RESEARCH ARTICLE (Open Access)

Food Demand System in Transition Economies: Evidence from Kosovo

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Abstract

Transition economies switching from the planned to market economy experience quite rapid structural changes in food consumption pattern. From scientific and policy intervention perspective, Kosovo provides interesting case study in analysing food demand system. Main objective of this study is to provide fundamental food demand analysis in the case of Kosovo. For such purpose, we estimate complete food demand system in which demand depends on income, prices and other socio-economic household characteristics. Along with assessment of the non-parametric Engel curves, study estimates complete demand system by using Quadratic Almost Ideal Demand System (QUAIDS). For the purpose of this study, we use micro data of the Household Budget Survey (HBS) obtained from the Kosovo Agency of Statistics (KAS). Dataset samples cover the period of eight rounds, including period between 2005 and 2012. The HBS dataset provides detailed information on monthly income and expenditure. QUAIDS estimations were conducted based on the STATA code developed by Poi (2012). Estimations were performed on the cross-sections with time trend aiming to maximise efficiency of estimates. QUAIDS parameters were estimated on the annual basis in order to track the dynamics of demand elasticities over the time period observed. Results of this study are coherent with findings from earlier studies in other transition economies. Estimates of expenditure elasticities reveal positive coefficients for all commodity bundles (excluding cereals). A greater magnitude of elasticity is evident in the case of fruits and vegetables (1.35) and meat and fish (1.01). Negative expenditure elasticity for cereals suggest that, ceteris paribus, as incomes rises Kosovo households perceive cereals as inferior goods with greater extend of substitutability. On the other hand, all own-price elasticities coefficients are negative suggesting that results are consistent with the demand theory. Meat and fish and dairy products display the value of own-price elasticity less then unit elastic. Coefficients for this food bundles reveal that as the price changes the quantity demanded is less sensitive. On the other hand, results suggest that cereals exhibit significantly greater own-price elasticity than unitary value (-2.25 and -2.18). Such high price sensitivity for cereals is not surprising for two particular reasons. Firstly, for the "bread eating" countries, such as Kosovo, cereal prices were increasing rapidly, therefore probability of substitution, as the price rises, is significantly greater. And secondly, Kosovo households are undergoing "nutrition transition" [16, 36] signalling transitioning food pattern towards the higher-value diet. Policy responsiveness in the case of our findings should be directed towards income improvement measures aiming to generate employment opportunities, particularly under the current conditions of high unemployment constraints in Kosovo. Contribution of agriculture at this stage might be an important income-generating sector.

Keywords: Food Demand System, QUAIDS, Kosovo.

1. Introduction

Transition economies switching from the planned to market economy experience a rapid structural change in food consumption. Households in these economies tend to shift their food patterns, from the consumption of traditional food staples towards more high-valued and diversified diets [37, 44]. Diet changes, exhibit the shift towards a diet with higher fat and meat and reduced carbohydrate and fibre [37].

Although transition has created a food security problem in various countries, the cause of the problem is not the diminishing agricultural output, nor is food availability. Liefert and Swinnen (2002) suggest that as the result of market reforms, consumer preferences replace planners' choices and thereof serve as dominant force driving production and consumption. Food consumption is affected by the wide range of the food security factors, such as food availability, food accessibility and food choice [26], which in turn are influenced by increased disposable income, demographic changes, rapid urbanization, culture and consumer preferences. Since the last 50

years, food availability has increased as a consequence of rising income levels and falling food prices. This in turn resulted in considerable changes in food consumption pattern, particularly in the transition economies.

Therefore, analysis of food consumption pattern and estimating responsiveness to changes in income and prices is essential to predict the food future demand and attain food security. Kosovo is undergoing the complex process of transition from the post-war and state-building institutions into consolidated market economy. Since the end of the war in 1999, Kosovo pursued relatively sound market reforms. However, despite significant progress, Kosovo remains an economy coping with poverty, combined with high unemployment and high rate of emigration [8, 17]. Economic growth has been well below the rate achieved in neighbouring economies and the level of per capita income is among the lowest in Europe. Consumption in many households depends on remittances sent from abroad [40], while the key socio-economic constraint is the high level of unemployment.

Unemployment is particularly jeopardised within the youngest share of population and rural areas. More than 55% of youth remains unemployed, while the long term unemployment aggravates development perspective of Kosovo [32, 40]. The key objective of this paper is to provide fundamental food demand analysis in the case of Kosovo. Here we estimate complete food demand system in which demand depends on income, prices and other socio-economic household characteristics. Very little or almost nothing is known about the food demand parameters of Kosovo and the rest of the Eastern European countries undergoing the transition process. This paper marks first attempt to approach food demand analysis in the case of Kosovo. The layout of this study is synthesized as follows. Firstly, we present a brief synthesis of the previous studies on the food demand conducted in transition economies. Secondly, we discuss the methodological framework explaining estimation strategy and variables entering into the demand system. Finally, in the last section we present results obtained and discuss policy implications related to the problem.

