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IMPACT OF OBSERVABLE QUALITY ATTRIBUTES ON HEDONIC PRICING OF MUTTON IN PAKISTAN: INSIGHTS FROM CONSUMER PREFERENCES

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ABSTRACT

Pricing of a product is vigorous for marketing strategies, which has a significant impact on the buying behavior of customers and businesses. The objective of the study is to identify the influence of diverse quality attributes of mutton on retail prices from customers' perspectives when they purchase mutton. For this purpose, the primary data were collected using a pre-tested well-defined questionnaire from the consumers of four major metropolitan cities of Pakistan i.e., Karachi, Lahore, Faisalabad, and Islamabad. The revealed preference theory is applied in the present study. The study used the hedonic price model considering log-linear functional form to evaluate the influence of mutton attributes on the retail price. The outcomes of this study reveal that place of purchase, meat color, hygienic condition, aroma, meat cuts, texture, juiciness, fat contents, and abattoir`s stamp are key variables that have an affirmative and substantial effect on the price of mutton at the retail level. The results reveal that coefficients of hygienic condition, juiciness, and abattoir stamp have significant positive, whereas fat content has a negative effect on the price of mutton. The outcomes of this study will help the producers for product development with an appropriate mix of quality attributes of mutton. The implications of the outcomes have been conferred in the context of developing profitable strategies for the meat industry in an emerging country.

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INTRODUCTION

Pakistan is a lower-middle-income economy, and 22.9 percent of its income is from agriculture. Livestock is an important subsector of agriculture and contributes 62.68 percent to agriculture value addition and 14.36a percent to the GDP of Pakistan (GOP, 2023). About eight million families are engaged in the livestock sector. This sector provides food products like milk and meat. The gross value addition of this sector has augmented from Rs. 5,441 billion in 2021-22 to Rs. 5,593 billion in 2022-2023, presenting the growth to the previous year (GOP, 2023). Cattle, goat, and sheep farming is common in cold areas due to pasture availability and favorable climatic environment. Pakistan's meat sector contributes to 3.1% of the GDP. The production of mutton is 1,046 thousand tonnes in Pakistan, whereas the country exported meat and its food products worth US$ 342.78 million in 2021-2022 (GOP, 2022). Pakistan is the third biggest mutton producer in the world and produce 799 thousand tonnes of mutton in 2022-2023 (GOP, 2023). The population is diverse in the major metropolitan cities of Pakistan and has varied preferences regarding meat purchasing. The consumers` demand for mutton is recognized by preferred attributes. The primary market for mutton in Pakistan is the middle-income group and affluent communities in large cities. The meat of all kinds is usually sold through butchers who buy animals from wholesale markets. They slaughter by themselves and sell in retail shops owned by themselves. The retail meat market in Pakistan faces serious concerns regarding the quality of mutton sold to customers. A common observation in traditional butcher shops is the sale of mutton from old and even deceased animals (Zakaria, 2015). To analyze the pricing of mutton effectively, various factors influencing its value were factored in as control variables, comprising the form of the store (e.g., hypermarket, butcher shop).

Theoretically, a consumer prefers the utility of various bundles of goods while purchasing. Consumers are rational and, therefore, will select the goods that provide the most utility with a given budget restriction. Goods are perceived as a combination of extrinsic and intrinsic attributes that mutually benefit consumers (Lancaster, 1966). Due to the significant rise in population, the demand for meat has significantly increased in various economies; as a result, global meat demand has increased (Mazhangara et al., 2019; Kadim and Sahi, 2018). It has been observed that the consumption of protein-based food products, such as (meat) is increasing rapidly in emerging countries as compared to the advanced countries (Burnier et al., 2021). This rising consumption of meat in developing economies is mainly correlated with increasing urbanization, changing income and living styles, varying eating practices, and consumer preferences (Neima et al., 2021). Mutton is used more particularly in developing countries, like Middle Eastern countries, Asian countries, and tropical countries (Rodrigues and Teixeira, 2010). Mutton is considered a good source of protein for its important nutritive features as

compared to other meats (Lee et al., 2008). The increasing trend of animal-based food demand is based on income (Tosun and Gürce, 2018; Weibel et al., 2019). There are a number of studies on customer inclinations for meat using different attributes considered by the consumers such as juiciness, tenderness, and aroma (Alves et al., 2022; Moreno et al., 2020; Hastie et al., 2020; Felderho et al., 2020; Payne et al., 2020; Mayulu et al., 2019; Aral et al., 2013). On the other hand, a few hedonic price studies on meat are present, comprising (Lawal et al., 2023; Staudigel and Trubnikov, 2022; Hossain et al., 2022; Fernández et al., 2019; Rafique et al., 2018; Topcu et al., 2015). An important technique for modeling predilections is termed revealed preference. There are a few indicators of revealed preference, like hedonic pricing, hedonic wage, and preventing behavior. Hedonic pricing is a well-known function (Abidoye and Chan, 2017) articulated by Rosen (1974) and explained as the implicit prices of attributes that reveal the particular degree of related characteristics.

The hedonic pricing function has been broadly applied in housing, scenes, and related features (Brown and Mendelsohn, 1984). Then it was used to evaluate the attributes of edibles (Bimbo et al., 2016; Caracciolo et al., 2013). Subsequently, researchers employed the hedonic methodology to assess the effect of various vegetable attributes, including freshness, taste, texture, and appearance on consumer purchasing decisions (Waugh, 1928); pepper (Estes, 1986); partially-treated goods; wheat (Espinosa and Goodwin, 1991; Ahmadi-Esfahani and Stanmore, 1995); treated goods; alcohol (wine) (Angulo et al., 2000; Sans and Combris, 2015; Nerlove, 1995; Oczkowski, 1994); cotton (Ethridge and Davis, 1982; Haidar et al., 2012); goat meat (Rafique et al., 2018); goat characteristics (Ahmad et al., 2019); apples (Khan et al., 2019). The same hedonic function was applied to evaluate the qualities of food items (Hossain et al., 2021; Hamidu et al., 2021; Burnier et al., 2021; Ahmad et al., 2019; Bimbo et al., 2016; Caracciolo et al., 2013; Huang 2014; Gracia and de-Magistris, 2013). Physical and different hedonic characteristics of fresh meat, such as texture, appearance, color, aroma, fat, etc., have an affirmative influence on the preferences and the extent of consumption. The impact of different attributes on the price of a product has been assessed by numerous researchers (Botta et al., 2023; Jantarakolica et al., 2022; Carvalho et al., 2022; Nerlove, 1995; Angulo et al., 2000; Ahmadi-Esfahani and Stanmore, 1995; Espinosa and Goodwin, 1991). The hedonic methodological structure was used for different studies on meat like frozen chicken and fish (Ahmad and Anders, 2012), chicken (Ramatu et al., 2014), red meat (Topcu et al., 2015), breakfast sausage (Vickner, 2015), meat (Thomas et al., 2017), goat feature (Ahmad et al., 2019), beef (Fernández et al., 2019), tilapia fish (Hossain et al., 2021), phantasies (Hossain et al., 2022).

