COOPERATION AND PRODUCTIVITY: SOME EVIDENCE FROM WEST GERMAN EXPERIENCE*

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1. INDUSTRIAL PARTNERSHIP SCHEMES IN WEST GERMANY

Somewhere between traditional entrepreneurial firms and worker cooperatives on the spectrum of alternative firm types lie a range of industrial partnership models, involving varying degrees of worker participation in decision-making, and/or profit-sharing. In West Germany there are known to be more than seven hundred firms in this category. Many belong to Arbeitsgemeinschaft zur Förderung der Partnershaft in der Wirtschaft e.V. (AGP) headed by Michael Lezius. Guski and Schneider have recently published a register of these firms in collaboration with Lezius.[1]) Their analysis reveals a variety of legal configurations hea-vily influenced by tax and company law. The size of employee profit and stock shares also varies greatly, most being relatively small. About half the firms in the sample have instituted some form of employee par-ticipation in what is normally regarded as managerial decision making. The schemes introduced by AGP members range from employee control in a few worker-managed co-operatives among the many small firms to minimal consultative and informative practice in the more sparsely represented larger firms.

This variety of schemes and practices revealed by the Guski and Schneider survey underlines the fact that no single, simple definition of worker participation or industrial partnership can readily be given. But essentially participation involves some form of post-contractual worker involvement, embracing at least access to information which is normaly confined to management and, in most cases, some involvement in the

decision making which traditionally defines the managerial function. It in general falls short of full workers' control.

The AGP members' schemes are voluntary, and formally quite distinct from the system of employee representation on supervisory boards under German codetermination laws. On the other hand the grass-roots development which they represent may have been indirectly influenced and encouraged by the climate of opinion leading to the legislative developments and fostered by them.[2])

The promotion of industrial democracy in some form is now a public policy objective in many countries[3]) However, most of the evidence presently available to policy makers is of a qualitative nature, and very few, if any, results exist quantifying the impact of industrial partnership on economic performance. As a result some important questions remain unanswered. In particular, we cannot with confidence say whether the improvements in the quality of working life that might result from a move along the continuum from traditional enterprises to worker control are available without loss of economic efficiency or whether, as some fear, they must be bought at a heavy resorce cost. Still less are we able to judge whether or not industrial partnership, by combining certain of the characteristics of both traditional firms and labour- -managed enterprises, might lead to superior economic performance to that of either of the two more extreme types of firm.

The comparatively well-documented German sample provides an excellent opportunity to make headway on these matters. With the cooperation of Michael Lezius and members of the AGP, the authors carried out an analysis of the impact of worker participation and various types of profit-sharing on a number of aspects of economic efficiency. In selecting this emphasis, it should be stressed, we in no way wish to detract from the importance of other kinds of effect and benefit. Rather, we focus on this aspect as being an area particularly lacking in information at the moment.

We begin with an analysis of certain dysfunctional aspects of traditional firms which worker participation and profit-sharing might ameliorate. Our concern is essentially with the employment relation.

2. DYSFUNCTIONAL ASPECTS OF TRADITIONAL FIRMS

Unlike most contractual arrangements in market economies, employment is usually a continuing relationship. To a large extent this may be traced to the prevalence of job-specific labour skills, which render immobility of labour costly both to the workers themselves and to employers. For the worker, skills learned on-the-job are often less productive, or inapplicable elsewhere. Consequently to leave a job is risky, as well as involving search and transport costs. But the employer too faces major costs in replacing the specific skills embodied in his existing

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[2]) The indirect influence of codetermination law is discussed further in Section 5.

[3]) See Garson (1977) for a survey.

labour force, while much installed capital is also task-specific and immobile. Over a wide range of outcomes employers and workers are thus stuck with each other.

Added to this, as has been emphasised in the economics literature, the complexity of production processes and uncertainty over future developments make it infeasible to regulate employment by means of detailed and explicit contracts covering every future contingency. As a result tacit or informal agreements are generally concluded, under which workers accept employers' authority to direct productive activity within certain limits. But because each side can inflict heavy costs on the other without their terminating the traditional firm then becomes a bargaining arena, prone to conflict and endemic mistrust.

On the one hand the individual worker immobilised by his specific skills becomes open to employers' opportunism. In this situation collusion amongst workers and formalised collective-bargaining agreements are the rational response. With the tables now turned on themselves, employers will in turn seek countermeasures of their own. One strategy recommended by traditional economists is to resort to individual incentives. According to the traditional argument, individual incentives are superior because a worker receives only a small fraction of his marginal product under a group incentive like profit-sharing, but receives all the benefits from shirking or leisure on-the-job.[4]) However in practice such schemes are unlikely to succeed since, as we have seen, workers' truly rational motivation in the social context of productive organization is for collusive and strategic behaviour.[5]) And there is abundant evidence of »negative collusion« to restrict output under traditional piecework schemes, where informal social sanctions and even violence against »rate-busters« have a lengthy history. ·

More subtle forms of destructive effect on productive cooperation and communication in a closely-knit organisation are also likely, yet entirely neglected in the traditional economists analysis, and arising from the rivalry for individual rewards and promotion. Thus, distorting information flows to obtain personal benefit is widely observed in such situations, whether by exaggerating one's own performance or denigrating a rival's. Faced with this kind of behaviour employers then find that increased monitoring costs must be incurred to counteract dishonesty.

