

Productivity Analysis of Beauty Parlour

(With reference to women economic empowerment in Butwal)

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Abstract

The present research was conducted for examining the productivity of Beauty Parlour Business in Butwal sub-metropolitan city of Rupandehi district of Nepal with the objectives to examine the input-output coefficients, returns to scale and allocative efficiency. The survey was carried out to obtain information from a sample of 50 beauty Parlours in the study area. Econometric tools were applied for getting the result. The value of coefficient of input items and materials (IM) is 0.5765. This implies that 100% increase in the expenses in items and materials causes to enhance the annual turnover by 57.65%. Likewise, the value of coefficient of input water (W) is 0.2889. This implies that 100% increase in the expenses in water causes to enhance the annual turnover only by 28.89%. But the value of coefficient of input electricity (E) is -0.2516. This implies that 100% increase in the expenses in electricity causes to decrease the annual turnover only by 25.16%. However, the value of coefficient of input depreciation (D) is 0.4095. This implies that 100% increase in the amount of fixed capital used in the BP business causes to enhance the annual turnover only by 40.95%. Similarly, the value of coefficient of parameter rent (R) is 0.0530173. This implies that 100% increase in the expenses in rent results into increasing the annual turnover only by 5.3%. Sum of input elasticities is 0.9702 indicates that 100% increase in all the inputs in used in beauty parlour would result into 97.02% (almost 100% constant returns to scale) increase in annual turnover of the BP. It can be seen that the inputs viz, fixed capital, water and items and materials are found, underutilized ($MVP > P$). The facts explored in this research reveals that women are excellently involved in the beauty parlour business to reinforce the productivity resulting into raising the living standard of whole family members enabling to raise the sense of equal participation in performing economic activities with male counterparts as well as teaching a good lesson for economic empowerment of women.

Keywords: input coefficient, elasticity of inputs, items and materials, depreciation, water, electricity.

I. Empowerment

"Empowerment" has been used to represent a wide range of concepts and to describe a proliferation of outcomes. Empowerment involves many dimensions, including: "increasing access to economic opportunities and resources; strengthening political power through women's organizations, solidarity, and collective action; raising consciousness about the symptoms and causes of prevalent oppressive religious,

economic, cultural, familial, and legal practices; and strengthening self confidence. Empowerment is a process in which individuals gain control over their own lives by knowing and claiming their rights at all levels of society at the international, local, and household levels. Self-empowerment means that individuals gain autonomy, are able to set their own agenda and are fully involved in the economic, political and social decision-making process. The present

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research aims to seek women's empowerment in beauty parlour business.

A. Women's Economic Empowerment

Approaches to economic empowerment concentrate on factors that help women succeed and advance in the market place. This includes increasing skills and access to productive resources, improving the enabling and institutional environments, and assisting women in their ability to make and act upon decisions in order to benefit from economic growth and development. Women's economic participation and empowerment (Eyben, 2008) are fundamental to strengthening women's rights and enabling women to have control over their lives and exert influence in society. The economic empowerment of women (OECD, 2010) is a prerequisite for sustainable development, pro-poor growth and the achievement of all the Millennium Development Goals (MDGs). Women (Zoellick, 2010) usually invest a higher proportion of their earnings in their families and communities than men. Increasing the role of women in the economy is part of the solution to the financial and economic crises and critical for economic resilience and growth. However, at the same time, we need to be mindful that women are in some contexts bearing the costs of recovering from the crisis, with the loss of jobs, poor working conditions and increasing precariousness.

B. Concept of Production Function

The production function stipulates the technical relationship between inputs and outputs in any production processes. There are many functional forms of production function estimation in economics. Among them, Cobb-Douglass is the prominent and widely used in illustrating the marginal productivity of employed inputs. The Cobb-Douglass functional form was used because it has been widely used in farm efficiency for developing and developed countries by many authors (Heady, 1951; Seyoum et al., 1998). The functional form meets the requirement of being

self-dual. In addition, it allows examining economic efficiency. This type of production function is linear in its logarithmic form, and therefore easy to estimate by using Ordinary Least Square (OLS) estimation technique.

