

Strategic Reason for Employing Workers with Public Service Motivation

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We construct a simple game-theoretic model in which one private firm and one public (or state-owned) firm compete in quantity of goods produced or service provided. The private and public firms each decide how many workers with public service motivation they will employ as part of an incentive scheme. We assume that both firms produce homogeneous goods with a quadratic cost function but that the private firm is more efficient than the public firm. Both firms are faced with linear inverse demand. We show that whether public firms employ more workers with public service motivation than private firms depends on the efficiency gap between the public and private sectors. This result explains why some literature in public administration reports a significant difference in public service motivation between employees in the private and public sectors and the other literature does not.

Keywords: Public Service Motivation; Oligopoly; Strategic Hiring Policy; Efficiency Gap

Introduction

One of the important issues in the literature of public administration is whether employees of public (or state-owned) firms and those of private firms are different in terms of work-related values, reward preferences, needs, and personality types (Wittmer, 1991). Following a prominent study of public service motivation (Perry & Porter, 1982; Perry, 1996, 1997), many papers study this issue¹. However, overall, empirical studies on this issue do not have consistent results. That is, some studies show that employees of public and private firms are different, but other studies do not show this. For example, while Rainey (1982) reports a difference in preferences regarding the value put on helping others, Gabris and Simo (1995) show that there is no difference between workers in the public and private sectors.

In order to explain why we cannot obtain robust evidence about the difference in public service motivation between workers in the public and private sectors, we provide a game-theoretic model. Analyzing this model, we show that the strategic incentive to employ workers with public service motivation and the disparity in efficiency between the public and private sectors accounts for the difference. That is, whether public firms employ more workers with public service motivation than private firms do depends on the efficiency gap between public and private firms.

Our approach is relevant to the issue of delegation in micro-economic theory and game theory (Vickers, 1985; Fershtman & Judd, 1987). In the delegation model, the objective of the principal is not the same as that of his agent. Thus, the principal creates an incentive scheme for the agent. In our model, the

owners and governors of the firms in the public and private sectors decide how many workers with public service motivation to employ. This decision works as a commitment of the incentive scheme. This point is in contrast to previous studies.

This paper is organized as follows. In the next section, we present the model. The third section calculates the equilibrium. The final section offers a conclusion.

The Model

We provide a simple game-theoretic model. We assume a public service market (e.g., the education industry or security industry) where one private firm (firm P) and one state-owned firm (firm S) compete in quantity of goods produced or service provided². In each firm, there is an owner (or governor) as principal and a manager (or public servant) as agent. For the private firm, the owner wants to maximize its profit; for the state-owned firm, the governor wants to maximize social welfare³. In order to maximize the owner's objective, the owner (or governor) designs the objective function of the manager (or servant) as the incentive scheme. For simplicity, following Vickers (1985), we assume that the manager's and servant's objective function (u_P and u_S) designed by owner and governor are:

$$u_P = \theta_P x_P + (1 - \theta_P) \pi_P,$$

$$u_S = \theta_S x_S + (1 - \theta_S) \pi_S,$$

²The assumption that there is only one private firm in the market is not essential for our results. We can extend the model to an oligopoly market with many firms.

³The oligopoly model with profit-maximizing private firms and welfare-maximizing public firms is called a mixed oligopoly model. For surveys on the mixed oligopoly model, see De Fraja and Delbono (1989) and Vickers and Yarrow (1988).

¹For the survey on public service motivation, see Perry (2000).

where x_i is the output of firm i , π_i is the profit of firm i , and θ_i is the incentive scheme chosen by the owner (or governor) of firm i ($= P, S$)⁴.

We can interpret θ_i as the degree to which a private or state-owned firm employs workers with public service motivation. The reason is explained as follows. If the firm employs many workers with public service motivation, the firm will tend to provide more public service. In other words, more workers with public service motivation means a larger value of θ_i ($i = P, S$). Since the owner or governor can decide whom to hire, they indirectly choose the level of θ_i through their hiring policy.

Given the incentive scheme, the manager chooses the output. We consider the quadratic cost of firms: γx_p^2 for a private firm and x_s^2 for a state-owned firm, where γ denotes the difference in efficiency. Since in many industries, private firms are more efficient than state-owned firm, we assume $0 \leq \gamma \leq 1$. We assume that the firms produce homogeneous goods and that they face linear inverse demand: $z = 1 - x_p - x_s$, where z is price.

