Evaluation of Consumer Preferences for Poultry Products in Ghana using Utility Space and Willingness to Pay Space Models

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Abstract

This paper examines price sensitivity, eco-labelling, and sustainability components of consumer preference for poultry products in Ghana. We employed the discrete choice experiment approach using recent advances such as the utility space and willingness to pay space models. Using a sample of 195 respondents from Cape Coast metropolis and Komenda Edina Eguafo Abirem municipality, the econometric modelling revealed that, on average, sampled consumers preferred imported poultry meat with eco-labelling, preferably sold at the supermarkets but also affordable. The results suggest that demand for high-quality and sustainably produced poultry meat may be an emerging demand among poultry consumers in Ghana. The preference for supermarkets, in addition to farmers' markets, shows that the Ghanaian food system is emerging. The study's findings show a need to improve food safety standards, promote sustainable poultry production, and raise consumer awareness of eco-labelling and certification schemes in emerging economies such as Ghana. Also, the findings of this study have provided useful information for the production, marketing, and policy decisions regarding the evolving consumer preference for poultry products in Ghana.

Abbreviations

AIC: Akaike Information Criteria; **ASC:** Alternative Specific Constant; **BIC:** Bayesian Information Criteria; **CLM:** Conditional Logit Model; COVID-19: Coronavirus Disease; **GHS:** Ghana Cedis; **GMNL:** Generalised Multinomial Logit Model; **IID:** Independent and Identically Distributed; **KEEA:** Komenda-Edina-Eguafo-Abirem; **LL:** Log Likelihood; **MIXL:** Mixed Logit; **SD:** Standard Deviation; **SE:** Standard Error; **UCCIRB:** University of Cape Coast Institutional Review Board

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Introduction

The poultry sector in Ghana contributes 37% of total meat production in the country and plays a vital role in poverty reduction, food security, and rural livelihoods, among others.[1,2] Despite its importance to socio-economic development, the sector is bedevilled by challenges, including low domestic production levels.[3] Over the years, several policies have been introduced by many Ghanaian governments to promote the local poultry industry. However, the poultry sector in Ghana is still characterised by declining local production levels.[4] Often, domestic poultry production levels are augmented with importation, which has its challenges, including pandemics such as coronavirus disease (COVID-19), making it difficult to rely on.[3,5] Therefore, the country can no longer depend on the import market.[6,7] Focus has to be geared towards developing the country's poultry production capabilities. One of the significant areas of concern in Ghana's poultry business that must be addressed is the marketability of poultry products produced in the country. This requires knowledge of consumer choices of poultry meat and poultry meat products to optimise production, marketing and policy-making in the sector for sustaining sustainable development goals: 1 no poverty, 2 zero hunger, and 8 decent work and economic growth.

Previous studies[8,9] have examined drivers, including price and quality effects on consumer choices for poultry meat. However, issues relating to sustainability, food safety, and convenience have recently emerged.[10] and [11] consider that such changes are a source of difficulties and opportunities for the poultry industry to adjust to new trends that consumers demand. Novel determinants like eco-labelling, which shows compliance with environmentally friendly or ethical standards, are increasingly being applied by consumers. Various studies have shown that more and more consumers are willing to pay price premiums for eco-labelled products, including poultry, even when apparent price sensitivity among most consumers in various markets is evident.[9,12] This reflects that, increasingly, an essential share of ecologically conscious consumers is influencing the shape of the poultry value chain.[13] established that eco-labelling positively influences consumer willingness to pay, especially for urban and higher-income consumers in developing countries. This is taken a step further

by,[11] who proved that the same eco-labelling can successfully command a price premium for poultry in Bangladesh as increasing awareness of sustainable production methods takes hold. While demand for eco-labelled products is rising, their desirability remains somewhat compartmentalised. On the one hand, research like[14] evidenced that only portions of consumers-higher-income and environmentally conscious ones-are willing to pay more for eco-labelled poultry. This means that while the market for sustainable poultry products grows, they are still in a niche, especially in price-sensitive regions. Another evolving preference is the form in which poultry products take. Compared with the previous consumption pattern, where whole poultry products dominated consumer demand, pre-cut and processed poultry product consumption can be seen, especially within the younger and more urban populations.[15] This trend shows that convenience in food consumption has become critical, and this is encouraged by the emerging popularity of modern retail channels such as supermarkets and online platforms. Price is an important determinant of consumer choice for food items, especially in developing markets with low or limited disposable incomes. Several research works validate that buyers first consider the affordability of the food, in this case, poultry. For example,[16] established that prices still dominate food buying decisions in most developing countries. Such consumers are susceptible to increases in the price of poultry, just like other staple foods. On a related note,[17] asserted that price strongly affects the willingness to pay for Arctic food products, which underlines the role pricing plays in food markets.

