

Demand for Poultry Products and Consumer Preferences in the South Togo

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Abstract

Original Research Article

This study analyzes the determinants of consumer demand for poultry products, with an emphasis on the diversity of poultry products marketed in the south Togo. To achieve these objectives, the Quadratic Almost Ideal Demand System (QUAIDS) model was used and data were collected from 317 consumers in south Togo. The results highlight the fact that economic and socio-demographic factors significantly influence the budget share allocated to the consumption of poultry products. For the most poultry products, the demand is inelastic varying between -0.391 and -0.932. The income elasticity of demand shows that the table eggs (0.68) and the local poultry meat (0.92) are essentials goods while the broilers meat (1, 34) and the imported frozen carcasses (1, 55) appear as luxury goods. Moreover, the local poultry meat and the imported frozen products appear as substitute goods.

Keywords: Demand, elasticity, poultry products, QUAIDS.

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INTRODUCTION

With an annual production of 70 million tons, the poultry is the second most consumed meat in the world, just behind pork. The chicken represents nearly 85% of world poultry production (Alain *and al.*, 2004). West Africa stands out as a breeding region par excellence with more than 400 million poultry (Mulumba *et al.*, 2008). In Togo, poultry farming contributes substantially for 14% to the GDP. It is one of the most dynamic sectors of the Togolese economy with a respective contribution of 4.6% and 2.7% of the meat and egg sectors to agricultural turnover (Lamboni, 2014).

However, the Togolese poultry sector is faced with several problems which hamper its development, in particular, the erosion of household purchasing power and competition from imported products. Indeed, Togo, like most West African countries, is dependent on poultry meat imports (Lamboni, 2014). At national level, the poultry products needs is very large and the consumption of meat per capita per year is estimated at 7 kg, which is significantly lower than the standard recommended by FAO (12 kg per person per year). In addition, the country imports approximately one million live poultry and nearly 10,000 tons of meat annually (FAO and ECOWAS, 2017). In 2007, around 1.25 billion FCFA was spent on meat imports such

as wings, neck, legs, bones, giblets. In fact, European meat industry unloads thousands of tons of chicken, hardly salable on the European market in the African countries in the process of development and causes the bankruptcy of the peasants with its lower prices (Obert and Ziegler, 2014). Although other works have been carried out on poultry products (FAO, 2006), those on the attributes of household choices are almost non-existent. It is therefore urgent to determine the demand for poultry products and the preferences of consumers in order to orient production to meet consumer expectations and thereby increase their purchasing volume. The remainder of the article is organized as follows:

Section 1 describes the econometric modeling of food demand and the method of data collect. Section 2 presents and discusses the analytical results. A conclusion and some implications for public policy close the article.

1. METHODOLOGY

1.1 Econometric modeling of food demand

The premise of rationality is at the basis of the theory of consumer behavior. Several models derive from this theory enables us to analysis the consumer preference and product demand. The fundamental objective of consumer theory is to explain how

supposedly rational individuals choose their level of consumption, when faced with different prices and a limited budget (Bossoh, 2012). Optimal demand is determined on the basis of the best consumption choices provided to the consumer by maximizing his utility

under constraint of the budget he has and the prices of goods (Bialès, 2018). So, if we consider n consumer goods that can be chosen by a household, the problem it faces is how to maximize its utility under budget constraint.

The algebraic expression of the basic hypothesis of consumer theory is represented as follows

$$\max U(x_1, \dots, x_n) \quad \text{Under constraint: } \sum_{i=1}^n p_i x_i \leq R \quad \text{with } i=1, \dots, n$$

1.2 Choice of functional form

To estimate the parameters of the demand equation, several functional forms exist. Cobb-Douglas, CES (Constant Elasticity of Substitution) and LES (Linear Expenditures System) utility functions are widely used. These functions have the advantage of respecting the theoretical assumptions of continuity, differentiability and homogeneity. However, they are characterized by restrictive assumptions relating to the elasticities (price, cross-prices, income and substitution) of the resulting consumer demand. With the LES system, it is not possible to obtain inferior goods, which is a major drawback in using such a specification. On the other hand, another limitation of this system comes from the fact that it implies linear Engel functions for all the goods whereas several empirical works show that the linear relation is not verified for all the goods and depends on the household income level (Bossoh, 2012).