Under these setting, the profits of firms are:

$$\pi_p = (1 - x_p - x_s)x_p - \gamma x_p^2,$$

$$\pi_s = (1 - x_p - x_s)x_s - x_s^2.$$

Social welfare is $SW = CS + \pi_p + \pi_s$, where the consumer surplus is $CS = (x_p + x_s)^2 / 2$. Then, the maximization problems of owner, governor, manager, and servant are $\max_{\theta_p} \pi_p$,

$$\max_{\theta_s} SW, \max_{x_p} \theta_p x_p + (1 - \theta_p)\pi_p, \text{ and } \max_{x_s} \theta_s x_s + (1 - \theta_s)\pi_s,$$

respectively. The timing of the game is as follows. In the first stage, the owner (or governor) of firm i ($= P, S$) chooses the incentive scheme θ_i . After the manager (or servant) of firm i observes the incentive scheme, they choose the output x_i in the second stage. We solve the model using backward induction.

Calculating Equilibrium

In the second stage, the maximization problems of manager and servant are:

$$\max_{x_p} \theta_p x_p + (1 - \theta_p)[(1 - x_p - x_s)x_p - \gamma x_p^2],$$

$$\max_{x_s} \theta_s x_s + (1 - \theta_s)[(1 - x_p - x_s)x_s - x_s^2].$$

The first-order conditions lead to the outcome in the second stage:

$$x_p = \frac{3 - 4\theta_s + \theta_p}{(1 - \theta_s)(1 - \theta_p)(7 + 8\gamma)},$$

$$x_s = \frac{1 + \theta_s + 2\gamma - 2\theta_p(1 + \gamma)}{(1 - \theta_s)(1 - \theta_p)(7 + 8\gamma)}.$$

In the first stage, the maximization problems of owner and

⁴One might think that the incentive scheme of the state-owned firm should be a convex combination of the output and social welfare. In this case, the governor of a state-owned firm chooses the incentive scheme that causes the servant to maximize social welfare. That is, the objective functions of the governor and servant are the same in equilibrium. Even so, the owner of the private firm chooses a positive θ_p . Hence, our main result is robust to this modification.

governor are:

$$\max_{\theta_p} (1 - x_p - x_s)x_p - \gamma x_p^2,$$

$$\max_{\theta_s} \left[\frac{(x_p + x_s)^2}{2} + [(1 - x_p - x_s)x_p - \gamma x_p^2] + [(1 - x_p - x_s)x_s - x_s^2] \right].$$

Note that the governor maximizes social welfare SW . Putting the outcome in the second stage into these maximization problems and using the first-order condition, we obtain the outcome in the first stage:

$$\theta_p = \begin{cases} \frac{4(1 + \gamma)}{35 + 86\gamma + 48\gamma^2} & \text{if } \gamma \geq \frac{1}{8}, \\ \frac{3}{27 + 32\gamma} & \text{otherwise.} \end{cases}$$

$$\theta_s = \begin{cases} \frac{-3 + 22\gamma + 16\gamma^2}{28 + 104\gamma + 64\gamma^2} & \text{if } \gamma \geq \frac{1}{8}, \\ 0 & \text{otherwise.} \end{cases}$$

This result is illustrated in **Figure 1**. In this figure, the private firm employs more workers with public service motivation if γ is small, and fewer workers with public service motivation if γ is large. When the private firm is more efficient, γ is closer to zero. Hence, the equilibrium structure of employment depends on the difference in the firms' efficiency. Solving $\theta_p > \theta_s$ for γ , we have the following proposition.

Proposition: $\theta_p > \theta_s$ if and only if $\gamma < (\sqrt{193} - 9) / 16 \approx 0.3058$.

