Motivation and Control in the Mondragon Experiment

The Replication and Sustainability of the Mondragon Experiment

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MOTIVATION AND CONTROL IN THE
MONDRAGON EXPERIMENT

KEITH BRADLEY AND ALAN GELB*

1. INTRODUCTION

The merit of alternative industrial structures is a much debated topic, from both economic and political perspectives. The economic issues are fairly universal. Are the prospects for employment creation, increased efficiency or accelerated investment better with capitalist or state-controlled enterprises? The political issues tend to be more country (or region) specific. They generally centre around conflict between control patterns within industry and structures of political power outside enterprises.

One alternative to capitalism and socialism is co-operativism—worker-controlled and managed enterprises. In certain areas, notably agricultural marketing and the professions, co-operative-like enterprises are quite common. In the vital field of manufacturing industry they tend to be infrequent and generally insignificant. Furthermore, most so-called ‘co-operatives’ are far from being completely co-operative, as defined by the criteria suggested by Vanek (1972), and a considerable number have developed in unusual economic and political circumstances which make it hard to draw general conclusions from their operation. Perhaps for this reason there appear to be few attempts to extract information from operating enterprises directed towards understanding how they function and how the fact that they are indeed co-operatives influences their members’ attitudes to their firms, their work environment and their efficiency. As a result, theories about how individuals interact in a co-operative have not been adequately tested, and remain extremely naive. As a result of crucial omissions from the ‘neo-classical’ model of the co-operative economy, for example, a widespread misapprehension exists that co-operatives face a ‘partially-free-rider’ problem whereas regular capitalist firms do not. This, we argue, has tended to bias opinions (on efficiency grounds) against co-operatives. On the other hand, advocates of co-operativism seem to us not to have come to grips with certain factors that might inhibit the development of co-operatives in general.

The political and ideological interest of co-operativism in a developed capitalist environment is intriguing. Theoretically, co-operatives appear to be quite acceptable to a wide spectrum of opinion. Any purely ideological objection by capital seems to us to be remote: it is hard to find criticism of worker involvement and ownership per se. Co-operatives are, after all, an extension of the use of profit-sharing schemes, employee stock bonuses and autonomous work groups, the latter associated with the ‘human relations’ school of thought in industrial organisation theory. Many tensions between capital, labour and management in more traditional capitalist firms may be traced to the contrast between their internal environment—control by capital or management—and the political clout wielded by labour which permits it to influence the internal working environment through legislation. Internal and external power structures are incongruent. Recognition of this fact has led to the interest in arrangements designed to render the structure of labour’s material rewards more compatible with enterprise objectives.

Notwithstanding the apparent lack of ideological objection, the noted reluctance of individual capitalists to make particular investments in co-operatives can virtually always be traced to doubts as to their profitability and security. The rarity of producer

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co-operatives itself therefore inhibits their ability to raise funds, despite some evidence that co-operatives, or part-co-operatives, have not fared too badly.7

Organised labour tends to view co-operatives with suspicion. Attempts at worker control are considered to legitimate, hence strengthen, the real control held by capital. Further, in the face of increased capitalist power, co-operativism fragments and weakens labour opposition. Correspondingly, the attitudes of organised labour to attempts to establish worker co-operatives have frequently been hostile, despite an ideological commitment to worker control and participation.8

This situation, constrained in practice but with fairly wide ideological appeal as presenting a 'third option' to capitalism and socialism, renders the potential of co-operative production structures considerably greater than that indicated by their current numbers and sizes. Of interest too, is their status as the ultimate in employee incentives schemes. From the perspective of economic development there is considerable interest in co-operative-type organisations.9 But the rarity of production co-operatives, perhaps largely due to the above-noted constraints, does raise difficulties for attempts to evaluate their potential.

The only sizeable enterprises fulfilling virtually all of Vanek's criteria for co-operatives10 appear to be those within the Mondragon co-operative group. Situated within a semi-industrialised region—the Basque provinces of northern Spain—these have enjoyed remarkable growth and apparent financial success since their establishment in 1956, currently employ some 18,000 co-operateurs11 and produce a wide range of manufactured and some agricultural products. Any focus on the extension of worker management towards its logical conclusion must necessarily draw heavily upon their experience.

Two main sets of issues should be distinguished. The logically prior set concerns the operation of the co-operatives. Have they managed to achieve a congruency between capital and labour the lack of which has soured industrial relationships since the onset of capitalism? How functional to their growth and success have been any such achievements? Before considering the second set of questions—the replicability and sustainability of Mondragon-style co-operatives—this first set needs to be addressed. This paper represents an attempt to do so, and is based on an analysis of survey data collected from the Mondragon co-operatives and industrial control groups during 1979. The second set of questions is being addressed in another paper.

Before proceeding to outline the specific set of issues to be analysed, a description of the main points of departure of the Mondragon co-operatives from conventional capitalist enterprises is necessary. The organisation of the group is therefore briefly outlined in Section II, following which specific issues are highlighted in Section III. Methodological points related to the empirical side are addressed in Section IV and the surveys are described. Results are presented in Section V and conclusion and further directions for research discussed in Section VI.

II. MONDRAGON: HISTORY AND ORGANISATION12

Arizmendi's thinking was twenty years ahead of its time. He believed that there would be a shortage of jobs and that works should be prepared for self-management so he prepared men capable for self-management. We were lucky that he came but he was lucky to come across a group of people like those around Mondragon. At first people didn't understand what he meant but gradually they began to comprehend his ideas. We owe Arizmendi everything.13

Most studies and commentaries on Mondragon have highlighted the importance of Basque nationalism as a binding force, encouraging the co-operation of normally opposing forces—capital and labour—against a common Spanish foe. In 1956 José Maria Arizmendi, a priest, inspired the takeover of a small bankrupt enterprise produc-
ing lamps as a worker-managed experiment. Between 1965 and 1975 the number of
coop-operative workers increased by about 1,000 per year. Currently the group provides
some 18,000 jobs and includes over eighty industrial and agricultural units. Only about
10 per cent of this job total has come through conversion of existing firms; the remainder
represents new employment. At the centre of the Mondragon group is its own savings
bank, the Caja Laboral Popular, through which loan capital is raised and channelled to
the industrial units. The group includes also its own social security co-operative and
technical training school.

The manufacturing co-operatives produce a variety of products—machine tools,
refrigerators and other kitchen appliances, furniture, bicycles, electrical goods and bus
to mention but a few—using a range of technologies. Capital/man ratios vary
between co-operatives—currently they range around $30,000 to $40,000 per
worker—and have been rising. In the 1970s Mondragon produced about 5 per cent of
national output in certain consumer goods, 3 per cent in the metal and engineering
sector and 1 per cent in heavy machinery, and about 14 per cent of the industrial output
of Guipuzcoa, the province in which their activity is concentrated.

We will not document figures on Mondragon’s sales, exports, profitability output/
man etc., since these have been carefully analysed. Suffice it to say that these figures
appear to be highly satisfactory. During much of the period of Mondragon’s growth,
Spanish industry developed rapidly, helped by an expanding domestic market and
considerable protection. Yet the Mondragon group is considered to have ‘outperformed
the capitalist environment’ in virtually all substantive respects. The statistics on
employment growth are impressive relative to those for local firms. It is difficult to arrive
at any conclusion other than that Mondragon is a most successful group of enterprises,
when judged by the usual criteria.

Formally, the organisational structure of a typical Mondragon co-operative does not
differ too greatly from that of a capitalist corporation. Figure 1 depicts the essentials.
However, the Junta Rectora (board of directors) is responsible to a General Assembly
and is elected by co-operateurs on a one-man vote. The Social Council is the Mondragon
equivalent of the German or French ‘works council’, representing co-operateurs
through a cell-based system to their management and board.

Wages are ex post confirmations of advances out of anticipated profits (anticipos).
The range of the wage scale is a matter for debate, although relative to Spanish industry
the scale is compressed. Theoretically the ratio of the lowest to highest payment is 1:3
although special bonuses may extend this to 1:4-5. Further extension follows if account
is taken of the method of deducting social security contributions, but compression is still
significant.

Mondragon rules governing capital and equity are quite complex. Net profits (or net
revenues minus payroll costs, interest and depreciation) are allocated to individual and
to two collective accounts, collective Reserves and the Social Fund, according to a set
formula. This so contrains distribution that reserves bear the major burden of fluctua-
tions in profitability. When profits are low, only 20 per cent accrue to Reserves but this
proportion increases greatly as they rise. Normally the Social Fund receives a flat 10 per
cent of profits. Individual accounts receive interest of 6 per cent per annum and are
revalued annually to reflect inflation and changed circumstances. Profit distribution to
individuals’ accounts is in proportion to their total work and interest incomes so that
long-serving worker members tend to receive larger shares.

Capital contributions are required from workers joining new or existing co-
operatives. On retirement, accumulated profits must by law be paid out within two
years, unless some alternative arrangement has been made. Co-operateurs may not sell
their shares, and voluntary departures involve a penalty of up to 30 per cent of
accumulated profits, although this is discretionary and imposed only when capital
withdrawal is seen as a threat. Individuals are not, therefore, ‘tied in’ to their
co-operatives in practice, but circumstances resulting in 'waves' of departures are likely to result in some blocking of funds.

Although Mondragon's criteria for co-operateur selection appear a little unusual relative to hiring criteria of firms this reflects the different roles of co-operateur and worker. In contrast to the emphasis on qualities of obedience and regularity noted in conventional recruitment, Mondragon emphasises, besides skill and education, 'community' variables which measure the degree of integration of workers in their local communities. Following acceptance, a worker undergoes trial periods of some six months during which time foremen's reports again stress heavily his social acceptability. This screening, and the probable self-selection among potential applicants aware of the criteria, serve to identify and reject workers with little 'co-operative' potential: plausibly, those viewing the co-operatives as just another work opportunity. Similar criteria are applied in assessing candidates for advancement within the co-operative.

Mondragon provides no formal guarantee of lifetime employment. But it is generally
accepted that adjustment to structural or market change will not be through job shedding. Co-operateurs may be reallocated between co-operatives which operate a revenue-sharing 'insurance' scheme. They continue to receive 80 per cent of their salary if unavoidably laid off. This, of course, inhibits redundancy since firing costs are so high.

Work discipline is closely regulated by rules internal to each co-operative. Misdeemeanours are classified as light, grave and very grave. Penalties range from written warnings through suspension to losses of income for up to sixty days. Striking against management is punishable by expulsion. In 1974 this penalty was imposed on seventeen strike leaders and lesser penalties levied on 397 strikers by the Junta Rectora of ULGOR, these punishments later being ratified by the ULGOR Assembly. Significantly, the anti-strike ethic has not been substantially weakened to accommodate sympathy strikes in favour of Basque nationalism or workers in general. However, to focus on punishment alone is one-sided. An important element of discipline consists of educational seminars to reinforce the ideal of co-operativism among Mondragon's members. Mondragon's ideal is to replace discipline by self-discipline.

III. A Theory of Co-operativism, Motivation and Control

In capitalist enterprises the objectives of different factors of production are unlikely to be identical. Capital (the shareholders) plausibly desires profitability above all. Managers may place a premium on security, pay and status, which they may not perceive as necessarily closely related to profits. Provided workers' jobs are not endangered, nonwork objectives such as leisure may be paramount. This divergence of interests has been seen to account for the prevalence of X-inefficiency: a situation where the cost curves of enterprises are far above what they could be, given available technical and organisational possibilities.\(^{18}\)

Cannot profit-sharing, worker stockholding or similar incentive schemes, if introduced into the capitalist framework, resolve this problem? While some improvement in the alignment of objectives of capital and labour is undoubtedly possible, it seems unlikely that the capital-labour division can be bridged so simply. The reason for this is that the returns to capital \textit{in total} are typically far below wage costs in capitalist enterprises, and equity typically represents only a part of the capital stock. Therefore, unless the fixed wage component is drastically reduced, any profit-related bonuses will be small relative to wage income.