However, flexible functional forms exist for estimating demand. These are models such as those of Rotterdam, Translog and AIDS (Almost Ideal Demand System) developed to overcome the limits of usual utility functions. Yankam (2004) believes that flexible forms are better suited to model the behavior of economic agents. Among them, the AIDS model, developed by Deaton and Muellbauer (1980), has become the benchmark model in demand analysis.

The AI demand system, linear with respect to the logarithm of total expenditures, is based on the

$$w_i = \alpha_i + \sum_{j=1}^n \gamma_{ij} \ln p_j + \beta_i \ln \left[\frac{m}{a(p)} \right] + \frac{\lambda_i}{b(p)} \left\{ \ln \left[\frac{m}{a(p)} \right] \right\}^2 + \varepsilon_i \quad (1)$$

w_i is the portion of the budget devoted to the i^{th} good.

p_j is the price j^{th} of the good.

m is the total expenditures or income (spent on the five types of poultry products).

assumption of theoretically linear Engel curves. However, several empirical studies have rejected this hypothesis in the context of studies on several goods and on heterogeneous populations (Lewbel, 1990; Blundell *et al.*, 1993).

An extension of the AIDS model is proposed by Banks *et al.* (1997) who introduce a quadratic term of the total expenditures compared to the starting model. Indeed, AIDS has been criticized for assuming the existence of a linear logarithm relationship of price and total expenditures within budget shares. The QUAIDS (Quadratic Almost Ideal System) is not as restrictive as the AIDS model in that it allows the income elasticity of assets to vary as expenses vary. As a result, goods can be considered a luxury item and a necessity. The QUAIDS model is superior to the AIDS model because the QUAIDS has both flexible form properties (Fisher *et al.*, 2001) and also admits a nonlinear Engel function, which is more appropriate for household data (Banks *et al.*, 1997). Thus, this study chooses QUAIDS with the incorporation of demographic variables to analyze the determinants of demand and estimate the elasticities of the types of poultry products considered.

1.3 Specification of the model QUAIDS

The QUAIDS contains in addition to terms which are linear in log income, a quadratic term which is the square of this variable. The general form of the model is given by the following system of equations:

p is the vector of prices where the term $b(p)$ is defined as follows:

$b(p) = \prod_{i=1}^n p_i^{\beta_i}$, with n the number of goods included in the model.

The term $\ln a(p)$ is a price index defined as follows:

$$a(p) = \left(\alpha_0 + \sum_{i=1}^n \alpha_i \ln p_i + \frac{1}{2} \sum_{i=1}^n \sum_{j=1}^n \gamma_{ij} \ln p_i \ln p_j \right) \tag{2}$$

$\alpha_i, \gamma_{ij}, \beta_i, \lambda_i$ are respectively the elasticities of the budget share to be estimated.

The constraints of additivity, price and income homogeneity and symmetry must be imposed.

$$\text{Additivity condition: } \sum_{i=1}^n \alpha_i = 1; \sum_{i=1}^n \beta_i = 0; \sum_{i=1}^n \gamma_{ij} = 0; \sum_{i=1}^n \lambda_i = 0 \quad \forall j \tag{3}$$

$$\text{Condition of homogeneity: } \sum_{j=1}^n \gamma_{ij} = 0 \quad \forall i \tag{4}$$

$$\text{Condition of symmetry: } \gamma_{ij} = \gamma_{ji}, i \neq j \tag{5}$$

By deriving equation (1) with respect to $\ln m$ and $\ln p_j$, we obtain the income elasticity and the price elasticity respectively:

$$\mu_i = \frac{\partial w_i}{\partial \ln m} = \beta_i + \frac{2\lambda_i}{b(p)} \left\{ \ln \left[\frac{m}{a(p)} \right] \right\} \tag{6}$$

$$\mu_{ij} = \frac{\partial w_i}{\partial \ln p_j} = \gamma_{ij} - \mu_i \left(\alpha_j + \sum_{k=1}^n \gamma_{jk} \ln p_k \right) - \frac{\lambda_i \beta_j}{b(p)} \left\{ \ln \left[\frac{m}{a(p)} \right] \right\}^2 \tag{7}$$

So, income elasticities are given by $\ell_i = \frac{\mu_i}{w_i} + 1$ and non-price elasticities offset are given by $\ell_{ij}^u = \frac{\mu_{ij}}{w_i} - \delta_{ij}$ where δ_{ij} is the Kronecker delta.

