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Modelling of Cost and Labor and Capital in Motor Housing Punch at Microeconomics

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Abstract

With regards to the assembly line of cost control of micro economy will be necessarily respected. The cost and labor L and capital K is to discuss and search in detail. The TC and AC is built through modelling in this paper. It is found that L will incline cost while K will decline it. K is effective than L at low cost. The best L=5 and K=23 which is calculated in terms of the product. The product is 4 for one worker. The curve is solved to discuss in detail. If the Q inclines TC and VC will incline as well meantime AC and AFC will decline which fits to the logic. But the FC declines while AVC even AC inclines in opposition. It explains that AVC results the per worker wage to incline at L=2, 4 and 6. K has more role than L.

Keywords: Modelling; Component; Micro economy; TC, FC and VC; AC; AFC; AVC; L; KQ

Introduction

Because the highest price mould and equipment is used in motor housing punch with punch machine and specially the automatic flow line for it consumes the mould and equipment price for many years. That said that the consumption of equipment needs more than three years to recover its expense. Firstly the cost control is needed. Secondly, the engineering model for process with flow line in main respects of its process is needed to building simultaneously. Here the cost is gained and discussed only. For instance, the specialist related company adopts their scientific modelling results and compares with before and after the control is done in details, so that a cost value can be obtained by specialist. Then they can ensure machine lifespan, not only excessive wearied, but also so fast that we don't make machine equipment breakdown for maintenance in long time [1-2]. The economic efficiency of mould and raw materials is important factor in automatic industry so that we can discuss this factor for the modules' benefit. The cost terms of TC (Total cost) and AC (Average cost) etc. is concept in micro economy. They affect the firm's benefit so it is important one. If a accountant can draw the curve for comparing and analysing the company will be convenient to deal many things. Because the parameter is needed to acquire fit to status the reliance will be questionable. [3]So the parameter is to be needed to investigate and solve the precious problem. Overviews the concept is solved through the modelling and used to practice is significant. It has applied to firm management and evaluation in a Morden corporation as soon as possible. Scientific evaluation will help corporation to precious investment and reasonable planning so as to grow up a strong one in urgency. In this study the TC, VC(variable cost), FC(Fixed cos) and AC, AVC, AFC etc. is investigated and it is adopted that the constant L and K is used to gain the curve to search them of intrinsic relationships. Moreover L (labor) and K (capital) is calculated for best of them and the near value is used to compare their difference and trend. It is found that with different value they have been variable trend which is different from the general trend. So the curves in process of the motor housing punch have been drawn through defining γ (technique coefficient), α (producing labour), β (capital elasticity). With logarithmic function it is calculated respectively according to raw data. Then model is established with Cobb-Douglas function in microeconomics. In this study these three parameters are in terms of a group value so total ones of these coefficient can represent the whole value. That is a consideration so in this supposed the model is completed.

The Economics Modelling to Three Parameters

The Cobb-Douglas function is

$$Q = \gamma L^{\alpha} K^{\beta} \quad (1)$$

Production quantity Q; γ is technique coefficient; α is producing labour; β is capital elasticity. It has

$$LN\gamma = LNQ - \alpha LNL - \beta LNK \quad (2)$$

Due to equation (2) it obtains

$$LN(Q_1/Q_2) = \alpha LN(L_1/L_2) + \beta LN(K_1/K_2) \quad (3)$$

Here, subscript 1 and 2, 3 is three coordinate.

$$LN(Q_2/Q_3) = \alpha LN(L_2/L_3) + \beta LN(K_2/K_3) \quad (4)$$

α is solved in terms of (3) it can be gotten

$$d\alpha = \frac{d\left[LN(Q_1/Q_2) - \beta LN(K_1/K_2)\right]}{LN(L_1/L_2)} \quad (5)$$

