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FIRM PERFORMANCE:
EVIDENCE FROM GERMANY AND
BRITAIN**

by

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**Worker Participation and Firm Performance:
Evidence from Germany and Britain⁺**

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Abstract

This paper examines the Freeman-Lazear works council/worker involvement model against the empirical backdrop of two different industrial relations systems: the British voluntaristic system, and the German system of mandatory works councils. We find that in nonunion British firms worker involvement increases economic performance, but in the union firms there are negative effects. The implication is that local distributive conflict can cause the wrong level of worker involvement to be chosen, as predicted by the model. In Germany, where centralized collective bargaining reduces local distributive conflict, we find that a mandate can be advantageous, again as predicted by the model. However, the straitjacket of a mandate is shown to disadvantage small German firms.

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1. Introduction

This paper investigates the impact of the involvement of workers in their companies on various indicators of firm performance. A comparison is drawn between Germany, with its tradition of mandatory works councils, and Britain, long characterized by its voluntaristic system of industrial relations. The theoretical backdrop to this inquiry is the influential model of direct participation offered by Freeman and Lazear (1995).

Interest in worker participation is at an all-time high, and the influence of the German institution is palpable. Practical manifestations are the works council directive enacted into law by the European Commission (Official Journal, 1994), establishing multinational works councils in European-level enterprises, and a backlog of more thorough-going participation initiatives including the proposed European Company Statute and the draft Fifth Directive on Company Law (Addison and Siebert, 1997). Even in the United States, stimulated by a precipitous decline in private-sector unionism, the recent Commission on the Future of Worker-Management Relations (1994a, 1994b) actively considered adoption of German-type participative institutions.

A comparison of the effect of German works councils with analogous though less authoritative institutions in Britain (in the form of consultation and joint consultative committees) allows one to consider a number of questions raised in the participation literature. Specifically, the distinction between endogenously chosen (the U.K.) and mandatory worker participation (Germany) assists in guiding the measurement of effects of participation on firm performance. At same time, comparison of the two countries addresses concerns having to do with the alleged shortfall of participation in regular markets that have motivated much of the policy debate.

The plan of the paper is as follows. Section 2 presents a modified version of the Freeman-Lazear model to fix ideas as to the relation between worker involvement and the relevant dimensions of firm performance. Section 3 provides institutional detail. The datasets employed, the WIRS and the Hannover Firm Panel, are reviewed in Section 4, together with the equation specifications. Section 5 charts the impact of the participative

institutions on measures of firm productivity, profitability, wages, and employment. An interpretative section concludes.

2. Theoretical Conjectures

Our starting point is the model of the works council provided by Freeman and Lazear (1995). Figure 1 is a modification of their basic diagram. The model we present is somewhat more general, relating as it does the intensity of structured "worker involvement," rather than works council power, to the total surplus of the enterprise. Specifically, the $R(x)$ function maps this joint surplus against the level of worker involvement, x . As shown, although an absence of any formal worker involvement is consistent with some positive surplus, the introduction of increasingly structured forms of involvement yields increases in surplus, at least up to some point. Accordingly, $R(x)$ has an inverted-U shape. We add flesh to this barebones concept of "structured worker involvement," and the forms it takes in Britain and Germany in section 3.

[Figure 1 near here]

More specifically, Freeman and Lazear argue that the joint surplus will increase with worker involvement both because management and labor have nonoverlapping relevant information sets and by reason of the creativity of discussion. Thus, for example, the provision of objective information by the firm increases efficiency by facilitating worker cooperation in tough times when labor might otherwise be disinclined to believe management assertions as to the state of nature. Similarly, the disclosure of private information by the worker side raises the joint surplus. Proceeding one stage further than information disclosure per se, consultation allows new solutions to production and other workplace problems because discussion is creative. Additionally, participation or codetermination is said to provide workers with greater security, thereby encouraging them to take a longer view of the prospects of the firm. These are the advantages. The downside is that worker involvement has the disadvantage that it delays decisionmaking. A further disadvantage noted by Freeman and Lazear (1995, 29) is that as worker involvement increases there comes a point where "management does not have enough control over decisions." For both reasons, there is thus some optimum level of worker

involvement, x^* in the figure. If the $R(x)$ function did not have a maximum, then the issue of choosing the degree of worker involvement would not arise.

Decisions about the desired amount of worker involvement are determined not only by the $R(x)$ function, but also by distributional considerations. Freeman and Lazear appeal to standard results in bargaining theory and argue that the worker share in the surplus, $s(x)$, increases as x increases. Put simply, knowledge is power. As the workers' knowledge increases, so too must their share. Thus, information disclosure by management is a two-edged sword. On the one hand, it validates management's claims as to the state of nature but on the other it potentially facilitates rent seeking on the part of workers. Similarly, workers will only divulge their private information to management if they have some say in how that information is used (Freeman and Lazear, 1995, 39). Greater worker involvement on these lines means less management discretion. Accordingly, worker share in the surplus may be expected to rise.

The second bold curve in Figure 1 shows the firm's profits $F(x)$, as a function of worker involvement. Because of the assumption that the worker share increases with worker involvement, $F(x)$ peaks before $R(x)$ does. As a result, there will be an under-provision of worker involvement, x_t . This result is used by Freeman and Lazear as a justification for a participation mandate; specifically, one that guarantees x^* .

Implicit in Freeman and Lazear's treatment is a further profit function, $G(x)$, shown by the dashed line in Figure 1. $G(x)$ is predicated on a different $s(x)$ function - a smaller increase in the workers' share as worker involvement increases, made possible by a partial decoupling of production and distribution. Such a decoupling is achievable, they argue (Freeman and Lazear, 1995, 32), in regimes where wages are determined outside the firm under centralized collective bargaining (or, we would add, an absence of collective bargaining). It can be seen that the maximum of this curve is closer to the participation optimum. In this situation, a mandate of x^* will increase participation, but less necessary than where there is the local distributive bargaining underlying $F(x)$.

Next, turning to the worker side, where there is no local bargaining (corresponding to profit function $G(x)$), worker choices are irrelevant. However, in the more general case, worker choices will matter. For example, given the profit function $F(x)$, if workers could choose the amount of worker involvement, they would select x_w . At x_w the difference between $R(x)$ and $F(x)$ is maximized, with workers seeking to maximize their share of the joint surplus. This exceeds the socially optimal level of worker involvement, just as management's choice fell short of that level. If worker involvement is the subject of bargaining, the outcome will lie between x_w and x_r , according to relative bargaining power. As can be seen, such bargaining can result in increases or decreases in the joint surplus.

