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QUASI-PERMANENT EMPLOYMENT AND THE COMPARATIVE THEORY OF COALITIONAL AND NEOCLASSICAL FIRMS

Robert A. Hart
Thomas Moutos

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Abstract

In an efficient bargaining context, we show that there are no intrinsic qualities in coalitional, or joint venture, firms that lead to divergencies in economic performance from neoclassical firms. Combining the notions of quasi-permanent employment and coalitional union-stockholder association - prime features of the Japanese firm (J-firm) - does establish key differences. We explore two forms of J-firm configuration. In the first, temporary workers are employed additionally to regular, or core, workers. The second involves regular workers producing a part of final sales with a subcontractor producing the remainder.

Robert A. Hart
Thomas Moutos
University of Stirling
Department of Economics
Stirling, FK9 4LA
Scotland

Quasi-Permanent Employment and the Comparative Theory of Coalitional and
Neoclassical Firms

INTRODUCTION

Recent comparative research into the structure and objectives of the firm has attempted to
understand the distinctive labour market and other economic characteristics of Japanese
compared to United States and European organisations.   First, Hashimoto (1979, 1990)
offers explanations for divergent Japan/US experiences in several key variables based on the
notion of lower informational transaction costs within Japanese firms.   Secondly, Weitzman
(1984) highlights the flexibility of Japanese compensation schemes given their emphasis on
the bonus or profit-sharing system.   However, Aoki's critique of Weitzman's share
economy as a depiction of a Japanese-style contract is also relevant to Hashimoto's rent
sharing models[2]: he argues

> ".....Weitzman's system does not live up to the full expectation provoked by the
> attractive name "share".   In his system, decisions on strategic management variables
> crucial to the well-being of employees, such as employment, are not shared by the
> employer and the union, either explicitly or implicitly, but are exclusively in the realm
> of managerial prerogatives." (Aoki, 1988, p.153)

By contrast, what if strategic management variables are jointly and concomitantly determined
within an efficient contract?   Can a distinction in performance between a Japanese
organisation on the one hand and a USA/European on the other still be achieved?   It is well
known that extending bargaining in the Weitzman-style profit sharing firm to allow for
employer-union negotiation of an efficient contract produces a set of identical outcomes to an

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2 Primarily because Hashimoto's models are predicated on the analysis of the marginal
employee; see Section 2.

equivalent bargain under a pure wage system (Barro and Romer, 1987).   As for Hashimoto's work, differential transaction costs stemming from asymmetric information are not easily accommodated within an efficient bargaining framework.

Recent years have witnessed the formulation of a body of work that has rigourously questioned whether the assumptions underpining the depiction of the neoclassical firm are, even approximately, relevant to Japanese experience.   The work of Aoki (1980, 1984 and 1988) is especially notable in this latter respect.   Aoki's representative firm is characterised by a coalition between stockholders and quasi-permanent employees.   Stockholders supply physical assets through the provision of equity capital.   Employees contribute firm-specific human capital through the accumulation of technical and organisational know-how.   The two sides are willing to combine their financial and human assets in order to achieve organisational quasi-rents.   They bargain over the rent shares that accrue to their cooperative activity as well as over the amount of assets that should be devoted to ensuring agreed growth objectives of the firm.   Stockholders do not partake directly in the bargaining process. They delegate their bargaining power to a manager whose role is to formulate strategy on the internal distribution of economic variables; this is undertaken so as to be consistent with organisational equilibrium given the perceived relative bargaining positions of the two parties.   The manager does not maximise own-utility but rather " arbitrates between the stockholders and the employees to promote organisational homeostasis" (Aoki, 1980).   This characterisation of bargaining compared to equivalent neoclassical bargaining models appears to offer fresh insights into comparative international labour market differences.

Aoki's coalitional firm covers a range of topics that extend well beyond those that are conventionally represented in collective bargaining models.   This arises through the parties' interests in the current realisation as well as the future generation of organisational rent.

