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Kiffin Goods

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Abstract

In this paper, we investigate the possibility of a managerial input that experiences increasing compensation along with decreasing intensity. We call this type of input a "Kiffin good" after the head football coach Lane Kiffin. We propose a novel production process that might lead to Kiffin behavior.

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1. Introduction

A Giffen good, or, more precisely, Giffen behavior, occurs when an individual's quantity demanded increases when the good's price rises. The existence of Giffen behavior has been confirmed in laboratories using, for example, rats.[1] In this paper we explore the possibility of a similar, counterintuitive correlation on the supply side of the market. In particular, we examine the potential for a Kiffin good, which we define as an input whose compensation increases at the same time that its productivity falls in some sense. The purpose of this paper is to formalize this notion and establish a setting in which such a phenomenon can take place.

The term "Kiffin good" was prompted by the defection of head football coach Lane Kiffin from the University of Tennessee to the University of Southern California. In short, it was an opportunity too good to pass up.[2] The ensuing model, however, is interesting on its own. A profit-maximizing firm hires both labor and management. Labor is paid the market wage, while management's pay is determined by bargaining. What makes the model special is that instead of choosing labor, management chooses the shape of the production function by choosing the intensity of management in production. The production function is also affected by the talent of the employed labor.

When worker talent increases, such as one achieves by moving to a football program with better players, the increase may crowd out the manager's intensity. If the decline in intensity is small enough that it does not outweigh the impact on production of the increased worker talent, total output still rises, and the manager's pay rises along with it. This is a Kiffin good, with the manager's increased compensation accompanied by decreased intensity.

2. The model

Consider the following novel production process. A firm hires both labor ℓ and management k.[3] Conditional on k, the production process is given by

[1]But not, unfortunately, for weasels. See Battalio et al. (1991) for an experiment in which rats increase their consumption of quinine when its price rises, and DeGrandpre et al. (1993) for an experiment in which smokers increase their purchases of a brand when its price rises.

[2]Presumably, Coach Kiffin can relate to this.

[3]It is, in fact, possible to hire more than one unit of Kiffins.

the function[4]

$$F(a, i, \ell) = ak^i f(\ell)$$

where $a > 0$ captures the talent level of the workforce, $0 < i < 1$ is referred to as the manager's *intensity*, and $k > 1$. Unlike most production problems where i is fixed and k and ℓ are variable, we allow management to choose its own intensity level i after the firm chooses k and ℓ. As with the management input, the firm's selection of the labor input is assumed to be non-strategic to avoid a more complicated leader-follower type two-stage model.

The payment to the manager is determined by a simple contract that divides the profits equally between the firm and the management. Consequently, the manager chooses i to maximize

$$\frac{1}{2}\left[pak^i f(\ell) - w\ell\right] - g(a)c(i)$$

where w is the wage, $g(a)c(i)$ is the cost of intensity, and p is the price of output.

The idea behind the function $g(a)$ is that higher values of a correspond to higher-quality labor or a more demanding work environment, and it may be more or less difficult to maintain intensity when a increases. We know that $g(a) > 0$, but its slope is open for debate. We assume that the cost function $c(i)$ is increasing and sufficiently convex for the second-order condition for a maximum to be satisfied. Within this framework we can formally define a Kiffin good.

Definition 1 *Management is a Kiffin good if its compensation increases simultaneously with a reduction in intensity.*

The task for this paper is to find conditions under which a Kiffin good exists. To do this we will explore how management's behavior and compensation change as the talent level of its work force increases. The manager's

[4]We treat k as exogenous throughout this paper. There are two reasons. One is that the structure we impose on the firm's decision problem is not sufficiently rich to analyze its choice of k because, in particular, we do not allow its costs to be convex in k. The other is that we are more concerned with the manager's behavior than the firm's. The primary issue with this assumption is that a firm with a different value of a might choose a different value of k, which would then impact the overall sign of di/da, which is our derivative of interest. However, holding k fixed even though a changes is consistent with a firm hiring an intact management team away from another firm.

first-order condition for a maximum is[5]

$$\frac{1}{2}pak^i \ln k - g(a)c'(i) = 0. \tag{1}$$

We want to see if increases in a crowd out intensity, so find di/da:

$$\frac{1}{2}pk^i \ln k - g'(a)c'(i) + \frac{di}{da}\left[\frac{1}{2}pak^i (\ln k)^2 - g(a)c''(i)\right] = 0$$

$$\frac{di}{da} = -\frac{pk^i \ln k - 2g'(a)c'(i)}{pak^i (\ln k)^2 - 2g(a)c''(i)}.$$

The denominator is negative by the SOC for a maximum, and the numerator is positive if $g'(a) < 0$, that is, if it is easier to maintain intensity in a higher-expectation environment. Under both of these conditions, $di/da > 0$ and there is no crowding out. But, if g' is sufficiently positive, so that moving to a better environment makes it much more costly to maintain intensity, then there is crowding out.