More attributes of meat, like health-related cues, brand, and convenience, influence the meat product demand other than taste and price (Ahmad and Anders, 2012). Low fat was found to be the most crucial quality attribute of meat. Moreover, texture and flavor were assessed to be considered most valued. Likewise, extrinsic quality characteristics like size and freshness affect the market price (Nadarajah, 2012). Cardona et al. (2023), Moreno et al. (2020), Abdullahi et al. (2020), Mayulu et al. (2019), Rafique et al. (2018), Udomkun et al. (2018), Xazela et al. (2017), Guerrero et al. (2014), Aral et al. (2013), Pirvutoiu and Popescu (2013), and Becker et al. (2000) investigated consumer preferences and purchase behavior for meat attributes while focusing on developed countries. The findings revealed that quality, appearance, aroma, tenderness, flavor, fat, juiciness color, and price are the significant factors the consumer considers for choice at buying place. Yousuf et al. (2019) found that habit and abattoirs stamp, followed by hygiene, taste, shopping location, freshness, and price were the quality attributes influencing consumer buying decisions regarding meat.

It has been observed that due to the nutritious value of meat, customers are ready to buy and eat mutton based on quality attributes such as freshness, cleanliness, area, condition of shops, abattoirs stamp, and presence of fat (Admassu, 2007). Over the last few years in Pakistan, consumers have been careful about mutton quality, because a major portion of mutton meat comes from informal markets with flexible regulations, raising concerns about hygiene and quality. Consumers now demand certain quality attributes from the meat industry in Pakistan. This focus on quality extends beyond the final product to encompass the production and management practices of the livestock business, making it an essential part of the meat industry. However, a key challenge remains in identifying the particular quality attributes that consumers use to evaluate meat quality. The authors could not find any study regarding the effect of different attributes, i.e., texture, aroma, and meat cuts (path, champ, rain, dusti) on the price of mutton in Pakistan. Based on the available literature, the present study assessed the effect of different attributes, i.e., place of purchase, hygienic condition, fat content, meat cuts (puth, champ, raan, dusti), texture, juiciness, aroma, and abattoirs` stamp on the price of mutton as a consumer consider these characteristics. Fat content, meat cuts, texture, aroma, and juiciness were the intrinsic attributes, while place of purchase, hygienic condition, and abattoir stamp were the extrinsic factors. Hence, to fill the gap, this study has been conducted to test which attributes consumers ponder at the place of purchase in major metropolitan cities of Pakistan.

This is particularly relevant in marketing fresh meat, where consumer demand directly influences the market. While existing literature explores various factors influencing consumer demand, it often overlooks the crucial role of quality attributes in mutton, hindering the development of effective marketing strategies. This study addresses this gap with the aims; 1) to determine which attributes at the point of sale are most valued by consumers when buying fresh mutton in metropolitan cities of Pakistan and 2) To examine the price premium consumers are paying for the attributes in the retail meat market.

METHODOLOGY

To achieve the objectives of the study, the hedonic price model was developed by Rosen (1974), a revealed preference method for measuring demand or value. Hedonic values consider the implicit values of associated characteristics and are shown by finding the values of goods having different attributes. Therefore, in the hedonic price model, price is used as a dependent variable, and correspondingly the perceived attributes are used as independent variables. The partial derivatives of the model concerning the attributes having the implicit price represent the extra expenditures needed to acquire one item with an additional quantity of the attributes (Rosen, 1974).

The hedonic price function finalizes the price of a product with the concerned attributes (Martínez-Garmendia, 2010). This study revealed preference theory and assessed log-linear functional form to analyze the impact of mutton attributes on its price. Consumers' preferences can be presented with the help of the goods the consumers purchase in different circumstances, particularly in different incomes and price statuses, revealing their true preferences for different bundles of goods. Generally, behavior is described concerning utility. Lancaster (1966) defined goods as a combination

of diverse worthy attributes and the peripheral prices of those, which is the result of attributes and the reason for the difference in prices of goods. Likewise, Rosen (1974) and Oczkowski (1994) examined and found that the monetary value of a good is fixed by its characteristics. A practical technique, i.e., a mathematical method or reliable econometric model, is required for hedonic analysis (Brown and Mendelsohn, 1984). For example, the economic theory of the hedonic function offers detailed guidance on selecting the appropriate functional form (Cropper et al*.,* 1988; Haab and McConnell, 2002), using the wrong model can lead to biased estimates and inaccurate conclusions about the true value of product attributes. The hedonic price model is adopted to assess the marginal prices of attributes.

It can be stated like:

$$P = P(Z) = P(Z_1; Z_2; Z_3; \ldots; Z_n \quad (1)$$

Here Z is depicting a path of characteristics that defines the product's price.

Price is taken as a dependent factor, and particular factors become a reason for dissimilarity among a specific product. A mathematical model is described through continuous dependent variable and several independent variables demonstrating the attributes. In a model, characteristics are interrelated or not with the concerned factors (Berndt, 1991).

Description of the model affects estimates of coefficients and can be ineffective due to irrelevant variables. Correspondingly, the addition of limited independent factor outcomes in an under-fitted model produces biased and unreliable projected measurements (Gujarati*,* 2009). There are two more issues in hedonic price modeling: multicollinearity and heteroscedasticity, which can be identified by means of the variance inflation factor (VIF) and Breusch and Pagan/Cook–Weisberg tests. Consequently, the independent attributes incorporated in the present study, the attributes of fresh mutton, are chosen on the basis of earlier studies (Felderhoff et al., 2020; Moreno et al., 2020; Rafique et al., 2018; Baba et al., 2016; Topcu et al., 2015). Therefore, the subsequent hedonic model is considered to find the effect of valued attributes on mutton price:

Analyzing the available literature, the functional form used in this study was as follows:

$$\text{Ln-pr mutton} = \beta_0+\beta_1(PP)+\beta_2(Col)+\beta_3(Fc)+\beta_4(Hy)+\beta_5(Puth)+\beta_6(Chaamp)+\beta_7(Raan)+\beta_8(Dusti)+ \beta_9(Tex/Ten)+ \beta_{10}(Juici)+ +\beta_{11}(Aro)+ \beta_{12}(Abstamp) + \beta_{13}(Fsd)+ \beta_{14}(Ism)+ \beta_{15}(Kch)+\beta_{16}(Lhr)+ \varepsilon \quad (2)$$

In this hedonic model natural log of price (*Ln-pr-mutton)* is the dependent variable of mutton, $\beta_0 \ldots\ldots \beta_{16}$ are the regression coefficients. However, the place of purchase (PP), fat content (FC), hygiene (Hy), cuts, juiciness (Juici), meat color (C), aroma (Aro), texture (tex/Ten), and abattoirs stamp (Abstamp) are independent variables. Major metropolitan cities such as Karachi (Kch), Lahore (Lhr), Faisalabad (Fsd), and Islamabad (Ism) are also considered as independent variables. ε is the error term/disturbance term.