1.1. Previous food demand studies in transition economies

There is a growing body of literature providing evidence on the consumer demand worldwide. Due to the expectations of greater price and income sensitivity and responsiveness, primary interest of the food demand analysis was focused on developing countries [1,6,29,30,33,44] and transition economies [3,13,19,21,22,39,42]. Only a limited number of studies of the food demand system shed the light on the household food demand in the case of transitional economies from the Central and Eastern Europe (CEE). Hence, early studies from the transition countries such as Slovenia [19,39] and Lithuania (22) utilize linearly approximated Almost Ideal Demand System (LA/AIDS) model in explaining consumer behavior. For example, Erjavec et al. (1998) evaluate food demand in Slovenia in the early birth of economic and political transition in the beginning of 1990s.

They match pre-transitional (1988) and transitional (1993) period, aiming to evidence dynamic changes of the food consumption pattern in Slovenia. Their study explains that regardless the extent of economic reform, the consumption of the basic food products (i.e. breads, milk and oil) in the Slovenian diet was not affected significantly. Later on, Regoršek and Erjavec (2007) updated food demand analysis by investigating the Slovene food pattern during the end of transition period. Interestingly, their results signify that Slovenia is losing consumption characteristics typical for countries in transition, and that consumption patterns of Slovenian consumers gradually adapted to general consumption patterns in the developed countries. Similar results of the food demand analysis were obtained in the case of Lithuania [22] suggesting that Lithuanian household consumption did respond to price and real income changes during their transition to a market-oriented economy. Most recent studies in the case of Romania and Slovakia [3,13] employ QUAIDS demand system estimations for the selected bounds of food commodities.

Both studies use the disaggregated household data and commonly stress out the price sensitivity of the rural and low-income households. Important to denote in both case studies are differences on proportion of income spent on food and how the households perceive food. Hence, in the case of Slovakia [13] estimates show declining trend of income spent on food while the households tend to perceive food as a necessity rather than a luxury. Adversely, in the case of Romania [3] extremely high share of income is spent on food and Romanian households tend to remain food price and income inelastic particularly for the basic food commodity categories.

1.2. Previous food demand studies in transition economies

Kosovo is a consumption driven economy with an extremely high contribution on GDP. Consumption pattern is affected indirectly through income and relative price changes. Data on household consumption in Kosovo (Table 1) provides evidence that total consumption increased significantly since the early 2005. This outcome holds true, both at national and per capital level. However, common denominator related on the structure of consumption is that expenditures are focused mainly to finance fulfilment of the basic needs (food and housing). Disaggregated structure of consumption reveals that food remains the main commodity group in which household expenditures are spent. The average share of food expenditures in total consumption during the observed period (2005-2012) varied between 35% and 45%. Within the same period, average expenditures spent on food exceeds the share of 40% of the total expenditures. Food demand remains an important development issue in Kosovo, while the main focus of previous studies has been directed on contribution of agriculture to food availability [7].

Table 1. Household consumption in Kosovo (2005-2012)

Year	Total annual consumption	Annual household consumption	Annual per capita consumption	Share of 5-key groups*	Share of food
	million EUR	in EUR	in EUR	% share	% share
2005	1,549	5,864	950	87	39
2006	1,414	5,721	980	86	39
2007	1,403	5,721	980	86	40
2008	1,798	6,707	1,156	86	38
2009	1,911	6,848	1,161	85	36
2010	1,937	7,110	1,228	84	35
2011	1,928	7,010	1,210	84	38
2012	2,292	7,657	1,380	88	45

** 5-key consumption groups: food, housing, transport, clothing and footwear, alcohol and tobacco*
Source: Own elaboration based on the data of KAS

Kosovo is a rural society where about 63% of population lives in rural areas. Distinct differences are evident on the food consumption between the rural and urban household consumption behaviour (Figure 2). Food expenditures in the rural areas tend to be greater than in urban settlements. More than a half of the total expenditures in the rural households are devoted to the food consumption. Education is obviously an important variable determining consumer behaviour. HBS data discriminate between the head of households with primary education, secondary education and higher education. Households in which the head of household achieved high (university) degree of education, share of total expenditures on food is significantly below the national average.

The average Kosovo household consist of about 5.5 members and represent largest in Europe. Therefore, size of household is significant variable affecting the share of expenditure spent on the food consumption. Ceteris paribus, food consumption should rise with household size. This is typical among poor households whose consumption of food is close to subsistence [15,20]. In our model we distinguish between the households comprised of the single member and households with two, three and more members. Employment status is relevant variable revealing household consumer behaviour. Here we categorize households based on the employment status of the head of household into four social groups: employees, the self-employed, economically non-active households and retirees, and the unemployed.

Aggregate data revels that economically weak social groups (unemployed and the self-employed) tend to spend a greater portion of their budgets on food comparatively to the households. The main limitation in assessing food demand system analysis in the case of Kosovo is incomplete data availability on the own production/consumption, therefore this variable is excluded from the model.

