2005

Cultural Variation in the Theory of the Firm

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Working Paper

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Working Paper 2005-07

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Abstract:

This paper presents a model of the firm that includes the possibility of firm and employee-on-the-job decision making based on alternatives to profit and utility maximization. Such alternatives are relevant and significant when explaining firm activity in cultural environments in which self interest is not considered to be a primary force driving human behavior. Three types of firms are defined and their properties compared: the Western firm, the Japanese firm, and the clan. The third is a combination of the first two.

Key words:

Culture, firm, decision making

JEL classifications:

D21, Z19

Cultural Variation in the Theory of the Firm[1]

In explaining firm behavior, economists focus on what seems to be the most important features of economic reality to secure the building blocks their models. In the case of Western firms, this has led to the postulation of such elements as production functions with their attendant properties, and the pursuit of maximization by firms as the motivating force that drives the determination of their behaviors. (The use of the term "maximization" here is intended to be quite general, covering both the long and short runs, and including the maximization or minimization of an appropriate objective function, with or without constraint, under conditions of either certainty or uncertainty.) Since it is not possible, given the limits of the experimental laboratory that economists have at their disposal, to confirm the veracity of such assumptions or even their implications (Caldwell [4, pp. 156-157], Katzner [12, pp. 8-9]), they must, of necessity, be accepted on faith. That faith, however, is still justifiable in terms of the cultural heritage of the particular subjects under investigation.

The reason why culture plays a role here is that the forces that motivate real people are determined, to a considerable extent, by their cultural backgrounds (Katzner [14]). And it is real people who make the decisions that guide the behavior of real firms. Returning to the case of the West, one of the most important cultural components, at least in so far as economic analysis is concerned, is self interest. That component was institutionalized at the center of certain Western cultures in the 17th century and spread to all of them, to one degree or another, shortly thereafter (Weber [17]). Indeed, it has become so fundamental in Western life and thought that self interest, in the form of postulates of rationality or maximization, is, today, quite naturally and readily accepted by economists in explanations of Western economic reality as the most important single force driving individual behavior (Katzner [11]).

It follows from this that in places where self interest is not a significant component of cultural backgrounds, postulates of rationality have no place in explanations of firm behavior because the real people who make the decisions do not think in those terms.[2] Such is the case, for example, with Japan (Katzner [11]). Rather than pursue the maximization of profit (including, under conditions of perfect competition, the selection of a cost-minimizing input mix, the hiring of inputs to the point at which they are paid the values of their marginal products, and the production of output to equate marginal cost to output price), it has been claimed, among other things, that Japanese firms (i) hold service to the general community and the provision of social and economic benefits to their employees as their primary objectives (Abegglen and Stalk [1, pp. 199-203]), (ii) maintain close ties with certain suppliers, in part, by not seeking out supplies from other firms that may be cheaper (Gerlach [5], and Ito [8, pp. 177-196, 214-226]), (iii) frequently make investment decisions on the basis of keeping up with the competition so as to maintain their social status (Nakane [16, p. 90]), and (iv) pay employees according to seniority (not productivity) and tend not fire them during hard economic times when they would be fired were they working for Western firms (Nakane [16, pp. 15, 82-83]). All of these characteristics are confluent with the well-known Japanese cultural values of loyalty, the honoring of the myriad of obligations that all (Japanese) people and institutions bear, and the maintenance of harmony within society (e.g., Benedict [2] and Nakane [16]).

These are not the only differences between Western and Japanese firms that are attributable to cultural dissimilarities. For, in addition to the owners and managers of Western firms, Western employees, too, are propelled in their behavior by self interest. This means that a Western firm can not only offer its employees financial and other incentives to direct their activities, but also expect

that those incentives will elicit, to some significant degree, the desired outcome. In Japan, however, where self interest is not the main spring of action, such incentive schemes are unlikely to be as successful. Rather, to draw forth desirable conduct, Japanese firms tend to rely more on a process of socialization of employees that appeals to the Japanese cultural values of loyalty, honoring obligations, and harmony, and which leaves employees wanting to do the "right" thing on their own.

