The approach of stochastic frontier analysis for determining technical efficiency of Date gardens in Bam

Samira Amirzadeh Morad Abadi

1. MSc in Agricultural Economics, University of Sistan and Baluchestan, Iran

Corresponding Author email: amirzadehsamira@gmail.com

ABSTRACT: Dates in the city of Kerman is one of the strategic products. Given that this product has a large role in the employment of people in this country. In as much evaluate the performance of the product is important. In this paper, using stochastic frontier techniques to evaluate the performance has been in the city of Bam. The results show that the performance of palm planters in the city is about 71%. So they can optimize their performance increased by about 30%. The tension has been discussed in this paper and the proposals in the paper Dates workers are improved.

Keywords: palm growers, bass, stochastic frontier techniques

INTRODUCTION

Understanding the possibilities and constraints of agricultural sector in Iran, can be help to increasing production and revenue with using factors correctly of maximization production with fixed inputs. Farmers are looking to minimize the variance of income and profits. Thus, improving the efficiency and resource allocation is necessary. Applied model in this study is stochastic frontier production and elasticity production input sin developing and developed countries, due to resource constraints in food production and food needs of growing human populations, agricultural operators can measure efficiency, the gap between the best producer and other producers in similar Constance technology set. Determining efficiency of farmers can be used in analysis of agricultural policies.

Experience Research

Nicest and Almeria (2005), use technical efficiency of tobacco farms in southeastern Antalya with both a comprehensive data analysis and stochastic frontier analysis.


Tour (2010) efficient farmers in Western Australia use Stochastic Frontier Analysis.

Croppenstedt (2005), wheat farmers in Egypt in technical efficiency using stochastic frontier analysis.

METHODS OF RESEARCH

In this lecture, technical efficiency have been studied with (SFA) parametric method to achieve the objectives, the extraction, the difference regression model were estimated. Then stochastic frontier production is estimated. So lack efficiency random is estimated to linear form, that both of these models using maximum likelihood.

Data collection

Questionnaire was used to collect information and needed data to evaluate the efficiency of Date gardens was collected from year statistical community 2009- 2010 To achieve better results, the information was collected in city, and then homogenization and the objectives is looking for the area study. A typical method of making the cluster is the one–stage cluster of Date farmers in the city of, and.
\[ Y_{it} = f(X_{it}, \alpha) \exp (\varepsilon_{it}) \]

In this model, \( Y_{it} \) is the garden product \( i \) for time \( t \), the vector \((k \times 1)\) of production inputs and other explanatory variables \( \alpha \) is one vector \((1 \times k)\) of the unknown parameters to be estimated, \( N \) number of observations and \( t \) is the number of periods. \( \varepsilon_{it} \) compound sentence of error is defined as follows (Tan et al., 2010; Khan et al., 2010):

\[ \varepsilon_{it} = g(X_{it}; \beta)V_{it}-h(X_{it}; \delta)U_{it} \]

\[ E \left( \varepsilon_{it} \right) = 0 \]

\[ Var \left( \varepsilon_{it} \right) = \sigma^2 \]

\[ \varepsilon_{it} = \sigma \exp \left( -\frac{\varepsilon_{it}}{\sigma} \right) \]

\[ \alpha = \left( \begin{array}{c} \alpha_1 \\ \vdots \\ \alpha_k \end{array} \right) \]

\[ \beta = \left( \begin{array}{c} \beta_1 \\ \vdots \\ \beta_k \end{array} \right) \]

\[ \sigma^2 \]

\[ \sigma \]

\[ \text{RESULTS AND DISCUSSION} \]

In the present study, three types of Cobb Douglas function, Transndntal (transcendent) and Translog (transcendental logarithmic) as well as possess the classical features was estimated by the software Eviews6. Estimated coefficients for these functions is necessary the become a simple linear form can be found with the logarithm of these functions (Deserting, 1376).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>54.72***</td>
<td>55.64</td>
</tr>
<tr>
<td>Lnx1</td>
<td>9.91***</td>
<td>12.66</td>
</tr>
<tr>
<td>Lnx2</td>
<td>0.33</td>
<td>-0.42</td>
</tr>
<tr>
<td>Lnx3</td>
<td>-10.1***</td>
<td>-10.8</td>
</tr>
<tr>
<td>Lnx4</td>
<td>4.41***</td>
<td>4.99</td>
</tr>
<tr>
<td>Lnx5</td>
<td>-6.21***</td>
<td>-9.99</td>
</tr>
<tr>
<td>Lnx6</td>
<td>27</td>
<td>0.31</td>
</tr>
</tbody>
</table>

Source: research Findings (* and ** and *** respectively significant at 10, 5 and 1% of showing)