And

$$d\alpha = \frac{dLN(Q_2/Q_3) - \beta LN(K_2/K_3)}{LN(L_2/L_3)} \quad (6)$$

In terms of above equation it can be gotten

$$d\beta = \frac{d\left[LN(Q_1/Q_2)LNL_1 - LN(Q_1/Q_2)LN(L_1/L_2)\right]}{LN(K_1/K_2)LNL_1 + LN(K_1/K_2)LN(L_1/L_2)} \quad (7)$$

$$d\beta = \frac{d\left[LN(Q_1/Q_2)LN(L_1/L_2) + LN(Q_2/Q_3) - LN(Q_1/Q_2)\right]}{[-LN(K_1/K_2) + LN(K_2/K_3)]LNL_3 + LN(K_2/K_3)} \quad (8)$$

From equation (2) it has

$$d\gamma = d\left[EXP(LNQ - \alpha LNL - \beta LNK)\right] \quad (9)$$

The cost increases steeply when labor is small then it becomes slow when labor becomes more than 4. At last the cost changes more sluggish when labor becomes more than 4. The same situation has been observed in K with the 4 times. Meantime, the cost of K has been 1/4 to compare with one of L that explains K is cheaper than L the cost approximate 1/4. It is due to each L productivity occupying 4 times to compare with K. The labor is more expensive than capital. So the people in firm has been regulated according to fixed capital. Maybe the detail regulation is in terms of actual situation. Here in this paper K is equal to a constant in usual. The formulas for cost control are listed as below (Table 1).

AC=TC′ (10)

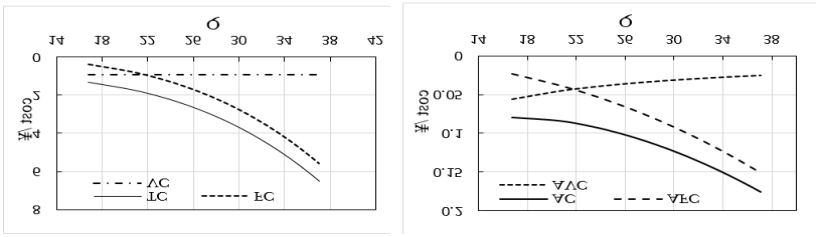
AFC=FC′ (11)

AVC=VC′ (12)

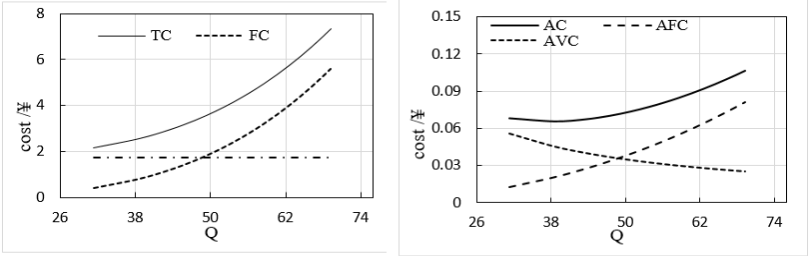
The parameters of which is formula of function Q which is products amount and L&K which is labor and capital respectively with coefficient α, β &γ. Here γ is technological coefficient; α, β are producing labor and capital elasticity respectively. Then α, β & γ variance will be accurate. To use ten data and average them is numerical result with α=0.58, β=0.3 & γ=3 (Table 2).

Discussion

Here, TC is total cost; FC is fixed cost; VC is variable cost. AC is average cost; AVC is average variable cost; AFC is average fixed cost. Table 1 is the original condition in formula. It is a one for input to solve the constant. It is in terms of practical data in per minute in producing division of a firm. It is used to solve three constants for complete equation so as to utilize it to compute data we want. It is clarified that constant L and K respectively and find the cost curve movement. It is chosen that L=2, 4& 6 and K=21, 23& 25 which is around L=5 and K=23 to search the difference. It is used above the parameter to establish equation to draw the curve as below. Here it is used the constant 15 Yuan as TC, as Table 2 (Figure 1).