Thus, negotiation is not restricted to well known variables such as worker compensation but also to employment levels and investment (financial and human capital) decisions.   We embrace this scope of bargaining in the neoclassical and coalitional models considered here. We distinguish between two classes of coalitional firm, however.   In the first variant, labelled the participatory firm (**the P-firm**), the constituency of bargainers is comprised exclusively of (homogeneous) employees and stockholders who remain with the firm once equilibrium is reached.   An enterprise-specific union represents only those employees covered by the bargaining agreement over rent shares.   External interests, such as the representation of others outside of this group, are excluded from consideration by the bargaining parties.[3]   In the second variant, the Japanese firm (**the J-firm**), the enterprise-specific union negotiates with respect to a core of regular, or quasi-permanent, employees.   The employment-status of the regular workforce is protected, in part, through two different mechanisms.   The firm may employ a sub-set of temporary employees whose jobs are more vulnerable to demand fluctuations.   Alternatively, or additionally, regular workers may be associated with a "permanent" part of total output with the remainder provided by outside subcontractors.

We also follow Aoki in representing the United States firm (**the A-firm**) by a neoclassical bargaining model while the coalitional firm with quasi-permanent employment represents its counterpart in Japan.   This begs the question as to whether there exist reasonably secure stylized facts that are captured by simple models and that enable the performance of the Japanese firm to be differentiated from an equivalent United States organisation.   These are provided, as highlighted in Section 2, by observed differences between the two countries in

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3 See Svejnar (1982) who analyses a participatory firm in which the bargainers are comprised of employees, managers and shareholders. We chose to exclude an independent bargaining role for managers in our models.

per-capita levels of firm-specific capital.   Attention is paid, therefore, on the match between predicted relative outcomes from our theoretical models and the empirical findings.   An additional focus of our models is whether variations in economic outcomes stem principally from different bargaining approaches between A- and P-firms or, rather, from the added dimension of quasi-permanent employment introduced by the structure of the J-firm.

We pay particular attention to differences that arise between A- , P- and J-firms with respect to employment levels as well as to average levels of organisational capital.   We turn first to the strategic role of this latter variable in the relevant literature.

I. ORGANISATIONAL CAPITAL

In our two types of firm, the bargaining parties wish to realise quasi-rents that arise from factors with firm-specific attributes.   Such rents are discussed in some detail in Aoki (1984, especially pp. 30/32).   In both neoclassical and coalitional settings, firm-specific resources can be generated through such channels as (1) a greater willingness by stockholders to take risks within a cooperative climate, (2) the relative amenability of workers to comply with management-led initiatives to monitor performance, (3) workers accumulation of on-the-job know-how and skills and the ability of managers to encourage and to utilise these human assets efficiently, (4) managers' unrestricted ability to allocate internal financial resources to attain efficiency goals, and (5) the formation of group skills through such practices as quality circles and job rotation.   A key element in creating these resources is that they necessitate

the group participation of shareholders and workers. They involve collective and not individualised decisions. Firm-specificity derives principally from the fact that the resources cannot meaningfully be transferred to or appropriated by an outside agent.[4]

We follow Miyazaki (1984) in modelling organisational capital, Z, within the firm's technology. Production is represented by F(N,K,Z) where, additionally, N is the number of workers and K is the stock of capital. We assume that $F_i > 0, F_{ii} < 0$ and $F_{ij} > 0$. Clearly, investment in human capital comprises important contributions to organisational rent. In neoclassical rent sharing models, as typified by Hashimoto (1979), emphasis is given to this aspect of total investment. In line with the seminal contribution of Becker (1962), investment decisions in such models are typically considered in relation to the marginal worker. While analytically attractive, this modelling strategy clearly does not capture all aspects of human capital formation. In an organisational context, investment is undertaken with respect to a team of employees. Emphasis is placed on group customs within the workplace that are developed collectively. Training investment and on-the-job work experience are designed to enhance team cooperation, worker knowledge of the interrelation of tasks and departmental activities, and general participation in the control and improvement of production processes. In general, the specificity of skills derives from the fact that knowledge of interdependent group custom and behaviour is unlikely to be appropriable and portable by employees leaving the firm to gain alternative employment. It is also emphasised by Aoki that investment in human capital not only enhances the quality and performance of workers but, more generally, the combined effectiveness of labour and capital. Stockholders, cognisant of a broad employee commitment to the ethos and work

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4 In the words of Aoki (1984, p.30) "....resources are firm-specific in the sense that they are value-less in isolation and productive only in their steady association with the corporate firm as a nexus for association".

practices of the organisation, are more likely to provide relatively strong financial resources and to exhibit a greater willingness to allow management considerable flexibility over their internal allocation.