Alternatively, employers may resort to ever-finer division of labour and specialisation of tasks, in order to simultaneously aid supervision, and reduce the costs to themselves of replacing existing labour and training new workers. When they do this, work is de-skilled and workers' autonomy and job-satisfaction reduced, thereby adding to conflict and endemic mistrust as labour and capital expend resources on the socially unproductive activity of attempting to extend or defend their share of jointly produced wealth.[6])

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[4]) See for example, Alchian and Demsetz (1972).

[5]) Fox (1974) Oakeshott (1978).

[6]) See Edwards (1979).

3. INDUSTRIAL PARTNERSHIP AS A MEANS OF JOINT-WEALTH MAXIMISATION?

Participatory firms — with or without profit sharing — will produce better outcomes than traditional firms if the *negative* collusion to maximise one party's share, described above, can be replaced by *positive* collusion to maximise joint wealth. The hypothesis that worker participation might achieve this effect would run as follows.

The negative collusion in traditional firms, and associated behaviour including strike threats, stems from the fact that this is perceived as the only available method of countering employers' opportunism. When, however, workers participate in decisions affecting their jobs — in managerial activities — the hypothesis runs, they acquire an alternative and more direct means of achieving this end. Moreover, when decisions are in some sense jointly taken, they are more likely to be regarded as fair. It should follow that such decisions will receive a readier acceptance and be implemented more efficiently.

However, workers are unlikely to agree to cooperate in maximising the joint wealth of owners and employees (including non-pecuniary components) while some parts of that wealth, especially the residual element, profits, whose size depends most critically on effort and on decisions taken, accrue wholly to others. Hence, if they agree to cooperate they will also require a share of profit, or any surplus above contractual rents and wages. Looking at it from the other viewpoint, participation with profit sharing is much more likely to yield positive results than participation alone. We thus arrive at the conclusion that profit-sharing should motivate efficient behaviour. As we have seen, this contradicts received and authoriative opinion,[7]) at least insofar as this is thought still to be valid in participatory settings. The divergence between our expectation and the orthodox one arises because we take explicit account of the social interaction among individuals at work in an organisational setting that is entirely neglected in the orthodox approach. Thus, with regard to the shirking problem, if the numbers involved in a group incentive like profit sharing are not too large and shirking imposes perceptible losses on co-workers with whom there is some personal interaction, then »positive collusion« and »horizontal monitoring« to encourage effort is the rational response for the peer group. Thus we see a reversal of the widely observed »negative collusion« to restrict output under traditional piece-pay schemes.

The interaction between participation and profit sharing is important and merits further exploration. It certainly seems reasonable that profit-sharing will seem to have more point to workers when they have some say in managerial decisions which determine the level of profitability. To the extent that this is so, the motivating effect of profit sharing should increase. Moreover, when participation is present, workers may both be able to see a reliable connection between their individual effort and received profit shares, and also have less reason to fear that entrepreneurial opportunism will deprive them of the fruits of their extra

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[7]) See for example Samuelson (1977).

labour. Conversely, in the absence of participation, profit shares are likely to be regarded as random and unrelated to workers' effort, while fear of expropriation will be high in the typical low-trust, conflict-prone organisation. In these circumstances both the orthodox view towards profit-sharing, and the preference of workers for wage increases rather than profit-related bonuses under collective bargaining, become understandable.

From our earlier arguments it is clear that the form which profit-sharing takes is important. What is required is a reward structure related to the performance of the firm as a whole. Profit-sharing in a literal sense, via profits-linked bonuses etc. and other group incentives schemes have the advantage of not creating an incentive for disruptive, individually competitive, rivalrous behaviour. Individual incentives, on the other hand, are more uncertain in their effects. Unless they are devised in such a way as to penalise rivalrous actions (such as distorted signals, obstructing fellow workers and lack of initiative which does not raise one's own standing), the disruptive effects of such rivalry may still outweigh the incentive effects, even under the positive influence of participation in raising trust and fostering co-operation. Similar arguments apply to small-group incentives which are again likely to foster rivalry between groups and hence counteract the potential benefits of participation in fostering overall co-operation.

A final question remains, which is whether we may expect a gradual continuous improvement in firm performance as we move from traditional firms to full participatory, profit-sharing ones, with the improvement beginning at quite low levels of both participation and profit-sharing, or whether it is necessary to exceed some perhaps quite high threshold level of both before any significant improvement occurs. Ultimately this question can be answered only by reference to the empirical evidence. But it can be argued that even limited elements of participation or partnership are likely to generate a loyalty and attachment to the workplace which is rationally founded in the knowledge that personal prospects including promotion and job security do depend heavily on firm growth and profitability to finance investments. Thus, as the contractual status of labour becomes closer to partnership, incentives for joint-wealth maximising co-operative behaviour should become progressively more powerful. Nevertheless, the uncertainty about where significant changes in performance occur as participation increases remains sufficient to make it advisable in empirical work to test both for gradual changes across the board and for discontinuous differences between groups of firms located towards the extreme ends of the spectrum.

