Regional Preferences in the Spanish Meat and Seafood Consumption

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Abstract. In the study of a geographically aggregated market, the choice of a representative household leads to consider the whole territory as a single, homogeneous one. However, there are reasons to believe that regional preference differences do exist when there are important cultural and climatic differences among regions, and, historically, most of them have developed and enriched their own cuisines and food preferences, as in Spain. The econometric analysis of separate demand systems of meat and seafood consumption for the aggregate Spain and for three regions, shows that differences are reflected in the patterns of complementarity and substitution.

Keywords: Meat and seafood, regional consumption patterns, Spain, indirect Allais coefficients.

1. INTRODUCTION

Many studies completed in recent years use systems of equations analyzing the demand for meat and fish. Most of them focus on the study of markets with a certain degree of regional aggregation, as national markets. In the study of a geographically aggregated market, the choice of a representative household for the aggregated market leads to consider the whole territory as a single, homogeneous one. However, there are reasons to believe that regional preference differences do exist. In such situations problems arise over the conclusions at the aggregated market level, and a regional demand analysis may be required.

For example, Wessels and Wilen (1994) study regional differences in household demand for seafood in Japan, and clearly explain the main reasoning about regional differences in consumption. There are important cultural and climatic differences between regions, and historically, most of them have developed and enriched their own cuisines and food preferences. Many of these customs involving regional consumption still exist, although the influences of demographic change and the rising of modern eating habits are changing consumption patterns. I add an additional issue concerning the Spanish case. In particular the lack of mobility of the Spanish workers and the high share of rural population until the early 70s have been suggested as the main explanation of the high Spanish unemployment (Marimon and Zibilotti, 1997). It is a general, and sad, explanation for the persistence of old habits in the Spanish regions.

The analysis of demand for meat and fish in Spain illustrates clearly the above problem, thus suggesting a focus in regional differences. However, the recent analyses of demand systems for meat and fish in Spain have been tackled generally at the national level, thus ignoring the study of regional preference differences, as in Gracia and Albisu (1995) and Gracia, Gil and Koç (1995), or Lombán and Millán (1998). The main exception in considering regional patterns is Lombán (1997), finding prices statistically endogenous in meat and fish regional demand systems. However, the use of household consumption data, and ignoring away from home consumption, is a main caveat against the estimating of inverse demand systems. Thus, it is interesting the study in a direct demand framework.

There is another issue I want to analyze. The terms of the estimated Slutsky substitution matrix are imperfect measures of the complementarity and substitution interactions between goods [Charette and Bronsard (1975)]. An alternate measure is proposed by Allais (1943), and Barten and Bettendorf (1989) develop and apply it to an inverse demand system. Barten (1991) shows the Allais approach in the direct demand system, in an implicit matrix form. Schroyen (1997) have applied directly this approach to an indirect utility function, giving the so called indirect Allais coefficients in closed form. The Allais' type intensities of interaction with respect to a standard pair, are related in a definite way to the shape of the utility function.

Both Barten and Schroyen use a functional form of the Rotterdam type. In this paper the approach is used with the Linear Almost Ideal Demand System (LAIDS) of Deaton and Muellbauer (1980).

The purpose of this paper is the regional study of the consumption of meat and fish in Spain, analyzing in home demands with quarterly data in Spain and in three regions. In the following section we introduce the data and a description of the patterns of national and regional fresh meat and fish consumption. The third section introduces the theoretical model. Tests for theoretical restrictions, elasticities and indirect Allais coefficients are presented in the fourth section to analyze regional differences. The final section summarizes the main results and offers some concluding remarks.

2. DATA

Quantity and price data used in this analysis are from the Food Consumption Panel of the Spanish Ministry of Agriculture, Fisheries and Food (MAPA). The average results under several aggregation criteria are available, including a decomposition in eight regions. National and regional aggregation data for three regions are chosen. I have selected the three most populated regions: Northeast (20.3% of the Spanish population), Center-South (19.7%) and Andalucia (18.3%). Moreover Center South includes Madrid, and Northeast includes Barcelona, the most important metropolitan areas in Spain.