In sum, without collective bargaining, the degree of worker involvement is more likely to be close to the social optimum than with it. To repeat, the relevant profit function for this case is the $G(x)$ function, the peak of which lies closer to x^* than does that of the $F(x)$ function. With centralized bargaining the position is similar, if we accept that centralization means that there is less scope for distributive bargaining at local level. The situation is least predictable from an efficiency perspective if there are strong unions together with local bargaining rights because the $F(x)$ profit function now applies. The introduction of a mandate requiring x^* worker involvement will here have a more marked effect on firm profit than in union-free environments or situations of centralized bargaining.

We are now in a position to summarize the predictions of the theory. In union-free environments:

- (a) the level of worker involvement will be chosen so that the total surplus is close to the optimum, x^* ;
 - (b) an increase in worker involvement will only be adopted if it increases profit and consequently total surplus. (Of course, for there to be an increase in worker involvement the prior level must have been rendered inappropriate by changing circumstances.)
- Changes in worker involvement are therefore expected to be directly linked to changes in total surplus.

And for union regimes with local distributive bargaining:

- (a) the level of worker involvement is unlikely to be chosen so that total surplus is at or near a maximum;
- (b) any observed increase in worker involvement need not be accompanied by increases in total surplus, but will be associated with a decline in profitability. Again, however, we should look to a relationship between changes in variables.

Particularly in the nonunion case, because the choice of the amount of worker involvement is endogenous - and distributive bargaining is no threat (curve $G(x)$ applies) - we do not expect a link between the level of this variable and the level of the joint surplus. Nonunion firms are managed so as to achieve near-maximum total surplus. Whatever level of worker involvement, be it high or low, that is necessary to achieve such performance will already have been chosen by management. Thus we expect no link between levels here. For unionized firms, on the other hand, the situation is more complicated because of the joint nature of control. Too high a level of worker involvement would be revealed by a negative association between the level of worker involvement and the level of total surplus.

A comparison of levels can be expected to be informative where worker involvement is at least partly outside the control of the firm, as in Germany. In the German case, works councils are mandatory but not automatic; they have to be activated by the worker side. Workers can be expected to choose a works council if it increases their share of the joint surplus. Where observed, therefore, works councils should be associated with lower profitability. As far as total surplus is concerned, an appropriately chosen mandate - where this is possible - should increase it.

In reality, a mandate has to confront the problem of firm heterogeneity. A diagram such as Figure 1 can be drawn for each firm. There is no reason to expect the maximum of $R(x)$ to correspond to the same level of worker involvement in each case. Most obviously, large firms are more likely to benefit from the structured worker involvement implied by a works council than their smaller counterparts: x^* will be higher for large than

small firms. The implication is that although total surplus in large firms could be increased by a works council mandate, this is unlikely to obtain in small firms.

3. Institutional Framework

We think of structured worker involvement as a continuum, ranging from information provision through consultation to participation/codetermination. The mechanisms whereby worker involvement is furthered, and the role of government, are of course quite different in the two countries. We begin our discussion with the German case, often regarded as the exemplar of industrial democracy and hence located at the upper bound of the continuum.

In Germany, information, consultation, and participation are formally prescribed by law and enshrined in the apparatus of the Works Council (*Betriebsrat*).¹ This body shares some similarities with its British "counterpart," the joint consultative committee, described below, even if the latter is nowhere near as authoritative.

Although the German works council is mandatory, it is not automatic. First there is a size threshold of five permanent employees, all of whom must be at least 18 years of age and three of whom must have at least six months' service. Second, a works council must be elected. Just three employees with voting rights (namely, 18-year olds and above), or a trade union represented in the establishment, are needed to call for a works meeting to elect an electoral board, which is then responsible for holding the election.² Once this procedure is activated, the works council is a fait accompli.

The works council is elected by the entire labor force, with the exception of employers and senior executives. All employees with voting rights are entitled to submit lists of candidates provided these have the support of at least 5 percent of employees. Unions may submit a list of candidates without having to meet this minimum requirement; union lists must be signed by two representatives. Wage earners and salaried employees may have separate or, as is increasingly the norm, joint lists of candidates. Elections are direct and by secret ballot, with winners elected on the basis of proportional representation from these lists.

The law fixes the size of the works council, which ranges from one to thirty-one members for establishments with up to 9,000 employees. For larger establishments, two additional members are added for each increment of 3,000 employees.³ The expenses of the works council apparatus are borne by the employer, including release time for part-time councillors and the wages of full-time councillors. The number of the latter is a function of the employment size of the plant.⁴ As we shall see, the influence of the works council also depends (in part) on plant size, so that it is not strictly correct to refer to the German legislation as a one-size-fits-all mandate.

Turning therefore to the rules governing the information, consultation, and codetermination rights of works councils, the employer has first to provide the works council with both timely and "comprehensive" information to enable it to discharge its general duties and on specific matters relating to manpower planning and the introduction of new technology and production processes. The quantity of information (and consultation) is a function of establishment size. Thus, in establishments with more than 20 employees, information must be given "in full and in good time" on reductions in operations and the introduction of new working methods, *inter al.*, and in plants with more than 100 employees an economic committee must be set up. This standing body, appointed by the works council, has to be fully informed on the current and future economic situation of the firm and be supplied with all relevant economic and financial information.

Consultation rights for their part cover planned structural alterations to the plant and prospective changes in equipment and working methods that affect job requirements, all decisions relating to manpower planning, and individual dismissals. In the latter case, failure to consult results in the dismissal being rendered null and void.

The hallmark of the German institution, however, is its codetermination rights over "social matters." These include the commencement and termination of working hours; the regulation of overtime and reduced working hours; leave arrangements; the introduction and use of technical devices to monitor employee performance; remuneration arrangements, including the fixing of job and bonus rates and other forms of performance

related pay; and health and safety measures. Failure to reach agreement in any of these areas leads to their adjudication through a formal conciliation apparatus.

Where the establishment normally employs more than 20 employees with voting rights, the works council also has a set of somewhat weaker consent rights covering the engagement, grading/regrading, and transfer of workers within the firm. Consent rights also obtain in the case of individual dismissals, noted earlier. If the works council withholds its consent, however, the employer can apply to the labor court for a decision in lieu of that consent.