4. EXPERIENCE OF PARTICIPATION AND PROFIT SHARING AMONGST AGP FIRMS[8])

Our evidence on how participation and profit-sharing works in practice was obtained via a questionnaire designed in co-operation with Le-

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[8]) For a more detailed account of the data sources and statistical method see Cable and FitzRoy (1978).

zius, and sent to AGP members. The final sample selected for our analysis contained 42 firms. These firms were distributed over a wide range of industries, almost all in manufacturing industries. Their size varied from as few as 20 employees to around 6,000. None of the few existing co-operatives supplied data, but several of the firms who did respond are well-known for the efforts of their owners or managers to introduce democratic practices into their internal decision-making processes.

Most of the information which was supplied was accounting or other 'objective' data: statistics on numbers employed, sales, wages and salaries, dividends, capital employed, and so forth. For the great majority of firms in our sample, which were unquoted, GmbH companies, this information is not publicly available, due to the minimal information disclosure requirements binding this type of German company.[9] The responding firms also supplied subjective evaluations of the degree of worker involvement in various areas of decision making. Four of the areas were concerned with essentially job-related issues: the wage system; production methods; job design; and determination of piece work premia etc. However, the remainder extended into the highest reaches of firm strategy, covering advertising; product design; price policy; and investment policy. In each case, the firms described themselves as having "no participation" or workers involved as "observers", "advisers", or "active participants".

The information on participation has obvious limitations, in particular its subjectivity and one-sidedness (coming wholly from management). The most serious bias it is likely to contain is a systematic tendency to overstate the degree of worker participation. However this causes comparatively few problems for our purpose, which is to assess the effect of different *relative* degrees of participation between firms or groups of firms, rather than to measure the extent of worker participation in absolute terms. In future work we propose to extend and refine the participation data with the aid of interviewing and detailed case studies. Meanwhile, the qualitative data provided through the questionnaire produced some interesting results in our preliminary analysis.

In order to measure the effects of participation on productivity we required quantitative indices of the degree of worker participation in the sample firms. These we derived from the qualitative, questionnaire data, taking account of both the purposes of workers' presence and the topics discussed. The practical problem was to determine an appropriate weighting structure for the different purpose categories and decision making areas, in order to derive a points score for each firm. Unfortunately there is to our knowledge no economic or sociological theory from which to derive an operational weighting scheme. We therefore experimented with many different specifications and schemes, but found our results generally insensitive to the choice of weights over a fairly wide range; in other words, the broad picture was not crucially affected

[9] Gesellschaften mit beschränkter Haftung, though on average much smaller than Aktiengesellschaften (AG) are numerically predominant in West Germany.

by the precise way in which the participation index was constructed. Two measures finally emerged which yielded results with the highest degree of statistical significance, and utilised very simple weighting schemes. The first (P_1) attributed weights of 0, 1, 2 and 3 to "no participation", "observer", "adviser" and "active participation" respectively, and equal, unit weights for each decision-making area except for advertising, which attracted a zero weight, as being of marginal importance. The maximum P_1 score was thus 21, which very few of the 42 firms achieved. The second participation variable (P_S) utilised the same weighting structure for the degree of participation in each area, but was confined to the three 'strategic' decision making areas (investment, price and product policy).

The questionnaire responses also yielded three variables relating to financial incentives offered to workers. The first, and quantitatively most important, was total employee remuneration in the form of incentive pay (I). Our impression is that this consisted mainly of piecework earnings, so that this variable must be seen as relating to the type of incentive about which our theoretical arguments were ambiguous or sceptical. The two other incentives variables were total profits distributed to workers (π_B) and workers' capital (M). Unlike (I) these are related more to overall performance than to individual effort, and may be expected to operate via peer-group pressure. Inspection of the data did not interestingly, indicate that π_B and M are confined mainly to white- rather than blue-collar workers, but the total amounts reported were typically very small.

To isolate and quantify the effects of worker participation and incentives on firm performance, all of the above variables were incorporated in multiple regression equations explaining differences in value-added (Y) across the firms in the sample, alongside other variables suggested by economic theory. The other variables comprised (various) measures of capital employed (K); white- and blue-collar labour input (L_W, L_B), included separately to permit later analysis of the differential effects of participation and incentives on production workers and others; and a series of eighteen industry — dummy variables, included to normalise for such influences as inter-industry differences in technology and market structure amongst the firms in our sample. Cross-sectional observations of the 42 firms in the years 1974—76 were pooled to form a single sample of 126 observations, and time dummies for the years 1975 and 1976 were added to allow for changes in relevant prices and in economic conditions from year to year (and found to be significant). Following orthodox economic theory and previous empirical work, the logarithms of the continuous variables were used in estimation. In effect, the regression model shows the effects of participation and incentives by the way in which these variables shift the 'normal' relationship between output and factor inputs within the firm.

