

DISCUSSION PAPER SERIES

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Alex Bryson

University College London and IZA

John Forth

Beyes Business School, City University and IZA

Francis Green

University College London

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IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

The Relative Importance of the Establishment in the Determination of Job Quality*

Using linked employer-employee data from the British Workplace Employment Relations Survey we examine how much of the variation in job quality is accounted for by establishment-level variation, and the relative importance of the establishment compared with occupation and employee characteristics. We do so for pay, six dimensions of non-pay job quality and overall job quality. We show that the establishment is the dominant explanatory factor for non-pay job quality, and as important as occupation in accounting for pay. Where you work accounts for between 38% and 76% of the explained variance in job quality, depending on the dimension. We also find that establishments which are 'good' on one dimension of non-pay job quality are 'good' on others. When we relate the estimated establishment effects (after allowing for the effects of occupation and of employee characteristics) to observed establishment characteristics, we find that non-pay job quality is greater in smaller establishments.

JEL Classification: J31, J32, M50

Keywords: job quality, decomposition, establishment

Corresponding author:

Alex Bryson
Social Research Institute
University College London
27 Woburn Square
London WC1H 0AA
United Kingdom
E-mail: a.bryson@ucl.ac.uk

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The aim of this paper is to investigate the importance of the establishment in accounting for variations in job quality in several dimensions. Around the turn of this century, the International Labour Organization proposed the policy objective of ‘decent work’ for all, and this became the driving vision for much of its work in subsequent years, culminating in the adoption of the decent work objective by the United Nations as part of one of its sustainable development goals (SDGs) for 2030 (ILO 1999). An important part of that concept concerns the characteristics of jobs that contribute to meeting workers’ needs from their jobs – that is, job quality. The OECD (2003) and some national governments promoted the mantra of ‘more and better jobs’, and similar sentiments were espoused by the Presidency of the Lisbon European Council in 2000.¹ Scholarly interest within several fields in the problem of job quality has also greatly increased during this century, to the extent that the number of papers on this topic has mushroomed.²

Conceptual progress has been made, and, though authors’ classifications vary somewhat depending on their available data, several dimensions of job quality have been identified and are widely used in analyses: earnings, prospects (including security), working time quality, autonomy and skill,³ work intensity, the social environment and the physical environment (Leschke and Watt 2008; Eurofound 2012; Burchell et al 2014; Eurofound 2012, 2021; Chen and Mehdi 2019; Berg et al. 2023; Bolliger et al 2022; Choi et al. 2020; Riva et al. 2022). Much evidence has also been amassed showing the strength of the association of each of these dimensions of job quality, sometimes in combination, with health and wellbeing. Taken together, the evidence now suggests that varying job quality is associated with a substantial proportion of the variation in general wellbeing across populations (Drobnič et al 2010; Eurofound 2019; Green et al. 2024; Green, 2025). This conclusion heightens the value to both scholars and policymakers of understanding the determinants of job quality.

Job quality has typically been attributed to supra-organizational factors such as technological change, the supply of skills and macro-social trends. However, with respect to earnings and benefits, an additional focus has been on firms as autonomous agents, able to adopt differentiated strategies and pay wages that diverge from those paid by competitors to workers in the same occupations with the same skills (Abowd et al. 1999). Such interfirm wage differentiation has for long been interpreted as resulting from limitations to competition, including pervasive anti-

¹ www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/00100-r1.en0.htm

² A Web of Science search on ‘job quality’ over all fields revealed the number of publications rose from just a few per year at the start of the century to an average of 110 per year over 2020 to 2023. Searches on specific dimensions of job quality – such as job security – reveal a similar exponential expansion of scholarly interest.

³ The ‘autonomy and skill’ dimension is referred to as ‘skills and discretion’ in some studies.

competitive practices, a psychological resistance to change in differentials and, more recently to the presence of dynamic monopsony in labour markets (Lester, 1952; Manning, 2003).