The works council can negotiate social compensation plans (*Sozialpläne*) and works agreements (*Betriebsvereinbarungen*). In all plants normally employing more than 20 employees, works councils have separate rights to demand compensation for the dislocation caused by plant closings, major changes in organization, and the like. Social plans may be regarded as a special case of works agreements. The latter cannot cover remuneration and other conditions of employment unless expressly authorized under the relevant industry/regional collective agreement. In fact, framework agreements at industry level have increasingly made provision for their implementation at local level. But beyond this, there is every indication that bilateral plant level agreements have in practice ranged well beyond those prescribed by the law (Müller-Jentsch, 1995, 60-61). This proliferation of works agreements might therefore hint at rent seeking behavior, although such behavior can clearly find expression outside of formal agreement.⁵

A final issue is the relation between works councils and unions per se. Works councils are formally independent of unions, but the links between the two have become increasingly close. Today not only are the large majority of works councillors union members (74 percent) but some two-thirds are also union nominees (Niederhoff, 1995). Although union density is not a datum in works council regimes, we were unable to exploit this variation in our empirical analysis of the German data (see below).⁶

The British case is more briefly dealt with given the traditional voluntaristic approach towards worker involvement.⁷ The forms taken by worker involvement are

much less well-defined than in Germany and we have been guided in our measurements primarily by the information available in the dataset, the Workplace Industrial Relations Survey (WIRS), on which more below. We shall distinguish between formal and informal involvement, drawing on section L ("Consultation and Communication") of the survey questionnaire. Under the heading of formal methods of involvement, our main measure is obtained from question L1, namely, whether the establishment has a joint manager-employee committee "primarily concerned with consultation rather than negotiation" (and excluding committees dealing with single issues such as health and safety). We shall refer to these bodies as "joint consultative committees" (JCCs). Under the informal heading, our measure relies on question L19, namely, whether management uses regular meetings to "communicate or consult with their employees". These regular meetings include "quality circles," other problem-solving groups, and "briefing groups". The survey identifies other dimensions of communication and consultation, including the topics considered at the meetings, but these are not exploited in the present treatment (but for further analysis, see Siebert and Wei, 1996).

JCCs are almost as prevalent in union as nonunion establishments, according to the WIRS data. Among establishments recognising unions, about 20 percent have JCCs in our sample; the corresponding figure for nonunion establishments is 18 percent. Regular meetings to communicate or consult - our informal measure - are somewhat more prevalent in union establishments (74 percent) than nonunion (61 percent).

As was argued in section 2, it is important to consider not only levels of but also changes in communication and consultation in the British case (where communication and consultation are endogenous to a greater extent than in Germany). Unfortunately, the WIRS considers only positive changes (that is, increases), namely, "any change within the last 3 years with the aim of increasing employee involvement in the operation of the enterprise" (question L23). Again we focus on JCCs and regular informal meetings. Increases in JCCs include reorganization, or the setting up of a new committee, while increases in meetings include more meetings for the purposes of general consultation, on production or productivity, and for discussion/communication of other topics including job appraisal.

In this paper, therefore, measurement of worker involvement in British firms boils down to the machinery of a joint consultative council (JCC) and/or regular meetings to communicate or consult with employees. Both of these are zero-one dummies. They are used in level and change form. In the German case, the measure of worker involvement is whether the firm has a works council. For Britain, we also construct an index of worker involvement (INV) taking the value of 0 if there is neither a JCC nor regular communication/consultation meetings, of 1 where there are just communication/consultation meetings, of 2 if there is only a JCC, and of 3 if there are both meetings and a JCC. An analogous index of change in worker involvement (NEWINV) is also used, based on changes in communication/consultation meetings and/or JCCs. The index of change in worker involvement is appropriate when the dependent variable is measured in change form.

4. Data and Specification

Our British dataset is the 1990 WIRS, a survey within England, Scotland and Wales of 2,061 establishments employing 25 or more workers. The response rate was 83 percent. (See Millward et al., 1992, for a complete description of this survey and information on its precursors of 1984 and 1980.) Larger workplaces were oversampled by design and all our results make use the weights included in WIRS to make them representative of the national sample of establishments. The sample is restricted to private nonagricultural establishments. The sample is 863 for the employment change equations, but falls to around 500 when the other measures of performance are used due to missing values.

For the analysis of the British data, we emphasize the union-nonunion distinction. This distinction is based upon whether establishments have a written agreement recognizing unions, either manual or nonmanual, for the purposes of negotiating pay and conditions of employment. Our samples are split almost equally between union and nonunion establishments.

The German data used in this inquiry were taken from the first wave (conducted in 1994) of a panel study investigating various aspects of firm behavior and performance.

The research project, the Hannover Firm Panel, comprises four annual waves (see below). The population covered encompasses all manufacturing establishments with at least five employees in the province of Lower Saxony. The sample of establishments is stratified according to firm size and industry, with oversampling of larger firms.⁸

As with the WIRS, interviews were held with the owner or top manager of the establishment, often assisted by personnel management in the larger firms. Some 1,025 establishments or 51 percent of all those approached agreed to take part in the first wave. Despite the high attrition rate, the deviation between the actual and planned stratification is relatively small.

The questionnaire used in the survey asks approximately 90 numbered questions. The questions vary by wave. The first and the third waves focus squarely on labour market issues, whereas the second and fourth waves - which omit the works council question - focus rather more on international issues. Themes addressed in the former waves include personnel structure and development, wages and salaries, working time, the determinants of employment, and firm performance.⁹

Although the item response rate is relatively high for most questions in the survey, almost one-third of the sample (318 establishments) responded that they did not know the level of workplace union density. Furthermore, inspection of the data led us to question the accuracy of the positive responses (on which, see Addison, Schnabel, and Wagner, 1992b). In the circumstances, we determined that it would be misleading to provide estimates of the association between union density and the outcome indicators. This is unfortunate because union density might usefully augment the dummy variable indicating the presence or otherwise of a works council in the outcome equations. That said, unlike the British case, the union-nonunion distinction does not motivate the German analysis which instead focuses on differences between small and large establishments.

It is important to note that, despite their mandatory nature, in weighted terms works councils occur in just 20.1 percent of the German establishments, even if these do

account for the lion's share, 73.4 percent, of employment. Similar results have been reported by Frick and Sadowski (1995) in an employment-based survey of establishments.

Turning next to the issue of specification, we first review our four outcome variables. Broadly speaking, apart from the fact that three of the four outcome indicators are in levels for Germany (not inappropriate in terms of the applied theoretical model in section 2 given "mandatory participation"), we were able to achieve reasonable correspondence between the performance equations for the two countries. The most notable difference is that the German productivity variable is a continuous measure of value added per worker unlike its British productivity change counterpart, which is a subjectively defined five-category measure (derived from the manager's answer to the question "In your opinion how does the level of labour productivity here compare with what it was 3 years ago?").¹⁰ The dependent variable in the German wage equation is the wage and salary bill divided by the number of employees, similar to the British measure, also in levels, which is a weighted average calculated over separate skill categories.¹¹ The three-category relative profit measure is to all intents and purposes the same for the two countries (derived from the answer to the question "How would you assess the financial performance of this establishment compared with other establishments in the same industry?"). Likewise, the employment change variable for Germany closely corresponds to that for Britain, each being calculated over a three year interval.