Using the P_1 participation variable the following results were obtained[10]

[10] Time and industry dummy coefficients are not reported. t values in parenthesis.

$$(\widehat{lnY}) = -0.558 + 0.001\ lnK + 0.335\ lnL_W + 0.671\ lnL_B$$
$$\quad\quad\quad (-4.70)\quad (0.02)\quad\quad (8.17)\quad\quad\quad (16.38)$$

$$-0.008\ lnM - 0.013\ lnI + 0.010\ ln\pi_E + 0.149\ lnP_i$$
$$(-1.11)\quad\quad (-2.34)\quad\quad (1.51)\quad\quad (4.16)$$

$$\overline{R^2} = 0.988$$

Overall the model explains 99% of the observed differences in value-added across the sample, but this very high figure is due to the type of model used and should not be given undue emphasis. Of most interest for our analysis is the statistically significant and positive coefficient attracted by the P_i variable. The incentives variables, however, do not perform well in this equation. I is statistically significant and negative, which could indicate the overriding influence of the disruptive aspects of individual incentives, discussed earlier, but both π_E and M are statistically insignificant and M also attracts a coefficient of 'wrong' sign. Of the other reported variables, the labour input coefficients are highly significant and of plausible magnitude, but the results for the capital input variable are, in this case, unsatisfactory.

The estimated effect on value-added of an increase in participation in this equation is quite large: a rise of 1.5% for a 10% increase in the P_i index. Thus, for example, a firm scoring 15 on the P_i scale would, other things being equal, produce 7.5% more output than a firm scoring only 10. A very similar result was obtained when P_i was replaced by the participation variable relating only to strategic questions of investment, price and product policy: P_S. This appears to suggest that, from the viewpoint of raising productivity, the existence of worker participation on employment related issues is immaterial, and it is the sharing of the highest level managerial prerogatives concerning economic strategy which is crucial in distinguishing participatory from nonparticipatory firms. However, there may be other considerations that need to be taken into account. In their recent study of the development of economic democracy under the Allende government in Chile, Espinosa and Zimbalist found that worker involvement usually began over work-related issues, with which workers had previous direct experience, and only later spread to technical questions and economic policy matters.[11] This sequence seems intuitively plausible. If true of the firms in our sample, it could imply that the P_S variable identifies not only the firms with participatory practices in strategic decision making, as intended, but also those with the longest experience of participatory practices of any kind. These firms would have had more opportunity to solve the problems arising from the adoption of participation schemes, and to have hit on the most effective procedures for joint decision-making in their own special circumstances. Clearly, this would tend to lead to improvements in the effectiveness of participation in *all* areas. Moreover, more time would have elapsed for the effects of jointly-taken decisions to work through to observed firm performance. Unfortunately our questionnaire could not elicit information on the length of ti-

[11]) Espinosa and Zimbalist (1978).

me since the introduction of participation schemes in individual firms. From other sources, however, we know that the spread of worker participation increased significantly just prior to and during the period of our study in the first half of the nineteen-seventies.[12] Thus there would seem to be a distinct possibility that the P_S variable is picking up time-related effects as well as effects due to co-determination in particular areas. A further, separate possibility is that in some cases firms responding to our questionnaire may have interpreted 'participation' over the wage system and piecework rates to include what are in effect collective bargaining procedures. Clearly these ought not to be reflected in our participation index, being characteristic of traditional rather than participatory firms. Given the way the variables are defined, P_i may have been distorted in this way, but this is unlikely in the case of P_S. Resolving these uncertainties over the participation data and consequently over the interpretation of the regression results for alternative indices is one of the priorities for our further work.

The regression model considered so far allows only for a restricted effect of participation on efficiency. By simply adding a separate participation variable to the model, we provide only for a "disembodied effect". In practice we should expect participation effects also to work through to efficiency by enhancing the productivities of labour and capital inputs to the production process, which are reflected in the coefficients of these variables. Moreover, as we stressed in our earlier theoretical discussion, there are strong grounds for expecting an interaction between participation and the various incentive payments. Again the need is to allow the estimated coefficients for these variables to vary with participation itself.

A method of achieving this which avoids the statistical problems likely to be encountered with other methods is to divide the sample into 'high-' and 'low-participation' subsamples, and estimate separate equations for each group. Two coefficients for each variable then emerge, differing to the extent that participation affects or does not affect the variable concerned, while any remaining disembodied participation effects will be captured by the difference, if any, in the first, constant term in the equations. The penalty of proceeding in this way is that, having divided the sample in two, and focussed on the differences *between* the groups, we obscure the effects, if any, of variations in the degree of participation *within* the groups. However, as we stressed earlier, there are in any case good grounds to test for discontinuous increases in the effects of participation between groups, rather than for a continuous, gradual increase across the whole spectrum of firms.

[12]) There were significant developments at the legal level over the period: the 1972 amendment of the 1952 Betriebsverfassungsgesetz (works constitution law), and the new co-determination law of 1976. The direct impact of the legislation on our firms would not have been very great (and in any case would have affected all firms in our sample equally). The new legislation in 1976 came too late to influence the data used in our study, which ended in 1976. But the encouraging climate of opinion at the political level no doubt both reflected and reinforced a more positive attitude at the grass roots, especially among the member firms of the AGP. For a succinct outline of the West German law see Nutzinger (1977).