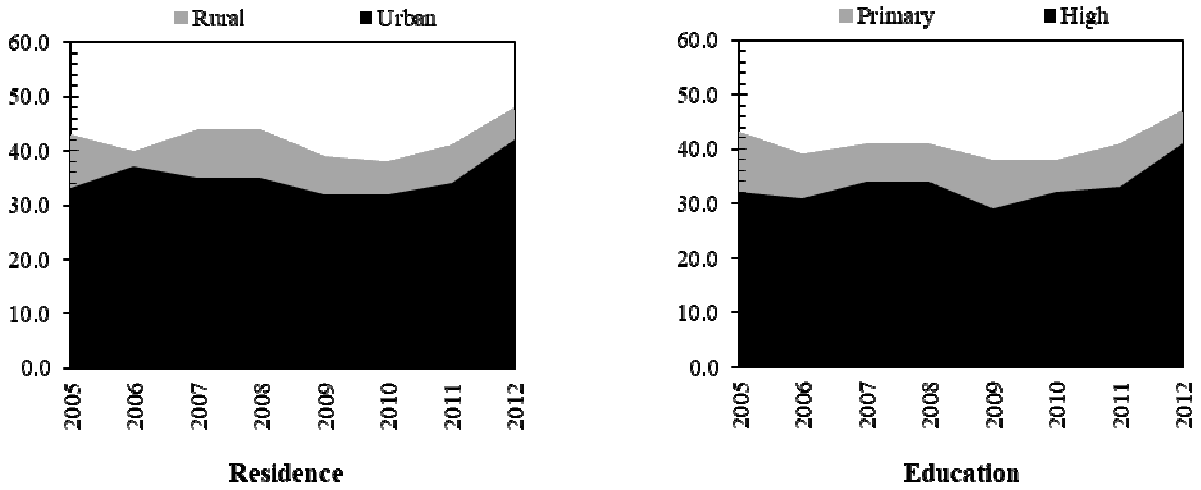

Figure 1. Share (%) of food in total consumption based on demographic variables (2005-2012)
Source: Own elaboration based on the data of KAS

2. Material and Methods

Literature suggests two basic approaches in utilizing demand analysis. Traditionally, the first approach is based on the estimation of Engel curves where food expenditure and income elasticities are derived. Whereas the objective of second approach is to perform econometric estimation in building up a demand system and from it to estimate compensated (Hicksian) and uncompensated (Marshallian) price and expenditure elasticities. Early roots of modelling demand system dates from the early 1950s when Stone (1954) introduced the Linear Expenditure System (LES). Later on, the Almost Ideal Demand System (AIDS) is proposed by Deaton and Muellbauer (1980). Further, both demand modelling approaches were melted into a Generalized Almost Ideal Demand System (GAIDS) grounded by Ballino and Violi (1990). These models are generally used to estimate demand equations for a group of commodities and not for commodities at a disaggregate level. They do not allow increasing or decreasing income elasticities.

Literature suggests other complete demand systems such as Rotterdam model [5,43] and the Translog model [10]. However, for the purpose of this study we adopted a demand system that has been widely applied in empirical studies through the use of the Quadratic Almost Ideal Demand System (QUAIDS), developed by Banks et al. (1997). QUAIDS model is an extended form of AIDS by a quadratic expenditure term, under the assumption that there is a non-linear relationship between income and expenditure. While the traditional AIDS have budget share equations that are linear in the logarithm of income [18], QUAIDS departures from linearity [4] and accounts for the zero consumption influence while estimating the income elasticity of demand. This model is an integrated demand system model that satisfies the homogeneity, symmetry and adding-up restrictions implied in the consumer theory [11]. QUAIDS demand system is frequently used to estimate food demand system but also recently employed to project tax policies [2,12,23].

2.1. QUAIDS model specification

In research it is often assumed that individual households have the indirect utility function as follows

$$\ln V = \left\{ \left[\frac{\ln m - \ln a(p)^{-1}}{b(p)} \right] + \lambda(p) \right\}^{-1} \tag{1}$$

where the term [ln$m$ - ln$a$(p)]/b(p) is the indirect utility function of the PIGLOG[1] demand system, m is household income, and a(p), b(p)and λ(p)are functions of the vector of prices p. To ensure the homogeneity property of the indirect utility function, it is required that a(p) is homogenous of degree one in p, and b(p)and λ(p) are homogenous of degree zero in p. The price index ln$a$(p)has the usual translog form

[1]Demand with expenditure shares that are linear in log total expenditure alone have been referred to as Price-Independent Generalised Logarithmic (PIGLOG) by Muellbauer (1976).

$$\ln a(p) = a_0 + \sum_j a_j \ln p_j + \frac{1}{2}\sum_i \sum_j \gamma_{ij} \ln p_i \ln p_j \quad (2)$$