The intuition behind this proposition is explained as follows. In our model, large θ_i ($i = P, S$) works as a commitment device for large output. When the private firm is quite efficient (γ is small), the private firm obtains high gain from this commitment because of large margin (price minus marginal cost). Hence, the private firm with small γ tends to set a large value for θ_p . This means that the private firm employs many workers with public service motivation. On the other hand, since the state-owned firm maximizes social welfare, it is concerned about efficient production. That is, if the private firm is quite efficient, the state-owned firm wants to move production from the state-owned firm to the private firm. For this to happen, the state-owned firm must commit to a small output. In other words, the state-owned firm chooses small θ_s . Hence, in this case, the state-owned firm employs fewer workers with public service motivation. The converse of above argument is

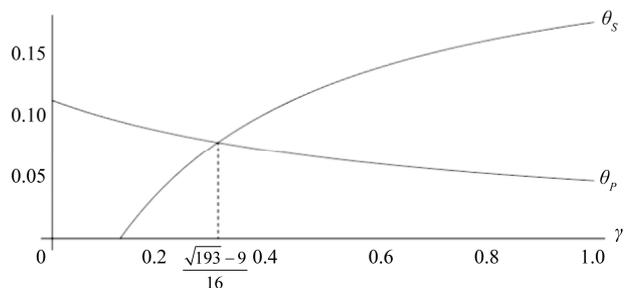


Figure 1. Equilibrium choice of θ_i .

also true: the private firm chooses small θ_p and the state-owned firm chooses large θ_s , when the private firm is inefficient (γ is large). Therefore, in the converse case, the state-owned firm employs more workers with public service motivation than does the private firm.

Our result can provide an explanation for why some literature reports significant difference in public service motivation between employees in the private and state-owned sectors and other literature does not. Since each study uses data from a different industry, the efficiency gap between private and state-owned firms is different in each study. With regard to our results, in order to obtain robust evidence about the relationship between the type of firm (private versus state-owned) and the level of public service motivation in workers, we need to control for the strategic effect of hiring policy. If we used data on the efficiency gap between private and state-owned firms and estimated the relationship between the type of firm and the level of public service motivation of workers, we could remove this strategic effect of hiring policy from the estimated results.

Conclusion

We consider a simple model and show that the equilibrium tendency of employing workers with public service motivation depends on the difference between public and private firms' efficiency levels. Hence, we provide the answer for why previous literature on public service motivation cannot obtain robust evidence on the difference between workers in the public and private sectors. Since we focus on the strategic reason for employing workers with public service motivation, we use a game-theoretic model. However, every industry is not oligopolistic. Therefore, in order to answer our question in competitive industries, we should create a model without strategic interaction. Although this issue is important, it is a consideration for future research.

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REFERENCES

- De Fraja, G., & Delbono, F. (1989). Alternative strategies of a public enterprise in oligopoly. *Oxford Economic Papers*, 41, 302-311.
- Fershtman, C., & Judd, K. L. (1987). Equilibrium incentives in oligopoly. *American Economic Review*, 77, 927-940.
- Gabris, G. T., & Simo, G. (1995). Public sector motivation as an independent variable affecting career decisions. *Public Personnel Management*, 24, 33-51.
- Perry, J. L. (1996). Measuring public service motivation: An assessment of construct reliability and validity. *Journal of Public Administration Research and Theory*, 6, 5-22. <http://dx.doi.org/10.1093/oxfordjournals.jpart.a024303>
- Perry, J. L. (2000). Bringing society in: Toward a theory of public-service motivation. *Journal of Public Administration Research and Theory*, 10, 471-488. <http://dx.doi.org/10.1093/oxfordjournals.jpart.a024277>
- Perry, J. L., & Porter, L. W. (1982). Factors affecting the context for motivation in public organizations. *Academy of Management Review*, 7, 89-98.
- Rainey, H. G. (1982). Reward preferences among public and private managers: In search of the service ethic. *American Review of Public Administration*, 16, 288-302. <http://dx.doi.org/10.1177/027507408201600402>
- Vickers, J. (1985). Delegation and the theory of the firm. *Economic Journal*, 95, 138-147. <http://dx.doi.org/10.2307/2232877>
- Vickers, J., & Yarrow, G. (1988). *Privatization: An economic analysis*. Cambridge, MA: MIT Press.
- Wittmer, D. (1991). Serving the people or serving for pay: Reward preferences among government, hybrid sector, and business managers. *Public Productivity & Management Review*, 14, 369-383. <http://dx.doi.org/10.2307/3380953>