The dependent variable is the budget share allocated to the consumption of the type of poultry product. It is explained by price, total expenditures on poultry products and socio-demographic characteristics. In our study, we assume that total expenses equal income.

To control for different preference structures and heterogeneity between households, socio-demographic variables were incorporated into the budget share equations using the ‘‘QUAIDS’’ command (Poi, 2012). It was important to integrate these variables in order to accurately estimate expenditures and price elasticities.

1.4 Income elasticity and price elasticity

Elasticities are derived directly from the demand function or the supply function. They measure the sensitivity of buyers and sellers to a change in market conditions, allowing supply and demand to be analyzed with greater precision. Elasticity can be defined as the percentage change in demand caused by a 1 percent change in the variable under consideration, all other things being equal (Ravelosoa *et al.*, 1999). Demand functions use different types of elasticity such

as price elasticity of demand, income elasticity and cross-price elasticity of demand (Boizot-Szantai and Sans, 2014). The socioeconomic and demographic characteristics of households play an important role in determining demand trends (Pollak and Wales, 1981).

1.5. Data collect

The study used data which are derived from the survey on a demand and consumer preference for poultry products carried in eight prefectures in south Togo from 30 may to 30 july 2018. This survey has covered a total number of 317 households consuming poultry products. Due to the lack of information on some variables, 301 observations were considered. The households surveyed have been selected through a probabilistic sampling. The variables collected are the characteristics of economic and demographic of the household, the qualities and the types of consumed poultry products, the prices and supply conditions, the forms of consumption of poultry products and the preferences of the consumers. Primary data were completed by secondary data extracted from the available documentation.

In short, five (5) types of poultry products are considered in this study.

- First type: Table eggs
- Second type: Meat from broilers
- Third type: Local poultry meats
- Fourth type: Frozen cuts of imported poultry (thighs, rumps, gizzards, fins, drumsticks, etc.)
- Fifth type : imported frozen carcasses

RESULTS AND DISCUSSION

2.1 Household sex and type of poultry products consumed

Table 1 shows the number of households in which the different types of poultry products studied are the most consumed as well as the sex of the head of household according to each type of product. According to table1, "table egg" is the type of poultry products most consumed (268 consumers) with 73.88 % of households which are headed by men against 26.12 % by women. The "local poultry meat" is consumed by

234 households. For this group of consumers, household heads are predominantly male (76.07 %) against only 23.93 % women. The "imported frozen cuts" is consumed by 169 households surveyed. These households are headed by 69.82 % men against 30.12 % women. The number of households having chosen "broilers meat" is 124. Regarding this type of poultry products, households that consume them are managed by 72.58 % of men and 27.42 % by women. Only 98 households, headed by 66.32 % of men and 33.68 % by women, prefer "imported frozen carcasses".

Table-1: Number of consumers and head of household sex by type of poultry products

Type of poultry products	Preference	Head of household sex	
		Male	Female
Table eggs	268	73.88 %	26.12 %
Broilers meats	124	72.58 %	27.42 %
Local poultry meats	234	76.07 %	23.93 %
Imported frozen cuts	169	69.82 %	30.12 %
Imported frozen carcasses	98	66.32 %	33.68 %

Source: Computed from survey data, 2018

2.2 Preference for poultry products

Figure 1 shows consumer preferences for different types of poultry products. Thus, it emerges that 30% of consumers prefer table eggs, 26% local

poultry meats. 19% is the proportion of consumers who prefer imported frozen cuts, 14% live broilers meat and 11% frozen imported meat.