Each data set consists of monthly observations from January-87 to September-96. Lombán (1997) presents evidence of endogeneity in meat and fish prices (unit values) with monthly data. I have changed frequencies to quarterly by adding quantities and values over three months, and calculating the resulting unit values.

The original data consists of twelve items in the meat and fish groups: chicken, beef, pork, lamb, rabbit, other fresh meat, frozen meat, transformed meat, fresh fish, frozen fish, transformed fish, and crustaceans and molluscs. From the original data of twelve groups of meat and seafood, I have chosen six items: chicken, beef, pork, fresh fish, frozen fish, and crustaceans and molluscs. Other groups are of lesser importance and, in general, very heterogeneous. The only important exception is transformed meat, with a large share in meat consumption, but including very different species, being chicken, beef and pork among them.

Thus, it is assumed that the six good considered are separable from other goods in the budget. Table 1 shows a statistical summary of per capita consumption levels, deflated prices with Laspeyres-like indexes with weights at mean shares, budget shares, and group expenditures for the six goods and four areas.

Meat and fish consumption patterns vary among regions. As an example, beef is the main budgetary group in Centre-South and important in Northeast, but with a remarkable lesser share in Andalucia. In Andalucia, pork and chicken are the main meat groups. Fresh fish consumption is remarkable for all regions. It is very interesting that quantity of fresh fish consumption is larger in Center-South (inner) than in Northeast and Andalucia, both of them coastal areas. This is a good example about the importance of Madrid in fish distribution. Prices are higher in Northeast, excepting for chicken. Prices for fish and seafood and chicken are lower in Andalucia. Although the differences seem not very large in general, the possibility of different responses to relative prices, expenditure or seasonal variations, is worth of further analysis.

QUANTITIES	kg			
	SP	NE	CS	AN
Fresh fish	3.2	2.8	3.5	3.2
Frozen fish	1.1	1.0	1.1	1.1
Crust&Mollusc	1.6	1.9	1.5	1.5
Beef	2.1	2.0	2.4	1.0
Chicken	4.1	4.6	4.0	4.3
Pork	2.0	1.9	2.0	2.3
PRICES	pta/kg			
	SP	NE	CS	AN
Fresh fish	625	738	625	526
Frozen fish	532	603	511	446
Crust&Mollusc	708	777	743	638
Beef	1044	1129	1017	1029
Chicken	312	313	330	302
Pork	619	675	586	620
SHARES				
	SP	NE	CS	AN
Fresh fish	0.24	0.23	0.25	0.25
Frozen fish	0.07	0.06	0.06	0.07
Crust&Mollusc	0.14	0.16	0.13	0.14
Beef	0.26	0.25	0.28	0.15
Chicken	0.15	0.16	0.15	0.19
Pork	0.15	0.14	0.13	0.20
EXPENDITURE (GROUP)				
	SP	NE	CS	AN
peseta	8319	9141	8756	6948

Table 1: Statistical summary. Means.

3. THE MODEL

In order to compare the different regions empirically, I use a common model for all of them. Concerning possible functional forms, what we might expect from our demand system is the ability to obtain a realistic picture of the substitution, own price and income (expenditure) effects that may arise after a change in the structure of relative prices. In this sense, a simple extension of the Linear Almost Ideal System of Deaton and Muellbauer (1980), used by Asche et al. (1998), in budget shares is given by

$$w_i = a_i + \Sigma j\, b_{ij} \log p_j + d_i \log(M/P) + a_{it}\, t \qquad (1)$$

and M, **p** are total expenditure and prices, respectively, and t is a time trend centered in mid-sample. P is measured by the Laspeyres-like index analyzed in Moschini (1995) and Asche and Wessels (1998)

$$\log P_t = \Sigma_i\, w_{i0} \log(p_{it}/p_{i0}) \qquad (2)$$

The model embodies theoretical restrictions as adding up (which is satisfied automatically by the system if it is estimated by linear methods), homogeneity and symmetry (that can be imposed and tested as restrictions on the parameter vectors) and negativity (which cannot be imposed but can be tested looking at the sign of the Slutsky matrix).