Hashimoto and Raisian (1985 and 1988) argue that average levels of firm-specific human capital investments in Japan are significantly higher than in the United States, ceteris paribus. It should be emphasised that their indirect evidence in support of this contention can be argued also to be indicative of higher average organisational capital in the former country since, as argued above, this variable is highly correlated with labour specificity. Three types of evidence are advanced. First, in line with the predictions from standard theory in the face of relatively high specific investments, Japanese firms display more wage and hours variability and less employment variability than in the United States for given demand shocks (see also Gordon, 1982). In effect, significant joint rents in the Japanese firm are "protected" through regular worker/management agreements over internal price and quantity adjustments. Secondly, following arguments by Hashimoto (1979) that bonus payments represent workers' shares of returns to investments in firm-specific capital, it is shown that the proportion of bonuses within total compensation is substantially higher in Japan than in the United States. Thirdly, wage-tenure profiles are found to be steeper in Japan with much of the wage growth attributable to firm-specific tenure (Hashimoto and Raisian, 1985).

II.   THE A- AND P-FIRMS

We begin by comparing bargaining outcomes in a neoclassical and a participatory firm under efficient contracts. The wage rate and the level of employment as well as the stocks of physical and organisational capital are determined jointly and concomitantly.

(a) The A-firm

The efficient contract that describes bargaining in the A-firm follows a standard neoclassical construct (MacDonald and Solow, 1981). In particular, we adopt the generalised Nash bargaining solution concept (Svejnar, 1986).[5] The bargaining parties comprise an employer and a single union. There is a closed shop agreement under which the firm employs only employees belonging to the union. Setting product price to unity, the firm's profit function is given by

$$(1) \qquad \pi(N,K,Z,w) = F(N,K,Z) - wN - rK - Z$$

where w is the wage rate and r is the rental cost of capital. Note that Z represents total expenditure on (organisational) human capital investment. An unemployed union member belongs to the union's labour pool and receives $u(\overline{w})$ utility, where $\overline{w}$ is the outside wage. The union's rent from the employment relationship is given by

$$(2) \qquad V - \overline{U} = N\{u(w) - u(\overline{w})\}.$$

The generalised Nash bargain takes the form

$$(3) \qquad \max_{N,K,Z,w} \Gamma = \pi(N,K,Z,w)^{(1-\alpha)}(V - \overline{U})^{\alpha}$$

where α represents relative union strength, with $\alpha \in \{0,1\}$.

From the first-order conditions to (3) we obtain

$$(4) \qquad F_N - w = \frac{u - u(\overline{w})}{u'}$$

which defines the contract curve. The wage must equal the marginal revenue product of labour plus the marginal risk premium of unemployment. As for relative shares, we find that

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5 Svejnar tests this solution on union-management settlements in 12 major United States companies.

(5)
$$w = (1-\alpha)F_N + \alpha\frac{(F - rK - Z)}{N}$$

and so if $\alpha = 0$ the firm is on its demand curve and if $\alpha = 1$ the firm receives zero profit.

Finally, the marginal product equals marginal cost conditions for human and physical capital are given, respectively, by

(6)
$$F_Z = 1$$

and

(7)
$$F_K = r.$$

Before turning to the participatory firm, consider a variation on the above scenario whereby bargaining includes a Weitzman-style profit sharing arrangement. If w_b is a base wage then the firm's profit is given by $(1-\lambda)\bar{\pi}$ where λ is the union's share of profit $(0 \leq \lambda \leq 1)$ and where $\bar{\pi} = \{F(N,K,Z) - w_b N - rK - Z\}$.   The union's payoff is then $N[u\{w_b + \lambda(\bar{\pi}/N)\} - u(\overline{w})]$.   It is easily shown that if these new profit and utility expressions are substituted into the Nash optimization problem defined in (3) then a set of identical first-order conditions to the foregoing are obtained.   Under efficient bargaining at the firm level and within a neoclassical framework, equilibrium outcomes from a profit sharing or bonus system do not diverge from a pure wage system.

(b) The P-firm

Consider now a firm in which stockholders and a group of employees seek to enter into a coalitional working relationship.   Employees are represented by an enterprise-specific union.[6]   The two parties aim to combine together in order to achieve rents stemming from their combined human and physical capital investments.   The bargaining constituency does

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6 We can imagine that there is an infinite supply of employees at the outside wage.

not stretch beyond those who are party to the agreement. A management team is agreed upon and employed by both sides to act as a neutral mediator, formulating mutually acceptable strategic plans.

