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EMPLOYEE VS. CONVENTIONALLY OWNED AND CONTROLLED FIRMS: AN EXPERIMENTAL ANALYSIS

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ABSTRACT

Full employee ownership, under which employees enjoy dominant ownership and control rights, is an innovation which alters the relationship between employees and the organization in which they work. Although it has been hypothesized to have a number of positive implications, it has suffered from poor diffusion and survival rates overall, and selection biases have limited the generalizability of field research. We have therefore attempted to develop *experimental* methods to test hypotheses about the effects of employee ownership on selected economic, social, and psychological outcomes. In our experiments, subjects in conventionally-owned firms exhibited higher productivity, perceived greater fairness in the pay they received and the method used to pay them, reported higher levels of involvement in their tasks, had more positive evaluations of their supervisors, and showed a greater propensity to interact with and provide assistance to their co-workers than did those in employee-owned firms. Four areas where further research is needed are identified; these will refine our understanding of employee ownership and the conditions under which it will operate as hypothesized.

EMPLOYEE VS. CONVENTIONALLY OWNED AND CONTROLLED FIRMS: AN EXPERIMENTAL ANALYSIS

In the past few years, there has been increased interest in various "innovations" in employee involvement and payment systems, and in how these affect performance and social-psychological outcomes within organizations (e.g., Cotton, 1993; Applebaum & Batt, 1994; Kruse, 1993). But while these innovations may hold promise, both their rate of diffusion and their impact appear to be lower in practice than theory would lead us to expect (Osterman, 1994; Cotton, 1993), especially in conventionally owned firms (Doucouliagos, 1995). One possible reason is that they do not appreciably alter the underlying economic and legal relationship between individuals and the organization in which they work.

Employee ownership represents an alternative form of innovation, for it *can* substantially alter this relationship. This holds especially under conditions of "full" employee ownership, where employees have majority ownership and economic return rights *and* exert effective control over their work organization (see Ben-Ner and Jones, 1995). A variety of potential benefits have been suggested for employee ownership under these conditions. These include a reduction in governance and distributional-related conflicts which generate control problems in conventionally-owned firms (Bowles, 1985; Bowles & Gintis, 1987), enhanced economic incentives for employees (Klein, 1987; Bowles and Gintis, 1993: 27-29), a greater sense of task involvement (Long, 1978a, 1989), and others.

A number of well publicized cases appear to lend support to these arguments, even though they often entail only partial ownership and control rights. In the U.S., some of the more prominent success cases include United Airlines, Avis, and Wierton Steel. In Canada, the most recent success has been Algoma Steel, although several pulp mills in Ontario and Quebec have also operated profitably under employee ownership (Noble, 1991; Lem, 1994). In Britain, the John Lewis Partnership has been cited as a positive example of employee ownership (Bradley, Estrin, & Taylor, 1990). In Continental Europe, employee-owned firms are widespread in France (Estrin & Jones, 1992) and in Northern Italy (Bartlett et al, 1992). The most widely publicized and elaborate

experiment has been the Mondragon system in Spain, which boasts over 20,000 worker-owners and 100 production cooperatives (Whyte & Whyte, 1988; Moye, 1993).[i]

Employee ownership has, however, historically suffered from poor diffusion and survival rates (Aldrich & Stern, 1983; Hansmann, 1990b), and there have been well-publicized reports of employee ownership failures (e.g., Rath Meatpacking). A number of possible reasons have been identified. Though some of these address historical circumstances (e.g., see Perlman, 1928: 189-193), most address more enduring problems associated with employee ownership (e.g., see Hansmann, 1990b). The latter include problems in obtaining financing (Fanning & McCarthy, 1986), and tendencies to consume profits through wages rather than through reinvestment (Fanning & McCarthy, 1986), to be risk-averse (Meade, 1986), to be politically unstable (Hannsman, 1990a), and to foster increased on-the-job leisure and shirking (Alchian & Demetz, 1972; Jenson & Meckling, 1979).

The extent to which these difficulties are avoidable has been a matter of some debate. Some consider them to be inherent in employee ownership (e.g., Jenson and Meckling, 1979; Hansmann, 1990b). Others maintain that they primarily reflect established institutional conditions, and hence that they would be less problematic within a more supportive institutional environment (e.g., Doucouliagos, 1990; Elster, 1989; Miller, 1992; and Miller, 1989). Still others suggest that these problems arise when employee ownership entails only partial control of both governance and rights of economic return. They assert that partial control weakens or even negates any potential positive performance effects (Ben-Ner and Jones, 1995).

Field research has not been able to resolve this debate (for reviews, see Jones & Plishkin, 1991; Cotton, 1993: 206-230).[ii] Though this research has tended to find support for many of the benefits associated with employee ownership (e.g., Doucouliagos, 1995), this support has generally been limited. Full employee ownership remains scarce, and tends to develop under unique circumstances, most notably in response to plant closings or divestitures (see Russell, 1988:

384-387). As a result, research findings have typically been based either upon firms in which employees lack full ownership and control rights, or upon individual cases and small clusters of firms in specific industries such as plywood cooperatives (Greenberg, 1984; Gunn, 1992) or supermarkets (Granrose et al, 1986). It has also been difficult to find firms operating under institutional conditions conducive to full employee ownership. Where such firms can be found (e.g., Israeli kibbutz and the Mondragon system), their experiences may reflect unique circumstances and hence not be readily generalizable (Conte & Svejnar, 1990).

In this paper, we therefore follow an alternative research strategy and use experimental methods to simulate a test of the individual and group level advantages of full employee ownership under controlled conditions. In doing so, we build on the work of Frohlich & Oppenheimer (1990, 1992), who developed experimental techniques to deal with distributive justice issues in production environments (see also Cooper, Dyck & Frohlich 1992). The experimental approach does not allow us to address some of the issues associated with the long-term, real-world viability of employee ownership. But this approach does enable us to simulate a controlled test of various arguments about hypothesized social-psychological and performance advantages of this ownership form. We concern ourselves with the individual and group levels because the hypothesized advantages of employee ownership are primarily at these levels. Thus, a finding that these advantages obtain in the laboratory may shed some light on whether institutional conditions and partial implementation are responsible for the limited diffusion and survival rates of employee-owned firms.