The Test Model Assumptions to Estimate the Technical Efficiency

The third hypothesis suggests that The inefficiency effects model variables such as farmer’s age, education, experience, size of household, Attending promotional activities of Date grown, the gardens, the trees, the number of units in garden plots on technical efficiency levels were not affected in this study. Note that each of these variables was tested separately can impact on the critical values and levels of technical efficiency. The results in Table shown Maximum likelihood estimator of the null hypothesis was rejected in each city and the variables considered on the level of technical efficiency effects are subjects.
X_1 inputs used in the production of Dates, including land (X_1) per hectare, hire labor (X_2) per day - person, the working family (X_3) per day - person, the frequency of irrigation (X_4), animal manure (X_5) per kg and fertilizer (X_6) per kg part V_i.

This direct relationship between this variable and cannot prove efficacy. This is confirmed in this only those who are working at jobs Dates, spent more time on this work and, have more technical efficiency. The negative coefficient on this variable indicate that technical efficiency increases within increasing number The number of plots (Z_6): The relationship between these factor sand the efficiency is only sign if cant for the city this variable indicates, that inefficiency increases when size garden and higher technical efficiency is reduced. Table 3-Results of the estimated production elasticity of input sin the region of Bam. The results indicate that variables of the farmer-sage, household size, number and size of garden plots with Date production, have sign if incant relationship with in efficiency in the city of. While in city of, the size of house hold and non-Date grown, variables and, variable of Date garden is found sized in, garden sign if incant relationship in efficiency: Table(2) to examine these factor sire addressed. Farmer age(Z_1): effect coefficient of age is negative and significant on the efficiency in the city of., While there is the lack in efficiency of, and, any significant effect. Therefore, this factor shows that age and Technical in efficiency Date Growers in city of, have an inverse relationship with.

In other words, technical efficiency of Date grower has increased when age increase, in city of., Infect, older farmers may have more experience in producing. Are efficient. Experience (Z_3): The relationship between these factors and in efficiency is sign if incant to tine acidity. The negative coefficient on this increasing age, experience, and squinty increase the technical efficiency has increased: Table (2) to examine these factors are addressed Farmer age (Z_1), effect coefficient of age is negative and significant on the efficiency in the city of, while there is the lack in efficiency of, and, any sign if incant effect. Therefore, this factor shows that age and Technical inefficiency Date growers in city of have an inverse relationship with. In other words, technical efficiency of Date grower has increased when age increase, in city of. In fact, older farmers may have more experience in producing, and thus they are efficient. Experience (Z_3): The relationship between these factors and in efficiency is sign if incant tine each city, the negative coefficient on this variable indicates within increasing experience, reduce in efficiency and increased efficiency as the age variable as explained by increasing age, experience, and consequently increase the technical efficiency has increased Household size (Z_4): The relationship between these factors and the efficiency is significance only for the city of, and,. The negative coefficient indicates that technical efficiency increases with higher household size this inverse relationship is between family size and inefficiency. It has been interpreted in the elasticity. This variable is sign if incant for the city Helm and Business activities other than Dates (Z_5): a positive coefficient of this variable is sign if incant only in the city, that Shows who do have job so there than Dates have been less of technical efficiency.

Table (5) Frequency distribution of Date grower sin the various levels of technical efficiency in the region of Bam. Table(5) of the minimum values, maximum and average technical efficiency in the three city study shows Farmers can reduce the difference inefficiency between the efficient operation and other Date growers in the city’s average technical efficiency of, Helm and the, respectively 16.22 and 19 percent improved. It can be used without major changes in technology and resources has increased only through farmers ‘technical efficiency, production a lot.

**Suggestions**

Planning and conversion industries related to the excess supply of Dates and creating added value at the time of product purchase creating and string the nine in restructure facilities required such as roads, transport, storage. The results of this study, the following suggestion sire offered to improve the efficiency of Date growers. Results showed that the experienced gardener who has a positive effect on technical efficiency, there for ebetAINED to transfer their experience stone farm through extension classes. Between variables, education and advocacy attending technical and relationship with economic efficiency, there Was no sign if cant, so should be the level of quality and quantity of class room science taproot eager culture and farmers, adequate and proper supervision. Review so the results revealed gardeners are not optimally treated in use of hire labor inputs, so it should conduct extension services of arm arson the efficient use of inputs and employing experienced and trained work force to increase their production. Government support for manufacturers, to monitor prices and banking facilities, providing can be improved market access requirements for production and supply of Dates Study Factors affecting efficiency Field studies showed the factors studied except other factor salsa affect the types of efficiency. The basic strategies for success Manu factories and the revenue and their strategies for success s essential, cooperative Union of Dates in the region to improve the timely supply market, and credit insurance products.
REFERENCES