The regression coefficient illustrates the percentage variation in a reliant variable with per unit change in regressor. On the other hand, in the explanation of the coefficient, there exists an error for the dummy variables in the equations. It is analyzed that in some studies significance of the coefficient is discussed, while in some studies, to indicate the proportional influence of the considered attribute on the dependent attribute, the researcher multiplied the dummy variable by 100. However, Halvorsen and Palmquist (1980) defined that such clarification is not accurate, especially for dummy variables. Supposing a common fault in Equation 3, Kennedy (1981) suggested the subsequent stable estimator 'F' that defines a suitable explanation of the coefficient of a dummy variable happening with the dependent variable. The researcher used this formula to determine the relative impact of the attributes in terms of the price premium paid by the customers.

$$F = \exp[\hat{\beta} - 1/2\,\mathrm{var}(\hat{\beta})] - 1 \quad (3)$$

For this study, the target population consisted of households buying mutton from the major metropolitan cities of Pakistan. A multistage sampling technique was adopted for the data collection. Four major metropolitan cities were purposively selected, and then mutton consumers were selected from diverse localities of Faisalabad, Lahore, Islamabad, and Karachi, using the purposive sampling method. The convenience sampling procedure was used for the selection of respondents.

The sample size was determined centered on the technique computed by Cochran (1963) and employed by Kothari (2004).

$$n = z^2\, pq/e^2$$

Here n denotes the sample size, and p denotes the ratio of the population. This formula was considered because the population of these cities was still being determined.

Here q is 1-p, Z is the standard variation, supposed to have a confidence level of 95%, i.e., α =0.05, and e is the desired level of acceptable error.

In this study, primary data were used. A well-defined and pre-tested structured questionnaire was used. Data on mutton prices, quality attributes (meat color, fat content, tenderness/texture, aroma, hygienic condition, meat cuts (chaamp, puth, raan, dusti and neck), place of purchase, juiciness and abattoirs stamp) were collected for this study. Respondents were questioned about the preferred attributes of mutton at the place of purchase. 768 respondents were questioned. The independent variables were coded as dummy variables and the reliant variable was taken as a continuous variable.

RESULTS AND DISCUSSION

Table 1 shows the descriptive statistics for the variables studied in the present study. The consumers who are purchasing mutton from the modern store they were having the opinion that they can buy everything regarding the grocery from the modern megastore. Hence, it was convenient for them to buy mutton from modern stores. From Table 1, it is clear that 66% of customers purchase mutton from butcher shops, due to the presence of butcher shops near the residence. Whereas, 34% of customers purchase mutton from modern stores. 60% were found conscious about the hygienic environment at the place of purchase. So, it is important for the butchers to ensure hygienic conditions at the place of purchase. It was found that 28% of customers consider more fat content. Whereas 33% of customers found conscious about the aroma of mutton. It was also observed that customers prefer to purchase different meat cuts such as puth 22%, chaamp 14%, raan 26% and dusti 21%. 72% of customers like to purchase tender meat because it will take less cooking time. Moreover, 50% of customers were found conscious of the abattoirs stamp as abattoirs stamp is considered a sign of quality meat.

The hedonic pricing model is a remarkable tool for straightening out the value of goods based on their individual characteristics. When applied to meat, it shows a clear picture of what consumers truly desire and how much they're ready to pay for particular attributes. In the hedonic model, the value of R^2 shows that 28.14 percent variation (Figure 1) in mutton price is due to different variables (place of purchase, color, hygienic environment, meat cuts, aroma, juiciness, Texture/tenderness, animal age, fat content and abattoir stamp). The study also applied the Regression Equation Specification Error Test (RESET). It is a common measurement test for the linear regression model. More precisely, RESET test checks whether non-linear combinations of the fitted values support clarifying the reactive attribute.

Table 1. Descriptions and measurements of variables used in the model.

Variables	Narration of variables	Mean	Std. Dev.
Price	Price of mutton	1434.67	52.482
PP	Place of purchase		
Ms	If the respondent considers modern store for buying meat=0, 1 otherwise	0.34	0.474
Ts	If the respondent considers butcher shop for buying meat=1, 0 otherwise	0.66	0.483
Col	If respondent considers pink meat color =1, 0 otherwise	0.45	0.498
Fc	If respondent considers more fat content =1, 0 otherwise	0.28	0.447
Hy	If respondent considers hygienic condition =1, 0 otherwise	0.6	0.49
Puth	If respondent considers puth =1, 0 otherwise	0.22	0.417
Chaamp	If respondent considers chaamp =1, 0 otherwise	0.14	0.342
Raan	If respondent considers raan =1, 0 otherwise	0.26	0.438
Dudti	If respondent considers dusti =1, 0 otherwise	0.21	0.407
Tex/Ten	If respondent considers tender meat =1, 0 otherwise	0.72	0.448
Juici	If respondent considers juicy meat =1, 0 otherwise	0.71	0.453
Aro	If respondent considers aroma =1, 0 otherwise	0.33	0.472
Abstamp	If respondent considers abattoir stamp =1, 0 otherwise	0.5	0.5
Fsd	If respondent belong to Faisalabad =1, 0 otherwise	0.23	0.419
Lhr	If respondent belongs to Lahore =1, 0 otherwise	0.25	0.435
Ism	If respondent belongs to Islamabad=1, 0 otherwise	0.29	0.456
Kch	If respondent belongs to Karachi=1, 0 otherwise	0.23	0.419

Note: N= 768.

