Research Note

Critical Analysis on Price Determinants of Cattle

SUPPLY and demand are the most important factors in determining price of cattle. Characteristics of the animal also influence the market price of cattle, holding supply and demand constant over a time. Various studies have identified age, milk yield, purity and breed in case of cows and age, breed and physical characteristics in case of bullock as factors mainly influencing the market prize of cattle (Suryawanshi *et al.,* 1996 and Biswal and Sanjaykumar, 2011). In this backdrop the present study was undertaken to analyse impact of various production parameters and physical characteristics in determining the price of cattle. Also, in the study area farmers believe in fortune associated with the marks on the body of animal. So, the impact of farmers' believed associated with certain marks and impact of winning a prize by cattle was analysed. This knowledge on factors that influence price of cattle in market would guide the farmers to obtain maximum price for their cattle.

Karnataka state is classified into eight agro-climatic zones. The present study is undertaken in eastern dry zone purposively, owing to higher population of both cows and bullocks in this zone. The study adopted ex-post-facto research design. Multistage random sampling technique was followed. Five districts namely; Bengaluru Rural, Chickballapur, Tumkuru, Kolar and Ramanagar districts were randomly selected and from each district one regular cattle market was selected. Two cattle fairs *viz.,* Ghati and Tumkur, being popular and attracting large number of animals were selected purposively. Study was undertaken during the period of October 2012 to January 2013. During this period a total of 39 bullock and 78 cow transactions through different marketing channels were recorded using a structured interview schedule.

Initially the degree and nature of association of independent variable with dependent variables (price of cattle) and multicollinearity was detected by obtaining correlation coefficients of price of animal with quantities factors. Dummy variables were incorporated to access impact of qualitative factors on the price of animal.

Three quantitative factors (milk yield, age and parity) and four qualitative factors (calf at foot, breed, health status and marks on the body of cow) for cows were the listed as price determinants. Linear multiple regression analyses using the following model was carried out to determine the influence of each factor on the price of the cow.

$$Y_i = b_o + b_1 X_{1i} + b_2 X_{2i} + b_3 X_{3i} + b_4 X_{4i} + b_5 X_{5i} + b_6 X_{6i} + b_7 X_{7i} + e_i$$

Where, Y_i, market price of ith cow in rupees; b_o, constant term; $b_1, b_2, b_3, b_4, b_5, b_6$ and b_7 are regression coefficients associated with $X_1, X_2, X_3, X_4, X_5, X_6$ and X_7 variables, respectively. X_{1i}, milk yield of ith cow in litres per day; X_{2i}, age of ith cow in years; X_{3i}, parity of ith cow in numbers; X_{4i}, dummy variable for presence or absence of calf of ith cow, with value '1' for presence and value '0' for absence of calf; X_{5i}, dummy variable for breed of ith cow, with a value '1' for CB animals and '2' others: X_{6i}, dummy variable for health status of ith cow, with a value of '1' for apparently normal and '0' for otherwise and X_{7i}, dummy variable for marks of the body of ith cow, with value of '1' for presence of marks and '0' for absence of marks.

Similarly for bullocks, one quantitative factor (age) and six qualitative factors (breed, pair set, general appearance, temperament, prize won and marks on the body of cattle) were listed for price determination. Following model was adopted for multiple regression analyses:

$$Y_i = b_o + b_1 X_{1i} + b_2 X_{2i} + b_3 X_{3i} + b_4 X_{4i} + b_5 X_{5i} + b_6 X_{6i} + b_7 X_{7i} + e_i$$

Where, Y_i, market price of ith bullock: b_o, constant term; $b_1, b_2, b_3, b_4, b_5, b_6$ and b_7 are regression coefficients associated with $X_1, X_2, X_3, X_4, X_5, X_6$ and X_7 variables, respectively. X_{1i}, age of ith bullock in years; X_{2i}, dummy variable for breed of ith bullock, with a value '1' for Hallikar or Amruthmahal and '0' others; X3i, dummy variable for pair set or not for ith cow, with value '1' for pair set and '0' for otherwise; X4i, dummy variable for general appearance of ith bullock, with value '1' for excellent appearance and '0' for otherwise; X5i, dummy variable for

temperament of ith bullock, with value '1' for normal and '0' for otherwise; X_{6i}, dummy prize won by ith bullock, with a value of '1' for prize won and '0' for otherwise and X_{7i}, dummy variable for marks of the body of ith bullock, with value of '1' for presence of marks and '0' for absence of marks.

The multiple linear regression of the listed factors (age, breed, pair set, general appearance, temperament, price won and marks on the body) of bullocks on their price were found significant with 0.788 coefficient of multiple determination (adjusted R^2). The results indicated that 78.80 per cent of total variation in market price of bullock was because variables included in the regression model (Table I). Whereas, in case of cow, the coefficient of multiple determination

TABLE I

Factors influencing the market price of bullock

(n=39)

Variables	Regression Coefficeint (₹)	t' value	Significance at 5 %
Intercept	7072.08	1.29	0.20
Age	-316.80	-0.64	0.53
Pair Set	3042.93	1.42	0.04
Breed	8028.33	2.99	0.00
General Appearance	4904.52	2.06	0.00
Temperament	-4712.92	-2.05	0.00
Presence or Absence of Marks	-5076.28	-1.59	0.02
Prize Won	49239.20	11.43	0.00

Note: $R^2 = 0.7880$

(adjusted R^2) was 0.814; indicating 81.40 per cent of total variation in market price of cow was explained by milk yield, age, parity, breed, health status, body marks and presence of calf, in the regression equation (Table II).