Another critical factor in consumer choice is marketing channels. While most developing countries still have wet markets, modern retail channels, including supermarkets and the Internet, are increasingly becoming important. Indeed,[18] note that consumers increasingly prefer formal retail environments when buying poultry based on higher safety and quality standards. Moreover,[19] note that an increase in online sales is a more significant change in food purchasing behaviour to identify an adequate opportunity for direct marketing for rural farms. In fact, despite the development of modern retail channels, traditional markets remain an important channel, especially for buyers searching for convenience and affordability. According to a

study by[20] most leafy vegetable retailers in Ghana still prefer trading their products in traditional markets due to the immediateness of buyers and attractive prices, which most probably also applies to poultry products.

In addition, the origin of foodstuffs has become a prime factor in consumer choice. Indeed,[21] identified that consumers in China are ready to pay higher prices for food products that guarantee safety and traceability, further validating the importance of products of origin to consumer choice. Food safety has also been identified as the most crucial concern related to poultry consumption. For instance,[22] argues that, in low- and middle-income countries, improving food safety will adequately enhance consumer confidence in food. This has also been supported by,[23] who indicate that food safety labelling is a prime determinant of consumer willingness to pay for pork in China, an indication that coincides with the essence of safety in poultry products.

It is, therefore, essential to examine consumer preferences for poultry products in Ghana in the context of the attributes above. Previous studies have examined consumer preferences for poultry products in different contexts using different methodologies. For instance,[24] examined consumer preferences and willingness to pay for domestic chicken cut parts in Ghana using a double-bounded dichotomous choice approach and deriving determinants of willingness to pay using a multivariate Tobit regression model. The approach used in [24] study is a contingent valuation technique that cannot evaluate multiple attributes simultaneously.[25] Our study, therefore, examines consumer preference and willingness to pay for poultry meat attributes using the choice experiment approach. The choice experiment approach helps identify trade-offs in choices and estimate substitution effects. Also,[8] examined consumer preference and demand for poultry meat attributes in Ghana. Although the study used the choice experiment approach, the willingness to pay values were estimated using the ratio approach. However, choice modellers have criticised the ratio method of estimating willingness to pay values as one cannot clearly distinguish the distributional assumptions of the willingness to pay values.[25] Our present paper extends on 8 study by using both the utility space model and the willingness to pay (WTP) space model as suggested in the literature. The willingness to

pay space model allows for the direct estimation of willingness to pay values and avoids the problems of distributional assumptions.[25]

In addition to the attributes of 8, the study considers marketing channels and eco-labelling important in developing the poultry industry in Ghana. Therefore, the key attributes considered in this paper - product form, eco-labelling, marketing channels, product origin, dressed product, and pricing - add to the increasing body of knowledge relevant to the literature on consumer behaviour in food markets.[9,12,19] It also meets the demand for current details concerning the interrelation of these preferences and sustainability and convenience trends. These insights are critical in assisting with the strategic decision-making processes for the poultry industry in the face of changing consumer needs and market dynamics.

The main goal of this research is to examine consumer preferences for poultry products in Ghana. The paper's specific objectives include 1) analysing consumer purchasing and consumption behaviour for poultry meat products in Ghana, 2) identifying and assessing the factors that influence poultry meat consumption in Ghana, and 3) evaluating consumer preferences and estimating their willingness to pay for poultry meat products using utility and WTP space models. The research questions in line with the objectives include 1) What are poultry meat products purchasing and consumption behaviour in Ghana? 2) what factors influence poultry meat consumption in Ghana? and 3) what are consumer preferences and willingness to pay for poultry meat products?

The rest of the paper is organised as follows: The next section describes the materials and methods. Results and discussion follow, followed by conclusions, limitations, and future research.