There have been a few efforts to incorporate some of these anti-profit- anti-utility-maximization characteristics in the theory of the firm. For example, Blinder [3] presents a model in which the firm attempts to maximize both profit and employee welfare combined and which, as a consequence, leads it actually to maximize revenue as opposed to profit. And Hay and Morris [7, Ch. 10] describe a model in which firm behavior is generated by aligning the growth of its inputs with the growth of the demand for its output. In the latter case, although the model includes a particular notion of growth maximization, the focus on growth itself, with its obvious benefits to both society and employees, nevertheless satisfies, to a considerable extent, characteristic (i) attributed to Japanese firms above. But although profit and utility maximization are avoided as such, since both of these models still contain other forms of maximization by the firm, they do not provide a clean break with postulates of rationality. And, as has been indicated above, those postulates are necessarily irrelevant in models that purport to explain the behavior of Japanese firms.

The purpose of this paper is to provide a model of the firm that allows for movement away from postulates of rationality or maximization and that, therefore, would possibly be applicable in a country like Japan. In particular, the model developed encompasses, as special cases, both firms that do rely on maximization in decision making, as well as those that do not. For convenience, a specific subset of the firms in the model that rely on postulates of rationality for decision making are referred to as "Western firms," while a subset of those whose decisions are based on some other criterion are called "Japanese firms." Formal definitions of these types of firms, along with a third type that combines certain elements of each, are provided in Section II. The inclusion of three distinct kinds of firms in the same model in this way permits comparisons between them that would otherwise not be possible. The particular contrasts that emerge relate to both structure and efficiency.

I

To account for an expanded range of cultural effects on the firm, attention will focus, in addition to outputs and inputs, on social interactions among its employees. Although inclusion of the latter will require the introduction of variables that appear to be incapable of measurement, those variables will be handled according to techniques set forth by Katzner [9], [12]. The model itself is a variant of that originally proposed by Gintis and Katzner [6] and subsequently invoked by Katzner [10] to study the efficiency of organizational forms.

Assume lines of authority in the firm are pyramidal so that every employee k (where $k = 1,\ldots,K$) has exactly one immediate superior or supervisor. All employees except those at the bottom end of a line of authority in the pyramid have at least one subordinate. Two or more employees with the same supervisor are co-workers. Situated at the top of the pyramid is the director who is designated by the symbol $k = 0$. The director may also be thought of as a chief executive, board of directors, or as a combination of both.

Each employee $k \neq 0$ supplies labor time z_k to the firm. During time supplied the employee performs activities a_k which are assumed to be independent of z_k and fall within the terms of his work arrangement.[3] These activities involve social interactions among employees and are limited by the technological imperatives of production. It is not required that the a_k be quantifiable: The only restrictions are that each "value" of a_k be capable of distinct, discrete, verbal description, and that the set of activities, A_k, over which a_k may range also be subject to similarly precise definition. In addition to performing activities, each employee provides rules which constrain the activities (i.e., limit the activity sets) of all workers (not only immediate subordinates) below him in authority. These rules are characterized in terms of the constraints they impose. Thus, if *k* is above k' in authority and if $R_{kk'}$ is a set of rules prescribed by *k* for k', then $R_{kk'}$ is defined as a subset of $A_{k'}$, or $R_{kk'} \subseteq A_{k'}$. The furnishing of rules may be thought of as an activity which is independent of all other activities and singled out for special attention. Rules may be so restrictive as to dictate exactly what must be done (i.e., select a single element from the employee's activity set) or they may allow for considerable flexibility and choice. Rules also have to be adapted to the technology of production and the capabilities of the individuals for whom they are intended. Moreover, the collection of rules imposed on any employee k' by all persons above him have to be consistent, that is, $\bigcap_k R_{kk'}$ must be nonempty, where the intersection is taken over all *k* above k' in authority. Let r_k denote the collection of sets of rules -- one set $R_{kk'}$ for each person k' below him -- issued by person *k*. When *k* has no subordinates, the symbol r_k has no meaning. Write $a = (a_1, \ldots, a_K)$ and $r = (r_1, \ldots, r_K)$. The director's rules, r_0, are presumed given.