Let p_K and p_N be the "prices" of capital and labour that are agreed within the firm; $\overline{r}$ and $\overline{w}$ are the respective outside prices. Profits, equivalent to (1) in the A-firm, are defined

$$(8) \qquad \pi^* = F(N,K,Z) - p_N N - p_K K - Z.$$

The utility accruing to stockholders is given by

$$(9) \qquad U_K = p_K K + (1-\phi)\pi^*$$

where ϕ is the workers' share of profit $(0 \le \phi \le 1)$. Workers' utility is expressed

$$(10) \qquad U_N = N\left[u\left(p_N + \frac{\phi\pi^*}{N}\right)\right].$$

The respective "outside" utilities are expressed

$$(11) \qquad \overline{U}_K = \overline{r}K$$

and

$$(12) \qquad \overline{U}_N = Nu(\overline{w}).$$

The Nash bargain, equivalent to (3), takes the form

$$(13) \qquad \max_{N,K,Z,\phi,p_K,p_N} \Delta = (U_K - \overline{U}_K)^{(1-\beta)}(U_N - \overline{U}_N)^{\beta}$$

where β represents relative enterprise union strength, with $\beta \in \{0,1\}$.

From the first-order conditions to (13), we obtain

$$(14) \qquad F_N - (1-\phi)p_N - \frac{\phi(F - p_K K - Z)}{N} = \frac{u - u(\overline{w})}{u'}$$

which is the same as (4) if

(15) $$wN = p_N N + \phi(F - p_N N - p_K K - Z).$$

Further, we find that

(16) $$(1 - \beta)\frac{N(u - \bar{u})}{u'} = \beta\{(1 - \phi)(F - p_N N - Z) + \phi p_K K - \bar{r}K\}$$

which corresponds to (5) if (15) holds and if $\alpha = \beta$ and $r = \bar{r}$. The respective equilibrium conditions for human and physical capital are given by

(17) $$F_Z = 1$$

and

(18) $$F_K = \bar{r}$$

which correspond to (6) and (7).

Comments

It has already been established that if bargaining in the A-firm incorporates a profit sharing scheme to allow for the joint determination of all decision variables then a set of identical outcomes to an equivalent bargain under a pure wage system is obtained. But such a comprehensive bargaining agreement also offers the same wage, employment and investment outcomes as its equivalent in the P-firm.

There is a caveat to these findings. The relative gains to each party in the P-firm will depend on their respective bargaining powers. From the first-order conditions with respect to ϕ in (13), we obtain

(19) $$\frac{U_N}{U_K} = \frac{\beta u'}{(1 - \beta)} \quad .$$

Note from the equilibrium conditions in the previous sub-section that p_N and p_K, the internal prices for labour and capital in the P-firm, are not uniquely determined. They are simply required to be related in such a way that (19) and other first-order conditions hold. Suppose that the system were extended to include profits, income, payroll and other taxes. Then the two internal prices could be manipulated, for given tax configurations, so as to maximise joint returns.[7] The relative gains to each party will depend on their bargaining power, as in (19), and not on an exogenously determined incidence of taxes. The coalitional arrangement appears to offer considerable scope for internal price manipulation in order to minimise the tax burden to the bargaining parties.

III. THE J-FIRM: TEMPORARY EMPLOYMENT

The outstanding difference between the participatory firm just described and that taken to represent the Japanese model (the J-firm) is that the latter employs a quasi-permanent workforce. While there are no explicit "lifetime" contracts in Japan as such, there do exist for many employees "an implicit understanding between the potential employer and the potential employee that an employment relation, if initiated, will continue, unless there arises a reasonable cause for either side to terminate it at an unforeseen future date" (Aoki, 1988, p.87). In essence, a group of regular workers seek to gain insurance against future fluctuations in income through the achievement of a reasonably strong guarantee of employment protection. The J-firm has three main buffering mechanisms to protect such permanent employment against unanticipated demand fluctuations. First, it may employ a sub-set of full-time employees whose jobs are vulnerable to changes in demand conditions. Secondly, it may employ a sub-set of part-time employees, a proportion of whose work patterns are also demand contingent. We treat both of these groups as temporary employees

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7 See Svejnar and Smith (1984) who deal with a similar possibility within profit sharing agreements in joint ventures.

in the sense that their expected duration with the firm is significantly shorter than their regular counterparts due to a stronger relationship between employment levels and the prevailing economic climate.   Thirdly, it may subcontract, or outsource, part of its production to other firms.   The last possibility is considered in Section IV.