This function can easily be changed into linear form in parameters and apt to run Ordinary Least Square estimation (OLS).The functional form of Cobb-Douglass production function.

$$Y = \beta_0 \prod_{n=1}^N X_n^{\beta_n} \dots (1)$$

Taking logarithm on both sides to satisfy the linearity in parameter property, making them amenable to estimation using the linear regression technique

$$\ln Y = \beta_0 + \sum_{n=1}^N \beta_n \ln X_n \dots (2)$$

Where Y= Value of output

X_n = inputs (n= 1,2,...,N)

B. Productive Efficiency

A rational producer allocates a given set of inputs to maximize profits from his/her enterprise. In order to maximize profits women have to produce given the level of Production. At this level, the objective is to produce a maximum output given the available inputs. When this is achieved a farmer is said to be technically efficient (Kakhobwe, 2007). Furthermore, given a set of input prices, a woman would want to optimally produce her output using the minimum cost of input mix. Achievement of the minimum cost of production means the woman is allocative efficient.

The Beauty Parlour Entrepreneur (BPE) becomes economically efficient when both above conditions have been achieved. The BPE seeks to explore ways to measure her efficiency level as he/she does not want to produce below the optimal output levels and beyond the minimum input cost. A combination of economic factors, institutional factors, available inputs and BPE characteristics influence BPE decisions.

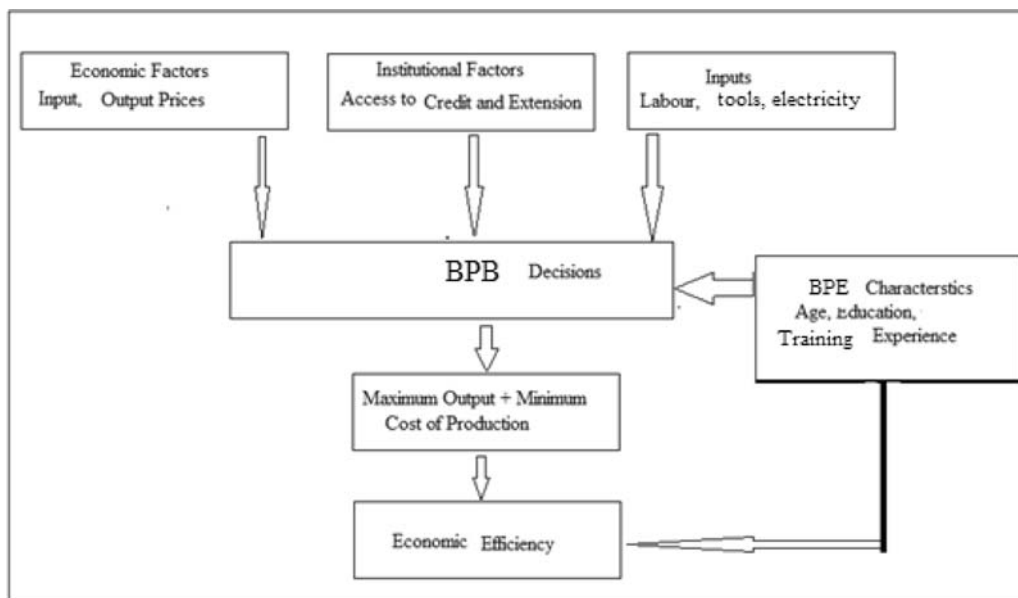


Fig-1.1 Framework for Production and Efficiency of BPB

Economic factors (Fig-1.1) include Parlour input and output market prices which limit the scale of the BPB. Institutional factors such as access to credit and extension enhances the capacity of the BPE to use improved technologies on the BP. The level of inputs such as labour, tools, electricity, chemicals etc determine the production mix that a BPE chooses to achieve her objectives.

