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Research Article

Seasonality in Household Demand for Meat and Fish: Evidence from an Urban Area

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Abstract: This paper, using the Almost Ideal Demand System (AIDS), derives estimates of factors influencing household demand for meat and fish during different seasons. Using primary data obtained from the survey, a system of equations pertaining to budget share, demand elasticities of own price, cross price and expenditure for meat and fish was estimated. The main conclusion is that there are seasonal effects on the consumption of meat and fish. In particular, during the Muslim Festival of Sacrifice the budget share of meat increases. Further, people living in urban areas were not sensitive to price increases except for in anchovy. This study is of importance to policy makers, producers and marketing strategists alike, as this conclusion will help them to design their respective policies to use resources more efficiently.

Key Words: Budget share, price elasticity, expenditure elasticity, meat consumption, seasonality

Et ve Balık Eti Hanehalkı Talebinin Mevsimselliği: Bir Kentsel Alan Örneği

Özet: Bu çalışma, Almost Ideal Demand System (AIDS)'i kullanarak, farklı mevsimlerde et ve balık için hane halkı talebine etkili faktörlerin tahmininde çıkarımlarda bulunmaktadır. Anket verileri kullanılarak, bütçe payı, talebin fiyat elastikiyeti, çapraz elastikiyet ve balık ve et için harcamalar, eşitlikler sistemi ile tahmin edilmiştir. Özellikle, Kurban Bayramı dönemlerinde bütçe paylarında artış olması durumu et ve balık tüketiminin mevsimsel etkisini inceleyen bu çalışmanın temel sonucu olmuştur. Bunun ötesinde, kentsel alanda yaşayan insanlar, hamsi hariç, fiyat artışlarına karşı duyarlı oldukları bulunamamıştır. Bu çalışma, politika yapıcıları, üreticiler ve pazarlama uzmanlarının izleyecekleri politikalarda etkili kaynak kullanımlarının düzenlenmesine, bu sonuçların onlara yardımcı olabilmesi bakımından önemlidir.

Anahtar Sözcükler: Bütçe payı, fiyat elastikiyeti, harcama elastikiyeti, et tüketimi, mevsimsellik

Introduction

For healthy and balanced nourishment, animal protein is claimed to be important. One's daily protein requirement is 70 g and two-thirds of this should be animal protein. In Turkey, per capita daily consumption of protein is only 8 g and for fish it is 7 g (1).

During the last 10-15 years, however, fish consumption in Turkey has increased, especially from aquaculture. A large portion of fish consumption in Turkey is fresh fish (70%), followed by frozen (4%), canned (1.5%) and salted (0.4%). Low and average income groups spend only 0.4% of their budget on fish, whereas meat consumption in average income groups is 5.5%. Fish is consumed in Turkey at least once a year in 98% of households. According to Macalister Elliott and Associates Ltd, the most commonly consumed types of fish (in kg) are anchovy (13.87), horse mackerel (3.54), trout (2.40), hake (1.32), mullet (1.02), atlantic bonito (0.92), sea bass (0.67), sea bream (0.41), sardine (0.40) and red mullet (0.22)(2). Annual meat and chicken consumption is 20-27 kg and 9.53 kg, respectively (3).

Although being surrounded by seas, Turkey's share of the total world supply of fish products is only 0.5% and it is an importer of fish products. Fish products are imported mainly from EU and EFTA countries in frozen form. Turkey has been spending about $21 million annually on imports of fish. Although imports of fish and products were almost zero from 1979 to 1983, they increased to $2 million in 1988, reached $28 million in 1990 and finally reached a maximum value of $85 million in 1997 (4).

Imports of fish are burden to the national exchequer. Some studies explored the reasons for Turkish fishery being in this state despite its favorable location (2). However, these studies did not examine household demand or the impact of seasonality on the consumption of fish, which are equally important for producers, marketing strategists and policy makers.