A critical value of P at which to divide the sample was not imposed arbitrarily, but found experimentally following a conventional statistical method. Thus we carried out the analysis repeatedly, dividing the sample at various values of P over an extensive range in which the critical value was expected to lie. The critical value was then identified as that at which the explanatory power of the equations was at a maximum. In the case of P_1 this proved to be where the high participation group included firms with a score of 13 or more. Interestingly, in view of our previous discussion, this value requires a firm to have some degree of participation in 'strategic' decision areas, even if participation elsewhere is at a maximum, for inclusion in the high group.

By pure coincidence, the high and low groups thus defined contained an equal number of firms. The high participation group firms on average employed 914 workers compared with only 584 in low participation firms, but capital per man in the latter was much higher at 90,400 DM per man compared with 66,900 DM per man. The firms in the two groups were on average identical or nearly so in terms of the proportion of whitecollar workers, hourly manual wages and average earnings and hours per man.

The separate results for the two groups proved to be statistically different from each other as a whole,[13] and were as follows:

High group

$$(\hat{lnY}) = -0.141 + 0.171 \; lnK + 0.251 \; lnL_W + 0.487 \; lnL_B$$
$$\quad\quad (-0.44) \quad (2.15) \quad\quad (2.38) \quad\quad\quad (6.18)$$

$$\quad + 0.026 \; lnM + 0.006 \; lnI + 0.059 \; ln\pi_E;$$
$$\quad\quad (2.11) \quad\quad\quad (0.96) \quad\quad (7.24)$$

$$\bar{R}^2 = 0.995$$

Low group

$$(\hat{lnY}) = -0.039 + 0.128 \; lnK + 0.375 \; lnL_W + 0.489 \; lnL_B$$
$$\quad\quad (-0.40) \quad (2.35) \quad\quad (11.88) \quad\quad (10.72)$$

$$\quad - 0.166 \; lnM - 0.003 \; lnI - 0.012 \; ln\pi_E;$$
$$\quad\quad (-2.46) \quad\quad (-0.45) \quad\quad (-1.40)$$

$$\bar{R}^2 = 0.996$$

No suggestion of a disembodied effect of participation on productivity remains in these equations, since neither of the intercept terms are statistically different from zero. However, efficiency differences do now appear that are embodied in the productivity of the three factor inputs. The coefficients for the relevant variables in these equations show the proportional increase in output that would result from given increases in the input level of then each factor. To obtain an estimate

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[13] The Chow test yielded an F-value of 6.98, around four times the required critical value at the five per cent level.

of the actual increase in output that would result from a unit increase in each factor, (i.e. the marginal product) we multiply each coefficient by the average value of output per unit of the factor in question for each group. The estimated marginal products on this basis are:

	High Participation Firms	Low Participation Firms
Marginal Product of:		
Manual Workers (per hour)	13,87 DM	15,93 DM
Non-Manual Workers (per annum)	26029,— DM	33414,— DM
Capital (per 100 DM)	12,— DM	3,— DM

Thus labour productivity is higher in low participation firms, by some 15% for manual workers and 28% for non-manual workers. However, capital is four times as productive at the margin in high participation firms. This reversal is as we would expect from orthodox economic theory, in view of the relative scarcity of labour in the former, and capital in the latter. It may, however, be doubted that in determining unit costs the relatively modest excess labour productivity in low participation firms would outweigh the huge difference the other way in the productivity of capital. Moreover, when the statistical analysis was repeated for high and low participation firms classified according to the P_S index rather than P_1, manual worker productivity in low participation firms was only 13% higher; non-manual productivity was actually 8.8% less than in high participation firms; and capital productivity remained $3\frac{1}{3}$ times lower. Overall, these results generate a strong suspicion of lower overall performance in low participation firms, due either to the choice of over capital-intensive methods or the inefficient utilisation of capital or both.

This suspicion is confirmed by the evidence on overall performance in the two groups. Thus the high-participation firms on average outperformed the low group by 5%, 177% and 33% respectively in terms of output per man, output per unit of capital and profitability (rate of return on capital employed) over the period of our study.

The differences in the effectiveness of economic incentives as between participatory and non-participatory firms that were anticipated in our theoretical discussion come through strongly in the regression results reported above. Thus in the equation for high participation firms, all three of the relevant variables exert a positive influence on output, and the two coefficients related to group incentives, M and π_E, are statistically significant at the normal confidence levels. By contrast, in the low participation group all three coefficients are negative and one significantly so.

However, these differences were much less clearcut when the high- and low-participation groups were classified according to the P_S index. Then, the results for *both* groups were very similar to those for the low participation group in the equation reported above, with the

exception that the π_E coefficient was positive, though very small and insignificantly different from zero. In interpreting this result, it should be borne in mind that, with the change from the P_I to P_S variables, the division of the sample into high and low participation groups also changes. Then, it is not surprising that the incentive variables should lose their effects in the equation for the high participation group when P_S is used, since the criterion for inclusion is now participation over strategic issues, not payments systems and other job-related matters. Taken together the results seem to imply an asymmetry in the interaction between participation and group incentives: that incentives are effective only when participation covers work-related issues, but that participation (over strategic issues) can produce productivity gains other than via incentives.