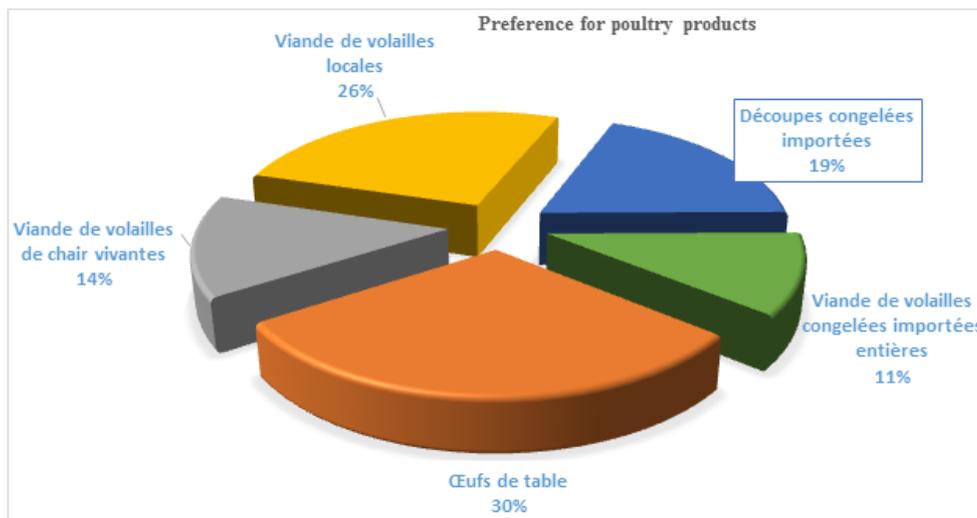


Fig-1: Preference for poultry products

Source: Computed from survey data, 2018

2.3 Place of provision for household poultry products

Figure 2 shows the different sources of supply for poultry products consumed in the households surveyed. It turns out that the shops are the most

preferred place of procurement, followed by the village market, the town market and the village farm, respectively. The "others" (5%) concern personal breeding, purchased from street vendors, along the roads or directly from homes.

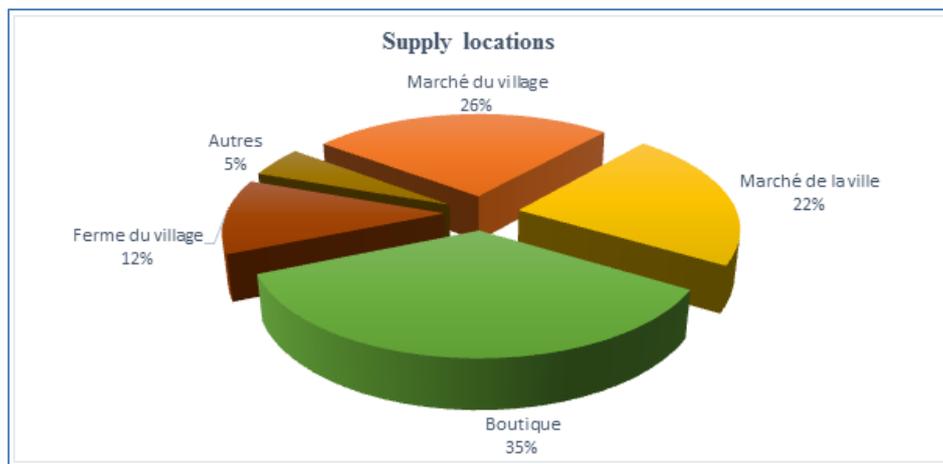


Fig-2: Household supply points for poultry products

Source: Computed from survey data, 2018

2.4 Food expenditures on poultry products

Figure 3 shows the annual expenditures devoted to the consumption of the different types of poultry products in the Maritime region. It appears that consumers spend annually on average 27451 FCFA;

30635 FCFA; 70655 FCFA; 33414 FCFA; 16028 FCFA respectively for table eggs, broiler poultry meat, local poultry meats, imported frozen cuts and imported frozen carcasses.

