

TRADERS' PREFERENCES FOR HALAL GOAT CHARACTERISTICS IN SELECTED MARKETS IN REGION XII, PHILIPPINES

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ABSTRACT

A market study was undertaken to determine traders' preferences for halal goat characteristics in five selected markets in Region XII and these were analyzed using double logarithmic hedonic price model to link prices to the animal's physical attributes. Analysis of data was divided into two groups of buyers: Muslim and non-Muslim. Data on breed, sex, meatiness, age, live weight, color of coat and length of horn were recorded from 1778 halal goats traded for six months from May to October 2010. Results indicated that live weight, meatiness, age, breed and sex were goat characteristics preferred by traders and were significant positive determinants of prices of halal goats regardless of classification of buyers. Live weight had the greatest positive influence on the price, followed by meatiness while sex of the animals had the smallest influence. Since weight and meatiness are correlates of good breed, this study highlights the need for continued efforts to upgrade native goats in order to produce halal goats to cater to the market needs. Given the significant premium associated with these characteristics, raisers could significantly improve their profitability by targeting specific halal goat characteristics.

Keywords: goat, halal, hedonic price model, market, traders

INTRODUCTION

The value of halal market in 2008 was estimated at US\$ 150 billion by the World Halal Forum and is expected to rise to US \$500 billion in 2010. With Islam growing at 2.9% annually and with more countries developing their respective halal industry, it is further projected that the potential market could swell to about US\$2.1 trillion in 15 years (unpublished report). To promote investment in the industry, the government has included halal food production in its 2004-2010 Medium Term Philippine Development Plan and has designated the Island of Mindanao as the halal hub center for food production.

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One of the enterprises with great potential to become an economically viable option for Region XII is halal goat production. Halal goats have religious significance as they are commonly used by Muslims as sacrifice in the observance of their faith since the region is home to majority of Muslim Filipinos, the primary consumers of such products, with an estimated population of between 4 to 6.3 million (unpublished report). Halal goat's potential is also anchored on its relatively lower production costs and the goat's potential in converting marginal land to useful grazing areas. As of 2005, the region has a goat population of 254,109 which accounted for 7.26% of the total population in the country, and has a per capita consumption of 0.21 kg per year, which was below the national record of 0.32 kg per year. This low consumption can be attributed to its low goat population (BAS, 2005).

Despite these bright prospects, several constraints are seen to hamper the growth of the industry. In a study conducted in Region XII, Naanep *et al.* (2009) observed that the respondents had inadequate knowledge of various halal goat production aspects which led to their inefficient marketing. Their inability to connect their production practices to marketing ultimately reduced their income from such an enterprise.

Rola *et al.* as cited by Dossa *et al.* (2008) mentioned that access to reliable markets for output across the years is one of the most important factors that affect the decision of small farmers to undertake production and to adopt improved production practices. Thus, this calls for an understanding of the traders' preference for halal goat characteristics in selected markets in Region XII. This study aimed to identify the physical attributes of goats preferred by the traders, determine how much price premium traders attach to these characteristics and derive implication of the results to current project efforts to improve halal goats.

Although a parallel study on traders' preference for goat characteristics has been conducted by Orden *et al.* (2005) in Pangasinan, a detailed look at short-run price relationship for halal goats is also warranted in Region XII to guide raisers in connecting their production activities to their marketing so as to obtain the premium price of the halal chevon. Information gained from a market study is only valid for a particular moment and will never correspond exactly to that of another study (Branson, 2000). Moreover, the results will serve as basis for crafting marketing system protocol for halal goats.

MATERIALS AND METHODS

Locale of the study

The study was conducted in five cities and one municipality in Region XII, namely, Tacurong City, Koronadal City, General Santos City, Kidapawan City and Midsayap based on their regional importance since they serve as domestic terminal for agricultural products, including livestock from the nearby towns. As trans-shipment points, these markets have become fast-growing market centers for goats in the region where sizeable Muslim populations reside.

Data collection

The protocol used by Orden *et al.* (2005) was used in this study. Specifically, three methods of data collection were employed to gather relevant information as follows: a) data from secondary sources and a quick overview of the market to identify the major players in the market; b) personal interview with traders and buyers using a prepared set of interview schedules; and c) focus group discussion with other key informants to validate information obtained from a and b.