Although there are some studies (5-15) pertaining to demand estimation, none of them explored the impacts of seasonality on meat and fish consumption. The aim of this study, hence, was to estimate the effect of seasonality on meat and fish consumption. Another point that makes this study distinct from previous ones is the fact that in this study demand elasticities are estimated using survey data rather than time series data.

From a policy point of view, demand elasticities are of considerable interest. The analysis and knowledge of household demand for various food items not only assist in estimating the responsiveness of an household of a particular income group to price changes but also help in designing policies for public welfare. In other words, this responsiveness will show how a household behaves and allocates resources in terms of the expenditure share of each food item.

Materials and Methods

Data for this study were obtained through a survey performed in Ankara, which consists of 15 municipalities. After grouping these 15 municipalities into 3 categories according to their income level (i.e. high, medium and low), 3 municipalities, 1 from each category, were selected randomly. Later, from these 3 selected municipalities, 500 households were selected randomly and information regarding their monthly expenditure on fish and meat products and quantities purchased was obtained (16). Expenditures on fish and meat products represent all expenses on fresh as well as processed items of the relevant category of fish and meat. Each household was considered a consumption unit that reflects choice of and preference for meat and fish consumption. This survey was conducted in December 2001.

The dynamics (flexibility) of fish (real) prices are determined using both linear and double logarithmic (double-log) functional equations. The double logarithmic function, however, produced the best results and was taken as shown in equation (1) (17). Real prices used here are obtained by deflating nominal prices by the consumer price index (CPI).

$$\ln p_t = \Pi_0 + \Pi_1 \ln p_{t-1} - \Pi_2 Q_t + \Pi_3 Zt \quad (1)$$

where P is the price of the product, Q is the quantity sold, and Z is the stochastic variable. The coefficient of quantity variable gives the flexibility (17).

In the literature, although various empirical demand systems with different specifications and functional forms are available, in this study we used the Almost Ideal Demand System (AIDS) model.

The expenditure function is specified as a function of utility (u) and prices (p) (18).

$$\ln C(u,p) = \alpha_q + \sum_{k=1}^{n} \beta_k \ln P_k + \frac{1}{2} \sum_k \sum_j r_{kj} \ln P_k \ln P_j + ub_0 \prod_{k=1}^{n} P_k^{bk} \quad (2)$$

From the logarithmic derivation of this function, the budget share of each commodity is derived as follows.

$$\frac{\partial \ln c(u,p)}{\partial \ln p_i} = \frac{P_i q_i}{\gamma} = \omega_i \quad (3)$$

Later budget share is taken as a function of prices and utility:

$$\omega_i = \alpha_i + \sum_{j=1}^{n} v_{ij} \ln p_j + b_i ub_0 \prod_{k=1}^{n} P_k^{bk} \quad (4)$$

where Vij=1/2(rij+rji).

With this function, the AIDS demand system is expressed as

$$\omega_i = \alpha_i + \beta_i \ln \frac{\gamma}{p} + \sum_{j=1}^{n} v_{ij} \ln P_j \quad (5)$$

where ω_i or $\frac{P_i q_i}{\gamma}$ is the budget share of commodity , P_i is the price of commodity i and q_i is the quantity of commodity i.

The beta (β_i) parameter shows the real income, and vij gives the effect of price changes on budget shares assuming the real income constant. In the model there is also arrangement of demand estimation for different varieties of meat and fish. Since the demand for different varieties of meat varies with habits and other factors (i.e.

seasons), an attempt is, therefore, made to determine the effects of these factors through the introduction of dummy variables. Seasonal expenditures pertaining to these products are estimated as follows:

$$\alpha_i = \delta_i + \Sigma_z \Theta_z D_z \quad (6)$$

where z = winter, autumn and D_z are dummy variables that are equal to 1 for the concerned season (z) and 0 otherwise.