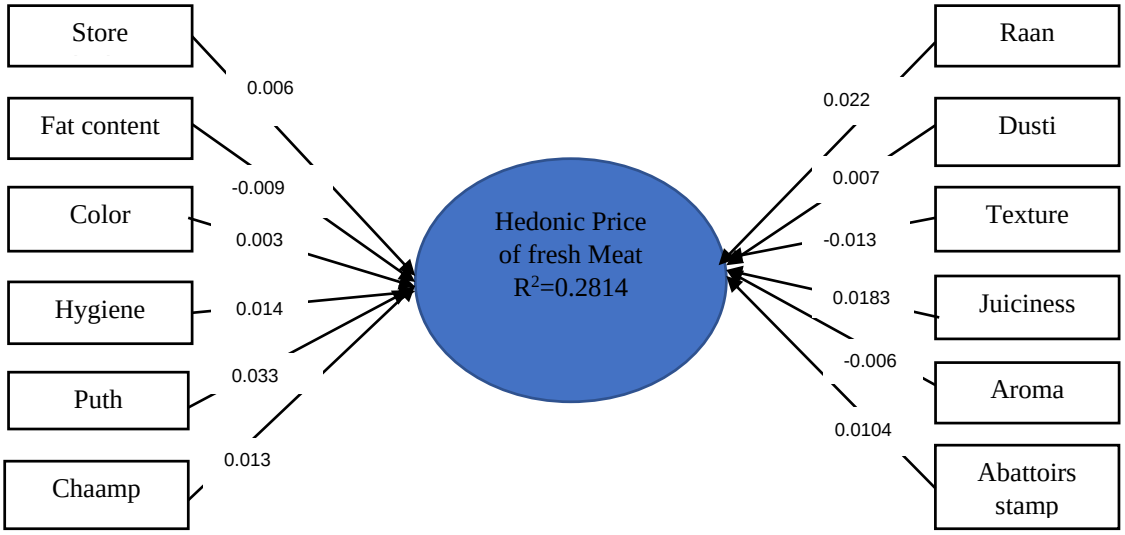

Figure 1. Outcomes of model showing the contribution of quality attributes toward price.

The estimated attributes as the place of purchase, color, hygienic condition, meat cuts (i.e. puth, champ, dusti and raan), juiciness, and abattoir stamp show a positive relationship with price.

Figure 1 illustrates the outcomes of the estimation of equation 2, where the dependent variable is the natural log of the price of mutton per kg and the independent variables are the place of purchase, color, hygienic condition, meat cuts (i.e. puth, chaamp, dusti and raan), juiciness, and abattoir stamp. As the place of purchase is concerned, the price tends to be higher in supermarkets as compared to traditional meat shops (butcher shops). The customers are paying a premium price 4.95 rupees in modern retail stores relative to the traditional butcher shops. Modern stores have a clean and hygienic environment which attracts customers. Moreover, it is more convenient for the customers to purchase groceries from superstores and also purchase mutton from there. But traditional customers concentrate on the traditional meat market i.e. butcher shops to buy fresh meat. Consequently, they would deliberately visit the traditional market to buy fresh meat, even though they bought former household goods from the super store (Chamhuri and Batt, 2013). The results of this study are similar to earlier studies which indicated that buyers consider freshness along with factors like the reputation of the place of purchase such as (Chamhuri and Batt, 2013; Sepúlveda et al., 2010; Bernues`et al., 2012).

According to the result in Table 2, The P-value of test statistics remains 0.0914, which is insignificant and indicates no issue of omitted variable bias. Multicollinearity is a major concern with hedonic regressions having hefty groups of paired attributes (Costanigro and McCluskey, 2011). The mean value of VIF is 1.50, ranging from 1.05 to 2.20 for different coefficients. As these values are less than 10, i.e., the major rule greatest value (Gujarati, 2009), multicollinearity is not an issue. To address the problem of heteroscedasticity, the study used the Breusch-Pagan/Cook-Weisberg test. The outcomes of the test show the

non-existence of heteroscedasticity. For the robustness of the outcomes, this study assessed standard error using the error term covariance matrix of ordinary least squares (OLS), HC0 (heteroscedasticity consistent -0), HC2 (heteroscedasticity consistent -2), and HC3 (heteroscedasticity consistent -3). Long and Ervin (2000) stated that HC3 is a better covariance matrix to calculate the parameters. Hence, the present study estimated the significance value using HC3. The relational effect assessed the specific attribute coefficient estimate's percentage impact on the mutton price evaluated at the sample mean.

The coefficient of hygienic condition at the retail level is positive and significant at a 5% level of significance, as expected. The outcome illustrates that customers are paying a premium of 10.54 rupees (i.e. 1.45%) relative to the retail store's non-hygienic conditions. Castillo and Carpio (2019) examined the color and hygienic conditions of meat shops. They found a positive and significant effect on the price of the meat and the willingness to pay of consumers. The result of hygienic conditions is consistent with the result of Castillo and Carpio (2019). Mutton is sold in retail shops in different locations of cities in Pakistan. The hygienic conditions differ according to the area; however, poor conditions are observed in different areas. The poor hygienic conditions may influence the buying decision of buyers and the amount of money they are paying for fresh mutton. Therefore, price setting with good hygienic conditions at retail stores is an influential factor for the purchase of mutton. To increase the profit, mutton retailers should focus on cleanliness and hygienic conditions. The Food Authority department should make arrangements for proper checking teams to visit the retail meat market and charge heavy penalties to the butchers and meat shops not following the procedures.

Becker et al. (2000) conducted a consumer survey to judge the quality of meat using the different quality attributes in Germany. It was identified that color an intrinsic credence quality attribute was the most important for the consumers. The outcomes are consistent with the results of Becker et al. (2000), Castillo and Carpio, (2019), and Rabadán et al. (2020).

The coefficient on fat content is negative and significant at 5% level of significance. The result indicates that for the mutton having more fat content, the customers are paying 7.09 rupee less relative to the mutton having less fat content. It was examined that Consumers think that mutton is a good source of protein to satisfy their needs for its nutritional value and the less fat content and becoming a healthy choice while comparing with other meat sources (Mandolesi et al. 2020). The result regarding fat content is also reliable as the studies of Verbeke and Vackier (2004), Banovic et al. (2009), Schnettler et al. *(*2009) and Mandolesi et al. (2020). As in Pakistan consumers consider less fat content in mutton while purchasing, there is a need to encourage breeding programs concentrated on goat and sheep breeds having leaner meat, try to modify tradition regarding health concerns. Also there is a need to support to have an access to breeding stock, farmers training for different breeds, and provision of financial incentives for the meat industry.

As far as the mutton cuts (puth, champ. Raan, dusti) are concerned, the coefficients of all cuts are positive and significant at 5% level of significance. The results indicate that customers are paying premium price of 24.54 rupees for puth, 9.73 rupees for chaamp, and 16.32 rupees for raan and 5.54 rupees more for dusti. Customers have different choices in terms of mutton cuts therefore, they pay a premium price. Ekanem et al. (2013) found that in the Nashville Metropolitan area goat meat consumers have the desire to purchase mutton. Moreover, the preference-specific cuts, and travel distance for buying mutton, the results are significant at the 5-percent level. The results of this study are consistent with Ekanem et al. (2013) and Giacomazzi et al. *(*2017). Whereas, customers are paying 10.04 rupees less for firm texture relative to the tender meat. Texture/Tenderness is an important significant factor for mutton acceptability. The coefficient of texture is negative but significant at a 5% level of significance. The negative sign for texture/tenderness indicates that consumers consider tenderness and freshness whereas customers did not like relatively hard texture and are paying 10.04 rupees less price. However, it was found that Indian customers thought that the tenderness and color of meat was a sign of freshness. The quality of meat was evaluated on the basis of tenderness (40.59%), and juiciness (37.06%). In reality, tenderness is an important sign of quality meat and a leading influencing attribute on customers` recognition (Gagaoua et al., 2019; Gagaoua et al., 2021). The results of the current study are consistent with Banerjee et al. (2022), Gagaoua et al. (2019), and Gagaoua et al. (2021). Consumers usually notice the texture of meat at the time of purchase. Tender meat is usually demanded by consumers as it is easy to cook comparatively. To raise awareness among consumers about factors influencing mutton texture/tenderness and tips for identifying and selecting good-quality meat there is a need to educate consumers. For this different channels can be used. To improve the texture the breeders should adopt new breeds. There is a need to promote research. The government should provide funds for research and the use of advanced techniques that can improve meat tenderness and make the adoption of new breeding systems.