Selection of trader-respondents

Traded halal goats usually reach the consumers passing through several intermediaries along the distribution lines through agents, assembler-wholesalers, wholesaler/retailers and meat retailers. Assembler-wholesalers and wholesaler-retailers are those traders who buy large numbers of goats from various sources to sell in nearby provinces for the former, while, the latter sell them within the locality on the retail basis. These traders purchase their stocks through an agent who receives commissions. Meat retailers occupy permanent stalls in the markets or malls and sell them as dressed meat. Institutional buyers are restaurant owners who buy live goats and sell them cooked.

A quick reconnaissance survey was conducted to identify the respondents since no listing was available from the market administrator and the time to identify the different types of halal goat sellers as well as to record the physical attributes of halal goat was inadequate. All halal goat traders situated in the trading places from May to October 2010 were interviewed. A total of 75 traders were grouped according to the nature of their activities in the market, consisting of 5 assembler-wholesalers (6.67%), 18 wholesaler-retailers (24%), 45 commission agents (60%), 3 meat retailers (4%) and 4 institutional buyers (5.33%). Data were collected twice in each month during the main market day for a period of six months.

Only the buyers of live goats were interviewed using a structured data sheet. Trained and experienced enumerators collected data on prices and physical traits of purchased goats such as breed, sex, age, size, meatiness, color of the coat and horn length, once the transaction between the buyer and the seller was completed. The description of the variables was measured based from the protocols used by Orden *et al.* (2005) and Dossa *et al.* (2008) as shown in Table 1.

Data analysis

Using the analysis employed by Orden *et al.* (2005), the double logarithmic form of the hedonic price function was used to estimate the relationship between recorded prices and the traits of traded animals using the procedures in SHAZAM Version 9. The hedonic price model treats each characteristic separately and estimates the implicit price for each trait through regression analysis. The price of the animal is then computed as a summation of all implicit prices. Data were analyzed at the School of Applied Economics, University of Southeastern Philippines in Davao City and were divided into two classifications of buyers: Muslims and non-Muslims. The empirical model of the double logarithmic form for Muslim-buyers showing the relationship between the recorded prices of halal goats

Table 1. Description of the variables measured in goats used in the study.

Variable code	Description	Level of measurement
Pg	Actual price	PhP
X ₁	Age	Estimated from dentition
X ₂	Live weight	Ocular inspection
X ₃	Meatiness	Thickness of meat in forequarters
X ₄	Sex	Male or female
X ₅	Breed	Upgraded or native
X ₆	Color of coat	Bright or dark
X ₇	Length of horn	Use of tape measure

numbering to 572 heads traded for 6 months commencing from May to October 2010 and the physical attributes of the animals was expressed as follows:

Log (Price)_i

$$= B_0 + B_1 \log(\text{age})_i + B_2 \log(\text{live weight}) + B_3 \log(\text{Meatiness})_i + B_4 D_{\text{sex}i} + B_5 D_{\text{breed}i} + B_6 D_{\text{color}i} + B_7 D_{\text{length}i} + E_i,$$

Where:

$\log(\text{Price})_i$ = natural logarithmic of the price of Halal goat_i

$\log(\text{Age})_i$ = natural logarithmic of the age of Halal goat_i

$\log(\text{Live Weight})_i$ = natural logarithmic of the weight of Halal goat_i

$\log(\text{Meatiness})_i$ = natural logarithmic of the meatiness of Halal goat_i

$D_{\text{sex}i}$ = dummy for sex

= 1, if goat i is male

= 0, otherwise (female)

$D_{\text{breed}i}$ = dummy for breed

= 1, if goat i is upgraded

= 0, otherwise (native)

$D_{\text{color}i}$ = dummy for color

= 1, if goat i has bright color

= 0, if goat i has dark color

$D_{\text{length}i}$ = dummy for length of horn of goat

= 1, if horn is more than 7.5cm.

= 0, if horn is less than 7.5cm.