Because our concern is with full employee ownership, we define and operationalize employee-owned firms to include not just full rights of economic return, but also full rights of governance and distribution. Under these conditions employees collectively choose (directly or through representatives) their superordinates and how their earnings are to be distributed. While employee ownership can take a number of forms (see Pierce, Rubenfield, & Morgan, 1991), these characteristics are consistent with the theoretical literature on full employee ownership (Ben-Ner and

Jones, 1995) and are closely associated with the advantages hypothesized for these firms (see Klein, 1987; Pierce, Rubenfield, & Morgan, 1991). Also consistent with this literature, they exclude from consideration most organizations with employee stock ownership plans (ESOPs), since most such plans involve only limited ownership and restricted (or no) voting rights (U.S. GAO, 1986:40).

HYPOTHESES

Hypotheses about the effects of employee ownership have appeared in a variety of literatures, and have reflected a variety of ideologies. Our overview of this literature suggests two such sets of effects at the individual and group levels. We label these "economic" effects and "social-psychological" effects.

Economic Effects

Perhaps the most important claim made for employee ownership is that it yields performance gains (Conte & Svejnar, 1990). A number of reasons have been advanced in support of this claim. First, and most simply, employee ownership means that workers have a much enhanced stake in an organization's performance. In effect, they become "dual" stakeholders, for they are both owners and employees. As a result, their incentive to maximize performance should be higher than it is under conventional ownership (French, 1987). They also have enhanced incentive to monitor the performance of coworkers (Bowles and Gintis, 1993: 28). Second, since employees feel a greater sense of ownership, they should experience enhanced intrinsic involvement in their task (Long, 1989; Paul et al, 1987; Pierce, et al., 1991; Bowles and Gintis, 1993: 27), with positive implications for performance. Third, under employee ownership, management's fiduciary responsibility is to employees rather than to external investors. Since employees are the ultimate beneficiaries of enhanced performance, a major source of distrust and acrimony under conventional ownership is eliminated (e.g., Bendix, 1956; Conte & Svejnar, 1990; Godard, 1992, 1993), again with positive performance implications. Finally, because employees are legally empowered to elect (directly, or through elected representatives) their superordinates and to determine how income is allocated,

legitimacy problems associated with pay and governance issues are less likely to occur (Pierce, et al., 1991).

Hypothesis 1a. Individual and group productivity will be higher in employee-owned firms than in conventionally-owned firms.

The factors noted above also suggest a reduced need for monitoring and supervision of employees, and a reduced expenditure of managerial resources on the "problem" of control (Bowles, 1985). In effect, "clan" control is more readily obtained, rendering hierarchy less necessary (Bowles & Gintis, 1987: 176ff). While managerial duties are by no means rendered superfluous, individual managers in employee-owned firms can, *other things being equal*, be expected to spend less time on supervision and monitoring (Bradley & Gelb, 1981).

Hypothesis 1b. Managers in employee-owned firms spend less time on monitoring and supervision than do managers in conventionally-owned firms.

Employee ownership is not without potential problems. Because a given individual will receive only a fraction of the profits generated by performance increases, employees may perceive only a weak linkage between individual performance and rewards. Individuals thus may have an incentive to free-ride by shirking on their own contribution while reaping rewards from the contributions of others (see Cooper et al., 1992:472). This may weaken or even negate the performance gains accruing to employee ownership.

Shirking is clearly a more general problem; some argue that it can be minimized by paying employees on a piece rate basis, where performance and pay are directly linked (Lazear, 1986).[iii] Profit and gain sharing schemes are in theory less effective because they are also plagued by the free rider problem. Yet, this problem is reduced if pay schemes are complemented by the traditional monitoring role of management, under which management's sole purpose is to maximize employee performance in order to maximize returns to capital (Jenson & Meckling, 1979). If these arguments are sound, they in effect negate much of the case for employee ownership at the micro level.

At present, the evidence to support this logic is mixed. For example, studies have shown that performance gains from profit sharing are, on average, only moderate (Shepard, 1994), and may even be illusory (Kruse, 1993). As well, piece rate systems may have perverse effects on performance (Lawler, 1971; Mitchell et al, 1990), especially under conditions of task interdependence (Miller, 1992). Yet, research also indicates that profit sharing may be markedly more effective when employees participate in decisions regarding the system of pay allocation (Cooper, et al., 1992; Frohlich & Oppenheimer 1992). Group pay schemes are likely to be more effective when there is organizational trust and attitudes are supportive of such schemes (Schuster, 1986). We examine this debate by testing whether the supposed effects of employee ownership hold after controlling for alternative pay schemes.

Hypothesis 1c. Controlling for alternative pay schemes, productivity will be greater under employee ownership than under conventional ownership.

Social/Psychological Effects.

Discussions about the social/psychological effects of employee ownership abound in the literature. We hypothesize four primary effects. First, since *all* surplus revenues from production are divided among employees rather than accruing (in whole or in part) to owners, distributive issues having to do with the proportion of income which should go to employees vs. owners are eliminated. Pay fairness perceptions are therefore less likely to be a problem in employee-owned firms.[iv] Moreover, employee ownership which gives employees greater influence over their pay structure should imbue it with an aura of fairness. In turn, perceptions of pay fairness should generate a higher level of satisfaction with the amount of pay received (Frohlich & Oppenheimer, 1990, 1992).

Hypothesis 2a: Individual perceptions of pay fairness will be more favorable in employee-owned firms than in conventionally-owned firms.

