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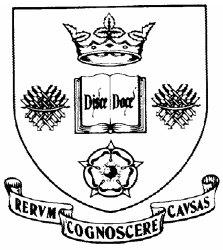

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Firm Performance, Worker Commitment and Loyalty.

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Abstract:

Using matched employer-employee level data drawn from the 2004 UK Workplace and Employee Relations Survey, we explore the determinants of a measure of worker commitment and loyalty (*CLI*) and whether *CLI* influences workplace performance. Our empirical findings suggest that the employee's industry-occupation specific relative wage is an important factor influencing employee attitudes towards the workplace. Other factors influencing employee commitment and loyalty are age and tenure, whilst workplace level characteristics of importance are: supervision; performance related pay and long term employment prospects within the workplace. With respect to the effects of employee commitment and loyalty upon the workplace, higher *CLI* is associated with enhanced workplace performance. This result holds for a number of robustness checks, thereby highlighting a hitherto neglected conduit for improved workplace performance. Our findings that employer characteristics influence employee commitment and loyalty suggest that workplaces may be able to exert some influence over the commitment and loyalty of its workforce, which, in turn, may affect workplace performance.

Key Words: Commitment; Financial Performance; Labour Productivity; and Loyalty

JEL Classification: J20; J50

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1. Introduction and Background

A large empirical literature exists which explores the determinants of organisational performance. For example, Machin and Stewart (1990), McNabb and Whitfield (1998) and Munday *et al.* (2003) examine the determinants of financial performance, whilst Griliches and Regev (1995), Oulton (1998) and Griffiths and Simpson (2004) focus on the determinants of labour productivity. Many such studies are based on firm level data. One might argue, however, that, in order to understand the determinants of firm performance, it is important to also analyse employee level information given that the behaviour of employees and the decisions they make may influence workplace performance. In this paper, we investigate whether the level of employee attachment to the employer influences workplace performance using matched employer-employee data. To be specific, we ascertain whether worker commitment and loyalty influence labour productivity and financial performance at the firm-level. In addition, we explore the determinants of such employee attitudes towards the organisation for which they work in order to ascertain how such attachments may be fostered.

The concept of organisational commitment has attracted a great deal of interest in the human resource management and psychology literatures. For example, employee commitment and loyalty are a central feature in the high performance workplace literature in which they are seen as mediating factors linking different types of human resource management and employment practices to enhanced performance. In this context, Meyer and Allen (1991) distinguish three dimensions to organisational commitment: affective commitment; normative commitment; and continuance commitment. Affective commitment captures an employee's emotional attachment to, identification with and involvement in the organisation, whilst normative commitment relates to an employee's obligation to remain in the

organisation, i.e. an employee's loyalty to their employer. Finally, continuance commitment is related to an employee's economic ties to the organisation and the employee's perceived costs of leaving the firm.

Meyer *et al.* (1993) argue that strong affective commitment to an organisation arises because employees share values with both the organisation and its members and is therefore predicted to have the strongest positive association with job performance, (see also Meyer *et al.*, 2002). With affective commitment, employees remain with their employer because they choose to do so. Green (2007) argues that, from an economist's perspective, affective commitment can be regarded as a proxy for the utility associated with working for the current employer as compared to doing the same job with the next best employer, thereby establishing firm-specific utility. As such, an employee's firm-specific utility potentially plays an important role in employee decision-making and workplace behaviour.

Since one might expect an employee's attachment to their firm to influence their supply of effort, which in turn may influence firm performance, it is surprising that employee commitment and loyalty have attracted only limited attention in the economics literature.[1] This is especially so given that employees' decisions over their supply of effort play a key role in various incentive models of worker compensation (for example, Lazear, 2000) as well as in the efficiency wage literature (see Akerlof, 1982; Akerlof and Yellen, 1990). In many such models, employee commitment and loyalty play an important role in the principal-agent issues surrounding the separation between the ownership and control of an organisation. The costs associated with delegated decision-making clearly depend on the extent to which the interests of the principal and agent differ (see, for example, Aghion and Tirole, 1997, and Athey and

[1] Previous studies include, inter alia, Lazear (1991), Kandel and Lazear (1992), Prendergast (1995) and Akerlof and Kranton (2000).

Roberts, 2001). In so far as employees who exhibit commitment and loyalty to their employer may have interests, which are aligned with that of their employer, the agency costs often associated with the employee-employer relationship are reduced.

One attempt to construct an economic model of identity and work incentives thus capturing such motivations, which are often missing in the standard economic model where an individual's preferences are fixed and primarily depend on monetary and effort considerations, is Akerlof and Kranton (2005). Their analysis, within a principal-agent framework, suggests that instilling in employees 'a sense of identity and attachment to an organisation is critical to well-functioning enterprises'. Furthermore, the role of pay as a way to motivate employees is less important if the employee is loyal and committed to the firm. Within the theoretical framework proposed by Akerlof and Kranton (2005), the worker adopts an identity as part of the organisation and his/her utility is reduced if he/she does not act in the best interests of the organisation, thereby reducing both the wage differential (associated with reward versus punishment) required to induce additional effort and the amount of costly monitoring undertaken by the employer. Moreover, since identification with the firm may lower average wages, a firm may find it profitable to create a sense of identity and attachment, i.e. engender loyalty and commitment, amongst its workforce.

In addition, establishing a committed and loyal workforce may be associated with enhanced firm performance and profits if the firm also benefits from less opportunistic behaviour on the part of employees without recompense to high incentive wages or costly levels of monitoring (Green, 2007). Furthermore, Green (2000) argues that a firm's human capital should be regarded as comprising social as well as technical skills which both influence productivity. Technical skills are regarded as the ability to convert inputs into outputs, whilst social skills are regarded as the extent to which employees act in a way that is aligned with the firm's

objectives. The importance of social skills in the hiring of employees is demonstrated by the use of personality and attitude tests as well as performance or competency tests during the hiring process (Brown and Sessions, 2006). Moreover, Green (2007) argues that organisational commitment is a social skill as it is associated with workplace behaviour in accordance with attaining the firm's objectives. One would, therefore, predict that such social skills would be positively associated with employee effort, which, in turn, would enhance firm performance.

In so far as the degree of commitment and loyalty of employees towards their employer is fundamentally linked to the way in which employees conduct themselves at the workplace the economic considerations and implications are clear. A committed and loyal workforce may require less incentive pay or supervision to supply effort to their employer, thereby lowering employment costs and enhancing firm performance. Given that employee commitment and loyalty clearly influence the agency considerations, which underpin the relationship between employees and employers, the lack of interest by economists in these important attributes of employees is surprising especially given the vast economic literature relating to principal-agent considerations within the workplace. In what follows, we firstly explore the determinants of such employee attitudes at the employee level. Secondly, we explore the implications of employee commitment and loyalty upon financial performance and productivity at the firm level, which contrasts with the focus in the management and psychology literature, which lies in the relationship between employee commitment and job performance rather than firm performance.