Also small will be dividends and capital gains from worker shareholdings, particularly since capitalists will be reluctant to hold equity in enterprises characterised by majority employee shareholding. This is because such a situation leaves open the possibility that employees, in their capacity as shareholders, may vote themselves sufficient wages to reduce dividends to zero, hence buy out the capitalists at no cost at all! Worker shareholding in capitalist enterprises must therefore remain quite minor.\(^{19}\)

One possible way around this problem is to reward selected workers—managers—with substantial profit-related incentives and rely on them to enforce the interests of capital throughout the enterprise. Capital-labour tension is thus transformed into management-labour conflict. The success of such a strategy will depend upon firm-specific factors and the political environment external to the firm. Firm-specific factors include the monitoring and control technology available to managers, which may be more or less effective but probably still leaves room for considerable organisational slack. The scope for this is undoubtedly greatly increased by the external factors in circumstances where labour possesses a substantial degree of political power, either \textit{de jure} or \textit{de facto}. For, in such cases, the institutional framework within which collective bargaining and industrial relations proceed will be affected to limit management's ability to manage effectively in the interests of capital. Most obviously, laws may be
passed to reduce management's power. Less apparent, but sometimes equally important, is the benefit perceived by labour from the absence of laws which, although perhaps constraining to management, at least provide clear guidelines for control. In the U.K. such an attitude appears to have been closely associated with the tendency for power to shift from national official labour agencies to unofficial bodies at plant level. Thus, while purely technical obstacles to control may be minor, the actual potential for control could be far less. It could also be noted that the takeover—the ultimate threat to managerial inefficiency—is powerless to prevent this variety of X-inefficiency.

All this suggests that the potential for increased productivity due to removing the labour-capital distinction, as is theoretically possible on co-operatives, is considerable. A major part of the empirical work reported on below was therefore directed towards understanding the priorities of the Mondragon co-operateurs. Why are their enterprises important to them (if indeed they are)? How closely do they appear to identify with their management (and management with them)? How far down the occupational and payments scale does ideological solidarity appear to be sustained? The answers to such questions throw some light on the potential contribution of the co-operative organisational form towards X-inefficiency, and perhaps, too, on the 'quality of industrial life' in the co-operatives.

Unless individuals' priorities can be perfectly aligned (a highly unlikely possibility in any organisation where products are produced by individuals acting jointly) a monitoring and control system will be needed to ensure that actions conform to overall objectives. In archetypal capitalist enterprises control is vertical, from supervisor to supervisee. Co-operatives may improve this vertical monitoring by increasing its acceptability. But additionally, the co-operative form may induce 'horizontal control', which may be a significant source of economy of formal control costs.

A formal model of control and incentive structures underlies the following discussion and is presented in the Appendix to this paper. The model is undesirably simplistic, no account being taken of risk or of the dynamic development of the firm. Its main features and conclusions are briefly described here. Information is recognised to be imperfect. Merely paying an employee in a regular firm a fixed wage provides very little incentive: in such circumstances he will behave optimally from his own perspective without regard for the interests of the firm. Some monitoring system is needed and can only be achieved at a cost. But who supervises the monitors? Somewhere in the firm must be employees who see the structure of their rewards as being linked to firm performance—we term such a limited set the 'managers'. The effectiveness of control is determined by: (a) the response of managers to incentives and (b) the impact of the vertical control system upon those controlled. As described above, these factors are both likely to be influenced not merely by technological and other factors internal to the firm, but by the social environment which encourages or frustrates vertical control systems.

In contrast to the capitalist firm, a co-operative distributes profits (the surplus) to its members according to some formula. Capital receives a fixed payment—and co-operateurs may also receive some component of their income in wage form. Given similar production functions for the co-operative and firm, output varies in a similar manner with comparable changes in the efforts of their employees. There is thus a similar 'incentive fund', for wider distribution in the co-operative and narrower disbursement in the firm.

In our model the consequences of wider surplus distribution in the co-operative are twofold. Firstly, some incentive is given to co-operateurs to align their actions more closely with the interests of their organisations by the direct link between their actions and its profitability. At first sight such a link might seem to be negligible in a firm of conventional size, where surplus is to be shared among several hundred or thousand. There are, in general, important complementarities between factors of production
within an enterprise, which permit the identification of closer relationship between
overall profitability and the efforts of smaller groups. Even so, the direct incentive is
likely to be small.

Nevertheless the sum of small direct incentives over the workforce may result in
improved vertical control. Collective appreciation by co-operateurs of their manage-
ment as their own 'delegated authority' could inhibit attitudes, informal agreements and
collective understandings which serve to frustrate attempts at vertical control. This is
only likely to occur, however, in the event that high-trust relations between managerial
and non-managerial grades of co-operateur can be maintained, an empirical question to
be investigated in this paper. In this case, labour (or the labour component) agrees to
align its priorities more closely with those of capital (or the capital component
commonly identified with the firm). Such a situation may contribute to co-operative
efficiency but is unlikely to completely satisfy more ideological supporters of
co-operativism.

More importantly, however, an appreciation of the complementarities between
corporateurs is likely to lead to another, indirect, incentive operating through monitor-
ing and encouragement between them. This 'horizontal monitoring', though it is likely
to be limited for any single individual, may be significant in aggregate because all are
involved. Indeed, it can be shown (see Appendix) that, under fairly general assump-
tions, broader distribution of a given incentive results in greater aggregate work effort
than a narrow distribution because of increasing marginal disutilities of monitoring. It
may also induce greater aggregate monitoring effort. Factors favouring a narrow
distribution of incentives include (a) economies of scale in monitoring activities,
(b) social or technological factors rendering horizontal control ineffectual, and (c) dif-
fences between individuals in their intrinsic preferences for monitoring. Co-
operateurs may therefore tend to create for themselves a more 'disciplined' environ-
ment (although it is not clear that they themselves will perceive it as being more
disciplined because of the different nature of the incentive system which induces a
measure of voluntary alignment of priorities).

How effective can such 'horizontal' control be? The critical questions seem to be the
extent to which individuals at different levels are able to perceive and judge the
behaviour of others and possible societal inhibitions on positive reinforcement by peers.
In principle the last problem should be minor in co-operative society. Production
technology plays a large role in circumscribing monitoring possibilities—some indeed
view technology as completely determining work behaviour and as predetermined at a
particular moment in a given social system. An alternative view would admit a possible
range of technological variation and allow a range of behaviour—perhaps associated
with plant layout—in a given technology. But considerable scope for lateral control
appears to exist regardless of technological constraints. Only some 2 percent of all
employed Americans are estimated to work under assembly line-like conditions. Many
of the lower occupations are the least constrained while direct supervisory possibilities
of many high-level staff are restricted to a few secretaries. In the last resort, the
possibility of horizontal monitoring and its actualisation are empirical questions, to be
addressed below.

We leave open in this paper the important question of whether co-operatives might
induce fundamental changes in economic man. Underlying our discussion is the same
self-centred individualistic human model common to conventional economic theory.
Perhaps co-operatives can lead to a greater weighting of other's welfare in individual
preferences, hence internalise some of the externalities between members, but we know
of no way of testing this proposition. Some internalisation is indeed quite likely at
Mondragon, given the close identification of many co-operatives with their local com-
unities and the criteria for selecting co-operateurs described above. It is, however,
also likely that distinctive individuals—those placing high priority on 'co-operativism'
will be attracted to co-operatively run enterprises, so that selection biases will affect estimates of causality from economic organisation to individual behaviour.

IV. The Survey

Basque reserve, political suspicion and the isolation of the region combine with logistical difficulties to inhibit data collection despite the willingness of management. It is thus difficult to obtain responses on a sufficiently broad basis to provide an adequate perception of co-operateurs.

Either of two options for collecting subjective data—open-ended in-depth interviewing and more tightly formulated questions able to be put in multiple-choice form—present problems of execution and interpretation. Data collection on a large scale proceeded using the second method, and was complemented by in-depth interviewing of a number of key personnel. Statistical material relating to profitability, sales and similar variables was not collected because of its availability in publications and our a priori decision to regard the co-operatives as successful business enterprises. Two questionnaires were distributed, the second including the possibility of postal return to reduce bias caused by the inclusion of potentially sensitive questions. The surveys were not identical but contained many questions in common. Responses were obtained from a diverse range of co-operatives to reflect variations within the group over size, age, product, technology and location. Overall, some 1,200 replies were achieved, a response rate of 30 per cent. Seven lengthy interviews were conducted, one with a founding member of Mondragon, the rest with high officials of the Caja Laboral Popular. These emphasised personnel and other policies of the manufacturing co-operatives, firm-community relations and the operation of the Caja.

Mondragon's product diversity and spatial distribution pose some problems for the selection of an appropriate control group. In addition to the normal comparisons of control and subject groups, we decided to use the control to obtain information of perceptions of Mondragon through the eyes of other workers in the Basque country. Some familiarity with Mondragon, even by reputation, was thus essential. Two firms were chosen: Union Carrejera in Mondragon is long-established and comparable to Ulgor, Mayc in Vitoria is located in a large industrial area and in product and technology is comparable with local co-operatives. Obtaining the co-operation of trade unions proved to be more difficult than persuading management to permit the surveys; overall, 280 responses were achieved, a response rate of 42 per cent.

V. Survey Results

The first survey covered eleven co-operatives, concentrating on Ulgor and Arrasate. Newer, smaller enterprises were also surveyed. The second survey covered four cooperatives, two located in the town of Mondragon and two outside.

Considering obvious characteristics: occupation, payments level, sex, 'Basqueness', etc, the data appear to be representative. Thirteen per cent of the respondents to the first survey were female, and 25 per cent individuals describing themselves as 'non-Basque'. 32 per cent of the sample were below thirty years of age, thirty-seven per cent between thirty and forty, 21 per cent between forty and fifty, and 10 per cent over fifty. (The average age of Mondragon workers was known to be thirty-four.) Dates of joining the group spread over the last twenty-two years, with slight clustering over 1967–71. 34 per cent of respondents were unskilled; semi-skilled and skilled co-operateurs accounting for 27 per cent and 15 per cent respectively and administrative and managerial staff for 13 per cent and 11 per cent. Profiles of respondents to the second survey were rather similar, except that there were fewer non-Basques (17 per cent), and more skilled workers. The sample was somewhat younger. 48 per cent below thirty, 35 per cent
between thirty and forty, 15 per cent between forty and fifty, and only 7 per cent over fifty.

Profiles of the control are in most respects quite similar. There are somewhat more women (24 per cent) and non-Basques (28 per cent), slightly more unskilled workers and a more pyramidal wage structure. While age profiles are similar, greater proportions of workers joined the control firms before 1956 and over 1972–6. The former difference reflects Mondragon's rapid growth, the latter, higher staff turnover in conventional firms.

The most significant difference between sample and control results occur in the proportion of respondents who were unemployed prior to joining their enterprise. Only 27 per cent of the first Mondragon sample and 42 per cent of the second were unemployed, whereas 55 per cent of the control did not have jobs immediately prior to taking up their current employment. The selection of the control firms proved to be successful in obtaining respondents possessing some familiarity with Mondragon. Workers claimed, on the whole, considerable knowledge of the co-operatives; in fact 91 per cent indicated that they had friends or relatives working in the group.

**Motivation and Enterprise Structure**

Objective measures of preference-intensity cannot, of course, be constructed. Respondents were, however, asked to rank factors concerning their enterprise in order of importance as perceived by themselves. For the co-operative two sets of factors were distinguished. Extrinsic factors—level of payments and job security—relate primarily to economic reward, while intrinsic factors—the 'Basqueness' of the enterprise and its co-operative nature *per se* cover other aspects. 'Basqueness' was included because of the emphasis placed on it by previous studies. A similar choice was presented to the control except that 'good working conditions' replaced 'co-operative nature' as a proxy for intrinsic values. Table 1 indicates rankings over these alternatives.

| Table 1
<p>| Ranking of Enterprise Characteristics* |</p>
<table>
<thead>
<tr>
<th>Co-operatives</th>
<th>Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Co-operative/working conditions</td>
<td>619 228 93 37</td>
</tr>
<tr>
<td>Job security</td>
<td>324 411 268 29</td>
</tr>
<tr>
<td>Basqueness</td>
<td>81 244 284 199</td>
</tr>
<tr>
<td>Payments</td>
<td>31 102 292 484</td>
</tr>
</tbody>
</table>

*Note: Column and row totals are not equal in Tables 1 and 8 because of the inclusion of partial rankings offered by some respondents. No conclusions of the paper are altered by their deletion.