From the AIDS model, price elasticity, cross-price elasticity and Marshallian elasticity are calculated (19):

$$\eta_{ij} = \psi_{ij} + v_{ij} / \omega_i - \beta_i (\omega_i / \omega_j) \quad (7)$$

where η_{ii} is price elasticity, η_{ij} is cross-price elasticity, and ψ_{ij} is the Kronecker delta, if i=j equals –1, otherwise 0. Expenditure elasticities are measured as follows:

$$\xi_i = 1 + \beta_i / \omega_i \quad (8)$$

Results

Table 1 shows the descriptive statistics of the products in this study. The upper part of this Table shows the expenditure share of each product of total expenditure on meat and fish, and the lower part presents a summary of price statistics of these products.

Using equation (1) the dynamics of fish prices are estimated and the results are given in Table 2. The values in parentheses are of t-statistics. No evidence of serial correlation was found at the 5% level (20) (in 1994, 1 $=38,495 TL).

Demand equation (4) was estimated using regression with a statistical program (MINITAB). The results are presented in Table 3 and t values are in parentheses. The coefficient of determination (R^2) for these equations ranged from 0.66 to 0.95. No evidence of serial correlation was found at the 5% level.

Table 1. Summary of statistics of the variables.

Meat types	Budget share (%)			
	Mean	SD	Minimum	Maximum
Beef	0.3117	0.0384	0.2470	0.3744
Chicken	0.3131	0.0155	0.2632	0.3610
Mutton	0.0830	0.0162	0.0511	0.1129
Other meat	0.0732	0.0207	0.0418	0.1026
Anchovy	0.0336	0.0121	0.0225	0.0437
Horse mackerel	0.0247	0.0122	0.0132	0.0352
Atlantic bonito	0.0062	0.0008	0.0052	0.0071
Blue fish	0.0089	0.0065	0.0022	0.0155
Trout	0.0193	0.0085	0.0104	0.0280
Sea bream	0.0092	0.0015	0.0071	0.0111
Hake	0.0083	0.0041	0.0039	0.0125
Other fish	0.1088	0.0512	0.0566	0.1600
	Price (TL/kg)			
Beef	3,385,946	226,649	3,005,272	3,997,895
Chicken	1,174,926	14,185	1,150,000	1,200,000
Mutton	3,599,194	149,149	3,350,000	3,850,000
Other meat	3,385,196	211,840	3,005,264	3,750,000
Anchovy	734,980	186,434	425,000	1,052,631
Horse mackerel	833,220	98,121	665,500	1,000,000
Atlantic bonito	1,649,178	364,135	1,000,000	2,250,000
Blue fish	2,990,940	645,422	1,882,352	4,117,647
Trout	2,450,771	27,779	2,400,000	2,500,000
Sea bream	4,233,867	435,673	3,500,000	5,000,000
Hake	274,346	44,590	200,000	350,000
Other fish	3,182,966	233,607	1,500,000	8,000,000

Table 2. Price flexibility for fish at wholesale market level.

Variety	Constant	P_{t-1}	Flexibility	Adjusted R_2
Pike-perch	0.6442	0.9001	-0.0395	0.87
	(3.32)	(19.55)	(-8.82)	
Trout	2.1658	0.7956	-0.0045	0.77
	(2.58)	(13.35)	(-3.73)	
Red mullet	1.0627	0.8718	-0.0514	0.85
	(2.79)	(17.93)	(-2.81)	
Blue fish	0.4870	0.9454	-0.0283	0.91
	(3.79)	(24.35)	(-2.48)*	
Sea bream	2.8306	0.7408	-0.0075	0.77
	(3.54)	(13.71)	(-2.91)	
Anchovy	0.7140	0.8929	-0.0361	0.87
	(2.45)*	(19.84)	(-2.02)*	
Horse mackerel	5.4029	0.2826	-0.1371	0.11
	(3.59)	(2.32)*	(-2.08)*	
Mullet	9.6703	0.0106	-0.1396	0.47
	(6.47)	(3.93)	(-2.84)	
Spanish mackerel	5.1979	0.4715	-0.1774	0.35
	(3.67)	(2.40)*	(-3.16)	
Sea bass	8.1061	0.2096	-0.1416	0.42
	(5.12)	(2.78)	(-6.45)	
Hake	5.0290	0.2717	-0.1676	0.17
	(2.65)	(8.11)	(-8.93)	
Atlantic bonito	3.9053	0.5245	-0.1733	0.39
	(3.20)	(2.83)	(-3.17)	
Sardine	8.5758	0.1766	-0.2256	0.22
	(5.48)	(4.35)	(-4.56)	
Mackerel	7.3803	0.2588	-0.0031	0.23
	(4.22)	(7.58)	(-1.98)*	