Materials and Methods
Study area Description
The study area is the Central region of Ghana. The Central region is located in the South-Western centre of Ghana and shares boundaries with the Ashanti region to the North, the Eastern region to the North-East, Greater Accra to the South-East and the West by the Western region. It is bordered to the South by the Gulf of Guinea. The region has a coastline of

150km, the longest coastline in Ghana and one of the smallest in the country.[20] The region has a total land area of nearly 9826kmsq with a cultivable land area of 7864kmsq.

Sampling and Research Instruments
The multistage sampling technique was utilised to select the sample for the study. The Central Region was purposively chosen in the first stage due to increased poultry product consumption. The Cape Coast Metropolis and the Komenda-Edina-Eguafo-Abirem Municipality were specifically sampled in the second stage. The third stage involved sampling individual communities within the two selected municipalities. Two communities were selected from KEEA (Elmina and Atabadze) and Cape Coast (Ankaful and Abura). A total sample of 195 was used for the study, comprising 100 from the Cape Coast metropolis and 95 from KEEA. In Cape Coast, we sampled 50 respondents each from Ankaful and Abura, while in KEEA, we sampled 50 from Elmina and 45 from Atabadze. The sample for this study is appropriate in the context of the choice experiment methodology employed. The 195 sample of the study comprises 124 (64%) women and 71 (36%) men. Also, 88% of the sample is educated, and 12% are uneducated (Table A1 in Appendix 1).

Questionnaires (Appendix 2) were used to gather accurate and reliable data on poultry consumers. The instruments were designed to respond to the research objectives adequately. Specifically, they addressed the objectives about respondents' socioeconomic characteristics, purchasing and consumption behaviour toward poultry products, factors that affect poultry meat consumption, and preferences and willingness to pay for poultry meat attributes.

Choice Experiment
The starting point of discrete choice experiment modelling is identifying attributes and levels. Based on the literature search 8 and the experts' interviews, the following attributes were identified: product form, eco-labelling, marketing channel, the origin of the product, dressed product, and price per kg. The product form involves the nature of the product offered for sale- there were four levels: fresh, frozen, chilled, and smoked. The eco-labelling refers to using eco-friendly materials to label products, measured on two levels: no eco-labelling and eco-labelling. The marketing channel refers to the point

of sale of poultry products, and this was measured on five levels: farmgate, farmers market, traditional market, supermarket and virtual market. The origin of the product attribute is related to whether the poultry meat was produced domestically or imported. The price attribute that represents the price per kg of poultry product was of three levels (GHS 20, GHS 30, and GHS 35).

Upon identifying the attributes and their corresponding levels, an efficient choice experiment design was generated in Stata,[15] with priors generated from pre-testing the questionnaire at the University of Cape Coast. An efficient design is more suitable because it is cost-effective and increases sampling efficiency(26). The attribute descriptions and levels are presented in Table A2 in Appendix 1. The choice experiment had two alternatives, option A and option B, and an opt-out, option C, as the third alternative to ensure that respondents are not forced to make choices.[27] The sample choice set is in Table A3 in Appendix 1. Following,[28] 30 choice sets were generated and grouped into 10 to reduce the cognitive burden on respondents. Therefore, each respondent faced 10 choice sets.

Econometric Specification
The study employed a discrete choice experiment because it enables one to estimate trade-offs and values of a good's attributes and provides valuable information for strategic planning interventions.[29] The choice experiment approach is based on Lancaster's characteristic theory of value, with its econometric basis in the random utility theory. The random utility has two components: a systematic component and an error component. The attributes of alternative *j* in choice occasion t faced by respondent n could be labelled as vector X_{njt}. The utility obtained by individual n from alternative *j* in choice occasion *t* is specified as:

$$U_{njt} = \beta_n X_{njt} + \varepsilon_{njt} \qquad ...(1)$$

where the coefficients of βn is unobserved and varies in the population with a density function *f(βn / Ө)* while Ө are parameters to be estimated. ε_{njt} is an unobserved random term that is identically and independently distributed. The unconditional probability of the sequence of choices made by an individual is expressed as an integral of all possible values of β_n:

$$P_{njt}(\theta) = \int L_{njt}(\beta_n)f\left(\beta_n/\theta\right) d\beta_n \qquad ...(2)$$

$$U_{njt} = \lambda_n\left[-p_{njt} + \gamma_n' X_{njt}\right] + \epsilon_{njt} \qquad ...(5)$$

