A Study in the Incentive Model of China's Private College President

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Abstract—The rapid development of private higher education institutions has made private colleges enter an intensive development stage, and the incentive to the private college president has become an important subject. However, the Ex ante incentive is superior to the Ex post incentive, and how to provide the effective incentive to the president after their appointment has become an urgent problem. Based on years of experience, I propose that the private college is complex entity with multiple governance mechanisms, or in other words, the private college is the same as other enterprises which all face the dual constraints of profit and development. Essentially, the first aim for the private college is how to get profit, and the second is how to grow. I will argue that in order to achieve the goals above, 'stock-based incentive' is the proper incentive for the private college president.

Keywords- private college; incentive; board of directors; president

I. INTRODUCTION

Although the rapid development in recent years, China's private higher education has begun to take shape in 2013, and now comprises more than 650 private colleges and 510 million students.

After the period of expanding development in recent years, private colleges have turned to the connotative type. Compared with the public universities, private colleges still belong to the category of enterprises in essence, namely to achieve development through its own financing. Their particularity determines are that the private college's presidents cannot only regard "profit maximization" as its only goal but also need to pay close attention to the capital constraints for its development. While some private colleges get national policy support in their development process, the president is confronted with more constraints. Therefore, how to give the effective incentive to the president becomes a core issue for the development of private colleges. Although the development of private colleges has triggered the attention of scholars and obtained a wealth of research, in the early stage these results were more concentrated on the problems of character, development, and challenges. The nature of private college is similar to enterprises, so we can use the existing economic theory to analyze to the methods of incentivizing the private college president, and provide some useful explorations for the cultivation of private colleges [1].

II. PRIVATE COLLEGES ARE THE GOVERNING UNIT RESTRICTED BY PROFIT

The important source of funding for the development of private colleges comes from tuition, building the private college into an elite school and attracting more students becomes the primary goals. The aim of the president is not only to emphasize teaching quality and innovation, but also to get more students. For sustained healthy development, the method to cultivate investment equilibrium between recruitment and teaching is important strategy for the president.

Although there are many other governance mechanisms that regulate private colleges, as governance units are constrained by profit, agency theory reveals the substantial relations in the process of private colleges. Private colleges share the same developing path in essence with enterprises: the developments of private colleges need to expand their scales continually, and their growth depends on tuition fees and other related earnings. In this case, the president of private colleges is the same as the professional manager who is faced with the same incentives and constraints, so incentive theory can be used to analyze how to incentivize the president of private colleges [2-3].

As the most important theoretical support for the corporate governance practice of professional managers, incentive theory argues that the expected incentive effect can be achieved through contract design, meaning that the contract is complete valid. Under this framework, the contractual recipient managers can not bargain, and the enterprise acquires its clear boundaries. The formulated contract between the principal (shareholders) and the agent (entrepreneurs) can achieve its incentive purposes, therefore the contract is complete. It has a strong explanatory power for the incentive practice of entrepreneurs and the senior manager's salaries. Based on this analytical framework, the board of directors of private colleges (to simplify the analysis, in the following the board of directors will act on behalf of the investors) can be viewed as principle, the president employed by the board of directors will be regarded as the agency, and all those settings are in accordance with the actual development of China's private colleges. This analogy will provide some theoretical innovations for the private college's future [4].

III. THE MODEL ANALYSIS OF "PRESIDENT

MOTIVATION" BASED ON THE INCENTIVE THEORY

The following analysis will draw upon three aspects; risk sharing based on risk attitude, market considering incentives, and stock-based incentives compensation.

(1) Risk sharing based on risk attitude

(a) Basic Model

The utility function can be defined as [5]:

Board:
$$U_p = P[y - w(y)]$$

The president's efforts and incomes are additive and separable, which is expressed as follows:

$$U_a = U(w, e) = u(w) - v(e)$$
(2)

where y is the output, w is the payment for president,

e is the effort level of president; U_p and U_a are the utility functions that refer to the board and president respectively, its shape is related to the risk attitudes of the board and president. W is the president's income and e is his cost of effort, which will bring utility and disutility to the president respectively.

The problem of risk-sharing can be formulated as the following optimization models [6]:

$$\max_{\substack{[e,w]\\[nmm] [e,w]}} \sum_{i=1}^{2} p_i(e) P[y_i - w(y_i)]$$
(3)
$$\sum_{i=1}^{2} p_i(e) u[w(y_i)] - v(e) \ge U^0$$
s.t.