The theoretical restrictions on the equation system are:

Adding-up $\Sigma_i a_i = 1$, $\Sigma_i a_{it} = 0$, $\Sigma_i b_{ij} = 0$, $\Sigma_i d_i = 0$ (3)

Homogeneity $\Sigma_j b_{ij} = 0$ (4)

Symmetry $b_{ij} = b_{ji}$, $i \neq j$ (5)

Seasonal variations are included by making in (1) the parameter $a_i = c_{i1} + \Sigma_k c_{ik} D_k$ to each equation (i=1,2..n) where k=2,3,4, and D_k is a dummy variable that equals one for quarter k and is zero for all other quarters. The parameter c_{i1} takes the first quarter as a comparison basis. Because of (3), $\Sigma_i c_{i1} = 1$ and $\Sigma_i c_{ik} = 0$, k=2,3,4. A change in the methodology by MAPA in January 1993 Is embodied adding the term $c_{93i}D_{93}$ to each equation (I=1,2. n?. D_{93} is a dummy variable that equals one since 1993 and is zero for all previous periods. Moreover, results concerning the theoretical restrictions of homogeneity and symmetry and with respect to autocorrelation problems improve adding in each equation an additional trend term $c_{it}D_{93}$ t. Adding-up implies $\Sigma_i c_{93i} = 0$, and $\Sigma c_{it} = 0$.

The systems of conditional demand equations in Spain and in each region, are estimated by maximum likelihood methods. An arbitrary equation -demand for pork- is deleted to ensure nonsingularity of the error covariance matrix. The coefficients of the omitted equation are recovered by using the estimated coefficients of the other five equations and the theoretical restrictions (3).

The formulae for elasticities at the normalization point are those in Asche and Wessels (1987)

Expenditure $$f_i = \frac{d_i}{w_i} + 1 \qquad (6)$$

Compensated $$e^*_{ij} = -\delta_{ij} + \frac{b_{ij}}{w_i} + w_j \qquad (7)$$

Uncompensated $$e_{ij} = -\delta_{ij} + \frac{b_{ij}}{w_i} - \frac{d_i}{w_i} w_j \qquad (8)$$

However, the analysis of cross elasticities is difficult to interpret and is not without problems, as Charettte and Bronsard (1975) or Barten (1991) noted. Substitution (complementarity) is characterized by a positive (negative) elasticity, while independence has $e_{ji} = 0$. Because of the adding-up and homogeneity conditions combined with negative own- price elements this criterion requires a dominance of positive k (substitution), on the compensated elasticities. Although the criterion is usually extended to elasticities analyzed in uncompensated form, it is unclear what substitute and complement really imply about preferences.

Charette and Bronsard (1975) and Barten (1991) recover a criterion by Allais (1943) which is invariant both in sign as in size, while requiring the arbitrary choice of a reference pair rs for comparison. Schroyen (1997) develops a parallel version of this criterion for the indirect utility function $v(\boldsymbol{\pi})=v(\mathbf{p}/M)$. The indirect Allais coefficient a_{ij} is given by

$$a_{ij} = \left(\sum_k v_k \pi_k\right)\left(\frac{v_{ij}}{v_i v_j} - \frac{v_{rs}}{v_r v_s}\right) \qquad (9)$$

It is clear that the indirect Allais coefficient is invariant. The coefficient Aij measures the interaction between i and j in comparison with that between a standard pair of goods r and s. Clearly, $a_{rs} = 0$. It is natural to select for the standard a pair of goods which are mutually independent. Contrary to the direct Allais coefficient, a negative value of the indirect Allais coefficient a_{ij} reflects complementarity, and a positive one substitution.

Until now the Allais coeficients have been estimated for Rotterdam-like models, with the exception in Millán and Aldaz (1998) where an inverse translog model is estimated. The indirect Allais coefficients can be calculated for whatever demand system following :

$$a_{ij} = -\frac{e^*_{ij}}{w_j} + \frac{e^*_{rs}}{w_s} + e_i - e_r + e_j - e_s \qquad (10)$$

The previous analysis solves the problems concerning signs, but some normalization concerning intensities is still needed. Schroyen (1997) defines an intensity measure as

$$i_{ij} = 100 \frac{a_{ij}}{M_a - m_a} \qquad (11)$$

where M_a= max (a_{ij}; $i \neq j$); m_a=min(a_{ij}; $i \neq j$).