The evidence continues to support the view that establishment practices (both observed and unobserved) have an impact on wages beyond any identifiable influences from workers' skills and other characteristics, and beyond the impact of the occupation to which employees are classified (Barth et al. 2016). The firm or establishment level is shown to be important for the understanding of wage inequality in several countries (OECD 2021). Much less is known, however, about the importance of the firm in accounting for other dimensions of job quality. These other dimensions could be connected to pay, because they are in part jointly determined by labour market conditions; they may also be loosely linked if higher wages are paid to compensate for poor job quality in another dimension. Nevertheless, non-pay dimensions need not be closely correlated with wages; in practice the correlations are distinctly low, and for some dimensions either zero or negative (Green, 2025). Thus, it cannot be presumed that the importance of establishments for non-pay dimensions of job quality is the same as it is for pay.

We contribute to the literature on the importance of the establishment by expanding the scope of enquiry to its potential influence on several dimensions of job quality. We deploy matched establishment-employee data from the British Workplace Employment Relations Survey (Department for Trade and Industry, 2014; Department for Business Innovation and Skills, 2015) to construct indices of job quality dimensions and composite indices of overall job quality and of non-pay job quality covering several dimensions. We deploy statistical methods to estimate for the first time the relative importance of establishments, compared with occupations and skills, for accounting for each dimension of job quality. The relative importance indicators are then compared between dimensions. The potential significance of these indicators is that, if large, they would suggest that establishment level policies – for example, for firms to implement a package of high-involvement working practices, or for government to impose regulatory controls that constrain certain practices found in low-job-quality establishments – could be a viable means to positively influence job quality. In further analyses we then proceed to relate the residual establishment premia (the fixed effects from our estimating equations) to the size and age of the establishment and to several other observed establishment characteristics, as suggested in theory and by previous studies of wages.

Theoretical frameworks and literature review

There is a long-standing literature spanning economics, industrial relations and organisational sociology, on the role of firms and their managers in wage-setting in the context of imperfect

labour markets (for example, Lester, 1952; Manning 2003; Osterman 2006; Batt et al 2010). Firms are presumed to have some leeway to choose a wage strategy, such as those exemplified in the banner distinctions between ‘high road’ and ‘low road’ firms (Osterman 2018). This presumption has been supported in recent years by a growing body of evidence showing the importance of firm-specific wage premia in accounting for wage variation, over and above the effects of occupations and of sorting according to employees’ skills and other characteristics (Abowd et al. 1999; Barth et al. 2016; Song 2019; Schaefer and Singleton 2019; Avent-Holt et al. 2020). One multi-country study (OECD 2021) found that the relative importance of firms varies across countries, being high in countries with more decentralised bargaining systems, more dualised industrial relations, and modest voluntary mobility, but low among very large firms. Overall across 20 OECD countries, firm-specific wage premia account for approximately one half of rising overall inequality between the mid-1990s and the mid-2010s. Firm-specific factors have also been found to play an important role in accounting for ethnic and gender discrimination on wages: employers and managers who design jobs and their rewards have a variable propensity to discriminate or, conversely, to treat all employees fairly; they are presumed able to indulge that propensity to a greater or lesser extent (Forth et al. 2023).

Theories of the determination of non-pay dimensions of job quality have often been framed in terms of macro-socio-economic factors, such as the growth of the ‘knowledge economy’ or, simply, economic growth, growing precariousness, the changing bargaining power and political power resources of labour, and the prevailing forms of technological and organizational change (such as skill-biased and effort-biased) along with global or domestic outsourcing (e.g. Kalleberg 2011, 2018; Howell and Kalleberg 2019; Green et al. 2022; Green 2025). Nation-specific institutions are seen to frame the prevalence of collective bargaining, the level at which it takes place, and the processes of occupational skill formation, which help to determine autonomy and skills requirements (Bryson et al. 2021). In some analyses these institutions are thought to cluster in certain country groups or ‘employment régimes’ (corporatist, Nordic, liberal market and so on) (Gallie 2007, 2009; Doellgast et al. 2009; Holman 2013; Frege and Godard 2014). These high-level determinants of job quality are then interwoven, in sociological accounts, with occupational social class as a potential key stratification category (Le Grand and Tahlin 2017; Mustosmäki et al. 2017; Warren and Lyonette, 2018; Gallie 2013, 2019; Williams et al. 2020).