The importance of temporary employment is underlined by Aoki (1988, Ch.5).   He shows that, while full-time temporary employment was an important phenomenon up to the early 1970s, it has now largely been superseded by the widespread and very significant growth of part-time employment in most major industries.   Aoki discusses evidence that there is a greater perception among (female dominated) part-timers that their jobs are transitory in nature.[8]   As for compensation, while some temporary workers receive bonuses, annual increments and other fringes, many do not.

Assume the same stockholder-employee bargaining relationship as in the P-firm with total employment defined as

$$N = N_R + N_T$$

where N_R is regular, or quasi-permanent, employment and N_T is temporary employment. The size of N_R is determined independently of the bargaining process.[9]   Regular

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8 Evidence of a growth in the "involuntary-status" of part-time employment in Japan is discussed in Tachibanaki (1987).

9 The permanent workforce can be viewed as consisting of employment that, on the basis of historical experience of unforeseen events, consists of jobs that are deemed likely to be unthreatened by demand shocks.   This would probably allow for some margin of error beyond the worst perceived demand downturn.

employees are represented by the enterprise union. By contrast, N_T is an employment choice variable determined at the point of contract negotiation.[10] Temporary workers are not unionised.[11]

We have already established that the efficient bargaining outcomes of the A- and P-firms are identical. Therefore, it is a matter of indifference if we chose either model as a vehicle for representing the basic set-up of the J-firm. Accordingly, we work with the former neoclassical structure. Assuming that both regular and temporary workers receive the same wage rate[12], stockholder's utility is expressed

$$(20) \qquad U_1(N,K,Z,w) = F(N_R + N_T, K, Z) - w(N_R + N_T) - rK - Z.$$

The union payoff from the employment relationship becomes

$$(21) \qquad U_2 = N_R \{ u(w) - u(\overline{w}) \}.$$

The revised Nash bargain is expressed

$$\max_{N_T, K, Z, w} \Omega = U_1^{(1-\gamma)} U_2^{\gamma}. \qquad (22)$$

where γ represents relative enterprise union strength, with $\gamma \in \{0,1\}$.

The derived marginal product of employment condition is

$$(23) \qquad F_{N_T} = w$$

while the comparable conditions with respect to organisational and physical capital are identical to (6) and (7) for the A-firm. We also obtain

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10 Without loss of generality we assume throughout that $N \geq N_R$.

11 This assumption is different from the ones made in models with a last-in-first-out criterion for redundancy selection; see, for example, Grossman (1983).

12 Although, see discussion below.

$$(24) \qquad \gamma w = \gamma \left(\frac{F - rK - Z}{N_R + N_T} \right) - (1 - \gamma) \frac{u - u(\overline{w})}{u'}$$

and so if $\gamma = 1 \rightarrow w(N_R + N_T) = F - rK - Z$, or the firm receives zero profit. By contrast,

if $\gamma = 0 \rightarrow u = \overline{u}$, or the union does not share the rent.

The first set of major comparative results are that total employment, together with the absolute levels of K and Z, are lower in the J-firm than in the equivalent A-firm. Derivations are outlined in the Appendix.

A graphical illustration of wage-employment comparative outcomes is presented in Figure 1. The union indifference curves of individual employees are represented, in ascending order of utility, by u_1, u_2, u_3. The A-firm's demand curve, $F_{N_A}(N, K_A, Z_A)$, lies to the right to that of the J-firm, $F_{N_J}(N, K_J, Z_J)$, because $K_A > K_J$, $Z_A > Z_J$. The equilibrium wage-employment combination in the A-firm, w_A-N_A, occurs on the contract curve, CC, where u_3 is tangential with an isoprofit curve (not shown). In the J-firm, the absence of bargaining power among temporary employees produces an equilibrium wage, w_J, associated with an employment level, N_J (= $N_R + N_T$), derived at the point where $w_J = F_{N_J}$. [13]

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13 Thus, the corresponding indifference curve of regular employees, u_2, becomes horizontal at w_J.

