

## Review Article

# The Relation between Labour and Capital to Quantity in Processes on Economics

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**Abstract:** The relation of labour and capital is investigated. It is found that labour will decrease with increasing capital and the same trend will be on the opposition. With the goods quantity increase they will become big. When the quantity is small like  $Q=8$  the very little change will happen so it is considered that it is the least one.  $K$ (capital) is larger than  $L$ (labor) 3~20 times which expresses the  $K$  is more weight than  $L$ . It is formed in terms of small coefficient  $\beta$ . It can be controlled through  $K$  and  $L$  that goods quantity is chosen so that the precision one may be solved whilst they are modified in terms of simulation when  $K$  and  $L$  change. It is convenient to our engineers and financial staffs to check the progression every day to guarantee daily work quantity in terms of  $K$  and  $L$ .

**Keywords:** Labor; capital; forge & thread; quantity; process; economic; punch.

## 1. INTRODUCTION

The relation between labor and capital is important. The two parameters will have relation which may be expressed through modeling and simulation. Because with goods quantity increases how to change and how many to change is the key problem to explore the intrinsic relation between them. So this study will proceed these things to solve the ultimate problem. With micro economics the labor and capital is established and simulated with model to find the value in detail [1-4].

In factory the relation of them is needed to draw and analyze them every a certain time to check the tendency. So the ultimate problem is wanted to check every day which may be benefit to corporation status. The ministry or financial or economist can do these work if it is necessary to control the whole relation of them. For the sake of the benefit we shall do some detail work from the view of finance and economy which will be benefit to our management daily that is for corporation convenience and used in management of enterprise [2, 3].

In this study the defined labor and capital relation is searched for factory to be convenient inference. Their relation with goods quantity is investigated in detail for management and plan enterprise. The management of labor and capital with goods quantity is established for further research of them. This study searches two processes as motor housing punch and screw forge & thread for comparing their variable point. That is destination of this paper.

In general the three parameters are needed to construct the financial department to monitor the whole goods labor and capital which is the destination in this paper. The engineer and financial staffs commonly monitor them for clarifying the goods quantity and other two labor and capital status. It will bring on the maximum profit and least deficit in a company.

## 2. MODELING AND SIMULATION

The Cobb-Douglas function is

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

Production quantity  $Q$ ;  $\gamma$  is technique coefficient;  $\alpha$  is producing labour;  $\beta$  is capital elasticity. It has

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$$LN\gamma = LNQ - \alpha LNL - \beta LNK \text{ -----(2)}$$

Due to equation (2) it obtains

$$LN(Q_1 / Q_2) = \alpha LN(L_1 / L_2) + \beta LN(K_1 / K_2) \text{ -----(3)}$$

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

$$LN(Q_2 / Q_3) = \alpha LN(L_2 / L_3) + \beta LN(K_2 / K_3) \text{ -----(4)}$$

$\alpha$  is solved in terms of (3) it can be gotten

$$\alpha = \frac{LN(Q_1 / Q_2) - \beta LN(K_1 / K_2)}{LN(L_1 / L_2)} \text{ -----(5)}$$

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

In terms of above equation it can be gotten

$$\beta = \frac{LN(Q_1 / Q_2)LNL_1 - LN(Q_1 / Q_2)LN(L_1 / L_2)}{LN(K_1 / K_2)LNL_1 + LN(K_1 / K_2)LN(L_1 / L_2)} \text{ -----(7)}$$

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

From equation (2) it has

$$\gamma = EXP(LNQ - \alpha LNL - \beta LNK) \text{ -----(9)}$$

$$L = EXP\left(\frac{LNQ - LN\gamma - \beta LNK}{\alpha}\right) \text{ -----(10)}$$

Here, K is capital; L is labour; Q is the goods quantity.