(a) L= 2



(b) L=4

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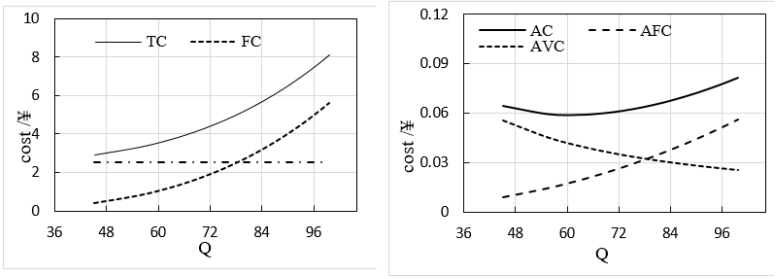
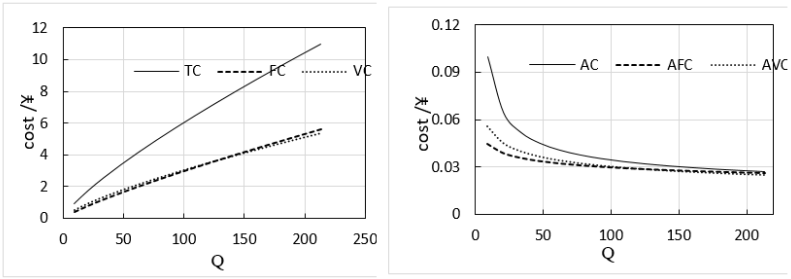


(c) L=6



(d) L=1,2•••,10; K=1,2,•••10

Figure 1: *Relations between cost-Q when Pl=0.5 and Pk=0.4.in process.*

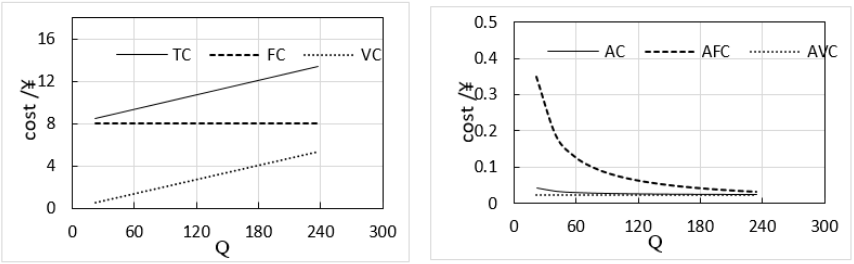
Table 1: *The conditions value in* $Q = \gamma L^{\alpha} K^{\beta}$.

No.	L	K	Q,/m
1	1	1	4
2	2	2	8
3	3	3	12
4	4	4	16
5	5	5	20
6	6	6	24
7	7	7	28
8	8	8	32
9	9	9	36
10	10	10	40

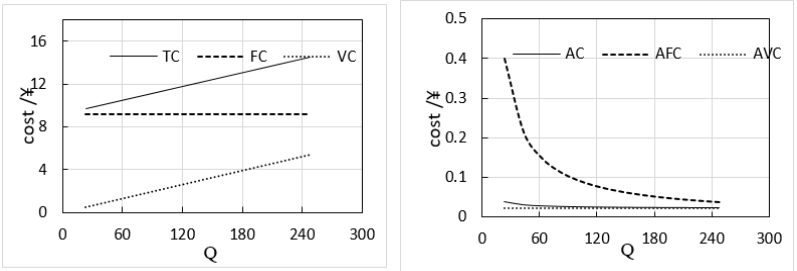
Table 2: *The conditions value in best K &L.*

Q	K	L	TC /min
2	0.5	0.5	15
4	1	1	15
6	1.5	1.5	15
8	2	2	15
10	2.5	2.5	15
12	3	3	15
14	3.5	3.5	15
16	4	4	15
18	4.5	4.5	15
20	5	5	15