$b(\mathrm{p})$ is the Cobb-Douglas price aggregator defined as

$$b(p) = \Pi_i p_i^{\beta_i} \quad (3)$$

and $\lambda(p)$ is defined as

$$\lambda(p) = \sum_i \lambda_i \ln p_i \quad \text{where} \quad \sum_i \lambda_i = 0 \quad (4)$$

By applying Roy's identity to the indirect utility function (1), the budget shares in the QUAIDS are derived as

$$i = a_i + \sum_j \gamma_{ij} \ln p_j + \beta_i \ln\left[\frac{m}{a(p)}\right] + \frac{i}{p}\left\{\ln\left[\frac{m}{a(p)}\right]\right\}^2 \quad (5)$$

For theoretical consistency and to reduce the number of parameters to be estimated adding-up, homogeneity and symmetry restrictions are commonly imposed. The fact that $\sum_i \ \omega_i = 1$, called the adding-up condition, requires that $\sum_i \ \alpha_i = 1, \sum_i \ \beta_i = 0, \ \sum_i \ \lambda_i = 0$ and $\sum_i \ \gamma_{ij} = 0 \ \forall j$. Moreover, since demand functions are homogeneous of degree zero in (p,m) $\sum_j \ \gamma_{ij} = 0 \ \forall j$. Slutsky symmetry implies that $\gamma_{ij} = \gamma_{ji} \forall i \neq j$. These conditions are trivially satisfied for a model with n goods when the estimation is carried out on a subset of n - 1 independent equations. The parameters of the dropped equation are then computed from the restrictions and the estimated parameters of the n - 1 expenditure shares.

Majority of previous studies extend the system with demographic variables following Pollak and Wales (1981) where the demographic effects shift the intercept α_i in equation (5). However, we follow the scaling approach introduced by Ray (1983) which has been implemented by Poi (2012) into QUAIDS. This approach has the advantage of having strong theoretical foundations and generating expenditure share equations that closely mimic their counterparts without demographics. For each household the expenditure function $e(\mathrm{p}, \mathrm{z}, u)$, underlying the budget shares is written as the expenditure function of a reference household $e^R(\mathrm{p}, u)$, scaled by the function $m_0(\mathrm{p}, \mathrm{z}, u) = \ \bar{m}_0(\mathrm{z})\varphi(\mathrm{p}, \mathrm{z}, u)$ to account for the household characteristics where z represents a vector of s characteristics and u is direct utility. The first term of m_0, $\bar{m}_0(\mathrm{z})$ measures the increase in a household's expenditures as a function of z, not controlling for any differences in consumption patterns. The second term $\varphi(\mathrm{p}, \mathrm{z}, u)$ controls for differences in relative prices and the actual goods consumed; a household with two adults and two infants will consume different goods than one comprising four adults.

Furthermore, we extend the vector z with a food expenditure control the rationale for which is the following. In estimating a food demand system the implicit assumption is that the consumer's utility maximisation decision can be decomposed into two separate stages wherein the first stage, the allocation of total expenditure between food and other commodity groups (housing, transport, entertainment, etc.) is decided.[2] In the second stage, the food expenditure is allocated among different food commodity bundles. The price and expenditure elasticities obtained from such a two-stage budgeting process are conditional or partial elasticities in the sense that a second-stage conditional demand system is estimated. To obtain unconditional elasticity estimates correction for the first stage budgeting decision is needed. Therefore, besides standard demographic variables, the share of food expenditure in the net disposable income is also added to the vector z.

The budget share equation (5) augmented with demographic effects becomes:

$$\omega_i = a_i + \sum_j \gamma_{ij} \ln p_j (\beta_i + \eta_i' z) \ln\left[\frac{m}{\bar{m}_0(z)a(p)}\right] + \frac{\lambda_i}{b(p)c(p,z)} \ln\left\{\left[\frac{m}{\bar{m}_0(z)a(p)}\right]\right\}^2 \quad (6)$$

where $c(\mathrm{p}, \mathrm{z}) = \prod_j p_j^{\eta' j z}$, $\eta' j$ represents the j^{th} column of parameter matrix η. The adding-up condition requires that $\sum_j \eta_{sj} = 0 \ \forall s$.

Similar to Banks et al. (1997) the expenditure and price elasticities are obtained by partially differentiating equation (6) with respect to $\ln m$ and $\ln p_j$ respectively:

[2]This separability assumption of food expenditure decision from other expenditure is motivated by Maslow's (1946) hierarchy of needs theory.

$$\mu_i \equiv \frac{\partial \omega_i}{\partial \ln m} = \beta_i + \eta_i' z + \frac{2\lambda_i}{b(p)c(p,z)} \ln\left[\frac{m}{\overline{m}_0(z)a(p)}\right] \quad (7)$$

and

$$\mu_i \equiv \frac{\partial \omega_i}{\partial \ln p_j} = \gamma_{ij} - \mu_i(a_j + \sum_k \gamma_{jk} \ln p_k) - \frac{\lambda_i(\beta_j + \eta_j' z)}{b(p)c(p,z)} \left\{\ln\left[\frac{m}{\overline{m}_0(z)a(p)}\right]\right\} \quad (8)$$

Then the expenditure and the uncompensated price elasticities are computed as $e_i = \mu_i/\omega_i + 1$ and $e_{ij}^u = \mu_{ij}/\omega_i - \delta_{ij}$ respectively; δ_{ij} represents Kronecker delta taking value 1 if $i=j$ and 0 otherwise. Using the Slutsky equation, we can finally compute compensated price elasticities: $e_{ij}^c = e_{ij}^u + e_i\omega_j$.

