / \partial z]\ z/(q_1+q_2)$$

where

$$\partial(q_1+q_2) / \partial z = (\partial q_1/\partial x_1)\ (\partial x_1/\partial z) + (\partial q_2/\partial x_2)\ (\partial x_2/\partial z) = \theta_1\ \partial q_1/\partial x_1 + \theta_2\ \partial q_2/\partial x_2$$

so that the aggregated elasticity is

$$\lambda_z = [\theta_1 \alpha_{x1} + \theta_2 \alpha_{x2}](\theta_1 x_1 + \theta_2 x_2)/(q_1+q_2).$$

Writing this expression in terms of the own-price elasticities and calling $w_j = q_j / (q_1+q_2)$ yields

$$\lambda_z = w_1\ (\theta_1 + \theta_2 \alpha_{x2}/\alpha_{x1})\theta_1 \lambda_{x1} + (1 - w_1)\ (\theta_2 + \theta_1 \alpha_{x1}/\alpha_{x2})\theta_2 \lambda_{x2}. \qquad (8)$$

It becomes clear from expression (8) that unless $\alpha_{x1} = \alpha_{x2}$ and $\theta_1 = 1$ or $\theta_2 = 1$, that is, in the trivial case where all items within a class follow the same demand function, the estimated class-price elasticity will be biased.[11] But even in the more realistic situation where $\alpha_{x1} \neq \alpha_{x2}$, $\theta_1+\theta_2 = 1$ and the elasticities λ_x are fixed, it is unlikely that w_1 would remain constant over time (at least in the long run) and therefore that λ_z would also remain fixed.

Our approach to the problem of clustering into classes followed essentially three stages: (a) identification of classes of related (actually substitute) goods, (b) selection of a typical demand function for each class; (c) estimation of class demand elasticities on the basis of the typical demand functions and the total consumption of goods within the class but expressed in equivalent amounts of the typical good. Although this is an ad-hoc procedure, it avoids some of the drawbacks pointed outbefore. First, our classes gather goods with similar demand functions. Second, as the class demand elasticities correspond to a single demand function instead of a hybrid function we avoid one source of variability in class elasticities, the one due to shifts in quantities consumed of goods of the same class. Third, we are able to build demand indices of constant elasticities without assuming constant elasticities at an item or class level. However, the clustering criterion

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[10] For example, the study of González Rozada considers two categories called "sugar, jam and cocoa".

[11] It is difficult to imagine why two items with similar demand functions would appear separately in the household item-classifier.

proposed is ad-hoc and sometimes relies on personal judgment which is not a minor issue.

5.2 The Functional Form

Regarding the analytical form of the demand function, González Rozada suggested that the log-log function was the most appropriate to explain the demand of households, although it requires that all individuals consume the same goods, as $\lim_{x_j \to 0} \ln x_j = -\infty$. However, simple inspection of the ENGHo'96 and ENGHo'04 databases reveals that such an assumption is clearly false. Therefore, González Rozada employed the log-log function only to estimate conditional (to those individuals who had indeed consumed the good under study) demand elasticities, and introduced another demand function to estimate unconditional elasticities. The analytical form of the latter was

$$w_j = \ln\beta_0 + \beta_1 \ln x_j + \beta_2 \ln y + \varepsilon_j \ , \beta_1 < 0 \text{ and } \beta_2 > 0$$

wherew_j is the proportion of total expenditure in the j-th good, and x_j and y have the same meaning as before. This specification, however, still has a serious drawback: it either assumes knowledge of the prices faced by those individuals who do not consume the good or (even worse) assumes that the prices of goods actually consumed are the same as those faced by non-consumers, which contradicts the demand theory, especially in the context of Marshallian functions. This specification also implies that demand elasticities are not constant but depend on w_j, as it may be shown that$\lambda_{1j} = \beta_{1j}/w_j$ and also that $\lambda_{2j} = \beta_{2j}/w_j$. The point is quite disturbing since it implies that the bigger the share of an item (or a class of items) on the total expenditure, the smaller the elasticities. As a consequence, the least amount of classes considered in González Rozada's paper together with the chosen functional form may explain the smaller absolute values of most elasticities in his findings.