The overwhelming priority on 'co-operativism' runs through all levels of the Mondragon workforce and across all characteristics of respondents. This indicates a high level of consensus on the emphasis placed officially on co-operativism. Although Mondragon workers undoubtedly have far greater job security than conventional workers, this ranks a clear second. It ranks first in the control where working environment is second. Differences in first rankings between subject and control groups are shown by a $\chi^2$ test to be significant at the 1 per cent level. Payments and 'Basqueness' are of generally lower priority, and orderings between these two alternatives tend to reverse between Basques and non-Basques.

The control group was also asked to comment on the most distinctive features of the co-operatives relative to their own firm. They singled out job security and worker involvement.
Consensus as to ordering may be taken, informally, as a rough guide to intensity. Table 1 indicates a greater gulf between the top two and bottom two alternatives on the co-operative. Only 15 per cent of co-operateurs rank payments first or second, while 37 per cent of the control do so. This, plus the probable uniqueness of certain intrinsic rewards of a co-operative suggest that Mondragon co-operateurs should be less mobile than control group workers in response to payments differentials offered by conventional firms. This impression is confirmed in Table 2 which summarises the willingness of respondents to transfer to other firms for specified pay increases.

<table>
<thead>
<tr>
<th>Would transfer without monetary incentive</th>
<th>Co-operatives</th>
<th>%</th>
<th>Control firms</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would transfer with some monetary incentive (up to 50 per cent rise)</td>
<td>155</td>
<td>27</td>
<td>144</td>
<td>54</td>
</tr>
<tr>
<td>Would not transfer</td>
<td>398</td>
<td>71</td>
<td>113</td>
<td>42</td>
</tr>
<tr>
<td>Total</td>
<td>561</td>
<td>100</td>
<td>268</td>
<td>100</td>
</tr>
</tbody>
</table>

\( \chi^2 = 64.0: \) significant at 0.005

Mondragon workers, therefore, are potentially less mobile in response to wage incentives. Another 'mobility' question hypothesised a transfer to a local 'Spanish' co-operative. Mobility, though still low, is slightly higher: see Table 3.

<table>
<thead>
<tr>
<th>Would transfer for pay incentive (up to 50 per cent)</th>
<th>Basque firm</th>
<th>%</th>
<th>Spanish co-operative</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would not transfer</td>
<td>398</td>
<td>71</td>
<td>353</td>
<td>66</td>
</tr>
<tr>
<td>Total</td>
<td>561</td>
<td>100</td>
<td>538</td>
<td>100</td>
</tr>
</tbody>
</table>

\( \chi^2 = 3.6, \) significant at 0.06

In indicating resistance to move to a 'Spanish' co-operative, this result is not, of course, inconsistent with the low priority placed on 'Basqueness' in Table 1. Against a generally Basque backdrop, the strongly Basque nature of the co-operatives is far less marked: their ethnicity is ranked lowest by the control as a factor distinguishing them from their own firms. The well-known strength of Basque nationalism actually provides, through Table 3, an impressive verification of the strength of 'co-operativism' as a perceived feature of the Mondragon group in Table 1.

To assess differences between co-operative and firm working conditions subject and control groups were asked comparable questions focusing on aspects of environmental receptivity: whether they sometimes felt prevented from voicing opinions and grievances, the gulf perceived between management and workers and the role seen for trade unions within their enterprise. This last is taken as an indicator of a perceived conflict of interests between capital and labour. Results are shown in Tables 4, 5 and 6. These results, as well as comments from intensive interviews, suggest that the Mondragon environment is far from perfect. Dissatisfaction and conflict do indeed exist in the co-operatives. However, they appear to represent a very significant improvement over conventional firms. Responses to the above questions are not quite homogeneous within Mondragon but vary somewhat by co-operative and respondent characteristics. Non-Basques and women, for example, are more prone to experience
MOTIVATION AND CONTROL IN THE MONDRAGON EXPERIMENT

TABLE 4
Perceived Difficulty of Representation

<table>
<thead>
<tr>
<th></th>
<th>Co-operatives</th>
<th>%</th>
<th>Firms</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sometimes inhibited from expressing opinions, etc.</td>
<td>415</td>
<td>41</td>
<td>117</td>
<td>55</td>
</tr>
<tr>
<td>Not inhibited</td>
<td>589</td>
<td>59</td>
<td>95</td>
<td>45</td>
</tr>
<tr>
<td>Total</td>
<td>1,004</td>
<td>100</td>
<td>212</td>
<td>100</td>
</tr>
</tbody>
</table>

$X^2 = 43.7$: significant at 0.005

TABLE 5
Perceived Division between Management and Workers

<table>
<thead>
<tr>
<th></th>
<th>Co-operatives</th>
<th>%</th>
<th>Firms</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large division</td>
<td>209</td>
<td>21</td>
<td>164</td>
<td>62</td>
</tr>
<tr>
<td>Small division</td>
<td>583</td>
<td>59</td>
<td>65</td>
<td>25</td>
</tr>
<tr>
<td>No division</td>
<td>200</td>
<td>20</td>
<td>36</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>992</td>
<td>100</td>
<td>265</td>
<td>100</td>
</tr>
</tbody>
</table>

$X^2 = 169.8$: significant at 0.005

TABLE 6
Support for Large Trade-Union Role in Enterprise

<table>
<thead>
<tr>
<th></th>
<th>Co-operatives</th>
<th>%</th>
<th>Firms</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>242</td>
<td>25</td>
<td>225</td>
<td>86</td>
</tr>
<tr>
<td>No</td>
<td>729</td>
<td>75</td>
<td>36</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>971</td>
<td>100</td>
<td>261</td>
<td>100</td>
</tr>
</tbody>
</table>

$X^2 = 328.2$: significant at 0.005

representation difficulties. Systematic differences in responses are being analysed in a further paper.

The relative absence of a worker-management gulf in Mondragon is paralleled by a surprising lack of social division between these groups outside work. Only 18 per cent of co-operateurs perceived a substantial social divide; 45 per cent saw no division at all. In contrast to the industrialisation experience of many developed and most developing economies, expansion of the co-operatives seems to have been achieved while maintaining an almost unstratified society.

Can we be sure that concepts such as ‘worker-management distance’ are indeed perceived similarly by the subject and control groups? A partial check was attempted by asking the control to assess this separation on the co-operatives relative to that in their own firms. 57 per cent considered the Mondragon division to be far smaller while only 4 per cent considered it to be greater. This perception accords well with Table 5.

Differences in manager-worker identification cannot easily be traced to third, ‘social’ variables. For example, while most co-operateurs have friends and relatives working in their enterprises, so do most members of the control.

Perceptions of job control and of participation also support the hypothesis that Mondragon offers a more favourable work environment. 77 per cent of co-operateurs consider that the co-operative nature of their enterprise allows them a greater measure of job control than they would have on a conventional firm. Participation perceptions are shown in Table 7.

This difference in perceptions may be partly subjective rather than due merely to objective differences. It cannot be ascribed to differing occupational proportions in sample and control—indeed, one of the more intriguing features of the responses is that even managerial grades in the control respond less positively than do many lower-grade co-operateurs. But in the final analysis, which is more important—that individuals
TABLE 7
Perceived Degree of Participation in Important Decisions

<table>
<thead>
<tr>
<th></th>
<th>Co-operatives</th>
<th>%</th>
<th>Firms</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct participation</td>
<td>128</td>
<td>13</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Indirect participation*</td>
<td>198</td>
<td>20</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Not very extensive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>participation</td>
<td>272</td>
<td>27</td>
<td>38</td>
<td>14</td>
</tr>
<tr>
<td>No participation</td>
<td>395</td>
<td>30</td>
<td>212</td>
<td>80</td>
</tr>
<tr>
<td>Total</td>
<td>993</td>
<td>100</td>
<td>269</td>
<td>100</td>
</tr>
</tbody>
</table>

$\chi^2 = 134.0$: significant at 0.005

*Note: Participation through representatives rather than directly.

participate or that they feel that they do? We leave this question open—but again note that while not conforming to an ideal model of equal participation, the perceived co-operative environments perform far better than those of the control.44

Vertical Trust Relationships in Mondragon

As described in Section III, co-operatives may improve efficiency if, through promoting high-trust relationships between capital, management and labour, they prevent the emergence of attitudes inhibiting vertical control. Capital-labour contradiction cannot directly be assessed since co-operateurs are equity and labour combined, yet, in its role as managerial and financial overseer of Mondragon the Caja Laboral Popular plays one part of the capitalist role, while as development bank and mobiliser of private capitalist savings it plays another part. Despite this ultimate obligation to its depositors, out of 973 responses, 82 per cent of co-operateurs considered the Caja really to support the interests of Mondragon workers.

In Table 8 groups are ranked according to the degree to which their actions were felt by co-operateurs to most closely further their own interests. Overall, co-operative managers followed by co-operative workers are felt to represent best the sample’s interest. Basque and Spanish workers come a poor third and fourth respectively. Worker-manager trust in Mondragon is revealed again in the second part of the Table where co-operative managers tend to rank co-operative workers in first place, as co-operative workers rank their managers.45 This is an especially impressive result given the discipline maintained on the co-operatives (see below).

TABLE 8
Ranking of Groups according to Representation of Interest by:

|                         | Co-operateurs Overall | Co-operative Managers |
|-------------------------|                       |                      |
|                         | 1| 2| 3| 4| 1| 2| 3| 4 |
| Co-operative managers   | 201| 97| 63| 38| 16| 16| 12| 2 |
| Co-operative workers    | 152| 206| 42| 3 | 24| 19| 2 | 2 |
| Basque workers generally| 70 | 76 | 107| 46| 7 | 10| 23| 3 |
| Spanish workers generally| 22 | 23 | 60| 249| 2 | 3 | 4 | 33 |

Co-operatives and Horizontal Monitoring

The second avenue through which co-operativism could contribute towards increased X-efficiency was shown in Section III to be through the setting-up of peer-group pressures to align individual actions towards collective goals. Results cited suggested that given fairly general conditions on monitoring technology and effectiveness, the aggregate volume of horizontal monitoring efforts induced by profit-sharing could be substantial. Does such a conclusion hold in the real world?

Formal supervisory responsibilities for co-operative and control groups are shown in Table 9. The profiles are virtually identical. This suggests that any peer group monitoring is used to supplement, rather than replace, formal control.
If technology severely limited the potential for horizontal control, there would be little point in extending incentives to encourage it. To establish the potential for such 'non-official' control, respondents were asked to estimate the number of workers on their enterprises that they felt able to observe and encourage in their duties. Results are shown in Table 10.

**Table 10**

<table>
<thead>
<tr>
<th>Monitoring Possibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number able to be observed</td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>1-5</td>
</tr>
<tr>
<td>6-10</td>
</tr>
<tr>
<td>11-20</td>
</tr>
<tr>
<td>Over 20</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

$\chi^2 = 5.3$: not significant at 0.250

The difference between Tables 9 and 10 understates the potential for informal supervision since formal supervisory duties exceed, in many cases, the number respondents felt able to monitor. This is true on both the co-operatives and control. On the co-operatives the volume of potential informal supervision (as crudely measured by the sum over respondents of the excess of their potential over their formal supervision estimates) equals that of formal supervision. Slightly smaller, but still very substantial possibilities for informal supervision appear to exist on the control.46

Informal supervision may not materialise if the general consensus denies the importance of work effort in furthering the goals of the enterprise. This is the case neither in the co-operative nor in the control although the latter group is slightly more ready to ascribe success to other factors: see Table 11. Responses to this question do not depend very sensitively upon occupation.

**Table 11**

<table>
<thead>
<tr>
<th>Belief in Dependence of Enterprise Success Upon Special Effort of Workforce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-operatives</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

$\chi^2 = 10.1$: significant at 0.005

Relative absence of peer-group monitoring is not, therefore, likely to be simply due to lack of opportunity or to consensus that work input is irrelevant to the success of the enterprise. However, co-operatives and control differ quite substantially in replies to the questions of whether only formal supervisors encourage workers to work harder: see Table 12.
Workers encourage each other: Co-operatives % Firms %
A great deal 160 53
A little 163 68
Not at all (only supervisors) 99 133
Total 422* 254

\[ \chi^2 = 59.7, \text{ significant at } 0.005 \]

*Note: This total is lower than previous totals because an error in the first questionnaire which might have confused some respondents might have invalidated some replies. (These, nevertheless, conform to the above pattern.)

Co-operatives do indeed appear able to induce horizontal controlling forces able to strengthen and complement traditional vertical control. Vertical control is itself plausibly rendered more effective by the strengthening of vertical high-trust relationships as shown in Table 8.\(^{47}\) Finally, the dependence of the Mondragon work ethic upon the interaction of two factors—the belief that success depends upon the efforts of the workforce and the shareholdings of co-operateurs in their enterprises—is illustrated in Table 13.