Yet, for reasons similar to those adduced for the importance of firms in determining wages, firms and establishments are also important for the determination of non-pay job quality, in that they may have a degree of freedom to adopt a range of levels for each dimension. They face partial constraints from above, through legal and regulatory requirements, such as those requiring

adherence to safety practices; such regulations do not, however, constrain managers fully. Managers are also limited by what the labour market will bear, in that high or low levels in any dimension of job quality are likely to affect the number of people offering to work for the firm, and also potentially their behaviour in post (whether they deliver high or low discretionary effort). Yet market constraints are also loose, because there is far from perfect information about the levels available in competing firms. Thus, firms can follow a range of labour reward and control strategies that are different from those of competitors, without expecting high levels of inward or outward mobility. Kelly et al. (2023) provide a wide-ranging evidence review of how each of several employer practices may affect worker mobility, including via increases in job quality.

We expect that information about the non-pay dimensions of firms competing in the labour market is likely to be much less complete than what is known about wages. It may be harder and more costly for job-seekers to learn about working conditions such as job autonomy or the extent of social support, or even the working time quality and the required pace of work in alternative jobs, than it is to obtain information about their posted wages which are relatively easy to discover. Making the conventional assumption that incomplete information about alternative job offers generates frictions by raising the perceived costs of mobility, we hypothesise therefore that the amount of variation in job quality between establishments that can be sustained is greater for non-pay job quality than for wages. Establishments will thus be relatively more important in accounting for variation in non-pay dimensions than in accounting for variation in pay.

The variation in job quality in similar jobs and occupations need not necessarily be the consequence of deliberative management strategy. Job quality can vary because, say, middle managers are variably supportive of those they oversee. Supervisors also have idiosyncrasies which, in a minority of cases, results in them becoming 'bad bosses' (Artz et al. 2020), which senior managers fail to control. Thus, a further source of variation is in managerial skills.⁴ As illustration, Arrighetti et al. (2022) find, using matched employer-employee data in Italian manufacturing firms, that employers facing uncertainties and demand fluctuations can deploy existing staff flexibly and make less use of non-standard labor (with lower job quality) in those firms where managerial skills and resources have been enhanced. Poor skills may lead senior managers to fail to promote or recruit effectively (leading to skills mismatch), or neglect to provide adequate training for the middle managers who will be directly affecting the job quality of many employees in the establishment. In short, firm-level factors such as the quality of senior leadership and of its human

⁴ This point is similar to that of Roberts and Shaw (2022, p.29) in their discussion of the effect of management practices on productivity, and the role of middle management.

resource management are likely to affect the job quality of all the firm's workers. Establishment-level variation in job quality is also a consequence of establishment-level variation in the collective voice and bargaining position of its workers (Hunter 2000). If a similar voice is available to all workers of particular occupations, across establishments, as happens in more centralised bargaining systems, then there will be more uniformity; by contrast, where there is decentralised bargaining, and where workers in some companies have acquired more voice than those in others, and that voice is used to affect working conditions, the consequence is more variation across establishments (Avent-Holt et al. 2020).

For all these reasons, we expect that each worker's experience of job quality depends to some extent on the particular organisation that they work for, whatever occupation they are following, and whatever their acquired skills. The research on observable, firm-level determinants of non-pay job quality remains relatively scarce. Some of the conditional cross-establishment variation in job quality might be related to observable characteristics, such as the size of the firm or establishment, its ownership and governance structure, its age, whether it has recently been bought out, its industry type and sector (public/private), its deployment of professionalised management and the affiliation of managers with professional networks, its adoption of industry quality standards, the gender balance of its managers, and whether it affords a labour voice and collective bargaining: any of these might help to account for managerial skills and orientations, and hence for the job quality in many dimensions that is experienced by workers (Hunter 2000; Doeringer et al. 2002; Gorjup et al. 2009; Storey et al. 2010; Gonzalez 2010; Levine et al. 2010; Haley-Lock and Ewert 2011; Piasna et al. 2013; Bryson et al. 2021; Hoque and Bacon 2023; Green and Lee 2024). However, we also expect that there would be substantive variation in establishment job quality premiums associated with factors that are typically not measured in large data sets – such as the firm's human resource strategy and managers' idiosyncrasies – and are therefore not accounted for by observable indicators.