4. THE EMPIRICAL ANALYSIS

I estimate the above model with the data explained in section 2. Since the data add up, the conditional errors also sum to zero and the conditional covariance matrix is singular. To overcome this singularity problem, an arbitrary equation must be omitted from the system. Thus, since fish and meat demands are analyzed in six items, five conditional demand equations were jointly estimated as a system using maximum likelihood methods in TSP 4.4. The coefficients of the omitted equation (pork) are recovered by using the estimated coefficients of the remaining equations and the theoretical restrictions.

	Log-likelihood				
	par.	SP	NE	CS	AN
general	65	848.1	797.3	756.4	705.2
homogeneity	60	841.3	792.5	753.3	699.9
symmetry	50	830.2	786.8	744.5	690.8
	Likelihood ratio				
	d.f.	SP	NE	CS	AN
homogeneity	5	13.6	9.7	6.2	10.7
symmetry	10	22.3	11.3	17.6	18.2
Critical values:					
Degrees of freedom=5		p(.01)= 15.1		p(.05)= 11.1	
Degrees of freedom=10		p(.01)= 23.2		p(.05)= 18.3	

Table 2. Test of theoretical restrictions.

The homogeneity restriction is imposed by entering all prices relative to that of the excluded good, and it is tested by means of a likelihood ratio test against the unrestricted system. Symmetry is imposed and tested against the homogeneous system by means of a likelihood ratio test. In Table 2, I present test statistics for the hypotheses under the alternatives of the unrestricted model: a) homogeneity, b) symmetry given homogeneity. All theoretical restrictions are accepted.

I do not present the detailed results of the estimations in such largely parameterized models. The equations' R^2 are fairly good, with a majority above .9, and being .71 for beef in Andalucia the lower. Some details about the eestimated equations are presented in Appendix A.

I do not make any formal tests of the hypothesis that all parameters or elasticities are identical for the different regions, due to the obvious dissimilarities between the particular results.

Only results concerning trends are almost equal in signs. There is a decreasing consumption of chicken, beef, pork and frozen fish, although the decrease of chicken and beef consumption in Andalucia is not statistically significant. The trends show an increasing consumption of fresh fish and crustaceans and molluscs. The dummy-trends since 1993 reinforce the previous trend for chicken, beef and frozen fish. However it is significant positive for pork, and significant negative for crustaceans and molluscs, and nonsignificant negative for fresh fish.

The only common agreement with respect to seasonality arises for lesser consumption of frozen fish in the second quarter (April to June) and of fresh fish in the fourth quarter (October to December), and an increase in consumption of crustaceans and molluscs in the fourth quarter.

	SP	**NE**	**CS**	**AN**
Fresh fish	1.10	1.07	**1.50**	0.95
	0.17	0.17	0.18	0.14
Frozen fish	0.96	1.00	0.67	**0.59**
	0.11	0.22	0.25	0.20
Crust&Mollusc	**0.34**	0.80	0.73	**0.41**
	0.14	0.19	0.21	0.18
Beef	1.09	1.26	**0.71**	0.99
	0.11	0.16	0.13	0.16
Chicken	0.99	1.04	0.85	0.79
	0.07	0.09	0.13	0.12
Pork	1.41	**0.56**	1.32	**2.14**
	0.37	0.24	0.49	0.45

Table 3. Expenditure elasticities.
Second row:st.dev.

Table 3 contains expenditure elasticities. Expenditure elasticities differing to -1 larger than twice their asymptotic standard errors are marked bold. All these expenditure elasticities are within group. The reference is unitary elasticities. The first remark is that the expenditure elasticities differ greatly. Fresh fish is a luxury only in Centre South, being unitary in all other regions. Frozen fish is a necessity in Andalucia and Centre South. Crustaceans and molluscs are necessities in all regions, but significant as different from unitary only for Andalucia and the national aggregate. Beef is a necessity in Center-South.