The output of the firm, *x*, depends on quantities of labor time and non-labor inputs purchased by the firm, as well as on rules for subordinates and activities (consistent with rules received from above) supplied by employees. This production function may be written mathematically as

$$x = f(y, z, a, r), \tag{1}$$

where $y = (y_1, \ldots, y_I)$ is an *I*-vector of quantities of non-labor inputs and $z = (z_1, \ldots, z_K)$. Actually, since it only serves to limit the values that *a* can take on and does not affect output directly, *r* need not be listed as an argument of *f*. But retaining *r* in the production function introduces no difficulties and at the same time provides convenience that is useful below. In the currently standard textbook treatment, *y* and *z* are picked by the firm and *a* and *r* are ignored. The present approach continues the selection of *y* and *z* by the firm. But now a separate choice (y, z) is made for each value of the vector (a, r). And, in addition, *a* and *r* themselves are determined through an independent decision process that engages only the firm's employees.[4] Of course, the choice of *a* and *r* reflects and describes the relevant social interactions among the employees of the firm. Regardless, it will simplify matters to assume that the markets in which the firm buys its non-labor inputs and sells its output are all perfectly competitive.

Let the firm pay each employee *k* a wage *w* according to the "incentive" function[5]

$$w_k = W^k(a_k, r_k), \tag{2}$$

where $k = 1,\ldots,K$. Non-monetary incentives, such as the possibility of promotion and the guaranteed long-term employment granted by many Japanese firms are not considered. Moreover, it is possible for W^k to be a constant function associating the same wage to all (a_k, r_k) in its domain. Constant incentive functions, of course, are consistent with the practice of paying the employee according to his seniority. The firm's profit function is

$$\pi(y,z,a,r) = p_x f(y,z,a,r) - \sum_{i=1}^{I} p_i y_i - \sum_{k=1}^{K} w_k z_k \,, \tag{3}$$

where p_x denotes output price, and p_i the price of non-labor input *i*. To keep matters simple, the director is assumed to be paid out of profit rather than provided a wage.

In Western firms, the functions W^k frequently have the property, implicit in previous discussion, that those values of $(a,r) = (a_1,\ldots,a_K,r_1,\ldots,r_K)$ that enhance the productivity or profitability of the firm are assigned a higher wage. In that circumstance, however, suppose that for fixed values of p_x, $p_1,\ldots,p_I$, *y*, and *z*, output is higher at (a',r') than at (a'',r''). If profit is also to be higher at (a',r'), then it is necessary that the W^k be set so that the additional wages paid employees at (a',r') over those paid at (a'',r'') is less than the additional revenue received at (a',r'). Were this not the case, then the most productive (a,r) need not be the most profitable, and hence moving to increase productivity might reduce profitability. Formally, the collection of incentive functions $\{ W^k \}$, one for each employee $k = 1,\ldots,K$, is said to be *profit efficient* (Gintis and Katzner [6, p. 282], and Katzner [10, pp. 548, 549]) whenever

$$f(y,z,a',r') \geq f(y,z,a'',r'')$$

if and only if

$$\pi(y,z,a',r') \geq \pi(y,z,a'',r'')\,,$$

for all *y*, *z*, *a'*, *a''*, *r'* and *r''*. Profit efficient incentives, then, have the property that productivity increases due to changes in (a,r) always are translated into larger profit. Note that, in addition to incentives which provide wage raises that are smaller than resulting revenue increments, all collections of constant incentive functions are also profit efficient.