Hypothesis 2b: Individual satisfaction with actual pay will be higher in employee-owned firms than in conventionally-owned firms.

Second, although employee ownership need not engender highly participative decision processes, by definition it entails a democratization of authority within the firm (Tannenbaum, 1983). Even if this democratization is indirect (i.e. through elected representatives), employees achieve the status of "citizens" who are able to elect their leaders. As a result, they are more likely to assign legitimacy to managerial authority, lessening the distrust and conflict which tends to arise in conventional authority relations (Dahrendorf, 1957). They are also more likely to view managers as "colleagues," for they have equal citizenship status. This lessens the status differences and the psychological distance which exists between workers and managers in conventionally-owned firms. Workers are also more likely to view managers as serving their interests rather than the interests of others, and hence see managers as being "on their side."

Hypothesis 2c: Individuals will hold more favorable attitudes towards managers in employee-owned firms than in conventionally-owned firms.

Third, because of their status as co-owners, employees are more likely to identify with, and develop a sense of belonging to, the organization for which they work (Pierce et al., 1991). In effect, employees are working for themselves rather than someone else. Even if this does not translate into enhanced "empowerment" on the job, it provides meaning for employees because they have control over their lives as "producers." Ultimately, therefore, they are less likely to feel alienated (Mandel, 1971), developing instead an intrinsic interest in their work (Tannenbaum, 1983, Long, 1978a, 1978b).

Hypothesis 2d: Individuals will display a higher level of involvement in their work in employee-owned firms than in conventionally-owned firms.

Finally, because employees collectively own and control the organization for which they work, they are more likely to interact positively with co-workers, provide assistance to co-workers, and generally function more effectively as a team.

Hypothesis 2e: Individuals in employee-owned firms will interact more positively with, and

provide greater assistance to, their co-workers.

METHOD & RESEARCH DESIGN

Subjects

The subjects were 210 male and female undergraduate students who were studying in a management program at a Canadian university. They were recruited for the experiment by being told that they would be paid for their work.

Variables and Design

A 2 x 2 design was used. The first independent variable was the form of contract, or company ownership (employee-owned or conventionally-owned contracts for production). The second independent variable was the system used to pay the production workers ("salary plus profit sharing" or "piece-rate plus profit sharing").[v] The subjects were randomly assigned to one of the four experimental conditions. There were a minimum of 10 groups of five subjects in each of the four conditions (a total of 42 five-person groups).

The dependent variables included objective measures of worker output, worker behavior while performing the task, and worker attitudes about their pay, their supervisors, and the work environment.

Experimental Procedure

When subjects arrived at the experimental site, they were given a name tag and asked to be seated. When all subjects who had been scheduled for arrival at a particular time--typically 15-25--had arrived, they were randomly assigned to one of the four conditions (five subjects in each group). Each group was then taken by an experimenter to a different room where they were seated.

Conventionally-owned firm condition. Subjects were first given a "Background" sheet which contained the following key points:

--the group would form a company which would do production work (proofreading of documents) over three production periods

--it was first necessary to determine who the owner of the company would be; this would be accomplished by a bidding system.

--each person could (but need not) submit a bid (maximum $15). The person with the highest bid would become the owner.

--total potential revenue for *each* production period was $50 (whether the potential revenue was achieved depended on worker productivity)

--worker wages would be subtracted from company revenue (each worker had to be paid a minimum of $2.50 for *each* production period)

--80 percent of the profits *after expenses* would be kept by the owner; the other 20 percent would be divided equally among the four workers

After subjects had read this material, the experimenter answered any questions of clarification they had. Subjects were then given time to write their bid on a 3 x 5 card. The experimenter then collected the cards and announced the name of the person who had submitted the highest bid. This person was designated as the owner. In the event of a tie, the two individuals who had tied submitted a second bid. If the bidders were still tied after the second bid, the tie was broken by a knowledge-testing question. The tie-breaking procedure was necessary in only 3 cases.

The experimenter then put place numbers in front of each person, with the owner being given #1 and the workers #2-#5. Each person put that number on all material used during the course of the experiment. At this time, all five subjects also received a "Payoff Sheet" to be used to keep track of their earnings. The owner then distributed a sheet entitled "directions for production workers" which described the task the workers would be doing.

The owner was then taken out of the room by the experimenter and given a document entitled "Directions for the Owner." This document indicated that:

--the workers would be doing a proofreading task which would involve correcting spelling errors in documents that would be provided

--the owner could manage the production workers or do actual proofreading in any proportion that the owner wished

--there were certain rules that had to be followed in correcting errors that were found

--the company would receive 50 cents for each error that workers found and properly corrected

--there were financial implications of various productivity levels of workers, with the owner making more money at higher worker productivity levels

These "Directions for the Owner" also contained detailed information about the pay scheme that would be used to pay the workers. In the "straight wage plus profit sharing" condition, owners informed their workers that they would be paid a flat rate of $2.50 per production period, plus 20 percent of company profits (i.e., 5 percent of total company profit for each worker). In the "piece rate plus profit sharing" condition, owners informed workers that they would be paid 25 cents for each spelling error they found and properly corrected, plus 20 percent of company profits (i.e., 5 percent of total company profits for each worker). A detailed example of how each of these payment schemes worked and what they would mean for both the workers and the owners was also presented. Neither workers nor owners had any say in which payment scheme would be used.

Once the owner had read this material, he or she was taken back into the room where the four production workers were waiting. The owner then explained to the workers how they would be paid and answered any questions the workers had.

Just prior to the first production period, owners and workers were given a "Pre-Production Questionnaire." The questionnaire contained several items designed to check whether subjects understood the experimental instructions and whether they understood the method that would be used to pay them for their work.

Once this questionnaire was filled out, the experimenter asked the owner to hand out the booklets that contained the material to be proofread. Each booklet was 5 pages long and contained approximately 30 spelling errors. No two booklets contained the same material in any treatment.

