A Short-Run Discretionary Behavior Model of the Firm*

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I. Introduction

While the role of discretionary managerial behavior in determining the objective(s) of the firm has been extensively studied, with a few exceptions, no attention has been focused on discretionary worker behavior[1]. While most economists who adhere to a managerial theory of the firm would not dismiss the existence of discretionary worker behavior, it appears that they uniformly dismiss the significance of this type of behavior in determining the internal behavior of the "firm". Presumably the behavior of a firm is determined by management motives if discretionary worker behavior can either be eliminated or made to conform to managerial objectives and if there are no other overpowering constraints on managerial behavior, such as effective shareholders control. However, the elimination or control of discretionary worker behavior generally involve explicit and/or implicit costs. If the cost of eliminating discretionary worker behavior is prohibitive from the managerial point of view, then discretionary worker behavior will serve as one form of effective constraint (internal) on discretionary managerial behavior. Just how the management group reacts to the discretionary behavior of workers, or more specifically to the various kinds of costs involved in trying to modify discretionary worker behavior, may have significant effects on some of the various economic variables of the firm, e. g., physical output and employment. Thus, the failure to deal seriously with discretionary worker behavior may diminish the descriptive accuracy and also may reduce the prescriptive usefulness of managerial models of the firm.

In this paper, we shall attempt to develop a short-run discretionary behavior model of the firm which explicitly takes into account discretionary worker behavior and to analyze some of its economic implications. Unlike previous studies which postulate some measurable variables which are linked to unobservable guiding motives or acts of choice, we shall deal directly with an "object" of choice which is extremely difficult to measure on a routine or continuous basis, i. e., work effort rate[2]. Since it is difficult to test any hypothesis regarding

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1) The literature on the managerial theory of the firm is quite extensive. Some pioneer works in this area are: O. E. Williamson [11], R. Marris [9], and W. Baumol [2]. Studies dealing with discretionary worker behavior to some extent are H. Leibenstein [6, 7], M. A. Crew, et. al. [3], A. Alchain and H. Demsetz [1] and O. E. Williamson [12].

2) O. E. Williamson, for example, states that "rather than attempt to introduce security, power, prestige, and so forth into the theory directly, we ask instead: to what activities do these motives give rise? These activities, rather than the motives, are then made a part of the model" [11, p. 1034]. The

causal relationships between observable and unobservable sets of variables, our research methodology emphasizes logical (mathematical) consistency and predictive power. The purpose of our model is to provide a conceptual framework by which one could derive functional forms of such subjective structures, as utility functions and effort transformation functions, that are consistent with some observable firm internal adjustment phenomena. The consistent forms can then be utilized to make predictions regarding how the firm will react to a different set of environmental (market) changes. Success in predictions provides the criterion by which one can make judgments regarding the relevance of the underlying subjective functions.

II. Discretionary Behavior Model of the Firm

A. General Assumptions

Our model is confined: (1) to the short-run where there is no change in fixed capital, (2) to two groups with separate spheres of discretionary opportunities, (3) to nonpecuniary means of discretionary behavior control, and (4) to parametric characterization of external influences on internal discretionary behavior.

Although the typical modern corporation is composed of more than two interacting hierarchical groups of people, treatment of more than two groups is too complex for the purpose at hand. We will restrict our analysis to the simplest hierarchical form of the firm. Assume that the firm consists of a fixed plant, a manager-owner (henceforth simply referred to as the "manager") and a group of workers. The model maintains the property of asymmetrical influence between the levels of the firm's hierarchy. The management group has the means (power)to modify the worker's opportunity sets. On the other hand, workers cannot alter the manager's opportunity set, but indirectly determine the opportunity "point" at which the manager operates.

There are a variety of means whereby the manager could alter the choice behavior of workers. For example, a manager could alter the pattern of discretionary worker behavior by way of modifying work effort specifications (work contract), by way of offering pecuniary bonuses related to higher productive worker effort, by way of threatening or encouraging a higher effort rate, or by way of changing the composition of his labor force. Some of these avenues of behavior control involve explicit cost beyond the basic time-based wage payment. As a matter of pertinent interest, however, we shall confine ourselves to nonpecuniary behavior control. In particular, we are interested in investigating the implications of what we shall refer to as "motivational" managerial effort.