Mixed Logit Model in Willingness to Pay Space
The utility model in equation (1) could be restated as

$$U_{njt} = -\alpha_n P_{njt} + \beta_n' X_{njt} + \epsilon_{njt} \qquad ...(3)$$

Where α_n and β_n are individual coefficients for price attribute (P_{njt}) and other poultry attributes (X_{njt}), and ϵ_{njt} is a random term. According to,[30] the random term is assumed to be extreme values distributed with variance,

$$\mu_n^2 \frac{\prod 2}{6},$$

where μ_n is an individual-specific scale parameter. When equation (3) is divided by μ_n, we get an IID extreme value distributed random term with variance equal

$$\frac{\prod 2}{6}_{30,31}:$$

$$U_{njt} = -\lambda_n p_{njt} + c_n' X_{njt} + \epsilon_{njt} \qquad ...(4)$$

Where $\lambda_n = \alpha_n/\mu_n$ and $c_n = \beta_n/\mu_n$, and that gives the utility space model ([30,31]).

Given the fact that WTP for the attributes is given as $\gamma_n = c_n/\lambda_n$, equation (4) can be reformulated as:

Equation (5) gives the willingness to pay space model $\frac{\prod 2}{6}$ 30,31.

Following previous studies, the maximum simulated likelihood model was used in estimating the models in Stata using Stata written codes.[32]

Results
Socio-economic Characteristics of Sampled Respondents
The socio-economic characteristics of respondents are reported in Table A1 in the Appendix 1. From the Table, the average age for all respondents is 35 years old, which characterises a relatively young population. The results in Table A1 also show that the mean of the gender variable is 0.64, where men (=0) and women (=1), indicating that the sample had more women than men. This may have implications for consumption behaviour in cases where cultural factors prevail in food preference and decision-making authority at the household level. Also, the average years of education is 10 years, suggesting that, on average, the respondents had a minimum of Senior High School level of education.

Table 1: Purchasing and consumption behaviour of respondents

Variables	Options	Frequency	Percentage
Consume poultry meat	Yes	195	100
	No	-	-
Frequency of consumption	Daily	27	13.9
	Weekly	102	52.3
	Monthly	49	25.1
	Quarterly	11	5.6
	Semi-annually	1	0.5
	Yearly	5	2.6
Origin poultry meat consumed	Local	27	13.9
	Imported	50	25.6
	Both	118	60.5
Nature of poultry meat consumed	Whole dressed	92	47.2
	Cut portions	103	52.8
Purchase location	Open (traditional) market	77	39.5
	Supermarket	38	19.5
	Coldstores	62	31.8
	Farmgate	17	21.2
	Retailers	1	0.5

Source=Authors creation, 2024

Purchasing and Consumption Behaviour for Poultry Meat Products

Table 1 shows the purchasing and consumption behaviour of the respondents for poultry products. From the Table, all respondents (100%) consume poultry meat, 52.3% consume it every week, and 13.9% consume it daily; both rates show the importance of poultry meat in regular diets (Table 1)—these high frequencies of consumption point toward the relevance of studying consumer preferences for poultry meat attributes. Also, on the origin of the poultry meat consumed, the majority, 60.5%, consume both local and imported poultry meat, showing mixed preferences, possibly due to availability and price.

For the purchase location, the majority of the respondents (39.5%) purchase poultry meat from the open (traditional) markets, and 31.8% purchase

it from the cold stores. This means that traditional and modern markets coexist. This is important in the context of such attributes as food safety, which is generally more assured in supermarkets than in open markets.

Factors that Affect Poultry Meat Consumption

The factors affecting poultry meat consumption are presented in Table 2. Accordingly, other than the nutrition factor, price 76.4% and food hygiene/quality 82.6% are the most influencing factors of consumption, which corroborates findings in the literature.[33,34] Consumers in developing countries make choices based on affordability and safety concerns. In this respect, strong preferences for safe poultry products reflect those in other regions, such as China, where food safety certification determines consumer decisions.