On the other hand, our results suggest that the broken line function is the one that best explains the demand of householdsin Argentina at an item level. In fact, some preliminary fits on ENGHo'04 data usinglog-log functions led to non-significant regression coefficients and, in many cases, to coefficients with a sign opposite to that expected according to the economic theory. Therefore, we rejected the hypothesis of constant elasticities in early stages of the research although we admit that this hypothesis prevails in the literature.Despite its simplicity, the broken line function also leads to demand indices of fixed parameters, as shown in (6), as long as the proportion of individuals that consume the good remains constant.[12]

5.3 Short and Long Term Elasticities

The comparison of the elasticities presented in the appendix against those computed by Frank (2012) between 2004 and 2010 shows that the former are usually larger in absolute value than the latter. We attribute this result to the homogeneity condition of demand systems (see Ferris 1998, p. 35) which states that the sum of the price elasticity, cross-price elasticities and the income elasticity must equal zero. Consequently, goods with multiple substitutes (or with few substitutes but high substitution elasticities) also exhibit high own-price elasticities. If we assume that in the long run any good has higher chances of substitution than in the short-term, it is reasonable to expect that ENGHo elasticities were lower in absolute value than those obtained from time series. However, simple

[12]This requirement involves only demand indices of aggregates of goods such as the classes mentioned in the appendix.

inspection of the results reveals that for example about half of the food-classes of ENGHo exhibit higher own-price elasticities, although this result should be interpreted with caution because of the many confounding effects derived from the class definition and estimation technique followed by each author. Regarding income elasticities, most food-classes of ENGHo showed lower elasticities than those computed by other authors. This resultcould not be checked on non-food classes because of the unavailability of further information. So far we do not provide an explanation on these findings.

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Appendix

Table 1: Own-price and Income Elasticities of Grouped Items form ENGHo'04

Description	ENGHo code	λ_0	λ_x	λ_y
Crackers and sweet biscuits (packaged or loose), breadsticks and toasts, croissants, dry or fine masses	E1111A	1.3709	-0.6290	0.2581
White bread and bread (canned or fresh), joss sticks, hamburger or hot dogs buns	E1111B	1.2274	-0.2502	0.0228
White and brown rice, and other types of rice	E1112A	2.9134	-2.5564	0.6429
Flours and starches, semolina and semolina, oatmeal and dry cereal mixes, pizza, gnocchi, etc..	E1112B	2.2681	-1.8456	0.5775
Dried and fresh pasta, filled or unfilled (noodles, ravioli, cannelloni, gnocchi, etc..)	E1113A	1.2029	-0.3855	0.1826
Pizza ready to cook, pizza's dough, empanadas prepared uncooked pie fresh tapas or pies, other semi-prepared foods of pastries	E1113B	2.6309	-2.0871	0.4562
Beef (including minced meat, hamburgers and frozen)	E1121A	1.1194	-0.2785	0.1590
Offal and beef offal, bone with or without meat	E1121B	3.0714	-3.4498	1.3784
Whole or chopped chicken, burgers and chicken supreme, other semi-prepared food with chicken	E1122	2.7729	-2.1324	0.3594
Cold cuts and salami, fresh sausages, sausages and other meats (pate de foie excluded, the canned corned beef and corned beef)	E1125	1.8516	-1.0533	0.2017
Fresh or preserved sea food	E1131/2	5.1154	-4.8913	0.7758
Vegetable oils, margarine and animal fats for cooking	E1141/2	2.1412	-1.5546	0.4134
Fluid or powdered milk, whole or skim	E1151	1.3850	-0.5326	0.1476
Cheese of all kinds, excluding cream cheese.	E1152+E115305	1.9542	-1.2254	0.2712
Butter, cream cheese and "dulce de leche"	E1153+E115201	3.2492	-2.6319	0.3828
Yogurt and fermentedmilk	E1153B	3.2535	-2.7086	0.4551
Eggs	E1154	2.3401	-1.7006	0.3605
Tropical fruits (banana and pineapple)	E1161A	3.4892	-2.8128	0.3236
Seasonal fruits (peach, plum, strawberry, melon, watermelon, pear and grapes, except citrus)	E1161B	3.9491	-3.7332	0.7842
Apple	E1161C	3.6291	-3.0668	0.4377
Citrus fruits (lemon, tangerine, orange and grapefruit)	E1161D	3.7827	-3.0406	0.2579
Canned fruit (including olives) and dried fruit or dried	E1162	4.2623	-4.2946	1.0323
Onion, garlic and green onions	E1171A	2.0398	-1.3180	0.2782
Leafy vegetables (spinach, celery, spinach, radishes, lettuce, etc..), Cabbage (cabbage, cauliflower, broccoli)	E1171B	1.7992	-0.9844	0.1852
Potato, sweet potato and cassava	E1171C	1.2497	-0.3605	0.1108
Tomatoes	E1171D	1.2114	-0.4116	0.2002
Carrot, beetroot and radishes	E1171E	2.2229	-1.5837	0.3608
Squash and zucchini,fresh	E1171F	2.1725	-1.5007	0.3282