2. Data

In order to explore the relationship between employee commitment, loyalty and firm performance, we analyse data from the 2004 Workplace and Employee Relations Survey (*WERS*). This is the fifth in a Government funded series of surveys conducted

at British workplaces, the previous four surveys having been conducted in 1980, 1984, 1990 and 1998. The aim of these surveys is to provide nationally representative data on the current state of workplace relations and employment practices in Britain, and it is widely regarded as the principal source of information pertaining to changes in British industrial relations [Chaplin *et al*. (2005)]. The survey population for the 2004 ***WERS*** is all British workplaces with at least five employees except for those in agriculture, hunting and forestry, fishing, mining and quarrying, private households with employed persons, and extra-territorial organisations. The sample comprises 2,295 workplaces, whilst the sample used for our econometric analysis includes 1,432 workplaces due to missing data. The 2004 ***WERS*** comprises four main sections: the Management Questionnaire; the Worker Representative Questionnaire (which we do not use in this paper); the Financial Performance Questionnaire; and the Employee Questionnaire. The first three sections yield establishment level information, whilst the final section (the Employee Questionnaire) provides employee level information.

Employee Questionnaire

Up to 25 employees from each workplace were asked to complete the Employee Questionnaire yielding a sample of 17,008 employees after conditioning on missing data. The Employee Questionnaire contains information on a number of measures of employees' attitudes towards both their job and their workplace. Two questions capture employee commitment and loyalty. Employees are asked to indicate how strongly they agree or disagree with each statement: (i) *I share many values of my organisation* and (ii) *I feel loyal to my organisation.* Responses to the former yield information pertaining to the individual's commitment to their employer (c),[2] whilst responses to the latter indicate the level of the individual's loyalty to their

[2] In one of the early studies in this area, Buchanan (1974) defines organisational commitment as being dedicated to the purposes and values of an organisation. The ***WERS*** survey question ties in with such a definition.

organisation (l). From this information, we have constructed two five point indices where 4 (0) represents the maximum (minimum) extent to which individuals agree with the above statements. The indices are defined as follows:

$$c_{wi} = \begin{cases} 4 = \textit{strongly agree (12.09\%)} \\ 3 = \textit{agree (43.43\%)} \\ 2 = \textit{neither agree / disagree (32.69\%)} \\ 1 = \textit{disagree (9.21\%)} \\ 0 = \textit{strongly disagree (2.58\%)} \end{cases} \qquad l_{wi} = \begin{cases} 4 = \textit{strongly agree (20.51\%)} \\ 3 = \textit{agree (50.00\%)} \\ 2 = \textit{neither agree / disagree (19.77\%)} \\ 1 = \textit{disagree (7.12\%)} \\ 0 = \textit{strongly disagree (2.60\%)} \end{cases}$$

where *i* represents the individual subscript and *w* denotes the workplace subscript, i.e. *wi* denotes individual *i* employed by workplace *w*. The figures in parenthesis indicate the percentage in each category.[3] Arguably, employees may be unable to distinguish between their commitment and their loyalty to the organisation, so following Green (2007), we adopt a hybrid combination of the two questions by generating an additive scale based upon Cronbach's alpha ranging from 0 to 4, where the scale of reliability is 0.77, which we term the commitment-loyalty index (*CLI*). The distribution across categories 0 to 4 are: 1.27%; 5.15%; 21.54%; 52.31% and 19.74% respectively.[4] The first part of the empirical analysis, presented in Section 3, investigates the determinants of *CLI* at the employee level. If employee loyalty and commitment towards the workplace influence workplace performance, it is important to ascertain which employee and workplace characteristics are associated with employee commitment and loyalty.

[3] It should be acknowledged that our analysis is based on self-reported data and the assumption that interpersonal comparisons can be made. The use of such data is becoming increasingly widespread in the economics literature and support for such data can be found in Guest (1990). In an early study, Hogan and Fleishman (1979) support the use of such data citing results from laboratory studies comparing perceived and actual effort exertion in physical activities. They report a highly significant positive correlation between actual metabolic rate and perceived effort in conducting a selection of occupational tasks.

[4] We have also conducted our analysis with categories 0 and 1 amalgamated. Our results are largely unchanged.

Management Questionnaire

In Section 4, we conduct workplace level analysis in order to explore the determinants of labour productivity, financial performance and profits per employee at the workplace. The labour productivity and financial performance measures are derived from the following question included in the Management Questionnaire: *I now want to ask you how your workplace is currently performing compared with other establishments in the same industry. How would you assess your workplace's (i) financial performance and (ii) labour productivity?* The management representative was asked to indicate in which of the following categories financial performance (FP_w) and labour productivity (LP_w) lay: (i) a lot better than average; (ii) better than average; (iii) about average for the industry; (iv) below average or a lot below average. From the responses to these questions, we constructed two four point indices as follows:

$$FP_w = \begin{cases} 3 = A\ lot\ better\ than\ average\ (11.66\%) \\ 2 = Better\ than\ average\ (40.50\%) \\ 1 = About\ average\ (39.11\%) \\ 0 = Below\ average\ (8.73\%) \end{cases} \qquad LP_w = \begin{cases} 3 = A\ lot\ better\ than\ average\ (6.91\%) \\ 2 = Better\ than\ average\ (42.18\%) \\ 1 = About\ average\ (44.90\%) \\ 0 = Below\ average\ (6.01\%) \end{cases}$$

where *w* denotes the workplace subscript and the figures in parenthesis indicate the percentage in each category.

Financial Performance Questionnaire

After completion of the Management Questionnaire based on a face to face interview, a short Financial Performance Questionnaire was left for 'someone responsible for financial matters at the workplace' to complete. This could only proceed with the agreement of the management respondent and his/her ability and willingness to locate a suitable respondent to the Financial Performance Questionnaire [Chaplin *et al.* (2005)]. The number of workplaces where such questionnaires were placed totalled

2,076 where 1,070 were returned. Thus, the overall response rate for the Financial Performance Questionnaire (as a proportion of questionnaires placed) is 51.5% [Chaplin *et al*. (2005)].

Notwithstanding the high attrition rate, the Financial Performance Questionnaire includes a continuous objective measure of financial performance, namely profits per head. There is evidence that both subjective and objective performance measures in WERS 2004 are weakly equivalent and produce similar results in fairly basic structural models (Forth and McNabb, 2007). Nevertheless, differences are evident and, as concerns about the use of subjective data are frequently raised (see, for example, Hamermesh, 2004), it is a prudent exercise to consider both types of performance measures in the present study. After observations with missing data have been omitted, we are left with a sub-sample of 495 workplaces for our analysis of profits per employee.[5] Summary statistics for the variables used in our empirical analysis are presented in Table A1 in the Appendix.

3. Employee Level Analysis

3.1 Methodology

Given that employee *CLI* may influence workplace level performance, explored below in Section 4, we focus initially on the determinants of employee *CLI*. We conduct generalised ordered probit analysis in order to explore the correlates of *CLI* allowing for clustering within establishments.[5] The generalised ordered probit model for *CLI* is modeled as follows:

$$CLI_{wi}^{*} = l'Z_{wi} + h_{wi} \qquad (1)$$

[5] The following analysis of the restricted sample of 495 workplaces is weighted making use of the weights detailed in Chaplin *et al.* (2005) based on the probability of workplaces taking part in *WERS* 2004 responding to the Financial Performance Questionnaire.