Statistically significant at 5% (*)
Note: values in parentheses are t ratios

The estimated coefficients of dummy variables are all significant and the Figure shows the significant seasonal coefficients for all products. As the seasonal dummies are, in fact, intercept shifters of the concerned demand equation, the magnitudes of these intercepts therefore represent the budget share of that commodity. The higher the intercept of an equation is the higher will be the budget share, holding other things constant. The vertical axis shows the percentage change in budget share. For example, during the winter-spring period, there is a 4.56% increase in beef consumption and the budget share of sheep and other meats during the March and June goes up. The reason for this is that these months are the time of the Muslim Festival of Sacrifice. Therefore consumption and expenditure of red meat are high during these months.

For other meat products, expenditure share varies in different seasons. For example, the share of anchovy expenditures increases in winter and autumn, and decreases in summer. From seasonal coefficients, it is possible to infer consumption habits and seasonal effects. Seasonal coefficients of fish equations increase in winter and decrease in summer and, accordingly, budget shares of these products increase mostly in January, February, March and December. The consumption of chicken is higher than that of fish during the summer (Figure).

Marshallian elasticities are calculated using equation (7) for each category and expenditure elasticities are estimated through equation (8). All elasticities and their respective t values are given in Table 4. All own-price elasticities are highly significant and inelastic except for anchovy, which appeared elastic.

Table 3. Parameter estimates for each 11 equations estimated.