The cover page of each booklet contained a repeat of the instructions for correcting errors that subjects had earlier read in the "Background" material. After re-reading this, subjects were asked if they had any further questions before the production period started. The first 10-minute production period then began.

At the end of 10 minutes, the experimenter returned to the room and told the subjects to stop working. The owner collected the workers' booklets and then left the room to calculate each worker's productivity and pay for the period. The experimenter assisted the owner in making the calculations and double-checked to make sure the calculations were accurate. Each worker's payoff sheet was then filled in, indicating how much money the worker had made for the production period. While these calculations were being done, the workers were on "break time" and could do whatever they wanted, as long as they stayed in the production room.

After completing the computations, the owner returned to the room where the workers were waiting and handed out each worker's payoff sheet. Workers were given time to study the sheet. A "Post-Production Questionnaire" was then given to the owner and the workers. This questionnaire contained questions designed to assess worker and owner/supervisor satisfaction levels with their supervision, pay, and job, as well as several questions regarding discussions workers had about the task with the owner and their co-workers (see Appendix). After this questionnaire had been filled out, production periods 2 and 3 were run using exactly the same procedures as for period 1. At the conclusion of production period 3, subjects were debriefed and paid for their work.

Employee-owned firm condition. Subjects were given a "Background" sheet indicating that they were part of a five-person company that was going to be doing a production task over three periods. The background information regarding the task was identical to that in the conventionally-owned firm condition (see above), but there were three important differences in the way the company was run.

First, since all workers were owners, there was no contract bidding. Rather, subjects were

told that their company was the successful bidder on a contract that was worth a potential of $50 per production period. They were also told that the administration cost of getting the contract would be divided equally among them and deducted from their earnings. The fact that workers had to put some money into the company meant that they had some ownership stake. [To equalize costs across the ownership treatments, each employee-owned firm was assessed a cost equal to the bid in a matching privately-owned firm (subjects were not aware of this).]

Second, subjects in employee-owned firms were allowed to pick the person who would be their "supervisor" by means of a vote.

Third, subjects were allowed to decide which of the two payment schemes they would use ("straight salary plus profit sharing" or "piece rate plus profit sharing"). Detailed examples of what each payment scheme meant were also provided. Group members were given time to discuss this issue before making a decision; all group members were paid using the same scheme once the consensus had been reached. None of the groups experienced any difficulty reaching agreement on which payment method to use. The two payment schemes were chosen with almost equal frequencies.

These three characteristics -- an ownership stake, allowing workers to pick their supervisor, and allowing workers to pick their payment scheme -- reflect the three primary distinguishing characteristics of employee ownership discussed earlier (economic return, governance, and distributional rights). In addition, in contrast to the conventionally-owned firms, workers in the employee-owned firms watched as their supervisor computed their pay; they were also allowed to keep their pay sheets face up, whereas in the other condition they were required to keep their pay sheets face down. These conditions are consistent with the greater information sharing characteristics which appear to typify employee owned and controlled firms (Bowles and Gintis, 1993: 28).

After these matters had been decided, the running of the three production periods and the administration of questionnaires was identical to that in the conventionally-owned firm condition.

RESULTS

Understanding of Experimental Conditions

To test whether workers understood the key elements of the condition under which they worked, they were asked whether they were being paid on a "piece-rate plus profit sharing" basis or on a "straight wage plus profit sharing" basis. This question also provided an implicit test of subjects' understanding of the ownership treatment. Of the 210 subjects, 190 clearly understood how their pay would be determined. There were no significant differences in comprehension across the ownership conditions.

A check was also made to determine if subjects (workers as well as owners/supervisors) understood the rules for proofreading and for correcting errors. Accordingly, on the "Pre-Production Questionnaire," five different questions were asked about the rules for proofreading and for correcting errors. An average of 182 (out of 210) subjects answered these five questions correctly. Again, there were no significant differences across the treatments.

Economic Effects

Arguments can be made for analysis of productivity at the individual or group level. We generally report individual measures because the experimental task involved pooled interdependence (Thompson, 1967), and because we wished to relate individual attitudes to productivity. Analyses based on group data are occasionally reported for comparative purposes.

Since productivity is a function of both managerial and worker behavior, it was assessed on the basis of all five group members, not just the workers. The first round of production was carried out without the workers' having actually experienced the receipt of pay for their work under the experimental treatments. Since the payment incentive is an integral component of the treatment, the relationship between subjects' behavior and production incentives is somewhat diluted in the first round. In addition, in round 1, the workers would likely focus their attention on learning about the new work context and performing an, as yet, unfamiliar task. Thus, although we report all rounds,

we focus on production in rounds 2 and 3 and the concurrent measures of psychological impact as the bases of analyses.

On an individual basis, productivity in employee-owned firms was significantly higher than in conventionally-owned firms (see Table 1). The effect of the treatment grew over time. For periods 2 and 3 combined, productivity in employee-owned firms was 11.4 percent higher than in conventionally-owned firms (M = 26.63 vs. 23.90, respectively). As might be expected, aggregation of the results at the group level weakens the results somewhat, but the same general findings are evident for the group analysis (significance levels range from .038 to .063. Hypothesis 1a is therefore supported.[vi]

Table 1 About Here

Comparisons of the productivity of supervisors in the two treatments and of the supervisors relative to their workers furnish two bases for evaluating Hypothesis 1b. Supervisors in the employee-owned firms corrected significantly more errors than owners in the conventionally-owned firms [M = 28.2 v. 20.6, t(2.89), $p < .006$]. Moreover, owners in the conventionally-owned firms underperformed relative to their workers [M = 20.6 v 24.7, t(1.80) $p < .037$].[vii] Despite having to perform supervisory tasks, supervisors in employee-owned firms produced at a slightly higher level than workers, but the difference was not significant [M = 28.2 v. 26.2, t(.930), n.s.].