Now find how pay changes with a. Recall that pay is $\frac{1}{2}\left[pak^i - w\ell\right]$, which means that is is sufficient to determine how pak^i changes with a.

$$\frac{d}{da}\left[pak^i\right] \quad = \quad pk^i + pak^i \ln k \frac{di}{da}$$

Note that the first term is positive, and that the second term has the same sign as di/da. Consequently, if di/da is positive the world is as it should be, with increased compensation accompanying increased intensity. Our main result follows from the above equation and the following definition.

Proposition 1 *k is a Kiffin good if*

$$-\frac{1}{a \ln k} < \frac{di}{da} < 0.$$

The basic transmission lane behind a Kiffin good is the following. When the input moves to a more demanding environment its marginal productivity rises, ceteris paribus, because it works with more productive labor. However, the move also increases the cost of maintaining intensity, and the Kiffin good responds by reducing its intensity, thereby reducing its productivity. If the

[5] For simplicity, we set $f(\ell) = 1$.

impact of the better environment on marginal product outweighs the impact of the decline in intensity, the Kiffin good's compensation rises at the same time that its intensity falls. Essentially, an input is a Kiffin good when work force talent crowds out intensity but not so much that it negates the positive impact of the talent.

3. Existence

An empirical exercise into the existence of a Kiffin good would be both obvious and largely unproductive.[6] In this section we provide an example which fits the conditions of Proposition 1. First, in order for di/da to be negative its numerator must be negative:

$$pk^i \ln k - 2g'(a)c'(i) < 0.$$

Solving for $g'(a)$ and substituting from the first-order condition above yields

$$g'(a) > \frac{g(a)}{a}.$$

In other words, any cost function $g(a)$ for which the marginal cost exceeds the average cost is sufficient for $di/da < 0$. We make the following choices:[7]

$$\begin{aligned} g(a) &= a^2 \\ c(i) &= i^2 \\ p &= 1 \\ k &= e \\ a &= e^{1/4}. \end{aligned}$$

Substituting into the first-order condition (**??**) yields

$$\begin{aligned} 0 &= \frac{1}{2} pak^i \ln k - g(a)c'(i) \\ &= \frac{1}{2} e^{\frac{1}{4}} e^i - (e^{\frac{1}{4}})^2 2i \\ &= \frac{1}{2} e^{\frac{1}{4}} \left[e^i - 4ie^{\frac{1}{4}} \right] \end{aligned}$$

[6] At the University of Tennessee, Coach Kiffin made \$2 million for his first (and only) year. After finishing the season with a mediocre win-loss record of 7-6 and a bowl game loss, Coach Kiffin defected to the University of Southern California, where he is now making \$4 million a year.

[7] Note that we use $e \approx 2.7$ units of the Kiffin good which is slightly more than reality.

and this has as a solution

$$i = \frac{1}{4}.$$

With these values, the second-order condition simplifies to

$$-\frac{3e^{\frac{1}{2}}}{2} < 0$$

indicating a maximum. It remains to show that di/da is not too negative so that the condition in Proposition 1 is satisfied. We have

$$-\frac{1}{a \ln k} = -e^{-\frac{1}{4}}$$

and

$$\frac{di}{da} = -\frac{1}{3}e^{-\frac{1}{4}}$$

so that this is a Kiffin good.

4. Conclusion

In this paper, we explore the possibility of Kiffin behavior, wherein a manager's compensation increases as his intensity decreases. We propose a novel production process, and then provide a simple numerical example showing that Kiffin behavior is indeed possible. While we focus on Coach Kiffin's move to the University of Southern California, Kiffin behavior can also be used to explain, for example, why a sports team suddenly improves when a star player is injured because his teammates "step up."

References

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