### TABLE 13
The Co-operative Work Ethic

<table>
<thead>
<tr>
<th>Investment as factor in belief that co-operateurs should work well</th>
<th>Belief in importance of special effort in success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Extremely strong</td>
<td>374</td>
</tr>
<tr>
<td>Weak</td>
<td>92</td>
</tr>
<tr>
<td>Total</td>
<td>466</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 36.0, \text{ significant at } 0.005 \]

It is interesting to note that only 2 per cent of co-operateurs considered themselves to be working less hard on their enterprises than they would on a conventional firm while over half considered that they worked significantly harder. Any efficiency gains achieved through the assumption of co-operative structure seem not, therefore, to be appropriated by the workforce in the form of leisure.\(^{48}\)

The importance of an individual's capital holding as a motivating factor would be expected to rise with the size of account, therefore with the length of association of the individual with Mondragon. Data lends strong support to this hypothesis. Co-operateurs of earlier vintage are about four times as likely to stress the importance of their investments as motivating their belief that fellow co-operateurs should work productively. However, this result could also arise from a competing hypothesis—the effect of age-related shifts in attitudinal variables.

### Discipline and Co-operativism

How do the above factors combine to influence the disciplinary environment of a co-operative relative to that of a firm? This is far from being a simple question, not only because of the lack of any objective measure of 'discipline', but because two offsetting tendencies induced by co-operativism influence subjective assessments of the nature and rigour of control.

On the one hand, the discussion in Section III and the results above (which, we feel,
provide substantial support for the interaction model outlined there) suggest that both formal and informal controls are likely to be stronger on a co-operative. Formal control is easier because of the inducement of vertical trust relationships; horizontal control is encouraged by joint shareholding. However, the same forces encouraging control are responsible for aligning individual priorities more closely with that of their enterprises. By reducing the need for control, this will also reduce individual perceptions of being subject to control. From the outside, the co-operatives should thus appear as well disciplined. However, a high degree of aquiescence to discipline and, therefore, a somewhat less disciplined impression should prevail inside.

Survey data provide some support for these hypotheses, as shown in Table 14. While perceptions of the co-operatives as disciplined rather than undisciplined enterprises prevails in general, the external view is significantly more inclined towards tighter discipline. This difference is plausibly associated with the alignment of individual and enterprise goals in the co-operatives: only 4 per cent of co-operateurs indicated disagreement with the way in which discipline was implemented. Of the other 96 per cent, almost half endorsed discipline as ‘strict’ while the remainder considered it moderate.

To obtain objective indications of discipline is indeed difficult. However, one verification of the combined effects of self and conventional discipline on the co-operatives is provided by the observation that absences due to ‘illness’ are, on average, about half those on comparable local firms. The results of our survey suggest that Mondragon’s co-operative nature permits the maintenance of a disciplined environment—without overtly constraining individual behaviour.

<table>
<thead>
<tr>
<th>View of co-operatives relative to firms</th>
<th>Co-operatives</th>
<th>%</th>
<th>Firms</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>More disciplined</td>
<td>392</td>
<td>39</td>
<td>129</td>
<td>49</td>
</tr>
<tr>
<td>Similar</td>
<td>383</td>
<td>39</td>
<td>128</td>
<td>48</td>
</tr>
<tr>
<td>Less disciplined</td>
<td>222</td>
<td>22</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>997</td>
<td>100</td>
<td>265</td>
<td>100</td>
</tr>
</tbody>
</table>

$\chi^2 = 52.1$: significant at 0.005

**VI. CONCLUSION**

The main issue addressed in this paper is whether Mondragon’s commercial success can be attributed to its co-operative organisation, rather than to other factors—good, conventional management, access to capital, etc. By ‘co-operative organisation’ is meant the constellation of ownership patterns, rules and community relations so distinctively part of Mondragon.

Survey and interview results suggest that co-operative organisation is significantly associated with its success. The simple theory of Section III indicates that co-operation could theoretically contribute to efficiency in at least two ways: by rendering more effective traditional ‘vertical control’ by reducing resistance, and by generating pressures towards horizontal reinforcement. Mondragon plausibly does both. Vertical control is improved by the generation and sustaining of consensus and high-trust relationships within the enterprise. Horizontal reinforcement is induced through dispersion of shareholdings and appreciation of the role of effort in the success of the enterprise. A disciplined environment is therefore maintained, without causing undue opposition or perception of strict discipline.

This not to say that Mondragon is perfect and disenchanted individuals tend not to be distributed randomly. Some dissenting factions do exist; their characteristics are being investigated in a further paper. In addition, to attribute causal significance to correlation may be premature: Mondragon’s success may not be due purely to its organisational
features but also reflect the nature of individuals choosing to work on the co-operatives and proving acceptable as entrants. This, and other issues make the potential replicability of Mondragon a difficult question. It is being addressed in a further paper.

APPENDIX: A SIMPLE MODEL OF MOTIVATION AND CONTROL

Production possibilities for output $y$ are assumed to be given by a *production function*

$$y = f(k, l_1, \ldots, l_n)$$

with $f$ concave, displaying non-increasing returns given fixed capital $K$. $l_j$ represents labour (effort) input of worker $j$. This is broadly defined to include punctuality, co-operation, furthering work quality and so forth. We abstract from risk, but assume that some effort is required to monitor $l_j$ possibly above some minimal level.

**Worker Activities and Environment:** Worker $j$ has two activities, labour $l_j$ and monitoring (encouragement, control) $c_j > 0$. Given his environment he attempts to maximise a separable, individualistic utility function:

$$\text{Max } u_j (m_j, l_j, c_j) = m_j - u_j (l_j) - u_3 (c_j)$$

where $m_j$ is his monetary reward, $u$ is concave and

$$m_j = \lambda_j f \text{ where } \sum_{j=1}^{J} \lambda_j = 1$$

**Decision on \{\lambda_j\} is profit sharing rule.**

Worker $j$’s *environment* $\gamma_j$ sets the divergence between the marginal disutility of labour and the reward accruing to $j$ from greater overall profitability: by (2), (3) maximisation yields

$$u_j' = \lambda_j \frac{\partial f}{\partial l_j} + \gamma_j$$

where

$$\gamma_j = \gamma_j (c_j, \ldots, c_{j-1}, c_{j+1}, \ldots, c_n)$$

is a function of the behaviour of other workers and managers. Line arising:

$$\gamma_j = \sum_k A_{jk} c_k$$

where $A_{kk} = 0$ for all $k$. We may now write:

$$A_{jk} = G_{jk} H_{jk}$$

where $G_{jk}$ represents the *power* (moral, legal, etc.) of $k$ over the actions of $j$ and $H_{jk}$ the *observation potential* of $j$ by $k$. Together $A_{jk} = G_{jk} H_{jk}$ is the *control matrix* of the enterprise.

**Interpretation of (4)** is that monitoring by others may ‘encourage’ or ‘force’ greater effort out of $j$ than he would deliver if only motivated by his share of profits. There are no natural units for measuring monitoring intensity. Therefore it is here expressed directly in terms of the ‘wedge’ between marginal utility $u'_j$ and the own-profit increment. This wedge relates to monitoring effects \{c_j\} through $A$, which is made up of two elements.50

**A Special Case: Production and Informational Symmetry:** Suppose that (i) $f$ is symmetric in $l$ and $l_j$ for all $i$ and $j$, and displays decreasing returns; (ii) that all utility functions are identical and concave, and $u'_j(0), u_3'(0) = 0$; and (iii) that for all $j, k, j \neq k$, $A_{jk} = \text{constant} = 1$; (iv) $n$ given; and (v) $\Sigma l = l$. If we omit the influence of $\gamma_j$ in (4), the problem of choosing the optimal \{\lambda_j\} to maximise output is straightforward: by (4),
concavity and symmetry of \( u_2 \) and \( f, \lambda = \sum l \) is maximised when \( \lambda = \frac{1}{n} \) for all \( j \). Also, by symmetry, \( l_j = \frac{l}{n} \).

Therefore, equal profit sharing results both in greatest aggregate \( l \) and its optimal distribution because of diminishing returns.

However, with larger \( n \) any influence of profit sharing becomes insignificant because of (4) becoming \( u'_2 = \frac{1}{n} - \frac{\partial f}{\partial l} \). As \( n \to \infty \), effort levels decline to minimal levels because of the 'free rider' problem.

Allowing now for the influence of controls \( y \). By symmetry, \( y = \sum y_j \). Let \( y = \frac{1}{n} \).

With equal distribution of surplus \( y = (n - 1) \sum y_j \). By symmetry and concavity of \( u \) and \( f \), the output maximising solution will still be the symmetric one \( \lambda_j = \frac{1}{n} \). At this solution \( y \) may not be maximised relative to its value for alternative distributions \( \{\lambda_j\} \), although (a) \( l = \sum l \), will be, and (b) the distribution of \( l \) over workers will again be equal and optimal. The curvature of individual utility functions could be such that the direct incentive effect described above almost suffices to extract maximum 'possible' effort. Individualistic 'self-discipline' could substantially replace discipline imposed by a hierarchy or by peer pressure. Whether this is likely in a large organisation depends on the prevailing view of self-discipline, and, no doubt, on the 'backup' of effective peer pressure. From inside a successful co-operative 'discipline' might thus not be perceived as extreme. From outside, perceptions based mainly on productivity and on 'objective' criteria (such as incidence of strikes, absenteeism) would tend to see a more disciplined environment.

**Assymetries:** The above model provides a framework for the effects of analysing real-world asymmetries or scale economies at individual task level, so permitting an assessment of the gains or losses from wider distribution of the surplus. Asymmetries or scale economies can enter in several ways: through production functions \( f \), utility functions \( u \), power coefficients \( G \), or observation coefficients \( H \). Omitting, for simplicity, differences in \( u \), the model suggests two reasons for extending incentives to an individual \( j \), the direct incentive of greater reward and the indirect incentive to encourage others a little more for greater reward. The more tightly an individual can be controlled by others and the less control or influence he can exert over others, the less is the argument for extending control incentives. The less he can be controlled by others and the more the use of his own 'discretion' matters to the enterprise, the more argument for extending incentives (according to direct argument), considering individualistic decision-making alone. Incentives must, therefore, be extended to: (a) certain (probably white-collar) workers with wide discretion, and whose tasks are difficult to monitor [managers perhaps, or certain key professionals]. For such a worker \( j \), \( \sum A_k \) is small, but \( \frac{\partial f}{\partial l} \) large. And (b) workers with discretionary monitoring ability: for worker \( j \) if over a wide range of \( i \), \( A_i \) is large (or \( \sum A_i \) large). This implies both (a) good opportunities to observe and (b) the power and influence to use observation ability to persuade.

Both technology and social environment affect the optimal incentive pattern. Suppose good instruments for observation permit a few managers to assess the performance of most of the workforce. This argues for concentration of incentives. However, if the political or social environment is such that managers cannot in fact enforce or persuade, the argument is far weaker: \( \sum H \) may be large, but \( \sum G \) small. An example might perhaps be the case of British industry in the 1970s with the rise of the shop-floor movement. There may then be an argument for spreading incentives to workers with lower \( H \)'s but with the ability to change the 'rules' to permit higher \( G \) to be achieved.
Suppose the barriers to efficiency are not the $H_i$'s but the $G_i$'s. While the $H_i$'s are perhaps fairly exogenous (observation potential depends on technology) the $G_i$ depend on the generally accepted power structure. One reason to extend incentives broadly is to try to raise the $G_i$'s generally, by establishing a broader consensus on the need for control. This is necessary to prevent the blocking of management initiatives by non-managerial employees, who must be convinced that productivity gains are in their interest rather than the forerunners to redundancy.

Monetary incentives to management may, therefore, be lower on a co-operative. This may however be compensated by far higher $G$'s. Management exists to control and monitor because of technology which dictates that some individuals have higher $H_i$'s. In the interests of the collective, these control as its delegated authority, but consensus prevents the growth of informal agreements and formal regulations which tend, over time, to lower the power coefficients $G$.