Equation	Beef	Chicken Meat	Mutton	Other Meat	Anchovy	Horse Mackerel	Atlantic Bonito	Blue Fish	Trout	Sea Bream	Hake
Constant	0.9730	0.5389	-0.6420	-0.6481	0.1912	0.3104	0.0955	0.0181	0.2080	0.0235	0.0052
	(1.94)*	(2.65)	(-3.50)	(-3.40)	(4.15)	(3.62)	(3.72)	(4.15)	(5.62)	(8.11)	(3.83)
Beef	0.1063	-0.0464	0.0122	-0.0542	-0.0329	0.0014	-0.0001	0.0045	0.0083	-0.0004	-0.0005
	(3.81)	(-2.74)	(3.57)	(-2.91)	(-3.05)	(1.96)*	(-3.22)	(8.08)	(2.87)	(-2.85)	(-1.96)*
Chicken	-0.0464	0.0523	-0.0272	0.0102	-0.0012	-0.0146	0.0018	-0.0053	0.0231	-0.0015	0.0004
Meat	(-2.74)	(4.11)	(-4.67)	(1.95)*	(-3.47)	(-2.58)	(2.85)	(-3.77)	(1.96)*	(-7.18)	(1.95)*
Mutton	0.0122	-0.0272	0.0425	-0.0237	-0.0004	-0.0005	0.0011	0.0017	-0.0048	-0.0015	0.0004
	(3.57)	(-4.67)	(8.55)	(-1.99)*	(-3.20)	(-4.07)	(2.92)	(3.13)	(-4.25)	(-4.28)	(8.94)
Other	-0.0542	0.0102	-0.0237	0.0695	-0.0030	-0.0060	-0.0026	0.0017	0.0012	-0.0015	0.0004
Meat	(-1.91)**	(1.95)*	(-3.99)	(2.85)	(-8.12)	(-8.86)	(-4.33)	(4.29)	(3.24)	(-3.15)	6.93)
Anchovy	-0.0329	-0.0012	-0.0004	-0.0030	0.0412	-0.0028	0.0022	0.0022	-0.0078	0.0077	-0.0010
	(-3.05)	(-3.47)	(-4.20)	(-8.12)	(8.12)	(-6.86)	(6.35)	(5.29)	(-5.63)	(1.96)*	(-4.89)
Horse	0.0014	-0.0146	-0.0005	-0.0060	-0.0028	(0.0231	0.0005	0.0012	-0.0013	0.0009	-0.0009
mackerel	(1.96)*	(-2.58)	(-3.07)	(-3.86)	-4.86)	(4.34)	(8.26)	(3.49)	(-6.73)	(6.31)	(-7.52)
Atlantic	-0.0001	0.0018	0.0011	-0.0026	0.0022	0.0005	0.0008	-0.0031	-0.0052	0.0063	-0.0010
bonito	(-3.22)	(4.85)	(5.92)	(-4.33)	(4.35)	(4.26)	(4.19)	(-4.60)	(-4.84)	(3.49)	(-3.88)
Blue Fish	0.0045	-0.0053	0.0017	0.0017	0.0022	0.0012	-0.0031	-0.0098	-0.0014	0.0038	0.0084
	(8.08)	(-7.77)	(7.13)	(7.29)	(5.29)	(6.49)	(-6.60)	(-3.51)	(-4.56)	(3.59)	(8.07)
Trout	0.0083	0.0231	-0.0048	0.0012	-0.0078	-0.0013	-0.0052	-0.0014	-0.0216	-0.0009	0.0022
	(3.87)	(1.96)*	(-4.25)	(3.24)	(-4.63)	(-4.73)	(-4.84)	(-5.56)	(-4.12)	(-3.56)	(8.43)
Sea bream	-0.0004	-0.0015	-0.0015	-0.0015	0.0077	0.0009	0.0063	0.0038	-0.0009	-0.0225	0.0082
	(-2.85)	(-3.18)	(-3.28)	(-8.15)	(1.96)*	(3.31)	(3.49)	(3.59)	(-3.56)	(-8.25)	(3.79)
Hake	-0.0005	0.0004	0.0004	0.0004	-0.0010	-0.0009	-0.0010	0.0084	0.0022	0.0082	-0.0095
	(-1.96)*	(1.95)*	(2.44)*	(2.93)	(-3.89)	(-3.52)	(-4.88)	(8.07)	(4.43)	(3.79)	(-7.54)
Other fish	-0.0014	0.0066	0.0006	0.0052	-0.0039	-0.0008	-0.0006	-0.0039	0.0081	0.0015	-0.0071
	(-2.88)	(3.32)	(3.32)	(4.64)	(-4.31)	(-7.15)	(-5.12)	(-6.87)	(3.36)	(2.64)	(-3.11)
Expenditure	0.0287	0.0263	-0.0257	-0.0212	0.0125	0.0138	0.0127	0.0013	0.0128	0.0008	0.0080
	(3.86)	(4.65)	(-5.63)	(-8.24)	(2.59)	(8.16)	(3.20)	(3.81)	(5.80)	(5.13)	(4.33)
D1 (Winter)	0.0048	0.0057	0.0004	0.0002	0.0032	0.0015	0.0010	0.0018	0.0045	0.0014	0.0007
	(3.95)	(4.13)	(1.29)*	(3.21)	(8.42)	(5.62)	(2.59)	(3.08)	(8.15)	(2.68)	(2.62)
D2 (Spring)	0.0219	0.0097	0.0066	0.0059	0.0032	0.0017	0.0005	-0.0002	0.0017	0.0009	0.0002
	(4.12)	(4.52)	(8.05)	(3.05)	(7.11)	(1.26)*	(1.18)*	(-2.94)	(2.01)*	(1.90)*	(1.82)*
D3	0.0103	0.0110	0.0011	0.0010	-0.0001	-0.0005	-0.0002	-0.0007	-0.0002	-0.0015	-0.0004
(Summer)	(2.81)	(2.55)	(2.14)*	(2.55)	(-4.41)	(-2.56)	(-1.18)*	(-3.87)	(-2.96)	(-1.01)**	(-2.27)
D4	0.0064	0.0102	-0.0004	0.0003	0.0010	0.0009	0.0001	0.0005	0.0010	0.0004	0.0006
(Autumn)	(1.45)**	(2.78)	(-2.01)*	(2.83)	(5.56)	(3.45)	(2.31)	(4.42)	(9.88)	(1.67)*	(2.57)
Adjusted R^2	0.81	0.92	0.66	0.88	0.87	0.80	0.93	0.82	0.80	0.86	0.95