The analysis so far assumes that temporary employees, while not represented in the union utility function, benefit equally with regular employees in the rent share emanating from the bargain. Among part-timers, the dominant source of temporary employment in Japan, many employees do not qualify for bonuses and other fringe benefits. We note in Figure 1, however, that even if temporary employees were receiving the opportunity wage, $\overline{w}$, total employment in the J-firm would not exceed max N_J.

Figure 1
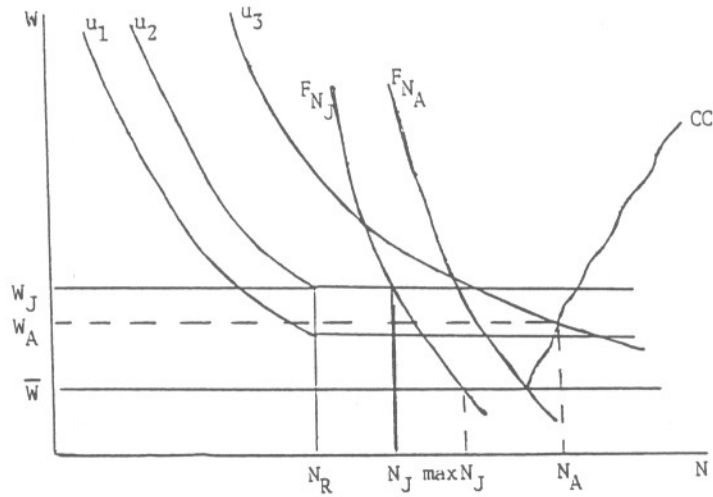
The second set of results refer to <u>average</u>, or per-capita, levels of organisational investments. In order to derive unambiguous results, we need to impose a specific functional form to describe the firm's technology in both A- and J-firms. We adopt the Cobb-Douglas function, using A and J subscripts to denote the respective firms: this is given by

(25) $$F_i = Z_i^{\delta_0} N_i^{\delta_1} K_i^{\delta_2} \qquad (i = A, J).$$

where $\delta_0 + \delta_1 + \delta_2 < 1$. [14]   Using (25), together with the first-order conditions in (6) and (7),

which apply to both A- and J-firms,[15] produces the relationship

(26) $$Z_A = \frac{Z_J}{K_J} K_A.$$

Using (25) note that $F_{Z_A} = F_{Z_J} \rightarrow Z_A^{(\delta_0 - 1)} N_A^{\delta_1} K_A^{\delta_2} = Z_J^{(\delta_0 - 1)} N_J^{\delta_1} K_J^{\delta_2}$ from which it follows, using

(26) and after some manipulation, that

$$\frac{N_A}{N_J} = \left(\frac{K_A}{K_J}\right)^{\psi}$$

where $\psi = (1 - \delta_0 - \delta_2)/\delta_1 > 1$ implies that $N_A/N_J > K_A/K_J$. Therefore, using (26), we obtain

(27) $$\frac{Z_J}{N_J} > \frac{Z_A}{N_A} \quad .$$

The average level of organisational capital in the J-firm is higher than in the A-firm.

What is the intuitive reasoning behind these results?   From the standard Nash bargaining

problem, the equilibrium solution in the "neoclassical" A-firm produces an employment level

(eg N_A in Figure 1) that is higher than the firm would chose unilaterally.   It would be less

keen, therefore, to invest in organisational capital[16] than if its workforce size is determined at

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14 Increasing returns to scale are ruled out by our underlying assumption of perfect competition.

15 Thereby obtaining $(\delta_2/\delta_0)(Z_i/K_i) = r \quad (i = A, J).$

16 Notice that Z does not enter into the union's payoff.

the point where marginal cost and revenue are equated. As shown in Figure 1, the J-firm's employment level lies on its demand curve and so the return per unit of organisational investment will be higher.