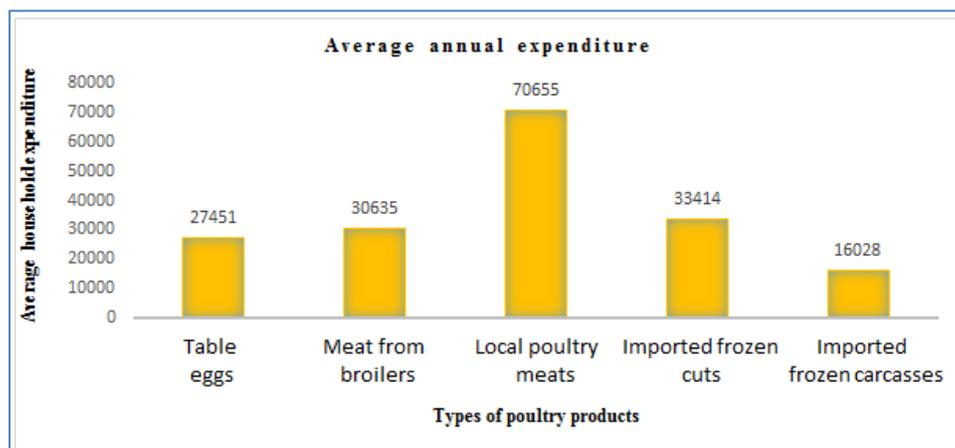


Fig-3: Annual food expenditures on poultry products

Source: Computed from survey data, 2018

2.5 Share of the poultry products category in the total expenditures on poultry products by the household

The average of the monthly shares of each type of poultry product in the total on poultry products of the household is given in Table 2. In the Maritime region,

the value of the average share of expenditures incurred by respondents in the consumption of eggs from table is 0.19; that of meat from live broilers is 0.14. For local poultry meat, its share is 0.40; that of imported frozen cuts being 0.20 and 0.07 is the share of frozen poultry meat imported.

Table-2: Share of the types of poultry products in the total expenditures of the poultry products

Variables	Average	Standard deviation	Minimum	Maximum
Share of Eggs	0.19	0.207	0	1
Share of Meat from broiler	0.14	0.214	0	1
Share of local poultry meat	0.40	0.305	0	1
Share of imported frozen cuts	0.20	0.243	0	1
Share of imported frozen carcasses	0.07	0.144	0	1

Source: Computed from survey data, 2018

2.6 Price by type of poultry products

The average price of different types of poultry products are presented in Table 3. The average price of a tray table eggs is 1983 FCFA and the price per unit of broilers 2449 FCFA. For one head of the local poultry,

the price is 2731 FCFA. Finally; one kilogram of imported frozen cuts costs 1497 FCFA and 1633 for a unit of imported frozen carcasses. It appears that the local poultry costs more than others. This provides an advantage for breeders.

Table-3: Purchase prices per unit of type of poultry products

Variables	Average	Standard deviation	Minimum	Maximum
Price of table eggs	1982.84	249,217	200	3200
Price of broilers meat	2449.22	347,587	150	4000
Price of local poultry meat	2731.06	937,414	1000	15000
Price of imported frozen cuts	1497.99	187,277	700	3500
Price of imported frozen carcasses	1633.00	112.858	1200	2500

Source: Computed from survey data, 2018

2.7 Determinants of demand for types of poultry products

This result is obtained from the estimation of the QUAIDS model.

Description of the variables introduced into the model

The QUAIDS model is estimated for the analysis of the determinants of demand. The dependent

variable is the budget share of the type or category of the poultry product purchased in the total expenditures on poultry products purchased by the household. The variables that explain the budget share include total household expenditures in poultry products, prices of types of poultry products and socio-demographic variables such as household size, the level of education of the head cleaning and the position of the household compared to its farm (Table 4).

Table-4: Description of the model variables

Variables	Definition of variables
Budget share in poultry products (Wi)	The share devoted to the type of poultry products in the total expenditures on poultry products
M	Total household expenditures on poultry products
Price (pj)	Purchase price of different types of poultry products
Housesize	Household size
Educatlevel	Education level of head of household
Housesit	Situation of the household in relation to a farm

Source: The authors

Estimation of the parameters of the budget share equation

The results of the estimation of the budget share functions are presented as follows:

- *Influence of income on the budget share*

The parameters relating to the measurement of the income effect on the budgetary share granted to the consumption of poultry products are significant with the exception of that of imported frozen cuts, which turns out to be insignificant. These are presented in Table 5. The coefficients are very significant (1%) for table eggs

and local poultry meats; significant at 5 % for meat from broilers and at 10 % for imported frozen carcasses. It appears that income influences the budget share allocated to different categories of poultry products with the exception of frozen cuts.