The questionnaire returns yielded information on a number of other dimensions of economic performance. Much of this data has yet to be analysed in depth, but an initial survey suggests four preliminary conclusions.

First, there appears to be no difference between the high and low participation firms in either of two performance variables often used as proxies for "alienation" or job-discontent: absenteeism and quit rates. Thus, on this evidence, worker participation of the type under observation does not radically transform the work situation in a way or to a degree which is reflected in these variables. The only evidence which might conceivably be consistent with reduced alienation is that earnings were no higher in the larger, high-participation firms. The absence of a significant increase in wages with firm size was confirmed by a regression of hourly wage rates on relevant variables, and contrasts with Scherer's finding of a significant positive relationship between wage rates and establishment size,[15] which he associated with the need to pay more in large firms to offset the higher alienation levels to be expected there according to survey results. In fact wages were very uniform across our sample, and neither participation nor incentive variables had any significant effect. Amongst other things this suggests there is no evidence of workers taking a share of profit indirectly through higher negotiated wages.

Secondly, over the years 1972—76 of our data, which go from boom through recession to (partial) recovery, output at constant prices grew twice as fast in the low participation sample, although the high group itself turned in an above-average performance, leading GDP growth by four percentage points. Thus in this one respect the low participation firms have the better record — unless, that is we are witnessing worker participation acting as a constraint on the pursuit of growth as a managerial objective.[16] For beyond some limit, such growth would be excessive from the point of view of social welfare.

Thirdly, from 1972 to the recession year 1975 total employment fell by 12.1% in high participation firms, compared with only 9.8% in low participation firms. Unless explained wholly by technological factors

15) Scherer (1976).
16) See Baumol (1962) and Marris (1964).

associated with the greater capital-intensity of production in low participation firms, this is clearly at odds with the suggestions often made that worker participation will lead to what in management eyes appears as downward rigidity in manning levels, and appears to workers as greater job security.

Finally, over the five years to 1976 output per man rose by more than 17% in high participation firms compared with only 4.2% in the low group. So great was the difference that the productivity level ranking reversed over the five year period, high participation firms starting at only 93% of the level of output per man in low-participation firms, and finishing 5% above them. This is of interest for at least two reasons. First, as we have already observed, we know from other sources that the first half of the nineteen-seventies was a period in which there was a significant spread of worker participation in Germany. The relative growth of high-participation firms' productivity could, therefore, reflect growth in the development of participation itself. Secondly, the fact that the high participation firms began with lower output per man tends to discount the argument that might otherwise be put, that worker participation is a luxury which only the successful can afford, and that the in general superior performance we have observed in participatory firms stems from other causes.

5. CONCLUDING REMARKS

On the evidence available to us the participation and profit-sharing schemes adopted by AGP members have led to significant gains in their economic performance. These gains may even have been understated in our results. Bearing in mind the spread of participation that occurred in Germany during the period we studied, it may be that within our sample the introduction of participation has been quite recent. If so, the effects we have observed are unlikely to capture the impact of participation in full. In particular, at least some of the high participation firms are likely to have been experiencing transactions costs from the transition to more worker involvement: developing and learning to operate new decision-making routines and so forth. Then our estimates of the impact on efficiency would contain a systematic downward bias.

Our sample of firms all lie in the middle ground between classical firms and worker control. Although economic performance seems to increase most distinctly with participation and profit sharing in this region, it would not be legitimate to extrapolate this trend to these more extreme types of firm. Thus our results strictly do not permit a ranking of 'classical' co-operative and intermediate firms in terms of productive efficiency. They do, however, render untenable the argument that any degree of worker participation, whatever its advantages in terms of human aspirations and quality of working life, comes at a high price in terms of resource costs and efficiency loss, and this is of direct relevance to the policy measures now being taken in many countries to promote and extend industrial democracy in some form.

In view of the private efficiency gains found, it may seem surprising that such public policy measures should be needed, and that worker participation is not already more widespread. Indeed, critics[17] of industrial democracy argue, by analogy with the Darwinian principle of natural selection, that only efficient organisations will survive the rigors of competition. If participation has not become widespread in the course of industrialization, then it must be generally inefficient. Hence legislation encouraging any form of industrial democracy represents merely another step in the continuing erosion of property rights by using the power of the state through the political process to transfer wealth from owners of capital to special interest groups such as workers.[18]

However this critique has two main weaknesses. First the critics have tended to concentrate on one particular variant, namely codetermination. This — originally West German — system of union representation on supervisory boards seems to alter proprety rights in favour of labour, and certainly gives union officials new access to managerial information, if not the necessary majority to sway crucial decisions. Codetermination should thus enhance the "voice" channels of communication between unions and management which Freeman[19] has emphasized. However it is far from obvious that the bargaining 'power' of a union is thereby increased. In the steel industry, for example, there is evidence that the United Steel Workers of America has secured significant improvements in relative wages (at least for those with steady employment),[20] and done much better for its members than has its codetermining German counterpart. The latter recently called the first steel strike in fifty years, and union board-representatives have shown no tendency to act as radical redistributors.

