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Does Higher Wages Prevent Workers from Transferring to Other Organizations?

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ABSTRACT

The idea that raising wages does not always lead to higher labor productivity has been explored in various works, with pioneering work being Solow (1957), which highlights the importance of technological progress. This was followed by Shapiro and Stiglitz (1984), which demonstrate that excessively high wages can make workers complacent or less motivated, and Blanchard and Summers (1986), which reveal that even with higher wages, productivity does not improve, among others. This paper takes a different approach by developing a theoretical model to explore the possibility of headhunting. Specifically, the model we propose involves external organizations that attempt to recruit workers from the organization in question. We examine scenarios in which wage increases prompt employees to leave for other organizations.

Keywords: wage increases, productivity, headhunting, theoretical model, optimal wage.

INTRODUCTION

The idea that raising wages does not always result in higher labor productivity has been examined, with Solow (1957) being the pioneering work that emphasizes the importance of technological progress, showing that wage increases may not lead to productivity gains unless there are technological improvements. Shapiro and Stiglitz (1984) demonstrate that excessively high wages can make workers complacent or less motivated, to cause inefficiencies like overconfidence and reduced effort, which ultimately diminish productivity. Blanchard and Summers (1986) highlight wage rigidity and reveal that even with higher wages, productivity does not improve, particularly if firms do not adapt to technological advances or other productivity-boosting measures.

Card and Krueger (1994), focusing on the complexity of the relationship between wage increases and productivity, make it clear that factors such as market conditions, technological advancements and so on influence whether higher wages bring about greater output. Frey and Osterloh (2002) examine if high wages reduce intrinsic motivation and reduce overall productivity.

This paper takes a different approach by developing a theoretical model, as in Fujita (2022), and exploring the possibility of headhunting. Specifically, the model we propose involves external organizations that attempt to recruit workers from the organization in question. We will examine scenarios in which wage increases prompt employees to leave for other organizations.

Structure of the present paper is as follows: Section 2 presents the basic model, and Section 3 explores situations where wage increases lead workers to switch to other companies. In Section 4, we determine the optimal wage for the organization in question. Concluding remarks are provided in Section 5.

BASIC MODEL

Let us consider an organization A that consists of a manager and workers. For simplicity of analysis, we assume that the workers are identical and each worker provides one unit of service, with quality increasing as the worker's effort level rises, which in turn leads to a higher income. We also assume that each worker experiences more disutility if she/he exerts more effort and that the disutility increases at an increasing rate. In the following, letting x denote the effort level of each worker and letting d be a positive constant, we specify the disutility function $D(x)$ as dx^2.

If we let w denote the wage level of w for each worker, benefit of each worker B is expressed as

$$B=wx-dx^2. \tag{1}$$

Assuming that each worker determines the effort level x so as to maximize B given the wage level w the manager offers, the maximization condition for each worker is

$$\frac{dB}{dx}=w-2dx=0, \tag{2}$$

which determines the optimal effort level x^* for each worker to be

$$x^* = \frac{w}{2d}. \tag{3}$$

By inserting (3) into (1), we have the maximum benefit of each worker B^* as

$$B^*= \frac{w^2}{4d}. \tag{4}$$

Now, let us assume that there are other organizations which are eager to hire the workers in the organization A. Let us also assume that workers who exert more effort in the organization A are more likely to be hired in other organizations, while the probability of being hired becomes less when the workers in the organization A claim higher income from other organizations.

In the following, by letting P denote the probability of workers being hired by organizations other than the organization A and letting z denote the wages the workers want from other organizations we express this situation as a function $P=P(x^*,z)$, where $\frac{\partial P}{\partial x^*} > 0$ and $\frac{\partial P}{\partial z} <$

0,which leads to the condition the workers in the organization A do not transfer to other organizations as follows.

$$P(x^*,z)z<w. \tag{5}$$

3. Situations where increasing wages leads workers to switch to other companies

If we specify the probability function $P(x^*, z)$ as

$$P(x^*,z) = 1 - \frac{1}{x^*} + \frac{1}{z}, \quad \text{if } x^*<z, \tag{6}$$
$$P(x^*,z) = 1 \quad \text{if } x^* \geq z,$$

for the simplicity of the analysis, then we obtain

$$z < \frac{w-1}{1-\frac{2d}{w}}, \quad \text{if } z > \frac{w}{2d}, \tag{7}$$
$$z < w, \quad \text{if } z \leq \frac{w}{2d},$$

by making use of (3) and (6).