[5] We are grateful to an anonymous referee for suggesting that we adopt the generalised ordered probit approach, which is advantageous in that the cut-off points are allowed to vary between individuals in contrast to the standard ordered probit model.

where CLI^{*}_{wi} is a latent variable denoting the unobserved propensity of individual *i* employed in workplace *w* to be committed-loyal to workplace *w*; CLI_{wi} is the individual's observed level of commitment-loyalty; Z_{wi} is a vector of exogenous characteristics, which are expected to influence CLI^{*}_{wi}; l is the associated vector of coefficients; and h_{wi} is a white noise error term.

In our set of explanatory variables, we include the individual's industry-occupation specific relative wage since, as efficiency wage models predict, an individual's commitment and loyalty, as captured by *CLI*, to their employer may be influenced by the individual's wage relative to the wage prevailing in their industry and occupation. An individual who receives low relative wages, for example, may be less likely to form an attachment to their employer.[6]

Other individual characteristics we control for are: age; gender; whether the individual is a member of a trade union; whether the employee works part-time; whether she/he is employed on a permanent contract; whether the individual's performance is subject to regular appraisals; and tenure at the current workplace.

Turning to workplace characteristics, monitoring and supervision play a prominent role in the organisational commitment literature. Hence, we include an index of the proportion of non-managerial staff with supervisory duties based on the responses to the following question: *What proportion of non-managerial employees here have job duties that involve supervising other employees?* Although, the supervision index serves to proxy the level of monitoring, it should be acknowledged

[6] The industry-occupation specific relative wage is defined as the respondent's weekly wage divided by the average weekly wage for the individual's specific industry and occupation. We distinguish between nine occupational categories: professional; managerial; assistant professional; clerical; craft; personal; sales; operative and all other occupations. In terms of industry, we distinguish between eleven classifications: manufacturing; electrical; construction; wholesale; hotel; transport & communication; finance; public; education; health and other industries. Hence, there are ninety-nine industry-occupation specific wage values.

that problems obtaining accurate measures of monitoring are well-documented. For example, Drago and Perlman (1989) note that supervision may occur for non-monitoring purposes such as to co-ordinate production. Alternatively, the number of supervisors might be high because monitoring is difficult (Allgulin and Ellingsen, 2002) or supervisors may only spend a fraction of their work time monitoring (Rebitzer, 1995). Despite such problems, the relative paucity of data compels us to rely on the proxy defined above. The inclusion of the dummy variable that equals one if the individual's performance is regularly subject to appraisal represents an alternative control for monitoring.

We also control for the number of dismissals, redundancies and suspensions at the workplace as a percentage of total employment within the workplace, which are expected to have a negative impact on commitment and loyalty. In addition, a dummy variable is included indicating whether the establishment has experienced difficulties filling vacancies for the individual's occupation. Employee level workplace tenure acts as a control for organisation specific human capital, which may make it costly to leave the organisation and, hence, may serve to engender attachment to the firm. In a similar vein, we include a five point index denoting the extent managers agree with the statement: *Employees are led to expect long-term employment in this organisation*. The highest value of the index (4) indicates that managers strongly agree with the statement; a value of 3 denotes that they agree with the statement; a value of 2 indicates that they neither agree nor disagree; a value of 1 denotes that they disagree; finally, a value of 0 indicates that they strongly disagree.

Other workplace characteristics we control for include workplace size and a binary control indicating whether industrial action has been taken in the last twelve months at the workplace. It may be the case that the level of worker loyalty and commitment will be lower in establishments where there are poor industrial relations

and the overall unrest is high. In addition, we control for the employer's perception of employee commitment. To be specific, we include a four point index indicating the extent to which managers agree with the following statement: *Employees here are fully committed to the values of this organisation.* The index takes the highest value (3) if the manager strongly agrees with the statement; a value of 2 if the manager agrees with the statement; a value of 1 if the manager neither agrees nor disagrees with the statement; and a value of 0 if the manager disagrees with the statement. Hence, the index is increasing in the manager's perception of employee commitment.

Finally, in order to explore alternative strategies that employers may adopt to encourage employee allegiance, we control for the presence of performance related pay and employee share ownership schemes at the workplace for the employee's occupation. Also incorporated into the vector of control variables is workplace performance, since arguably high performance firms might inspire greater levels of *CLI* – this issue is further discussed in Section 4.3.

3.2 Results

The results of estimating equation (1) are presented in Table 1 where we focus on the marginal effects for each category from the lowest through to the highest level, i.e. categories 0 to 4, where the two extreme categories denote *'strongly disagree'* and *'strongly agree'* respectively.[7] Panels A to C incorporate alternative measures of workplace performance as control variables, where the full regression results are presented in Panel A with labour productivity included as a control variable, whilst in Panels B and C, for brevity, the regression results are summarised with financial

[7] Estimated coefficients in ordered response models have no natural interpretation since the sign of the coefficient only uniquely determines the change in probability at the top and bottom categories of the dependent variable, see Greene (2003). Hence, we follow convention and focus on the marginal effects.

performance and profits per employee included to control for workplace performance, respectively.[8]

With respect to the individual's relative wage, a one per cent increase in the log relative wage increases the probability that the individual reports the highest category for *CLI* by 2.7 percentage points, see Table 1 Panel A. Our empirical findings suggest that comparisons between an employee's wage and that of a particular reference group are significant determinants of worker commitment and loyalty to the workplace, which is consistent with efficiency wage theory, although the magnitude of the implied relationship is moderate.[9]

Employee characteristics, specifically age and gender, play the largest role in terms of the magnitude of the marginal effects across the *CLI* thresholds. Turning to other employee characteristics, the length of time with the current employer is also significantly associated with *CLI*. The effects of tenure at the workplace indicate that individuals with shorter tenure are less committed and loyal relative to the reference category of being employed for more than 10 years at the same workplace. This may be because such individuals have not acquired high levels of workplace specific human capital, which may make leaving the workplace less costly. Alternatively, it may simply be that people who do not generate feelings of commitment and loyalty are more likely to quit their jobs. Part time employees are also less likely to harbour high levels of *CLI*.

Turning to workplace characteristics, the proportion of workers with supervisory duties is significantly associated with *CLI*. Specifically, the level of supervision decreases (increases) the probability that the individual is in the lowest

[8] We have also estimated equation (1) via a random effects ordered probit specification where the results are largely in line with those reported in Table 1.

[9] The distribution of the employee's wage relative to the industry-occupation specific wage in ***WERS*** 2004 is consistent with corresponding employee relative wage distributions calculated from the ***British Household Panel Survey*** 2004 and ***Labour Force Survey*** 2004.

(highest) categories of *CLI*. There is also some evidence that performance related pay has a degree of influence upon employee commitment and loyalty. Long term employment prospects within the workplace have a monotonic positive influence upon engendering higher levels of *CLI*: at the mean of the index of long term employment prospects, the probability that the individual reports the highest category of *CLI* is around 2 percentage points. Interestingly, there are no statistically significant effects from the percentage of dismissals or suspensions, industrial action or employee share ownership at the workplace.