The more diverse result is for pork, a luxury in Andalucia and a necessity in Northeast. It is remarkable that pork consumption is larger in Andalucia. This suggest differences in tastes that are reflected in diverse non-homothetic patterns of expenditure increasings in meat and seafood.

The own-price, shown in Table 4, are negative in all cases, as required by theoretical properties on curvature. They are highly significant with the exception of frozen fish in Andalucia and fresh fish in Center-South. There are several differences in magnitude. Fresh fish is elastic in the aggregate only. Pork is clearly elastic in all cases.

	SP	**NE**	**CS**	**AN**
Fresh fish	-1.61	-0.94	-0.42	-0.91
	0.25	0.18	0.28	0.27
Frozen fish	-0.53	-0.31	-0.50	-0.34

	0.09	0.13	0.17	0.20
Crust&Mollusc	-0.41	-0.42	-0.72	-0.51
	0.15	0.16	0.19	0.19
Beef	-1.01	-1.12	-0.92	-0.79
	0.17	0.16	0.17	0.21
Chicken	-0.40	-0.25	-0.40	-0.59
	0.06	0.05	0.10	0.14
Pork	-2.09	-1.64	-2.20	-2.55
	0.30	0.18	0.38	0.55

Table 4. Own-price compensated elasticities.
Second row:st.dev.

The uncompensated elasticities are presented in Appendix B. The results are not very different to those with the indirect Allais coefficients, but the latter reflect the differences more clearly. I select chicken and frozen fish as the reference pair. This pair is selected because chicken and frozen fish are the cheaper goods without a priori reason to be considered as substitute or complements. According to the compensated elasticities, only in Northeast chicken and frozen fish appear as slightly significant substitute.

Schroyen (1997) suggest that values of the normalized intensity coefficients i_{ij} in (11), between –100 and –10 indicate strong substitution, between –10 and –1 mean weak substitution between –1 and 1 suggest independence, $1 < i_{ij} < 10$ is weak complementarity, and $10 < i_{ij} < 100$ show strong complementarity. This criterion seems too wide. I simply comment on values that are highly significant in the indirect Allais coefficient a_{ij} in (10). Standard values are calculated using the procedure Analyz in TSP4.4.

Table 5 presents the results for the different regions. An examination reveals substantial evidence for dissimilarity between the regions. The normalized coefficients i_{ij} from significant indirect Allais coefficients are marked in bold. They are generally larger than 50 in absolute value, excepting in Northeast. The larger number of pairs with a significant different pattern of more substitute than chicken and frozen fish is in the national aggregate Spain: fresh fish is relatively substitute to crustaceans and molluscs, beef, and pork. Frozen fish and beef are substitute. Also beef and pork, and pork and chicken are substitute. This pattern is very dissimilar to that of any region analyzed. The pairs involving fresh fish appear only for Spain.

The only common pairs are (beef,pork) and (pork,chicken) that are substitute in Northeast and Andalucia. There are not other pairs with the same significant pattern in these two regions. In Andalucia, there is a very important substitution relationship between frozen fish and crustaceans and molluscs, while in Northeast this pair is a complement. By the other side, there are three complement pairs in Northeast: (fresh fish, frozen fish), (crustaceans and molluscs, chicken) and (beef, chicken). The intensity is of different sign in Andalucia for these latter pairs, although not significant. Alternatively, we can think of chicken and frozen fish as highly substitute in Northeast, more than suggested by the compensated elasticities (or by the not significant uncompensated elasticities).

	Frozen fish	**Crust. Moll.**	**Beef**	**Chick.**	**Pork**
SPAIN					
Fresh fish	-6	**-70**	**-70**	-31	**-47**
Frozen fish	.	-10	**-45**	0	-20
Crust&Moll.		.	-7	-13	-22
Beef			.	22	**-65**
Chicken				.	**-78**
NORTHEAST					
Fresh fish	**58**	-11	-10	14	11
Frozen fish	.	17	-17	0	26
Crust&Moll		.	14	**39**	6
Beef			.	**38**	**-36**
Chicken				.	**-42**
CENTER-SOUTH					
Fresh fish	33	3	-4	3	6
Frozen fish	.	40	**-43**	0	**-60**
Crust&Moll.		.	-18	5	**-52**
Beef			.	-1	-26
Chicken				.	-23
ANDALUCIA					
Fresh fish	-11	-34	-38	-25	-20
Frozen fish	.	**-75**	-40	0	16
Crust&Moll.		.	25	-21	-46
Beef			.	-1	**-70**
Chicken				.	**-53**

Table 5. Normalized indirect Allais coefficients.