One additional piece of confirmatory evidence is available for hypothesis 1b. Workers in the employee-owned firms rated their supervisors as having spent more time proofreading [M= 6.18 v. 5.55, t(3.16), $p < .002$), confirming that supervisors in the employee-owned condition expended less time on supervision.[viii]

Hypothesis 1c dealt with the impact of the payment scheme on employee productivity. An analysis of variance revealed no main effects for the two payment schemes, nor were there any interaction effects between the two treatments (see Table 2). Only the form of ownership significantly affected productivity. Thus, hypothesis 1c is supported.

The variance of 2.3% should be kept in perspective. It represents the explained variance in an analysis of variance in which the independent variable is binary. The more practically significant difference in the treatments is the difference in mean productivity between the two ownership conditions (the 11.4% noted above). A difference of this magnitude can clearly have a substantial effect on a firm over time.

Table 2 about here

While the payment schemes did not have an objective impact on productivity, they did result in a *perceived* effect on shirking behavior. Workers in the straight wage treatment perceived others to be working less hard than did workers in the piecework treatment [M = 7.25 vs. 7.67, t(2.14), $p < .017$].

Social/Psychological Effects

It was hypothesized that subjects in employee-owned firms would have more favorable attitudes toward various aspects of their work than subjects in conventionally-owned firms (Hypotheses 2a-e). The Post-Production Questionnaire which was distributed to subjects after each production period contained four groups of questions-- one group relating to pay, one to supervision, one to worker attitudes about the task, and one to relations with co-workers. The responses of workers and owners/supervisors to these four groups of questions are analyzed below.

Workers attitudes about pay. As shown in Table 3, workers in employee-owned firms perceived greater *pay fairness* than workers in conventionally-owned firms [M = 7.54 vs. 6.39, t(4.37), $p < .0001$]. This finding appears to support hypothesis 2a, and is consistent with the argument that distributive issues having to do with the division of proceeds are less problematic under employee ownership.

Table 3 about here

Another indicator of fairness is worker satisfaction with the *method of payment*. Referring

again to Table 3, compared with workers in conventionally-owned firms, those in employee-owned firms were significantly more satisfied with the method of payment [M = 7.45 v. 6.18, t(4.24), p < .0001].

As far as *actual pay* was concerned (hypothesis 2b), workers in employee-owned firms were more satisfied with the pay they received [M = 7.39 v. 6.24, t(4.33), p < .0001].

The apparent support of hypotheses 2a and 2b is tempered by the existence of a potential confounding factor: subjects in the employee-owned firms earned significantly more than subjects in the conventionally-owned firms (M = $13.22 vs. $7.54, t(15.90, p < .0001). An analysis of variance showed that no effect of ownership condition remained for pay fairness, method of payment, or satisfaction with actual pay after controlling for the amount of money that subjects received.

But this potential confound does not necessarily mean that ownership form had no effect on subjects' pay perceptions. Pay differences might have influenced worker responses in absolute terms, but they could not have produced a relative effect since subjects were unaware of payment levels across conditions. In addition, one of the key arguments regarding employee ownership is that employees do have an increased financial stake under this form of ownership. A definitive conclusion on this issue awaits further research which is specifically designed to disentangle these issues.

Worker attitudes about supervision. To test hypothesis 2c, workers were asked how satisfied they were with their owner/supervisor. The mean responses were significantly higher in the employee-owned condition [M = 7.67 v. 6.13 t(6.20), $p < .0001$]. As shown in Table 4, even when controlling for pay, employees in the employee-owned firms were significantly more satisfied with their supervisors than employees in the conventionally-owned firms. Table 4 also shows that there was no relationship between satisfaction with the owner/supervisor and the payment scheme. Recall that a previous analysis showed that satisfaction with the payment scheme and the perceived fairness of payment were related to the actual pay employees received. Table 4 shows that the amount of actual pay received was not significantly related to satisfaction with the owner; as well, the perceived fairness of payment and the satisfaction with the payment scheme were independently related to satisfaction with owner. Specifically, employees in employee-owned firms were more satisfied with the payment scheme, and perceived greater pay fairness than employees in the conventionally-owned firms. [Similar analyses for the other dependent variables discussed below showed that significant differences between ownership conditions remained for all measures except one (interest in the task) after controlling for pay.]

Table 4 About Here

Additional data were gathered on hypothesis 2c by asking subjects how helpful the owner/supervisor was in facilitating task accomplishment. Workers in the employee-owned firms perceived the supervisor as significantly more helpful than workers in conventionally-owned firms [M = 5.62 v. 4.37, t(4.02) $p < .0001$]. Overall, hypothesis 2c was strongly supported, with workers in employee-owned firms being more positively disposed toward their supervisors. There were no differences in employee- and conventionally-owned firms on the issues of worker knowledge of the earnings of their boss, or how much they believed what the boss told them.

Worker attitudes about the task. To test hypothesis 2d, subjects were asked how interesting the task was. Compared to workers in conventionally-owned firms, workers in

employee-owned firms felt that the task they were doing was more interesting [M = 5.30 v. 4.74, t(2.00), p < .024]. This supports the argument that workers in employee-owned firms experience a heightened sense of intrinsic involvement as they carry out their task.

There were no differences between employee- and conventionally-owned firms in terms of (1) the self-reported effort that workers expended in doing the task, (2) the effort workers perceived that others were expending in doing the task, and (3) the difficulty of the task. In light of the differences in productivity between the two treatments, these lack of differences in perceptions of effort might reflect a lessening of *subjectively* perceived effort and difficulty, or alternatively, might reflect the higher efficiency of the worker-owned environment.