For the s table eggs, increasing 1 FCFA income increases the allocation for consumption of 0.2 FCFA. This is the case also in the flesh of poultry meat and carcasses chilled imported. In fact, the increase of 1 FCFA income increases their respective share in the expenses of 0.17 CFA and 0.13 FCFA.

Table-5: Results of the estimation of the demand function: Influence of income on budget share

Variables (shares)	Coef.	Std. Err.	P> z	Sig
Table eggs	.1992193	.0673521	0.003	***
Meat from broilers	.1688806	.0757632	0.026	**
Local poultry meats	-.5547232	.0749625	0.000	***
Imported frozen cuts	.0509734	.0960434	0.596	Ns
Imported frozen carcasses	.1356499	.0744576	0.068	*

Source: Computed from survey data, 2018. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Influence of price on the budget share

The parameters that measure the individual effect of price on the budget share are presented in Table 6. These parameters are significant at 10 % and 1 % respectively for table eggs and local poultry meats. This result means that the increase of 1 FCFA in the price significantly influences the budget share for these two types of poultry products.

Thus, an increase of 1 FCFA in the price of table eggs increases its share by 0.39 FCFA. Also for local poultry meat, the increase in its price by one unit increases its share by 1.97 FCFA.

Table-6: Results of the estimation of the demand function: Influence of the price on the budget share [¹]

Settings	Coef.	Std. Err.	P> z	Sig
gamma_1_1	.3920665	.2143208	0.067	*
gamma_2_1	.1209154	.1222877	0.323	Ns
gamma_3_1	-.7580871	.2990811	0.011	**
gamma_4_1	.0672186	.1444087	0.642	Ns
gamma_5_1	.1778866	.1226885	0.147	Ns
gamma_2_2	.1246898	.1587821	0.432	Ns
gamma_3_2	-.4884698	.2987819	0.102	Ns
gamma_4_2	.1070196	.1009306	0.289	Ns
gamma_5_2	.135845	.0952002	0.154	Ns
gamma_3_3	1.974793	.549051	0.000	***
gamma_4_3	-.24611	.3456363	0.476	Ns
gamma_5_3	-.4821257	.2788037	0.084	*
gamma_4_4	.0606193	.0992311	0.541	Ns
gamma_5_4	.0112525	.0930898	0.904	Ns
gamma_5_5	.1571416	.1461798	0.282	Ns

Source: Computed from survey data, 2018. *** p <0.01, ** p <0.05, * p <0.1

Effect of the quadratic term on the budget share

The parameters of the quadratic term are significant for table eggs and local poultry meats. This

shows that the relation of the budget share and the income is not linear for these types of poultry products.

Table-7: Results of the estimation of the demand function: Effect of the quadratic term on the budget share

Budget share	Coef.	Std. Err.	P> z	Sig
Table eggs	.008836	.0021251	0.000	***
Meat from broilers	.0037621	.002539	0.138	Ns
Local poultry meats	-.0174385	.0021659	0.000	***
Imported frozen cuts	.0017816	.0031001	0.566	Ns
Imported frozen carcasses	.0030588	.0024492	0.212	Ns

Source: Study result made from survey data, 2018, *** p <0.01, ** p <0.05, * p <0.1

¹In this table gamma1_1 means the influence of the price of eggs on their budget share; gamma2_1 means the influence of the price of meat from broilers on the budget share of table eggs; gamma3_1 explains the influence of the price of local poultry on the budget share of eggs; gamma4_1 shows the influence of the price of imported cuts on the budget share of eggs; gamma5_1 indicates the impact of the price of imported carcasses on the budget share of eggs; gamma2_2 means the influence of the price of broilers on their budget share; gamma3_2 shows explains the influence of the price of local poultry on the budget share of broilers; gamma4_2 indicates the impact of the price of cuts on the share of broilers; gamma5_2 shows the effect of the price of imported carcasses on the share of broilers; gamma3_3 shows the influence of the price of local poultry on their budget share; gamma4_3 means the influence of the price of cuts on the share of local poultry; gamma5_3 shows the impact of imported carcasses on the share of local poultry; gamma4_4 explains the effect of the price of cuts on their budget share; gamma5_4 explains the influence of the price of imported carcasses on the budgetary share of cuts; gamma5_5 measures the impact of the price of imported carcasses on their budget share.

