The Modeling of Car Cost & Revenue and Best Profit in Manufacturer on Economics

Run Xu1,*, Jiaguang Liu2

1Gyeongsang National University, Metallurgical Engineering Dept. Chinju 52828, Korea
2Yantai Institute of Technology, Mechanical Electrical Dept., Yantai 264005, China

*Corresponding author: Run Xu

Abstract: The relationship between revenue and cost is established to find the intrinsic nature with integrated Cobb-Douglas function. It is found when the best labour is 98 the cost is low and the number of cars are 1.1 with the best profit intersection of 41 thousand Yuan which is best profit point with integrated method. When the best capital is 498Yuan the profit point is 1.1 of the number of cars with the 40 thousand Yuan too. The intersection of pieces and value between profit and cost attains 0.9 and 1.16 pieces with 32 and 41 thousand Yuan at the best capital and labor respectively. This is the important one in the course of profit. It is transferring the start and end point. Generally this point is regarded the best profit begins and may be chosen as the best profit. Meantime in the scope of P_A and P_C it has 0≤APROFIT≤AC. P_A and P_C it has AC≤APROFIT≤AR and ≥P_AR it has APROFIT ≥ AR. So the best profit has been accessed P_AR the average profit is bigger than AR ie.APROFIT ≥ AR. It is the last one mentioned above if manufacturer has enough investment capital and technique workers. The Cobb-Douglas Function has been a limited for example the the precision matter that makes the modeling a certain thing.

Keywords: Modeling; cost; cars; revenue; best profit; manufacturer; economics.

1. INTRODUCTION

The revenue product is a behavior with investing certain money and requiring revenue from investment and product in market. This process includes sale product in order to form the profile of product so it is a process which completes this function in whole process. The profit is calculated through revenue and cost is an important factor in this process. In this paper the revenue has been computed and drawn from their relation with cost. The revenue AC, AVC & AFC and product is investigated for searching their change in these processes. For the better benefit it must be studied further it can gain the profit use. Since the stability is key as for this procedure. How we can define stable and low cost parameter is significant matter. For the inference the different drawing between profit cost and quantity is made to analyze the change and low cost situation in this study. The constant labor L & capital K is defined to fit to cost value for this process.

The least total cost and the biggest total product has an important role with the quantity & labor. Because the least one is evaluate the cost per labor under the best labor and capital on economics. If the cost is big it will increase cost burden. Only if the least cost can decrease the cost price and the reasonable choose may be used in determining the total cost. Because of its availability it may be chosen for other factor such as the random price promotion. In this paper the revenue is adopted from higher value to check the piece and the cost value. So as to higher revenue the low cost value and low pieces is necessary. For the sake of the least total cost the best labor and capital has been established firstly and then determined the least total cost equation with quantity and labor [1-5].

In this study the integrated Cobb-Douglas function is adopted to solve the whole field of profit curve in order to observe the best profit and piece change to dig the deep relationship between them. It is found that the good relationship exists in them no matter how the condition may be changed. It is available to solve the best profit matter which distresses us many years with the Cobb-Douglas function to compute the technical problem. In many field the exponential function has been a certain role in calculating the important technological function. But due to the complication the precise may be met serious
challenge. Now the precise may be less than the prediction the good result is gained by us in this paper. The erroneous investigation needs to be checked again to adopt it for us to solve in further research. Our destination may be the search the erroneous degree and correct scope to meet its calculation demand in future. For example the Cobb-Douglas function sometime loses its virtual value with logically become another one. Those need to be searched again and find the error cause to further utilization better. The related profit has been analyzed according to their functions of integrated transfer. The biggest efficiency results are concluded as in this study and detailed data content is stated as below later discussions. Up to now all of the efficiency is clarified in terms of the different scope between all of turning points. So it is judged that the detailed value in each piece for goods is been clarified according to this data. This function may apply to all of goods for company and consultant which has been significant thing.

2. MODELING AND DISCUSSIONS

The modeling of car has been established according to modeling with economic equations that has a certain role in stock market. So Cobb-Douglas function is used to complete the modeling.

The detail establishment and modeling is as related literature.