Our key independent variables are of course the participation measures. We earlier commented in some detail on the British measures of formal and informal worker involvement, as well as the construction of an index fashioned out of each. We also described our measures of the changes in worker involvement. By contrast the German measure is simpler and blunter: a single dummy variable signifying the presence or otherwise of a works council. The German dataset does not allow us to distinguish between possible "types" of works councils. Given that the powers of the works council do vary formally (and likely in practice also) by establishment size (see section 3), however, we present results for the total sample and for a subsample of smaller establishments employing between 21 and 100 employees. The lower probability of

observing works councils among such smaller firms provides additional grounds for this sample construction.

There are clearly many other factors that affect both levels of and changes in firm performance and we need to control for these. At root, firm performance must be determined by management ability or good fortune. The variables included in our performance equations can be thought of as more or less adequately proxying these elusive qualities. Performance will also be determined by cyclical factors, and by the degree of risk of the industry.

Our controls for the German and British samples are similar, although of course we are constrained by the data at our disposal. (A comparable set of controls is used in Fernie and Metcalf, 1995.) In addition to broad industry dummies (9 in the case of Britain, 31 in the case of Germany), we control for several characteristics of the workforce such as the importance of female workers, part timers, skilled manual workers, and shiftworkers. These proportions might be thought of as picking up factors relating to the cyclicality and/or riskiness of the establishment's market, so that in general - outside of the wage equation - we have no clear-cut priors. For example, a establishment using many part timers might be subject to cyclical demand changes. If mistakes are more likely to be made in such situations, then performance could be adversely affected. A further variable falling within this category is whether or not the establishment produces a product primarily for export.

Variables more directly related to management ability include, firstly, the age of the establishment. (Note that establishment age in the German sample is not continuous since the survey only records whether the establishment was set up before 1960.) The age variable might pick up the possibility that the newer entrants have the better ideas. Alternatively, the long-lived establishments might have proven management, so that the outcome could go either way. Secondly, the payment system variables - namely, the use of payment by results for some sections of the workforce, and the use of profit-sharing schemes - might indicate a forward-looking management, keen to experiment.¹² A similar argument justifies the inclusion of the technology variable, indicating the use of automated

or "state of the art" plant and equipment. In the British case, we are also able to include a union density variable which is relevant because it could constrain experimentation. (Note, this variable is also relevant for nonunion establishments; even if they do not recognize unions for collective bargaining purposes, they will still have union members.)

Thirdly, market dominance might signal managerial ability - as well as the possibility of monopoly rents. We control for market dominance in several ways: establishment size, whether the establishment is part of a multi-plant firm, and whether the establishment has few competitors. Managers in smaller establishments might also have different tastes - a desire for "independence" - which could translate into lower performance.

Finally, the German dataset offers possibilities of further variables that are specific to individual outcome equations. For the profit equation, there are dummies denoting, in the opinion of the management respondent, excessive wage and nonwage costs. And in the employment change equation, there are dummies identifying short-time working and wages exceeding those set in the industry tariff agreement. For the wage (and value-added) equation(s) the length of the average working week also enters as a regressor. A capacity utilization measure proxying demand conditions is furthermore incorporated in the value-added, profit, and employment change equations, where a direct association is expected. The variable takes the form of an index constructed from responses to a six-element categorical question in the survey, the lowest value of the index characterizing capacity utilization of less than 85 percent.

5. Findings

Summary findings for Germany and Britain are presented in Table 1. Full results for Britain are contained in Tables 2 through 5, distinguishing between nonunion and union establishments. Detailed findings for Germany are given in Tables 6 through 9, this time distinguishing smaller establishments from the full sample. Broadly speaking, the British results for the index measure of information and consultation suggest that worker involvement tends to have positive effects in nonunion establishments, but insignificant to negative effects in the union group. For Germany, any favorable impact of works councils

is confined to the full sample. We next consider these results and their implications in more detail.

[Table 1 near here]

Britain. Taking the British evidence first, consider the results for the labor productivity change measure, which we take to be closely related to the joint surplus. From the first two columns of Table 2 it can be seen that in the nonunion case changes in both formal and informal communication and consultation produce the anticipated positive coefficient estimates for both formal and informal communication, whether the variables are taken separately or as an ordered index.

[Tables 2 and 3 near here]

Yet for the union establishments, Table 3 indicates that there is no significant effect of either type of communication and consultation, or for the ordered index. We interpret these results as indicating that competitive pressures cause nonunion establishments to adopt beneficial changes in communication and consultation, but that there is no sign of this phenomenon in union establishments.

The picture is similar, though less clear-cut, for the employment change variable, while recognizing that employment change is not such a good indicator of movements in the joint surplus. As can be seen from the last column of Table 2, for nonunion establishments the coefficient estimate for the formal communication and consultation change measure is positive but statistically insignificant, while that for the informal variant is positive and statistically significant. Combining formal and informal measures into an index (see the third column of Table 2) yields a highly statistically significant positive coefficient estimate.

For union establishments (the last two columns in Table 3), there are opposing effects: increases in formal communication and consultation are associated with negative

employment changes, while increases in the informal type seem to be beneficial. Nevertheless, the ordered index shows a significantly negative association.

[Tables 4 and 5 near here]

As for the level of financial performance, the communication and consultation variables as well as the index - now all in levels - are generally insignificant for the nonunion sample. These results are reported in the first two columns of Table 4, and accord with our priors: management in nonunion firms chooses levels of worker involvement, high or low, so as to achieve near-maximum performance. However, in the sample of union establishments, by contrast, there are clear signs of a negative effect for the various measures of worker involvement (see the first two columns of Table 5). Most notably, the results for the ordered index indicate a sharply negative effect.

Broadly speaking, the wage results are the other side of the financial performance coin. That is to say, worker involvement appears to raise wages in nonunion establishments but to have no discernible impact among their union counterparts. On the whole, these results are favorable to the view that, because the level of worker involvement is chosen to optimize performance in the nonunion establishment, there can be no association between that magnitude and the level of plant performance. However, in union establishments too much worker involvement could well be chosen.

Space constraints prevent much discussion of the coefficients for the control variables. Focusing therefore on the productivity growth equation, we note that this measure of performance is higher for older establishments, within establishments operating a payment-by-results scheme and/or a profit-sharing scheme, and among establishments with lower union density. These results tend to obtain across union and nonunion regime alike.