The analytical assumption that all external influences on the firm's internal group behavior are exogenous is essential in order for us to derive an internal or "frictional" (c. f. [6]) equilibrium of the firm. The internal equilibrium is a simultaneous one. First, the manager tries to maximize his utility. This process delineates the workers' effort rate options and the workers in turn maximize their utility subject to their constrained opportunity sets and to the nature of their group interdependence. Worker optimizing behavior clarifies the manager subjective frontier, thus enabling him to complete his maximization.

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behavioral approach of Cyert and March [4], on the other hand, begins with observed behavior rather than underlying motives. For a discussion on different approaches, see F. Machlup [8].

B. Discretionary Worker Behavior

Suppose our firm has n workers. The number of workers in our simple firm cannot be arbitrarily large[3]. Assume that n does not exceed the manager's span-of-control.

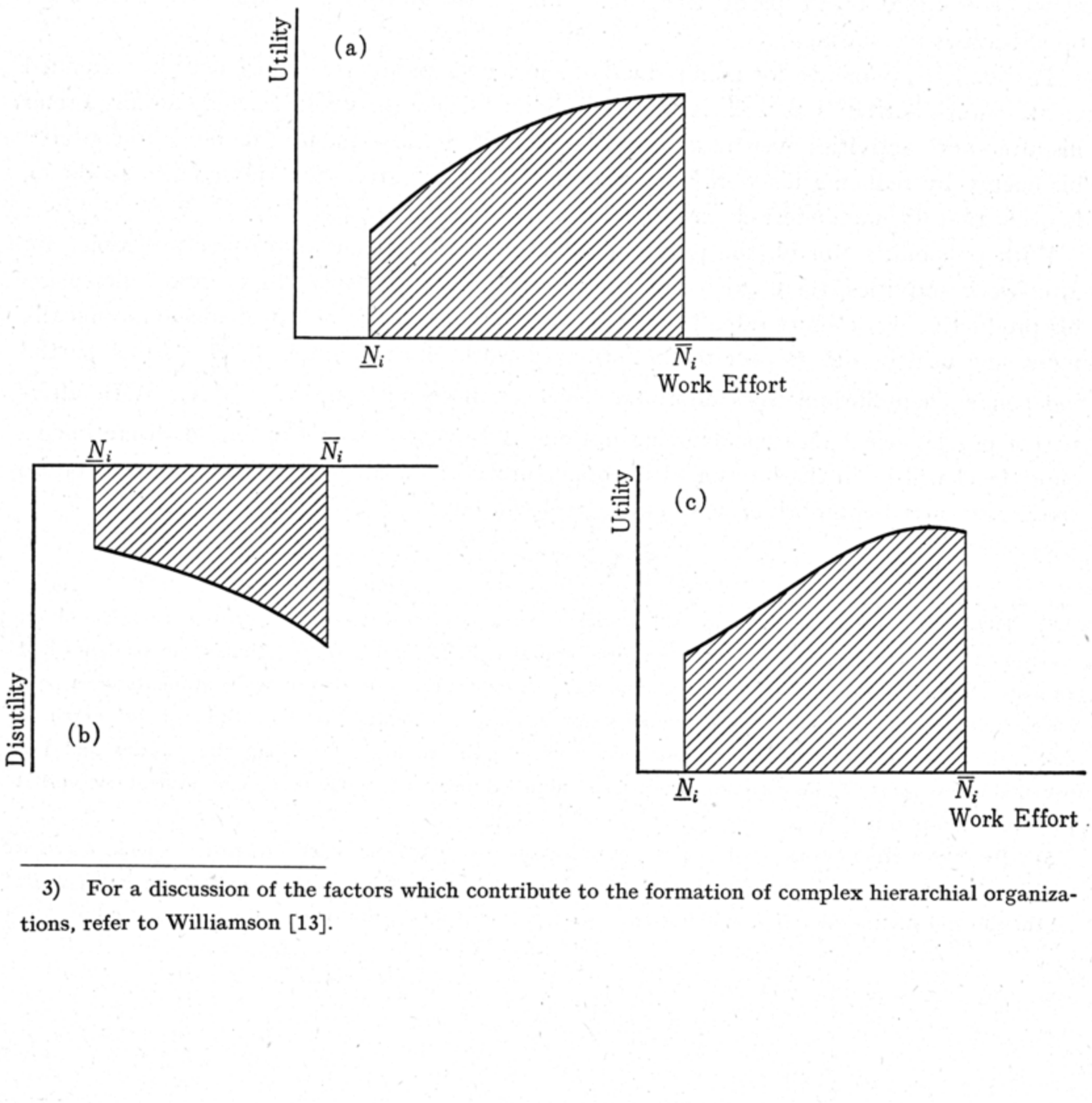
Assume that a worker's time-based wage rate is determined by the industry wage structure and that his length of time on the job is determined by the manager. Thus, the worker's job related income is not subject to his control. Although worker's hours on the job are not within his control, assume that within some minimum and maximum levels determined by market and nonmarket constraints a worker has control over his total work effort by virtue of his control over his work effort per hour, i. e., his effort rate. To formalize this, let e_i indicate the ith worker's work effort rate and L_i, his total number of hours on the job. The worker's total work effort is expressed as:

$$(1) \quad N_i = e_i L_i$$

We can represent his discretionary set of work effort levels by the lower bound $\underline{N}_i = \underline{e}_i L_i$ and by the upper bound $\overline{N}_i = \overline{e}_i L_i$.

Given his job related income, a worker could either "like" or "dislike" his discretionary work effort[4]. In other words, he attaches some non-neutral subjective value to discretionary

Figure 1: Worker's Utilty Contours



3) For a discussion of the factors which contribute to the formation of complex hierarchial organizations, refer to Williamson [13].

work effort. In Figure 1, three possible worker utility contours are illustrated. Case (a) represents positive but diminishing marginal utility with respect to discretionary work effort; case (b) represents disutility of discretionary work effort; and case (c) illustrates positive, zero, and negative marginal utility depending on the level of discretionary work effort.

If a worker is an individual who dislikes the nature of his work, within his capacity to do so, he will tend to minimize his disutility by resorting to on the job idleness (leisure). The worker's optimum independent discretionary work effort level will then be his lower bound level N_i in Figure 1b. Thus, if all workers abhored their work, the firm's partial independent equilibrium work effort level, which we shall denote as N^*, is represented by: $N^*=\sum_{i=1}^{n} \underline{N}_i$.

A reduction in a worker's effort rate may not only be attributable to a desire for on the job leisure. If a worker's discretionary opportunity set consists of both "productive" and "nonproductive" work effort, and if he dislikes productive effort but likes nonproductive effort, then it appears reasonable that for a given job-related income, the worker will try to enhance his psychological returns by shirking productive work effort[5]. Even if the worker did not dislike productive work effort, it would be rational for him to undertake some shirking if he had a strong preference for nonproductive effort over productive effort. Thus, a worker's discretionary productive work effort may tend to be smaller if there exist opportunities for shirking.

The idea of preference for nonproductive effort over productive effort may be extended to after-work activities as well. A worker may not dislike his work. He may simply prefer his after-work activities over his work-related activities. Consequently, he tends to conserve his energy by reducing his work (productive) effort rate, given the opportunity to do so, in order that he may undertake his after-work activities more vigorously.

With possibilities for on the job nonproductive activities and/or worker preference for after-work activities, there exists an opportunity cost with respect to a worker increasing his productive work effort rate. Thus, even if all n workers of the firm had monotomically increasing utility with respect to discretionary work effort (Figure la), the firm's partial independent equilibrium work effort level will not necessarily be $N^*=\sum_{i=1}^{n} \overline{N}_i$. With alternative psychological return enhancing options, a typical worker's optimum discretionary effort level will be in the interior of his opportunity set, i. e., $\underline{N}_i<N_i^*<\overline{N}_i$, and therefore the firm's partial equilibrium work effort level will be:

$$\sum_{i=1}^{n} \underline{N}_i<N^*<\sum_{i=1}^{n} \overline{N}_i$$

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4) Here we must assume that not all workers are conditioned to pecuniary rewards. Based on experiments involving students working on jigsaw puzzles, E. L. Deci [5] found that some students had an intrinsic desire (motivation) to solve the puzzles put before them. However, when students were paid for each puzzle solved, there was a tendency for intrinsic motivation to be displaced by extrinsic motivation. The locus of causality shifted: money became the reason for solving the puzzles and not personal inclinations. While pecuniary rewards diminished intrinsic motivation, complimentary verbal feedback increased it.

5) By "productive" work effort, it is meant effort expended on work activities which make a positive contribution to the firm's output. "Nonproductive" work effort applies to effort expended while on the job which either does not affect the firm's output or affects it negatively.

Independent worker utility (or disutility) with respect to discretionary work effort does not appear to be a dominant feature of a worker's life. Social psychology researches into the nature of worker group behavior have long confirmed the fact that informal work groups exert a strong influence over the work habits and attitudes of the individual worker[6]. Let us consider this aspect of a worker's productive life by postulating some form of interdependence among workers.

