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Production Cost Analysis of Indonesian (South Sulawesi) Local Food

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Abstract:
Background: *This research aims to determine the effect of spices, main ingredients, packaging tools, and output on Indonesian (South Sulawesi) local food cost of production. This research also calculates the profit maximization condition to reach the sustainability of this business.*
Materials and Methods: *The research was firstly conducted and intending to have a set of experimental data. The production run was done in 13 times. In this research, the cost analysis must be firstly applied. Then a linear regression applied for getting cost function type in order to know further about the economic scale.*
Results: *The results show that there are only two significant variables, i.e., packaging tools and output. The total cost of this business could be inferred that still inelastic both on input prices and the output.*
Conclusion: *There is an indication that the output needs to be increased further.*
Key Words: *Local Indonesian Food; Cost of Production; Profit Maximization.*

I. Introduction

In facing Asean Economic Community (AEC) era, there are increasingly the need to lift local food, i.e., "*palekko*" menu which is guaranteed to be more healthy and kosher content and to be well known by the wider community, especially for Indonesian teenagers. *Palekko* in *Bugis* ethnic language means a pan made by clay. The "*palekko*" menu is based on duck or chicken and mixed with matching spices. To run this business, the "*palekko*" menu was customized by presenting 5 different levels of spiciness such that: 1. Falling in love, 2. Clapping one hand, 3. Rejected love, 4. Breaking Love, and 5. Died Dead. The product has also been considered in such a way to create an unusual brand that could be a magnet to attract consumers.

Food industry is well known as one of the technological developments form. Food industry is an effort to produce every special combination of raw materials that become a thing that ready to consume or placing in the market. Food industry is considered to be an important one because it can be a business chance either for a big or small company. This food industry can also give more employment opportunities for societies.

Entering to the food industry, however, needs a brand and a unique taste to retain segmented market. It then needs every specific marketing strategy such as STP strategy and others[1,2,3,4,5,6,7]. This paper was firstly employed the powerful of cost function analysis[8,9]. The finding of this study reveals about the solution for entering into the food industry and the amount of production should be in the large scale and indeed the food industry tend to be a monopolistic competition[10].

II. Material And Methods

The research was firstly conducted and intending to have a set of experimental data. The production run of "*palekko"* was done in 13 times. This research is supported by the Indonesia Minister of "*Ristek Dikti"* with Student Creativity Program. The program is then giving the student of Hasanuddin University a chance to run business in Makassar City, Indonesia.

In this research, the cost analysis must be firstly applied. Then a linear regression applied for getting a cost function type in order to know further about the economic scale, the relevant of average and marginal cost function. Total production cost was then regressed on three nested independent variables of input prices such that, W_1 consist of the average price of all the spices and rice, W_2 consist of the average price of the main ingredients, i.e., duck and chicken or a mixed of them, and W_3 consist of the average price of all marketing and packaging tools; and the independent variable of output (Y). The results of this procedure can explain the strategy for the sustainability of this business.

III. Results and Discussion

Cost Analysis and Economic Scale

In analyzing the cost of production, Cobb-Douglas type of cost function can be directly expressed in Equation (1), is as follow,

$$C = c_0 W_1^{\beta 1} W_2^{\beta 2} W_3^{\beta 3} Y^{\beta 4} e^{\mu} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Where C represents as total cost, W_i is the average input prices of the i[th] input used, Y is the total unit of output and e is the natural number and μ is random terms. The liner estimation equation for the cost function can then be expressed by taking natural log of Equation (1) is as follow,

$$Ln\ C = Ln\ c_0 + \beta_1\ Ln\ W_1 + \beta_2\ Ln\ W_2 + \beta_3\ Ln\ W_3 + \beta_4\ Ln\ Y + \mu \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

Where Ln $c_0 = \beta_0$ represents as the parameters of constant cost. $\beta_i,\ i = 1, 2, 3, 4$ is the elasticity parameters of input prices and output on the total cost. The OLS estimation results of the Equation (2) are reported as shown in Table 1.