Unlike with wages, there has been no research hitherto on the relative importance of establishments in accounting for the variation in non-pay elements of job quality. The research on establishment-level wage variation relies on the presence of matched employer-employee data sets, the proliferation of which has enabled the above-cited studies. Yet these data sets are typically compiled from administrative sources which record few, if any, elements of non-pay job quality. An exception is hours of work which, if recorded administratively, is relevant since the avoidance of very long-hours working is an important element of working time quality having strong negative associations with physical health. For other elements of working time quality (such as hours flexibility), and for other dimensions of job quality, administrative data normally provides no

information. Consequently, these administrative matched data sets do not permit the importance of establishments in determining non-pay job quality to be investigated.

To examine the role of establishments, we therefore present evidence from one of the few non-administrative data sets suitable for addressing this issue. The British Workplace Employment Relations Surveys (WERS) collected data in both 2004 and 2011 from employees on variables pertaining to their earnings, prospects, working time quality, autonomy and involvement, work intensity and the social environment. While some of these dimensions of job quality are not captured with as comprehensive array of items as is available, for example, in the European Working Conditions Surveys, the data are sufficient to record substantial variation within each of these dimensions. The only dimension of job quality, out of the seven listed in the introduction, that is not covered by any items is the physical environment of work, so this dimension is absent from our analysis. With that exception, we can construct composite indices of job quality for each dimension. By combining these we are also able to construct an overall index of job quality, and an index of non-pay job quality comprising all dimensions except pay. These indices then enable an examination of three questions that arise from the discussion in this section:

- How much of the variation in overall job quality is accounted for by establishment-level variation, and what is the relative importance of establishment, compared with occupation and with employee sorting according to their skills and other characteristics.
- Splitting the index, how does the relative importance of the establishment vary across the dimensions of job quality? Specifically, does the data support the hypothesis that establishment level variation is less important with respect to pay than with respect to non-pay elements of job quality?
- To what extent can observed establishment-level characteristics (capturing governance, ownership, size, gender of management, sector and industry) account for the conditional association of establishment level with job quality?

Data and methods

Dataset

The 2004 and 2011 WERS, when appropriately weighted, provide nationally representative data on employees in establishments in Britain with 5 or more employees, covering all sectors of the economy except agriculture and mining (Kersley et al, 2006; Van Wanrooy et al, 2013). Our analysis exploits two elements of these surveys. The first is the management interview, conducted face-to-face with the most senior establishment manager responsible for employee relations. In 2004,

interviews were conducted in 2,295 establishments with a response rate of 64%, while in 2011, 2,680 interviews were conducted with a response rate of 46%. The workplace sample for the 2011 survey comprised all responding workplaces from 2004 plus a refreshment sample designed to make the 2011 survey cross-sectionally representative; some 989 workplaces yielded observations in both years.

The second element is the survey of employees, undertaken in the subset of these establishments where management permitted it (76% of all establishments in 2004; 72% in 2011). Self-completion questionnaires were distributed to a simple random sample of 25 employees in these establishments (or to all employees in establishments with 5-24 employees). In 2004, 22,451 usable questionnaires were returned. This represents a response rate of 61% in participating establishments and a yield of 46% from all employees who would have received a questionnaire had all establishments have consented to distribution. In 2011, 21,981 questionnaires were returned, with a response rate of 54% and a yield of 39%.

To maximise our sample size and thus the explanatory power of our estimates, we pool the two years of data, while including a year dummy to control for possible conditional shifts between waves. This yields 44,432 employee observations, deriving from a total of 3,056 workplaces, 600 of which are observed in both years. Among these 44,432 employee observations, we have data on our job quality indices, employee characteristics and occupation for 39,309 employees. We further restrict the sample to those workplaces which generate at least two employee observations each year, to be able to separate the influence of employee and workplace characteristics on job quality via the estimation of workplace fixed effects. This leaves an estimation sample of 39,150 employees across 2,919 workplaces, with 560 of these workplaces being observed in both years. Unique identifiers make it possible to account for the non-independence of these panel workplace records in variance estimation when pooling across years. The 13,246 employee responses that derive from panel workplaces (7,113 in 2004 and 6,133 in 2011) are anonymous and so must be treated as independent from one another across time in variance estimation; this necessarily also obviates the estimation of worker fixed effects.