B_0 = Intercept term

B_1 = Percentage change in price of goat for a 1 percent change in age

B_2 = Percentage change in price for every 1 percent change in live weight

B_3 = Percentage change in price for every 1 percent change in meatiness

B_4 = Intercept change associated with sex

B_5 = Intercept change associated with breed

B_6 = Intercept change associated with color

B_7 = Intercept change associated with length of horn

E = disturbance term

$i = 1, 2, 3, \dots, 572$

The imperial model for Non-Muslim buyers is the same with $i = 1, 2, 3, \dots, 1, 206$.

The ordinary least-square regression (OLS) was used to estimate the functions. The OLS estimators provide the best linear unbiased estimates under certain assumptions. The expected value of the estimated parameter approximates the true value of the parameter. The OLS estimators are best in the sense that their variance is the minimum in the class of linear unbiased estimators. In this sense, the OLS estimators are the most efficient in this class.

RESULTS AND DISCUSSION

Physical characteristics of halal goats preferred by traders

Table 2 presents the physical characteristics of halal goat according to traders' rank of preference in five selected markets of Region XII. Results revealed five preferred goat attributes in buying halal goats: weight, meatiness, age, breed and sex. However, Muslim traders, aside from the five mentioned characteristics, preferred halal goats with horns especially if they are used for sacrifice.

Table 2. Physical characteristics of halal goats according to traders' rank of preference.

Characteristics	Rank *	Total rank (N=75)	Mean	Description of preference
Live weight	1	119	1.59	12-17 kg, medium size
Meatiness	2	155	2.07	Well muscled
Age	3	248	3.31	Young
Breed	4	294	3.92	Upgraded
Sex	5	337	4.49	Male

Live weight of the animals was ranked first by the traders in their preference in buying halal goats. Traders preferred goat weighing 17 kg more or less, classified as medium sized animals because they are easier to sell. Traders in the region had higher range for each classification compared to the one adopted by Orden *et al.* (2005) because of the variability of live weight of goats traded in Pangasinan and in Region XII. On the other hand, small sized goats with a weight of less than 12 kg and large size goats weighing 18kg or more were less preferred. Small animals have less dressing percentage (Pinkerton, 2005) but are charged the same dressing fee of PhP150 per head. On the other hand, large animals are least preferred because of their high price. Although the transactions were done by visual appraisal, traders were observed to be well skilled in estimating live weights. Traders targeting animals for purchase usually make good guesses about weight and their ability to guess the weight helps them in making good bargain (Jabbar, 1988).

Meatiness ranked as the second preference of traders where they opted for well-muscled animals due to higher dressing percentage. Meatiness is usually determined by examining the animal's hindquarters, loin, shoulders and neck. It is likewise the most important carcass characteristic of slaughtered goats and is affected by a number of genetic and environmental conditions as well as specific herd management decisions (Pinkerton, 2005). Following the scale used by Orden *et al.* (2005), goats with well-muscled hindquarters should have a meat thickness of more than 5 cm, whereas those with a meat thickness of less than 5 cm are considered thin.

Age was also preferred and ranked third. Young goats were preferred because they require less time in cooking. Apura and Apura (1997) reported that consumers in Region XI preferred goats one year and below in age because meat was tender and had less odor. Moreover, Engle and Greener as cited by Orden *et al.* (2005) mentioned that under usual management, kids do not store much body fat until they are approximately one year old. Goats aged from 11 months to two years have a higher proportion of lean muscle and less bone, but they may not have more body fat than yearlings. Older animals store more body fat if nutritional conditions are favorable, but can become thin when feed is limited. This is supported by Owen *et al.* (1983) who noted that development of fat in goats occurs very late and only reaches appreciable levels when the animals are near or at their mature body weight. Moreover, Abebe as cited by Orden *et al.* (2005) concluded that the dressing percentage of Somali goats is affected by age; animals slaughtered at a later age had more lean meat and fat ($P < 0.05$).

Breed ranked fourth among the characteristics preferred by the traders. Majority of the traders preferred upgraded goat due to meatiness and higher meat recovery over that of native goats. The advantages of goat upgrading were reported in several studies by Stanisiz *et al.* (2009) and Cruz *et al.* (1999). These include increase in body size, growth performance and milk production, production of better quality offspring and shorter production period due to faster growth rate, and an increased income and profitability. On the other hand, native goats were preferred for sacrifice perhaps because of their lower prices and strong cultural values attached to them by the local traditional institutions (Dossa *et al.*, 2005).