Worker attitudes about relations with co-workers. To test hypothesis 2e, workers were asked a series of questions about their interactions with their co-workers. Compared to workers in conventionally-owned firms, workers in employee-owned firms:

(1) talked more with their co-workers [M = 4.80 v. 4.00, t(2.84) p < .0025]

(2) felt that talking with co-workers was more useful in increasing their own productivity [M = 5.14 v. 4.54, t(1.82) p < .035]

(3) felt that talking with co-workers was more useful in increasing their co-workers' productivity [M = 5.88 v. 4.90, t(3.00) p < .0015].

No significant differences across conditions were found for two other related variables: the frequency of talk about task performance during production periods, and the frequency of talk about performance during break time.

DISCUSSION

The present study demonstrates the potential value of experimental research for the study of employee ownership. By using experimental methods, we were able to effectively simulate a test of the micro-level effects of full employee ownership, in isolation from the confounding effects of institutional factors commonly blamed for the limited diffusion and survival rates of

employee-owned firms. We were also able to avoid a number of the selectivity problems associated with field research on employee ownership. In both respects, experimental research methods offer important advantages relative to field research. These advantages may be offset by some of the classic and oft-cited problems associated with experimental methods, but research of the sort reported here can, at minimum, serve as a complement to both case study and multivariate field research.

In this study, subjects in the employee-owned firms exhibited higher productivity, perceived greater fairness in the pay they received and in the method that was used to pay them, reported higher levels of involvement in their task, assigned more positive evaluations to their supervisors, and showed a greater propensity to interact with, and provide assistance to, their co-workers. The data also indicate that the simulated employee-owned organizations had lower supervisory requirements. Thus, our findings suggest that employee ownership may indeed have potential micro-level advantages over conventional ownership. They also suggest that these advantages hold under alternative payment schemes.

Though we believe these findings to be encouraging, they should be viewed as preliminary. At least four questions can be raised, each of which calls for subsequent research, building upon the design reported in this study.

First, the present study simulated firms that were small and short lived. It is possible that the effects we observed would not have been evident in firms which were either larger in size or which existed for a longer time period. As Hansmann (1990a; 1990b) argues, large established firms may be more prone to political instability, thus negating the effects observed in this study. It is also possible that employees simply lose interest in these firms, giving rise to an entrenched oligarchy (Michels, 1959) and ultimately resulting in a "degeneration" of the motivational advantages of employee ownership. The present study allows for neither of these possibilities, however, in subsequent research, both size and duration can be varied in order to establish whether, and the extent to which, these make a difference in our findings.

Second, in employee-owned firms, workers have legal control over governance and distributional issues. Thus, we operationalized employee ownership to include employee participation in the selection of their supervisor and of their pay scheme. But it is possible that this participation, rather than ownership per se, accounts for the observed differences between the employee-owned and conventionally-owned firms. Previous experimental research by Frohlich & Oppenheimer (1992) gives some weight to this conjecture. They found (in keeping with other findings in social psychology) that the act of participating in group decisions regarding the allocation of income can serve as a substitute for direct material reward in promoting productivity. Specifically, the groups' decisions regarding how to *fairly* allocate earnings was at issue. They found that participation led *low* producers who were being subsidized by transfer payments to redouble their efforts.

This is important, because it suggests that the limited diffusion and success of innovations in conventionally-owned organizations referred to earlier may be attributable not to conventional ownership per se, but rather to problems with the innovations themselves. Although governance and distributional issues fall within the purview of ownership rights in conventionally-owned organizations, it may be possible to establish autonomous work groups in these organizations where workers choose both their supervisor *and* their pay scheme. If so, it is also possible that the effects attributed to employee ownership in the present study could also be attained under conventional ownership, at least under the appropriate conditions. Under the logic advanced by organizational economists, such conditions would arguably render hierarchy superfluous and hence call for employee rather than conventional ownership. Nonetheless, this possibility calls for further research, examining whether employee-owned firms outperform conventionally-owned firms when such conditions are established.

A third and related issue has to do with our assumption that employee-owned firms actually entail *de facto* as well as *de jure* participation in governance and distributional issues. While field

research suggests that employee ownership typically does give rise to more participatory structures (Conte & Tannenbaum, 1978; Rhodes & Steers, 1981), this need not be the case (see Hammer & Stern, 1980). A question therefore arises regarding the implications of alternative organizational forms for the effectiveness of employee-owned organizations. This question can be addressed in subsequent research by simulating employee-owned and conventionally-owned firms with different levels of participation.

Finally, this paper does not address the issue of whether the limited diffusion and survival rates of employee-owned firms reflects inherent problems with employee ownership, or whether they reflect unfavorable institutional conditions. Whether relevant institutional conditions can be simulated in experimental research is a difficult question. However, it may be possible to vary experimental conditions in order to establish the extent to which the various reasons given for limited diffusion and survival rates appear to be valid. In particular, it may be possible to introduce financial decision alternatives to explore for risk aversion and the willingness to re-invest rather than consume profits. Moreover, in simulations with large groups, it may be possible to explore the implications of alternative mandated governance structures for political instability.

To conclude, the findings reported in this study must be viewed as preliminary. Nonetheless, this study does lend credence to some of the theoretical arguments in favor of employee ownership as an alternative institutional form, suggesting that it may indeed have motivational advantages over conventional ownership. It also serves as a "pointer" for subsequent laboratory research on employee ownership, both demonstrating the potential of this research for addressing issues not readily addressed in field studies, and identifying some of these issues.

ENDNOTES

1. The Mondragon system has had serious difficulties adjusting to the EC. But the cooperatives have adjusted by increasing their remuneration ranges (from 3:1 to 7:1) and by introducing other reforms, so as to be able to recruit technically proficient managers and professionals. Similar adjustments have recently been adopted to deal with related problems in the Israeli Kibbutz system.

2. There has been considerable research on the effects of employee stock ownership plans (ESOPs). However, ESOPs are often implemented to address specific external exigencies (e.g., takeover threats) and typically do not entail full ownership and control (see U.S. GAO, 1986:40). Thus, these studies do not shed much light on the potential effects of cooperatively-owned firms.