REFERENCES

1. For a discussion of these issues in the context of developing countries, see A. M. Choksi, 'State Intervention in the Industrialization of Developing Countries: Selected Issues', World Bank Staff Working Paper No. 341, 1979.
2. The fact that professional co-operatives are commonly termed 'partnerships' should not obscure their similarity to co-operatives.
3. For an assessment of the extent to which several well-known co-operatives satisfy these criteria, see D. C. Jones, 'Producer Co-operatives in Industrialised Western Economies', British Journal of Industrial Relations, July 1980.
4. For reasons developed in K. Bradley and A. Gelb 'The Radical Potential of Cash Nexus Breaks', British Journal of Sociology, June 1980 many co-operatives tend to be formed as last-ditch resorts, out of bankrupt firms, frequently at the centre of intense political controversy.
5. J. Thornley Worker Cooperatives in the Western World, Heinemann, 1981, and Rothschild-Whitt ('The Collectivist Organization: An Alternative to Rational-Bureaucratic Models', American Sociological Review, Vol. 44, August 1979, pp. 509-27) have studied the operation of small co-operatives. However, the difficulty of distinguishing between small co-operative behaviour and that of small family firms raises methodological problems. A limited number of larger units has been studied by the New Systems of Work and Participation Program of the School of Industrial and Labor Relations, Cornell University.
6. Studies indicate some success of profit-sharing schemes in improving productivity and reducing labour-capital conflict in the United States: see K. Friedan, Workplace Democracy and Productivity, National Center for Economic Alternatives, Washington, D.C., 1980; and: University of Michigan, Institute for Social Research, 'Employee Ownership', Report to the Economic Development Administration of the United States, Department of Commerce, Project No. 99609433, 1979. However, the extension of profit-sharing and autonomous work groups to co-operativism should not be made too lightly since the former represent a shift in the way in which Taylorist principles are implemented rather than a fundamental change in capitalism. While labour is accorded a measure of job control it is not given control over investment, financial and product strategies. R. Edwards Contested Terrain, Basic Books, New York, 1979 provides a vivid analysis of the increasing contradiction between hierarchy and efficient control in contemporary capitalist environments.
7. On this last point see Jones, 1980, op. cit., and D. Zwerdling, Democracy at Work, Association for Self-Management, Washington, D.C. The insensitivity of capital flows to ideological factors is particularly clear from international evidence. Capitalists have had little hesitation in lending to countries espousing non-capitalist philosophies (Peru, Yugoslavia, Poland, China ... the list is endless) provided that loans were felt to be adequately secured. In many cases security may be said to have emanated mainly from the desire of capital-exporting countries to avoid defaults and disruption of international monetary arrangements rather than from the 'credit-worthiness' of borrowers. For discussion of the reluctance of lenders to fund co-operatives, see Thornley, 1980, op. cit.; and M. Schaaf, Cooperatives, National Center for Economic Alternatives, Washington, D.C., 1977.
8. For a clear statement of such hostility, see the example of the U.K. Labour Party as described in K. Bradley and A. Gelb, 'The Political Economy of "Radical" Policy', British Journal of
Political Science, June 1979. Interestingly, employee ownership appears to be less ideologically charged in the U.S. Bills to encourage the transformation of declining firms into co-operatives are being considered by Congress: for example, the Voluntary Job Preservation and Community Stabilization Act, H. R. 12094, Congressional Record, Vol. 124, No. 94, 1978. Probably this difference may be ascribed to a stronger pluralistic tradition which facilitates lobbying by small groups. In the U.K. such groups tend to become appended to broader political movements, hence to acquire ideological overtones.

9. This interest is promoted by a recognition that institutional development is necessary to affect a large range of infrastructural projects successfully and by dissatisfaction with conventional 'top-down' arrangements for promoting growth with equity. This point is addressed in E. M. Rogers, N. Collets and J. Mbindingo, 'Social and Cultural Influences on Poverty-oriented Human Resource Development Policies and Programs', World Bank mimeo, January 1980.

10. For a succinct summary of these, see Jones, 1980, op. cit.

11. In this paper 'co-operator' is used to distinguish co-operative members from workers in conventional firms. Co-operateurs, of course, embody both capital and labour.


13. Interview with Rafael Fernandez Aresti, founder member of Mondragon, at Ulgor, Mondragon, July 1979.


15. See Logan and Thomas, 1980, op. cit.

16. The distribution formula is as follows: let $R_1 = \text{net profits}$ and $R_2 = \text{total payroll costs (wages and interest income)}$. Then the total proportion of profits to individual accounts is $P = \frac{R_1}{(R_1 + R_2)}$. $P$ is also constrained to be not more than 60 per cent of $R_1$ and not more than 70 per cent of $R_2$. Similar formulae apply to losses. For descriptions of the formulae and their application see Oakeshott, 1978, op. cit. and Logan and Thomas, 1980, op. cit.


19. Such a desire, for capitalists to retain majority control, has been observed in several cases involving employee participation, notably at Pioneer Chain Saw in Quebec, Canada. Some examples from Arizona also have been noted. The potential danger of recent Dutch legislation giving workers the right to veto Board appointments seems not to have been generally appreciated, although the way in which this is to be implemented provides some safeguard against the implied 'moral hazard' problem. The Meidner plan theoretically allows majority worker shareholding in Swedish industry, but shares are held effectively by the trade union movement as a whole. Even small employee bonus or stockholding could of course improve efficiency: for some evidence of this, see Frieden, 1980, op. cit., Ch. 2.

20. The British example of labour's rejection of the 1969 White Paper and 1971 Industrial Relations Act initiated by the Labour Party is perhaps the clearest case of this phenomenon, but it is considerably more widespread.

21. This is because the parameters of X-inefficiency are economy-wide, rather than specific to one particular management. Industrial conflict results mainly in a nationwide decline in output and incomes, or in capital exports. D. Morawetz, 'Why the Emperor's New Clothes are not Made in Colombia', World Bank Staff Working Paper No. 368, 1980, provides interesting examples of the influence of cultural factors on the X-inefficiency of clothing manufacturers in Colombia, the Far East and the U.S.A., although the general importance of culture in determining productivity is very difficult to isolate.
22. For developing countries, it also suggests that political development towards the democratic model will raise their potential.
23. The genre of the model is that of contract-theoretic bargaining. Such models have been recently developed for analysing crop-share contracts: see, e.g., C. Bell and P. Zusman, 'Towards a General Theory of Equilibrium Sets of Contracts—The Case of Agricultural Rental Contracts', Development Research Center, World Bank, mimeo, 1980. In the present application, the contract is chosen collectively and attention must be paid to the monitors arising out of the incentive structure. For an excellent discussion of the relationship between incentives and the institutional environment in which contracts are arranged, see Williamson, 1978, op. cit.
24. Assuming of course that he does not expect his behaviour to lead to bankruptcy.
25. In neoclassical models capital receives profits. Management is not explicitly introduced because of absence of a necessity for control. This follows from the theory's orientation towards individualistic price-guided behaviour. But it is recognised that difficulties arise in explaining the very existence of firms in this framework: see A. A. Alchain and H. Demsetz, 'Production, Information Costs and Economic Organization', American Economic Review, 62, 5, December 1972.
26. That is, any capital raised externally. Whether 'internal capital' or the capital component of co-operateurs should receive profits is not an important distinction in the present context.
27. The size of an increment in output and revenue from a given increase in effort, etc. is thus similar for a co-operative and firm.
28. Instead of feeling that, say, only 1/300 of the extra profit generated by his efforts would be received personally, a co-operator might thus feel the proportion to be closer to 1/30 or 1/10.
29. For an interesting treatment of trust relationships and their significance, see A. Fox, Beyond Contract: Work Power and Trust Relations, Faber, London, 1974. Friedan, 1980, op. cit., presents evidence to suggest a lack of trust in the U.S. between managers and blue-collar workers: in one study only about 20 per cent of the latter agreed that they would benefit from greater productivity.
30. See, for example, E. Ginzberg, The Manpower Connection, Harvard University Press, 1975. The switch from assembly line to autonomous work group production at the Volvo Kalma plant provides an interesting counterexample to technological determinist theories.
31. On the other hand, of course, such staff may require especially large incentives since their work is difficult to monitor. Disastrous decisions by top executives may only become apparent years later through their consequences.
32. Technology, both in production and monitoring activities, may thus be seen as determining the balance, for a co-operative, between horizontal and vertical (delegated authority) control. High economies of scale in vertical monitoring would tend to encourage vertical control. Peer group pressure would be directed towards improving the environment for such control—if high-trust relationships are sustainable.
33. In addition, it seems to us unwise to rely on changes in human nature as the main argument in favour of co-operatives, although some might not agree.
34. For example, very low response rates to early surveys were attributed by management to a combination of personal and political questions which might allow respondents to be identified. Elimination of these questions in later surveys improved response rates.
35. The logistic difficulties presented by large-scale interviewing, together with Basque reluctance to discuss sensitive points with outsiders biased us towards surveys. These, in addition, are able to take advantage of the high level of literacy achieved in the Basque country.
36. This appeared to be due to the nature of certain questions and the newly established legitimacy of Spanish unions.
37. 'Basqueness' is not really a question of ethnic origin, as for centuries the Basque provinces have sent and received migrants from other parts of Spain. Rather it relates to the degree to which individuals feel integrated into the Basque community and language. A subjective view of Basqueness is thus the only correct interpretation of the concept.
38. That is, the fact that it is a co-operative rather than a conventional firm. This attribute is taken to be a composite for all the features felt by co-operateurs to distinguish the co-operative environment from that of a firm. There will inevitably be difficulties in distinguishing between factors: for example, a close association may be perceived between the co-operative nature of Mondragon and its policy of not shedding labour.
39. Co-operateurs were in addition told to assume the possibility of complete capital withdrawal without penalty.
40. It might be noted that any misrepresentation bias will tend to equalise sample and control profiles. For example, in Table 4, greater inhibition on the control is more likely to result in control workers claiming not to be inhibited when the reverse is true, relative to co-operateurs. This biases results against Mondragon. A certain degree of genuine dissent could, however, be
functional to an organisation, preventing complaining and forcing sustained re-examination of objectives and methods.

41. In the case of the latter this may result from sex-correlated factors such as pay and status rather than from direct gender differences (at Mondragon, as elsewhere in industry, females tend to receive lower pay and occupy inferior position to males).

42. Whether the society is considered to be 'classless' in the Marxist sense at first sight depends on the inequality of share ownership between co-operateurs. An unequal distribution implies that those owning more shares extract surplus value from those owning few—but over lifetimes, net transfers of surplus could be zero.

43. To ask the control for perceptions of Mondragon is preferable to cross-checking in reverse because of the possibly self-selecting nature of the co-operateurs. The control, it may be fairly assumed, is more likely to include respondents unsympathetic to Mondragon (because they have not joined), hence likely to judge the co-operatives harshly.

44. Inter-co-operative variations and inter-firm variations, while existing, appear less significant than the differences between co-operatives and control taken overall.

45. Managerial first ranking over the first two alternatives differ from those of non-managerial co-operateurs at the 0-025 level.

46. Informal supervision possibilities may also be understated because the set of persons able to be monitored does not coincide with the set formally controlled. These points and the potential for informal control could be developed using detailed enterprise studies given the necessary resources.

47. For other evidence to this effect, see Bradley and Gelb, 1980, op. cit.

48. Whether co-operateurs actually work harder is, of course, another matter, although control perceptions of co-operative discipline (see below) suggest that they do. However, it seems to us that in assessing the impact of co-operative structure on efficiency, the subjective view is at least as important as the objective, since it indicates the direction in which group pressure is felt to act. Short of a rigorous work-study exercise we see no way of assessing work intensity differences objectively.

49. See Logan and Thomas, 1980, op. cit.

50. In principle the elements of A (and their impact on individuals) could be made to depend explicitly on the co-operative 'ethic' rather than purely on the structure of financial incentives. Evidence from Mondragon cannot easily separate these effects because of the correlation between capital holdings and length of stay, itself plausibly correlated with 'socialisation' into co-operative society. As noted above, it seems unwise to found arguments for co-operatives solely on the presumption of fundamental changes in economic man.
THE REPLICATION AND SUSTAINABILITY OF THE MONDRAGON EXPERIMENT

KEITH BRADLEY* AND ALAN GELB†

I. INTRODUCTION

Increasingly, there is interest in worker co-operatives—or, at least, in enterprises with substantial employee ownership—as alternative forms of industrial organisation. Views on their potential tend, however, to be polarised—either they are dismissed as peripheral to the remainder of the economy or eulogised as cures for all forms of industrial ills. This, together with their rarity in manufacturing industry, inhibits a balanced assessment of their potential.