(4)

where U^0 is the reservation utility for the president. (b) Modeling

By constructing a Lagrangian function, the optimization problems above can be solved by:

$$\lambda^{*} = \frac{P'[y_{i} - w^{*}(y_{i})]}{u'[w^{*}(y_{i})]}, \quad i \in (1, 2)$$
(5)

where λ is the risk optimum distribution ratio, also the distribution ratio for unit of output ^y between the board and the president. Obviously, $\lambda^* > 0$. When the utility functions of the board and president are constant, that are preferences are stable, λ^* is a constant.

The analysis for the board and president only are in the

conditions of risk-neutral or risk-averse.

(1) Board risk-neutral

If $P'[y_i - w^*(y_i)] = a(\text{constant})$, the optimal contract requires

 $u'[w^*(y_1)] = u'[w^*(y_2)] = a / \lambda^*$

If the president is risk averse, then the optimal contract

is established only by $w^*(y_1) = w^*(y_2)$. That is to say, in the optimal contract the risk-averse president's income is uncorrelated to the output, it is a fixed income

prescribed by the contract, and all the risks come from the risk-neutral board.

② Agent risk-neutral

$$u'[w^*(y_i)] = a$$
, a is a constant.
The optimal contract requires $P'[y_1 - w^*(y_1)] = P'[y_2 - w^*(y_2)] = a\lambda^*$

The conditions of optimal contract $P'(\cdot) = a\lambda^*$ is required under various output conditions, the risk distribution is equal to the marginal utility of the board. If the board is risk averse, $P''[y_1 - w^*(y_1)] < 0$, the optimal contract can only be established in the condition

$$y_1 - w^*(y_1) = y_2 - w^*(y_2)$$

(2) The president incentive in the "market governance" Supposing the board is risk neutral and the president is risk averse, a contract is designed to reduce agency costs, as the salary specified in the contract is based primarily on the outputs or market returns.

(a) The basic hypothesis of the model

① The production function of private colleges [7]:

 $\pi = aA^{\theta}e + i + \varepsilon$ (6)

where e is the variable of the president's efforts, i is the ability variable of the president (intelligence); \mathcal{E} is the random factors with the normal distribution of 0 as mean and σ^2 as variance; *a* is the degree of effect for the efforts variable on the outputs; A is the scale of private college, θ is the degree of effect for the scale of investment on the outputs, the greater parameter θ indicates the greater effect of the enterprise size on the outputs. of $\frac{\partial \pi}{\partial A} = \theta a A^{\theta^{-1}} e > 0$

The symbols

$$\frac{\partial^2 \pi}{\partial A^2} = \theta(\theta - 1)aA^{\theta - 2}e$$

ðΑ are not determinate, for the private college relates to the returns to scale; when it increases to scale, larger than 0, this indicates that the president's efforts correspond to the private college's own factors.

Based on the hypothesis above, $E\pi = aA^{\theta}e + i$ $Var(\pi) = \sigma^2$

(7)

(2) The incentive contract provided by the board for the president is a linear contract:

 $s(\pi) = w_0 + \beta \pi$ (8)

③ The utility function of the board and the president V(y) = y, risk-neutral; were supposed as: $U(w) = e^{-\rho w}$, $\rho > 0$ is the president's coefficient of risk-aversion.

④ The president strives to increase his reputation, and this will increase the cost of efforts and take personal time, bringing disutility to the president. Supposing the profits which are based on the president's efforts can be measured by currency, the cost function is as follows:

$$C(e) = \frac{1}{2}(c-b)e^{2}$$

b > 0 is the cost coefficient of

efforts, and c > 0 is for personal profits, such as reputation, etc., that bring the president utility, so it can offset the cost of effort (effort disutility) to some extent, and is related to the governance environment and other factors. In reality due to the asymmetric information between the board and the president, the utility comes from the president's efforts less so than the total cost of his efforts, viz c-b > 0.

(b) Basic model building

1) Certainty equivalent rate of the board

As the principal, the board is risk-neutral, V(y) = y

V(y) = y, the expected utility equals the expected income [8]:

(9)
$$E\{V[\pi - s(\pi)]\} = -w_0 + (1 - \beta)(aA^{\theta}e + i)$$

⁽²⁾ Certainty equivalent profit of the president As the agent, the president's actual income is:

$$W = s(\pi) - \frac{1}{2}(c-b)e^2 = w_0 + \beta\pi - \frac{1}{2}(c-b)e^2$$
(10)

Definition: if U(X) = E[U(W)], W is the random income, U(X) is the utility function, then X is the certainty profit equivalent to W.