These British results are likely to be compared with those of Fernie and Metcalf (1995). (See also Kersley and Martin, 1995.) However, our treatment differs in comparing changes over time in performance with changes over time in worker

involvement. This enables us focus on a given establishment's decisions through time, rather than comparing different establishments (which we see as essentially noncomparable in the British case, at least in nonunion establishments, given the endogenous nature of the worker involvement). We also emphasize the different decision processes in nonunion and union establishments, and the zone of indeterminacy that surrounds decisions on worker involvement in the latter.

Germany. The German results are presented in Tables 6 through 9. Throughout a distinction is drawn between the full sample and a subsample of smaller firms employing between 21 and 100 workers.¹³ Among the latter, roughly one-half of the firms have works councils, and the statutory powers of the works council are a datum. Unlike the British case, it will be recalled that the impact of the works council is measured by the coefficient estimate on a simple dichotomous variable indicating the presence or otherwise of a works council. The limitation of this participation covariate - in addition to its bluntness - is that, for our sample at least, all firms with 1,000 or more employees have works councils. Unfortunately, with this dataset we are unable to construct an index of worker involvement (although for one such attempt with German data, see Addison and Wagner, 1997) or otherwise distinguish between "types" of works council. In any event, it remains true that the powers of the works council exceed those of a British JCC.

[Table 6 near here]

We next discuss the productivity, employment change, profitability, and wage results in turn. Beginning with value-added per worker, the most notable result from Table 6 is the difference in works council impact as between the full sample and the smaller firm subsample. For the former, works councils are associated with higher productivity. No such relation is found among smaller firms. For larger firms, then, it appears that the benefits attributed to works councils by their proponents are real. One interpretation would be that large firms need councils - or analogous forms of governance apparatus - to overcome the problems emphasized by the collective voice model, stemming from the public goods nature of the workplace. Smaller firms, on the other hand, may face altogether less difficulty in ascertaining worker preferences and in

monitoring worker effort. Despite this difference, the results are at odds with early studies of works council impact that pointed to significantly lower (total factor) productivity in works council regimes (e.g. FitzRoy and Kraft, 1987).

[Tables 7 and 8 near here]

The employment effects of German works councils, charted in Table 7, do not offer any evidence of classic insider behavior. The association between works council presence and employment change 1991-94 is negative, but the coefficient estimate is poorly determined.

Table 8 gives the German results for profits. The depressing effect of works councils on this relative profitability measure is found for the total sample and the smaller firm subsample alike. A similar result - this time using the ratio of cash flow to capital rather than a subjective, self-reported measure - was indeed reported in the early literature (see FitzRoy and Kraft, 1985). On these results, there is some indication of distributive bargaining.¹⁴

[Table 9 near here]

Table 9 gives the fitted wage equation and casts further light on the profitability results. Works councils can be seen to be associated with significantly higher earnings, other things being equal, and across all firms. It is not clear from inspection of the data exactly how this wage advantage is secured - whether through local settlements exceeding the industry tariff agreement or via wage (group) drift - but the result again underscores the interpretation of the profit effect as redistributive rather than, say, the outcome of cumbersome consultative procedures.

Finally, regarding the effects of the other covariates, among the more interesting results are the following: the positive effects on value-added per employee of profit-sharing schemes for managers (if not for the generality of employees) and of the proportion of workers with a polytechnic/university degree (if not the proportion of skilled

blue-collar workers); the adverse effect of nonwage labor costs on profitability; the role of high-tech in stimulating employment growth; and, finally, the insignificance of firm size in wage determination and indeed, more generally.

6. Conclusions

The Freeman-Lazear model, suitably modified to take account of union presence and distributive bargaining, appears consistent with the British evidence. The summary results of Table 1 suggest clearly that in the nonunion firm appropriate levels of worker involvement are chosen. However, in the union firm worker involvement seems to have negative effects. Our interpretation here is that the wrong level of involvement is chosen because of distributive conflict, as might be predicted from the Freeman-Lazear model.

The German results are more complicated. Large establishments with works councils appear to have higher productivity. The problem here is the presence of consistently higher earnings in works council regimes and the absence of any productivity effect in the small establishment sample. Consistently higher earnings across the spectrum of works council establishments points to rent seeking behavior, even if this phenomenon does not seem to be accompanied by slower employment growth. In larger establishments with works councils, the issue is whether higher productivity offsets the profit effect (anticipated by the model) to yield higher total surplus. With the data at our disposal we cannot answer this question definitively.

For small establishments with works councils, we can rule out any increase in joint surplus because of the combination of lower profitability and no increase in the value-added productivity measure. Smaller establishments might therefore be well advised to consider whether there are practical alternatives to works councils, that is, measures that reduce the demand for such representation among the workforce. We are currently far from being able to identify such factors with any precision.¹⁵

It follows that in both the cases of large and small establishments further progress in analyzing the impact of works councils on efficiency requires additional data to

enable the researcher to get a better handle on total surplus. Even armed with such information, the story does not end here because of possible works council effects on firm investments in tangible and intangible capital. That is to say, even if output is unchanged in the cross section, the effect of rent seeking on investment - via a capture of the quasi-rents to long-lived, relation-specific capital - may serve to lower efficiency (Hirsch, 1991). Admittedly the limited data relating to investment behavior available to us in the Hannover Firm Panel (concerning the introduction of new products and production processes in the preceding year) does not indicate that such investments are less in works council regimes, irrespective of the size of the establishment. But this falls far short of a conclusive test.¹⁶

And yet the bottom line is not that participation should be mandated. Participation seems to work in the British case on a voluntaristic basis, the hallmark of that system's industrial relations tradition. If we argue that union regimes provide a setting analogous to a mandate, then clearly the suggestion from the British evidence is that mandates do not work. Participation is of course mandated in Germany and, given that nation's centralised industrial relations system - which tends to limit if not remove distributive bargaining at firm level - it could be argued that the Germans may have not got it far wrong. The mandate at least in terms of the basic legislation dating back to 1952 (if not 1972) might be seen as reflecting the interests of the two sides of industry, at least in large firms.

But there are nagging worries about the "intrusiveness" of worker involvement set by the German mandate - again, a reference to the smaller firm results. Our main conclusion must be that it is local distributive bargaining which causes inappropriate levels of worker involvement, just as predicted by the Lazear-Freeman model. A mandate is not an easy solution to this problem given the heterogeneity of firms.