The value of juiciness is positive and significant at 5% rationale of the study as expected. Customers are paying a price premium of 13.57 rupees for juicy mutton. The outcome is consistent with Fonti-i-Furnols and Gerrero (2014). Breeders should concentrate on the breeding and production practices to improve the diverse quality attributes preferred by the consumers, to increase profitability. It is obvious from the results that the importance customers give to diverse attributes of mutton differs broadly, as consumption inducements is determined by the different quality attributes and mutton cuts etc. This generates an opportunity for buyer-led items for consumption development and promotes market segmentation (Grunert, 1997). The buyer's preference for quality attributes creates an appropriate business policy for the meat sector, as the considered attributes can be improved without changing the meat items for consumption (Ophuis and Van, 1995). Understanding consumer quality sensitivity will help to design strategies for the mutton sector and product development that will be appropriate to changing prerequisites of markets and meet the standards required by customers and policymakers.

Consumers have no proper information about meat marketing activities in the chain. Therefore, they intend to be sure of the quality of the product they will buy. Thus, they usually emphasized authorized abattoir stamps in metropolitan cities.

Customers are paying a premium price of 7.60 rupees for the mutton having an abattoir stamp relative to the mutton having no stamp at all. Jabbar and Adnassu (2010) examined the fresh meat buying preferences using the conjoint analysis technique and found that the most preferred meat was fresh meat with low-fat content having an abattoir`s stamp sold at a hygienic outlet. The outcomes align with the studies of Jabbar and Admassu (2010) and Castillo and Carpio (2019).

Table 2. Results of the hedonic price model of fresh mutton.

ln-pmutt	coeffecient	P-value	S.E HC3	S.E OLS	S.E HC0	S.E HC2	% Relative Impact	Relative Impact PKR
PP	0.0063*	0.013	0.0026	0.0025	0.0025	0.0025	0.63	4.59
Col	0.0032	0.241	0.0027	0.0027	0.0028	0.0028	0.32	2.33
Fc	-0.0098*	0.000	0.0026	0.0026	0.0028	0.0028	-0.97	-7.09
Hy	0.0144*	0.000	0.0024	0.0025	0.0023	0.0023	1.45	10.54
Puth	0.0332*	0.000	0.0040	0.0040	0.0037	0.0037	3.37	24.54
Chaamp	0.0133*	0.002	0.0042	0.0042	0.0036	0.0036	1.33	9.73
Raan	0.0222*	0.000	0.0036	0.0036	0.0036	0.0035	2.24	16.32
Dusti	0.0076*	0.042	0.0037	0.0037	0.0037	0.0036	0.76	5.54
Tex/Ten	-0.0139*	0.000	0.0026	0.0027	0.0031	0.0031	-1.38	-10.04
Juici	0.0185*	0.000	0.0026	0.0026	0.0029	0.0030	1.86	13.57
Aro	-0.0062*	0.013	0.0025	0.0025	0.0024	0.0025	-0.61	-4.5
Abstamp	0.0104*	0.000	0.0027	0.0027	0.0027	0.0027	1.04	7.6
Fsd	0.0006	0.878	0.0037	0.0037	0.0038	0.0038	0.05	0.43
Ism	0.0108*	0.002	0.0035	0.0035	0.0035	0.0035	1.08	7.89
Kch	0.0063	0.084	0.0037	0.0037	0.0036	0.0036	0.63	4.59

R2=0.2814 Ramsey RESET Test F(3,748) =2.16 *P*-value = 0.0914
Mean VIF=1.50 Breusch-Pagan / Cook-Weisberg test for heteroscedasticity:
F(16, 751)=20.40 $\chi 2(1)=0.23$ *P*-value = 0.6289
P-value =0.0000

Significance levels at 5%* and 10%** SE HC3 based.

Abattoirs` stamp is considered a sign of quality. Therefore, butchers should make sure the abattoirs` stamp to increase the profit. The information on buying preferences is necessary for the different stakeholders. The information about consumers` buying behavior will be helpful in developing the procedures and business strategies to intensify the market share. Price is an important factor that affects the demand and sale of the product. Considering the different markets, meat prices are different in Faisalabad, Lahore, Islamabad, and Karachi markets. Consumers are paying a premium price of 7.89 rupees in Islamabad as compared to Lahore.

CONCLUSIONS

It has been observed that the growth rate of consumption is changing due to the changing consumer behavior. The current study measures the effects of different quality attributes (place of purchase, hygiene, color, meat cuts, aroma, texture, fat content, and abattoirs stamp in the mutton, etc.) on customers' concerns regarding mutton prices in developing countries like Pakistan. The outcomes of this study reveal that hygiene, juiciness, meat cuts, and abattoir stamps at the retail level are key variables that have positive and significant results on mutton price, and the relative impact illustrates how much customers are paying price premium for various attributes and hygienic meat. Actually, the attributes of a product influence the price of the product. Many studies available were confined to the attributes examined and concentrated on the production rather than the item of consumption having specific attributes. Therefore, the present study bursting the fissure and measured consumers' inclinations for buying mutton at the retail level in major metropolitan cities of Pakistan. Analyzing consumer choices, this study finds that retail mutton attributes impact on price. Therefore, the allied stakeholders should make sure the required attributes should be present in order to get profit. Staff training in proper handling and preparation of diverse meat cuts will not only maintain product quality but also equip them to answer customer questions about meat attributes, enhancing the customer experience. The meat industry should adopt strategies to encourage breeding programs concentrated on goat and sheep breeds having leaner meat. Also, financial incentives are needed for the growth of this sector. Conversely, the government should impose conditions to ensure hygienic conditions at the retail level and the provision of quality mutton with the provision of a sound slaughtering system and by implementing and enforcing strict regulations on hygiene throughout the meat industry, so that the consumers can purchase mutton having good quality attributes at affordable prices.