The president maximizes his utility $E[U(W)] = E[e^{-\rho w}]$ is equal to the following certainty equivalence income:

(11)
$$X = w_0 + \beta (aA^{\theta}e + i) - \frac{1}{2}(c - b)e^2 - \frac{1}{2}\rho\beta^2\sigma^2$$

③ Constraint conditions

Making the president's level of reservation utility \overline{W} regards it as the known exogenous variable, referring to the president's profits before appointment. Maximizing the value of the college is the pursuit of the risk-neutral board (including good social prestige, etc.), that is, it is expected to maximize its income level, so the model can be built as follows [9]:

$$\max_{\substack{e,\beta,w_0\\e,\beta,w_0}} [-w_0 + (1-\beta)(aA^{\theta}e+i)]$$

S.t.
$$w_0 + \beta(aA^{\theta}e+i) - \frac{1}{2}(c-b)e^2 - \frac{1}{2}\rho\beta^2\sigma^2 \ge \overline{w}$$

(IR) (12)

$$e \in \arg \max[w_0 + \beta(aA^{\theta}e + i) - \frac{1}{2}(c - b)e^2 - \frac{1}{2}\rho\beta^2\sigma^2]$$

(IC)

(3) Solution and analysis

(a) Optimal contract under conditions of perfect information

(13)

The optimal contract between the board and the president can be obtained by solving the following model:

$$\max_{e,\beta,w_0} [-w_0 + (1-\beta)(aA^{\theta}e+i)]$$

(14)

$$w_0 + \beta (aA^{\theta}e + i) - \frac{1}{2}(c-b)e^2 - \frac{1}{2}\rho\beta^2\sigma^2 = \overline{w}$$

(15) Solving the model above can obtain the optimal efforts level of the president under conditions of the optimal incentive contract, which is expressed as follows [10]:

$$V = \frac{a^2 A^{2\theta}}{2(c-b)} + i - \overline{w}$$

(16)

From the previous analysis, under conditions of perfect information, the optimal contract between the risk-neutral board and the risk-averse president, and requires the president to be paid a fixed salary while the board bear the entire risk. The optimal incentive contract can not provide the president with an output incentive, and the fixed salary given by the optimal contract is the sum of his costs of efforts and the level of reservation utility.

(b) Optimal contract under conditions of imperfect information

In reality the information is imperfect, and therefore the level of the president's efforts becomes the private information. Only in accordance with the observation of the level of output can the board evaluate the level of the president's efforts. Under conditions of imperfect information, the incentive contract provided by the board is expressed as follows:

$$\max_{e,\beta,w_0} \left[-w_0 + (1-\beta)(aA^{\theta}e+i) \right]$$

(17) *S.t.*

$$w_{0} + \beta(aA^{\theta}e + i) - \frac{1}{2}(c - b)e^{2} - \frac{1}{2}\rho\beta^{2}\sigma^{2} \ge \overline{w}$$

$$(IR) \qquad (18)$$

$$e \in \arg \max[w_0 + \beta(aA^{\theta}e + i) - \frac{1}{2}(c-b)e^2 - \frac{1}{2}\rho\beta^2\sigma^2]$$

;

(IC) (19) The solution for the optimal questions above is:

$$\beta'' = \frac{a^2 A^{2\theta}}{(c-b)\rho\sigma^2 + a^2 A^{2\theta}} ; e'' = \frac{\beta a A^{\theta}}{(c-b)} w_0'' = \overline{w} + \frac{u^2}{2} [\rho\sigma^2 - \frac{a^2 A^{2\theta}}{(c-b)}] - ui$$
(20)

where
$$u = \frac{a^2 A^{2\theta}}{(c-b)\rho\sigma^2 + a^2 A^{2\theta}}$$

Rooted in the model conclusions, it can be clearly seen that besides the individual efforts, the incentive of the president has something to do with the environmental factors and human factors. Firstly, although the president's effort and the incentive intensity hace positive correlation, the effort is based on the measurement of output, where the enrolled students are the most important factor to measure the output; therefore it is difficult for this to be influenced by the president's wisdom. In addition, the risk-aversion level of the president is influenced by the environment and personal experiences.

IV. CONCLUSION AND SUGGESTION

The private colleges in China has entered a connotative development stage, and how to effectively motivate the president has become the key issue for the private colleges. Based on the particularity of private colleges, it is difficult to directly apply the theory of professional manager's incentives to this industry; president's personal prestige may successfully affect the development more than his wisdom. However, the president's personal prestige is selected in advance, and then the method to achieve compatibility of interests for the president and the college is considered afterwards. This is the key factor for the incentive contract of the president. From the analysis of the private college's nature, it is clear that private colleges are constrained by profits firstly, and the second constraint is the proposition of development, and the notion of stockbased incentive compensation is put forward based based on this.

The development of private colleges has its own special particularity, in terms of this specificity the incentives of the president are very complex. The first difficulty is how to define the president's personal wisdom, and his individual talents may face some constraints in private colleges. In the development procession of the private college, if profits are regarded as more important factors than developments, then the incentives of the president will face the challenge of adverse selection.

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