Canned vegetables (mainly tomatoes and beans)	E1172	0.9839	-0.2299	0.2460
Sugar and sweetener	E1181	3.3292	-2.6327	0.3035
Jam, jelly, and honey	E1182	5.9592	-5.6364	0.6772
Single ice-cream, packaged or loose	E1183	1.9116	-1.5353	0.6237
Alfajores, chocolates and other goodies	E1184	0.8394	-0.1738	0.3344
Salt, vinegar, spices and condiments (including concentrated broth)	E1191+E119302	0.8151	-0.0028	0.1878
Yeast, baking powder and baking products	E1193	4.1385	-4.0991	0.9606
Roast beef, rotisserie chicken, pizzas, cakes and pies ready to eat	E1194	2.3483	-1.4045	0.0562
Infusions (coffee, cocoa, tea and yerba mate, etc.)	E1211	1.5177	-0.7933	0.2756
Non-alcoholic beverages (soft drinks, juices, soda, mineral water, etc.)	E1212	1.0317	-0.1755	0.1438
Alcoholic beverages (wine, beer, spirits, aperitifs and spirits)	E1221/2/3/4	1.6699	-0.9604	0.2905
Meals outside with table service (lunch, dinner, breakfast and lunch)	E1311A	1.9639	-1.2017	0.2378
Meals outside without table service (fast-food, sandwiches, pizza and drinks)	E1311B	3.0575	-2.3568	0.2993
Infusions consumed outside the home (coffee, tea, mate tea with or without croissants)	E1311C	4.6577	-4.2802	0.6225
Drinks consumed outside the home (soft and alcoholic)	E1311D	5.0303	-4.8366	0.8063
Cloth and threads for weaving, from cotton, wool or synthetic	E2110	--	--	--
Clothing for men (including underwear)	E2121/24	1.0684	-0.3416	0.2732
Women's apparel (including underwear)	E2122/25	0.9512	-0.1319	0.1807
Clothing for children and babies (including underwear)	E2123/26	1.6143	-0.9634	0.3491
Leather goods and accessories to dress	E213	4.2306	-3.7336	0.5030
Laundry, laundromat, laundry and dry cleaning of clothing, shoes, and cleaning sheets and tablecloths	E2141/222101/4623	3.6295	-2.9702	0.3407
Men's footwear (shoes, moccasins, slippers, sandals, etc.)	E2211	5.1758	-4.9090	0.7332
Women's shoes (shoes, sneakers, slippers, sandals, etc.)	E2212	4.7209	-4.2518	0.5309
Kid's shoes (slippers, sandals, sandals, etc.)	E2213	5.7288	-5.5105	0.7817
Repair of personal items (clothing alterations, shoe composure, etc.), furniture and carpets	various	3.0566	-2.4661	0.4095
Rental housing for permanent use	E3111	1.8690	-1.1713	0.3023
Materials and construction labor	E3211/21	0.8635	-0.2205	0.3570
Water and sewer (including garbage collection, plumbing and cesspools cleaning)	E3321	3.7715	-2.5000	-0.2715
Electricity	E3411	2.7496	-1.2923	-0.4573
Natural gas in tubes, kerosene, wood, coal and other fuels for home	E3421A/31	1.2893	-0.7171	0.4278
Natural network gas for homes	E3421B	7.2871	-4.9902	-1.2969
Furniture, mattresses and somiers (excluding repair)	E4111/12/13	2.8861	-2.2464	0.3603
Pillows, blankets, sheets, tablecloths, dishcloths and towels (excluding repair)	E4211/12	2.5998	-2.0606	0.4608
Home appliances (cooker, ovens, heaters,	E4311/12/13/21/	4.9017	-4.6432	0.7415

