International Journal of Research in Social Sciences
Vol. 9, Issue 6, June - 2019,
ISSN: 2249-2496 Impact Factor: 7.081
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

AN APPROACH FOR ASSESSING EFFICIENCY OF DAIRY OWNERS BY THE APPLICATION OF ECONOMETRIC MODEL

Saddam Hussain[1], Dr.Satendra Kr[2]

Department of Statistics

[1,2]OPJS University, Churu (Rajasthan) – India

ABSTRACT

This particular analysis sought in order to recognize some production inefficiency issues among small scale dairy farmers as well as to prescribe steps to lessen the inefficiency. The newspaper focuses on things impacting the economics of milk production. A growth in milk efficiency the study's suggestion is also going to play a significant role in obtaining one of the huge 4 agenda of manufacturing as well as food security as there'll be far more milk that is a raw material for several of the manufacturing industries. Government's perspective of ensuring food as well as nutrition security of the county will additionally be partially actualized because of to increased milk production.

Keywords: Econometric, model, dairy, milk production.

I. INTRODUCTION

A model is a rearranged portrayal of a genuine phenomenon, for example, a real system or cycle. The genuine phenomenon is spoken to by the model so as to clarify it, to foresee it, and to control it, goals relating to the three reasons for econometrics, specifically auxiliary examination, determining, and strategy assessment. In some cases the real system is known as the real-world system so as to stress the differentiation among it and the model system that speaks to it.

1.1 ECONOMETRIC MODELS

Econometric models are commonly algebraic models that are stochastic in including arbitrary factors (rather than deterministic models which do exclude irregular factors). The irregular factors that are incorporated, normally as added substance stochastic disturbance terms, account to a limited extent for the oversight of pertinent factors, wrong determination of the model, mistakes in estimating factors, and so forth.

Econometric models are either direct or non-straight. Early econometric models and numerous current econometric models are straight in that they can be communicated as models that are direct in the boundaries. This linearity suspicion has been a significant one for demonstrating mathematical and

International Journal of Research in Social Sciences
Vol. 9, Issue 6, June - 2019,
ISSN: 2249-2496 Impact Factor: 7.081
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

statistical theorems concerning econometric models, for assessing boundaries, and for utilizing the assessed models for basic examination, anticipating, and strategy assessment. The linearity suspicion has been supported in a few different ways. To begin with, numerous economic relationships are by their very nature direct, for example, the meanings of expenditure, revenue, cost, and profit.

1.1.1 Structural form

The basic econometric model is the structural form, from which the reduced form and the final form can be obtained. The general structural form of the linear (in parameters) stochastic econometric model, assuming there are g endogenous variables, $y_1, y_2, \ldots, y_g$, and k exogenous variables, $x_1, x_2, \ldots, x_k$, can be written:

$$y_1\gamma_{11} + y_2\gamma_{21} + \cdots + y_g\gamma_{g1} + x_1\beta_{11} + x_2\beta_{21} + \cdots + x_k\beta_{k1} = \varepsilon_1,$$

$$y_1\gamma_{12} + y_2\gamma_{22} + \cdots + y_g\gamma_{g2} + x_1\beta_{12} + x_2\beta_{22} + \cdots + x_k\beta_{k2} = \varepsilon_2,$$

$$\vdots$$

$$y_1\gamma_{1g} + y_2\gamma_{2g} + \cdots + y_g\gamma_{gg} + x_1\beta_{1g} + x_2\beta_{2g} + \cdots + x_k\beta_{kg} = \varepsilon_g.$$

1.1.2 Reduced form

This reduced form uniquely determines the probability distributions of the endogenous variables, given the exogenous variables, the coefficients, and the probability distributions of the stochastic disturbance terms.

The reduced form is written

$$y = x\Pi + u.$$

1.1.3 Final form

Econometric models are either static or dynamic. A static model includes no express reliance on schedule, so time isn't basic in the model. (Just adding time addendums to variables doesn't change over a static

model into a powerful one.) A unique model is one in which time assumes a fundamental job, normally by the consideration of slacked variables or contrasts of variables after some time. Along these lines, in the event that any equation of the model is a distinction equation, at that point the model is dynamic. (Time likewise assumes a fundamental job if variables and their paces of progress after some time are remembered for the model, for example, in a differential equation.)