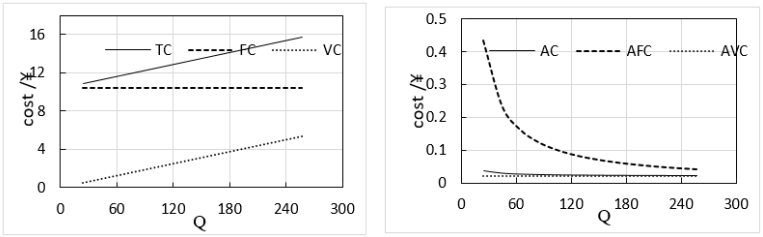
22	5.5	5.5	15
24	6	6	15
26	6.5	6.5	15



(a) K=20



(b) K=23



(c) K=26

Figure 2: *Relations between cost-Q with K when Pl=0.5 and Pk=0.4.*

As seen in Figure 1 the different L and production Q is shown. If the Q inclines TC and VC will incline as well meantime AC and AFC will decline which fits to the logic. But the FC declines while AVC even AC inclines in opposition. It explains that AVC results the per worker wage to incline at L=2, 4 and 6. The cost value trend of them declines with inclining L=2, 4 and 6. It expresses that low cost will arrive with high L=6. Figure 1(d) shows that the total curves for us. It expresses that total TC inclines while AC decline with Q. the biggest one is TC and then is FC and VC. Otherwise the AC is the biggest one an then AVC at last AFC. With inclining the L the product will incline. It expresses that inclining the labour the quantity inclines too. When the L=2 the quantity is 36; when L=4 it is 70; when L=6 it is 98. This is the best one for economic prediction. So if we use it to arrange person the scientific arrangement is attained. According to the calculation 5 person is the best quantity, because as seen in Figure 1（c） L=6 is this status so this figure is needed to pay attention. The status of L=1,2•••,10 the quantity attains 220 which is the result of labour incline. In this figure AC is 0.06~0.08 ¥ and AFC is 0.03~0.06¥ per person, so the total one will be quite large. Such as 0.03 ¥ is 1.38-¥ if it is multiple person quantity, so it is somewhat low. So if the high cost decline is needed we can choose the low L such as L=2 (Figure 2).

In Figure 2 the different K and Q is shown. It is known that better status is drawn here. The cost TC will incline and AC will decline when the Q inclines. Figure 1(c) shows the highest cost value which expresses the TC and AC is the highest one. It explains that when inclining Q the cost will be high. If we adopt the low K the one will decline correspondingly. The condition is Pl=0.5 and Pk=0.4. if changing this one the new relation will be attained. Here Pl is labor price and Pk us capital price. The financial account shows that relationship between cost and quantity for a

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worker in terms of production in a time. Because the nonlinear curve slope is different we may find the sluggish slope and define the exact value to application to corporation cost control. In Figure 2(b) the AFC is main evaluation curve as mentioned. Its declining value is 0.35¥, ie. 10.5¥, it is great. So additionally in view of cost value K has more role than L. At the K=20¥, 23¥ and 26¥ the cost of AC, AVC and AFC will decline as the K inclines and TC, AC and FC will incline as the K increases. However AC and AVC has little changes and AFC has big incline. To compare them it will be found that TC etc is much changeable than AC etc. which explains the bid difference between total and average cost in process. Meantime the quantity will increase from 230 to 250¥ as K becomes from 20 to 26¥ which explains the quantity must increase with increasing capital for balance.

Conclusion

The TC and AC is built through modelling in this paper. It is found that L will incline cost while K will decline it. The highest cost value which expresses the TC and AC is the highest one. It explains that when inclining Q the cost will be high. If the Q inclines TC and VC will incline as well meantime AC and AFC will decline which fits to the logic. But the FC declines while AVC even AC inclines in opposition. It explains that AVC results the per worker wage to incline at L=2, 4 and 6. AFC declines most at K=26 since capital inclines. That is due to constant capital on the other hand. In general the constant L and K is shown that AVC and AFC declination is attained.

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