3. But Miller (1992) discusses how worker relations can be expected to develop over the longer term so as to undermine the effects of piece rate systems. His evidence, though not quantified, and his theoretical argument are impressive. However, some economists suggest that much depends upon the design of the piece rate system (see Mitchell et al, 1990:48-50) -- an argument which dates back to Frederick Taylor's advocacy of a "differential" piece rate system.

4. Of course pay equity issues can still arise. The argument here, however, is that issues having to do with the overall wage bill -- for example, the overall level of pay increase or decrease granted to employees in a particular period -- would tend to be reduced or eliminated. Thus, holding constant for pay equity issues, satisfaction with pay should be higher.

5. A straight salary condition was not used because it has no parallel in the worker-owned company (i.e., a straight salary condition is not conceptually meaningful in a worker-owned company).

7. All t-tests are one-tailed if they are reporting data relating to one of the explicit hypotheses. T-tests reporting other data are two-tailed.

vii. This finding may be the result of the best speller being selected as the supervisor in some of the employee-owned firms. In the conventionally-owned firms, no such selection "system" was in place (unless we assume that aggressive bidders are also good spellers). Since subjects were randomly assigned to conditions, some of the best spellers in the conventionally-owned firms would have been workers, not owners. This would have inflated worker productivity in those firms compared to the employee-owned condition. In any case, as noted earlier, we are primarily concerned with the productivity of the work group, not simply workers or supervisors.

viii. Means ranged from 4.40 to 7.67 because they were calculated by adding subject responses for periods 2 and 3.

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APPENDIX: SOCIAL / PSYCHOLOGICAL VARIABLES

VARIABLE	WORDING OF QUESTIONS:	MEANS*
OWNER / ADMINISTRATOR PROOFREADING	COMPARED TO THE WORKERS, HOW MUCH ACTUAL PROOFREADING WORK DID THE OWNER / ADMINISTRATOR DO? (1 = MUCH LESS, 2 = LESS, 3 = THE SAME, 4 = MORE, 5 = MUCH MORE)	5.87
SATISFACTION WITH PAYMENT SCHEME	HOW SATISFIED ARE YOU WITH THE PAYMENT SCHEME THAT WAS USED TO PAY YOU? (1= VERY DISSATISFIED, 2 = DISSATISFIED, 3 = NEUTRAL, 4 = SATISFIED, 5 = VERY SATISFIED)	6.82
SATISFACTION WITH PAYMENT	HOW SATISFIED ARE YOU WITH THE AMOUNT OF MONEY YOU EARNED DURING THIS PERIOD? (1 = VERY DISSATISFIED, 2 = DISSATISFIED, 3 = NEUTRAL, 4 = SATISFIED, 5 = VERY SATISFIED)	6.81
PERCEIVED FAIRNESS OF PAYMENT	HOW FAIR DO YOU THINK YOUR PAY WAS? (1=VERY UNFAIR, 2= UNFAIR, 3= NEUTRAL, 4 = FAIR, 5 = VERY FAIR)	
SATISFACTION WITH OWNER / ADMINISTRATOR	OVERALL, HOW SATISFIED ARE YOU WITH THE ADMINISTRATOR? (1 = VERY DISSATISFIED, 2 = DISSATISFIED, 3 = NEUTRAL, 4 = SATISFIED, 5 = VERY SATISFIED)	6.96
HELP FROM OWNER / ADMINISTRATOR	HOW HELPFUL WERE YOUR INTERACTIONS WITH THE OWNER / ADMINISTRATOR (1 = NOT AT ALL, 2 = SLIGHTLY, 3 = NEUTRAL, 4 = USEFUL, 5 = VERY USEFUL)	6.89
INTEREST IN TASK	HOW INTERESTING WAS THE TASK YOU HAD TO DO? (1 = VERY TEDIOUS, 2 = TEDIOUS, 3 = NEUTRAL, 4 = INTERESTING, 5 = VERY INTERESTING)	4.99
WORK EFFORT OF INDIVIDUALS	HOW HARD DID YOU WORK DURING THIS PRODUCTION PERIOD? (1 = VERY LITTLE, 2 = A BIT, 3 = MODERATELY, 4 = HARD, 5 = VERY HARD)	5.02
WORK EFFORT OF OTHERS	HOW HARD DID THE OTHER WORKERS WORK? (1 = VERY LITTLE, 2 = A BIT, 3 = MODERATELY, 4 = HARD, 5 = VERY HARD)	7.48
DIFFICULTY OF TASK	HOW DIFFICULT WAS THE TASK YOU HAD TO DO? (1 = VERY DIFFICULT, 2 = DIFFICULT, 3 = NEUTRAL, 4 = EASY, 5 = VERY EASY)	7.46
TALK WITH OTHERS	HOW MUCH DID YOU TALK WITH THE OTHER WORKERS DURING THIS SESSION? (1 = VERY LITTLE, 2 = SOME, 3 = MODERATE, 4 = QUITE A BIT, 5 = VERY MUCH)	6.36
USEFULNESS OF TALK FOR INDIVIDUAL PRODUCTIVITY	HOW USEFUL DO YOU THINK THIS TALK WAS IN INCREASING YOUR PRODUCTIVITY? (1 = NOT AT ALL, 2 = A LITTLE, 3 = MODERATE, 4 = QUITE A BIT, 5 = VERY MUCH)	4.40
USEFULNESS OF TALK FOR OTHERS' PRODUCTIVITY	HOW USEFUL DO YOU THINK THIS TALK WAS IN INCREASING THE OTHER WORKERS' PRODUCTIVITY? (1 = NOT AT ALL, 2 = A LITTLE, 3 = MODERATE, 4 = QUITE A BIT, 5 = VERY MUCH)	4.84
TASK RELEVANCE OF TALK	TO WHAT EXTENT DID THIS TALK HAVE TO DO WITH THE PERFORMANCE OF YOUR TASK? (1 = VERY LITTLE, 2 = SOME, 3 = MODERATE, 4 = QUITE A BIT, 5 = VERY MUCH)	5.39
TALK ABOUT TASK DURING BREAK	DURING THIS MOST RECENT BREAK, TO WHAT EXTENT HAVE YOU TALKED WITH THE OTHERS ABOUT TASK PERFORMANCE?)1 = NOT AT ALL, 2 = A LITTLE, 3 = MODERATE, 4 = QUITE A BIT, 5 = VERY MUCH)	5.45
		5.73

*Note: Means range from 4.40 to 7.48 because they were calculated by adding subject responses for periods 2 and 3.