The Cobb-Douglas function is

\[ Q = \gamma L^\alpha K^\beta \]  

Here Production quantity Q; \( \gamma \) is technique coefficient; \( \alpha \) is producing labour; \( \beta \) is capital elasticity. K is capital; L is labour; AFC is average fixed cost; AVC is average variable cost; AR is the average revenue; TR is total revenue. The calculated constant is \( \gamma = 0.02; \alpha = 1.2; \beta = -0.26 \) respectively. Since

\[ AC = dTC/dQ = P(Q/\gamma)^{1/\alpha - 1} \cdot 1/\alpha \cdot K^{-\beta/\alpha} \]  

Because

\[ A\text{Profit} = \int (AR - AC)dQ = AR - P(Q)^{1/\alpha} \cdot \gamma^{1-1/\alpha} \cdot K^{-\beta/\alpha} \]  

It has

\[ T\text{Profit} = A\text{Profit} \cdot Q \]  

The parameter \( P_l \) is labor price and \( P_k \) is capital price. It is supposed that former and later one is 50Yuan. profit is in terms of 50Yuan Q is piece of product. TC is total cost; Aprofit is the average profit; Tprofit is the total profit. The parameter of constant value with labor and capital & quantity may be seen literature. It is chosen that 10groups value to acquire average ones. The detail narration is expressed as below.

It is found when the best labour is 98 the cost is low and the number of cars are 0.9 with the intersection of 30 thousand Yuan which is profit point from Figure 1(a-b). When the best capital is 498Yuan the profit point is 0.9 of the number of cars with the 30 thousand Yuan. So the balance value is 30~40 thousand Yuan which could be satisfactory with both situations because the average revenue can’t be intersected with average cost line in the case of the best labors. It is regulated that the capital and labor price is from 50 Yuan to 500Yuan both in Figure 1(a) so the intersection is formed.

As seen in Figure 1(a-g) the average profit meets 0.9 with average curve and it meets 30 thousand with the average curve respectively. It means that only if excess these points the best profit which subtracts the deficit will be formed the more value excesses these points the more profit will be produced. Meanwhile the total profit will be bigger than average profit. If it has bigger revenue and less cost the best profit may increase. The difference of them is bigger the bigger best profit will be obtained. Figure 1(b&d) is the multiple part and it may be detailed and observed carefully to see the best profit trend with 498 Yuan capital and 98 labors respectively. It is concluded that the Profit point is named as P as seen in Figure 1(b,d&f) may be observed whose value is about 40 thousand. It expressed that the better consistent with above three amplitude graphs by integrated from Cobb-Douglas function. Meantime the best profit value has been also defined as this value of 40 thousand and 1.1 pieces. It is evident that the method is available and very precise. So for the sake of best condition it is feasible to with this function to solve the best profit condition under best labor and capital. According to three coefficients i.e. \( \gamma \), \( \beta \) and \( \alpha \) the best condition with Cobb-Douglas function the best profit point may be solved. If the piece and revenue amount excesses this quantity the better profit may be obtained because they are the total profit i.e Aprofit=\( \int_0^Q (AR - AC)dQ \) with this point. We can gain the 42 thousand at least in this P point. Tprofit is bigger than this the larger profit can be made in this study.

On the other side the intersection between profit and cost is transferring point of profit. Here Aprofit=AC= \( \int_0^Q (AR - AC)dQ \) so \( \int_0^Q AR = AC + \int_0^Q ACdQ \). it is the course of profit to be formed. According to Figure 1(b,c &f) the pieces is 0.9 and 1.16 with the best capital and labor and the value of profit is 32 and 42 thousand respectively.
(a) $K=498$ Yuan; $P_l=P_k=50$ Yuan; $L=10,20,...,180$ Yuan

(b) $K=498$; $P_l=P_k=50$ Yuan; $L=10,20,...,180$ Yuan

(c) $L=98$; $P_l=P_k=50$ Yuan; $K=200,250,...,1250$ Yuan
(d) $L = 98; P_l = P_k = 50$ Yuan; $K = 200, 250, \ldots, 1250$ Yuan

(e) $K = 498$ Yuan; $P_l = P_k = 50$ Yuan; $L = 10, 20, \ldots, 180$ Yuan

(f) $K = 498$ Yuan; $P_l = P_k = 50$ Yuan; $L = 10, 20, \ldots, 180$ Yuan
As seen in Figure 1(e&g) the total profit may increase when the quantity increases. The total profit curve and total cost may intersect at 0.9 and 1.15 pieces. This is the profit point which.