2.2. Data availability and aggregation

For the purpose of this study, disaggregated data of the Household Budget Survey (HBS) and the Consumer Price Index (CPI) were obtained from the Kosovo Agency of Statistics. Both dataset samples cover the eight rounds between 2005 and 2012. The annual HBS sample size for the given period varies from 2,275 to 2,397 households. The HBS dataset provides detailed information on monthly income and expenditure. Detailed HBS dataset enables to approach responsiveness of different consumer groups based on urban dummy, size of household, education and employment status of the head of household. It is important to note that HBS samples do not represent real panel database as the surveyed households are randomly changed each round year. Further, we matched a weighted average unit price provided from the CPI to each consumption item in order to obtain physical amounts consumed for each household. Once we obtained physical amounts we proceed with aggregation procedures into commodity bundles.

There is a common experience on consumer behaviour studies to bundle individual food commodities into broader aggregate groups. Despite the confronting opinions, there is a lack of common rule on how to create the commodity groups. In order to make the estimation manageable, here we aggregate food commodities into five bundles as follows: (1) cereals, (2) meat and fish, (3) dairy products, (4) fruits and vegetables, and (5) other food products. The aggregation we follow reflects the main types of food consumption expenditure and similar approach of commodity aggregation were applied in the case studies [13,21]. The main advantage of such narrow bundling approach lays on the reduction of the total number of parameters in the model and simplification of the demand system estimation. Such an approach also avoids the problem with the zero consumption. QUAIDS estimations were conducted with STATA software, based on the code developed by Poi (2012). Estimations were performed on the cross-sections with time trend aiming to maximise efficiency of estimates. QUAIDS parameters were estimated on the annual basis in order to track the dynamics of demand elasticities over the time period observed.

3. Results and Discussion

3.1. Descriptive statistics

Summarized descriptive information used in conducting QUAIDS estimations (Table 2) indicates that significant changes took place in terms of income and price development. Between two time periods (2005 and 2012) observed here, incomes marked a significant increase, while the prices followed the same direction. Moreover, here we evidence relatively significant increase on the expenditure share spent on meat and fish, while the opposite took place in the case of fruits and vegetables. Expenditures of the other food bundles remained relatively constant during the observed period. Since 2005, food prices were significantly distressed by the world price shocks. This is particularly true when matching the period of incidence of the food price shocks in the world and domestic market. Such an outcome reveals domestic food price vulnerability on transmitting signals from the world market. Price resiliency is particularly evident in the case of the key cereal commodities, such as wheat flour and bread. Interestingly, once we match the results of the food price changes with domestic agricultural supply (measured by self-sufficiency ratios) one outcome is more than obvious. For the food items in which Kosovo is domestically self-sufficient, the incidence of the food inflation is minor. On the other hand, for the

food commodities in which Kosovo has comparative advantage and relatively balanced trade (i.e. potatoes, apple, fresh milk etc.), prices remained nearly unchanged.

Table 2. QUAIDS summary statistics

Variable	Definition	2005		2012	
		Mean	SD	Mean	SD
food exp	Household food expenditure (in EUR)	155.05	156.95	212.80	125.10
$w_{cereals}$	Expenditure share on cereals	0.21	0.18	0.23	0.11
w_{meat}	Expenditure share on meat and fish	0.17	0.17	0.23	0.10
w_{dairy}	Expenditure share on dairy	0.20	0.19	0.20	0.09
w_{fruits}	Expenditure share on fruits and vegetables	0.33	0.20	0.19	0.09
w_{other}	Expenditure share on other food products	0.09	0.10	0.16	0.09
$p_{cereals}$	Price of cereals (in EUR)	1.61	0.29	2.22	0.62
p_{meat}	Price of meat and fish (in EUR)	4.43	1.10	5.22	1.09
p_{dairy}	Price of dairy products (in EUR)	2.96	0.64	2.83	0.43
p_{fruits}	Price of fruits and vegetables (in EUR)	2.17	0.44	2.36	0.63
p_{other}	Price of other food products (in EUR)	4.04	1.48	4.08	1.41
urban rural	If urban then 1, if rural then 2	0.57	0.50	0.53	0.50
HH_size	Household (HH) size	5.95	2.93	5.55	2.82
edu	Education of the head of household	1.84	0.71	1.58	0.78
working st~H	Employment status of the head of household	0.57	0.50	0.56	0.50

Note: SD-standard deviation.
Source: Own elaboration based on the HBS data of KAS

3.2. Engel curves for selected food bundles

Initially we present empirical results of the food demand analysis by reporting estimations of the Engel curves for the given food bundles between two transitory periods (2005 and 2012). Engel curve aims to describe how a consumer's purchases of food vary as the consumer's resources such as income vary over the time [27]. A proper Engel curve reflects income elasticity and determines whether food categories are perceived as inferior, normal or luxury goods. However, the main limitation of Engle curve lays on its descriptive nature [18] neglecting the price and non-income effects. In estimating Engel curves we employ non-parametric Kernel regression as suggested by Banks et al. (1997).