Endnotes

1. The following discussion abstracts from worker representation on the supervisory boards of companies. But it should be noted that three-quarters of the elected workforce representatives on company boards covered by the 1976 Codetermination Act are also members of the works council. For an English translation of the legislation described here, the Works Constitution Act of 1972, as amended in 1989, see The Federal Minister of Labour and Social Affairs (1990).
2. The union has only to claim that it has at least one member in the plant; no formal registration procedure is required, and the identity of the union member does not have to be disclosed.
3. The legislation also automatically provides for "central works councils" in companies with more than one plant and for the election of "combine councils" in groups of companies.
4. For example, in establishments with between 300 and 600 employees, one (of the 9) works councillors is released from any work duties, whereas in plants with, say, 9,001-10,000 employees eleven (of the 31) councillors are full time.
5. It should also be noted that the works council is explicitly held to a "peace obligation" and cannot therefore withdraw labor.
6. For one study of the union-works council nexus, see Müller-Jentsch (1995) 64-65.
7. The main laws are the Employment Act of 1982 which simply requires companies with over 250 employees to state annually in their company reports the initiatives they have taken to promote employee involvement, and the Finance Act of 1978 - and its successors - giving tax concessions to companies allocating shares to staff on an all-employee basis (see Hyman and Mason, 1995).
8. Full information on the sampling frame, interviews, and data editing procedure are provided in Infratest Sozialforschung (1995).
9. English translations of the first and second wave survey questionnaires are contained in Brand et al. (1996). We note parenthetically that because of negligible changes in works council status between the first and second waves, we were unable to exploit the panel character of the data.

10. Where the dependent variable is categorical rather than continuous we use the ordered probit estimator (Maddala, 1983).
11. Median establishment weekly pay data are available from the WIRS for three manual occupational categories. From these median values, we calculate a manual worker pay average for individual establishments using the employment proportions as weights.
12. It has been argued in the German case that profit sharing for workers is an alternative form of worker "participation" available to more efficient managers, enabling them to sidestep the paraphernalia and delayed decisionmaking of a council. Also, profit sharing for managers has been identified with a more consensual management approach seeking compromise, and thereby lessening the need for workers to elect works councils on defensive grounds. On these arguments, see Addison, Schnabel, and Wagner (1997b).
13. We also experimented with a subsample of firms employing 10-249 workers. The main findings with respect to works council impact were unaffected. Full results are available from the authors upon request.
14. In the German dataset we also have access to an absolute profit measure, again based on a self-reported, five-element categorical measure. Grouping these categories in similar fashion as for the relative (to other firms) profit measure and rerunning the equation in Table 8 strongly confirmed the negative association between works council presence and profitability. (See also Addison, Schnabel, and Wagner, 1997a.)
15. Although we have elsewhere reported that teamwork is associated with a lower probability of observing a works council, which might hint at the presence of real alternatives (see Addison, Schnabel, and Wagner, 1997b).
16. More negative evidence, on the basis of actual investments in physical capital, albeit for a much smaller sample, is reported in Addison, Kraft, and Wagner (1993).

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Figure 1: Worker Involvement, Total Surplus, and Profit

Table 1: Summary Results for Germany and Britain of the Effects of Worker Involvement on Firm Performance and Wages

Germany - works council effect		
	All establishments	Establishments with 21-100 employees
Value-added per worker	positive (5%)	insig
Employment change	insig	insig
Profit level	negative (1%)	negative (1%)
Wage level	positive (1%)	positive (1%)
Britain - index of information and joint consultation effect		
	Union establishments	Nonunion establishments
Labor productivity change	insig	positive (1%)
Employment change	negative (1%)	positive (5%)
Profit level	negative (1%)	insig
Wage level	insig	positive (1%)

Notes: The table gives the sign of the coefficient estimate on the works council dummy for Germany and on the index measure of information and joint consultation (levels or changes) for Britain. The figures in parentheses denote significance levels. Union establishments in Britain are defined as those with a written agreement recognizing either manual or nonmanual unions for negotiating pay and conditions of employment; nonunion establishments, as defined, do not necessarily record zero union density.

Source: Tables 2-9.

Table 2: Britain - Effects of Worker Involvement on Labor Productivity and Employment Change, Nonunion Establishments

Variable	Labor Productivity Change ^a		Employment Change ^b	
	(1)	(2)	(1)	(2)
Constant	-0.004 (0.004)	-0.016 (0.016)	-22.644 (0.497)	-17.255 (0.380)
Firm age (age in years)	0.023** (2.139)	0.023** (2.136)	-1.284* (1.854)	-1.317* (1.910)
ln (Firm size) (logarithm of Firm size)	0.189 (1.120)	0.191 (1.138)	14.272* (1.872)	13.500* (1.776)
New JCC (dummy=1 if JCC reorganized or established, 1987-90)		1.562** (2.251)		14.271 (0.710)
New Infcon (dummy=1 if increase in Infcon, 1987-90)		0.649** (2.048)		41.536*** (3.072)
NEWINV index (index of JCC and Infcon increases; range 0-3)	0.714*** (2.969)		19.005** (2.270)	
Single establishment (dummy=1 if single establishment)	-0.123 (0.884)	-0.120 (0.843)	1.518 (0.157)	0.144 (0.015)
Female (percentage female)	0.010** (2.313)	0.010** (2.332)	-0.108 (0.476)	-0.134 (0.592)
Skilled (percentage skilled workers)	0.009*** (4.349)	0.009*** (4.359)	0.020 (0.146)	0.013 (0.097)
Part time (percentage part time)	0.001 (0.462)	0.001 (0.453)	0.044 (0.197)	0.060 (2.70)
Shift (dummy=1 if shift work used)	0.038 (0.248)	0.038 (0.244)	6.701 (0.685)	7.028 (0.722)
Piece rate (dummy=1 if payments by results used for any work group)	0.505** (2.461)	0.513** (2.417)	-6.275 (0.506)	-10.055 (0.806)
Market power (dummy=1 if dominant firm/few competitors)	0.131 (0.844)	0.129 (0.834)	8.836 (0.930)	8.845 (0.935)
Export (dummy=1 if product mainly exported)	0.288 (1.111)	0.287 (1.100)	15.594 (1.040)	16.356 (1.096)
Automated (dummy=1 if automated machines used)	0.211 (1.005)	0.206 (0.980)	-30.089*** (2.669)	-30.080*** (2.680)
Profit sharing (dummy=1 if used)	0.308** (2.273)	0.316** (2.266)	0.106 (0.012)	-2.209 (0.241)
Density (percentage of work force in	-0.009** (2.484)	-0.009** (2.483)	0.033 (0.138)	0.053 (0.224)

Table 3: Britain - Effects of Worker Involvement on Labor Productivity and Employment Change, Union Establishments