C. Allocative, Technical and Economic efficiency

The concept of allocative efficiency and its measurement may be explained with the help of Farrell's diagram. In Figure 1.2, two inputs, X_1 and X_2 , are represented on the horizontal and vertical axes, respectively. SS' is an isoquant representing various combinations of inputs (X_1 and X_2) used to produce a certain quantity of output (Y). All points on this isoquant reflect technically efficient production. An effort is made to measure the efficiency of a particular firm, which is operating at a point P . At this point (P), the particular firm produces the same level of output (Y) as produced on isoquant, SS' . To define the technical efficiency of the observed firm, a line is drawn from the origin to the point P . This line crosses the isoquant at the point Q .

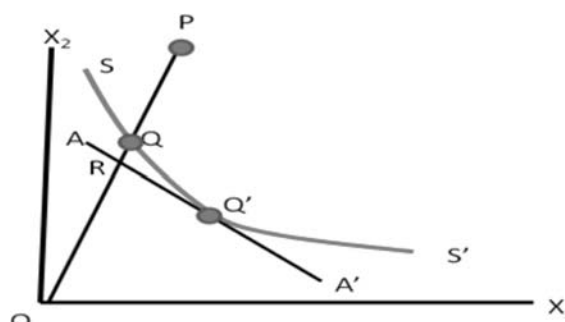


Figure 1.2: Farrell's Measure of Allocative Efficiency

If the input prices are available, allocative efficiency could be defined. An isocost line, AA' , is drawn tangential to the isoquant, SS' , at the point Q' , which intersects the line OP at the point R . For the output quantity produced at the point Q , the best use of inputs is at the point Q' because it incurs the minimum cost.

Resources can be characterized (Olukosi and Erhabor, 1988) into variable and fixed resources. They include land, machinery, farm building etc. (Baumol, 1977) stated that production economics is concerned with optimization and optimisation implies efficiency. Efficiency measurement is important because it leads to a substantial resource savings (Bravo- Ureta and Rieger, 1991). Identification of sources of inefficiency

is important to the institution of public and private policies designed to improve performance (Ogunjobi, 1999).

(Farrel, 1957) observed that technical inefficiency arises when less than maximum output is obtained from a given bundle of factors while allocative inefficiency arises when factors are used in proportions, which do not lead to profit maximization. Allocative efficiency can be measured by using the relation, $MVP_t = b_i \times \frac{\bar{Y}}{\bar{X}}$, (Meena et al, 2012) where MVP_t = Marginal value productivity of inputs for Cobb-Douglas production function, where, \bar{Y} and \bar{X} = are the geometric means of output Y and i^{th} input (X) and b_i is the estimated regression coefficient associated with i^{th} input. Resource use efficiency of inputs measures whether or not the inputs are used optimally. A necessary condition for this is that its MVP should be equal to its price. Mathematically, there exists resource efficiency in respect of the use of i^{th} inputs, if $MVP_i = P_i$, where, P_i is the unit price of i^{th} inputs. In order to examine the resource use efficiency, the MVP of those inputs should be worked out with those regression coefficients which are statistically significant in the estimated production function. Any deviation of MVP of i^{th} inputs from its unit price, are termed as resource use inefficiency. The higher the difference between MVP of an input and its price, the higher is the resource use inefficiency and vice versa. Further t-test is used to test the statistical significance of the difference between the MVP of i^{th} inputs and its unit price. The t-test for this purpose is computed as $t = \frac{MVP_t - P_t}{SE(MVP_t)}$ Where, $SE(MVP_t)$ = Standard error of MVP of i^{th} inputs. Standard errors in case of Cobb-Douglas forms of production function was worked out as $SE(MVP_t) = SE(b_i) \times \frac{\bar{Y}}{\bar{X}}$ Since the mathematical form selected was Cobb Douglas and $SE(b_i)$ is the standard error of estimated partial regression coefficients associated with i^{th} inputs.