Such an assessment must address two sets of issues. The first concerns the internal organisation of existing co-operatives, its effect on industrial relations and on efficiency. The second concerns the replicability of co-operative experiments and the sustainability of co-operative forms in general. In a previous paper we address the first set of issues with specific reference to the Mondragon group of co-operatives in the Basque provinces of Spain. The present paper addresses the second set of issues in the Mondragon context.

Certain gains from co-operative organisation appear to be considerable. Our previous study concluded that the co-operative form succeeded in realising significant high-trust relationships between managerial and non-managerial members and maintaining consensus. Conflict typically accompanying hierarchical control was, correspondingly, low. Additionally, significant horizontal reinforcement appeared to be evoked as a result of workers shareholding and an appreciation of the role of effort in success. Relative to local firms, the co-operatives exhibited a more favourable industrial environment which itself is plausibly associated with improved X-efficiency. Mondragon therefore does rather well when judged by the first set of questions. Accepting this success, do the Mondragon co-operatives provide examples for emulation? Is replication possible? Are they durable, stable experiments? This paper discusses a number of issues of importance in judging them from these perspectives. Some important difficulties associated with the sustainability and more general replication of Mondragon will be discussed in Sections II. Section III, IV and V present empirical evidence bearing on these issues. Conclusions are in Section VI.

II. BARRIERS TO A CO-OPERATIVE ECONOMY

The ‘Basque ness’ of Mondragon has been held to be of great importance to its success and consequently a barrier to its replication. Both cultural and political factors are highlighted by other studies as providing a foundation receptive to ideas of self-management. Significant cultural features include a high Basque propensity to save relative to that of other working people. High-trust relations between workers are said to have been generated through working men’s drinking clubs. The political factors have been dominated by attempts of the Spanish central government to bring

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unity to the country which have manifested themselves in substantial repression of Basque cultural activity and expression. Thus:

In the Basque country ... one will be reminded of the suppression of regional cultures by the Franco regime and its servants. As recently as December 1976 ..., a detachment of the Civil Guard, led by a lieutenant, burst into the cinema of the Basque town of Mondragon to interrupt a pre-Christmas festival of Basque songs and music ... The guards ordered the packed audience to leave and, after one minute, began firing rubber bullets and smoke grenades ... Last year, after a shoot-out near Mondragon between Civil Guards and ETA terrorists, many of the town’s citizens applauded the ETA men. A few weeks ago 500 people held pro-ETA demonstrations in the town centre. *(The Economist, November 3, 1979).*

Such repression may have provided a binding force and created consensus between the Basque people. It has been suggested that in the absence of such unusual circumstances successful co-operatives are much less likely. ‘Basqueness’ is, however, a subjective rather than objective concept. Historically, the Basque country has always drawn and assimilated immigrants. There is no formal distinction between Basque and non-Basque. On the co-operatives the real distinction, as noted below, is between those who have integrated themselves with the local community and those who have not.

Our results argue against ethnicity as the determining factor of Mondragon’s success. However, we contend that a more significant obstacle to the widespread establishment of Mondragon-style co-operatives is the difficulty of reconciling them with labour mobility. A large proportion of co-operatives appears to be established in areas where mobility is low for geographical or occupational reasons. It is significant that Mondragon emphasises the degree of integration into local communities in hiring decisions, strengthening its community links by developing social and welfare services and by preferentially hiring children of co-operateurs.

For several reasons a community-cooperative link might be important. Obviously co-operative solidarity could be cemented through social, non-work contact, generating familiarity and high-trust relationships between co-operateurs. Additionally, strong community ties could lower labour mobility and reduce the desire of co-operateurs to withdraw capital while working for the enterprise. Labour and capital mobility are both important as they bear on the equity constraint facing co-operatives. The total capital stock of an enterprise may be considered as being composed of loan capital and equity or own resources. Equity must remain in the hands of co-operateurs for them to be capable of taking autonomous decisions. As with any firm operating in the capital market, gearing limits restrict available assets/man to a multiple of equity/man, even with good access to loan capital. Setting aside start-up difficulties, the problem in the long run is to maintain sufficient equity to permit accommodation to technical change and sustain growth.

Regionalised populations of low mobility are plausibly less inclined to desire to withdraw capital from their enterprises, with the objective of remitting capital to other geographic areas. Withdrawals by existing co-operateurs may be limited by regulation but only if consensus on the desirability of limitations is maintained. More seriously, however, individual equity shares must be withdrawn by departing co-operateurs if control is to be maintained within the enterprise. Assuming that new co-operateurs are unable (or unwilling) to replace equity withdrawn by retiring members, equity/man ratios decline. Reliance upon communal or ‘socially-owned’ equity is, on the other hand, likely to reduce incentives especially to reinvestment of co-operative surplus.

In Mondragon, equity is accumulated by members in the course of their employment span through retentions of corporate surplus in individual accounts. Let
Li be the number of co-operative workers who joined i years ago and Xi be the average equity/man accumulated by a co-operateur in cohort i. Typically, \( X_{i+1} > X_i \). The average equity/man, \( E \), is given by:

\[
E = \frac{\sum X_i L_i}{\sum L_i}.
\]

Clearly the higher is the proportion of long-serving co-operateurs, the higher will be \( E \). In Section IV, we simulate the effect on \( E \) of different profiles of employment duration using Mondragon data, assuming that capital may be withdrawn. It will be seen how sensitively \( E \) responds to even a slight increase in labour turnover.

The third issue we focus on is the possible role of screening of co-operateur applicants in Mondragon's success. Two types of screening may be distinguished—'social' and monetary. To the extent that these barriers reduce the entry of workers with a history of unemployment and job change or with 'non co-operative' value systems, Mondragon's success may not be duplicated merely by transplanting its organisational rules.

In all firms screening on entry takes into account variables not strictly related to the task at hand. Blackburn and Mann (1979) emphasise selection of workers on conventional firms by criteria of obedience and regularity. Mondragon too, selection emphasises 'attitudinal' variables, but these are specific to co-operatives. In drawing up short lists of applicants the most important of such variables is integration: both into the local community, and, potentially, into the co-operative. This carries high weight in assessing candidates. Following acceptance, a worker undergoes trial periods of some six months during which time foremen's reports again stress heavily his social acceptability. Promotion too, takes 'social' variables into account.

Monetary screening is induced by requiring a down payment, and the potential freezing of a part of this, by the co-operative management should the member intend to depart. While the exact contribution and method of payment varies according to circumstances, the average contribution roughly equals one year's pay at the lowest grade. A proportion must be paid in cash, on entry. If, for the average Basque worker, the down payment is perceived as a significant amount, monetary screening might result in a work force with characteristics different from those of the rest of the population. Unless funds are easily borrowed, for example, past employment plays a large role in permitting a worker to join, while, at the same time co-operative success is likely to increase the pool of potential applicants. Co-operative employment may not be for all, especially for those most in need of jobs.

In the following sections, the above three barriers to a co-operative economy—ethnicity, reconciliation of co-operatives and mobility, and the role of screening—are investigated empirically with respect to Mondragon, the world's most successful co-operative group.

III. ETHNICITY, COMMUNITY AND CAPITAL WITHDRAWAL

Basque nationalism is indeed strong in Mondragon. Forty-eight per cent of our respondents voted for Basque extreme left-wing parties and another 40 per cent for Basque nationalists. Within the co-operatives, the official language is Basque and there is some pressure on non-Basque speakers to learn the language. However, Basqueness is not seen as an overriding feature of Mondragon either by its workers or by those on other local firms. Table 1 indicates the rankings of four characteristics of Mondragon as seen by its own workers and by workers in the control group.

Rankings are very similar for subject and control groups. The most distinctive feature of Mondragon is perceived to be its co-operative nature.
THE MONDRAGON EXPERIMENT

Table 1

Rankings of Mondragon Characteristics by Subject and Control

<table>
<thead>
<tr>
<th></th>
<th>Co-operatives</th>
<th>Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Co-operativism,</td>
<td>619</td>
<td>228</td>
</tr>
<tr>
<td>Involvement in firm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security of</td>
<td>324</td>
<td>311</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'Basqueness'</td>
<td>81</td>
<td>244</td>
</tr>
<tr>
<td>Payments</td>
<td>29</td>
<td>102</td>
</tr>
</tbody>
</table>

employment is generally ranked second. Far behind come the ethnic nature of the
corporatives and their level of payments.

While from outside of the Basque provinces the Basque dimension is accredited
strong causal significance, from inside, against the backdrop of general Basqueness this
characteristic is far less important. Although 80 per cent of co-operateur respondents
describe themselves as Basque, so do 72 per cent of the control. The gulf between
Mondragon workers, as perceived by themselves, and Basque workers appears in
some sense to be sharper than that perceived between Basque and Spanish workers.
Respondents were asked to rank groups whose behaviour they identified most closely
with their own interests. The results are shown in Table 2.

Table 2

Co-operateurs' Identification with Certain Groups

<table>
<thead>
<tr>
<th></th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Co-operative Management</td>
<td>201</td>
</tr>
<tr>
<td>Co-operative Workers</td>
<td>152</td>
</tr>
<tr>
<td>Basque Workers Generally</td>
<td>70</td>
</tr>
<tr>
<td>Spanish Workers Generally</td>
<td>22</td>
</tr>
</tbody>
</table>

Note: Row and column totals are not equal because of the inclusion of partial rankings offered by
some respondents. No conclusions of the paper are altered by their deletion.

Mondragon co-operateurs' identification with each other appears to be much
stronger than with outside workers. Further decomposition of the data shows that
Mondragon managers identify their interests most closely with those of non-
managerial co-operateurs, while the latter identify with management.16 Unusually
high trust relationships exist on Mondragon, both laterally between members and
vertically through the control hierarchy.

IV. RECONCILING CO-OPERATIVES WITH LABOUR MOBILITY

Integration into a tight, close-knit community was argued in Section II to be a
potentially important factor in preserving the equity capital of a co-operative.
Mondragon provides strong support for this hypothesis, interpreting respondents
claiming to be non-Basque as those not integrated into their communities: see Table 3.
It is clear that the close balance between those desiring to withdraw capital and those
content with the *status quo* is maintained only by the high proportion of co-operateurs integrated into the Basque communities.

Co-operative location would also be expected to affect the desire to withdraw capital. Subsamples within the co-operative group support this hypothesis as well. While 44 per cent of Mondragon-based respondents to the second questionnaire indicated a desire to withdraw accumulated profits, 67 per cent of the co-operateurs situated in larger industrial centres desired to do so. Basque and non-Basque proportions were similar in these two groups, but there are strong indications that the latter group feels less well-integrated into their co-operatives than does the former. Eighty-three per cent of the Mondragon-based sample had many friends and relatives working in their enterprise, compared to only 47 per cent of the second group. Co-operateurs in large urban centres generally seem to have been more prepared to take employment in other firms in response to hypothetical offers of higher pay, and were strongly attracted to the co-operative by the prospect of work. In their attitudes to management and the Caja Laboral Popular, they appear to be less imbued with the co-operative ethic. Lack of a close link between co-operative enterprises and local communities may therefore render equity accumulation more difficult by expanding the horizons of co-operateurs.

Reallocation of co-operateurs within the Mondragon group is not infrequent. Our data suggest that potential mobility from the co-operatives to other firms is low.

### Table 3

<table>
<thead>
<tr>
<th></th>
<th>Desire for Withdrawal</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Basque</td>
<td>342</td>
<td>376</td>
<td>718</td>
<td></td>
</tr>
<tr>
<td>Integration</td>
<td>113</td>
<td>66</td>
<td>179</td>
<td></td>
</tr>
<tr>
<td>Non-Basque</td>
<td>435</td>
<td>406</td>
<td>841</td>
<td></td>
</tr>
</tbody>
</table>

$X^2 = 13.8$: significant at 0.005

### Table 4

<table>
<thead>
<tr>
<th>Enterprises of Worker</th>
<th>Co-operative</th>
<th>Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(A) Spanish Co-operative</td>
<td>%</td>
</tr>
<tr>
<td>No Monetary Incentive</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>10%-50% Salary Increase</td>
<td>167</td>
<td>31</td>
</tr>
<tr>
<td>Would Not Change</td>
<td>353</td>
<td>66</td>
</tr>
<tr>
<td>Total</td>
<td>538</td>
<td>561</td>
</tr>
</tbody>
</table>

A-B $X^2 = 6.5$ significant at 0.05

B-C $X^2 = 64.3$ significant at 0.005
Mondragon’s promise of job security (a distinctive feature as understood by the control: see Table 1) appears more important than its level of payments. Respondents were asked whether they would be willing to transfer to other hypothetical enterprises for specified wage premia. Responses are shown in Table 4, numbers indicating those expressing desire to transfer. Co-operateurs and workers differ very significantly in their willingness to leave their respective enterprises, co-operateurs being slightly more ready to transfer to another co-operative.