Secondly, the critique fails to take into account the productivity-enhancing role of cooperation and participation. At the same time, there is a valid aspect to the critique of industrial democracy, concerned with its possible redistributive effects. Paradoxically, this has not been formulated clearly by the traditionalist critics, because of their failure to appreciate the full role of cooperation in production.[21]

For instance, it is not implausible that participation will reduce the (marginal) productivity of white-collar or administrative personnel below the level it would otherwise reach, as their exclusive decision-making power and access to information is modified. Some evidence of this may perhaps be seen in the lower coefficient (and implied marginal product) of white-collar workers in participatory firms in our regression results on page 18. As long as the earnings of particular

groups of workers bear some relation to their productivity, we would expect to find lower white-collar earnings where participation is high. In fact, in our sample of German firms we do not find that earnings of white- (or blue-) collar workers are significantly affected by participation. But this could simply reflect the rather rigid wage structure imposed by collective bargaining in West Germany in the short run, together with the relative novelty of participation schemes.

In the long run it must be regarded likely that organizational innovations which increase rank and file worker skills, whether directly connected with their newly acquired decision-making role or deriving from increased levels of industrial training made worthwhile in participatory environments, will lead to higher wages at the lower levels, commensurate with going market rates for the skills in question. Thus, even when the productivity of the organization as a whole rises, and some managerial and supervisory functions may decline in relative and even in absolute importance, and monetary rewards will decline with them. Managerial resistance to innovation of various kinds is therefore to be expected and is in fact both widespread and well-documented.[22]

And opposition from management would constitute a very significant barrier to the spread of participatory practices, given managements' key decision-making role in large, complex firms with widely dispersed shareholders.

The other group likely to suffer a diminution of role and consequent redistribution of power, status and ultimately earnings are union officials. Again, they have generally been opposed to decentralised participation and profit sharing schemes in practice. Cogent reasons for their opposition are not far to seek. Workers who share in both the making and the results of decisions can begin to approach the status of partners rather than employees - in the traditional master-servant relationship. At the very least, the negotiating role of unions vis-a-vis management in collective bargaining would be significantly modified if industrial partnership were practised widely.

In the face of opposition from influential groups likely to lose from the redistributive effects of participation, we may expect schemes to go forward only where little redistribution takes place.[23] The evidence on gains to workers from our study is fragmentary, and needs to be augmented in future work. But at present workers in the high participation firms do not appear to receive higher earnings, and the proportion of profits distributed to employees was generally quite tiny. Moreover, if quit rates and absenteeism are any guide, changes in

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[17] e.g. Pejovich (1978).

[18] Both the substance and the language of the critique in some ways recall classical arguments against »combinations« of workmen and unionisation in its earliest phases. It is therefore interesting to note that unionisation has been found to enhance productivity in the U.S., even where capital, training and various worker characteristics are controlled for (Brown and Medoff 1978).

[19] Freeman (1976), Freeman and Medoff (1979).

[20] See Challenge (1978).

[21] But see FitzRoy (1974) for an early version.

[22] For examples of revealing statements by managers see Rosenthal (1978). One manager who refused to allow distribution of a questionnaire observed (p. 38): "This company is democratic ... but when it comes to managerial decisions, every company is a dictatorship ... these questions are too socialistically inclined".

[23] It is probably also no accident that the experiments which have taken place have often been pioneered by owner entrepreneurs with democratic convictions. In addition, smaller firms are probably better suited for participation practices, especially insofar as they do not have complex managerial hierarchies or give rise to the same need for union representation of workers en masse as in large firms.

the quality of working life, reducing alienation, may have been undramatic, to say the least, while the evidence from employment statistics tends to point away from any significant increase in job security. If the gains to workers have in fact been as meagre as this suggests, and perceived to be so, workers elsewhere may understandably conclude they have little to gain from participation save higher reponsibilities. Thus, distorted signals of the potential effects of participation can result in the addition of worker disinterest to managerial and union opposition as impediments to the diffusion of participation.

More generally, all change generates costs, and the contractual reactions which define organisations like firms or unions can hardly be fundamentally altered without some redistribution of the benefits. When the gains are diffuse and their nature is not widely appreciated, but the costs appear well-defined and concentrated among those with most influence and most to lose in the existing hierarchy, then realization of net gains is inevitably a slow process. Thus some form of legislation may be both legitimate and essential to reap the efficiency gains from reducing monopolies in information processing and decision-making held by management and to some extent unions, and encouraging learning processes involved in productive cooperation and participation.

The design of policy measures to secure benefits from cooperation is clearly a complex matter, and requires much more research before legislation can be put on a scientific footing. But clearly the blanket enforcement of any rigid system, whether based on German codetermination practice or any other model, could inhibit the variety of organisational innovation conducive to individual initiative at grass root level. As we observed earlier, codetermination laws could have positive indirect effects on attitudes towards participatory practice. Conversely, ill designed or presented legal measures may be expected to generate contention and a climate of opinion ill-suited to informal cooperation and experimentation.