According to the cultural distinctions drawn at the outset, there are two general possibilities for the selection of *y* and *z* by the firm. On the one hand, Western firms choose *y* and *z* on the basis of profit maximization in relation to (3), given the W^k and values for p_x, $p_1,\ldots,p_I$, *a*, and *r*. For fixed (a,r), the consequences of these choices under standard assumptions imposed on the production function *f* in (1) are well-known and not repeated here. On the other hand, nonWestern firms determine *y* and *z* given *a* and *r* according to some generally-non-profit-maximizing criterion that, for present purposes, is not necessary to specify. For convenience it is assumed that those firms also take prices p_x and $p_1,\ldots,p_I$ as parameters. With these latter parameters fixed, the relationship between selections of *y* and *z* and values of *a* and *r* in nonWestern firms may be summarized by the firm selection function s^f as follows:

(4) $$(y, z) = s^f(a, r).$$

Of course, the possibility that s^f might reflect profit maximization as a special case has not been ruled out.

It is worth providing an example to illustrate how the function s^f might be determined. Consider the Japanese firm. With (a,r) set, specific social interactions among employees obtain. Given those interactions, the hours each employee supplies and the quantity of non-labor inputs with which he works impinge on his ability to fulfill his social and productive obligations and on the nature of the harmony present within the firm. This, in turn, affects overall cooperation and productivity. Historically the firm has established and become comfortable with a certain realization of harmony and a particular ability among employees to fulfill obligations. Suppose, then, that given any (a,r), the firm chooses *y* and *z* to maintain as much as possible that harmony and ability. In this way, a (y,z) is determined for each (a,r).

There are also two general possibilities for the selection of $a = (a_1,\ldots,a_K)$ and $r = (r_1,\ldots,r_K)$ by the firm's employees. For both instances, assume employees choose values of the a_k and r_k (subject to the constraints indicated below) independently of their selection of leisure time and consumption so that these latter selections may be ignored. With respect to Western firms, let the utility function, u^k, (assumed to exist) of employee *k* be written as

(5) $$\mu_k = u^k(a_k, r_k, w_k).$$

Note that the appearance of w_k as an argument of u^k makes the role of incentives in employee decision making explicit. However, substitution of (2) into (5) eliminates w_k and reduces (5) to

(6) $$\mu_k = U^k(a_k, r_k).$$

Suppose that the chosen value of $(a,r) = (a_1,\ldots,a_K, r_1,\ldots,r_K)$ emerges uniquely from the simultaneous maximization of $U^k(a_k, r_k)$ by each employee $k \neq 0$, subject to the constraints that, as *k* varies, the a_k are consistent with all rules imposed on *k* from above or, in other words, that a_k is in $\bigcap_{k'} R_{k'k}$ for every *k*, where the intersection is taken over all k' above *k* in authority. Such an (a,r) is called an *internal equilibrium* for the Western firm. Thus, in the Western case, and given the director's rules r_0, (a,r) is obtained from utility maximization, (y,z) is secured from profit maximization as described earlier, and the firm's output and profit are determined from (1) and (3). The collection of all internal equilibria for the Western firm generated as the director's rules vary is denoted by $\mathcal{E}$. Note that $\mathcal{E}$ contains the internal equilibria arising when the director's rules are such that they impose no effective constraints on the activities of any worker.

For nonWestern firms, let each (a_k, r_k) be chosen by *k* in light of the given directoral rules r_0 and some generally-non-utility-maximizing principle that is (in parallel to the selection of *y* and *z* by the nonWestern firm) left unspecified and is subject to the constraint that a_k is in $\bigcap_{k'} R_{k'k}$ for each *k*, where, once again, the intersection is taken over all k' above *k* in authority. As before, the

possibility that (a_k, r_k) is determined from the maximization of a utility function like (6) is not precluded, and the selected vector $(a, r) = (a_1, \ldots, a_K, r_1, \ldots, r_K)$ is an internal equilibrium for the nonWestern firm. The set of all such internal equilibria as the director's rules vary is identified by the same symbol $\mathcal{E}$ used earlier.