The results of the hedonic price function indicate that signs of various attributes are conferring to the study's expectations. The positive coefficients for the place of purchase, hygienic condition, different mutton cuts, and attributes show that customers are paying a premium for different cuts and attributes. Based on these findings, retailers can develop data-driven strategies to attract new customers and boost profitability. Additionally, strict government regulations promoting hygiene in retail markets are recommended to ensure public health. This study is expected to boost retailers' profits by identifying key consumer preferences in mutton purchases. This information is valuable for various stakeholders in the mutton industry, enabling them to improve their operations. By providing actionable insights, this study empowers policymakers, administrative institutes, and marketing managers to establish a thriving meat retail market. This study aligns with Lancaster's (1966) view that consumer preferences for product attributes (characteristics) influence their purchasing decisions. Consumers seek to maximize their satisfaction (utility) by choosing a set of characteristics within their budget and considering product prices. Hedonic pricing analysis, which examines how variations in attributes affect prices, further strengthens this understanding by revealing the implicit values consumers place on specific characteristics. The hedonic pricing model is a powerful tool that can be used by business organizations to understand consumer preferences. By analyzing how price varies with different product attributes, business organizations can identify which features hold the most value for their customers. This knowledge allows meat businesses to

allocate resources effectively towards creating high-quality products and crafting targeted business strategies, ultimately achieving a competitive advantage in the marketplace.

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REFERENCES

Abdullahi, N.M., Huo, X., Shahriar, S., Kea, S., Abdullahi, A.M., Abubakar, M.I., 2020. Determinants of household beef purchase intention: An application of the extended theory of planned behavior. Int. J. Bus. Manag. Econ. Res. 11, 1724–1734.

Abidoye, R.B., Chan, A.P.C., 2017. Critical review of hedonic pricing model application in property price appraisal: A case of Nigeria. Int. J. Sustain. Built Environ. 6, 250–259.

Admassu, S.A., 2007. An analysis of demand for beef with a focus on quality and safety in Addis Ababa city, Ethiopia, M.Sc. Thesis, Addis Ababa University. https://scholar.archive.org/work/zgocfgwf3zgknkxkk4n2nrywte/access/wayback/https://nadre.ethernet.edu.et/record/8568/files/SamuelAmare.pdf.

Ahmad, W., Ahmed, T., Ahmad, B., 2019. Hedonic pricing of goat characteristics at the market level: the case of Pakistan. Int. Food Agribus. Manag. Rev. 22, 483–498.

Ahmad, W., Anders, S., 2012. The value of brand and convenience attributes in highly processed food products. Can. J. Agric. Econ. 60, 113–133.

Ahmadi-Esfahani, F.Z., Stanmore, R.G., 1995. Quality premiums for Australian wheat in the growing Asian markets. Aust. J. Agric. Econ. 38, 237–250.

Alves Malheiros, B., Spers, E.E., Silva, H.M.R. da, Contreras Castillo, C.J., 2022. Southeast Brazilian consumers' involvement and willingness to pay for quality cues in fresh and cooked beef. J. Food Prod. Mark. 28, 276–293.

Angulo, A.M., Gil, J.M., Gracia, A., Sánchez, M., 2000. Hedonic prices for Spanish red quality wine. Br. Food J. 102, 481–493.

Aral, Y., Aydin, E., Demir, P., Akin, A.C., Cevger, Y., KUYULULU, Ç.Y.K., Arikan, M.S., 2013. Consumer preferences and consumption situation of chicken meat in Ankara Province, Turkey. Turkish J. Vet. Anim. Sci. 37, 582–587.

Moreno, L., Jerez-Timaure, N., Valerio Hernández, J., Huerta-Leidenz, N., Rodas-González, A., 2020. Attitudinal determinants of beef consumption in Venezuela: A retrospective survey. Foods 9, 202.

Baba, Y., Kallas, Z., Costa-Font, M., Gil, J.M., Realini, C.E., 2016. Impact of hedonic evaluation on consumers' preferences for beef attributes including its enrichment with n-3 and CLA fatty acids. Meat Sci. 111, 9–17.

Banerjee, R., Maheswarappa, N.B., Mohan, K., Biswas, S., Batabyal, S., 2022. Proteomic technologies and their application for ensuring meat quality, safety and Authenticity. Curr. Proteomics 19, 128–141.

Banović, M., Grunert, K.G., Barreira, M.M., Fontes, M.A., 2009. Beef quality perception at the point of purchase: A study from Portugal. Food Qual. Prefer. 20, 335–342.

Becker, T., Benner, E., Glitsch, K., 2000. Consumer perception of fresh meat quality in Germany. Br. Food J. 102, 246–266.

Berndt, E.R., 1991. The Measurement of Quality Change. In: The Practice of Econometrics: Classic and Contemporary, Addison-Wesley Publishing Company, Inc., Reading, MA New York Pp: 105-132.

Bernués, A., Ripoll, G., Panea, B., 2012. Consumer segmentation based on convenience orientation and attitudes towards quality attributes of lamb meat. Food Qual. Prefer. 26, 211–220.

Bimbo, F., Bonanno, A., Liu, X., Viscecchia, R., 2016. Hedonic analysis of the price of UHT-treated milk in Italy. J. Dairy Sci. 99, 1095–1102.

Botta, R., Garlock, T., Asche, F., Camp, E. V, Ropicki, A., 2023. The value of product attributes for farmed oysters: A hedonic price analysis of US restaurant menus. J. Agric. Appl. Econ. Assoc. 2, 295–305.

Brown Jr, G., Mendelsohn, R., 1984. The hedonic travel cost method. Rev. Econ. Stat. 427–433.

Burnier, P.C., Spers, E.E., de Barcellos, M.D., 2021. Role of sustainability attributes and occasion matters in determining consumers' beef choice. Food Qual. Prefer. 88, 104075.

Caracciolo, F., Cembalo, L., Pomarici, E., 2013. The hedonic price for an Italian grape variety. Ital. J. Food Sci. 25, 289.

Carvalho, G.R., Faria, W.R., Nardy, V.P.D.R., Betarelli Junior, A.A., 2022. Hedonic pricing analysis for semen of dairy bulls in Brazil. PLoS One 17, e0267109.

Castillo, M.J., Carpio, C.E., 2019. Demand for high-quality beef attributes in developing countries: The case of Ecuador. J. Agric. Appl. Econ. 51, 568–590.

Chamhuri, N., Batt, P.J., 2013. Segmentation of Malaysian shoppers by store choice behaviour in their purchase of fresh meat and fresh produce. J. Retail. Consum. Serv. 20, 516–528.

Cochran, W.G., 1963. Sampling Techniques, 2nd Ed., New York: John Wiley and Sons, Inc.

Costanigro, M., McCluskey, J., 2011. Hedonic price analysis in food markets, in Lusk, J.L., Roosen, J. Shogren, J.F. (eds), The Oxford Handbook of the Economics of Food Consumption and Policy. Oxford University Press, Oxford, pp. 152–180.