II. REVIEW OF RELATED LITERATURE

Dhiraj K Sing (2020)A lot of the all-out milk created in India rose from 3.2% in 2001–02 to 5.2% in 2018–19, yet the profitability of its dairy part is lower than the public normal. The low economies of scale, absence of institutional help, and strength of little and negligible farmers have obliged the part's effectiveness. The specialized productivity of dairy farmers—controlled by a farmer's group size, the size of their holding of developed land, training, and experience—would be improved by abilities advancement and innovation move.

Pavić et al., (2020) this study analyzes the consequences that motion 112 of the Rural Development Policy had on the socioeconomic status of Slovenian dairy farms. The data used in this specific paper had been collected from Farm Accountancy Data Network (FADN), a database for applicants in motion 112 (young farms transferees), from whose uses for participation in this particular action the data had been received. Twenty-eight diverse econometric models had been created throughout the very first phase of the investigation. The evaluation of the models was later performed by implementing legitimate statistical as well as econometric criteria. The results reveal the primary positive consequences that motion 112 had on socioeconomic signs of the dairy farms: number of full time labor power, number of head of big livestock, total revenue (in net value along with euros) added.

Birthal, Pratap&Pandey (2019) Attributable to a few price and non-price factors, India's dairy area has developed astoundingly in the previous forty years. In this paper, we survey relative commitments of such factors to the development of journal part. Our outcomes demonstrated that dairying, regarding both creature stock and yield, isn't a lot of receptive to prices of yield just as information sources. Nonetheless, over the long haul, the yield reacts decidedly too innovative change in creature reproducing, feed supplies, veterinary administrations and markets.

Kumar, Anjani (2019) The Indian government has put forth huge attempts to elevate dairy cooperatives to connect the milk makers with shoppers. In spite of this, milk advertising is as yet overwhelmed by customary outlets. This paper inspects the effect of current dairy esteem chains on food security pointers, for example, net gets back from dairying and utilization consumptions. Utilizing an enormous, public, ranch level dataset from India and a multinomial endogenous exchanging regression model, results uncover that Indian dairy farmers' coordination with the cutting edge dairy esteem chain has a positive and huge effect on their food security (estimated by net returns and family utilization uses). Investment in

current milk-promoting outlets fundamentally expands net returns every year, whether or not farmers pick one outlet or a mix.

Saroj, Sunil and Joshi, (2018) This paper inspects the effect of dairy helpful participation on ranch execution pointers, for example, milk yield, net returns, and reception of sanitation measures (FSM) in milk creation, utilizing board data from a study of milk makers in 2007 and 2015 in Bihar, India. An endogenous exchanging regression model, which represents choice predisposition, is utilized in the investigation. The observational examination uncovers that dairy agreeable enrollment has a positive and measurably critical effect on milk yield, net returns, and consistence with FSM. An investigation of data disaggregated by ranch size additionally shows that minimal farmers will in general profit more from dairy cooperatives than little, medium, and huge farmers.

Yusuf, elik. (2018) Summary In this particular paper, we work with a two stage decision option modeling to calculate milk usage demand patterns in Southern Anatolian Region (SAR). The designs show that a two stage Cragg model is much more appropriate than an one-time Tobit model which assumes the determination to buy milk and the products of its to be the just like the decision for the quantity consumed. Most of economic and demographic factors play role that is crucial of milk product use pattern. Specific tastes & preferences are actually pole in figuring out the amount of milk quantity demanded.

M, Singh and Dinesh, O. (2017) Pointing out the conceptual and analytical flaws of the paper, "Do Producers Gain from Selling Milk? An Economic Assessment of Dairy Farming in Contemporary India" (EPW, twenty four June 2017), this report explores the economics of milk production in India. It highlights, particularly, the demand for any evaluation of the dairy industry of India to think about the interactions among crop as well as livestock production systems.

Tyrychtr et al., (2015) Econometric model program of farms is an extremely complicated process requiring understanding not just the economy but mathematical and statistical also techniques in farming employees themselves. The remedy might be an application of econometric issues in analytical choice support systems for farms managers. For such an answer is actually essential to develop a multidimensional data source for assistance on-line analytical data processing (OLAP). This paper proposes a brand new technique (called TEM CM) for proper transformation of econometric model to the conceptual data model for producing multidimensional schemes. This particular brand new technique enables formalizing the procedure of transferring production perform in farming to multidimensional data model and hence leading to a more effective look of data warehouses as well as OLAP databases for choice support in the agricultural analytics methods.