II

The model set out above encompasses, among other possibilities, two general kinds of firms: the profit-maximizing firm with utility-maximizing employees and the non-profit-maximizing, non-utility-maximizing alternative. In each case, the actual behavior of the firm in question rests, in addition to the input quantities selected by the firm, on the internal equilibrium chosen by its employees. Also in each case, it is clear that the director (or board of directors) is unlikely to be indifferent among the options from which his respective employees choose. Suppose the preferences of the director are represented by the utility function $U^0(a, r)$. Of course, the director of the Western firm would prefer (a', r') to (a'', r'') whenever there exists a $(\hat{y}, \hat{z})$ such that $\pi(\hat{y}, \hat{z}, a', r') - \pi(y, z, a'', r'') > 0$ for all values of (y, z), and this would be reflected in the nature of his U^0. The director of the nonWestern firm, however, would probably have different priorities. For example, it has been pointed out above that Japanese firms take their primary objectives to be service to the community and the provision of social and economic benefits to their employees. The Japanese director's utility function might also be influenced by the socialization and consensus-building that normally takes place within the Japanese firm.

In either the Western or nonWestern case, denote the firm's target values of output and input as determined by the director by x^T, y^T, and z^T. Assume the Western director obtains these targets as follows: Find the profit-maximizing vector (y, z) corresponding to each internal equilibrium. Then choose for y^T and z^T those respective values of *y* and *z* that yield the greatest profit when accompanied by their associated internal equilibria. The output target x^T is now secured upon substitution in (1). Obviously, the (a, r) identified with (y^T, z^T) maximizes U^0. For the nonWestern firm, the targets would be determined with respect to some generally-non-profit-maximizing criterion. In the Japanese firm, say, that criterion might have to do with the maintenance of both the firm's social status and its past rate of growth. Regardless, such targets would relate back to the firm's internal equilibria through (1) and (4), and may interact with the director's preferences among those equilibria as expressed in U^0. To analyze the role of the director's preferences and targets in relation to firm behavior, additional concepts are needed.

An employee $k \neq 0$, whose behavior is derived from utility maximization, is called *incentive motivated* (Gintis and Katzner [6, p. 282], and Katzner [10, p. 556]) if for all pairs of values (a'_k, r'_k) and (a''_k, r''_k) the numerical inequality

$$W^k(a'_k, r'_k) \geq W^k(a''_k, r''_k)$$

implies

$$U^k(a'_k, r'_k) \geq U^k(a''_k, r''_k).$$

Incentive motivation means that individual preferences are such that, upon the maximization of their utility functions, employees respond in the "same direction" as that of incentives. This is the theoretical representation of self interest on the part of employees in Western and other firms. That self interest, together with the proper structuring of incentive functions (not yet completely specified), is what permits those firms to harness, should they wish to do so, their employees to the engine of profit maximization.

Now recall production function (1). For employee $k \neq 0$ consider any two (a'_k, r'_k) and (a''_k, r''_k) such that (i) output is at least as high using a'_k in (1) instead of a''_k, and (ii) r'_k restricts all subordinates of *k* to subsets of their respective activity sets obtained under r''_k on which output is at least as large as it is anywhere else in the r''_k sets. Other things being equal, then, the output associated with (a'_k, r'_k) can not be less than that associated with (a''_k, r''_k). Assume that all pairs of vectors (a_k, r_k) can be compared in this way, and that (i) and (ii) hold regardless of the activities performed by the remaining employees and regardless of the quantities of labor time and non-labor inputs hired by the firm. Under these conditions, if

$$W^k(a'_k, r'_k) \geq W^k(a''_k, r''_k),$$

then W^k is referred to as *non-decreasing* (Katzner [10, p. 557]). In other words, incentive functions are non-decreasing provided they are set so as to reward employees toward activities which do not decrease output. Similarly, an employee *k*, whose behavior is derived from utility maximization, is said to *internalize the worth of productivity*[6] when, under the same conditions,

$$U^k(a'_k, r'_k) \geq U^k(a''_k, r''_k).$$

Thus, the employee's preferences among pairs of vectors of activities and rules favor those that do not reduce output. The reason for the introduction of this concept will become clear shortly.