Table 2: Factors that affect poultry consumption

Factors	Yes	Percentage	No	Percentage
Availability	128	65.6	67	34.4
Price (affordability)	149	76.4	46	23.6
Food hygiene/quality	161	82.6	34	17.4
Nutrition	157	80.5	38	19.5
Convenience	132	67.7	63	32.3

Source=Authors creation, 2024

Preference for Poultry Meat Attributes

The results of the conditional logit model (CLM) and the mixed logit (MIXL) model in utility space are presented in Tables 3 and 4, and that of the willingness to pay space model are presented in Tables 5 and 6. The significance levels of the attributes in the models are presented in superscript a, b and c, representing 1%, 5% and 10% levels, respectively (Tables 3-6). From the results, the price attribute is negative and highly significant at 1% in both the CLM and MIXL model (Tables 3 and 4), suggesting that sampled consumers prefer cheaper poultry meat, a behaviour consistent with consumer behaviour ([28]). The coefficient of the alternative specific constant -ASC (modelled here as an opt-out) in both models (Tables 3 and 4) is negative and significant at 1%, showing that consumers are unsatisfied with current poultry meat attributes, on average. This result points to preference for improved quality poultry products such as safety and

quality including eco-labelling with consumers willing to pay a premium price on this account to avoid the current offerings.

The chilled and frozen poultry product form attribute levels are negative and significant at 10% and 1%, respectively in the MIXL model (Table 4), compared with the reference, fresh poultry meat product form, although the chilled form is not significant in the conditional logit model (Table 3). This result is unsurprising and confirms the general trend in most developing countries where fresh-produced poultry meat is usually preferred on perceived quality grounds. Also, smoked poultry meat product form attribute level in the CLM and MIXL model is negative and significant at 1%, suggesting once again, that fresh poultry product form is preferred by sampled consumers. Some consumers may attach strong importance to this form, either because of regional or cultural preferences.

Table 3: Estimates from the Conditional Logit Model (CLM)

Taste parameters	Model 1: CLM	
	Coeff.	SE
Price	-0.031[a]	0.005
ASC	-3.199[a]	0.221
Chilled form	-0.125	0.105
Frozen form	-0.182[c]	0.096
Smoked form	-0.346[a]	0.100
Eco-labelling	0.052	0.053
Farmers market	-0.014	0.103
Traditional market	0.009	0.135
Supermarket	-0.057	0.110
Virtual market	-0.214c	0.117
Origin of product(imported=1)	1.041[a]	0.057
Dressed product (reference= whole dressed)	0.043	0.058
N	5820	
LL	-1282.614	
AIC	2589.227	
BIC	2669.256	

Note: a=significant at 1% alpha level, b=significant at 5% alpha level, and c=10% significance level. SE=Standard Error, SD=Standard deviation, N=Number of observations, LL=Log likelihood; AIC=Akaike Information Criteria, BIC=Bayesian Information Criteria, ASC-Alternative Specific Constant. Source=Authors creation, 2024

The eco-labelling attribute in the CLM model is insignificant; however, in the utility space of MIXL model (Table 4), it shows a positive and significant effect at a 5% significance level, indicating increased awareness of or preference for environmentally sustainable poultry meat attributes. Among the attribute levels of marketing channels, only the virtual market is significant at 10% in the CLM (Table 3) and 1% in the MIXL model (Table 4). Sampled consumers are, however, indifferent towards farmers' markets, traditional market and supermarket channels compared with the reference marketing channel, farmgate, as the coefficients on those attribute levels of marketing channel are not significant in both models. The origin of the product attribute, a dummy variable where imported equals 1 and local, 0, has an extremely high positive coefficient and is also significant at 1% in both models, which indicates a strong preference for imported poultry meat (Tables 3 and 4). The dressed product attribute is also positive and significant at a 10% alpha level in the MIXL model (Table 4) but not significant in the CLM

model, indicating that sampled consumers prefer choice cuts to whole dressed products.

The standard deviations of the price attribute and the product form attribute (chilled, frozen, smoked) are significant at 1%, 10%, 1% and 1%, respectively (Table 4). Equally, the standard deviations of the farmers market channel attribute level, traditional market channel attribute level, origin of product attribute, and eco-labelling attribute are significant at 1%, 5%, 1%, and 5%, respectively. The significant standard deviations for the above attributes indicate heterogeneity in consumer preferences.