D. Analysis of Returns to Scale

If the sum of the first order input elasticities more than 1, this illustrates the existence of increasing returns to scale at the mean. Imposing the restriction (Karna, 2012) that the sum of output elasticities of all

inputs be equal to 1, we can test the hypothesis of constant returns to scale: $t = \frac{(b_1 + b_2 + b_3 + b_4)}{SE(b_1 + b_2 + b_3 + b_4)}$

II. Statement of Problems

The term empowerment has been used more often to advocate for certain types of policies and intervention strategies than to analyze them, as demonstrated by a number of documents from the United Nations (UNDAW, 2001; UNICEF, 1999), the Association for Women in Development (Everett, 1991), the Declaration made at the Microcredit Summit (Results, 1997), (DFID, 2000), and other organizations. Feminist activist writings often promote empowerment of individuals and organizations of women (Sen and Grown, 1987; Jahan, 1995; Kumar, 1993) but vary in the extent to which they conceptualize or discuss how to identify it. Capitalism, top-down approaches to development, and/or poverty itself are seen as sources of disempowerment that must be challenged by bringing "lowers"-the poor and disenfranchised-(Chambers, 1997) into the management of community and development processes. The growth of civil society and participatory development methods at both macro and micro levels of society are usually proposed as the mechanisms by which empowerment takes place (Friedmann, 1992; Chambers, 1997). For example, (Narayan et al., 2000a) focus on state and civil society institutions at both national and local levels, including informal institutions such as kinship and neighbourhood networks. Institutions at the micro level, such as those of marriage and the household, are not considered part of the state or of civil society, but interpersonal gender dynamics within the household are considered part of the equation of social exclusion and in need of directed efforts at change. Every development endeavour should consider the above stated issues and problems faced by the rural women. Patriarchy pervades in our society and is observed in various guises and forms among different castes and ethnic groups. Given traditional gender divisions of labour, women concentrate more on their ascribed reproductive roles and responsibilities while men focus on "productive" income-earning roles. The average work burden of women in Nepal (16

hours) is much higher in rural area. Women lag behind men in literacy and educational attainment. Various forms of violence against women exist in rural area, among them violence based on superstition, such as torture for alleged witchcraft, sexual violence and harassment in some caste, domestic violence, polygamy, child marriage is still prevalent, apart from dowry related violence. Women have only limited access to resources and only limited control over those they can access. Over 70 per cent women are confined to self-employed, unpaid and low-wage informal sector activities. Many women are forced to go to foreign lands (i.e. Yemen, Israel & other middle-east countries, etc). Representation of women in government civil service as well as in political leadership and decision making bodies is nominal and often short-lived due to social stigma, family responsibility and economic hardships. According to the NLSS 2004, of the total landholdings, females own only 8.1 per cent land and the average size of their land is just two-thirds that of an average male holding. Only 4 per cent of the households have female ownership of both house and land, and 7 per cent of the livestock population has female ownership. After the restoration of the democracy in 1990, two local level elections were held in Nepal, but only few women were elected in DDC and VDC chairperson and vice-chairperson in Nepal. We found that the level of women participation in local authorities and institutions is extremely nominal and only fulfils the mandatory provision of Local Self-Governance Act (LSGA, 1999).

The Research problems require addressing the following questions:

1. What are the factors that determine the productivity of beauty parlour business (BPB)?
2. In what ways BPB economically empower women?
3. Are inputs of business optimally allocated?

III. Objectives

The present paper aims to fulfil following objectives:

1. To analyze productivity of BPB;
2. To assess returns to scale of BPB;
3. To examine the allocative efficiency of BPB.

IV. Hypotheses

Following hypothesis is set for the present research study:

1. Inputs shows constant returns to scale in BPB
2. Inputs used in BPB are optimally allocated

V. Significance of the Study

The significance of the research may be stated as follows:

1. Assessing profitability of BPB can have manifold advantages. For researchers, findings may help them to revisit Income Generating strategy to cater to the needs of deprived women.
2. The participants selected in the BPB will get the earning opportunity.
3. It will be extremely helpful for BPE to know how BPB output is affected by various attributes with different intensity. They can take benefit by changing the determinants for improvement in the BPB.