Frozen fish and fresh fish appear as 'weak' complement in Center-South, and the pattern is similar for frozen fish and crustaceans and molluscs. The main relationships in Center –South is substitution for (frozen fish, beef), (frozen fish, pork) and (crustaceans and molluscs, pork).

Thus, I have presented evidence of very different patterns of substitution and complement in meat and seafood consumption in the regional Spain. These comparisons of substitution are compared with those of a standard pair (frozen fish, chicken). Alternate selections of a standard pair could highlight other relationships that are not presented with this particular choice. In any case, the evidence against a common preference structure is high.

5. CONCLUSIONS

In this paper, meat and seafood consumption patterns are studied for Spain and the three more populated of the eight regions available from the Food Consumption Survey of the Spanish Ministry for Agriculture, Fisheries and Food. To compare the different regions empirically, I use a common model for all of them, this being a simple extension of the LAIDS model. The common model is not further extended by pooling the separate regions because the differences in derived elasticities are great enough to reflect the various patterns in meat and seafood consumption in the Spanish regions.

The most obvious conclusion that can be drawn from the results in this paper is how different the Spanish regions are regarding meat and seafood consumption. Expenditure elasticities vary considerably from region to region, in same cases, as in pork, dramatically. Own price elasticities vary less, but some differences are still significant. A study of significant indirect Allais interactions, based on recent development by Shroyen (1997), reveals substantial variations in substitution and complement patterns. This is a somewhat ad hoc procedure, but it is enough to suggest the existence of different consumption patterns.

The same criticism of ''ad hocity'' applies to functional form, aggregation, and several corrections, such as seasonal and intervention dummies and time trends. More sophisticated econometrics and better data (including microdata) are some further possibilities. However, the main conclusion concerning different consumption patterns on a regional basis seems justified. Climatic and cultural differences between the regions seem to lead to noticeable effects concerning meat and seafood consumption.

The information in this study suggests the existence of separate markets in Spain. Perhaps not only 'preferences' are not alike, but also the particular cuts (for meat, fish), presentations (age, size, and so) or varieties (for fresh fish, meat) aggregated under the headings in this study. These findings may allow those interested in seafood and meat production and distribution analysis to anticipate changes in the retail markets. Moreover, perhaps further regional disaggregattion is needed. As an example, Center-South includes the Metropolitan Madrid and large rural areas in Extremadura. The more general proposal is that more attention must be paid to regional characteristics in understanding food consumption.

6. ACKNOWLEDGEMENTS

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Apendix A. SOME ESTIMATION RESULTS.

Each restricted system (homogeneity and symmetry imposed) has 5 equations, 39 observation and 50 parameters.

SPAIN

	Fresh fish	Frozen fish	Crust&Moll.	Beef	Chicken
R^2	0.893	0.985	0.981	0.881	0.966
D-W	1.034	1.723	2.442	1.201	1.986

NORTHEAST

	Fresh fish	Frozen fish	Crust&Moll.	Beef	Chicken
R^2	0.899	0.957	0.937	0.737	0.972
D-W	1.323	1.615	1.743	1.299	1.979

CENTER-SOUTH

	Fresh fish	Frozen fish	Crust&Moll.	Beef	Chicken
R^2	0.898	0.951	0.971	0.876	0.916
D-W	1.600	1.981	1.818	1.186	1.234

ANDALUCIA

	Fresh fish	Frozen fish	Crust&Moll.	Beef	Chicken
R^2	0.792	0.909	0.926	0.711	0.794
D-W	1.468	1.838	2.140	1.013	1.807