In general, we can assume that the ith worker's utility is a function not only of his own discretionary work effort level, but also of those of his co-workers and of his co-workers' psychological states and of the manager-owner's motivational effort (M). In other words, worker interdependence is assumed to apply to utility levels as well as discretionary effort levels. Formally, this is expressed as:

$$(2) \quad U_i = G_i(e_1L_1, \cdots e_nL_n\,;\, U_j\,;\, M), j=1, \cdots, n\,;\, j \neq i.$$

The M and L_i variables are exogenous to the workers and the work effort rates are confined to the workers' discretionary sets, i. e.

$$\underline{e}_i \leqq e_i \leqq \bar{e}_i.$$

By positing a utility function with co-workers' utility levels included as arguments, we have assumed a feedback mechanism whereby a worker's influence on other members of his work group is communicated back to him.

We assume workers to maximize their utility based on discretionary work effort. However, as can be seen from the necessary conditions for the maximization of each and every worker's utility, a worker cannot maximize his own utility without the cooperation of his co-workers.

Construct the implicit functions J^i as:

$$(3) \quad J^i(e_i, U_i) = U_i - G_i(e_1L_1, \cdots, e_nL_n\,;\, U_j\,;\, M) = 0.$$

Assuming an interior maximum, the interdependent marginal utility of the kth worker can be expressed as:

$$\frac{\partial U_k}{\partial e_k} = -\frac{\dfrac{\partial(J^1, \cdots, J^n)}{\partial(U_1, \cdots, U_{k-1}, e_k, U_{k+1}, \cdots, U_n)}}{\dfrac{\partial(J^1, \cdots, J^n)}{\partial(U_1, \cdots, U_n)}} =$$

$$= -\frac{\begin{vmatrix} J_{U_1}^1 & \cdots & J_{U_{k-1}}^1 & J_{e_k}^1 & J_{U_{k+1}}^1 & \cdots & J_{U_n}^1 \\ & \ddots & & & & & \\ & & J_{U_{k-1}}^{k-1} & & & & \\ & & & J_{e_k}^{k} & & & \\ & & & & J_{U_{k+1}}^{k+1} & & \\ & & & & & \ddots & \\ J_{U_1}^n & & & & & & J_{U_n}^n \end{vmatrix}}{\begin{vmatrix} J_{U_1}^1 & & J_{U_1}^1 \\ & \ddots & \\ J_{U_1}^n & & J_{U_n}^n \end{vmatrix}}$$

The necessary conditions for partial worker maximum utility are:

6) Refer to J. A. C. Brown, "The Social Psychology of Industry," in [10].

$$\left.\frac{\partial U_k}{\partial e_k}\right|_{\substack{M=\text{const.}\\ L_k=\text{const.}}}=0 \text{ for } k=1, \cdots, n.$$

A pervasive feature of any cohesive worker group is the group norm. The notion of a group norm can be formalized by the proper interpretation of the process of interdependent utility maximization. For example, consider the case where $n=2$. If we assume that each worker is a "workophite", $\frac{\partial G_k}{\partial e_k}>0$, that he places a positive subjective value on his co-worker's utility, $\frac{\partial G_k}{\partial U_j}>0$, and we assume that changes in a worker's effort rate has a negative effect on his fellow workers' utility, $\frac{\partial G_k}{\partial e_k}<0$, then the necessary conditions are:

$$\frac{\partial U_1}{\partial e_1}=\frac{1}{E}\frac{\partial G_1}{\partial e_1}+\frac{1}{E}\frac{\partial G_1}{\partial U_2}\frac{\partial G_2}{\partial e_1}=0$$

and

$$\frac{\partial U_2}{\partial e_2}=\frac{1}{E}\frac{\partial G_2}{\partial e_2}+\frac{1}{E}\frac{\partial G_1}{\partial e_2}\frac{\partial G_2}{\partial U_1}=0$$

where $E=1-\frac{\partial G_1}{\partial U_2}\frac{\partial G_2}{\partial U_1}>0$. The first terms on the right side of the equality signs represent the "direct" effects of a worker's variation in his own discretionary work effort rate. The second term in each equation represents the "feedback" effect. The direct effects are positive, while the feedback effects are negative. Thus, the independent worker's utility contour may look like Figure la, but under partial work group equilibrium the representative contour will look more like Figure 1c. The work group effort norm, in conjunction with the manager's motivational effort and job-time scheduling, will determine the firm's total productive work effort input.