Trade union membership is found to lower the probability that an employee will respond in the top categories of *CLI*. This finding is consistent with the literature on unions and absenteeism (Chaudhury and Ng, 1992 and Leigh, 1981; 1985), which shows that union members go absent more often than non-union employees. One possible explanation for such a finding is that union members may have a stronger sense of security at work.

Having ascertained which employee and employer characteristics engender employee commitment and loyalty to the workplace, the following analysis investigates whether the average level of employee *CLI* within the workplace influences workplace performance.

4. Workplace Performance

4.1 Methodology

The following workplace performance models are estimated where the average level of the employee commitment-loyalty index (*CLI*) within the workplace, $\overline{CLI}_w$, is included in the set of explanatory variables:

$$LP_w^* = b'X_w + g_1\overline{CLI}_w + n_{1w} \quad (2)$$

$$FP_w^* = j'X_w + g_2\overline{CLI}_w + n_{2w} \quad (3)$$

$$\Pi_w = q' X_w + g_3 \overline{CLI}_w + n_{3w} \quad (4)$$

where LP_w^* and FP_w^* represent two latent variables denoting the unobserved propensity of workplace *w* to achieve a certain level of labour productivity and financial performance respectively in terms of the subjective measures of performance; Π_w represents profits per employee, the objective measure of performance; X_w is a vector of workplace characteristics expected to influence FP_w^*, LP_w^* and Π_w ; b , j , q , g_1, g_2 and g_3 are the associated vectors of coefficients; and n_{jw} (*j=1,2,3*) are random error terms. Thus, the estimated coefficients of $\overline{CLI}_w$ indicate the nature of the relationship between average employee *CLI* within the workplace and the measures of workplace performance.[10] Equations (2) and (3) are estimated via a generalised ordered probit specification over the sample of 1,432 workplaces, whilst equation (4) is estimated by ordinary least squares (OLS) over the sample of 495 workplaces.

The vector of explanatory variables, X_w, is based on the existing literature and includes: quadratics in workplace size and workplace age; controls for whether the firm is foreign owned or a UK multinational; industrial affiliation; controls for the presence of performance related pay or employee share ownership at the workplace; the average industry-occupation specific relative wage in the workplace (as defined in Section 3) denoted by $\overline{\mathrm{RW}}$; a dummy indicator for whether there is a recognised trade union at the workplace; a public sector dummy variable;[11] and the percentages

[10] We have also investigated incorporating commitment and loyalty simultaneously as two separate measures: only commitment was statistically significant. However, if entered separately, both commitment and loyalty were found to be significantly associated with workplace performance. These results are available from the authors upon request. This suggests that employees may not be able to discern the difference between the two survey questions and, hence, supports the use of a hybrid measure.

[11] We have also undertaken the empirical analysis excluding the public sector, with the key findings generally unchanged. These results are available on request. However, 20% of the sample of

of unskilled, female and ethnic minority employees in the workplace. As a proxy for the relative importance of labour costs within the workplace, we also include a four point index indicating the percentage of the workplace's sales revenue or operating costs, accounted for by wages, salaries and other labour costs such as pensions and insurance.[12]

4.2 Results

Table 2 presents the results of estimating the relationship between workplace performance and $\overline{\text{CLI}}$, with the results of estimating equations (2), (3) and (4) summarised in Panel A. It is apparent from Panel A that, for our sample of 1,432 workplaces, employee $\overline{\text{CLI}}$ is positively associated with higher levels of the three measures of workplace performance.[13] Due to the ordered nature of the labour productivity and financial performance indices, we focus on the marginal effects for each category, lowest through to highest, i.e. categories 0 to 3, where the two extreme categories denote *'below average'* and *'a lot above average'*, respectively.

With respect to labour productivity, LP_w, shown in the first column of Table 2, the marginal effects presented in Panel A indicate that $\overline{\text{CLI}}$ is associated with a decrease (an increase) in the probability that workplace labour productivity is *'below average'* (*'a lot above average'*). Indeed, evaluated at the sample means, the

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workplaces are in the public sector, hence excluding such workplaces significantly reduces our sample size, particularly in the case of the continuous measure of financial performance. Moreover, substantial variation exists in the mean level of each measure of performance within the public sector where the standard deviations for labour productivity, financial performance and profits per employee are: 0.667, 0.729 and 2.137 respectively (for comparison see Table A1 in the Appendix for the overall sample).

[12] In terms of the labour cost index, a value of zero denotes less than 25%; one denotes 25% to 50%; two denotes 50% to 75%; and three denotes 75% or more. The index indicating the proportion of sales revenue or operating costs accounted for by labour costs enables us to proxy the importance of labour costs relative to the costs of other factor inputs.

[13] For brevity, we omit the full results of estimating the alternative models of workplace performance. In accordance with the existing literature, our findings suggest that workplace size, whether the workplace has performance related pay or employee share ownership all increase the probability of having the highest level of financial performance. Conversely, workplace age, a high proportion of labour costs relative to sales revenue and the proportion of ethnic employees decrease the probability of attaining high workplace performance. These results are available from the authors on request.

magnitude of the effects of the employee commitment-loyalty index are 9 and 8 percentage points at the two extremes of the index respectively.[15] We replicate the above analysis focusing on the alternative subjective measure of workplace performance – financial performance (FP_w) in the second major column of Table 2. The results are consistent with those found for labour productivity in that higher levels of $\overline{\text{CLI}}$ are associated with a decrease in the probability of financial performance being *'below average'*. Evaluated at the sample mean, the largest effect of $\overline{\text{CLI}}$ serves to increase the probability that workplace financial performance is *'above average'* by 15 percentage points. The final column of Table 2, which focuses upon a sub-sample of 495 workplaces reporting profits per employee, again reveals a positive association between workplace performance and employee commitment and loyalty.

In order to explore the robustness of our findings, we replace $\overline{\text{CLI}}$ with the four point index of the level of employee commitment perceived by the manager taken from the Management Questionnaire as defined in Section 3. The results are shown in Panel B of Table 2 and reveal a positive association between higher employee commitment as perceived by the manager and workplace performance, although the effect on the continuous measure of profits per employee is insignificant.

To summarise, our workplace results thus far suggest that employee commitment and loyalty are positively related to higher levels of labour productivity and financial performance at the workplace. Moreover, the magnitudes of the

[15] These calculations are based on the mean sample characteristics of workplaces. For example, the 9 percentage point effect is calculated by multiplying the marginal effect by the mean of average *CLI*.

estimated effects suggest that worker attachment to the organisation is an important conduit for improved performance.[14]

4.3 Robustness

In this sub-section we further consider the robustness of the estimated relationship between *CLI* and workplace performance. First, we investigate the possibility of reverse causality between *CLI* and performance, i.e. the potential for high performance organisations to engender greater levels of *CLI*, by employing an instrumental variables approach. Secondly, we make use of the panel element of *WERS*, which enables us to analyse the change in workplace performance over the period 1998 to 2004 and how this is influenced by *CLI* in 1998 arguably enabling a causal hypothesis to be tested. Finally, the potential simultaneity between the relative wage and *CLI* is explored, in that relative wages may also directly influence workplace performance as well as having an indirect effect via workers' commitment and loyalty to the organisation.