Measuring job quality

We measure an employee's job quality using multiple items from the WERS Survey of Employees Questionnaire. While the items covered in the employee survey are wide-ranging, and sufficient to capture most of the elements of job quality suggested in earlier literature, they do not include the quality of the physical environment. They do, however, include multiple items covering autonomy (including involvement) and skill development and utilization. While earlier analyses combined

these in one index, on the basis of sociological theory suggesting close links between the two, recent literature has evinced some decoupling of the trends in these two elements and found that in some countries (including Britain) worker autonomy declined even while skill requirements continued to rise (Gallie et al. 2018; Henseke et al. 2018). We therefore decided to enter these two sub-dimensions – autonomy and skill – separately in our analysis. We thus construct sub-indices measuring seven dimensions of job quality: earnings, prospects, working time quality, autonomy, skill development and utilization, work intensity, and the quality of the social environment. Except for earnings, each of the sub-indices is compiled from multiple items; a full list of items and coding frameworks is shown in Table 1.

We then construct an overall index of job quality, and an index of non-pecuniary job quality, from these sub-indices. Each index and sub-index is constructed as an additive scale, using standardized values of the individual items (mean 0, variance 1). The index itself is also standardized prior to analysis. In cases where one or more components of an index or sub-index has a missing value, the index is computed from the remaining available items. On each index, higher values indicate better job quality.

Table 1: Components of the job quality indices

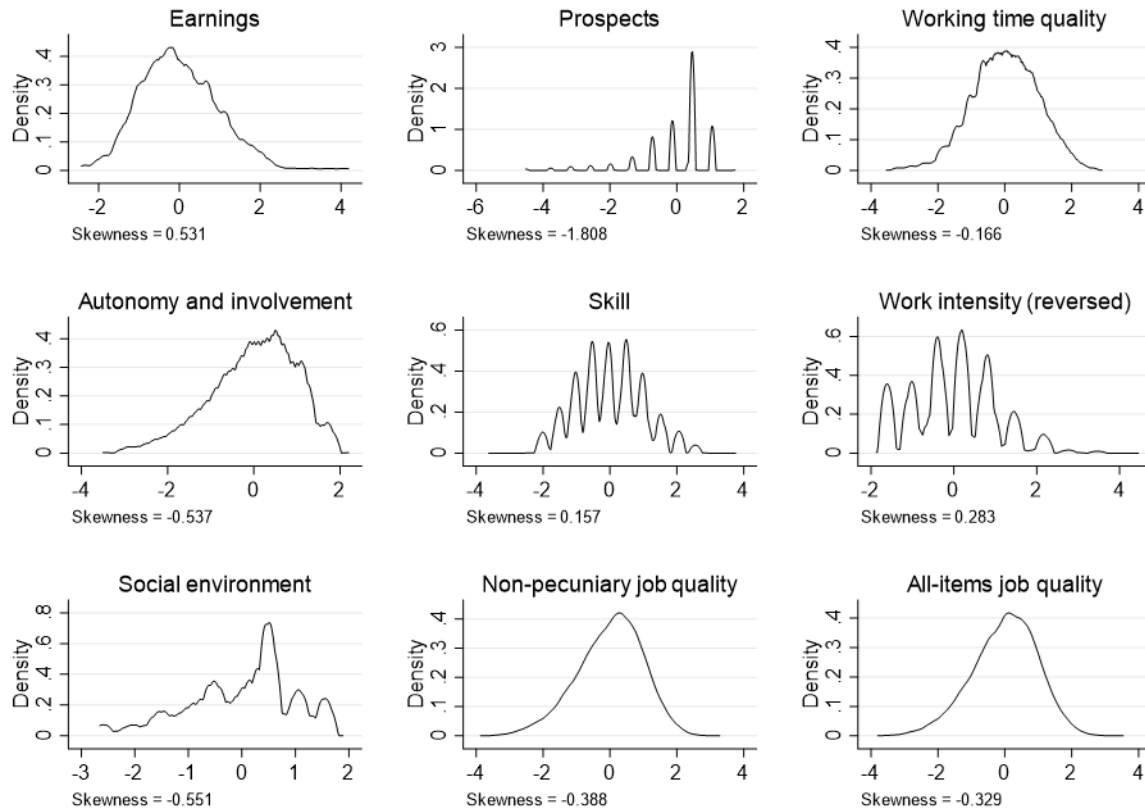
Component of job quality	Source question text	Source question scale / coding
Earnings:		
Natural log. of real, usual gross weekly earnings (banded) divided by usual weekly hours (continuous)	How much do you get paid for your job here, before tax and other deductions are taken out? / How many hours do you usually work in your job each week, including overtime or extra hours?	£/hour, deflated using Consumer Price Index and winsorized at 1 st and 99 th percentile
Prospects:		
Perceived job security	Do you agree or disagree with the following statements about your job? ... I feel my job is secure in this establishment	Strongly agree (5) to Strongly disagree (1)
Contract type	Which of the phrases below best describes your job here?	Permanent (1), Temporary – with no agreed end date (0), Temporary – with an agreed end date (0)
Working time quality:		
Avoidance of long weekly working hours	How many hours do you usually work in your job each week, including overtime or extra hours?	Less than 48 hours (1), 48+ hours (0)
Working time flexibility	In general, how much influence do you have over the following? ... The time you start or finish your working day	A lot (4) to None (1)
Availability of flexible working arrangements	In the last 12 months, have you made use of any of the following arrangements, and if not, are they available to you if you needed them? ... Flexi-time; The chance to reduce your working hours; Working the same	I have used this arrangement (1), Available to me but I do not (0)