Results of our estimation reveal that shapes of the Engel curves (Figure 3) are consistent with theoretical framework of consumer demand. Engel curve for the cereals has an inverted U-shape, meaning that consumption of this food category is transformed from the normal goods into inferior goods. Such transformation explains a change of consumer behaviour on cereals as their income reached the point when they could afford a more diverse diet. Similar outcome is revealed for the dairy food commodities, suggesting transformation of the Engel curve from positive to negative slope between two time periods observed. On the other hand, there is a clear positive trend of the Engel curve in the case of meat and fish, explaining positive relationship between an income and share of expenditure spent on this food category. As the income increases, the quantity demanded for meat and fish continue to increase. Such an outcome signifies that these food items are perceived as normal goods. Interestingly, between two transitory periods, shape of the Engel curve for fruits and vegetables depicts transformation from inferior to normal goods. Thus, complying with demand theory and reflecting the level of economic development that is fuelled by the increase of the disposable incomes.

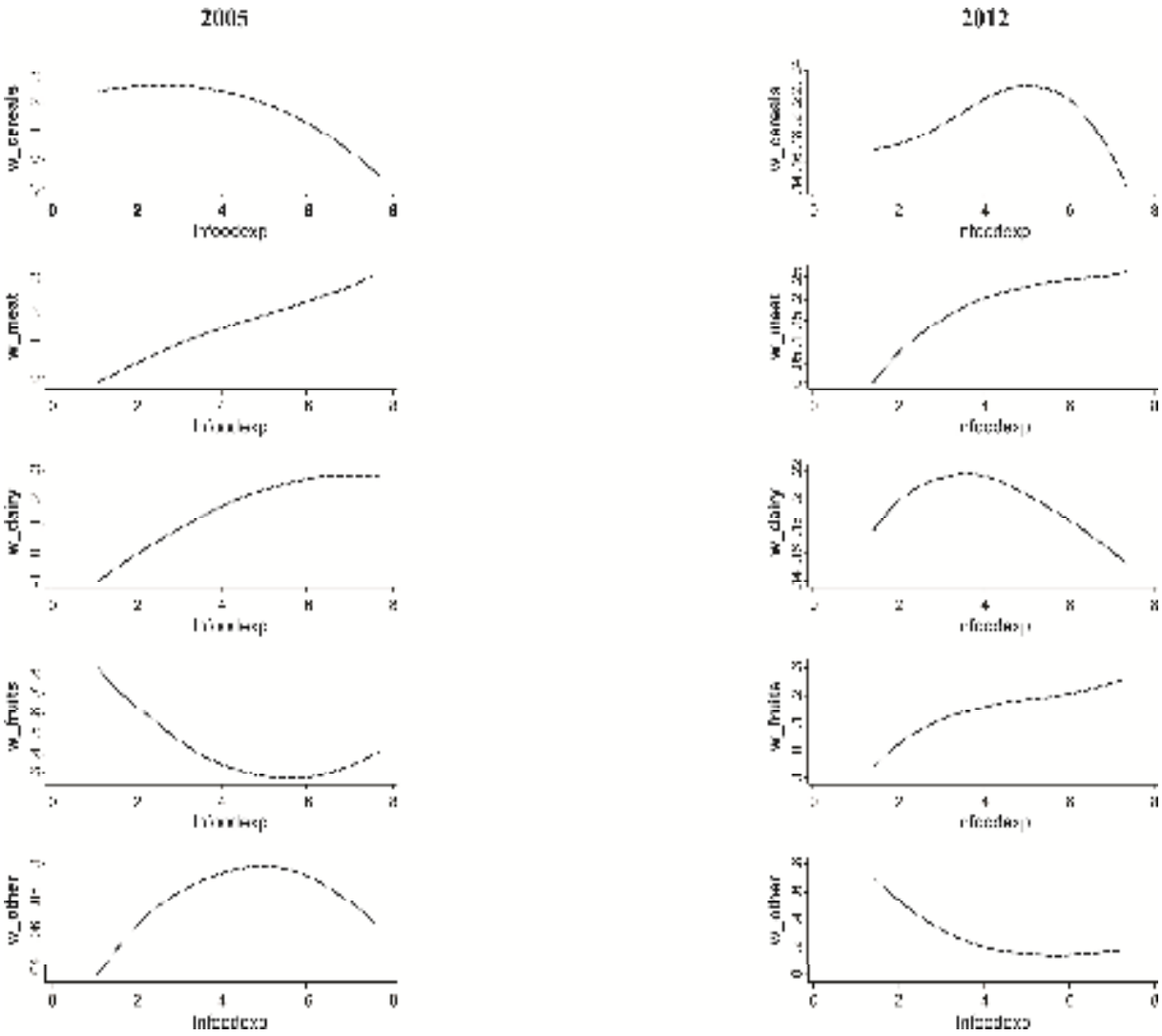

Figure 3. Nonparametric Engel curves for food shares (2005 and 2012)
Source: Own elaboration based on the HBS data of KAS