Finally, employee $k \neq 0$ *internalizes the values of the firm* provided that, with (a'_k, r'_k) a component of $(a', r') = (a'_1, \ldots, a'_K, r'_1, \ldots, r'_K)$ and (a''_k, r''_k) a component of $(a'', r'') = (a''_1, \ldots, a''_K, r''_1, \ldots, r''_K)$, he chooses (a'_k, r'_k) over (a''_k, r''_k) if and only if

$$U^0(a', r') \geq U^0(a'', r'').$$

The presence of this property among all of the firm's employees may be interpreted to mean that a socialization process takes place within the firm that leaves employees always prepared to select those activities and rules that are consistent with the director's preferences. In general, such choices do not reflect postulates of rationality since they involve neither the employees' own utility functions (preferences) nor their maximization. However, internalizing the worth of productivity may still be viewed as the special case of internalizing the values of the firm in which (i) the director has preferences that always lean towards increased output, (ii) the director and employee utility functions are consistent in the sense that, for all (a', r') and (a'', r''),

$$U^0(a', r') \geq U^0(a'', r'')$$

if and only if

$$U^k(a'_k, r'_k) \geq U^k(a''_k, r''_k)$$

for every k, and (iii) the U^k are maximized to determine the employees' choices of (a_k, r_k).

It is now possible to give full definitions of the notions of Western and Japanese firms. Like the standard characterization of perfect competition, these may be thought of as "ideal types" which do not usually appear in reality exactly as pictured, but which are useful for study nonetheless. A firm is called *Western* provided that both it and its employees make decisions (including the setting of targets) on the basis of, respectively, profit and utility maximization, all incentive functions W^k (where $k \neq 0$) are non-decreasing and (as a group) profit efficient, and all employees ($k \neq 0$) are incentive motivated.[7] It is referred to as *Japanese* whenever profit and utility maximization do not guide (respectively) the firm and its employees in their decision making, all incentive functions are constant functions (and hence profit efficient), and all employees ($k \neq 0$) internalize the values of the firm. These definitions capture and formalize the essence of the concepts of Western and Japanese firms, along with the cultural differences they reflect, suggested in earlier discussion.

A third type of firm is useful for comparative purposes. A *clan* (Ouchi [15, p. 132]) is a firm in which all decisions (including the setting of targets) of employees and firm are, respectively, utility- and profit-maximizing, all incentive functions are constant functions (and hence profit-efficient), and all employees ($k \neq 0$) internalize the worth of productivity.[8] Evidently, the clan is a hybrid containing elements of both Western and Japanese firms in which utility and profit maximization are taken from the former, and the special instance of internalizing the values of the firm, namely, internalizing the worth of productivity, comes from the latter. That is, the clan is a Japanese firm in which utility and profit maximization on the part of, respectively, employees and firm have been added. Of course, the targets x^T, y^T, and z^T are set by both Western firms and clans as those which maximize profits over all vectors (y, z, a, r) according to the method described previously. The latter maximizing vectors in the Western firm and the clan are assumed to exist uniquely in each case.

Consider now a distinct internal equilibrium (a, r) in different sets $\mathcal{E}$ for each of the Western firm and the clan described above. Such equilibria have been defined in general in Section I and hence apply directly to these two cases. The following proposition follows immediately from previous definitions and assumptions.