Willingness to Pay for Poultry Meat Attributes
Tables 5 and 6 present the willingness to pay (WTP) space model estimates modelled in the mixed logit (MIXL) model and generalised multinomial logit (GMNL) model frameworks. The coefficients in both models are direct WTP values except that in the case of the GMNL WTP space model (Table 6), the price coefficient is fixed ([29]). From the results,

the eco-labelling attribute, though positive, is not significant in both models, indicating that sampled consumers are indifferent towards it. Regarding the product form attribute, compared with the reference product form level, fresh, sampled consumers have less value for chilled, frozen and smoked product forms, as revealed in the negative and significant coefficients in both models (Tables 5 and 6).

Table 4: Estimates from the Mixed logit (MIXL) model in utility space

Taste parameters	Model 2: MIXL model			
	Coeff.	SE	SD	SE
Price	-0.056[a]	0.014	-0.114[a]	0.016
ASC	-10.010[a]	1.377	-4.776[a]	0.635
Chilled form	-0.338[c]	0.186	-0.404[c]	0.236
Frozen form	-0.583[a]	0.182	0.780[a]	0.221
Smoked form	-1.138[a]	0.236	1.354[a]	0.244
Eco-labelling	0.231[b]	0.099	-0.307[b]	0.134
Farmers market	0.079	0.195	-0.714[a]	0.210
Traditional market	-0.311	0.272	-0.877[b]	0.342
Supermarket	0.050	0.194	0.202	0.259
Virtual market	-0.842[a]	0.233	-0.217	0.232
Origin of product (imported=1)	2.720[a]	0.305	3.523[a]	0.304
Dressed product (reference= whole dressed)	0.195[c]	0.108	-0.007	0.159
N	5820			
LL	-857.802			
AIC	1763			
BIC	1923			

Note: a=significant at 1% alpha level, b=significant at 5% alpha level, and c=10% significance level. SE=Standard Error, SD=Standard deviation, N=Number of observations, LL=Log likelihood; AIC=Akaike Information Criteria, BIC=Bayesian Information Criteria, ASC- Alternative Specific Constant. Source=Authors creation, 2024

Table 5: WTP Estimates from the MIXL Willingness to Pay Space model

Taste parameters	Model 3: MIXL WTP space model			
	Coeff.	SE	SD	SE
Price	-7.139[a]	1.240	0.109	1.092
ASC	-19.644[a]	1.920	9.278[a]	1.041
Chilled form	-0.555[a]	0.155	-0.612[a]	0.161
Frozen form	-0.544[a]	0.176	0.607[a]	0.127
Smoked form	-1.226[a]	0.242	1.488[a]	0.205
Eco-labelling	0.118	0.089	0.105	0.105
Farmers market	0.192	0.205	1.236[a]	0.174
Traditional market	-0.235	0.241	-0.211[a]	0.215
Supermarket	0.376[b]	0.183	0.324[a]	0.123
Virtual market	-0.474[a]	0.159	-0.399[a]	0.151
Origin of product (imported=1)	4.084[a]	0.352	-4.540[a]	0.395

Dressed product (reference= whole dressed)	-0.056	0.094	-0.476	0.119[a]
Tau	-	-	-	-
Gamma	-	-	-	-
N		5820		
LL		-846.034		
AIC		1740.068		
BIC		1900.126		

Note: a=significant at 1% alpha level, b=significant at 5% alpha level, and c=10% significance level. SE=Standard Error, SD=Standard deviation, N=Number of observations, LL=Log likelihood; AIC=Akaike Information Criteria, BIC=Bayesian Information Criteria, ASC-Alternative Specific Constant. Source=Authors creation, 2024