Means that once the value of total profit exceeds this point the best profit may be acquired. it will produce the best profit subtracting the loss of cost due to quantity deficit. On the other side the value is not different with the Pk=50 and Pl=50 under capital and labor difference from L=10,20,...180Yuan to K=200,250,...1250Yuan. It expresses that the common property is still the same as no matter what they are.

In general the profit will intersect with AR and AC so it is benefit to us if the profit point is big. The biggest product profit will be in the condition of intersection between profit and AR. The bigger one may be the condition of intersection between profit and AC. In Figure 2 the points have been shown, the three functions are Aprofit, AR and AC. The three main points are PA named as absolute Aprofit called as average profit, P_AR and P_AC. In the points of them they are absolute average profit=0, Aprofit=AC and Aprofit=AR while in the scope of PA and P_AC it has 0≤Aprofit≤AC, P_AC and P_AR it has AC≤Aprofit≤AR and ≥P_AR it has Aprofit≥AR. The 1.1 and 40 thousand is the P_AR point any pieces excess 1.1 that says that Aprofit≤AR. Meanwhile the 0.9 and 30 thousand is the PAC point any pieces exist in the two PA and P_AR points may produce Aprofit≥AC. In the end 0.1 and 35
thousand is the $P_{AA}$ point that means that the one
excesses it may produce $Aprofit \geq 0$. As seen in Figure
2 the all of the three points which exists in the scope of
them may form different one. When the pieces increase
the average profit may be larger. The efficiency and
profit turn is $P_{AR} \geq P_{AC} \geq P_{AA}$. The best efficiency is 1.1
pieces and 40 thousand which lies in PAR point any
investment that is larger than it will gain bigger
efficiency than 40 thousand Yuan. If its investment is
increased to 1.1 pieces each minute the accompanied
device, person and investment is huge because the 0.25
pieces is usual situation per minute. They are near 4
times device and person investment so it is needed
careful thought and decision. It is proceeded in other
study for the limited investment for consultant and
company. So the better one is between $P_{AA}$ and $P_{AC}$
whose piece is from 0 to 0.9 pieces and whose
efficiency is from 0 to 30 thousand Yuan each minute.
The precise error isn’t checked yet, the 0.9 pieces
somewhat big for company. If it is decreased to a low
one for example 0.5 etc. It may apply to reality but now
we can’t judge its precise and error. So it is theory
model according to Cobb-Douglas Function ultimately.

3. CONCLUSIONS

The relationship between profit and cost has
been established to find the profit and piece. It is found
the 1.1 pieces is the best one at best labor of 98 and
capital of 498 Yuan & profit of 40 thousand Yuan.
Meantime 0.9 and 1.16 pieces is the course profit point
with 30 and 42 thousand Yuan profit at the best capital
and labor respectively.

The profit will increase from 0 to 120 thousand
with the pieces increasing from 0 to 3 with the best
capital. The one may be from 0.3 to 60 thousand with
the piece is from 0.3 to 1.5 in this study. While the
points is in the scope of PAA and PAC it has $0 \leq
Aprofit \leq AC$, PAC and PAR it has $AC \leq Aprofit \leq AR$
and $\geq PAR$ it has $Aprofit \geq AR$. The all of the three
points which exists in the scope of them may form
different one. When the pieces increase the average
profit may be larger. The efficiency and profit turn is

$PAR \geq PAC \geq PAA$. The better one is between PAA
and PAC whose piece is from 0 to 0.9 pieces and whose
efficiency is from 0 to 30 thousand Yuan according to
Cobb-Douglas Function. The Cobb-Douglas Function
has the problem whose precision isn’t investigated yet
by now. So referring to this problem has been deep
investigated further later. The two value with the best
labor and capital is different from each other. One is 0.9
pieces and the other is 1.1. Thereby the 0.9~1.1 pieces
is considered in this paper. On the other hand 32
thousand and 40 thousand may be the correspondent
capital respectively. With the same method the 32~40
thousand is the scope we choose. The consistency with
each other is needed to study more for example above
two groups value. Only if the consistency may be
clarified to a certain degree can it be used to application
to solving cost matter really by university professor,
researcher and interesting ones. The best profit may be
attained as the value is bigger than AR that is
intersection of point PAR. The more value has been the
bigger profit may be acquired according to this paper.
The value for best profit is 1.1 pieces for quantity and
40 thousand for capital no matter what it is the best
capital or labour.

REFERENCES