C. Manager-Owner Behavior

We assume that the management level of our simple firm is composed of a single manager who is also the owner of the firm. Although organizational form may be an essential aspect of internal firm efficiency, it is not the intention of this analysis to consider complex organizational form. For our purpose, we will merely utilize the fundamental hierachical relationship between a manager and his subordinates.

Our manager-owner is assumed to have a utility function defined over profit (π) and discretionary effort (D).

$$(4) \quad U_m=G_m(\pi, D),$$

with the following properties: $\frac{\partial U_m}{\partial \pi}, \frac{\partial U_m}{\partial D}>0$ and $\frac{\partial^2 U_m}{\partial \pi^2}, \frac{\partial^2 U_m}{\partial D^2}<0$. The manager's discretionary effort (D) is assumed not to be productive. We could think of D as being indicative of either leisure (idleness) or nonproductive effort (e. g. practicing his golf strokes). In either case, the manager's endeavor to vigorously seek leisure or nonproductive activities diverts his efforts from his managerial functions.

The managerial function we are primarily concerned with can be broadly called the motivational function. We shall construe the motivational function to be the exercising of nonpecuniary means to induce a higher level of productive work effort from the members of the firm's labor force. In our model, the manager has two levers for controlling the firm's productive work effort input. First, he has the right to vary workers' scheduled hours on

the job. (Production scheduling function.) Secondly, he has the prerogative of constraining the workers' discretionary effort rate sets (motivational function). Success in the motivational function requires that the manager possess some knowledge of the spectrum of motivating techniques and of the social dynamics of his work group. If there exist opportunities for worker shirking, the manager's motivational effort may entail supervisory policing which reduce nonproductive worker utility enhancing options. If workers' discretionary efforts are productive, the manager's motivational effort may involve paying his workers verbal compliments in order to elevate the group's work effort norm. On the other hand, his efforts may involve reprimands and threats as a means of evoking more productive effort from his workers.

Granted that the manager is fairly successful in conducting motivational activities, if he wanted a higher level of productive work effort from his workers than the group was willing to generate under a regime of no managerial motivational intervention, then he is required to direct more of his own efforts towards motivational endeavors, which reduces his utility enhancing efforts. In other words, the manager's discretionary effort level (D) is a negative function of his managerial motivational effort level (M).

$$(5) \quad D=T(M),$$

with $T'(M)<0$ and $T''(M)>0$.

D. Firm's Production and Profit Functions

The firm's short-run production function is of the general form

$$(6) \quad Q=F(K,N),$$

where Q=real output, K=fixed plant, and N=total productive work effort. The firm's production function defines the feasible technical input relationships between physical plant and total productive work effort which yield maximum real output. The production function is assumed to have the following "well-behaved" properties: $F(0, N)=F(\mathrm{K}, 0)=0$, $\frac{\partial F}{\partial K}>0$, $\frac{\partial F}{\partial N}>0$, $\frac{\partial^2 F}{\partial K^2}<0$ and $\frac{\partial^2 F}{\partial N^2}<0$. The firm's total productive work effort is ultimately a function of the manager's motivational effort (M) and total assigned hours of work (L), both of which are under the control of the manager[7].

$$(7) \quad N=N(M,L)$$

and

$$(8) \quad L=\sum_{i=1}^{n} L_i.$$

The firm's short-run profit function is expressed as:

$$(9) \quad \pi=pQ-wL-FC.$$

The output price (p) and the time-based wage rate (w) are both parameters. FC is another parameter representing "fixed cost". Labor cost is assumed to be the only type of explicit variable cost. It is assumed that the manager does not explicitly pay himself for his motivational efforts.

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7) The specific properties of (7) will depend on the specific form of the workers' utility functions. For analysis of equilibrium and stability, however, it is assumed that:

$$\frac{\partial N}{\partial M}, \frac{\partial N}{\partial L}>0; \quad \frac{\partial^2 N}{\partial M^2}, \frac{\partial^2 N}{\partial L^2}<0 \text{ and } \frac{\partial^2 N}{\partial M \partial L}, \frac{\partial^2 N}{\partial L \partial M}>0.$$

E. Condensed Model

By making the necessary substitutions, we can obtain a condensed version of our discretionary behavior model of the firm.