Table 6: WTP Estimates from the GMNL Willingness to Pay Space model

Taste parameters	Model 4: GMNL WTP space model			
	Coeff.	SE	SD	SE
Price	Fixed	-	-	-
ASC	-18.243[a]	1.892	12.204[a]	1.223
Chilled form	-0.307[b]	0.140	-1.383[a]	0.184
Frozen form	-0.359[a]	0.100	-0.970[a]	0.128
Smoked form	-1.210[a]	0.176	-1.779[a]	0.099
Eco-labelling	0.003	0.055	0.104[b]	0.047
Farmers market	0.475[a]	0.169	0.679	0.085
Traditional market	-0.331[a]	0.114	0.294[a]	0.097
Supermarket	0.327[b]	0.143	0.128	0.091
Virtual market	-0.530[a]	0.160	0.499[a]	0.127
Origin of product (imported=1)	3.512[a]	0.236	4.013[a]	0.266
Dressed product (reference= whole dressed)	0.329[a]	0.068	-0.462[a]	0.050
Tau	1.710***	0.198		
Gamma	0	-	-	-
N		5820		
LL		-844.196		
AIC		1736.39		
BIC		1896.96		

Note: a=significant at 1% alpha level, b=significant at 5% alpha level and c=10% alpha level, SE=Standard error, SD=Standard deviation, N=Number of observations, LL=Log likelihood; AIC=Akaike Information Criteria, BIC=Bayesian Information Criteria. ASC-Alternative specific constant, Source=Authors creation, 2024

Concerning the marketing channel attribute, the supermarket's attribute level is positive and significant at 5% in both models, reinforcing the value for formal markets when price and safety concerns are considered. In addition, the farmer's market attribute level is positive and significant at a 1% significance level in the GMNL model (Table 6), showing that when scale heterogeneity is accounted for, sampled consumers will value the farmers' market attribute level. Compared with the farmgate marketing channel, sampled consumers have less value for traditional and virtual marketing channels, as revealed in their negative and significant coefficients in the GMNL model

(Table 6). Also, sampled consumers value choice cuts to whole dressed poultry meat as shown in the positive and significant coefficient of dressed product attribute (Table 6) measured as a dummy where choice cuts equal 1; this may be arising from convenience. The scale parameter, tau, is also significant, suggesting that scale heterogeneity is essential (Table 6).

Discussion

The finding of a youthful sample is consistent with [35] and [36] studies in Kenya and Ghana, respectively, that found that consumers of poultry are mainly youth. This is an essential point since, generally, younger consumers tend to exhibit different purchase behaviours than older consumers, especially when adding value to new attributes such as food safety or eco-labelling. Younger consumers would, according to [16] tend to be more adaptable to new technologies and may be much more open to experimentation with new product attributes such as eco-labelling or chilled poultry; however, they tend to be more sensitive to prices. Younger consumers may attach more value to better value for money than premium attributes like sustainability.

The finding that the price attribute is negative and significant at 1% follows the general literature,[25] which states that most consumers in developing countries are very sensitive to price, especially for a staple food commodity like poultry.The finding is also consistent with [8] that sampled poultry consumers in Ghana have a disutility for higher prices, compared with lower prices of poultry meat.[16] emphasize that price is a major determinant of food choice, especially in developing economies with limited disposable income.

The eco-labelling attribute which is positive and significant at 5% in the mixed logit model in utility space is consistent with [13] that eco-labelling is still emerging in developing countries with more urban and higher-income consumers willing to pay more for sustainably produced products. As consumers become more aware of environmental issues, eco-labelling will become very important.

Supermarket channels are generally preferred over traditional markets in the willingness-to-pay space model as revealed in the positive and significant coefficient (Tables 5 and 6), with

consumers declaring a higher value for the purchase from more formal and regulated environments, such as supermarkets. This finding is consistent with [37] study outcome that consumers prefer supermarkets because they think the items sold there have higher quality and safety. This is also in correspondence with world trends where people consider supermarkets offering safer and more quality products. Also, the value for supermarkets shows a transition from conventional food systems to formal retail environments, which shows that sampled consumers are becoming more conscious of food safety and quality issues. Affordability remains the key driver, but increasing demand for food safety, sustainability, and convenience is unmistakable. The trend represents, at the same time, opportunities for upgrading poultry products through better regulation, certification, and public awareness campaigns.