Statistically significant at 5% (*), 10% (**)

Note: values in parenthesis is t ratios

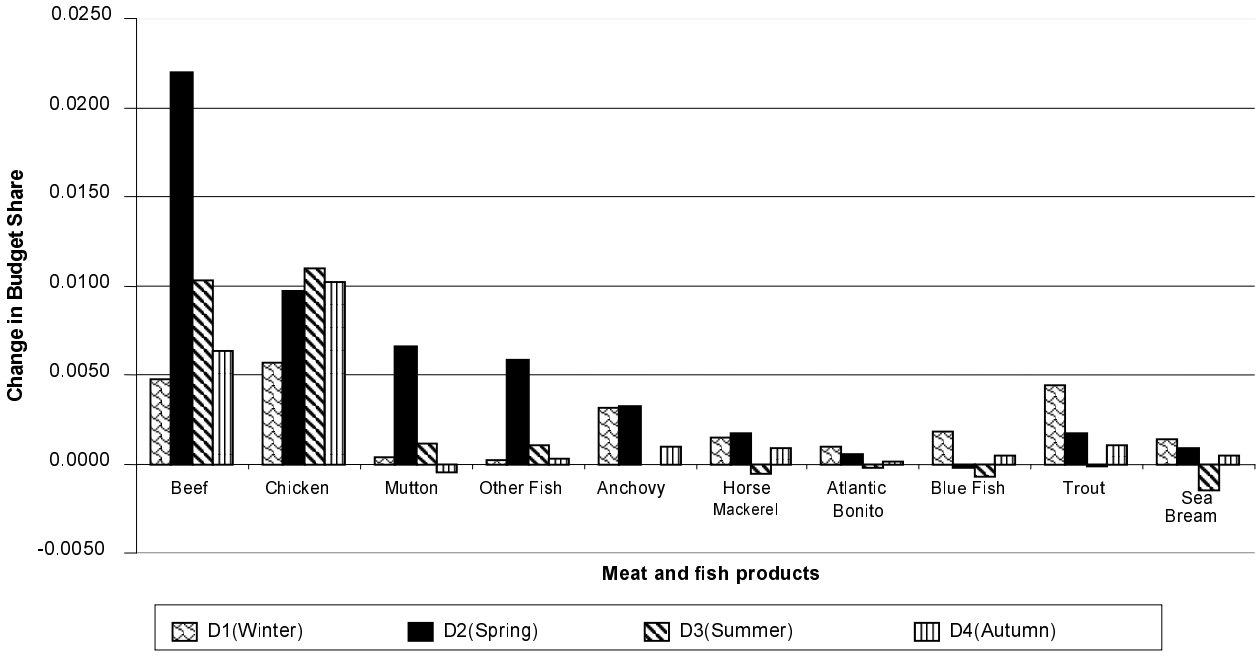

Figure. The coefficient (parameters) for seasonal impact on different types of meat consumption.

Table 4 also shows the coefficients of cross price elasticity between fish and other meat varieties. From the sign of these coefficients, the nature of the relation between 2 products (substitution or complementary) can be inferred. A positive sign indicates that the products are substitutes for each other and a negative sign indicates that they complement each other. The higher the value of cross-elasticity, the stronger will be the degree of substitutability or complementarity of the 2 products. According to this, all products, except for chicken and beef, and chicken meat and other fish, are substitutes.