Cropper, M.L., Deck, L.B., McConnell, K.E., 1988. On the choice of funtional form for hedonic price functions. Rev. Econ. Stat. 668–675.

Ekanem, E., Mafuyai-Ekanem, M., Tagegne, F., Singh, S., Favors, D., 2013. Goat meat consumer preferences: implications for goat meat marketing in metropolitan Nashville, Tennessee area. J. Food Distrib. Res. 44, 1–9.

Espinosa, J.A., Goodwin, B., 1991. Hedonic price estimation for kansas wheat characteristics. West. J. Agric. Econ. 16.

Estes, E.A., 1986. Estimation of implicit prices for Green Pepper quality attributes using an hedonic framework. J. Food Distrib. Res. 17, 5–15.

Ethridge, D.E., Davis, B., 1982. Hedonic price estimation for commodities: an application to cotton. West. J. Agric. Econ. 7. 293-300.

Felderhoff, C., Lyford, C., Malaga, J., Polkinghorne, R., Brooks, C., Garmyn, A., Miller, M., 2020. Beef quality preferences: Factors driving consumer satisfaction. Foods 9, 289.

Fernández, J., Melo, O., Larraín, R., Fernández, M., 2019. Valuation of observable attributes in differentiated beef products in Chile using the hedonic price method. Meat Sci. 158, 107881.

Font-i-Furnols, M., Guerrero, L., 2014. Consumer preference, behavior and perception about meat and meat products: An overview. Meat Sci. 98, 361–371.

Gagaoua, M., Monteils, V., Couvreur, S., Picard, B., 2019. Beef tenderness prediction by a combination of statistical

methods: Chemometrics and supervised learning to manage integrative farm-to-meat continuum data. Foods 8, 274.

Gagaoua, M., Terlouw, E.M.C., Mullen, A.M., Franco, D., Warner, R.D., Lorenzo, J.M., Purslow, P.P., Gerrard, D., Hopkins, D.L., Troy, D., 2021. Molecular signatures of beef tenderness: Underlying mechanisms based on integromics of protein biomarkers from multi-platform proteomics studies. Meat Sci. 172, 108311.

Giacomazzi, C.M., Talamini, E., Kindlein, L., 2017. Relevance of brands and beef quality differentials for the consumer at the time of purchase. Rev. Bras. Zootec. 46, 354–365.

GOP, 2022. Trade Development Authority of Pakistan 2021- 2022. Ministry of commerce, Islamabad, Pakistan. Retrieved from https://tdap.gov.pk.

GOP, 2023. Pakistan Economic Survey 2022-2023. Finance and Economic Affairs Division, Ministry of Finance, Govt. of Pakistan, Islamabad, Pakistan.

Gracia, A., de-Magistris, T., 2013. Preferences for lamb meat: A choice experiment for Spanish consumers. Meat Sci. 95, 396–402.

Grunert, K.G., 1997. What's in a steak? A cross-cultural study on the quality perception of beef. Food Qual. Prefer. 8, 157–174.

Guerrero, A., Campo, M.M., Cilla, I., Olleta, J.L., Alcalde, M.J., Horcada, A., Sañudo, C., 2014. A comparison of laboratory-based and home-based tests of consumer preferences using kid and lamb meat. J. Sens. Stud. 29, 201–210.

Gujarati, D.N., 2009. Basic Econometrics. Tata McGraw-Hill Education, New Delhi.

Haab, T. C., McConnell, K.E., 2002. Valuing environmental and natural resources: the econometrics of non-market valuation. Edward Elgar Publishing, Northampton, UK.

Haidar, S., Aslam, M., Hassan, M., Hassan, H.M., Ditta, A., 2012. Genetic diversity among upland cotton genotypes for different economic traits and response to cotton leaf curl virus (CLCV) disease. Pak. J. Bot 44, 1779–1784.

Halvorsen, R., Palmquist, R., 1980. The interpretation of dummy variables in semilogarithmic equations. Am. Econ. Rev. 70.

Hamidu, B., Mohammed, I., Murtala, N., Jibril, S.A., Mohammed, S.Y., 2021. Hedonic Price Analysis Of Chicken Meat Cut In Bauchi State, Nigeria. J. Agripreneursh. Sustain. Dev. 4, 139–151.

Hastie, M., Ashman, H., Torrico, D., Ha, M., Warner, R., 2020. A mixed method approach for the investigation of consumer responses to sheepmeat and beef. Foods 9, 126.

Hossain, A., Badiuzzaman, Nielsen, M., Hoque, S., Roth, E., 2022. The role of private companies in improving nutrition of consumer groups in a developing country: a hedonic analysis of tilapia attributes in Bangladesh. J. Appl. Aquac. 34, 598–624.

Hossain, A., Nielsen, M., Roth, E., 2022. Consumer willingness to pay for quality attributes of pangasius (pangasianodoan hypophthalmus) in Bangladesh: A hedonic price analysis. Aquaculture 555, 738205.

Huang, C.H., 2014. Relationships between consumers' nutritional knowledge, social interaction, and health-conscious correlates toward the restaurants. J. Int. Manag. Stud. 9, 59–67.

Jabbar, M.A., Admassu, S.A., 2010. Assessing consumer preferences for quality and safety attributes of food in the absence of official standards: The case of beef, raw milk and local butter in Ethiopia. https://cgspace.cgiar.org/bitstream/10568/3010/1/ResearchReport_No24.pdf#page=49.

Jantarakolica, T., Wanitphakdeedecha, R., Yan, C., Ng, J.N.C., Sudhipongpracha, T., 2022. Price decomposition of laser treatment for port-wine stain using the hedonic pricing model. J. Cosmet. Dermatol. 21, 998–1003.

Kadim, I.T., Sahi, A.B.A., 2018. Health aspects of camel meat: a review of literature. Adv. Anim. Vet. Sci 6, 271–272.

Kennedy, P.E., 1981. Estimation with correctly interpreted dummy variables in semilogarithmic equations. Am. Econ. Rev. 71. 801.

Khan, J., Shah, S.A., Saddozai, K.N., Fayaz, M., Ali, S., Jan, A.U., Ali, G., 2019. A hedonic price analysis of consumer's preferences and willingness to pay for quality attributes of apple. Sarhad J. Agric. 35, 1243–1246.

Kothari, C.R., 2004. Research methodology: Methods and techniques. New Age Int. https://dspace.unitywomenscollege.ac.in/bitstream/123456789/163/1/Research%20Methodology%20C%20R%20Kothari.pdf.

Lancaster, K.J., 1966. A new approach to consumer theory. J. Polit. Econ. 74, 132–157.

Lawal, A.T., Dambazau, S.A., Musa, S.A., Mohammed, A.B., Umar, J., Adomi, A.A., Gaya, A.Y., Hamisu, K., 2023. Consumer preference analysis and demand for meat in kano metropolis: a hedonic model approach. Fudma J. Sci. 7, 176–181.