Sex was also identified as a characteristic preferred by traders. Male goats were preferred because they have heavier carcass and to insure that animals for slaughtering are not pregnant since it is ethically unacceptable among Muslims to slaughter pregnant animals. Moreover, males are commonly used for sacrifice and for celebration while female animals are preferred for raising.

Hedonic price relationships

A double logarithmic hedonic model was applied to link price with the animal's physical attributes. Analysis of data was clustered into 2: Muslim and Non-Muslim buyers since halal foods promote healthy and clean foods and suitable for anybody regardless of religious beliefs. Monthly prices of halal goats purchased by Muslims in 5 selected markets of Region XII tended to go down towards the opening and closing of classes since farmers were faced with cash shortages, indicating that although livestock may provide a fallback position for cash in times of crisis, terms of trade may be the worst when the farmers need cash the most, but tend to build up

several weeks toward a peak surrounding major religious occasions, like Eid al Fitr and Eidal adha, and falls sharply after these occasions. Similar trend was observed by Ayele *et al.* (2004) in Ethiopia.

In addition, results clearly indicate that live weight had the greatest significant contribution affecting price variation in halal goats with an attached premium of PhP 789.30. This is supported by Dossa *et al.* (2005) who stated that live weight was a significant ($P < 0.001$) characteristic affecting goat prices with an estimated elasticity of demand for goats with respect to live weight of 0.99. Holding other characteristics constant, an increase of 1% of the live weight of goat will result in increase in price by 0.46%. This means that a change per kilogram live weight of the goat could provide an added price of PhP 46.01.

Similarly, meatiness also added significantly to the prices of goats with an attached price premium of PhP 433.20. Price of halal goat increased by 0.25% for every 1% change in meatiness. A change in meat thickness from 3-4 or 4-5 could provide an added price equal to PhP 150.35. This significant premium for meatiness is due to higher dressing percentage and carcass yield.

In like manner, breed contributed significantly to the price of halal goats. The difference in price between upgraded and native goats was significant, with the former fetching higher price by 0.050% over the latter. Holding all other characteristics constant, buyers are willing to pay higher price for upgraded goats at approximately PhP 84.65. The significant premium for upgraded goats agrees with the findings of Stanisiz *et al.* (2009) who observed that crossbreds with 25-50% and 75% of the Boer genes showed significant higher dressing percentage, their carcass was covered with a thicker fat cover over the ribs and over the longissimus dorsi muscle compared to those of the native dairy goat. Moreover, with increasing share of Boer genes in genotypes, the fat content of carcass increased and the bone content decreased. Sensory evaluation showed that upgraded goat kids were more tender and juicier than their native counterpart. In five (5) markets surveyed, the overall market share of upgraded animals was about 21%.

Likewise, age also influenced significantly the price variation of halal goats. As the animal grows older, it becomes meatier, thus, its price increase by 0.041% for every 1% increase in age up to 3 years only. The price premium attached to this attribute is PhP 75.70. Beyond this age, prices tend to go downward. The significant discount for older animal can be due to the negative correlation between age and tenderness level (Orden *et al.*, 2005). Moreover, mature animals above two years have collagen in connective tissue which has a reduced ability to gelatinize under the influence of heat and moisture (Casey, 1992), a reason for goat meat being perceived as stringy, tough and strongly flavored, which is typical of old animals in most species. Similar observation was observed by Ayele *et al.* (2005) in Ethiopia that price per animal increased with age but declined for older or over mature animals for both sheep and goats.

On the other hand, sex also had the lowest positive influence on halal goat prices. Significant differences in prices were observed between male and female goats. In addition, the buyers showed preference for male goats and with all other characteristics being constant, male goats were likely to fetch higher prices by 0.029% approximately equal to PhP 49.30 than female goats. This price differential could be due to the sex influences on carcass composition and meat properties of

goats. It is known that male goats produce significantly heavier carcass and have higher dressing percentage than their female counterparts (Dawa *et al.*, 1996; Mourad *et al.*, 2001). Likewise, meat from males presents greater juiciness, flavor quality and general acceptability than meat from female animals (Rodriguez and Teixeira, 2009). Color and length of the horn had insignificant effect on price.