Component of job quality	Source question text	Source question scale / coding
	number of hours per week across fewer days; Working at or from home in normal working hours; Working only during school term times; Paid leave to care for dependents in an emergency.	not use (1), Not available to me (0)
Managers' approach to non-work responsibilities	Now thinking about the managers at this establishment, to what extent do you agree or disagree with the following? ... Managers here understand about employees having to meet responsibilities outside work	Strongly agree (5) to Strongly disagree (1)
Autonomy and involvement:		
Task discretion	In general, how much influence do you have over the following? ... The tasks you do in your job; The pace at which you work; How you do your work; The order in which you carry out tasks	A lot (4) to None (1)
Employee involvement	Overall, how good would you say managers at this establishment are at ... Seeking the views of employees or employee representatives; Responding to suggestions from employees or employee representatives; Allowing employees or employee representatives to influence final decisions	Very good (5) to Very poor (1)
Skill Development and Utilization:		
Training received	Apart from health and safety training, how much training have you had during the last 12 months, either paid for or organised by your employer?	10 days or more (10), 5-9 days (7), 2-4 days (3), 1 day (1), Less than 1 day (0.5), None (0)

Component of job quality	Source question text	Source question scale / coding
Managers' approach to skill development	Now thinking about the managers at this establishment, to what extent do you agree or disagree with the following? ... Managers here encourage people to develop their skills	Strongly agree (5) to Strongly disagree (1)
Skill match	How well do the work skills you personally have match the skills you need to do your present job?	Much lower (0), A bit lower (0), About the same (1), A bit higher (0), Much higher (0)
<i>Work intensity (reversed):</i>		
Ease of job demands	Do you agree or disagree with the following statements about your job? ... My job requires that I work very hard	Strongly disagree (5) to Strongly agree (1)
Pace of job demands	Do you agree or disagree with the following statements about your job? ... I never seem to have enough time to get my work done	Strongly disagree (5) to Strongly agree (1)
<i>Social environment:</i>		
Trust and fair treatment	Now thinking about the managers at this establishment, to what extent do you agree or disagree with the following? ... Can be relied upon to keep their promises; Are sincere in attempting to understand employees' views; Deal with employees honestly; Treat people fairly	Strongly agree (5) to Strongly disagree (1)
Climate of employment relations	In general, how would you describe relations between managers and employees here?	Very good (5) to Very poor (1)
<i>Composite indices:</i>		
Non-pecuniary job quality:		

Component of job quality	Source question text	Source question scale / coding
All non-pecuniary sub-indices	Prospects, Working time quality, Autonomy and involvement, Skill Development and Utilization, Work intensity (reversed), Social environment	
All-items job quality:		
All sub-items	As above plus Earnings.	