The formulas for cost control are listed as below

$$AC = TC / Q \text{ -----(10)}$$

$$MP_L / P_L = MP_K / P_K \text{ -----(11)}$$

$$TC = KP_K + LP_L \text{ -----(12)}$$

$$MP_K = dTP / dK \text{ -----(13)}$$

$$MP_L = dTP / dL \text{ -----(14)}$$

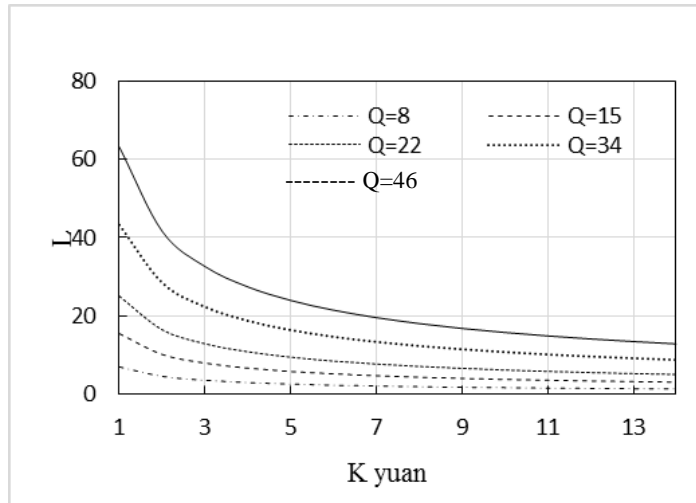
$$AP = TP / L \text{ -----(15)}$$

$T_p$  is total product; AP is average product;  $MP_k$  is marginal product of capital;  $MP_l$  is marginal product of labor; TC is total cost;  $P_k$  is capital price;  $P_l$  is labor price.

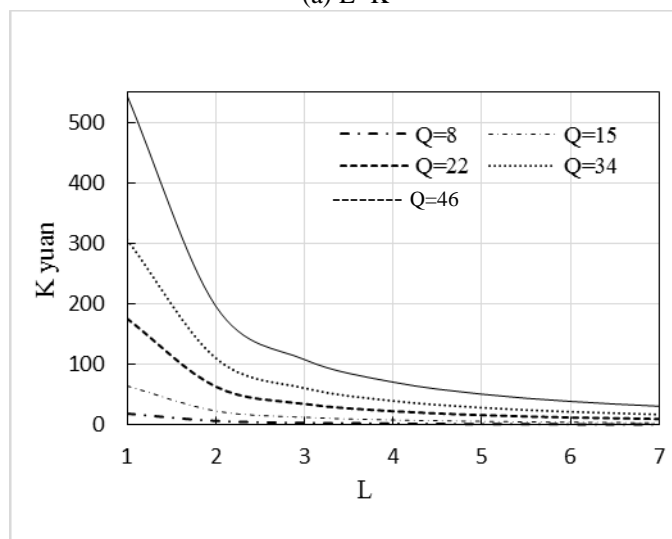
### 3. DISCUSSIONS

With the above equations the below curves are drawn after analyzing them it is found their intrinsic rule. From two types of curve it is found that the same trend is gained as below. If it is defined that  $P_l$  is 0.3 yuan and  $P_k$  is 0.4 yuan the best L and K is 2 and 31 yuan in motor punch and 0.3 and 3 yuan in forge & thread respectively when TC is 30 pieces/min. Meantime  $\gamma$  is 1.7 and 2.8,  $\alpha$  is 0.78 and 0.83,  $\beta$  is 0.5 & 0.45 in these processes respectively. As they are changed the best L & K will be changed too. The five quantities are used to simulate in this study. As seen from Figure 1(a~b) the labor will decrease with increasing capital and it will increase with quantity increase. When the quantity is 8 the labor may be minimum about 3 persons at the 5 yuan. That is the lowest cost and lowest worker quantity point. If the quantity is satisfied labor and capital will be known through this model. It is inverse to the former that is known secondly. On the contrary the K and L & goods quantity can be used actively so the two ways are used in factory for the sake of the best management by engineers.

If regulation of K and L the goods quantity will be determined that is out of curve to be corrective too, but the Q must be investigated again and look for this best one because the modeling has best parameter tendency. It is been built in terms of Cobb-douglas function and the origin parameters and coefficient is modeled to resolve tendency matter which may be solved by curve for near one and precision may be used the modeling. In this paper the Cobb-douglas function is the main simulation modeling so the coefficient correction may be affect the ultimate curve. However the coefficient is solved and the average one will be adopted. So the precision is controlled by the function limitation and negative one may be formed to evaluate which is positive correction.