Variable	Labor Productivity Change		Employment Change	
	(1)	(2)	(1)	(2)
Constant	4.165 (1.233)	4.366 (1.256)	-121.59*** (2.634)	-108.01** (2.437)
Firm age	0.055* (1.928)	0.057* (1.945)	-0.347 (0.322)	-0.326 (0.316)
ln (Firm size)	-0.317 (1.128)	-0.339 (1.228)	25.909*** (4.083)	21.794*** (3.561)
New JCC		-0.163 (0.301)		-159.86*** (7.916)
New Infcon		0.514 (1.353)		19.362* (1.699)
NEWINV index	0.153 (0.906)		-35.696*** (4.790)	
Single establishment	-0.387 (1.313)	-0.293 (0.776)	4.955 (0.284)	15.342 (0.911)
Female	-0.017*** (3.362)	-0.017*** (3.286)	-0.664** (2.520)	-0.342 (1.328)
Skilled	0.002 (0.711)	0.001 (0.302)	0.598*** (3.917)	0.562*** (3.833)
Part time	0.015 (1.498)	0.013 (1.209)	-0.130 (0.444)	-0.348 (1.231)
Shiftwork	0.278 (0.885)	0.264 (0.821)	-5.658 (0.454)	-9.258 (0.774)
Piece rate	1.252* (1.770)	1.246* (1.742)	22.102 (1.547)	30.297** (2.202)
Market power	-0.293 (0.993)	-0.316 (1.070)	24.101** (1.986)	25.535** (2.194)
Export	0.506 (1.238)	0.453 (1.076)	-7.225 (0.400)	-17.775 (1.022)
Automated	0.061 (0.198)	0.022 (0.070)	-19.336* (1.863)	-21.487** (2.158)
Profit sharing	0.362 (1.460)	0.419 (1.519)	0.700 (0.062)	5.153 (0.474)
Density	-0.006 (1.328)	-0.008 (1.530)	-0.466** (2.311)	-0.549*** (2.832)
Industry dummies	included	included	included	included
Pseudo R ²	0.408	0.411	0.115	0.228
n	237	237	449	449

|t|-values in parentheses

Notes: *, **, *** denotes significance at the .10, 0.05, and .01 levels, respectively.

See Table 2 for definition of variables.

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Industry dummies	included	included	included	included
Pseudo R ²	0.244	0.196	0.018	0.079
n	291	291	424	424

|t|-values in parentheses.

Notes: *, **, *** denote significance at the .10, .05, and .01 levels, respectively.

^a The manager's assessment of the level of labor productivity in the establishment relative to three years ago, 1987-90.

^b Employment change, 1987-90.

Table 4: Britain - Effects of Worker Involvement on Profitability and Wage Levels, Nonunion Establishments

Variable	Profit ^a		Wages ^b	
	(1)	(2)	(1)	(2)
Constant	0.975 (1.078)	0.953 (1.044)	61.579*** (2.739)	59.778*** (2.662)
Firm age	-0.017* (1.777)	-0.015 (1.549)	-0.494 (1.498)	-0.409 (1.228)
ln (Firm size)	0.213 (1.340)	0.210 (1.318)	22.823*** (5.946)	22.689*** (5.924)
JCC (dummy=1 if Joint Consultative Committee present)		-0.147 (0.816)		6.094 (1.041)
Infcon (dummy=1 if regular meetings to communicate/consult)		0.007 (0.051)		12.428*** (2.673)
INV index (index of JCC and Infcon levels; range 0-3)	-0.051 (0.668)		5.889** (2.496)	
Single establishment	0.172 (1.273)	0.176 (1.303)	8.277* (1.784)	8.586* (1.853)
Female	0.005 (1.602)	0.005 (1.577)	-1.004*** (8.188)	-1.024*** (8.330)
Skilled	-0.002 (0.920)	-0.002 (0.985)	0.339*** (4.726)	0.322*** (4.456)
Part time	-0.004 (1.543)	-0.004 (1.562)	-1.043*** (9.201)	-1.050*** (9.280)
Shiftwork	-0.189 (1.557)	-0.180 (1.448)	-5.338 (1.135)	-4.470 (0.947)
Piece rate	-0.526*** (3.076)	-0.537*** (3.141)	-0.051 (0.009)	-0.871 (0.149)
Market power	-0.153 (1.142)	-0.159 (1.182)	-4.427 (0.969)	-4.990 (1.091)
Export	-0.324 (1.611)	-0.308 (1.514)	38.740*** (5.319)	40.132*** (5.486)
Automated	0.316* (1.741)	0.315* (1.729)	6.943 (1.304)	6.336 (1.190)
Profit sharing	0.039 (0.321)	0.038 (0.312)	-3.634 (0.810)	-4.248 (0.946)
Density	0.001 (0.260)	0.001 (0.244)	0.292*** (2.684)	0.294*** (2.711)
Industry dummies	included	included	included	included
Pseudo R ²	0.094	0.095	0.607	0.609
n	271	271	364	364

|t|-values in parentheses.

Notes: *, **, *** denote significance at the .10, .05, and .01 levels, respectively.

Table 5: Britain - Effects of Worker Involvement on Profit and Wage Levels, Union Establishments

Variable	Profit		Wages	
	(1)	(2)	(1)	(2)
Constant	2.152** (2.530)	2.456*** (2.812)	147.97 *** (7.704)	145.47*** (7.485)
Firm age	-0.070*** (4.796)	-0.071*** (4.710)	0.306 (0.732)	0.252 (0.595)
ln (Firm size)	0.203 (1.240)	0.189 (1.158)	2.047 (0.705)	2.245 (0.771)
JCC		-0.164 (0.699)		-6.418 (1.236)
Infcon		-0.474** (2.227)		1.842 (0.357)
INV index	-0.179** (2.010)		-2.125 (0.938)	
Single establishment	-0.260 (1.047)	-0.330 (1.257)	9.021 (1.309)	9.574 (1.383)
Female	0.0002 (0.049)	0.002 (0.322)	-1.189*** (10.20)	-1.190*** (10.212)
Skilled	0.009*** (3.506)	0.008*** (2.959)	0.183*** (2.649)	0.189*** (2.724)
Part time	-0.011* (1.910)	-0.011* (1.774)	-1.922*** (15.13)	-1.932*** (15.138)
Shiftwork	-0.835*** (3.979)	-0.836*** (3.882)	18.760*** (3.816)	19.184*** (3.881)
Piece rate	0.216 (0.987)	0.211 (0.952)	-2.268 (0.383)	-2.172 (0.367)
Market power	-0.528*** (3.039)	-0.540*** (3.042)	3.827 (0.792)	4.026 (0.832)
Export	-0.229 (0.843)	-0.207 (0.753)	-10.650 (1.526)	-11.352 (1.615)
Automated	0.743*** (3.340)	0.714*** (3.254)	6.303 (1.308)	6.232 (1.293)
Profit sharing	0.405** (2.041)	0.337* (1.657)	19.662*** (4.269)	19.839*** (4.301)
Density	-0.006 (1.369)	-0.006 (1.313)	0.132 (1.466)	0.121 (1.332)
Industry dummies	included	included	included	included
Pseudo R ²	0.374	0.377	0.598	0.612
n	201	201	401	401

|t|-values in parentheses

Notes: *, **, *** denote significance at the .10, .05, and .01 levels, respectively.
See Tables 2 and 4 for definition of variables.