Equations		
(III. 1)	$U_i=G_i(e_1L_1,\cdots,e_nL_n;\ U_j;\ M)$ $j=1,\cdots,n;\ j\neq i$	Worker's Utility Function
(III. 2)	$U_m=G_m\{pF[K,N[M,L)]-wL-FC;\ T(M)\}$	Manager's Utility Function
(III. 3)	$L=\sum_{i=1}^{n}L_i$	Firm's Scheduled Hours

Variables	Parameters
e_i=worker's effort rate	K=fixed plant
M=manager's motivational effort	p=output price
L=firm's scheduled hours	w=wage rate
	FC=fixed cost

F. Internal Equilibrium and Stability

The manager is assumed to maximize his utility function (4) subject to his effort transformation function (5) and to the firm's profit function (9). Although there is no explicit cost for managerial motivational input, there is a relevant subjective cost to the manager who provides this input. This opportunity cost is the manager's psychological returns foregone as a result of providing motivational input.

In order for the manager to achieve maximum utility, it is necessary that he operates the firm at the point where the marginal revenue product of the total scheduled hours of employment (holding work effort rates constant) just equals the prevailing time-based wage rate and that his *net* marginal utility associated with variations in motivational effort (holding hours of employment constant) is zero. Formally, these conditions can be derived by differentiating equation (III. 2) partially with respect to both motivational effort (M) and total hours of employment (L), and setting the resulting equations equal to zero, i. e.,

$$(10)\quad \frac{\partial U_m}{\partial L}=\frac{\partial G_m}{\partial \pi}\left(p\frac{\partial F}{\partial N}\frac{\partial N}{\partial L}-w\right)=0$$

and

$$(11)\quad \frac{\partial U_m}{\partial M}=\frac{\partial G_m}{\partial \pi}\left(p\frac{\partial F}{\partial N}\frac{\partial N}{\partial M}\right)+\frac{\partial G_m}{\partial D}T'(M)=0$$

Assuming $\frac{\partial G_m}{\partial \pi}>0$, condition (10) requires $p\frac{\partial F}{\partial N}\frac{\partial N}{\partial L}=w$. Condition (11) can also be expressed in the following manner:

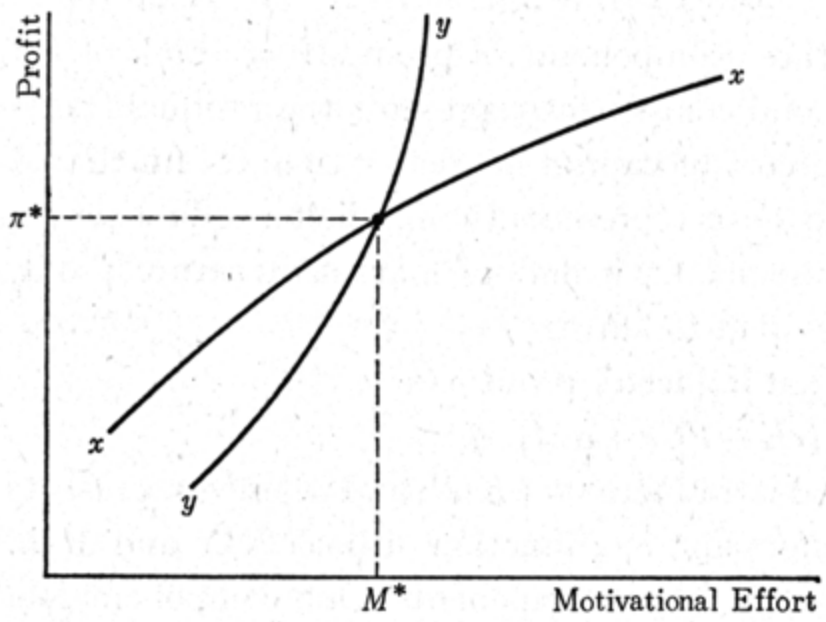
$$(11)\ -\frac{\partial G_m}{\partial D}T'(M)\Big/\frac{\partial G_m}{\partial \pi}=p\frac{\partial F}{\partial N}\frac{\partial N}{\partial M}$$

which implies that for maximum utility, the subjective rate of substitution between profit and motivational effort should be equal to the partial marginal profit rate attributable to motivational effort.

Solving equations (10) and (11) simultaneously determines the manager's optimum operating levels of motivational effort and total hours of employment. Due to the presumed nature of the second order properties of most of the functions, there is no cause to suspect that the solution will yield minimum rather than maximum utility[8]. If the manager's optimum

position requires more productive labor input than that which is forthcoming from managerially unconstrained worker utility maximization, he will intensify his motivational efforts and time scheduling to constrain workers' discretionary behavior until the desired magnitude of productive labor input is forthcoming.