Reverse causality between CLI and workplace performance

Initially, we explore reverse causality by instrumenting *CLI*, based upon the analysis presented in Section 3 above. To be specific, in the performance equations, i.e. equations (2), (3) and (4), we replace $\overline{\text{CLI}}$, i.e. the average exogenous *CLI* for each workplace, with the average predicted *CLI* for each workplace, where predicted *CLI*

[14] Workplaces which indicated that it was not possible to make comparisons about labour productivity or financial performance or that the relevant data were not available were excluded from our sample (approximately 32%). We have experimented with recoding the missing values in the dependent variable by including these workplaces in the '*about average*' category, which increases the sample size to over 2,100. Testing the difference in the estimated coefficients between the estimates reported in Table 2 and those based upon the larger sample size reveals no significant difference in the estimated relationship between *CLI* and performance at the 1% level. Similarly, for the employee level results, the sample size of 17,008 employees is governed by the number of workplaces we analyse and, in addition, whether employees respond to the commitment and loyalty questions, i.e. the dependent variable. We have experimented with recoding missing values in *CLI* in the employee level data to the "*neither agree/disagree*" category, yielding a sample size over 21,100 employees. The results reported in Table 1 are largely unaffected. Indeed, testing the difference between the estimated coefficients from equation (1) estimated across 17,008 employees and that for 21,100 employees, we find no significant difference at the 5% level.

is based on the employee level specifications presented in Table 1, i.e. equation (1). Thus, employee characteristics are incorporated into the employee level *CLI* model as well as workplace level control variables. This is an advantageous approach in that it may alleviate potential bias due to unobserved heterogeneity, which might affect both sides of the regression equation, i.e. *CLI* and the workplace performance measures, Green (2007). Moreover, as can be seen from the results presented in Section 3, we also condition *CLI* upon workplace performance. The results shown in Table 1 suggest that performance measured by either of the subjective measures, labour productivity (Panel A) and financial performance (Panel B), or the objective measure of performance profits per employee (Panel C), does not have a significant impact upon *CLI*. Such findings suggest that workplace performance is not a statistically significant determinant of employee *CLI*.

We then re-estimate equations (2), (3) and (4) replacing $\overline{\text{CLI}}$ with the average predicted *CLI* for each workplace. The analysis based upon the predicted or instrumented *CLI* shown in Table 2 Panel C reveals a positive association between employee commitment and loyalty and the measures of performance. There is a significant effect for average predicted *CLI* at both extremes of the subjective measures, but not upon profits per employee.[15] Indeed, evaluated at the sample mean, the magnitude of the effects of average predicted *CLI* upon the probability that the workplace experiences labour productivity *'above average'* is 8 percentage points, similar in magnitude to that found in Section 4.2. The finding that none of the three

[15] We find an insignificant relationship when the residuals from the performance equations, i.e. equations (2), (3) and (3), are regressed on the explanatory variables, averaged at the workplace level, used in equation (1), which are not included in equations (2), (3) and (4).

measures of workplace performance affect *CLI* in the employee level analysis and that average predicted *CLI* influences performance is in accordance with a causal effect.[16]

CLI and the change in workplace performance

We explore the issue of causality between workplace performance and $\overline{\text{CLI}}$ in an alternative manner by making use of the panel element within *WERS*. We analyse a subset of workplaces interviewed in both 1998 and 2004: there are 522 workplaces in both waves with information on the key variables in question. To be specific, we explore the effect of $\overline{\text{CLI}}$ measured in 1998 upon the change in financial performance between 1998 and 2004, denoted by $\Delta FPER_{w,2004}$. Arguably, any significant association between these variables is evidence of $\overline{\text{CLI}}$ influencing workplace performance rather than workplace performance influencing $\overline{\text{CLI}}$. Information on financial performance in the panel aspect of *WERS* is only available as a subjective measure defined by an ordered variable as: 0 if the change in financial performance is below the industry average; 1 if the change in financial performance is equal to the industry average; and 2 if the change in financial performance is above the industry average. The following model is estimated as a generalised ordered probit where we condition upon variables measured in 1998:[17]

$$\Delta FPER_{w,2004} = a' X_{w,1998} + g\overline{CLI}_{w,1998} + u_w \qquad (5)$$

The results of estimating equation (5) are presented in Table 3 Panel A and reveal that, based upon the sample means, $\overline{\text{CLI}}$ decreases the probability that the workplace

[16] We have also explored an alternative modelling strategy, which entails joint modelling of average commitment and loyalty at the workplace and performance. To be specific, we adopt a bivariate probit model where one binary dependent variable equals 1 if the average *CLI* is in the highest two categories and the second binary dependent variable takes the value of 1 if the subjective performance measure (either labour productivity or financial performance) lies in one of the highest two categories. For the case of the continuous measure of performance, we adopt a two stage probit least squares estimator. Our findings are in accordance with the results in Table 2 Panel C with the positive effect of employee commitment and loyalty on performance prevailing with the joint estimation procedure.

[17] The findings are robust to changing the control variables to 2004, or indeed creating differenced control variables across time where applicable.

experiences a change in financial performance below (above) the industry average in the region of 38 (11) percentage points. As a further robustness check, we also instrument $\overline{\text{CLI}}$ in 1998, based upon the specification of control variables used in Section 3 above – but measured in 1998. The results shown in Table 3 Panel B reveal that the relationship between average predicted *CLI* in 1998 and workplace performance remains after instrumentation.

Reverse causality between CLI and relative wages

Our final robustness check focuses on the possible simultaneity between relative wages and workplace performance. Arguably, it is possible that higher levels of performance might lead to higher wages, which might also influence the relative wage, akin to rent sharing arguments (Blanchflower *et al*., 1996). To consider whether relative wages influence workplace performance in estimating equations (2), (3) and (4), the average workplace relative wage ($\overline{\text{RW}}$) was incorporated into the financial performance models. The marginal effects associated with the relative wage ($\overline{\text{RW}}$) are shown in Table 2 Panel A. For each measure of financial performance, there is no significant direct relationship between the average relative wage and workplace performance, only an indirect influence operating through *CLI* as is evident from the analysis presented in Section 3, i.e. the positive relationship between the relative industry-occupation wage and *CLI*.

To investigate the possible simultaneity between average relative wages and workplace performance, we undertake a simultaneous modeling approach. Specifically we adopt a two-stage probit least squares estimator as follows:

$$F_w^* = m' X_w + q\,\overline{RW}_w + v_w$$

$$\overline{RW}_w = g'\overline{H}_w + f F_w^* + e_w \qquad (6)$$

where the average relative wage across employees within the workplace, $\overline{RW}_w$, is modeled as a continuous variable, whilst workplace performance (either labour productivity or workplace financial performance) is treated as a binary variable which takes the value of one if the workplace has performance "*above average*" or "*a lot above average*". The estimates derived from this framework are consistent and have corrected standard errors (see Maddala, 1983). The explanatory variables in vector $\overline{H}_w$ include controls averaged across employees within the workplace: tenure at the current workplace, part-time employment, permanent contract, trade union membership, gender, marital status, ethnicity and highest educational qualification.[18] In the case of financial performance measured by profits per employee, which is a continuous variable, a standard two stage least squared approach is adopted. Under a rent-sharing type argument, we might expect f to be positive and significant.