- **Influence of socio-demographic factors on the budget share**

Among the socio-demographic variables included in the model, the size of the household exerts a negative influence on the share of the budget allocated to broilers meats, positive influence on the share of the budget allocated to imported frozen cuts. This result means that the larger the household size is, the less it invests in the purchase of live broiler meat. Conversely,

the larger the household size, the more it invests in the purchase of imported frozen cuts. The estimation also shows that, if the head of household's education is high, he invests less in the purchase of local poultry and more in imported frozen cuts. The position of households near a poultry farm has a positive influence on the share of the budget allocated to the consumption of local poultry meat.

Table-8: Results of the estimation of the demand function (QUAIDS model): Influence of socio-demographic variables on the budget share

Settings	Coef.	Std. Err.	P> z	Sig
eta_Housesize_1	.0003956	.0002702	0.143	Ns
eta_Housesize_2	-.000759	.0002786	0.006	***
eta_Housesize_3	-.000375	.0004245	0.377	Ns
eta_Housesize_4	.0008566	.0003117	0.006	***
eta_Housesize_5	-.0001181	.00021	0.574	Ns
eta_Educatlevel_1	.0007844	.0005348	0.142	Ns
eta_Educatlevel_2	-.0005723	.0005326	0.283	Ns
eta_Educatlevel_3	-.0016688	.0008062	0.038	**
eta_Educatlevel_4	.0015216	.0005966	0.011	**
eta_Educatlevel_5	-.0000649	.0003943	0.869	Ns
eta_Housesit_1	.0015643	.0031687	0.622	Ns
eta_Housesit_2	-.0042714	.0035308	0.226	Ns
eta_Housesit_3	.010312	.004901	0.035	**
eta_Housesit_4	-.0040564	.0027304	0.137	Ns
eta_Housesit_5	-.0035484	.0028399	0.211	Ns

Source: Computed from survey data, 2018. *** p < 0.01, ** p < 0.05, * p < 0.1

NB: The variable "Housesize" indicates the size of the household. Thus the variables "eta_Housesize_1", "eta_Housesize_2", "eta_Housesize_3", "eta_Housesize_4" and "eta_Housesize_5" respectively measure the influence of the size of the household on the demand for eggs, broilers meat, local poultry meat, imported cuts and carcasses.

The pattern is the same for the variables "eta_educatlevel: level of education of the head of household" and "eta_housesit: situation of the household in relation to a farm" which respectively indicate the impact of the level of education of the head of household and the situation of the household versus farm on different types of poultry products.

The results obtained from the estimation of the budget share function shows that variables such as income, price, household size, the level of education of the head of household and the situation of the household in relation to a farm are the main factors influencing the budget share allocated to the consumption of poultry products. These results are consistent with those of Yovo (2010) who found that price and household size are the main factors affecting demand for goods. Kombate *et al.* (2010) found the same results when they show that the demand for imported rice is essentially determined by income and prices (price of local rice and price of imported rice).

Our results are similar to those of Sankara *et al.* who carried out a study in 2004 on the analysis of the determinants of household demand for fish in Burkina Faso. The study found that the determinants of the demand for fish are household size, the price of fish in the market, the level of education and the income of the head of household.

The results are all the same similar to those obtained by Laroche-Dupraz *et al.* (2008) who found that consumers prefer local chicken and that the share of the budget allocated to its consumption is higher compared to other types of chicken by applying Lancaster's theory to the consumption of broiler chickens in Cameroon.

Estimation of elasticities

The different types of elasticity are estimated to determine the nature of the various types of poultry products.

Income elasticity of demand for types of poultry products

Table 9 shows the income elasticities according to the different types of poultry products. The income elasticity measures the change in demand with respect to income, other things being equal elsewhere. An increase in income of 1% leads to an increase in demand of table eggs from 0, 68%; the living broilers

1.3 4 %; of 0.92 % for local poultry meat and that of imported frozen carcasses is 1.55%. Meat from live broilers and imported frozen carcasses are then luxury goods because they have elasticity greater than 1. The table eggs and local poultry meat have an elasticity

value between 0 and 1. This means that those products are essential goods. There is therefore part of the basic foods within households. As soon as the standard of living of consumers exceeds the subsistence threshold, they begin by consuming products considered as luxury.