Figure 2: manager-Owner's Optimum State



The manager's optimum state is depicted by the intersection of the *xx* and *yy* curves in Figure 2. On the vertical axis we measure profit, and manager's motivational effort on the horizontal axis. The curve *yy* is the locus of potential maximum utility, i. e. where necessary condition (11) prevails. The *xx* curve, on the other hand, represents the locus of points where condition (10) prevails, and represents the locus of maximum profits.

In an effectively controlled (motivated) firm, the stability of the firm's internal equilibrium is determined by the stability of the manager's optimum state. The manager's equilibrium will be stable if the *xx* curve intersects the *yy* curve from the right. The internal equilibrium could still be stable even if the *xx* curve did not intersect the *yy* curve from the right. However, under these circumstances, the path back to internal equilibrium will be highly specific (i. e. a saddlepoint path or a converging cyclical path).

As specified, our discretionary model is still essentially a "managerial" model, as the manager has access to all levers of discretionary behavior control and is the prime shaper of internal firm behavior. While the discretionary powers of workers are limited, their utility maximizing behavior is a determinant of the manager's maximum feasible profit "frontier". In this respect, discretionary worker behavior may serve as a resistance factor to managerial utility maximization, and not as a prime shaper of internal firm behavior.

G. Motivational Effort and Profit

Assuming that the firm's production is homogeneous of degree one with respect to capital (K), manager's motivational effort (M) and total hours of employment (L), and that raw material costs are zero, the firm's value added (pQ) sums to the following functional returns:

$$(12)\quad pQ=p\frac{\partial F}{\partial K}K+p\frac{\partial F}{\partial N}\frac{\partial F}{\partial M}M+p\frac{\partial F}{\partial N}\frac{\partial N}{\partial L}L+\pi_0$$

where the marginal product of capital $\frac{\partial F}{\partial K}$ and the marginal product of firm work effort $\frac{\partial F}{\partial N}$ are both unique functions of K/N, where the marginal efficiency of motivational effort $\frac{\partial N}{\partial M}$ and the marginal efficiency of hours of employment $\frac{\partial N}{\partial L}$ are both unique functions of

8) Due to space limitations, the mathematical analysis of maxima and of stability are not presented here. Only the results are discussed.

M/L, and where $\pi_0 \gtreqless 0$ represents market structure profit (parameter). Since $p\frac{\partial F}{\partial N}\frac{\partial N}{\partial L}=w$ under manager's utility maximization, by substituting (12) into the firm's profit function (9), we obtain:

$$(13) \quad \pi=\pi_0+\left(p\frac{\partial F}{\partial K}K-FC\right)+p\frac{\partial F}{\partial N}\frac{\partial N}{\partial M}M.$$

Expression (13) implies that there are really three components of profit. If we think of FC as contractual interest payments, then the second component represents the residual short-run rent on capital. If the long term carrying cost of capital is greater than its functional return, then rent is negative (loss). The third term represents the implicit residual return on motivational effort. All three residual components, including market structure profit, accrue to the manager by virtue of his ownership of the firm.

We can define "discretionary" or "motivation induced" profit as:

$$(13a) \quad \pi-\pi_0 \equiv (rK-FC)+\alpha M,$$

where r represents the rental rate on capital and is a function of K/N, and where α represents the value marginal product of motivational effort and is a function of both K/N and M/L. Thus, the manager's discretionary profit consists of two components. One component is a short-run rent on capital (positive, zero, or negative), and the other is a residual functional return on motivational effort.

III. Market Impact on Internal Equilibrium (Comparative Statics)

In this section we examine the effects of market variable changes on the discretionary firm's equilibrium. There are three market parameters: product price (p), wage rate (w) and market structure profit (π_0). Changes in these market variables will ultimately affect the manager's equilibrium motivational effort (discretionary effort) and the firm's equilibrium hours of employment, as the manager's equilibrium is the prime shaper of the firm's internal equilibrium. In general, the firm's internal equilibrium can be expressed as:

$$(14) \quad Z_1(M^*, L^*; p, w, \pi_0)=0$$
$$(15) \quad Z_2(M^*, L; p, \pi_0)=0,$$

where Z_1 and Z_2 are the implicit equilibrium solutions of the necessary conditions (10) and (11)[9]. The comparative static results are summarized in Table 1.