Nahid Mohammed TawfikFawi et.al (2013) pointed toward examining the inclinations of utilization example of milk and factors influencing customers' buy choice of dairy items in Khartoum, state capital

of Sudan. Quality was discovered to be the principle factor influencing the buy choice, trailed by cost of the items. New milk was the profoundly favored milk type among the residents. The examination finished up with various proposals, some of which are processors and makers of dairy items should execute present day promoting ideas that attention on the shoppers' needs and needs. Additionally, makers and processors should utilize showcasing blend in manners that expansion their deals and make fulfilled shoppers.

III. RESEARCH METHODOLOGY

For the purpose of this study following model is used to assess the efficiency of dairy owners.

Allocative efficiency

A cost frontier of a Cobb-Douglas function structure was utilized to appraise the allocative efficiency as follows:

$Ci = (Pi; \alpha) \exp (Vi + Ui)$

Where

Ci was the expense all things considered, g was a Cobb-Douglas function, Pi was costs of inputs utilized in production, α was the boundary to be assessed, and Vi and Ui were random errors taken to be independent and indistinguishably appropriated (iid) and ordinarily dispersed N (0, σv 2). Ui showed the level of allocative efficiency of a farm.The Cobb-Douglas Equation above was linearized as follows:

$\ln C = \alpha 0 + \alpha\ 1 \ln P_1 + \alpha\ 2\ \ln P_2 + \alpha\ 3\ \ln P_3 + \alpha\ 4\ \ln P_4 + Vi + Ui$

Where

C=Total cost of milk production;

α =Vector of the unknown parameter to be estimated

P1 = Cost of fodder;

International Journal of Research in Social Sciences
Vol. 9, Issue 6, June - 2019,
ISSN: 2249-2496 Impact Factor: 7.081
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

P2 = Cost of concentrates;

P3 = Cost of animal health;

P4 =other operating expenses; and Vi and Ui= Error terms.

The allocative efficiency (AE) was taken to be the ratio of anticipated that minimum expense of production should the watched/actual expense of production, as is shown in Equation below. The AEi should lie somewhere in the range of 0 and 1.

$AEi = Ci*/Ci = \exp(Ui)$

IV. DATA ANALYSIS AND INTERPRETATION

Summary statistics of variables used at the production as well as cost functionality

Summary statistics of variables used in the production and cost function of the frontier analysis are actually offered in Table below.

Table 1: Summary statistics of variables used in the production and cost function

Variable	Unit	Mean	Std deviation	Min	Max
Monthly milk production	Litres	492.69	427.51	60	2,460
Herd size	No	2	2	1	17
Monthly fodder/cow	Kgs	1,561.44	68.55	1,424	1,700
Monthly concentrates/cow	Kgs	93.06	84.34	84.34	456.01
Monthly cost of animal health	Ksh	308.85	300.14	16.67	1,700
Cost of concentrates	Ksh	4,286.26	1,760.16	1,010	9,250

International Journal of Research in Social Sciences
Vol. 9, Issue 6, June - 2019,
ISSN: 2249-2496 Impact Factor: 7.081
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

Cost of fodder	Ksh	6,954.62	9,515.89	0	45,000
Operating expenses	Ksh	3,248.68	11,061.16	50	58,700

Distribution of efficiencies among small scale dairy producers

Dairy owners' complex productivity ranged from a minimum of 39.60 % to maximum of 95.95 % with a mean of 68.68 % as shown in Table six. Thinking about the mean, there's a sign that farmers had a loss of 31.32 % in milk production because of to technical inefficiencies. In an additional study of small scale dairy producers in Meru as well as Embu by Mugambi (2014), it was discovered that the mean specialized productivity was 83.7 %. Considering Meru and Embu have very similar climatic ailments with Mukurweni, the results suggest that farmers in Mukurweni had been much less effective as well as had the potential to increase the effectiveness of theirs. The distribution of the specialized effectiveness suggests that vast majority of the producers work between 51 90 % effectiveness scores, while eleven % of the farmers work in a specialized effectiveness score of fewer than fifty %. This means the producers from the study area have the potential to reduce the quantities of inputs used without decreasing the milk production of theirs by boosting their specialized efficiency.