The smaller turnover in the Mondragon group leads to a different pattern of joining dates than that which would be expected in a conventional firm. Joining profiles differ in two important respects. Firstly, Mondragon’s sustained, rapid expansion implies relatively few joiners before 1960. Secondly, the joining-date distribution of the control group is bimodal, indicating a large number of recent joiners despite the general economic slowdown after 1972. The firms contain a larger proportion of transients than do the co-operatives.

Lower intrinsic mobility of co-operateurs may be advantageous in that it blunts the conflict between compressed co-operative wage differentials and labour market forces. In its absence, maintaining managerial and specialist skills could prove a more severe problem for the co-operatives. However, emphasis on job security raises potential difficulties for the coexistence of co-operatives with conventional capitalist enterprises. To cope with possible shifts in demand, the diverse product mix of Mondragon is essential to facilitate the transfer of labour between enterprises experiencing different fortunes. This is seen as a major safety valve by co-operative management. However, this option provides only limited flexibility even to so well-developed a group as Mondragon, where marketing and technology changes are currently forcing consideration of redundancy.

The impact on capital availability of the redundancy of established workers, or of higher labour turnover in general could be considerable. If sustained reinvestment of surplus into individual accounts is the main source of equity capital accumulation, long spells of employment are necessary for high equity/man ratios. Simulations have been made of the relationship of E to profiles of the vintage structure of co-operatives. Mondragon’s history permits computations of the accumulation of equity over a 22-year period by an average co-operateur. It is thus possible to estimate real equity holdings given length of stay, assuming Mondragon rules of surplus sharing and taking conditions over the past 22 years as representative. In the present exercise, no allowance is made for the approximate 20 per cent of surplus allocated to reserves. The Xi are shown in Figure 1, together with four vintage profiles and resulting values of E.

L1 represents a state of no growth with no labour attrition, L2 steady growth at 10 per cent per annum. E(L2) is below E(L1) by 30 per cent, indicating the serious conflict between two objectives of Mondragon: employment creation and increasing capital intensity. L3 corresponds to the employment duration profile of our first survey: assuming low turnover and continuing profitability, equity/man is capable of increasing substantially during a transition to steady growth. Retirement, itself, should pose little problem for the Mondragon group, even if retirees are able to withdraw accumulated profits.

In contrast, labour turnover seems to present a serious problem. We represent turnover simply by a steady rate of attrition, equal for workers of all vintages. Profile L4 is based on L3 but includes a 3 per cent attrition rate: E declines by 9 per cent. In balanced growth with labour attrition the vintage profile depends approximately on the sum of the growth and attrition rates: a rise in either putting equal downwards pressure on E. A 3 per cent rise in attrition thus needs to be offset by a similar fall in growth to maintain the co-operative’s capital stock. It is difficult to grow without locking-in a co-operative work force for very substantial periods.
One apparent way out of this dilemma is to rely upon 'socially-owned' equity held by the collective rather than in individual accounts. This might, however, lead to a reduction in efficiency, due to a fall in individual incentives. At Mondragon, it appears that those who have been longest with the group (hence accumulated most equity) are far more inclined to cite their investments as a factor motivating concern that they and their fellows work well; see Table 5. While this result could be attributed to other factors (such as age differences) it is nonetheless suggestive.

<table>
<thead>
<tr>
<th>Capital Holdings and Desired Work Intensity Investment as Factor in Belief in Substantial Work Effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Strong</td>
</tr>
<tr>
<td>18+</td>
</tr>
<tr>
<td>8-17</td>
</tr>
<tr>
<td>Mondragon up to 7</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 10.2 \text{ significant at } 0.01 \]

In summary, a number of obstacles limit the replicability of Mondragon-style co-operatives in broader industrial society. To maintain incentives and encourage reinvestment of surplus it is necessary that a significant portion of the capital of a co-operative is owned by its individual co-operateurs. Changing conditions and technology render labour mobility desirable. Perhaps more important is the
preservation of individual choice in changing firms, location or occupation. Yet, within a Mondragon-type system, a conflict appears between the three objectives: (a) high mobility, (b) equity accumulation, and (c) appropriately structured incentives for reinvestment of surplus. For locational—and perhaps ethnic—reasons, naturally low mobility of Mondragon co-operatives has diminished the potential conflict between these objectives, permitting rapid growth and accumulation.

V. SCREENING AND CO-OPERATIVE SUCCESS

In Section II it was noted that screening of co-operative applicants could involve both monetary and non-monetary factors. In this section, we review evidence on screening and its possible impact on co-operative ideals and efficiency. Almost all our co-operative respondents considered their initial contribution as a fairly large sum to invest. In the eyes of the control group, the contribution is perceived as the prime barrier to joining, followed closely by the fear of being 'locked-in' and unable to withdraw capital. The capital requirement plausibly screens out a substantial number of lower-income applicants, just as potential 'locking-in' would be expected to reduce applications by workers not seriously intending to stay. Table 6 compares the employment experience of co-operateurs and control group workers immediately prior to their current status. The higher proportion of previously unemployed in the control is probably associated, at least to some extent, with the capital requirement of Mondragon. In addition, a past history of unemployment or job instability may act as another screen to co-operative entrants.

<table>
<thead>
<tr>
<th>Enterprise of Respondent</th>
<th>Co-operatives</th>
<th>%</th>
<th>Firms</th>
<th>%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed before joining</td>
<td>687</td>
<td>67</td>
<td>122</td>
<td>44</td>
<td>809</td>
</tr>
<tr>
<td>Unemployed before joining</td>
<td>341</td>
<td>33</td>
<td>151</td>
<td>56</td>
<td>492</td>
</tr>
<tr>
<td>Total</td>
<td>1,028</td>
<td>100</td>
<td>273</td>
<td>100</td>
<td>1,301</td>
</tr>
</tbody>
</table>

X² = 45.0 significant at 0.005

Further evidence of screening is provided by Tables 7 and 8. Far more co-operateurs saw the co-operatives as one of a range of alternative opportunities. Correspondingly, relative to the control, they declared themselves to have been less motivated to join merely because of a desire for work. This impression is reinforced by the observation that 65 per cent of co-operateurs indicated that they would have refused a similar job on a local conventional firm had one been offered, in favour of joining their co-operative, in spite of the deterrent posed by the capital contribution. In a sense, and relative to conventional firms, Mondragon has provided jobs to those not needing them. Job creation is thus substantially indirect—through siphoning workers off other firms—partly because of the ability of the co-operatives to select desirable members.

What evidence exists that screening might contribute to a diminution of industrial conflict on the co-operatives by maintaining consensus? Rigorous formulation and testing of any such relationship must be approached with caution for several reasons. How can we measure 'co-operative attitudes' or the circumstances under which individuals joined? Both dependent and independent variables are multifaceted, subjective amalgams. Additionally, the sample of co-operateurs is necessarily limited
Table 7
Alternative Employment Opportunities

<table>
<thead>
<tr>
<th>Enterprise of Respondent</th>
<th>Co-operatives</th>
<th>%</th>
<th>Firms</th>
<th>%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative Employment Opportunity</td>
<td>No</td>
<td>332</td>
<td>33</td>
<td>139</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>675</td>
<td>67</td>
<td>137</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1,007</td>
<td>100</td>
<td>276</td>
<td>100</td>
</tr>
</tbody>
</table>

$X^2_1 = 28.2$: significant at 0.005

Table 8
Main Motivation for Joining Enterprise

<table>
<thead>
<tr>
<th>Enterprise of Respondent</th>
<th>Co-operatives</th>
<th>%</th>
<th>Firms</th>
<th>%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-operative/Working Conditions</td>
<td>628</td>
<td>65</td>
<td>61</td>
<td>23</td>
<td>689</td>
</tr>
<tr>
<td>Employment</td>
<td>298</td>
<td>31</td>
<td>183</td>
<td>72</td>
<td>481</td>
</tr>
<tr>
<td>Basque Enterprise</td>
<td>40</td>
<td>4</td>
<td>11</td>
<td>4</td>
<td>51</td>
</tr>
<tr>
<td>Total</td>
<td>966</td>
<td>99</td>
<td>255</td>
<td>99</td>
<td>1,221</td>
</tr>
</tbody>
</table>

$X^2_2 = 146.1$: significant at 0.005

to those selected—we cannot sample those failing to enter—and even were this possible, such a group could not be expected to comment credibly on an unexperienced work situation. As described below, the non-random distribution of co-operateurs over characteristics biases estimated relationships rather severely.

For each composite variable a number of responses were selected to represent various facets, and multiple regressions performed between each facet of the dependent variable—attitudes—and the independent explanatory variable—circumstances of joining. Each regression included a set of 'standardising' variables to take into account the possible influences of third variables correlated with dependent and independent variables. Let:

$Y_i = \text{facet } i \text{ of 'co-operative attitudes' where } i = 1, 2, \ldots, 7$

$X_j = \text{facet } j \text{ of 'joining condition' where } j = 1, 2, 3, 4$

$S_k = \text{standardising variable } k \text{ where } k = 1, \ldots, 7$

Each regression takes the form:

$Y_i = a_{i1}X_j + \sum_{k=1}^{7} b_{ij} S_k$

assuming linear relationships. Facets of 'co-operative attitudes' and 'joining conditions' are:

$Y_1 = \text{Perception of greater job control;}$

$Y_2 = \text{Perceived degree of participation in important decisions;}$
\[ Y_3 = \text{Ability to voice opinions or complaints}; \]
\[ Y_4 = \text{Perceived 'distance' between co-operative workers and management}; \]
\[ Y_5 = \text{View of the Caja Laboral as acting in workers's interests}; \]
\[ Y_6 = \text{Opinion on need for trade unions in co-operative}; \]
\[ Y_7 = \text{Desire to withdraw shareholding from co-operative}; \]
\[ X_1 = \text{Willingness to have taken similar job outside co-operative}; \]
\[ X_2 = \text{Perception of co-operative on joining as only employment opportunity}; \]
\[ X_3 = \text{Declared principal motive for joining co-operative}; \]
\[ X_4 = \text{Whether in employment before joining co-operative}. \]

Standardising variables included are: age, sex, ‘Basqueness’, joining date, wage, occupation, and ‘ideology’. The last variable is proxied by perceptions of the role of management on conventional Basque firms.

Empirical results are affected by worker selection biases. Selection is heavily influenced by social and attitudinal assessments as well as by skill, functional and educational considerations. Mondragon interviews are probably influenced in their selection by a set of variables which includes our variables \( X_1 - X_4 \). Perfect screening over these variables would be expected to result in not merely orthogonal, but compensating variations between the \( X_i \) and between the \( Y_i \). For example, to be acceptable, a prospective worker, if currently unemployed, might be required to demonstrate greater ‘co-operative’ motivation than one employed, since the latter is, prima facie, more likely to be joining out of an acceptable co-operative impulse. Similarly, attitudes favourable and unfavourable to co-operativism would tend to offset, rather than reinforce each other. The estimated \( a_{ij} \) would then be expected to be non-significant and of random sign. A full test of perfect screening is therefore the dominance of compensating variations between the ‘entry’ variables and the ‘attitude’ variables, as well as the absence of any significant relationship between them.\(^{28}\)

Correlation matrices between the independent and dependent variable facets are shown in Tables 9 and 10 respectively. Correlations are low, yet generally statistically significant.

**Table 9**

<table>
<thead>
<tr>
<th>( X_i ) Correlation Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>( X_1 )</td>
</tr>
<tr>
<td>( X_2 )</td>
</tr>
<tr>
<td>( X_3 )</td>
</tr>
<tr>
<td>( X_4 )</td>
</tr>
</tbody>
</table>

* Significant at 1 per cent level.