The results are presented in Table 4, where the first two columns show the results of estimating equation (6) for labour productivity and financial performance respectively. Table 4 is split into two panels with Panel A reporting the results of the effect of instrumented relative wages and *CLI* upon workplace performance and Panel B reporting the effects of instrumented financial performance upon the relative wage. Clearly, across the subjective measures of workplace performance, when estimated simultaneously, the average relative wage within the workplace has no significant impact upon workplace performance. This finding accords with that reported in Table 2 Panel A where the relative wage was treated as an exogenous variable. Similarly, as shown in Table 4 Panel B, the three instrumented measures of financial performance have no impact upon the average relative wage within the workplace. In the final column of Table 4, for the subset of 495 workplaces with information on profits per

[18] To specify *H*, we include control variables associated with standard Mincerian earnings functions, since the dependent variable is the average within each workplace of the employee's wage weighted by the relevant specific industry-occupation wage.

employee, when estimating this measure of workplace performance simultaneously with the relative wages by two stage least squares, there is no significant impact of relative wages (workplace performance) upon workplace performance (relative wages). Thus, it would appear that there is no direct simultaneity between workplace performance and relative wages. Our findings suggest that relative wages only have an indirect influence upon workplace performance operating through commitment and loyalty, i.e. *CLI*, which is contradictory to a rent sharing argument but consistent with efficiency wage theory.

5. Conclusion

In this paper we have analysed matched employer-employee data in order to explore the influence of employee commitment and loyalty on workplace performance. Our empirical findings suggest that employee commitment and loyalty are positively associated with higher levels of workplace performance. Arguably, it is thus in an establishment's interest to foster such attachments. Hence, our empirical analysis highlights a potential avenue for productivity and financial gains at the establishment level, which has been somewhat neglected in the economics literature. Moreover, our employee level analysis of the determinants of employee attitudes suggests not only a role for worker characteristics, but also for workplace characteristics (such as supervision, performance related pay and long term prospects of employment) in influencing such attachments. Such findings suggest that establishments may be able to exert some control over the loyalty and commitment of its workforce, which, in turn, may enhance establishment performance.

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Table 1: The Determinants of Employee Commitment and Loyalty: Employee Level Analysis

PANEL A: SUBJECTIVE MEASURE OF WORKPLACE PERFORMANCE – LABOUR PRODUCTIVITY

	CLI=0: Strongly Disagree		*CLI*=1: Disagree		*CLI*=2: Neither Agree/Disagree		*CLI*=3: Agree		*CLI*=4: Strongly Agree	
Employee Characteristics	M.E.	*TSTAT*	M.E.	*TSTAT*	M.E.	*TSTAT*	M.E.	*TSTAT*	M.E.	*TSTAT*
Log Relative Wage (RW)	-0.0009	*(1.15)*	-0.0044	*(2.28)*	-0.0267	*(7.10)*	0.0053	*(2.20)*	0.0267	*(7.60)*
Male	0.0092	*(4.87)*	0.0195	*(5.41)*	0.0321	*(4.27)*	-0.0421	*(4.97)*	-0.0187	*(2.59)*
Part Time	0.0005	*(0.23)*	-0.0027	*(0.58)*	0.0202	*(2.13)*	0.0282	*(2.66)*	-0.0463	*(6.01)*
Age 16-17	0.8471	*(12.05)*	-0.7194	*(7.11)*	0.2077	*(2.38)*	-0.2097	*(2.90)*	-0.1257	*(2.59)*
Age 18-19	0.8506	*(19.11)*	-0.7346	*(8.69)*	0.2923	*(3.72)*	-0.2617	*(4.20)*	-0.1466	*(5.85)*
Age 20-21	0.8793	*(25.38)*	-0.7380	*(8.43)*	0.2717	*(3.26)*	-0.2688	*(4.49)*	-0.1442	*(10.05)*
Age 22-29	0.7551	*(21.17)*	-0.6022	*(7.43)*	0.2384	*(3.23)*	-0.2459	*(4.10)*	-0.1453	*(9.32)*
Age 30-39	0.5971	*(14.68)*	-0.4996	*(7.51)*	0.2427	*(3.83)*	-0.2177	*(3.62)*	-0.1224	*(7.09)*
Age 40-49	0.6207	*(15.43)*	-0.5286	*(8.16)*	0.2114	*(3.40)*	-0.1966	*(3.25)*	-0.1069	*(4.62)*
Age 50-59	0.6400	*(14.95)*	-0.5541	*(8.18)*	0.2076	*(3.24)*	-0.1979	*(3.22)*	-0.0956	*(3.83)*
Age 60-64	0.8054	*(17.67)*	-0.7305	*(9.01)*	0.1233	*(1.74)*	-0.1383	*(2.07)*	-0.0599	*(3.52)*
Tenure: tenure <1 year	0.0013	*(0.38)*	0.0262	*(5.30)*	0.0393	*(3.61)*	-0.0340	*(2.46)*	-0.0303	*(2.52)*
Tenure: 1 year ≤ tenure < 2 years	0.0024	*(0.69)*	0.0193	*(3.74)*	0.0258	*(2.31)*	-0.0391	*(2.80)*	-0.0037	*(0.32)*
Tenure: 2 years ≤ tenure < 5 years	0.0023	*(0.90)*	-0.0140	*(3.08)*	-0.0112	*(1.24)*	0.0112	*(1.01)*	0.0117	*(1.28)*
Tenure: 5 years ≤ tenure < 10 years	-0.0011	*(0.49)*	-0.0067	*(1.41)*	-0.0029	*(0.29)*	0.0168	*(1.40)*	-0.0062	*(0.64)*
Permanent Contract	-0.0003	*(0.12)*	-0.0094	*(1.34)*	-0.0017	*(0.13)*	0.0034	*(0.21)*	0.0080	*(0.66)*
Trade Union Member	0.0055	*(2.78)*	0.0175	*(4.19)*	0.0235	*(3.07)*	-0.0197	*(2.31)*	-0.0269	*(3.65)*
Regular Performance Appraisal	-0.0014	*(0.81)*	-0.0051	*(1.24)*	0.0003	*(0.04)*	0.0089	*(0.99)*	-0.0028	*(0.32)*
Workplace Characteristics										
Log Workplace Size	-0.0003	*(0.10)*	0.0062	*(0.92)*	0.0319	*(2.48)*	0.0090	*(0.61)*	-0.0467	*(3.58)*
Log Workplace Size Squared	0.0001	*(0.17)*	-0.0005	*(0.80)*	-0.0027	*(2.15)*	0.0001	*(0.03)*	0.0031	*(2.44)*
Percentage of Dismissals	0.0001	*(0.17)*	0.0008	*(1.55)*	0.0004	*(0.31)*	-0.0007	*(0.64)*	-0.0005	*(0.60)*
Percentage of Redundancies	0.0001	*(1.67)*	0.0009	*(5.10)*	0.0013	*(2.19)*	-0.0011	*(2.47)*	-0.0012	*(2.57)*
Percentage of Suspensions	0.0001	*(0.03)*	0.0069	*(1.57)*	-0.0049	*(0.51)*	-0.0002	*(0.02)*	-0.0019	*(0.21)*
Index of % Supervisors	-0.0021	*(2.90)*	-0.0043	*(2.43)*	-0.0031	*(0.88)*	0.0005	*(0.12)*	0.0091	*(2.61)*
Vacancy Difficulties at Workplace	0.0023	*(0.83)*	-0.0014	*(0.24)*	0.0219	*(1.68)*	-0.0163	*(1.08)*	-0.0065	*(0.53)*
Performance Related Pay	-0.0036	*(2.31)*	0.0051	*(1.29)*	-0.0072	*(0.89)*	0.0117	*(2.34)*	-0.0059	*(0.73)*
Industrial Action in Last 12 Months	-0.0034	*(1.43)*	0.0053	*(0.71)*	0.0106	*(0.70)*	-0.0088	*(0.51)*	-0.0038	*(0.22)*
Employers' perception of commitment	-0.0054	*(4.57)*	-0.0186	*(5.90)*	-0.0556	*(8.86)*	0.0218	*(3.22)*	0.0578	*(9.11)*
Long-term employment prospects in workplace	-0.0001	*(1.91)*	-0.0035	*(1.73)*	0.0017	*(0.37)*	0.0037	*(1.93)*	0.0081	*(2.82)*
Labour productivity	-0.0003	*(0.27)*	-0.0044	*(1.67)*	-0.0078	*(1.38)*	-0.0001	*(0.01)*	0.0126	*(1.16)*
Chi Squared	2328.88 *p=[0.000]*									
OBSERVATIONS	17,008									