VI. Limitations

The study evaluates women's empowerment issues only through Beauty Parlour Business in Butwal. The factors other than BPB have not been included in women economic empowerment. As in the case of most empirical studies, the results obtained in this study should be considered as relative and not absolute in terms of magnitude. Moreover, the model used is limited in the sense that it does not consider other factors such as risks and market imperfections that can also influence the technical efficiency of farmers. Area of study is limited to only Butwal, Nepal. It does not account of study of Beauty Parlour Training Institutes.

VII. Methodology

Exploratory (qualitative) and Descriptive research design, equipped with econometric tools, are adopted to analyze the empowerment of women through BPB. The women who participate in Beauty Parlour Business are selected for questionnaire interview. Interview is made with 50 BPB Purposive sampling and convenient sampling design was adopted to collect data.

A. Data Analysis Technique

Econometric Method

Following econometric models is applied for analysis:
Model 1: Production Technology Estimation (Estimate of Production Function, on the basis of input)

The production function is given by:

$$\ln Y_j = \beta_0 + \beta_1 \ln X_{1j} + \beta_2 \ln X_{2j} + \beta_3 \ln X_{3j} + \beta_4 \ln X_{4j} + \beta_5 \ln X_{5j} + u_j$$

where \ln designates a natural logarithm and subscripts i and j , respectively, represent the inputs used by BPE $_j$.

Further:

Y = turnover per Year (Rs.)

X_1 = Value of cosmetic/raw materials used per Year (Rs.)

X_2 = rent per Year (Rs.)

X_3 = Value of electricity per Year (Rs.)

X_4 = Value of water provided per Year (Rs.)

X_5 = interest on fixed capital per Year (Rs.)

Model 2: To test whether inputs are optimally allocated

If $MVP_i = P_i$, where, P_i is the unit price of i^{th} inputs.

Where, $MVP_i = b_i \frac{\bar{Y}}{\bar{X}}$. The t-test for this purpose will

$$\text{be computed as } t = \frac{MVP_i - P_i}{SE(MVP_i)}$$

Model 3: Analysis of Returns to Scale

Hypothesis of constant returns to scale (Karna, 2013)

$$\text{can be tested by: } t = \frac{(b_1 + b_2 + b_3 + b_4)}{Se(b_1 + b_2 + b_3 + b_4)}$$

VIII. Results and Discussion

A. Estimation of Production Function

Input-Output Relationship: BP production function describes input-output relationship in BP Turnover. The model is constructed in such a way to remove the effect of heteroscedasticity. To do this, the software GRETL is used which removes the presence of heteroscedasticity present in the data. Cobb-Douglas production function for Input and Output was fitted. Estimation of Cobb-Douglas production function provides the estimates of input coefficients, also known as partial elasticities of output. The result of regression analysis is presented in Table- 8.1.

Table- 8.1

Model 1: Heteroskedasticity-corrected, using observations 1-50 (n = 39)

Missing or incomplete observations dropped: 11

Dependent variable: LNATO

Table- 8.1(i)

Variables	Coefficient	Std. Error	t-ratio	p-value	
const	3.83698	3.89297	0.9856	0.33149	
LNIM	0.576545	0.209175	2.7563	0.00945	***
LNELEC	-0.25169	0.19558	-1.2869	0.20709	
LNDEPR	0.409501	0.371118	1.1034	0.27782	
LNWAT	0.288947	0.132206	2.1856	0.03605	**
LNARENT	-0.0530173	0.0244042	-2.1725	0.03710	**

Table- 8.1 (ii) Statistics based on the weighted data (ANOVA):

Sum squared resid	105.5749		S.E. of regression	1.788642
R-squared	0.536707		Adjusted R-squared	0.466511
F(5, 33)	7.645854		P-value(F)	0.000073
Log-likelihood	-74.75785		Akaike criterion	161.5157
Schwarz criterion	171.4971		Hannan-Quinn	165.0969

Table- 8.1 (iii) Statistics based on the original data:

Mean dependent var	14.33754		S.D. dependent var	0.829664
Sum squared resid	20.21801		S.E. of regression	0.782730

(Source: Author's Calculation, GRETL)

As shown in the model summary, (Table- 8.1 ii), on an average, the inputs used in BP explain 53.6% of total variation in annual turnover of BPs ($R^2 = 0.5360$ and adjusted $R^2 = 0.466$). The model in overall for explaining cause-effect relation was found significant.