3.3. Testing the QUAIDS parameters

Estimated QUAIDS parameters indicate that majority of the own-price parameters, cross-price parameters and linear expenditure parameters are statistically significant. Furthermore, most of the quadratic expenditure terms are also statistically significant at 5% or higher. The Wald test on the estimated QUAIDS parameters has been performed in order to test for significance of quadratic expenditure term and respective demographic variables. Results of the Wald test (Table 3) explain that quadratic expenditure term (lambada) is significant in determining the food expenditure, and such a finding is based on the high values of $\chi 2$ statistics and p-values being below the 0.05 significance level.

This outcome holds true for all investigated years and leads us on rejection of the null hypothesis related to lambadas being equal to zero. Further, test of the null hypothesis were conducted for respective demographic variables, such as urban dummy, size of household, level of education and employment status of the head of household. As in the case of quadratic expenditure term, results of the test explain high values of $\chi 2$ statistics and p-values being below the 0.05 level.

Summing up, the Wald test positively confirmed selection of QUAIDS as proper strategy comparatively to traditional linear AIDS. Obviously, Wald test verifies the selection of respective demographic variables as significant in determining the food expenditure pattern.

Table 3. QUAIDS specification Wald tests

	2005	2006	2007	2008	2009	2010	2011	2012
	χ^2	χ^2	χ^2	χ^2	χ^2	χ^2	χ^2	χ^2
H_0: $\eta_{urban\_i} = 0$ and $\rho_{urban} = 0$	157.84	129.85	286.49	311.44	203.58	197.57	228.00	199.91
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
H_0: $\eta_{HHsize\_i} = 0$ and $\rho_{HHsize} = 0$	43.18	37.95	191.54	148.37	193.34	128.01	102.78	99.89
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
H_0: $\eta_{edu\_i} = 0$ and $\rho_{edu} = 0$	11.76	18.57	3.09	2.50	13.82	9.11	10.41	12.69
	(0.038)	(0.002)	(0.686)	(0.777)	(0.017)	(0.105)	(0.064)	(0.027)
H_0: $\eta_{work\_status\_i} = 0$ and $\rho_{work\_status}=0$	29.67	15.43	10.25	12.92	12.40	7.14	14.85	3.28
	(0.000)	(0.009)	(0.068)	(0.024)	(0.030)	(0.211)	(0.011)	(0.657)
H_0: $\lambda_1 = 0$	128.33	155.70	327.96	484.41	424.07	280.21	269.94	403.99
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Note: i = 1,...,5. p-values of Wald tests in parentheses
Source: Own elaboration based on the HBS data of KAS

3.4. Elasticity estimates

Elasticity estimates were derived on the annual basis covering the time period 2005 to 2012, but for the sake of simplicity results presented here shows average values for the investigated period. In the Table 4 are shown results of the price (compensated and uncompensated) and expenditure elasticities estimated from the QUAIDS parameters. Expenditure elasticities for all food categories (excluding cereals) are positive. A greater magnitude of elasticity is evident in the case of fruits and vegetables (1.35) and meat and fish (1.01). Negative expenditure elasticity for cereals indicates that, ceteris paribus, as incomes rises Kosovo households perceive cereals as inferior goods with greater extend of substitutability. On the other hand, all own-price elasticities coefficients are negative suggesting that results are consistent with the demand theory.

Meat and fish and dairy products display the value of own-price elasticity less then unit elastic. Coefficients for this food bundles reveal that as the price changes the quantity demanded is less sensitive. On the other hand, results suggest that cereals exhibit significantly greater own-price elasticity than unitary value (-2.25 and -2.18). Such high price sensitivity for cereals is not surprising for two particular reasons. Firstly, for the "bread eating" countries, such as Kosovo, cereal prices were increasing rapidly, therefore probability of substitution, as the price rises, is significantly greater. And secondly, Kosovo households are undergoing "nutrition transition" [16,36] signalling transitioning food pattern towards the higher-value diet. Almost all compensated cross-price elasticities are positive and lower than unit value, signifying that food categories examined here might serve as substitutes. On the other hand, coefficients of uncompensated cross-price elasticities in majority (excluding cereals) are negative. Such an outcome reveals the importance of income effects on consumer decision

Table 4. Average estimated demand elasticities (2005-2012)