The finding of preference and value for imported poultry meat, as revealed in positive and significant coefficients in Tables 3-6, is consistent with the finding of [8] that Ghanaian consumers prefer imported poultry meat to local poultry meat. According to,[38] consumers preference for imported poultry products is influenced by price, health and safety issues, accessibility, appearance, taste and tenderness.[39] confirmed the issue of price that consumers prefer cheap poultry products, and therefore, the sampled consumers' preference for imported poultry meat could be arising from the fact that imported poultry meat in Ghana is 30-40% cheaper than local poultry meat.[39]Also,[40] found that imported poultry products are more easily accessible than local poultry, often faced with production challenges. Furthermore, the preference for imported poultry meat could be an issue of availability. For instance,[36] stated that, unlike imported chicken, which is readily available in the vicinity of sampled consumers, consumers have to look for locally produced chicken, which applies to other poultry products. Specifically, they found in a study that 62% of respondents indicated a great effort to purchase local poultry products, suggesting that locally produced poultry products are not readily available. Furthermore,[41] found that sampled Ghanaian consumers prefer imported poultry meat based on convenience.

Conclusion

This research uses descriptive statistics and a choice

experiment approach to study consumer preferences for poultry products in a developing country in utility and willingness to pay (WTP) spaces. Results from descriptive statistics on purchasing and consumption behaviour and factors that affect poultry meat consumption show that most sampled consumers purchase and consume poultry products weekly, and the factors, price, consumer food hygiene, and nutritional quality are among the prime drivers determining consumers' choices. Regarding the choice experiment modelling estimates, sampled consumers prefer imported poultry over local poultry, while fresh poultry meat is preferred over chilled or frozen types. Preference for imported poultry meat could arise from availability, affordability and convenience. They also prefer poultry meat from farmers' markets and supermarkets to traditional and farmgate points of sale.

The study's policy implications are as follows: Since food hygiene and quality are highly regarded, governments and relevant stakeholders should further enhance food safety standards and enforcement. This could be done by improving the safety standards of traditional markets, like wet markets, and formal retail outlets, such as supermarkets. Second, consumer preference for cheap poultry meat suggests the need for the government to introduce subsidies, which will help poultry producers streamline practices without significantly increasing the cost of production, hence overpricing poultry products to consumers. Third, producers should be encouraged to adopt eco-friendly methods, while government campaigns should educate consumers on eco-labelling, food certification, and sustainable practices. Fourth, the disutility for virtual markets as a marketing channel for buying poultry meat products implies that policy measures that spur the development of e-commerce outlets for food products will improve consumers' access to a wider variety of safer, higher-value poultry products. Governments should consider helping build the needed digital infrastructure and logistics systems to foster expanding this marketing channel.

Limitations and Further Research

The present study provides essential information on consumer preferences for poultry products attributes in Ghana but has several limitations that must be declared. First, the sample size of 195 respondents from two municipalities may not represent other regions or populations within the country. Second, even though the essential attributes of this research involve price, eco-labelling, product origin, and marketing channels, different drivers could be considered in developing the model: ethical motives for buying a specific product or brand reputation and packaging design. Third, the eco-labelling variable was generalised into either eco-labelling or non-eco-labelling to reflect consumers' perceptions of different levels of eco-labelling standardisation, which is very hard to generalise. Further studies should, therefore, extend the study to other regions of Ghana, including other emerging economies, and decompose eco-labelling into all segments. In addition, future studies should consider psychological factors that could influence consumer choice in addition to exploring in detail the preferences for the different types of poultry.

Conflict of Interest
The authors have no conflict of interest to disclose

Data availability statement
Data would be made available upon reasonable request from the corresponding author.

Ethics Statement
This research involved human participants. Therefore, ethical approval was obtained from the

University of Cape Coast Institutional Review Board, Ghana, approval number: (UCCIRB/EXT/2022/26). Before data collection, a consent form was read out to the respondents to ensure their confidentiality and anonymity. Respondents could redraw where they were uncomfortable at any point in the response to the questions.

Informed consent statement

Informed consent was obtained from the respondents during data collection in conformity with the ethical standards guiding research in Ghana and as outlined by the Institutional Review Board of the University of Cape Coast.

Clinical Trial Registration

This research does not involve any clinical trials.

Permission to Reproduce Material from other Sources

Not Applicable.

Author Contributions

*   **Rebecca Owusu:** Conceptualisation, Data Analysis and Writing.
*   **Fatimah Abubakari Von:** Data Collection, Review and Editing
*   **Lawrence Acheampong:** Data Collection, Review and Editing
*   **Alexander Tetteh Kwasi Nuer:** Data Collection and Methodology

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