The model is statistically significant. In Table- 8.1 (ii), the model confirms F-test to fit the model. Calculated value of F is 7.65 reveals that the regression equation is statistically significant (very low p-value) in explaining the causal relationship between inputs and output. So, null hypothesis is rejected and it implies that all β 's (parameters) are not zero.

(a) Items and Materials

As hypothesized, there is positive relationship noticed between annual turnover of BPs and value of Items and Materials used as an important input of the parlour business. The effect of items and materials is very prominent in explaining the functional relationship in the given form. The value of coefficient of input items and materials (IM) is 0.5765. This implies that 100% increase in the expenses in items and materials causes to enhance the annual turnover by 57.65%. p-value of the coefficient indicates that items and materials is statistically significant at high level ($<.01$). As shown in the functional relationship (1), that it is the items and materials which are most significantly used by the BPEs in providing various services to the customers.

(b) Water

As hypothesized, there is positive relationship noticed between annual turnover of BPs and value of water used as an input of the parlour business. But the effect of water is not very prominent in explaining the functional relationship in the given form. The value of coefficient of input water (W) is 0.2889. This implies that 100% increase in the expenses in water causes to enhance the annual turnover only by 28.89%. P-value of the coefficient indicates that water is statistically significant at 5% level of significance ($p < 0.5$). This reveals the fact that increasing the amount of water BPEs substantially add to the turnover because in

many expensive services of parlour water is used.

(c) Electricity

Against hypothesized, there is negative relationship between annual turnover of BPs and value of electrocity used as an input of the parlour business. But the coefficient of electricity is not statistically significant in explaining the relationship. The value of coefficient of input electricity (E) is -0.2516. This implies that 100% increase in the expenses in electricity causes to decrease the annual turnover only by 25.16%. P-value of the coefficient indicates that electricity is not statistically significant. That is why the impact of electric expenses on the annual turnover can be ascertained well in this research. As shown in the functional relationship (1), the electricity does not play as important role as do the items and materials and fixed capital equipment. This implies that in the beauty parlour many services being provided to the customers do need electricity. So using more electricity means wasting of money resulting into reduction in turnover.

(d) Depreciation

A part of fixed capital investment is deducted from the value of fixed investment. This is known as depreciation. This shows that the capital equipment needs to be replaced after its life period is completed. So depreciation is important in business. As hypothesized, positive relationship is noticed between annual turnover of BPs and value of fixed capital of the parlour business. That is why the effect of fixed capital is very prominent in explaining the functional relationship in the given form. The value of coefficient of input depreciation (D) is 0.4095. This implies that 100% increase in the amount of fixed capital used in the BP business causes to enhance the annual turnover only by 40.95%. This is because like other capital intensive business where machines and other capital equipment plays vital role, the beauty parlour business however not being highly capital intensive business the value of coefficient of the parameter is very high. P-value of the coefficient indicates that fixed capital is not statistically significant.

(e) Rent on Parlour Rooms

Only 76% of the sampled BPEs are running on the rent and others have the parlour in their own buildings. As hypothesized, there is positive relationship is noticed between annual turnover of BPs and value of Rent on Parlour. This means greater the space higher will be rent and more place for attending the customers resulting into higher annual turnover. However, higher rent also may be associated with good location resulting into greater profit. But the effect of rent expense is very low in explaining the functional relationship in the given form. The value of coefficient of parameter rent (R) is 0.0530173. This implies that 100% increase in the expenses in rent results into increasing the annual turnover only by 5.3%. P-value of the coefficient indicates that rent is statistically significant at 5% level of significance. This reveals the fact that only increasing the expenses of rent BPEs cannot contribute increase in the turnover in a substantial manner.

The discussion on this section reveals that in the beauty parlour business, the input items and materials, capital equipment, water are most vital for yielding a good turnover, however other inputs also have its own importance.