The elasticities appeared significant for all varieties of fish and meat. The values of these elasticities are above zero, indicating that all products are normal (Table 4). If the expenditure elasticity for a good is higher than one, it is considered a luxury good (21). The expenditure elasticity of beef, chicken, and mutton is higher than one and hence these commodities are classified as luxury commodities in Turkish urban society. The other products are classified as normal.

Discussion

The own-price elasticities for beef, chicken, anchovy, horse mackerel, atlantic bonito and mutton are -0.7127, -0.6933, -1.0004, -0.4025, -0.5131 and –0.9943, respectively. These results are consistent with those reported by Koç (22) except for the case of chicken. Koç (22) estimated the price elasticity for beef, mutton and chicken as –0.86, –0.75, and –1.42, respectively. Expenditure elasticities estimated by Koç for these items are, respectively, 0.94, 0.65 and 0.96, which are not very much different to our estimates which are presented in Table 4. The results may differ as they depend on the nature of the data used and the time lag between the 2 studies.

Macalister Elliott and Associates Ltd (2) found values of -0.52, -0.43, -0.03, -0.09 and -0.92 for beef, chicken, anchovy, horse mackerel and atlantic bonito, respectively. These results are consistent with ours except for anchovy and horse mackerel, whose magnitude of elasticity differs perhaps due to the time lag and the different methodology used by Macalister Elliott and Associates Ltd (2).

The objective of this study was to determine the effect of seasonality on the demand for meat and fish in urban areas. Ankara, a capital city, was chosen and a survey was conducted. Besides identifying relations between meat varieties, this work aimed to provide empirical evidence of consumer choices, consumption patterns, trends and

Table 4. Elasticity estimates.