Table 1: Market Variable Impact On Firm's Internal Equilibrium

Affect On \ Increase In	p	w	π_0
L^*	+	−	+
M^*	?	+	+

The results are generally not surprising. One would normally expect a discretionary firm's demand for hours of employment (L) to respond negatively to changes in the market wage rate and positively to changes in market product price and market structure profit (assumed to be positive). However, when compared to a profit maximizing firm, the discretionary firm's elasticity of demand for total hours of employment may differ significantly.

9) The fact that w does not enter into (15) will enable us to identify (14) in cases where the market wage rate flucuates significantly.

This should be evident, for in the case of the discretionary firm, the nature of the manager's utility and effort transformation functions play a role in determining the firm's demand for hours of employment in addition to the technological nature of production[10].

Market impacts on the manager's equilibrium motivational effort are also not surprising. Both an increase in the market wage rate and market structure profit will tend to reduce discretionary profit without affecting the manager's discretionary effort. Thus, to compensate for the utility loss due to market reduction of discretionary profit, the manager tends to increase his motivational effort. The product price change impact on equilibrium motivational effort is indeterminate. If discretionary effort (D) is a "normal" argument in the manager's utility function, an increase in market price will lead to a reduction in the manager's equilibrium motivational effort. On the other hand if D is "inferior", then an increase in product price will lead to an increase in the manager's equilibrium motivational effort.

IV. Conclusion

The simple discretionary model presented in Section II is distinguished from managerial models of the firm in that more specific treatment is accorded to discretionary worker behavior and in that the model tries to deal directly with difficult to measure subjective variables. The model is too elementary in several respects. For example, we have confined our specification only to interactions between two groups of individuals with power distributed asymmetrically between them. Furthermore, our treatment of nonpecuniary means of discretionary behavior control has been limited. The manager could conceivably resort to hiring and firing activities in order to modify the composition of his labor force in such a manner that the desired labor effort response is obtained. Also, the firm's organizational complexity has been restricted to the most elementary hierarchical form. This reduces the operational usefulness of the model as other organizational factors determine internal efficiency besides motivation. And finally, the manager's opportunity frontier has been confined to trade-offs

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10) The nature of market wage rate change effects on the discretionary firm's equilibrium hours of employment provides us with an avenue toward estimating the nature of the underlying subjective functions. Let the parametric effect equation be expressed as:

$$\frac{dL^*}{dw}=\phi(M^*, L^*; p, \pi_0).$$

If this expression is integrable, we can derive the discretionary firm's demand for hours of employment. For example, let:

$$\frac{dL^*}{dw}=a\left(\frac{L}{w}\right)^b.$$

By integrating, we obtain:

$$\int L^{-b}dL^*=a\int w^{-b}dw+c \text{ or } \frac{1}{1-b}L^{1-b}=\frac{a}{1-b}w^{1-b}+c.$$

Solving for L, we derive the firm's demand for hours of employment, i. e.:

$$L^D=(aw^{1-b}+k)^g \text{ where } k=c(1-b),\ g=1/1-\text{b and } b\neq 1.$$

The values of the constants a and b depend on p and π_0. The constant of integration c depends on M^*. By finding utility, effort transformation and production functions which are consistent with our integrable differential equation, we can then derive impact functions for p and π_0 on L^*, whichever impact function yields the best predictions enables us to determine the relevancy of specific subjective functions.

between discretionary and motivational efforts. Since there are other managerial functions besides the motivational one, the transformation may be realistically more complex.

Despite its specification and operational limitations, the model gives a fairly good idea of the analytical potentials of discretionary behavior models of the firm. Although the particular discretionary model presented in this paper is still essentially "managerial" in nature, discretionary models involving symmetrical distribution of power may be analyzed in terms of game or bargaining theories and their economic implications compared to those of the neoclassical and managerial theories of the firm. Even in instances where qualitative results are not different, quantitative results (e. g elasticity of derived demands) may differ significantly and thereby influence the predictive capacities of the various models.

The investigative approach to discretionary behavior models of the firm suggested in this paper is novel. Instead of conventionally dealing with measurable activities to which subjective motives give rise, we propose to deal directly with elements of subjective acts of choice. The specific forms of the underlying subjective (and technological) functions are ascertained from the firm's response to a particular kind of market change. Consistent subjective functions are then utilized to make predictions regarding a firm's response to other kinds of market change. Success in predictions enables us to judge the relevance of the underlying subjective functions.

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