Thus, we can plot the region that satisfies the condition (7) in w-z space in two cases: as shown in Figure 1 for $0 \leq z \leq \frac{1}{2}$ and as shown in Figure 2 for $z \geq \frac{1}{2}$, with the minimal point located at point M $\left(2d + \sqrt{4d^2 - d}, \frac{(4d+2\sqrt{4d^2-d}-1)(2d+\sqrt{4d^2-d})}{\sqrt{4d^2-d})}\right)$. The dotted regions in both figures represent the areas where workers in the organization A transfer to other organizations.

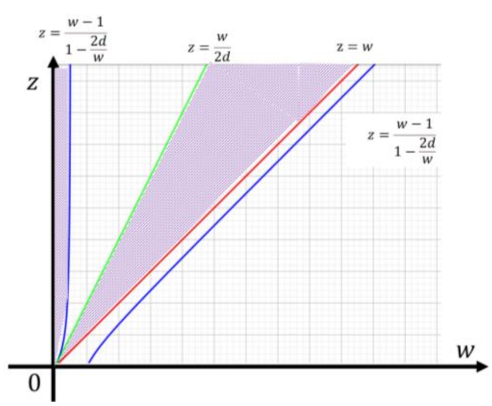

Figure 1: Areas where workers transfer to other organizations for $0 \leq d \leq \frac{1}{2}$

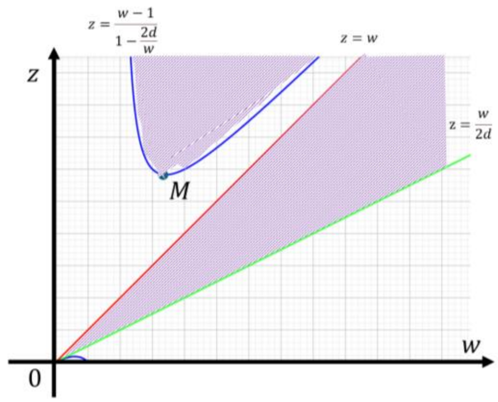

Figure 2: Areas where workers transfer to other organizations for $d \geq \frac{1}{2}$

From Figure 3 we can see that an increase in w changes whether the workers should stay in the organization A or switch jobs. That is, if $z = \bar{z}$, the workers in the organization remain there for $0 \leq w \leq w_1$ and $w \geq w_2$, while switch jobs to other organizations for $w_1 \leq w \leq w_2$.

In Figure 4a, if $z = \bar{z} \geq M_z$, the workers in the organization remain there for $0 \leq w \leq w_1$, $w_2 \leq w \leq w_3$ and $w \geq w_4$, while switch jobs to other organizations for $w_1 \leq w \leq w_2$ and $w_3 \leq w \leq w_4$. In Figure 4b, if $z = \bar{z} \leq M_z$, the workers in the organization works there for $0 \leq w \leq w_1$ and $w \geq w_2$, while switch jobs to other organizations for $w_1 \leq w \leq w_2$.

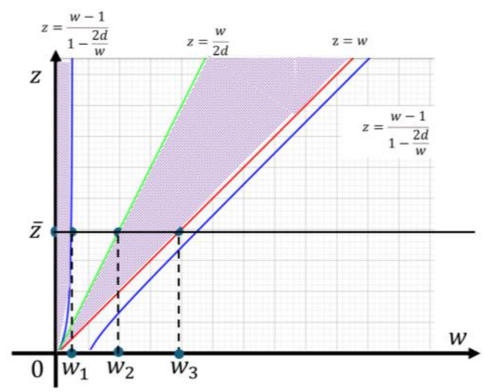

Figure 3: Wages that do not transfer to other organizations for $0 \leq d \leq \frac{1}{2}$