Equation	Beef	Chicken Meat	Mutton	Other Meat	Anchovy	Horse Mackerel	Atlantic Bonito	Blue Fish	Trout	Sea Bream	Hake	Other Fish
Beef	-0.7127	-0.3908	0.3256	1.0005	0.0492	0.0604	0.0253	0.0547	0.0412	0.0001	0.0002	0.0003
	(-19.25)	(-8.67)	(6.60)	(680.8)	(8.67)	(10.82)	(4.79)	(8.13)	(7.48)	(4.33)	(4.15)	(3.84)
Chicken	0.6290	-0.6933	0.2056	0.5886	0.0161	0.1775	0.0176	0.0125	0.0179	0.00003	0.0003	0.0001
	(13.05)	(-871.8)	(23.26)	(8.38)	(17.64)	(18.82)	(25.27)	(14.78)	(26.68)	(3.38)	(4.77)	(4.15)
Mutton	0.9120	0.1890	-0.9943	0.1456	0.0103	0.0823	0.0104	0.0138	0.0148	0.00001	0.0001	0.0001
	(8.52)	(18.16)	(-576.3)	(14.53)	(8.46)	(6.80)	(1.06)	(12.50)	(13.24)	(5.15)	(3.85)	(3.05)
Other meat	0.0221	0.0175	0.1317	-0.9281	0.0035	0.0309	0.0129	0.0018	0.0028	0.0000	0.0000	0.0002
	(3.26)	(3.83)	(2.39)*	(-7.40)	(3.39)	(3.52)	(11.88)	(6.52)	(2.79)	(0.00)	(0.00)	(3.52)
Anchovy	0.0228	0.0030	0.0097	0.0018	-1.0004	1.0012	0.0011	0.0016	0.0013	0.0044	0.0018	0.0020
	(3.50)	(1.96)*	(3.25)	(3.31)	(-13.50)	(4.21)	(4.90)	(3.27)	(3.12)	(2.58)	(8.12)	(6.48)
Horse mackerel	0.0601	0.0112	0.0011	0.0114	0.9918	-0.4025	0.0007	0.0004	0.0003	0.0020	0.0021	0.0018
	(2.64)	(3.35)	(2.95)	(6.52)	(1.92)	(-12.97)	(2.85)	(2.89)	(2.94)	(8.05)	(8.52)	(6.08)
Atlantic bonito	0.0060	0.0006	0.0001	0.0017	0.0819	0.0013	-0.5131	0.0007	0.0000	0.00002	0.0000	0.0009
	(4.24)	(4.89)	(4.22)	(4.06)	(4.47)	(4.85)	(-43.92)	(5.07)	(0.00)	(3.07)	(0.00)	(5.12)
Blue fish	0.0006	0.0007	0.0006	0.0006	0.1064	0.0012	0.0002	-0.3601	0.0004	0.0000	0.0001	0.0001
	(3.86)	(2.63)	(2.72)	(3.23)	(3.14)	(4.54)	(3.23)	(-15.52)	(8.12)	(0.00)	(3.09)	(5.91)
Trout	0.0181	0.0004	0.0002	0.0005	0.3814	0.0071	0.0021	0.0009	-0.3491	0.00003	0.0004	0.0028
	(6.91)	(6.91)	(7.04)	(7.90)	(3.07)	(3.27)	(6.00)	(3.51)	(-91.18)	(3.38)	(5.12)	(6.91)
Sea bream	0.0100	0.0001	0.0000	0.0001	0.1818	0.0001	0.0013	0.0068	0.0000	-0.1801	0.0001	0.0000
	(4.05)	(4.29)	(0.00)	(1.98)*	(3.42)	(3.14)	(4.81)	(13.05)	(0.00)	(-34.81)	(3.77)	(0.00)
Hake	0.0011	0.0000	0.0001	0.0000	0.2215	0.0008	0.0001	0.0001	0.0001	0.0000	-0.1521	0.0002
	(2.62)	(0.00)	(3.30)	(0.00)	(2.67)	(2.77)	(2.86)	(3.08)	(4.19)	(0.00)	(-25.13)	(3.48)
Other fish	0.0005	-0.0018	0.0018	0.0131	0.6218	0.4211	0.3118	0.0381	0.0034	0.0010	0.0014	-0.1104
	(4.42)	(-4.02)	(3.47)	(3.32)	(7.42)	(5.12)	(8.68)	(20.01)	(11.05)	(5.08)	(8.08)	(-18.06)
Expenditure	1.4839	1.1659	1.0095	0.8930	0.516	0.5758	0.2031	0.0573	0.6000	0.0248	0.1522	0.0813
	(5.92)	(5.71)	(5.08)	(4.38)	(3.82)	(3.95)	(3.24)	(2.08)*	(3.98)	(4.15)	(2.41)*	(2.22)*

Statisticallysignificant at 5% (*)

Note: values inparentheses are t ratios

availability of possible substitutes and complementary products. This knowledge will not only maintain the continuity of meat consumption but also reduce the producer risk while channeling these products in the market.

The results showed that there are seasonal fluctuations in the consumption of meat varieties. Consumption of red meat (cattle, sheep and goat) increases during spring, the time of the Muslim Festival of Sacrifice, and the household budget share of these varieties increases too. During the winter, on the other hand, consumption and the budget share of fish products increase.

The price elasticity of anchovy is elastic, and for the rest it is inelastic, showing that consumers in Ankara are not sensitive to the price of meat products (except anchovy).

Seasonal consumption of meat varieties changes according to seasonal demand. For example, beef consumption increases 4.56% in winter and spring. These seasonal expenditures are very important for marketing strategies.

This study also analyzed the substitution and complementary effects between meat varieties. According to this, chicken and beef, and chicken meat and other fish varieties are complements, while the other meat varieties are substitutes. The complementary effects of meat varieties change according to consumer choices.

Expenditure elasticities are higher than one for beef, chicken and mutton, and therefore they are considered luxury goods by the people living in Ankara. Other meat varieties are considered normal goods and have the highest share in the household budget.

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