Board Work for Lecture 11: Wells Fargo and Multitasking

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1 Destructive Effort

1.1 Setup

- Output depends on a productive and destructive task:

$$y = 1 + ae_1 - be_2, a > 0, b > 0$$

- The 1 is latent profit from operating at all.

- The cost of effort is:

$$c(e_1, e_2) = (e_1^2 + e_2^2)/2$$

- We measure and pay only based on total effort:

$$m = e_1 + e_2$$

$$w(m) = \alpha + \beta m$$

1.2 Solution

As always, we start with the agent's choice of effort given the wages are already set:

$$\max_{e_1, e_2} \alpha + \beta(e_1 + e_2) - (e_1^2 + e_2^2)/2$$

$$[e_1 :]\beta - e_1 = 0 \implies e_1 = \beta$$

$$[e_2 :]\beta - e_2 = 0 \implies e_2 = \beta$$

Now we plug this in to get the utility the agent expects if they accept the wage:

$$u(accept) = \alpha + \beta(\beta + \beta) - (\beta^2 + \beta^2)/2$$

It is helpful to simplify here a bit:

$$u(accept) = \alpha + 2\beta^2 - \beta^2 = \alpha + \beta^2$$

The firm always sets α to make the worker indifferent to accepting or rejecting. If the set α such that the worker strictly preferred the job, they would be leaving profit on the table as they could lower α, increase profit and not impact worker behavior at all.

$$\alpha + \beta^2 = 0 \leftrightarrow \alpha = -\beta^2$$

The firm's profit is:

$$\pi = 1 + ae_1 - be_2 - \alpha - \beta m$$

plugging everything in:

$$\pi = 1 + a\beta - b\beta + \beta^2 - 2\beta^2 = 1 + (a - b)\beta - \beta^2$$

The firm maximizes this with respect to β. Let's suppose everything is okay and we can take the FOC:

$$[\beta :](a - b) - 2\beta = 0 \leftrightarrow \beta^* = \frac{a - b}{2}$$

But wait. This entire stream of logic only works if $a - b > 0$. What if $a - b < 0$? Then the marginal destructive effort we get with more incentives outweighs any productive effort. If that is true, more incentives only hurts profit. So the firm should set $\beta^* = 0$. This is the final result!

Profit is then given in two cases:

$$\pi^* = \begin{cases} 1 + (a - b)^2/4 \text{ if } a - b > 0 \\ 1 \text{ if } a - b \leq 0 \end{cases}$$

If the firm could do everything itself (first-best) what would it do? To find out, maximize surplus allowing the firm to pick efforts directly:

$$\max_{e_1, e_2} 1 + ae_1 - be_2 - (e_1^2 + e_2^2)/2$$

Notice that e_2 is wasteful: it takes costly effort and only hurts surplus. Thus set $e_2^{FB} = 0$. Then solve for e_1:

$$[e_1 :]a - e_1 = 0 \leftrightarrow e_1^{FB} = a$$

Choose the amount of e_1 where marginal cost is equal to marginal benefit! profit under the first-best is:

$$\pi^{FB} = 1 + ae_1 - be_2 - (e_1^2 + e_2^2)/2 = 1 + a^2/2$$

Even if b is very close to 0, we are still losing $a^2/4$ in profit from multitasking inefficiency. One way the firm could get this money back is to prohibit task 2. Then the firm can just set $\beta = a$ and everything is resolved. But is this realistic? Do firms always have the power to prohibit an activity entirely?