refrigerators and other appliances, excluding repair)	4511			
Repair of home appliances (stoves, heaters, appliances, tools, TV and video players, computers, etc.)	various	1.8503	-1.1176	0.2673
Kitchen utensils (pans, pots, kettles, fountains, dishes and other utensils including tupperware)	E4411/12/13/14	1.7323	-1.8499	1.1176
Tools and largeequipment	E4510	--	--	--
Small tools for house and garden	E4521	--	--	--
Electric equipment (lamps, switches, transformers, cables, batteries, etc.)	E4522	2.1259	-1.4125	0.2866
Detergents, degreasers, dishwashing and cleaning powders and bathroom (including bleach)	E4611A	1.0954	-0.2485	0.1531
Detergent, soap loaf, detergents, conditioners and dressings for clothes	E4611B	0.7776	-0.1061	0.3285
Furniture polish, and cleaner	E4611C	3.8692	-3.2083	0.3391
Broom, duster, mop, dryer, bucket, sponges, rubber gloves and cellulose cloths	E4612	1.7855	-1.0809	0.2954
Trash bags, paper towels and tinfoil for cooking, disposable tableware	E4613A	3.7829	-2.9384	0.1554
Candles, incense, matches	E4613B	0.7919	0.0203	0.1878
Housekeeping (cleaning, cooking, ironing and childcare)	E4621	4.9430	-4.1919	0.2490
Medicines and vitamins (excluding infant food)	E5111A	2.9743	-2.4222	0.4480
Alcohol, gauze, bandages, syringes, thermometers, etc. (includes disposable diapers for adults)	E5121	1.8892	-1.4032	0.5140
Glasses and dentures	E5131	5.1657	-4.7523	0.5866
Medical and psychological consultation (not including surgery or nurse), laboratory and radiological studies	E5211/31	1.4518	-0.6217	0.1699
Dental consultation	E5221	3.8084	-3.1627	0.3543
Prepaid medical aid and medical emergency (including surgery, hospitalization, and geriatric nurse)	E5241/5311/9411	6.5941	-6.1976	0.6035
Gasoline, diesel and CNG, change or purchase of motor oil (not including washing and greasing)	E6114	2.4937	-2.2130	0.7193
Washing, greasing the automotive, parking and tolls	E6115/16	3.9999	-3.5538	0.5539
Train ticket, subway and bus (including charter)	E6121A/22	0.9702	-0.2320	0.2619
Taximeter and car rental with chauffer	E6121B	2.1632	-1.7697	0.6064
Phone service at home (including phone cards, excluding installation)	E6231/33B	3.2372	-2.9361	0.6988
Cell phone service (including phone cards), paging and beepers	E6232/3B	2.5870	-2.1292	0.5422
Internet service from home and from booths, booths, etc	E6233A	1.5698	-0.8720	0.3022
TV, radio, tape recorder, VCR, DVD player, personal computer (including laptops), diskettes, CD ROM, DVD, video games, etc. (excluding repair)	E7111/21/31/41/42, E722102/3	6.0052	-5.6535	0.6484
Games, toys, costumes, etc. (excludes boats and canoes)	E7221B	3.2662	-2.8407	0.5745
Sports items and games (balls, chips, etc.), canoes, kayaks, surfboards and boats	E7221A/E7231	4.5000	-5.5225	2.0225
Food and petcare	E7251	3.3105	-3.3171	1.0066

Club membership, gym, summer camp and sports court rental	E7311	7.0333	-6.8968	0.8636
Cable or satellite	E7321A	2.3580	-1.6315	0.2735
Cinema, theater, concert, dance and other cultural and recreational events	E7321B	3.8567	-3.4430	0.5863
Newspapers and magazines (including journals)	E7421	2.1879	-1.5540	0.3661
Children's books and textbooks, novels, essays, short stories, dictionaries and encyclopedias	E7411/8211	1.9694	-1.3714	0.4020
Hotel or pension, campsite or rental of housing or timeshare	E7500	4.3000	-3.6387	0.3388
Formal education (tuition and fees for primary, secondary and university)	E8111	-2.5333	-0.0003	3.5336
Textbooks and other texts for study	E8210	--	--	--
School supplies (notebook, folder, notebook, pen, ruler, etc., excluding photocopies)	E8221A	1.4705	-0.6098	0.1393
Photocopies	E8221B	1.5176	-1.6786	1.1610
Cigarettes, cigars, pipes, etc.	E9111	1.3392	-0.6753	0.3361
Hairdresser for men and boys	E9211A	3.8624	-3.1869	0.3245
Hairdressing and personal care of women	E9211B	3.8033	-3.3479	0.5446
Disposable baby diapers and baby food	E511B/923104	1.1124	-0.4165	0.3041
Toilet paper, toothbrushes, razors, sanitary napkins, disposable tissues (excluding diapers)	E9231	0.8489	-0.0417	0.1927
Cosmetics, beauty creams, deodorant, shampoo and conditioner, hairspray, etc.	E9232A	1.6256	-0.7475	0.1219
Toilet soap, toothpaste, shaving cream	E9232B	1.5605	-0.9345	0.3740
Scissors, pliers, tweezers, comb, brush, razor and shave	E9221/33	4.7980	-4.8092	1.0112
Watches, jewelry and fantasies	E931102	3.8302	-3.0776	0.2474
Social protection	E9400	--	--	--
Insurance except life and automobile insurance	E9511/21	4.7087	-4.3965	0.6878
FinancialServices	E9600	--	--	--
Funeral Services	E971108	0.2309	0.0020	0.7671