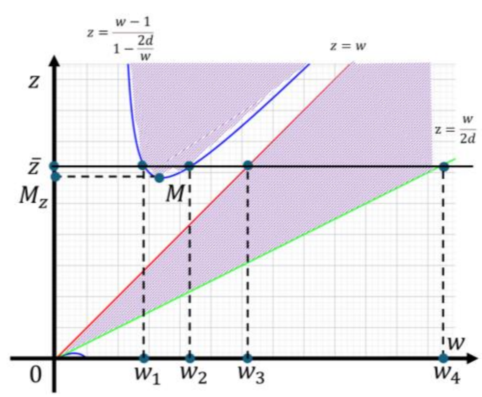

Figure4a: Wages that do not transfer to other organizations for $d \geq \frac{1}{2}$ and $\bar{z} \geq M_z$

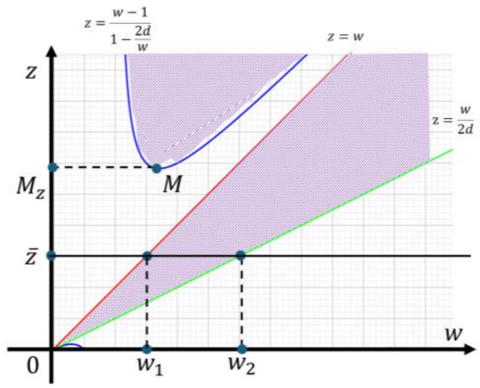

Figure 4b: Wages that do not transfer to other organizations for $d \geq \frac{1}{2}$ and $\bar{z} \leq M_z$

OPTIMAL WAGE FOR THE ORGANIZATION UNDER CONSIDERATION

Based on the above analysis, this section derives the wage level that maximizes the profit of the manager.

Assuming that number of workers to be *n* and price of the service to be *Q*, profit of the manager *V* is expressed as

$$V=n(Qx^*-wx^*) \quad (8)$$

Substituting (3) into (8), we have

$$V = n(Q\frac{w}{2d} - \frac{w^2}{2d}). \quad (9)$$

Thus, the problem the manager should solve is formulated as

$$\text{Max } V = n(Q\frac{w}{2d} - \frac{w^2}{2d})$$

Subject to $P(x^*, Z)Z<w$,where $x^* = \frac{w}{2d}$.

In order to have a specific number, let us assume that *d*=1, *n*=1, *z*=4 and *Q*=10. In this case, firstly we have the wage that maximizes the manager's profit if it were not for the constraint as *w**=5 and secondly we can see from Figure 4b that the wage range in which workers do not switch jobs is 0 ≤ w ≤ 4, or w ≥ 8, which enables us to depict the graph of the function *V* as in Figure 5. Thus, we have the wage that maximizes the manager's profit, with the constraint that the worker does not switch to other organizations, as *w*=4.

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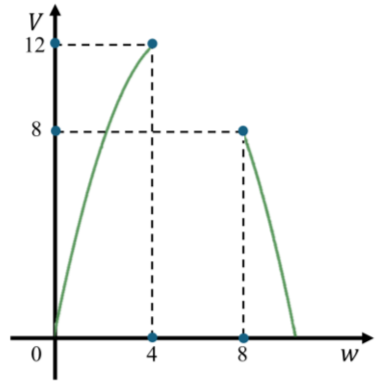

Figure 5: Wage that maximizes the manager's profit for *d*=1, *n*=1, *z*=4 and *Q*=10

We can obtain the optimal wages for other cases as well.

CONCLUDING REMARKS

In the present paper, we developed a theoretical model in which external organizations attempt to recruit workers from the organization under consideration and explored the conditions under which wage increases lead employees to leave for other organizations.

To simplify the analysis, we made certain assumptions regarding the functions of disutility, probability, and other variables, and we excluded the possibility of strategic interactions between the organizations involved.

However, it is clear that these assumptions limit the generality of the model. Therefore, in future work, it will be necessary to relax these assumptions and construct a more comprehensive and general framework that incorporates strategic interactions and potentially more complex functional relationships. This will be the focus of our next investigation.

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