Age had a negative impact on price of bullocks as well as on cows, as age of cow increased the prices were found decreasing. Price of bullock decreased by ₹ 316.80, for an additional year increase in age. Price of a cow decreased by ₹ 339.46, for an additional year increase in its age. But, impact of age on price of bullock and cow was found to be statistically

TABLE II

Factors influencing the market price of cow

(n=78)

Variables	Regression Coefficeint (₹)	t' value	Significance at 5 %
Intercept	14099.12	1.87	0.07
Milk Yield	2822.73	10.51	0.00
Age of the animal	-339.46	-0.35	0.73
Parity	-1501.90	-0.66	0.01
Calf at foot	2610.03	0.91	0.02
Breed	3068.43	0.67	0.00
Health Status	2012.88	0.51	0.61
Presence or absence of marks	-11455.52	-2.70	0.01

Note: $R^2 = 0.8140$

insignificant. Suryawanshi *et. al*. (1996) also reported that temperament and age (number of front teeth and horn rings) had significant impact on price of bullock.

Impact of breed was found to be positive and highly significant on price of bullock and cow. Bullocks belonging to Hallikar or Amruthmahal breed fetched additional amount of ₹ 8028.33 compared to non-descript bullocks. Crossbred cow fetched additional ₹ 3068.43 compared to non-descript cow.

Pair set or lack of pair for a bullock had a positive and significant effect on price of bullock. A higher price was realized for a bullock in pair compared to sum of prices of individual bullock. Bullock price increased by ₹ 3042.93, if sold in pair. The results revealed that farmers were ready to pay more price to bullocks in pair, since good pairing is essential for their utilization and for agricultural operations. Having excellent general appearance was found to increase price of bullock significantly. Excellent general appearance increased the price of bullock by ₹ 4904.52.

Temperament of a bullock was found to have significant and negative impact on its price. Bullock with erratic temperament lost ₹ 4712.92 when compared to normal tempered bullock. Marks on body of a bullock and cow were found to have significant and negative impact on price. Presence of marks reduced the price of bullock by ₹ 5076.28 and price of cow was reduced by ₹ 11455.52. Farmers' belief in

fortune associated with marks on the body of animal they possess influenced the price of cattle with marks.

Most significant impact on price of a bullock was by whether it had won a prize or not. The prize has increased the price of bullock by ₹ 49239.20 compared to the bullock which had not won any prize. Possessing bullocks which have won prize is associated with prestige and recognition in society, and competition for such pair increased price of them tremendously.

Level of milk yield of a cow had positive and significant impact on price of cow. Every additional litre increase in milk yield increased the price of a cow by ₹ 2822.73. Since milk yield is most important economic trait in dairy animal, its impact on price of cow is significant in increasing the economic returns.

Number of calving had a negative and significant impact on total price of cow. For every additional calving, the price of cow decreased by ₹ 1501.90. Presence of calf with cow fetched additional ₹ 2610.03 compared to without calf. Calf at foot had a significant impact on price of cow. Cow with a calf assures additional animal and roughly indicates the stage of lactation. Effect of health status had insignificant impact on the price of cow. But, compared to debilitated cow apparently healthy cow fetched additional ₹ 2012.88.

All the six qualitative factors had significant influence on price of bullocks. Being Hallikar or Amruthmahal breed, being in a pair, having good general appearance and winning a prize fetched an additional amount of ₹ 8028.33, ₹ 3042.93, ₹ 4712.92 and ₹ 49239.20, respectively. But cattle with inauspicious marks and erratic temperament lost ₹ 5076.28 and ₹ 4712.92, respectively.

Milk yield, calf at foot and breed had a positive and significant impact on price of cow. Additional one litre milk yield, having calf along and being crossbred fetched an additional amount of ₹ 2822.73, ₹ 2610.03 and ₹ 3068.43, respectively. Age, parity and presence of marks had negative impact on the price of a cow. Biswal and Sanjaykumar (2011) also reported that milk yield, age and parity had positive and significant influence on price of cow. But Girma *et al.,* (2009) repoted that fertility, disease resistance and calf vigour were the more important traits considered in price determination.

The result of the study indicate that the price of cow was greatly influenced by age, breed, milk yield, parity, health status and presence of calf and marks on the body of the cow. Whereas, in case of bullocks age, breed, temperament, pair set, general appearance, winning a prize and presence of marks on the body of bullock influence price greatly. The results also indicated that the cow buyers were willing to pay higher price for additional milk yield, (owing to its economic importance) and having higher preference for crossbred cows. Bullocks of local breeds in pair and having docile temperament were paid higher prices. Farmers' belief in fortune associated with marks on the body of animal, found to greatly influence price of both, bullock and cow. Scientific price fixation of cattle should be encouraged among the cattle buyers. They need to be about the economically important traits to be considered in pricing of cow and bullocks and efforts to change farmers' belief in fortune associated marks on the body of animal were needed. Study reported that crossbred cows and draught breed bullocks fetched additional price. Hence, dairy farmers should be motivated to adopt crossbreeding. Incorporating superior germplasm *viz.,* Hallikar and Amruthmahal in non-descript population would produce superior bullocks and bring more economic returns.

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REFERENCES

BISWAL, A. AND SANJAYKUMAR, 2011, Factors affecting price of cattle and buffalo in Odisha. *Ind. J. Ani. Sci.,* **81** (11) : 105 - 106.

GIRMA, T, K., AWUDU, A. AND CLEMENS, W., 2009, Valuing traits of indigenous cows in Central Ethiopia. *J. Agric. Econ.,* **60** (1) : 386 - 401.

SURYAWANSHI, S. D., GAIKWAD, N. S., BANKHELE, A. S. AND YADAV, D. B., 1996, Marketing of draft animals in Western Maharashtra : A case of Belhi market. *Ind. J. Agric. Mark.,* **10** (2) : 103 - 104.