Table 1: Cost Function Estimation Results.

Independent Variable	Regression Coefficient	t-Statistic	Probability (α)
Constanta (Ln $c_0 = \beta_0$)	9.049	2.016	0.079
Spices (Ln W_1)	-0.189	-0.402	0.698
Main Ingredients (Ln W_2)	0.004	0.080	0.938
Packaging Tools (Ln W_3)	0.318	2.245	0.055
Output (Ln Y)	0.898	2.733	0.026
α = 5%; R^2 = 0.574; adjusted R^2 =0.361; N = 13 F-statistic = 2.691; Prob (F-statistic) =0.109[a]			

The regression results (Table 1) show that there are only two significant variables, i.e., packaging tools and output. It means that when there is 100 percent change in the average price of packaging tools, the cost of production would lead to increase by amount of 31.8 percent and likewise with the 100 percent change in output will lead to change the cost of production by 89.8 percent. The total cost of this business for "*palekko*" could be inferred that still inelastic both on input prices and the output. There is an indication that the output needs to be increased further. However, if there is an increase in output in which it will still to pushing up the cost of production, then it would means that the production was not in optimum scale yet[8,9,10,11].

One should note in this business experiment that all the labor cost were not included or need not to be accounted for the cost of production. The nested independent variable of average input price for spices and main ingredients are also reported insignificant to affect the cost of production. So only the packaging tools and output become the relevant independent variables, i.e., that those two variables should be empirically inserted into the total cost function. The result of the cost function from estimating Equation (2), after getting the anti-log of Ln $c_0 = \beta_0$ into the parameter of c_0, take the form is as follow,

$$C = 8510.02364\ W_3^{0.318}\ Y^{0.898} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

From the empirical cost function of Equation (3), average cost (AC) and marginal cost (MC) function can then be derived consecutively are as follow,

$$AC = \frac{8510.02364\ W_3^{0.318}}{Y^{0.102}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

And

$$MC = 7{,}642\ W_3^{0.318}\ Y^{0.102} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

Theoretically the marginal cost function will intersect with the average cost at it's the minimum point (Varian, 1992 and 2010) and the solution of this MC = AC (when at minimum point of AC) condition can measure the economic scale of output. In this empirical case, however, the minimum economic scale of output was not an important thing to be determined as main target[1,2,3,4,5,6,7].

Profit Maximization

Profit maximization is reached by the highest profit attains from changing revenue with an additional output equal to marginal cost, MR = MC. In perfect competition, the maximum profit condition become price equal to marginal cost, P = MC. From Equation (5), the condition of profit maximization can be expressed into Equation (6), is as follow,

$$P = 7{,}642\ W_3^{0.318}\ Y^{-0.102} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6)$$

From the Equation (6), this condition of profit maximization requires every large scale of output with the applied perfect competition price level at the amount of Rp. 14,000,-, i.e., about 14,456,223.1 units of output; using the average of input price for packaging tools, W_3= Rp. 1,328.672. This result indicate the possibility for professional large scale enterprises to enter in this kind of food industry.

Indeed, this experimental marketing was originally proposing the breakeven point (BEP) price level around Rp. 9,843 with market share targeting on 600 units of output a months (1,200 units in two months project). In fact, in the 13 times production run that the business tried out have been enabling to produce around 786 units that in average of 60,5 units with BEP price level about Rp. 7,341,5 and the actual selling price of Rp. 14,000

should be then considered to be more competitive one. This price standard can be considered to reflect the general willingness-to-pay for the Indonesian teenagers[2,3,7,12].

IV. Conclusion and Suggestion

This study indicates the possibility role of large scale enterprises in exploring market share and profit maximization in the food industry without any constrain on the development of food technology. Marketing matters in such that the packaging tools could be significantly determined the cost of production and the price decision as well. The study suggests that the entrepreneurs who are interested to enter on this local food industry should be a professional one by conducting a large scale business.

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