Table 2: Efficiency distribution (numbers and proportions) of small-scale dairy farmers

Efficiency (%)	**TE**			**AE**			**EE**		
	No	**%**	**Cum**	**No**	**%**	**Cum**	**No**	**%**	**Cum**
91-100	5	5.5	100	67	73.6	100	3	3.3	100
81-90	20	22.0	94.5	14	15.4	26.4	12	13.2	96.7
71-80	18	19.8	72.5	3	3.3	11.0	13	14.3	83.5

International Journal of Research in Social Sciences
Vol. 9, Issue 6, June - 2019,
ISSN: 2249-2496 Impact Factor: 7.081
Journal Homepage: http://www.ijmra.us, Email: editorijmie@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal - Included in the International Serial Directories Indexed & Listed at: Ulrich's Periodicals Directory ©, U.S.A., Open J-Gate as well as in Cabell's Directories of Publishing Opportunities, U.S.A

61-70	19	20.9	52.7	5	5.5	7.7	22	24.2	69.2
51-60	19	20.9	31.9	1	1.1	2.2	21	23.1	45.1
1-50	10	11.0	11.0	1	1.1	1.1	20	22.0	22.0
Min (%)	39.60			35.58			31.19		
Max (%)	95.95			99.99			94.89		
Mean (%)	68.68			91.32			62.62		

Key; TE- Technical efficiency, AE- Allocative efficiency, EE- Economic efficiency

The dairy owners' allocative effectiveness scores range between 35.58 % as well as 99.99 % with a mean of 91.32 %. Average farmers would help save a price of 8.8 % in case they were operating at exactly the same level with by far the most allocatively effective farmer (1- (91.32/99.99)*100), while by far the most allocatively ineffective farmer would save a cost of 64.42 % by running at the amount of the most effective farmer (1- (35.58/99.99)*100).

V. COCNCLUSION

The factors recognized to adversely influence allocative effectiveness were the household size and monthly concentrate costs. The two factors increase farmers' costs, leading to a strain in the accessible capital that can be utilized toward dairy farming. Factors discovered to be contrarily associated with economic proficiency were the age of the household head, household size, and hired work and monthly concentrate costs.

Recommended policy actions therefore, should be directed towards the construction of more milk collection centers (markets) near the farmers in order to reduce the distance to the market; establishment of breeding centers for dairy animals in order for farmer to increase their herd size; and knowledge transfer through provision of extension services in order to educate the farmers on dairy management.

REFERENCES: -

[1] Dhiraj K Singh, Technical efficiency of dairy farmers in Bihar, India: status and determinants, Agricultural Economics Research Review 2020, 33 (1), 81-86 DOI: 10.5958/0974-0279.2020.00009.9

[2] Pavić, Lazar & Turk, Jernej&Grgić, Ivo &Prišenk, Jernej. (2020). Impact Analysis of the Young Farmers' Support Program on Slovenian Dairy Sector Development Using Econometric Modeling Approach. Agronomy. 10. 10.3390/agronomy10030429.

[3] Birthal, Pratap&Pandey, Ghanshyam&Jumrani, Jaya &Hazrana, Jaweriah. (2019). Supply response in Indian dairying. The Indian journal of animal sciences. 89. 459-465.

[4] Kumar, Anjani& Mishra, Ashok &Saroj, Sunil & Joshi, P.K.. (2019). Impact of traditional versus modern dairy value chains on food security: Evidence from India's dairy sector. Food Policy. 10.1016/j.foodpol.2019.01.010.

[5] Saroj, Sunil & Joshi, P.K. &Takeshima, Hiroyuki. (2018). Does cooperative membership improve household welfare? Evidence from a panel data analysis of smallholder dairy farmers in Bihar, India. Food Policy. 75. 24-36. 10.1016/j.foodpol.2018.01.005.

[6] Yusuf, Çelik. (2018). Factors affecting milk consumption pattern in Southern Anatolian Region: An application of a two-stage econometric model.

[7] M, Dinesh & Singh, O.. (2017). Economics of Dairy Farming in India. Economic and Political Weekly. 52. 77-79.

[8] Tyrychtr, Jan &Vasilenko, Alexandr. (2015). Transformation Econometric Model to Multidimensional Databases to Support the Analytical Systems in Agriculture. AGRIS on-line Papers in Economics and Informatics. 7. 71-77. 10.7160/aol.2015.070307.

[9] Nahid Mohammed TawfikFawi and Mohamed Osman Mohamed Abdalla (2013), "Milk Preferences of Consumers and effect of the marketing mix on Consumers' Purchase decision of Dairy products" Indian Journal of marketing ,Vol.43, No.2, February, P.57-62.