The findings of the current study are similar in some attributes to other studies. Orden *et al.* (2005) reported significant effects of meatiness, size, breed, sex and age on pricing of goat. Dossa *et al.* (2006), Okali and Upton (1985) and Rodriguez *et al.* (1995) reported similar effects of live weight and sex in the price while Francis (1990) and Jabbar (1998) reported the effects of breed on the goat price.

The monthly prices of Halal goats for non-Muslim buyers showed two peaks of prices towards Muslim festivals and went down after these festivals and towards the opening and closing of classes where farmers need cash to pay for their children's education. Basic statistics of the variables for halal goats for non-Muslim buyers showed that the average price of halal goat was PhP1,699.20. Similar trend was noted between the two classifications of buyers. Estimates of parameters for hedonic price model for halal goats for non-Muslim buyers showed similar characteristics with Muslim buyers. These are live weight, meatiness, age, breed and sex which are also positive determinants of the price of halal goat.

Live weight also had the greatest influence in price which increased by 0.50% for every 1% increase in live weight and a price premium of PhP 765.70. Meatiness followed with a price premium of PhP 362.10. Price increased by 0.24% for every 1% change in meatiness. Age was also a significant determinant of price which increased by 0.08% for every 1% increase in age and a price premium of PhP 123.30. Breed likewise significantly influenced the price of goat. Upgraded goats could fetch a higher price of PhP 105.85 over that of native goats and increased almost by 0.07% compared to their native counterparts. Sex also explained the variation of prices of halal goat. Male goats significantly commanded a price of PhP 31.10 which is higher than that of female halal goat.

Implications of upgrading

As the goat industry sets targets for the year 2020, current efforts are geared towards upgrading native goats to achieve these targets. However, do upgraded goats possess the desired characteristics of the traders in Region XII to justify continued upgrading efforts?

The results of the present study show that live weight and meatiness are the two most preferred halal goat characteristics by buyers. Native halal goats are relatively lighter due to their genetic makeup. Based on the data from the three focal sites of the project, "Establishment of Halal Goat Production Protocols" in General Santos City; Columbio, Sultan Kudarat and Tantaran, South Cotabato, the average daily gain is 72.48 g while the average birth weight is 2,110 g for native halal goat (unpublished report). Thus, native goats could achieve its desirable weight of 17 kg in 7 months. On the other hand, upgraded goats of native-Dadiangas-Nubian-Boer descent could attain the desired weight in just 4.50 months considering an average daily gain of 109.46 g and birth weight of 2,300 g for upgraded goats (unpublished report). Therefore, upgrading will shorten the rearing

time for goats to attain the desired weight. Consequently, goats would not only be meatier but also younger and more tender (Orden *et al.*, 2005; Apura *et al.*, 1997). The reduction of the rearing period from 7 to 4.5 months would also reduce the variable inputs. This could be translated to a saving of PhP 309.10 per head for feeds, labor and biologics (PCARRD, 2007) for 2.5 months with the following assumptions: semi-intensive; 100 g per day per head for 180 days at PhP 12.00 per kg for feeds equivalent to PhP 45.00; PhP 165.00 per day at 183 days per year for labor equivalent to PhP 251.6 and PhP 60.00 per head per year for biologics equivalent to PhP 12.50. This implies that upgrading will produce the desired characteristics in a shorter period of rearing. Thus, goat raisers could significantly improve their profitability through the adoption of appropriate management and marketing practices.

Another benefit of upgrading is the price differential between native and upgraded goats at maturity age. Native halal goats weigh approximately 17 kg with a market price of PhP 1,599.00 per head while upgraded goats weigh about 25.3 kg with a market price of PhP 1,914.00 per head. With an added cost of upgrading in the amount of PhP 100 per head, a net difference of PhP 215 per head will be realized when raising upgraded goats.

These implications run parallel to the study of Orden *et al.* (2005) that upgrading could benefit raisers by receiving higher prices of their animals at maturity age and the reduction of cost for rearing as a result of shorter period of time to attain the desired weight at maturity age. Upgrading the native goats would be beneficial to farmers by way of receiving higher prices for their animals and from reduced expenditures resulting from shorter periods of production.

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