Table-9: Income elasticity of demand for types of poultry products

	<i>Eggs</i>	<i>Live meat poultry</i>	<i>Local poultry</i>	<i>Cuts imported frozen</i>	<i>Imported frozen carcasses</i>
<i>Average</i>	0.6808	1.3434	0.9189	1.0246	1.5508
<i>Standard deviation</i>	0.0708	0.1034	0.0444	0.0804	0.1340

Source: Computed from survey data, 2018.

The elasticity of demand with respect to price measures the change in demand for the good as a function of the change in its price. The demand function corresponds to the demand function traditionally defined and which takes into account both the substitution effect and the income effect. Direct price elasticities are negative in accordance with demand theory. Among the types of poultry products studied, local poultry meats are more sensitive to price increases with a direct price elasticity of 0.93. This means that a 10% increase in its price implies a drop of 9.3% in demand for local poultry meats. The elasticity value of table eggs is less than 1. This means that the demand for table eggs is inelastic to price.

Cross-price elasticities measure the change in demand relative to the price of other goods. The cross-price elasticity in the majority of cases is other than zero. For example, the change in the price of table eggs affects negatively the demand for local poultry meats. This means that an increase in the price leads to a decrease in demand for local poultry meats. Table eggs and local poultry meat are then complementary goods. However, the prices increase for local poultry meat increases demand for imported frozen products. Consequently, local poultry meat and the imported frozen products can be considered as substitute goods.

Table-10: Direct and cross price elasticities

	<i>Table Eggs</i>	<i>Meat from broilers</i>	<i>Local poultry meats</i>	<i>Imported frozen cuts</i>	<i>Imported frozen carcass</i>
<i>Table Eggs</i>	-0.391 (0.397)	-0.324 (0.222)	-0.132 (0.265)	0.029 (0.303)	0.137 (0.244)
<i>Meat from broilers</i>	-0.567 (0.308)	-1.418 (0.41)	0.469 (0.317)	0.271 (0.361)	-0.099 (0.288)
<i>Local poultry meats</i>	-0.107 (0.124)	0.218 (0.107)	-0.932 (0.192)	0.083 (0.125)	0.015 (0.083)
<i>Imported frozen cuts</i>	-0.038 (0.287)	0.229 (0.246)	0.209 (0.252)	-0.810 (0.415)	-0.196 (0.302)
<i>Imported frozen carcasses</i>	0.187 (0.627)	-0.210 (0.534)	0.335 (0.452)	-0.638 (0.82)	-0.555 (1.12)

Source: Computed from survey data, 2018. Standard deviation in parentheses

Conclusion and policy implications

Poultry products, a source of animal protein, have become very important in the diet of households in Togo, especially in the South. However, due to the persistent low production rate and the non-competitiveness of local production, Togo has not yet been able to meet its needs. Thus, the country depends on imports to cover its needs in poultry products. This study analyzed the determinants of demand for poultry products and consumer preference by considering the diversity of the range of poultry products on the market. In total, five types of poultry products were distinguished in the study: table eggs, broilers meat, local poultry meat, frozen cuts of imported poultry and frozen carcasses imported. It emerges from the results obtained that factors such as the income of the head of

household, the size of the household, the level of education of the head of household and the position of the household in relation to a farm influence the budget share allocated to the consumption of poultry products in general. Particularly for imported frozen cuts, the size of the household and the level of education of the head of household positively influence the share of the budget that consumers allocate to their consumption. For the local poultry, it is the situation of the household in relation to a farm that positively influences the share of the budget that consumers allocate to their consumption. Results also show that broilers meat and imported frozen carcasses are luxury goods whereas table eggs and local poultry meats are essential goods. Moreover, the local poultry meat and the imported frozen products appear as substitute goods. Therefore,

it is urgent to invest in the intensification of poultry production so as to cover local demand in poultry and reduce the importation of the imported frozen products.

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