Table 6: Germany - Effects of Works Councils on Value-Added Per Worker

Variable	All establishments	Establishments with 21-100 employees
Constant	66.82 (0.81)	45.91 (0.37)
Works council (dummy=1 if works council present)	15.40** (2.48)	9.43 (1.27)
Firm size (number of employees)	-0.03** (2.03)	1.20 (1.63)
Firm size squared	0.11 E-4 (1.75)	0.01 (1.62)
Branch plant (dummy=1 if branch plant)	11.10 (1.44)	5.16 (0.45)
Firm age (dummy=1 if founded before 1960)	-11.72** (2.29)	2.65 (0.43)
Female (percentage female)	-0.70*** (4.20)	-0.43* (1.92)
Skilled (percentage skilled workers [<i>Facharbeiter</i>])	-0.10 (0.84)	0.05 (0.41)
Degree (percentage with Polytechnic/University degree)	1.24*** (2.86)	1.93** (2.21)
Part time (percentage part time)	-0.50*** (2.66)	-0.67** (2.51)
Shift work (dummy=1 if shift work used)	21.01*** (3.10)	22.08*** (2.79)
Hours (Usual number of hours worked per week)	0.70 (0.34)	0.95 (0.30)
Capacity (index for capacity utilization, ranging from 1(<85 percent) to 6(>100 percent))	3.74*** (2.64)	4.36** (2.13)
Advanced technology (dummy=1 if state-of-the-art production technology)	9.52* (1.86)	0.97 (0.16)
Profit sharing for employees (dummy=1 if used)	6.75 (0.95)	3.55 (0.38)
Profit sharing for management (dummy=1 if used)	11.93** (2.42)	25.79*** (4.16)
Market share (dummy=1 if market share of main product more than 5% in main market)	-1.83 (0.33)	8.73 (1.45)
Industry dummies	included	included
R ²	0.294	0.376
n	692	283

|t|-values in parentheses

Notes: *, **, *** denotes significance at the .10, .05, and .01 levels, respectively.

Table 7: Germany - Effects of Works Councils on Employment Change^a

Variable	All establishments	Establishments with 21-100 employees
Constant	-11.002 (0.86)	-70.831 (1.29)
Works council	-6.600 (1.15)	-1.210 (0.13)
Firm size	-0.023 (1.61)	0.969 (0.73)
Firm size squared	0.16 E-5 (1.62)	-0.87 E-2 (0.75)
Branch plant	-7.621 (1.28)	-2.880 (0.20)
Firm age	-14.649** (2.22)	-13.713 (1.24)
Female	0.024 (0.24)	-0.115 (0.45)
Skilled	0.015 (0.22)	-0.049 (0.37)
Degree	3.869* (1.71)	12.104 (1.40)
Part time	-0.269 (1.52)	-0.260 (0.82)
Shift work	5.285 (0.80)	9.750 (1.10)
Short time (dummy=1 if short-time work used)	-11.312*** (3.10)	-7.758 (0.96)
Overtime (dummy=1 if overtime used)	14.176*** (2.63)	13.264 (1.63)
Capacity utilization	0.395 (0.18)	-1.221 (0.45)
Advanced technology	9.813*** (2.61)	6.255 (0.90)
Wages (dummy=1 if higher than collective agreement)	-10.809 (0.95)	-18.114 (1.23)
Industry dummies	included	included
R ²	0.126	0.290
n	848	353

|t|-values in parentheses

Notes: *, **, *** denote significance at the .10, .05, and .01 levels, respectively.^a Employment change is measured over 1991-94.

See Table 6 for definition of other variables.

Table 8: Germany - Effects of Works Councils on Profitability^a

Variable	All establishments	Establishments with 21-100 employees
Works council	-0.327*** (3.39)	-0.606*** (3.89)
Firm size	0.214 E-3 (1.14)	0.012 (0.67)
Firm size squared	-9.40 E-9 (0.63)	-0.77E-4 (0.53)
Market share	0.258*** (2.63)	0.119 (0.79)
Capacity utilization	0.099*** (3.20)	0.100** (2.04)
Advanced technology	0.338*** (3.76)	0.326** (2.18)
Profit sharing for employees	0.119 (1.01)	0.313* (1.68)
Profit sharing for management	0.405*** (4.37)	0.217 (1.44)
Wage costs (dummy=1 if wage costs judged too high)	-0.036 (0.39)	-0.040 (0.26)
Non wage labor costs (dummy=1 if non-wage labor costs judged too high)	-0.483*** (4.74)	-0.757*** (4.15)
Industry dummies	included	included
R ²	0.095	0.157
n	817	335

|t|-values in parentheses

Notes: *, **, *** denote significance at the .10, .05, and .01 levels, respectively.^a Profitability is an index measure derived on the basis of the manager's assessment of performance relative to other firms in the same industry.

See Table 6 for definition of other variables.

Table 9: Germany - Effects of Works Councils on Wages^a

Variable	All establishments	Establishments with 21-100 employees
Constant	10.82*** (22.88)	11.58*** (12.93)
Works council	0.14*** (3.49)	0.17*** (2.61)
Firm size	-0.53 E-4 (0.78)	-0.01 (1.55)
Firm size squared	-0.35 E-8 (0.82)	0.86 E-4 (1.61)
Branch plant	-0.04 (0.73)	-0.11 (0.75)
Firm age	0.59 E-3 (0.02)	-0.04 (0.62)
Female	-0.30 E-2*** (3.26)	-0.17 E-2 (1.02)
Skilled	-0.16 E-2** (2.20)	-0.16 E-2 (1.33)
Degree	0.01*** (5.29)	0.94 E-2** (2.00)
Part time	-0.80 E-2*** (4.53)	-0.82 E-2** (2.39)
Shift work	0.10*** (2.84)	0.07 (1.28)
Hours	-0.68 E-3 (0.06)	-0.02 (0.71)
Overtime	0.07** (2.23)	0.13** (2.25)
Profit sharing for employees	0.05 (1.16)	0.08 (1.20)
Market share	-0.03 (1.06)	-0.03 (0.63)
Industry dummies	included	included
R ²	0.309	0.226
n	824	345

|t|-values in parentheses

Notes: *, **, *** denote significance at the .10, .05, and .01 levels, respectively.

^a The dependent variable is the natural logarithm of the average wage per employee.

See Tables 6 and 7 for definition of variables.

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