TABLE 1: DIFFERENCE IN PRODUCTIVITY BY OWNERSHIP TREATMENT

MEANS & (STANDARD DEVIATIONS) OF SUBJECT'S NET CORRECTIONS IN

CONDITION	ROUND 1	ROUND 2	ROUND 3	ROUNDS 2+3	ROUNDS 1+2+3	N
EMPLOYEE OWNED	9.94 (4.20)	12.91 (4.66)	13.71 (4.89)	26.63 (8.86)	36.57 (12.25)	105
CONVENTIONALLY OWNED	9.40 (4.28)	11.83 (4.82)	12.07 (5.62)	23.90 (9.54)	33.30 (12.71)	105
T	0.927	1.66	2.27	2.15	1.90	
1-TAILED PROBABILITY	0.177	0.049	0.012	0.016	0.029	

TABLE 2: EFFECT OF EXPERIMENTAL TREATMENTS ON PRODUCTIVITY

DEPENDENT VARIABLE: PRODUCTIVITY
N: 210
MULTIPLE R SQUARED: 0.023

ANALYSIS OF VARIANCE

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE	F-RATIO	P
OWNERSHIP	405.35	1	405.35	4.768	0.030
PAYMENT SCHEME	54.30	1	54.30	0.639	0.425
OWNERSHIP*SCHEME	63.80	1	63.80	0.750	0.387
ERROR	17512.26	206	85.01		

TABLE 3: SATISFACTION WITH THE PAYMENT SCHEME AND PAY

TREATMENT		PERCEIVED FAIRNESS OF PAYMENT	SATISFACTION WITH PAYMENT SCHEME	SATISFACTION WITH PAYMENT
CONVENTIONAL OWNERSHIP	MEAN	6.39	6.18	6.24
	S D	(1.77)	(1.98)	(1.71)
	N	83	84	84
EMPLOYEE OWNERSHIP	MEAN	7.54	7.45	7.39
	S D	(1.62)	(1.91)	(1.72)
	N	84	84	83
SIGNIFICANCE	T-VALUE	4.37	4.24	4.33
	P	.0001	.0001	.0001

TABLE 4: SATISFACTION WITH THE OWNER / ADMINISTRATOR - EXPLAINED BY EXPERIMENTAL TREATMENTS AND OTHER FACTORS

DEPENDENT VARIABLE: SATISFACTION WITH THE OWNER / ADMINISTRATOR N: 167
MULTIPLE R SQUARED: 0.378

ANALYSIS OF VARIANCE

SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE	F-RATIO	P
Ownership	16.147	1	16.147	8.076	0.005
Payment scheme	4.251	1	4.251	2.126	0.147
Pay received	0.247	1	0.247	0.124	0.725
Satisfied with payment scheme	14.754	1	14.754	7.380	0.007
Fairness of pay	10.996	1	10.996	5.500	0.020
Error	321.888	161	1.999		

Intercorrelation Matrix

	SATP23	SATR23	FAIR23	HELPSU23	INTERE23	TALKBR23	TALKFR23	TALKUS23	TALKUW23	TALKRE23	HARDOT23	HARDWK23	SATOW23	PROOF23	DIFFI23	SATWKR23	SATWR23
SATP23	1.000																
SATR23	0.773	1.000															
FAIR23	0.782	0.694	1.000														
HELPSU23	0.270	0.250	0.238	1.000													
INTERE23	0.126	0.146	0.169	0.247	1.000												
TALKBR23	-0.027	-0.033	-0.106	0.150	0.103	1.000											
TALKFR23	0.106	0.080	0.024	0.503	0.269	0.338	1.000										
TALKUS23	0.256	0.213	0.170	0.666	0.268	0.236	0.627	1.000									
TALKUW23	0.169	0.181	0.141	0.504	0.348	0.205	0.518	0.693	1.000								
TALKRE23	0.219	0.159	0.125	0.575	0.303	0.180	0.504	0.695	0.649	1.000							
HARDOT23	0.193	0.184	0.167	0.110	-0.091	0.186	0.040	0.032	0.063	0.062	1.000						
HARDWK23	0.126	0.030	0.079	0.159	0.021	0.103	-0.001	0.049	0.025	0.082	0.675	1.000					
SATOW23	0.519	0.518	0.508	0.510	0.092	-0.015	0.187	0.335	0.266	0.231	0.244	0.196	1.000				
PROOF23	0.187	0.152	0.257	0.279	0.064	0.021	0.205	0.111	0.114	0.107	0.253	0.216	0.390	1.000			
DIFFI23	-0.150	-0.028	-0.101	-0.185	0.084	0.060	-0.113	-0.145	-0.027	-0.076	-0.122	0.054	0.039	0.134	1.000		
SATWKR23	0.219	0.332	-0.281	0.131	0.179	0.211	0.127	0.108	0.065	-0.197	0.317	0.026	.	-0.140	0.012	1.000	
SATWR23	-0.032	-0.021	0.351	0.663	-0.052	0.490	0.423	0.247	0.523	0.633	0.156	0.297	.	0.211	0.138	0.011	1.000