Table 1 (Continued): The Determinants of Employee Commitment and Loyalty: Employee Level Analysis

PANEL B: SUBJECTIVE MEASURE OF WORKPLACE PERFORMANCE – FINANCIAL PERFORMANCE

	CLI=0: Strongly Disagree		*CLI*=1: Disagree		*CLI*=2: Neither Agree/Disagree		*CLI*=3: Agree		*CLI*=4: Strongly Agree	
	M.E.	*TSTAT*	M.E.	*TSTAT*	M.E.	*TSTAT*	M.E.	*TSTAT*	M.E.	*TSTAT*
Log Relative Wage (RW)	-0.0008	*(1.14)*	-0.0044	*(2.28)*	-0.0266	*(7.08)*	0.0051	*(2.16)*	0.0267	*(7.61)*
Workplace Financial Performance	-0.0005	*(0.58)*	-0.0009	*(0.40)*	-0.0098	*(2.12)*	0.0029	*(0.57)*	0.0084	*(1.63)*
Controls	As in Table 1 Panel A									
Chi Squared	2,245.93 *p=[0.000]*									
OBSERVATIONS	17,008									

PANEL C: OBJECTIVE MEASURE OF WORKPLACE PERFORMANCE – LOG PROFITS PER EMPLOYEE

	CLI=0: Strongly Disagree		*CLI*=1: Disagree		*CLI*=2: Neither Agree/Disagree		*CLI*=3: Agree		*CLI*=4: Strongly Agree	
	M.E.	*TSTAT*	M.E.	*TSTAT*	M.E.	*TSTAT*	M.E.	*TSTAT*	M.E.	*TSTAT*
Log Relative Wage (RW)	0.0009	*(0.16)*	-0.0018	*(0.58)*	-0.0302	*(5.12)*	0.0071	*(1.99)*	0.0249	*(4.38)*
Log Profits per Employee	-0.0001	*(0.27)*	0.0002	*(0.16)*	-0.0024	*(0.84)*	-0.0018	*(0.73)*	0.0041	*(1.13)*
Controls	As in Table 1 Panel A									
Chi Squared	615.60 *p=[0.000]*									
OBSERVATIONS	6,681									

Notes: M.E. Denotes marginal effect. Results are from a generalised ordered probit specification allowing for clustering effects within workplaces.

Table 2: The Relationship between Workplace Performance and Employee *CLI* : Workplace Level Analysis

PANEL A: AVERAGE EMPLOYEE COMMITMENT-LOYALTY INDEX WITHIN THE WORKPLACE

	LABOUR PRODUCTIVITY (*LP*)				*FINANCIAL PRODUCTIVITY (FP)*				*PROFITS PER EMPLOYEE*
	0	1	2	3	0	1	2	3	
$\overline{\text{CLI}}$	-0.0354	-0.0560	0.0619	0.0294	-0.0362	-0.0172	0.0557	-0.0023	0.3993
	(2.98)	*(2.87)*	*(2.05)*	*(2.03)*	*(2.24)*	*(0.58)*	*(2.83)*	*(0.11)*	*(1.97)*
$\overline{\text{RW}}$	-0.0038	-0.0042	0.0040	0.0041	-0.0108	-0.0011	-0.0010	0.0129	0.0008
	(0.55)	*(0.29)*	*(0.28)*	*(0.63)*	*(1.37)*	*(0.08)*	*(0.08)*	*(1.47)*	*(0.10)*
Wald Chi Squared	108.25 *p=[0.000]*				147.69 *p=[0.000]*				–
Pseudo R Squared	0.0324				0.0401				–
F Statistic	–				–				2.74 *p=[0.000]*
R Squared	–				–				0.1934

PANEL B: EMPLOYERS' PERCEPTION OF EMPLOYEE COMMITMENT

	LABOUR PRODUCTIVITY (*LP*)				*FINANCIAL PRODUCTIVITY (FP)*				*PROFITS PER EMPLOYEE*
	0	1	2	3	0	1	2	3	
Commitment	-0.0287	-0.1062	0.1101	0.0249	-0.0419	-0.0290	0.0302	0.0406	0.0354
	(4.30)	*(5.88)*	*(6.10)*	*(2.69)*	*(5.17)*	*(1.98)*	*(2.76)*	*(3.78)*	*(0.25)*
Wald Chi Squared	165.56 *p=[0.000]*				202.45 *p=[0.000]*				–
Pseudo R Squared	0.0539				0.0548				–
F Statistic	–				–				2.75 *p=[0.000]*
R Squared	–				–				0.1808

PANEL C: AVERAGE PREDICTED EMPLOYEE COMMITMENT-LOYALTY INDEX WITHIN THE WORKPLACE

	LABOUR PRODUCTIVITY (*LP*)				*FINANCIAL PRODUCTIVITY (FP)*				*PROFITS PER EMPLOYEE*
	0	1	2	3	0	1	2	3	
Predicted $\overline{\text{CLI}}$	-0.0185	-0.1238	0.1024	0.0400	-0.0342	-0.0028	0.0096	0.0274	0.1585
	(1.43)	*(3.41)*	*(2.77)*	*(2.13)*	*(2.91)*	*(0.08)*	*(0.26)*	*(2.37)*	*(1.63)*
Wald Chi Squared	105.24 *p=[0.000]*				140.29 *p=[0.000]*				–
Pseudo R Squared	0.0326				0.0394				–
F Statistic	–				–				4.87 *p=[0.000]*
R Squared	–				–				0.0791
OBSERVATIONS	1,432								495

Notes: Marginal effects are shown for *LP* and *FP*, whilst estimated coefficients are shown for profits per employee. T statistics are shown in parenthesis. A generalised ordered probit specification is used to model *LP* and *FP*, whilst OLS is used to model profits per employee. Controls include: average relative wage; quadratic in workplace size; quadratic in workplace age; index of labour costs as a proportion of sales revenue; proportions of females, ethnic origin, unskilled; foreign ownership; UK multinational; trade union recognition; performance related pay or employee share ownership; public sector and industry dummy variables.