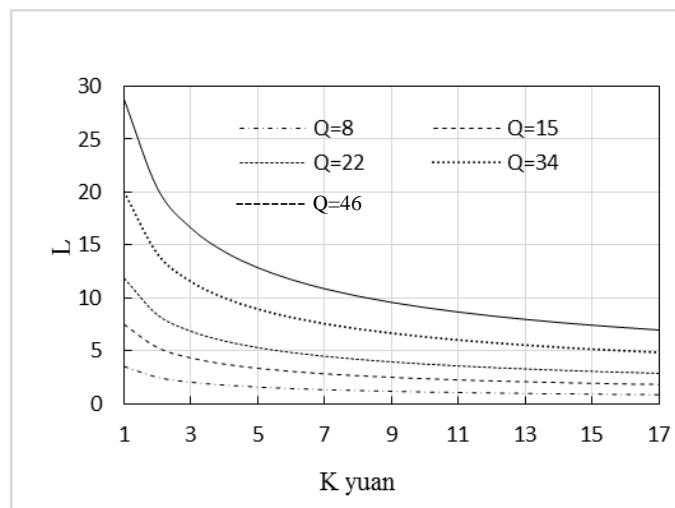


(a) L=K

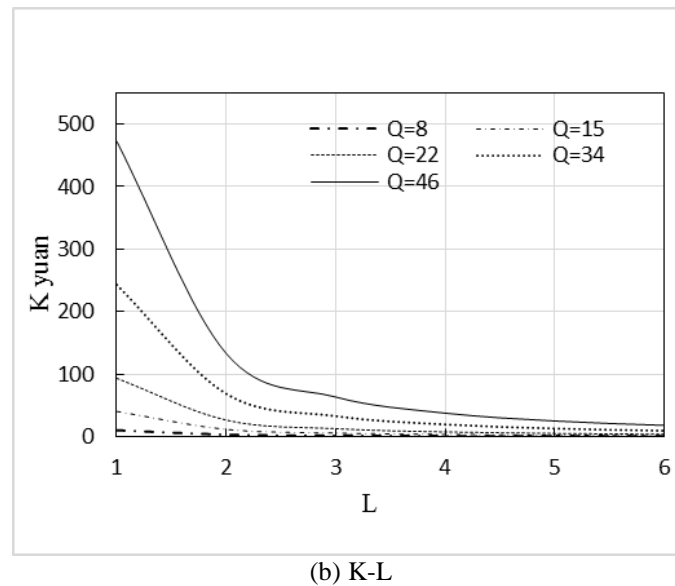


(b) K-L

**Fig-1: The curves of labour and capital in motor punch process.**



(a) L=K



(b) K-L  
**Fig-2: The curves of labour and capital in screw forge & thread process.**

As seen in Figure 2 the labor may increase with increasing capital and it may decrease with quantity increase. The difference that is 80 yuan in punch whilst it is 60 yuan in forge & thread at the 2 labors. Moreover the labor is more than 2 times in punch than forge & thread in Figure 1 (a) and Figure 2(a). The cost will increase in it. However the price per unit of punch is higher than that of forge & thread that means the high turnover will be done in punch per machine. The capital in Figure 1(a & b) is larger than the labor that expresses that the capital is weight value. It has bigger factor than later. Its scope is from 3 times to 20 times bigger than the later. It may demand more goods price to maintain its role. So the capital is needed in necessary situation whilst the labor is needed widely. We used firstly labor and then the capital which is turn of prior one ie.  $L > K$ . When capital is constant the price may incline bigger than the labor that expresses the former is bigger value than the later according to the small coefficient  $\beta$  size. When the labor is constant the price will decline that explains it is caused with big coefficient  $\alpha$  size. It is solved with original data according to Cobb-Dougllass function.

Overview if the plan is built in terms of modelling the quantity every day has been determined. Our engineers may check the three sides and know the factory situation like deficit and profit and know the cause in order to revise it. The big one shall be check carefully and the small one can be neglected so the deficit is avoided which can make profit to be damage.

### 3. CONCLUSIONS

The method of processes are investigated and found the labor in punch is two times than the forge & thread in terms of simulation results. The labor will decrease when the capital increases and it will increase when the goods quantity increase. When capital is constant the price may incline bigger than the labor that expresses the former is bigger value than the later according to the small coefficient size  $\beta$ . When the labor is constant the price will decline that explains it is caused with big coefficient  $\alpha$  size. The theoretical and fact difference is needed to check cause and resolve it. Big difference must report to president to avoid deficit to happen to be benefit to company.

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