Apendix B. Uncompensated elasticities

SPAIN	Price of					
	Fresh fish	Frozen fish	Crust&Moll.	Beef	Chicken	Pork
Fresh fish	-1.88	-0.20	0.47	0.47	0.06	0.23
	0.25	0.19	0.18	0.15	0.11	0.30
Frozen fish	-0.07	-0.60	-0.06	0.05	-0.08	-0.02
	0.06	0.09	0.06	0.04	0.03	0.06
Crust&Mollusc	0.17	-0.21	-0.46	-0.23	-0.19	-0.13
	0.11	0.11	0.14	0.08	0.06	0.14
Beef	0.50	0.22	-0.21	-1.30	-0.54	0.45
	0.17	0.17	0.17	0.18	0.10	0.21
Chicken	0.02	-0.19	-0.10	-0.34	-0.56	0.33
	0.08	0.08	0.07	0.06	0.06	0.10
Pork	0.16	0.01	0.02	0.25	0.32	-2.27
	0.13	0.08	0.10	0.08	0.06	0.29

2nd row: Standard error.

Apendix B. Uncompensated elasticities. (cont.)

	Price of					
NORTHEAST						
	Fresh fish	Frozen fish	Crust&Moll.	Beef	Chicken	Pork
Fresh fish	-1.18	-0.79	0.27	0.26	-0.11	-0.06
	0.18	0.21	0.17	0.12	0.08	0.20
Frozen fish	-0.20	-0.36	-0.04	0.09	0.02	-0.08
	0.05	0.13	0.05	0.05	0.04	0.07
Crust&Mollusc	0.15	-0.16	-0.55	-0.12	-0.40	-0.04
	0.12	0.16	0.17	0.10	0.06	0.14
Beef	0.34	0.47	-0.08	-1.45	-0.49	0.81
	0.15	0.24	0.17	0.18	0.09	0.22
Chicken	-0.08	0.07	-0.34	-0.33	-0.42	0.52
	0.06	0.10	0.06	0.05	0.06	0.08
Pork	-0.09	-0.22	-0.06	0.30	0.35	-1.71
	0.09	0.13	0.10	0.08	0.05	0.17
CENTER SOUTH						
	Fresh fish	Frozen fish	Crust&Moll.	Beef	Chicken	Pork
Fresh fish	-0.81	-0.65	-0.06	0.08	-0.07	-0.11
	0.28	0.34	0.24	0.17	0.17	0.35
Frozen fish	-0.21	-0.54	-0.24	0.15	-0.05	0.23
	0.09	0.17	0.09	0.06	0.06	0.11
Crust&Mollusc	-0.14	-0.52	-0.82	0.08	-0.16	0.43
	0.12	0.19	0.18	0.09	0.09	0.19
Beef	-0.13	0.67	0.15	-1.12	-0.20	0.32
	0.20	0.27	0.21	0.18	0.14	0.31
Chicken	-0.14	-0.10	-0.16	-0.09	-0.52	0.16
	0.10	0.15	0.11	0.07	0.11	0.16
Pork	-0.07	0.46	0.39	0.19	0.16	-2.34
	0.12	0.17	0.13	0.09	0.09	0.37
ANDALUCIA						
	Fresh fish	Frozen fish	Crust&Moll.	Beef	Chicken	Pork
Fresh fish	-1.14	-0.24	0.16	0.23	0.00	-0.08
	0.27	0.32	0.21	0.22	0.16	0.32
Frozen fish	-0.09	-0.38	0.22	0.05	-0.15	-0.22
	0.09	0.20	0.09	0.09	0.07	0.13
Crust&Mollusc	0.02	0.48	-0.57	-0.64	-0.13	0.15
	0.13	0.22	0.19	0.13	0.10	0.22
Beef	0.16	0.18	-0.56	-0.95	-0.27	0.53
	0.14	0.22	0.15	0.21	0.11	0.21
Chicken	-0.03	-0.38	-0.08	-0.37	-0.75	0.37
	0.13	0.21	0.14	0.15	0.14	0.22
Pork	0.14	-0.26	0.41	0.68	0.50	-2.89
	0.20	0.28	0.22	0.20	0.16	0.57

2nd row: Standard error.