B. Analysis of Returns to Scale

Returns to scale refers to the study of the behaviour of output of the firm when all the inputs are varied simultaneously in the same proportion. H0: If the sum of the first order input elasticities is less than 1, this illustrates the existence of decreasing returns to scale at the mean.

In Table-8.2, for samples survey, sum of input elasticities $\Sigma bi = 0.9702$ indicates that 100% increase in all the inputs in used in beauty parlour would result into 97.02% (almost 100% constant returns to scale) increase in annual turnover of the BP.

Table-8.2: Returns to Scale

Coefficients (bis)	Se (bis)
0.57655	0.20918
-0.2517	0.19558
0.4095	0.37112
0.28895	0.13221
-0.053	0.0244
$\Sigma bi = 0.970286$	$\Sigma SE(bi) = 0.932483$
t	1.04054

Source: Author's calculation

But the calculated value of $t = 1.04054$ while critical value of t is 2.012 (df=46) at the level of significance 5%. Since calculated value of t is less that the critical value of t , therefore the null hypothesis is accepted. This implies that the law of decreasing returns to scale operate in beauty parlour business as this business is not entirely capital intensive business.

C. Analysis of Allocative Efficiency

Allocative (or price) efficiency measures firm's success in choosing optimal proportions, i.e. where the ratio of marginal products for each pair of inputs is equal to the ratio of their market prices.

Table -8.3 Allocative Efficiency

	RENT	DEPR	ELEC	WAT	IM	ATO
(bi)	-0.0530173	0.409501	-0.25169	0.288947	0.576545	
GM	73252.73	8571.079	7314.612	1981.333	379959.2	1618545
MVP	-1.17144	77.32933	-55.6929	236.0399	2.455959	
Se(bi)	0.539219	70.08116	43.27708	107.9987	0.891041	
t(bi)	-2.17247	1.103425	-1.28689	2.185582	2.756281	t (critical)=
						2.014
Pi	1	1	1	1	1	1
Comparison	MVP<P	MVP>P	MVP<P	MVP>P	MVP>P	
Allocative efficiency	over utilized	underutilized	over utilized	underutilized	underutilized	

Source: Author's calculation

Geometric mean of inputs and outputs calculated is shown in row (GM). Similarly, computations of Marginal Value of Productivity of inputs (MVP), standard error of (bi) are shown in the table. In Table-8.3, it can be noticed that Marginal Value Productivity of the inputs Water (WAT), Items and Materials (IM) and rent (RENT) are found statistically significant at the level 5%. Since the coefficient of rent and electricity are negative, it is kept out of analysis, because negative value of coefficients reveals that if input amount is decreased by BPEs, annual turnover can be increased. Comparing MVP and the unit price (=1), it can be seen that all the statistically found inputs, viz, fixed capital, water and items and materials are underutilized (MVP>P). This implies that all annual turnovers can be increased by better utilization of available amount of the inputs such as water, fixed capital equipment and items and materials of the BPs. The analysis also reveals that the BPEs do not require incurring additional cost on the inputs but only better utilization of available underutilized inputs can bring greater turnovers.

IX. Conclusion

This study provides estimates of Beauty Parlour

production functions as they relate to level of output and amount of inputs. The over-all purposes of this study were to develop certain mathematical concepts relative to economic productivity of inputs in BPB, to provide estimates of marginal rates of substitution among inputs and to determine other relationships basic to the evaluation of materials and other inputs. It had the auxiliary objectives of relating these turnover-inputs relationships to certain Beauty Parlours and business environmental characteristics. Except the input Electricity, all other inputs depict positive relationship between the value of input and turnover. This implies that the turnover can be increased by increasing the inputs like cosmetics and materials, fixed capital etc in order to meet the increasing demand of the customers and to increase the revenue of parlour. Analysis of returns to scale shows that by increasing all the inputs simultaneously, output can be increased at almost same rate. This is also an advantage to the parlour business. The study of allocative efficiency implies that annual turnovers can be increased by better utilization of available amount of the inputs such as water, fixed capital equipment and items and materials of the BPs without increasing the cost of production.

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