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KOOPERACIJA I PRODUKTIVNOST: NEKA ZAPADNONEMAČKA ISKUSTVA

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R e z i m e

U članku su prezentovani rezultati kvantitativne, ekonometrijske studije o participaciji zaposlenih u upravljanju i raspodeli dobiti u Zapadnoj Nemačkoj. Po mišljenju autora ova studija predstavlja prvo istraživanje te vrste o tendencijama »industrijske demokratije« u jednoj zapadnoj, kapitalističkoj ekonomiji i razlikuje se od uobičajenih "case study" pristupa. Studija ima preliminarni karakter pošto sadrži samo ograničeni broj podataka, uglavnom ekonomskih, iz malog uzorka manjih i srednjih preduzeća. Nijedno od tih preduzeća nije kooperativno preduzeće, ali uzorak u celini sadrži razne varijante participacije vezane kako za radna mesta tako i za »strateška« pitanja i raspodelu dobiti.

Glavni rezultati su ukazali na to da participacija snažno i veoma pozitivno utiče na produktivnost, kao i to da raspodela dobiti ima značajan pozitivan efekat na produktivnost u kombinaciji sa visokim stepenom participacije. Uz malu participaciju ovaj efekat je neznatan. Tradicionalni individualni stimulansi, kao što su akordne nadnice, imaju negativan efekat na produktivnost u kombinaciji sa visokim nivoom participacije dok inače nemaju značajnijeg (ni pozitivnog ni negativnog) efekta.

Dobijeni empirijski rezultati smešteni su u teoretski okvir motivisanosti i međusobnog delovanja gde participacija podstiče saradnju od strane zaposlenih, posebno onda kad oni učestvuju u nagrađivanju za posebna zalaganja. Posebni stimulansi mogu, međutim, da naruše saradnju time što podstiču razdorno rivalstvo, uskraćivanjem informacija saradnicima i drugim merama preko kojih se postižu lične koristi na račun zajednički ostvarenog učinka i efektivnosti.

Zatim se ukratko razmatraju prepreke širenju participacije radnika u upravljanju i »industrijske demokratije«. Čak i najmanji korak u tom pravcu može da ima posledice na deobu moći, informacija i bogatstva. Tradicionalno rukovodstvo može da smatra da su njegovi prerogativi ugroženi čak i onda kad postoji mogućnost da dođe do povećanja produktivnosti i organizacione efikasnosti. Ovakva situacija nalikuje na tradicionalno opiranje učlanjavanju u sindikate iako se pokazalo do bolje komuniciranje i saradnja u uslovima kolektivnih pregovaranja doprinose poboljšanju učinaka (performansi). Na kraju članka autori ukazuju na potrebu eksperimentisanja sa različitim organizacionim modifikacijama i inovacijama.

UTJECAJ TEHNOLOŠKOG NAPRETKA NA RAST DRUŠTVENOG PROIZVODA INDUSTRIJE*

Ante PULJIĆ**

UVOD

Utjecaj tehnološkog napretka na rast proizvodnje možemo mjeriti upotrebom različitih indeksa globalne proizvodnosti faktora proizvodnje i upotrebom različitih oblika funkcija proizvodnje.

Veličina indeksa globalne proizvodnosti izražava odnos indeksa proizvodnje i sume ponderiranih indeksa utrošaka faktora proizvodnje ili pak razliku između stope rasta proizvodnje i sume ponderiranih stopa rasta utrošaka faktora proizvodnje. Pri upotrebi indeksa globalne proizvodnosti obično se pretpostavlja da je konkurencija na tržištima faktora i proizvoda savršena. Ta pretpostavka omogućuje zamjenu fizičkih marginalnih proizvodnosti faktora njihovim cijenama i implicira konstantne prinose. U skladu s njom ponderi su udjeli faktora u proizvodu a njihova suma jednaka je jedinici.

Funkcija je proizvodnje analitički opis veze između utrošaka faktora proizvodnje i maksimalne količine proizvodnje u određenom vremenskom razmaku. Pri njenoj upotrebi često je suvišno pretpostavljati da na tržištima faktora i proizvoda vlada savršena konkurencija i s njom u skladu ograničiti se na konstantne prinose. Naprotiv, ocjenjivanjem njenih parametara možemo ispitati stupanj kunkurentnosti i saznati veličinu prinosa. Zbog toga su funkcije proizvodnje bolja analitička sredstva od indeksa globalne proizvodnosti. To ne znači da pri njihovoj upotrebi ne uskrsava mnoštvo problema.

Funkcija proizvodnje najčešće se sastoji od dvije multiplikativne funkcije od kojih je jedna eksponencijalna funkcija vremena. Nepoznati parametar funkcije vremena veličinu kojega ocjenjujemo, predočuje stopu utjecaja neopredmećenog tehnološkog napretka na rast proizvodnje. Taj napredak podjednako uvećava sve sastavne dijelove nekog faktora proizvodnje. Utjecaj opredmećenog tehnološkog napretka ogleda se u stopama povećanja djelotvornosti mlađih generacija