**Table 10**

<table>
<thead>
<tr>
<th>( Y_i ) Correlation Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>( Y_1 )</td>
</tr>
<tr>
<td>( Y_2 )</td>
</tr>
<tr>
<td>( Y_3 )</td>
</tr>
<tr>
<td>( Y_4 )</td>
</tr>
<tr>
<td>( Y_5 )</td>
</tr>
<tr>
<td>( Y_6 )</td>
</tr>
<tr>
<td>( Y_7 )</td>
</tr>
</tbody>
</table>

* Significant at 1 per cent level

\(^{a}\) Sign inconsistent with common directionality
significant. More importantly, all signs for the $X_i$ are as would be predicted in the absence of screening and only two nonsignificant correlations between the $Y_j$ differ from the pattern. The $X_i$ and $Y_j$ components do indeed exhibit some common 'directionality' although dispersion about their common directions is large.

Table 11 shows the matrix of regression coefficients $a_{ij}$ as obtained from the twenty-eight regressions. Coefficients are small, yet sixteen out of twenty-eight are significant at the 5 per cent level and the signs of twenty-three coefficients (including all sixteen significant ones) are consistent with the hypothesis that attitudes towards the co-operative relate systematically to the circumstances under which individuals join. Broadly speaking, individuals seeing the co-operative as one of a 'range' of employment possibilities, hence less dependent on it for a job, exhibit more 'co-operative' attitudes. Interpret coefficients as probabilities. Then, for example, suppose that 100 workers were to join the co-operatives as a last resort:

<table>
<thead>
<tr>
<th>Index $i$</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-0.13*</td>
<td>0.04*</td>
<td>0.13*</td>
<td>0.09*</td>
</tr>
<tr>
<td>2</td>
<td>-0.05</td>
<td>-0.12</td>
<td>0.24*</td>
<td>0.24*</td>
</tr>
<tr>
<td>3</td>
<td>0.05</td>
<td>0.11*</td>
<td>-0.07</td>
<td>-0.10*</td>
</tr>
<tr>
<td>4</td>
<td>0.13*</td>
<td>0.16*</td>
<td>-0.13*</td>
<td>0.04*</td>
</tr>
<tr>
<td>5</td>
<td>-0.06*</td>
<td>0.05*</td>
<td>0.07*</td>
<td>0.10*</td>
</tr>
<tr>
<td>6</td>
<td>0.06</td>
<td>0.10*</td>
<td>-0.10*</td>
<td>0.07*</td>
</tr>
<tr>
<td>7</td>
<td>0.03</td>
<td>0.13*</td>
<td>-0.06</td>
<td>0.05a</td>
</tr>
</tbody>
</table>

*Significant at 5 percent level  
Inconsistent sign

compared to 100 workers joining with alternative options of employment, some sixteen 'extra' would perceive a serious division between management and workers. The potential growth of division within enterprises is considerable.

It is not possible to form unbiased estimates of the relationship between characteristics and attitudes which would prevail with a less rigorous selection policy. However, the effect of selection is, as noted above, to bias the regression coefficients towards zero, probably very significantly, so that estimates understated true values, providing lower bounds. Attempts to expand the co-operatives unduly rapidly, or to emphasise the objective of 'direct' job creation (i.e. the offering of employment to individuals less able to find work in conventional firms), would probably result in a considerable weakening of their present ideological solidarity.

VI. CONCLUSION

In many respects, the remarkable co-operative experiment of Mondragon demonstrates advantages of a co-operative economy. The consensus-building and efficiency-inducing potential of the co-operatives is suggested by results shown in a previous study. The present paper has sought to analyse barriers to replication of Mondragon in a wider industrial setting. We conclude that they are quite substantial—but different in nature to those frequently cited.

Basque ethnicity *per se* does not appear to be so major a factor as to prevent the replication of Mondragon. More problematical are the roles of linkages with local communities and limited labour mobility. These are significant features for a number
of reasons. Firstly, they appear to contribute to the maintenance of consensus. Secondly, they partially insulate the co-operatives from competitive pressures of the external labour market, permitting a more compressed payments scale. Thirdly, the limitation of co-operateur horizons helps to retain capital by reducing the desire to remit savings to distant areas while working. Fourthly, low labour turnover is vital for the maintenance of co-operative equity capital. Co-operative survival may not be easy in a fluid labour market with technology changes and general labour mobility.

Communal, rather than individual capital holdings may reconcile equity maintenance with labour mobility—but at a high cost. Individual shareholdings appear to play an important motivating role at Mondragon—76 per cent of our sample saw their investments as a major factor in their belief that other workers and themselves should work especially well. Divorcing rewards from returns to co-operative capital provides a strong incentive for decapitalisation.

In certain respects, notably prior unemployment experience, Mondragon co-operateurs differ from control workers. This raises the possible importance of screening in providing Mondragon with a distinctive pool of workers. These appear more likely to identify with the co-operative ethic and maintain solidarity with fellow co-operateurs. As alternative opportunities decrease, the pool of potential co-operateurs increases, including more individuals viewing the co-operatives primarily as a job opportunity. Unless screening is perfect, increased pressure is placed on socialisation processes after entry to maintain consensus.

What then are the prospects for Mondragon-type co-operatives in a modern industrialised economy? From a 'static' viewpoint, probably rather good. Results of our earlier paper point to the efficiency-raising potential of the co-operative form. The U.S. experience also indicates this potential, albeit in less truly co-operative circumstances than those of Mondragon.

A dynamic analysis over the lifetime of an enterprise suggests a less favourable outlook because of the generally high mobility and relative absence of community attachment common in major industrial regions. There are, of course, exceptions to this rule—two notable ones would appear to be Switzerland and Japan. In fact Mondragon seems not too dissimilar to the large Japanese cartels in a number of respects—internal mobility but limited internal-external movement, community links, job tenure and responsibility for social security. In the more fluid environment characteristic of other developed economies there do, however, appear to be quite sizeable pockets of relative immobility and community attachment in which Mondragon-type enterprises might flourish with appropriate access to loan capital. It is interesting to note the tendencies towards co-operate establishment in such regions in the North-eastern United States, where they might stabilise local communities.

Stabilisation is not, however, achieved without a cost. The locking-in effect will tend to inhibit quantity and quality adjustment in co-operative labour markets, which must then adjust through implicit prices. Non-price adjustment is forced onto the remaining labour market, which bears the brunt of fluctuations in employment levels. A clear example of this is the dual functioning of the Japanese labour market over the 1970s.

REFERENCES
1. This research was supported by the Nuffield Foundation. Views expressed are those of the authors and do not necessarily reflect those of the Institutions with which they are affiliated.
2. In a number of countries, institutions have been created to assist their establishment: the U.K. and France have JOL and SCOP respectively, while in the U.S., Bills HR12094 and HR2203 promise to institutionalise transitions towards employee ownership.
3. Bradley and Gelb (1981), 'Motivation and Control in the Mondragon Experiment', British Journal of Industrial Relations, Vol.XIX, No.2. This paper also includes a brief overview of the Mondragon co-operatives and of our survey.


6. Bradley and Gelb (1980a), ‘The Radical Potential of Cash Nexus Breaks,’ British Journal of Sociology, June. A number of examples in Canada, the U.S., Australia, France and the U.K. may be cited to support this observation.

7. ‘Not only are their professional qualifications examined but also their morals. We concern ourselves about how potential workers behave in the community.’: Rafael Fernandez Aresti, founder member of Mondragon, July 1979.


9. In fact, one of the difficulties faced by many co-operative experiments is the small share of equity held by many workers.

10. Difficulties of co-operatives in the U.S. and U.K. have partly been ascribed to the reluctance of bankers to lend to them: see, for example, Thornley (1981), Worker Co-operatives, Heinemann, and Rothschild-Whitt (1979), ‘The Collectivist Organisation: An Alternative to Rational-Bureaucratic Models’, American Sociological Review, Vol.44, August. op.509-27. Mondragon, through the establishment of the Caja Laboral Popular has relaxed this total capital constraint—but the potential equity constraint remains. Debt/equity ratios have risen slightly in Mondragon, but, at about 1:1 are considerably lower than on many conventional firms.

11. Distinctions between small family firms and co-operatives are not easy from this point of view—both may, at a certain stage of development, be constrained by equity shortage. Firms, however, have the option of making public equity offerings: co-operatives may be compromised by doing so.

12. Various ways of overcoming this problem have been mooted by Caja Laboral Popular officials to fully solve the problem. For example, providing retirees with pensions in lieu of payouts reduces their security because the pension becomes the residual bearer of risk.

13. It is understood that Yugoslav co-operatives, whose capital is socially owned, currently faced this problem as there is no incentive for older workers, some of whom occupy managerial positions to generate a surplus for re-investment.

14. The importance of the integration criterion was highlighted in all interviews with co-operative management.

15. As noted in Bradley and Gelb (1981), op. cit., this may not be easy to distinguish from other characteristics—such as job security.


17. The attitudes of co-operateurs to their management and the Caja Laboral Popular are discussed in Bradley and Gelb (1981), ibid.

18. Co-operateurs were, in addition, told to assume the possibility of complete capital withdrawal without penalty.

19. The co-operatives have been able to recruit managers through their own ranks and keep them through a variety of non-monetary incentives. Recruitment of specialists from outside is more difficult. Tension between labour market and co-operative forces is indicated by the decision in 1979 to formally widen differentials on Urssa in the larger industrial city of Vitoria. Our survey indicates a strong desire for greater equalisation of payments in Urssa, especially among the lower paid. It is interesting to speculate on whether the internal labour market will provide continuing upward mobility as technology levels of the co-operatives rise.


21. Lagun Aro (the co-operatives’ social service) is studying the possibility of introducing unemployment insurance. The extension of the central agency to shoulder redundancy expense is seen as necessary to shift the burden from industrial co-operatives. Interview with Antonio Calleja, Director, Caja Laboral Popular, July 1979.

22. Nominal assets of an average co-operator over 1956-77 are estimated by Thomas and Logan (1981), op. cit.

23. Let \( L_0 = 1 \); then \( L_t = (1-g)/(1+q) \) where \( g \) and \( q \) represent growth and attrition rates respectively.

24. As described by Thomas and Logan (1981), op. cit., despite the fact that co-operatives may accumulate at slightly different rates, capital holdings are well proxied by length of service.

26. Possible variation in third variables between sample and control which contribute to the different profiles in Tables 5, 6 and 7 do not undermine the screening argument since such variations are themselves probably the result of screening. For example, Mondragon may employ fewer females because these are more likely to want temporary employment or have less access to funds. Neither is the different pattern of joining dates between the co-operatives and control responsible.

27. These are regarded as different facets rather than as constituting a set of variables scaleable according to some criterion such as that of Guttman. There is no reason, for example, to believe that a positive answer to $X_1$ should imply a similar response to $X_2$ but that positive $X_2$ should not necessarily imply positive $X_1$, etc. All estimation is by OLS.

28. Individuals may be considered to possess a characteristic vector $z = (X_1, X_2, X_3)$ where $X_1$ and $X_2$ provide indications of ideological commitment, and $X_3$ denotes other attributes such as skills. The $X_i$ are distributed over the population of potential co-operative workers and selection involves choosing workers for whom $f(X_1, X_2, X_3) \geq k$ where $k$ is some cutoff score. Positive correlation between $X_1$ and $X_2$ in the population will be biased towards negative values by selection, the bias being stronger the higher is $k$ and the more weight is placed on $X_1$ and $X_2$ relative to other variables. For an indication of possible bias, let $X_1$ and $X_2$ each take value 1 and 0 with probability 0.5 and be positively correlated with coefficient 0.6. Omit the influence of $X_3$. If 40 per cent are rejected by screening, correlation between $X_1$ and $X_2$ for the selected workers is $-0.2$. Screening changes the sign of ex post observed correlation from its value in the population of all workers.

29. Interpretation of regression coefficients as probabilities is appropriate in the case of dichotomous dependent variables. To avoid the problems of probabilities fully outside the $(0,1)$ range, logit or similar transportations may be used. Two of the seven dependent variables are trichotomous variables: for these, simple linear scaling (constant interval) has been adopted.


31. ibid.


No. 225. George Psacharopoulos, "The Economics of Higher Education in Developing Countries," *Comparative Education Review*

No. 226. Katrine Anderson Saito and Delano P. Villanueva, "Transaction Costs of Credit to the Small-scale Sector in the Philippines," *Economic Development and Cultural Change*


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