Theorem 1. Let fixed values of *y* and *z* be given and suppose the director's rules impose no effective constraints on the selection of activities and rules by any worker. Then in both Western firms and clans, internal equilibrium always maximizes profit over the set of all consistent vectors (a, r), that is, over the relevant $\mathcal{E}$. Thus, with profit-maximizing targets x^T, y^T, and z^T, if the firm (director) sets $y = y^T$ and $z = z^T$, then employee selections of (a, r) ensure that $x = x^T$ and hence that all targets are met.

Theorem 1 has several implications. First, every (a, r) in the relevant $\mathcal{E}$ that is not profit maximizing must arise because the director's rules exclude the profit-maximizing (a, r) from the options opened to employees. Although logically possible, one would not expect the director's rules in Western firms and clans to be so constituted. Second, in each case, individual action results in profit maximization automatically without needing the director to dictate rules. Even if all targets were met, Japanese firms do not, except by coincidence, operate at profit- and utility-maximizing values of *y*, *z*, *a*, and *r*. Hence, in this sense they are not generally as efficient as their Western counterparts.[9]

But there is still another sense in which efficiency escapes the Japanese firm. This second kind of efficiency arises in relation to the notion of internal Pareto optimality (Gintis and Katzner [6, p. 280], and Katzner [10, p. 560]). And inefficiency is present because, under the conditions that generally apply in the Japanese situation, it is possible, without any change in input quantities and without making anyone worse off, to expand output by reallocating activities and rules inside the firm, that is, by rearranging the social interaction among the firm's employees. The argument is as follows:

Let $\mathcal{E}$ be given along with *y* and *z* in the production function (1). A vector $(a^0, r^0) = (a_1^0, \ldots, a_K^0, r_1^0, \ldots, r_K^0)$ in $\mathcal{E}$ is called *internally Pareto optimal in production* as long as there is no other (a, r) in $\mathcal{E}$ such that

$$U^k(a_k, r_k) \geq U^k(a_k^0, r_k^0),$$

for all $k = 1, \ldots, K$,

$$U^k(a_k, r_k) > U^k(a_k^0, r_k^0),$$

for at least one $k = 1, \ldots, K$, and

$$f(y, z, a, r) \geq f(y, z, a^0, r^0).$$

Thus at an internal Pareto optimum, no reorganization of production in terms of activities and rules can make one employee better off, and no one else worse off, without lowering output. If, for example, through the imposition of rules, workers are not permitted to perform their jobs in ways in which they prefer, even though their preferred ways leads to the same output, then the (a, r) obtained is not internally Pareto optimal. Note that the director is not included in this notion of Pareto optimality and that the functions U^k and *f* are all taken to be given.

Propositions asserting the internal Pareto optimality of internal equilibria in Western firms and clans are presented below. In all cases, *y* and *z* are assumed fixed. Only the proof of Theorem 3 is outlined here; that of Theorem 2 is similar.[10]

Theorem 2. Let the firm described in Section I be Western and suppose the director's rules impose no effective constraints on the selection of activities and rules by any worker. If $(\bar{a}, \bar{r})$ is an internal equilibrium for the firm, then it is also internally Pareto optimal in production.

Theorem 3. Let the firm described in Section I be a clan and suppose the director's rules impose no effective constraints on the selection of activities and rules by any worker. If $(\bar{a},\bar{r})$ is an internal equilibrium for the firm, then it is also internally Pareto optimal in production.

Proof:

Suppose $(\bar{a},\bar{r}) = (\bar{a}_1,\ldots,\bar{a}_K,\bar{r}_1,\ldots,\bar{r}_K)$ is an internal equilibrium in the appropriate $\mathcal{E}$ (given *y* and *z*). Invoking Theorem 1 and the profit efficiency property that characterizes (in part) clans, $(\bar{a},\bar{r})$ also maximizes both profit and output. If $(\bar{a},\bar{r})$ were not internally Pareto optimal, then there would exist a reorganization of production $(a,r) = (a_1,\ldots,a_K,r_1,\ldots,r_K)$ in $\mathcal{E}$ such that

$$U^k(a_k,r_k) > U^k(\bar{a}_k,\bar{r}_k), \tag{7}$$

for some employee *k*, and the levels of output and of utility of all other employees are no lower at (a,r) than at $(\bar{a},\bar{r})$. Now because the firm is a clan, all employees internalize the worth of productivity. But applying the definition of internalizing the worth of productivity by employee *k* to (7) implies [11]

$$f(y,z,a,r) > f(y,z,\bar{a},\bar{r}),$$

and this contradicts the maximality of output at $(\bar{a},\bar{r})$. Therefore $(\bar{a},\bar{r})$ is internally Pareto optimal in production.

Q.E.D.

Thus the clan, which, recall, is a Japanese firm to which maximization has been added, is efficient. But without that latter addition, because neither the employees of the firm, nor the firm itself maximizes in their respective decision making, the Japanese firm cannot, in general, be expected to achieve internal Pareto optimality. It should be pointed out, however, that the absence of efficiency in this sense, even when combined with that in the preceding sense derived from Theorem 1, does not necessarily threaten the survival of the firm. This is due to the fact that mitigating circumstances and offsetting effects might be present. Indeed, it has been argued elsewhere (Katzner [13]) that, in spite of inefficiencies like those elucidated here, offsets such as the presence of large quantities of unpaid labor, the bonus system with respect to which employees are remunerated, and a willingness to accept low rates of return on invested capital, permitted actual Japanese firms, which have many of the characteristics of the theoretical Japanese firm defined above, to lead the Japanese economy to almost 20 years of unprecedented growth during the decades following the Korean War.

Finally, it is clear, and has been amply demonstrated above, that the theory of the firm is perfectly capable of expansion to include the possibility of variation across different cultures. Such expansions, moreover, can be made sufficiently rich to permit the comparison of properties of firms that operate on the basis of distinct cultural backgrounds. And adding these cultural dimensions to the theory of the firm provides, in many cases, more realistic and significant explanations of firm

behavior than those obtained by the forced imposition of irrelevant postulates of rationality as representative of the primary motivating impulse that drives individual and firm action.

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Footnotes

1. The author gratefully acknowledges the help of Douglas Vickers in the preparation of this paper.

2. In general, of course, rationality in decision making can be said to exist in the absence of self interest and maximization. But for purposes of present discussion, it will be convenient to refer to action as derived from self interest, and only that action, as being both rational and satisfying postulates of rationality or maximization.

3. The definition of an activity would normally include a statement or an implication regarding the length of time necessary to perform that activity. And this, in turn, suggests a relation between z_k and a_k. The latter relation, however, lies beyond the scope of present discussion, and will be ignored.

4. The presence of real capital assets among the components of *y* could be taken to imply that the model, in making *y* a decision variable, is determining an instantaneous optimal structure for the firm. Analytically, that raises the question as to whether employees' choices of activities and rules remain constant throughout the lives of the assets. But this problem is set aside and not considered in subsequent discussion.

5. The determination of W^k in (2) and its relation to the labor market is disregarded.

6. This concept was referred to in Gintis and Katzner [6, p. 284] and Katzner [10, p. 557] as "internalizing the values of the firm." As noted momentarily, it is a special case of a more general notion that is given the latter name below.

7. The Western firm was called a "bureaucracy" by Ouchi [15, p. 134] and Katzner [10, p. 558].

8. The fact that it is technically possible for a firm to be, at the same time, both Western and a clan is irrelevant for present argument. See Katzner [10, p. 558n].

9. For further discussion of this and related kinds of inefficiency in Japanese firms, see Katzner [13].

10. A proof may be found in Katzner [10, pp. 561-562].

11. Recall that underlying the notion of internalizing the worth of productivity is the assumption that all vectors (a_k, r_k) can be compared, as previously indicated, in relation to the firm's output.