IV. THE J-FIRM: SUBCONTRACTING

Suppose that, instead of employing temporary workers, the firm subcontracts part of its total production to an outside supplier.[17]　For simplicity, and without affecting the generality of the discussion at hand, we assume that the subcontractor adds to final output rather than providing intermediate goods and services.　There are a number of stylized facts that reasonably summarise the relationship between the J-firm and one of its subcontractors (Aoki, 1988, pp212/3), with the following particularly pertinent to present developments. First, during the contract period, the firm guarantees not to switch suppliers or to replace the subcontracted goods with its own output.　Secondly, at the point of negotiation, only target quantities to be supplied are specified; actual supply is fine-tuned on a per-period basis. Thirdly, price rules to cover supply quantities are specified in the initial contract.　Fourthly, the subcontractor adds a unit profit margin into the original cost estimate.

It becomes important in this new problem to distinguish between the product price posted to the outside market by the J-firm and that received by the subcontractor from the J-firm. Negotiation now takes place among three parties, stockholders, the union and the subcontractor.　Their respective utility functions are given by

$$\hat{U}_1 = pF(N_R, K, Z) + (p - p_s)S - rK - wN - Z,$$

$$\hat{U}_2 = U_2,$$

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17 We ignore the possibility of subcontracting combined with the employment of temporary workers.

$$\hat{U}_3 = p_s S - C(S)$$

where p is the market product price, S is the subcontractor's output, p_s is the product price per unit sold to the J-firm and C(S) is the subcontractor's total cost of producing S.[18]   The Nash bargain becomes

(28)
$$\max_{K,Z,w,p_s,S} \Theta = \hat{U}_1^{\theta_1}\hat{U}_2^{\theta_2}\hat{U}_3^{\theta_3} \ \ .$$

The degrees of power of the stockholders, the union and the subcontractor are represented respectively by θ_1, θ_2 and θ_3 with $0 \le \theta_1, \theta_2, \theta_3 \le 1$ and $\theta_1 + \theta_2 + \theta_3 = 1$.

As standard with the type of Nash problem expressed by (28), we find that the optimal values of utilities are proportional to the relative sizes of the power parameters.   Thus, from the first-order conditions, we obtain $\hat{U}_1/\hat{U}_3 = \theta_1/\theta_3$ and $\hat{U}_1/\hat{U}_2 = \theta_1/(\theta_2 u'(w))$.

What are the potential advantages to the two parties within the J-firm of bargaining with a subcontractor?   The position is illustrated with reference to Figure 2.   From the first-order conditions to (28), we find that

(29)
$$p = C'(S).$$

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18 Without loss of generality, we assume that the subcontractor is risk neutral.

Figure 2
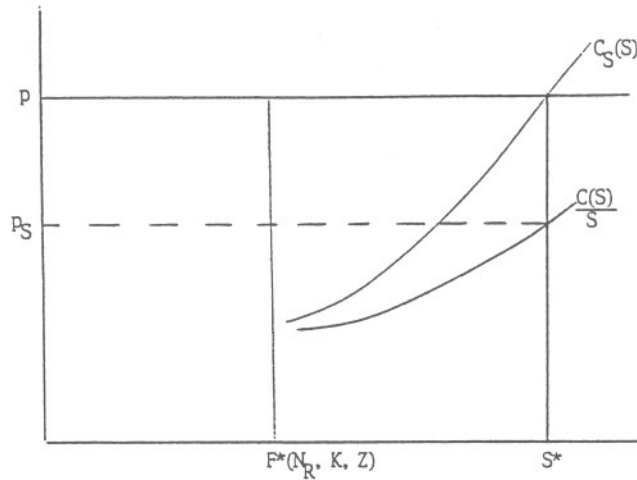
If the subcontractor has no power, or $\theta_3 = 0$, then $p_s = C(S)/S$ or the

subcontractor's average revenue equals average cost.   In such a case, both U_1 and U_2

would be higher than in the absence of a subcontractor since members of the J-firm can

extract all the surplus from the "low" cost producer.   Since $N = N_R$ and since we also

obtain, in line with earlier results, $pF_K = r$ and $pF_Z = 1$,   we can solve for K and

Z.   So, optimal production in the J-firm, $F*(\cdot)$, is set independently of U_3, as well as

p_S and S.   As long as the subcontractor can produce up to optimal output, $S*$, at an

average cost lower than the firm then stockholders and the union within the J-firm

would benefit from subcontracting.[19]

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[19] This analysis does not preclude bargaining parties in the A-firm from themselves
taking advantage of sub-contracting.   The question would then arise as to which type
of firm would have more recourse to subcontracting.   This is outside the scope of the
present paper. However, imagine that there is imperfect competition.   Ceteris
paribus, higher levels of employment and capital in the A-firm would then imply a lower
product price and, therefore, less subcontracting.