	C	*MF*	*D*	*FV*	*OF*	
		Compensated price elasticities				Expenditure
C	**-2.25**	0.54	0.55	0.76	0.68	-0.24
MF	0.54	**-0.58**	-0.04	0.08	-0.07	1.01
D	0.47	0.04	**-0.62**	0.12	-0.07	0.93
FV	0.74	-0.01	0.06	**-1.00**	0.15	1.35
OF	1.00	-0.09	0.04	0.10	**-1.15**	2.61
		Uncompensated price elasticities				
C	**-2.18**	0.66	0.54	0.81	0.41	
MF	0.23	**-0.79**	-0.23	-0.14	-0.09	
D	0.29	-0.19	**-0.80**	-0.07	-0.15	
FV	0.42	-0.31	-0.19	**-1.33**	0.07	
OF	0.64	-0.79	-0.52	-0.47	**-1.49**	

Note: *C*-Cereals, *MF*-Meet and fish, *D*-Dairy products, *FV*-Fruits and vegetables, *OF*-Other food

Source: Own elaboration based on the HBS data of KAS

Capturing food demand responsiveness on the price changes is one of the most relevant issues concerning to the food security. Therefore, assessment of the compensated own-price elasticities is of the crucial relevance. The main finding related to the development of own-price elasticities during the observed period (Figure 4) shows relatively declining trend for all food categories. Shaper and steep decline is visible in the case of cereals, as well as meat and fish. Moreover, such an outcome is particularly true for the period before the occurrence of the global food price spikes. Therefore, most probably, price distortions from the global food market made Kosovo households more price sensitive.

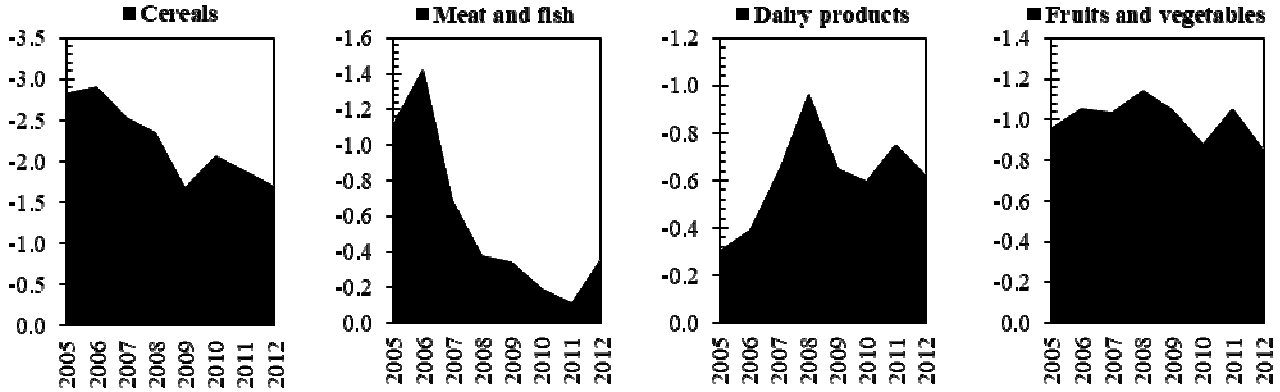

Figure 4. Compensated own-price elasticites
Source: Own elaboration based on the HBS KAS

4. Conclusions

Kosovo is in the early stages of transition process coping with the hardships of the systematic socio-economic dysfunctions such as high unemployment, prevalence of poverty, food trade deficit, and vulnerability from the price transmitting effects from global markets.

Results of this study are coherent with results obtained by earlier studies in transition economies. Estimated expenditure elasticities were positive and statistically significant for all food bundles, except for cereals. Such an outcome has a logical explanation for the "bread eating countries" (such as Kosovo), where relative increase in income tends to change consumer behaviour, from the consumption of basic food categories (such as cereals) into food categories with greater nutrition values (i.e. meat and fish). Magnitudes of estimated elasticities are significantly higher than those estimated in the case of developed countries and consistent with the estimates derived in the transition economies. Price elasticities for almost all food bundles are relatively high indicating that demand for food in Kosovo is price sensitive. Estimates of the own-price elasticities were negative and consistent with the demand theory. Such an outcome suggests that as relative prices changed, Kosovo households adjusted their food consumption patterns through substitution among competing food items.

Policy responsiveness in the case of our findings should be a mix of two target policies. Firstly, Kosovo should primarily target improvement the self-sufficiency of supply for the given food categories in order to eradicate the price transmission risks from the world food market. And, secondly, income directed policies should eager generating employment opportunities, particularly under the current conditions of high unemployment in Kosovo. Contribution of agriculture at this stage might be an important income-generating sector..

5. Acknowledgements

This research was supported by the Slovak Research and Development Agency under the contract No: APVV-15-0552 and No: APVV-16-0321. We thank the Kosovo Agency of Statistics for granting access to the Household Budget Survey data. The views expressed are purely those of the authors and may not in any circumstances be regarded as stating an official position of the National Bank of Slovakia. The authors are solely responsible for the content of the paper.

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