Table 3: The Relationship between the Change in Financial Performance over 1998 to 2004 and *CLI*: Workplace Level Panel Analysis

PANEL A: AVERAGE EMPLOYEE COMMITMENT-LOYALTY INDEX WITHIN THE WORKPLACE MEASURED IN 1998

	Change in financial performance (1998-2004) below industry average		*Change in financial performance (1998-2004) equal to industry average*		*Change in financial performance (1998-2004) above industry average*	
	M.E.	*TSTAT*	M.E.	*TSTAT*	M.E.	*TSTAT*
$\overline{\text{CLI}}$	-0.1320	*(2.04)*	0.0962	*(1.46)*	0.0358	*(2.60)*
Wald Chi Squared	*103.71 p=[0.000]*					
Pseudo R Squared	0.1506					

PANEL B: AVERAGE PREDICTED EMPLOYEE COMMITMENT-LOYALTY INDEX WITHIN THE WORKPLACE MEASURED IN 1998

	Change in financial performance (1998-2004) below industry average		*Change in financial performance (1998-2004) equal to industry average*		*Change in financial performance (1998-2004) above industry average*	
	M.E.	*TSTAT*	M.E.	*TSTAT*	M.E.	*TSTAT*
Predicted $\overline{\text{CLI}}$	-0.1356	*(2.28)*	0.0324	*(1.10)*	0.0679	*(2.29)*
Wald Chi Squared	*102.38 p=[0.000]*					
Pseudo R Squared	0.1516					
OBSERVATIONS	522					

Notes: M.E. denotes marginal effect. Results are from a generalised ordered probit specification. Controls are: average relative wage; quadratic in workplace size; quadratic in workplace age; index of labour costs as a proportion of sales revenue; proportions of females, ethnic origin, unskilled; foreign ownership; UK multinational; trade union recognition; performance related pay or employee share ownership; public sector and industry dummy variables.

Table 4: The Relationship between Workplace Performance and Relative Wages: Two Stage Estimation: Workplace Level Analysis

	TWO STAGE PROBIT LEAST SQUARES				TWO STAGE LEAST SQUARES	
PANEL A: STAGE 2	DL=1 if Labour Productivity Above Average (i.e. LP>=2)		DP=1 if Financial Performance Above Average (i.e FP>=2)		Profits per Employee	
Instrumented $\overline{RW}$	0.0176	*(0.50)*	0.0307	*(0.87)*	-0.8532	*(1.51)*
$\overline{CLI}$	0.2208	*(2.95)*	0.1243	*(2.67)*	0.0232	*(1.87)*
Log Likelihood Ratio	49.22 *p=[0.000]*		59.48 *p=[0.000]*		–	
Pseudo R squared	0.0248		0.0300		–	
F Statistic	–		–		2.63 *p=[0.000]*	
Adjusted R Squared	–		–		0.0689	
PANEL B: STAGE 1	Log Relative Wage $\overline{RW}$		Log Relative Wage $\overline{RW}$		Log Relative Wage $\overline{RW}$	
Instrumented DL	0.0241	*(0.67)*	–	–	–	–
Instrumented DP	–	–	0.3832	*(0.74)*	–	–
Instrumented Profits	–	–	–	–	0.0006	*(0.05)*
$\overline{CLI}$	0.1966	*(2.54)*	0.0878	*(2.54)*	0.1221	*(2.13)*
F Statistic	13.13 *p=[0.000]*		12.04 *p=[0.000]*		3.24 *p=[0.000]*	
Adjusted R squared	0.1387		0.1394		0.0790	
OBSERVATIONS	1,432				495	

Notes: (i) Coefficients are shown with T statistics in parenthesis. (ii) Control variables used in stage 1 for the two stage probit least squares are proportion of employees within the workplace: in each tenure group; in each highest education category; male; single; white. (iii) Control variables used in stage 2 for the two stage probit least squares and standard two stage least squares are: quadratics in workplace size and workplace age; index of labour costs as a proportion of sales revenue; proportions of females, ethnic origin, unskilled; foreign ownership; UK multinational; trade union recognition; performance related pay or employee share ownership; public sector and industry dummy variables.

Table A1: Summary Statistics

	MEAN	STANDARD DEVIATION	MINIMUM	MAXIMUM
Workplace Level Analysis				
Financial Performance (*FP*)	1.5509	0.8097	0	3
Labour Productivity (*LP*)	1.5001	0.7132	0	3
Log Profits per Employee	-2.0689	2.5957	-10.4070	36.4491
Average Commitment Loyalty Index ($\overline{CLI}$)	2.9581	0.4680	0	4
Average Relative Wage Paid in Workplace ($\overline{RW}$)	4.5551	1.0127	1.6510	10.7376
OBSERVATIONS		1,432		
Employee Level Analysis				
Employee Characteristics				
Employee Commitment Loyalty Index (*CLI*)	2.8218	0.8493	0	4
Log Relative Industry-Occupational Wage (*RW*)	4.2202	0.9801	-2.1501	12.9457
Male	0.4739	0.4993	0	1
Part Time	0.2079	0.4059	0	1
Age 16-17	0.0098	0.0989	0	1
Age 18-19	0.0219	0.1467	0	1
Age 20-21	0.0259	0.1589	0	1
Age 22-29	0.1565	0.3634	0	1
Age 30-39	0.2538	0.4352	0	1
Age 40-49	0.2682	0.4430	0	1
Age 50-59	0.2197	0.4141	0	1
Age 60-64	0.0368	0.1884	0	1
Tenure: tenure <1 year	0.1552	0.3622	0	1
Tenure: 1 year $\leq$ tenure < 2 years	0.1274	0.3335	0	1
Tenure: 2 years $\leq$ tenure < 5 years	0.2649	0.4413	0	1
Tenure: 5 years $\leq$ tenure < 10 years	0.1877	0.3905	0	1
Permanent Contract	0.9235	0.2658	0	1
Trade Union Member	0.3715	0.4832	0	1
Regular Performance Appraisal	0.7091	0.4542	0	1
Workplace Characteristics				
Log Workplace Size	4.8406	1.5773	1.6094	8.7979
Log Workplace Size Squared	25.9188	16.1929	2.5903	77.4022
Percentage of Dismissals	1.1343	3.1136	0	100
Percentage of Redundancies	2.1030	8.7708	0	100
Percentage of Suspensions	4.2815	4.9483	0	100
Index of % Supervisors	1.5980	1.0814	0	6
Vacancy Difficulties at Workplace	0.1170	0.3214	0	1
Performance Related Pay	0.3613	0.4804	0	1
Industrial Action in Last 12 Months	0.0800	0.2713	0	1
Employers' perception of commitment	1.8653	0.6727	0	3
Long-term employment prospects in workplace	3.0175	0.8947	0	4
OBSERVATIONS		17,008		