

An Analysis Of The Firm: Contract Economics And Statistics

Approach

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The firm in market is a special contract of human capitals and non-human capitals, with its unique feature brought forth by the involvement of firm contract including human capitals, of which the property-rights feature demands incentive. The principal-agent theory dictates such a kind of contract, i.e., certain reward programs stimulate agents to better work. If e is adopted to represent the **effort** of agents, $S(e)$ (value of products) thus depends on e (the **effort** of agents) and (ϵ random interference beyond observation), namely,

$$S(e) = e + \epsilon \quad (1)$$

In the (1) formula, ϵ is normally distributed, with its expected value being 0 (zero); Meanwhile $S(e)$ serves also as the **signal** demonstrating the degree to which agents exert themselves. Principals should provide for agents rewards $W(S(e))$ which is associated with the $S(e)$ as the **signal**, namely, the contract between principals and agents is illustrated as follows:

$$W(S(e)) = \alpha + \beta S(e) \quad (2)$$

In the (2) formula, α refers to the fixed part of rewards while β indicates the reward's extent of reaction towards the **signal**.

Since the open-door policy was implemented, Chinese state-owned enterprises have developed unique contracts relationship of two-level distribution, the first being the contract concluded between the government, entrusted by the state, as the guardian of state assets and the enterprise managements, and the second one between the enterprise managements and the workers. For the incentive effects of the two-level distribution contracts, I have conducted statistical tests. The statistical tests conducted by me are about the relationship between wages total of the staff, which is denoted by W , and outputs of the enterprise products, which is denoted by Y . The empirical equation between W and Y is as follows:

$$W = \alpha + \beta Y + \epsilon \quad (3)$$

In the (3) formula, W refers to the wages total or bonus total of the staff, α refers to intercept, β refers to the level of reaction, i.e. regression coefficient, Y refers to total outputs, which is total value of products, ϵ refers to random interference. With the total samples being 200 industrial enterprises from Shandong province in China, the results evaluated by OLS means (at a 1% level significance) are as follows:

The relationship between wages total and value total of products:

$$W = -19.66 + 0.1463Y \quad (4)$$

(60.137)

$$R^2 = 0.9948$$

The relationship between wages total and net value of products:

$$W = 39.763 + 0.264Y \quad (5)$$

(14.963)

$$R^2 = 0.9734$$

The relationship between bonus total and value total of products:

$$W = -18.003 + 0.018Y \quad (6)$$

(30.012)

$$R^2 = 0.9916$$

The relationship between bonus total and net value of products:

$$W = -1.442 + 0.070Y \quad (7)$$

(9.401)

$$R^2 = 0.9168$$

The results above show that the incentive effects produced by the incentive contracts of state-owned enterprises are significant, in other words, the statistical tests for the economic efficiencies of enterprises, on which two means (i.e. wages level and bonus level) have had positive impact, are passed.

Moreover, the principals, in addition to giving agents the incentive to operate in the owner's interest, should exercise monitoring, i.e., the principals must investigate and punish malpractices of agents. The economics problem here lies in the balance between probabilities of investigation and punishment and an organization costs. If **C** is adopted to refer to the organization costs, **P** to the probability of investigation and punishment and **K** and **S** to the malpractice losses and the restriction costs respectively, the equation at any probability of investigation and punishment takes the following form:

$$C = S + K \quad (8)$$

In addition, $\frac{dS}{dP} > 0$ indicates that the restriction costs is the increasing function of probabilities of investigation and punishment while $\frac{dK}{dP} < 0$ reveals that the malpractice losses is the decreasing function of probabilities of investigation and punishment. Owing to the existence of restriction costs, rational principals don't limitlessly raise the probability of investigation and punishment, but manage to obtain one with the minimum of organization costs, which meets the following formula:

$$\frac{dS}{dP} + \frac{dK}{dP} = 0 \quad (9)$$

ANALYSE DE L'ENTREPRISE: L'ECONOMIE DE CONTRAT ET STATISTIQUES

(Analyse de l'entreprise: l'économie de contrat et statistiques)

Selon les théories de l'économie néoinstitutionnelle, l'auteur a discuté dans cet article le problème de contrat de l'entreprise et a mené un examen statistique sur les effets des contrats de stimulation des entreprises nationales chinoises.