As in the case of temporary employment within the J-firm, it is easy to show in the subcontracting model that, ceteris paribus, per-capita levels of organisational investments in the J-firm are higher than in the A-firm. Subcontracting produces total employment in the J-firm that is smaller than if it were itself to produce total output. In these circumstances, and recalling that Z does not enter the union's utility function, it would be more inclined, on the average, to invest in organisational capital.

V. CONCLUSIONS

Suppose that a single union bargains over employees' rent share aggregated over all those who gain employment as a result of the bargain. Then differentiating between neoclassical and coalitional firms produces no differences in efficient bargaining outcomes. This suggests that there are no intrinsic qualities in joint venture associations per se that account for observed divergencies in economic performances. If, additionally, the notion of quasi-permanent employment status for a sub-set of employees is introduced - a much highlighted feature of the J-firm - differences in outcome do occur. We examine two forms of J-firm configuration. In the first, an enterprise union represents a core of regular workers. Both stockholders and the union may find it to be advantageous, however, to hire an added group of temporary employees. This latter group may either receive a share of the rent negotiated with respect to regular members' utility preferences or they may merely receive the outside wage. Under these conditions, the levels of employment and the absolute stocks of physical and organisational capital will be higher in the A- than in the J-firm. In a second formulation, a part of the firm's final sales is produced by a subcontractor. Under fairly general assumptions, the same relative employment, physical and organisational capital outcomes are obtained.

By contrast, per-worker organisational capital investments in the J-firm exceed those of the A-firm. In effect, the exclusion of temporary employees from the union utility function or the use of a subcontractor allows the firm to operate nearer its demand curve thereby providing a stronger stimulus to invest in the enhancement labour's marginal product. These explanations for differences in average investments in organisational capital have the advantage of appealing, primarily, to a labour market phenomenon with standard industrial relations roots. Union members are keen to obtain stability of wage income. The union represents this objective while realising that state-contingent economic variables may require the formation of a workforce that extends beyond the core. Bargainers recognize, therefore, the need to hire a more flexible group of workers with less permanent status. Concentrating more attention on the role of quasi-permanent employment might well provide a useful research key to understanding the comparative performances of A- and J-firms.

Appendix: Comparative sizes of N, K and Z between A- and J-firms

From (4), we know that the marginal employment condition in the A-firm is given by
$F_N - w = (u - u(\overline{w}))/u'$. The equivalent condition in the J-firm is given by (23), that is
$F_{N_T} = w$. From the concavity of the utility function, we know that $\overline{w} > w - \{(u - u(\overline{w}))\}/u'$.
It follows that $F_N(N, K, Z) < F_{N_T}(N_R + N_T, K, Z)$. Since $F_Z = 1$ and $F_K = r$ hold in both A-
and J-firms, it is sufficient to ascertain the "multipliers", $(dN/dw), (dZ/dw), (dK/dw)$ in the
J-firm. Totally differentiating the first-order conditions, gives

$$\begin{vmatrix} F_{NN} & F_{NK} & F_{NZ} \\ F_{KN} & F_{KK} & F_{ZK} \\ F_{ZN} & F_{ZK} & F_{ZZ} \end{vmatrix} \begin{vmatrix} dN \\ dK \\ dZ \end{vmatrix} = \begin{vmatrix} 1 \\ 0 \\ 0 \end{vmatrix} dw.$$

Hence, we obtain

$$num\left(\frac{dZ}{dw}\right) = F_{KN}F_{ZK} - F_{ZN}F_{KK} > 0.$$

The determinant of the system (Δ) is necessarily negative, since it is nothing more than the
Hessian of the production function, which will be concave only if

$$F_{NN} < 0 \qquad \begin{vmatrix} F_{NN} & F_{NK} \\ F_{KN} & F_{KK} \end{vmatrix} > 0 \qquad \text{and} \qquad |\Delta| < 0.$$

Therefore, $dZ/dw < 0$, and so since $w > \overline{w}$ (see above), Z (A-firm) > Z (J-firm).
Similarily,

$$K, N|_{A-firm} > K, N|_{J-firm}.$$

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