Lee, J.H., Kouakou, B., Kannan, G., 2008. Chemical composition and quality characteristics of chevon from goats fed three different post-weaning diets. Small Rumin. Res. 75, 177–184.

Mandolesi, S., Naspetti, S., Arsenos, G., Caramelle-Holtz, E., Latvala, T., Martin-Collado, D., Orsini, S., Ozturk, E., Zanoli, R., 2020. Motivations and barriers for sheep and goat meat consumption in Europe: A means–end chain study. Animals 10, 1105.

Martínez-Garmendia, J., 2010. Application of hedonic price modeling to consumer packaged goods using store scanner data. J. Bus. Res. 63, 690–696.

Mayulu, H., Rahman, A., Yusuf, R., 2019. Consumer Preference of Broiler Meat Attributes in Traditional Markets. Hasanuddin J. Anim. Sci. 28-36. http://journal.unhas.ac.id/index.php/hajas/article/view/9877.

Mazhangara, I.R., Chivandi, E., Mupangwa, J.F., Muchenje, V., 2019. The potential of goat meat in the red meat industry. Sustainability 11, 3671.

Nadarajah, S., 2012. Hedonic price analysis of shrimp: Quality Factors influencing Market price of Shrimp in Nha Trang, Vietnam (Master's thesis, Universitetet i Tromsø). https://munin.uit.no/handle/10037/4752.

Neima, H.A., Sirwan. K., Hameed. K., 2021. Consumers Choice and Preference for Chicken Meat in Sulaymaniyah. In IOP Conference Series: Earth Environ. Sci, 910: 012028. IOP Publishing. https://iopscience.iop.org/article/10.1088/1755-1315/910/1/012028/meta.

Nerlove, M., 1995. Hedonic price functions and the measurement of preferences: The case of Swedish wine consumers. Eur. Econ. Rev. 39, 1697–1716.

Oczkowski, E., 1994. A hedonic price function for Australian premium table wine. Aust. J. Agric. Econ. 38, 93–110.

Ophuis, P.A.M.O., Van Trijp, H.C.M., 1995. Perceived quality: A market driven and consumer oriented approach. Food Qual. Prefer. 6, 177–183.

Payne, C.E., Pannier, L., Anderson, F., Pethick, D.W., Gardner, G.E., 2020. Lamb age has little impact on eating quality. Foods 9, 187.

Pirvutoiu, I., Popescu, A., 2013. Research on Consumer Behaviour in Bucharest Poultry Meat Market. Sci. Pap. Anim. Sci. Biotechnol. Stiint. Zooteh. si Biotehnol. 46. 389-396.

Rabadán, A., Martínez-Carrasco, L., Brugarolas, M., Navarro-Rodriguez de Vera, C., Sayas-Barberá, E., Bernabéu, R., 2020. Differences in consumer preferences for lamb meat before and during the economic crisis in Spain. Analysis and perspectives. Foods 9, 696.

Rafique, S.A., Ghafoor. A., Ali, A., 2018. Hedonic price approach: The testing relationship between quality attributes of mutton and its prices in Faisalabad city, Pakistan. Pakistan J. Appl. Econ. Special Issue 377-388. https://www.cabidigitallibrary.org/doi/full/10.5555/20193419900.

Ramatu. M.A., Noah, L., Abigail A.A., 2014. Hedonic Price Analysis of Dressed Chicken in Ghana. Int. J. Bus. Soc. Sci. 5. 215-223.

Rodrigues, S., Teixeira, A., 2010. Consumers' preferences for meat of Cabrito Transmontano. Effects of sex and carcass weight. Spanish J. Agric. Res. 8, 936–945.

Rosen, S., 1974. Hedonic prices and implicit markets: product differentiation in pure competition. J. Polit. Econ. 82, 34–55.

Sans, P., Combris, P., 2015. World meat consumption patterns: An overview of the last fifty years (1961–2011). Meat Sci. 109, 106–111.

Schnettler, B., Vidal, R., Silva, R., Vallejos, L., Sepúlveda, N., 2009. Consumer willingness to pay for beef meat in a developing country: The effect of information regarding country of origin, price and animal handling prior to slaughter. Food Qual. Prefer. 20, 156–165.

Sepúlveda, W.S., Maza, M.T., Mantecón, Á.R., 2010. Factors associated with the purchase of designation of origin lamb meat. Meat Sci. 85, 167–173.

Staudigel, M., Trubnikov, A., 2022. High price premiums as barriers to organic meat demand? A hedonic analysis considering species, cut and retail outlet. Aust. J. Agric. Resour. Econ. 66, 309–334.

Thomas, I.W., Junfei B., James L.S.J., 2017. Assessing the Value of Quality and Food Safety-Related Attributes: A Hedonic Analysis of Chinese Meat Price. https://ageconsearch.umn.edu/record/258381/files/Abstracts_17_06_06_12_38_23_23__134_129_80_240_0.pdf.

Topcu, Y., Uzundumlu, A.S., Baran, D., 2015. How sensory and hedonic quality attributes affect fresh red meat consumption decision of Turkish consumers? Ital. J. Food Sci. 27, 181–190.

Tosun, P., Gürce, M.Y., 2018. Consumer comments about meat anti-consumption. Br. Food J. 120: 2439-2453.

Udomkun, P., Ilukor, J., Mockshell, J., Mujawamariya, G., Okafor, C., Bullock, R., 2018. What are the key factors influencing consumers' preference and willingness to pay for meat products in Eastern DRC? Food Sci. Nutr. 6, 2321–2336.

Verbeke, W., Vackier. I., 2004. Profile and effects of consumer involvement in fresh meat. Meat Sci. 67, 159-168.

Vickner, S.S., 2015. Estimating the implicit price of convenience: A hedonic analysis of the US breakfast sausage market. Agribusiness 31, 281-292.

Waugh, F.V., 1928. Quality Factors Influencing Vegetable Prices' Amer. J. Agric. Eco. 10, 185–196.

Weibel, C., Ohnmacht, T., Schaffner, D., Kossmann, K., 2019. Reducing individual meat consumption: An integrated phase model approach. Food Qua. Prefer. 73, 8-18.

Xazela, N.M., Hugo, A., Marume, U., Muchenje, V., 2017. Perceptions of Rural Consumers on the Aspects of Meat Quality and Health Implications Associated with Meat Consumption. Sustainability 9, 1-11.

Yousuf, J.B., Bose, S., Kotagama, H., Boughanmi, H., 2019. Preferences and intentions of seafood consumers in Oman: An empirical analysis. J. Int. Food Agribus. Mark. 31, 175–203.

Zakaria, R., 2015. The real meat. Retrieved online from: https://www.dawn.com/news/1207254.