Figure 1: Kernel density plot of job quality indices (pooled years)



Note: Generated from the pooled sample of employees from 2004 and 2011, weighted. Number of observations = 39,150.

Figure 1 shows kernel density plots for each of the job quality dimensions, as well as for the aggregated indices. As is familiar from many other sources, the Earnings dimension is positively skewed, showing a long upper tail of high paying jobs. Also somewhat positively skewed is the distribution of the Skill Development and Utilization indicator and Work Intensity. In contrast, all other dimensions are negatively skewed, as is the aggregated non-pay job quality. This observation is consistent with evidence from across Europe showing especially low wellbeing in bad jobs at the low end of the multidimensional job quality spectrum (Green and Lee 2024).

Validating the job quality index

Given that the concept of job quality refers to job characteristics that normally contribute to meeting workers' needs from work, we review the validity of our aggregate job quality indices by examining their correlations with employee-level measures of job satisfaction and well-being.

Job satisfaction is measured using an additive index which sums the employee's evaluations (on a five-point scale from 'Very satisfied' to 'Very dissatisfied') across eight items common to the 2004 and 2011 employee questionnaires. These items are: the sense of achievement they get from their work; the scope for using their own initiative; the amount of influence they have over their job; the training they receive; the amount of pay they receive; their job security; the work itself; and the amount of involvement they have in decision-making at the establishment. Well-being is measured using an additive three-item index (adapted from Warr, 2007) which sums the employee's evaluations (on a five-point scale ranging from 'All the time' to 'Never') of the extent to which, over the past few weeks, their job has made them feel: tense; worried; and uneasy.

Table 2 shows that employees in higher-quality jobs are more satisfied and have higher well-being than employees in lower quality jobs.⁵ The correlations between the aggregate indices of overall job quality and non-pay job quality and job satisfaction are particularly strong. Also notable are the positive, but relatively low correlation coefficients between Earnings and other dimensions, implying that it would be misleading to treat Earnings on its own as a proxy for overall job quality.⁶

⁵ Recall that we reverse code Work Intensity such that a higher score means lower work intensity, so lower work intensity is associated with higher well-being and, to a lesser extent, job satisfaction.

⁶ Note the negative correlation between well-being and earnings. This has been observed previously with these data by Bryson et al. (2012) who suggest this may be linked to the stress and anxiety generated by the responsibilities linked to well-paid jobs.

Table 2: Pairwise correlations between job quality components, job satisfaction and well-being

	Earnings	Prospects	Working time quality	Autonomy and involvement	Skill	Work intensity (reversed)	Social environment	Non-pecuniary job quality	All-items job quality	Job satisfaction	Well-being
Earnings	1.00										
Prospects	<i>0.02</i>	1.00									
Working time quality	0.17	0.06	1.00								
Autonomy and involvement	0.12	0.20	0.46	1.00							
Skill	0.11	0.14	0.30	0.40	1.00						
Work intensity (reversed)	-0.15	-0.06	0.04	<u>0.02</u>	-0.04	1.00					
Social environment	0.01	0.19	0.45	0.66	0.48	0.09	1.00				
Non-pecuniary job quality	0.08	0.42	0.65	0.77	0.64	0.29	0.81	1.00			
All-items job quality	0.34	0.40	0.66	0.76	0.63	0.23	0.76	0.96	1.00		
Job satisfaction	0.10	0.33	0.39	0.70	0.50	0.02	0.67	0.73	0.71	1.00	
Well-being	-0.13	0.12	0.16	0.24	0.11	0.38	0.32	0.37	0.32	0.36	1.00

Notes:

1. The measures of job satisfaction and well-being are described in the text
2. Pairwise correlations are computed on the pooled sample of employees from 2004 and 2011, weighted.
3. Number of observations for all cells = 39,819, except: penultimate row (job satisfaction) = 37,758; and final row (well-being) = 39,316.
4. Key to statistical significance: bold type = $p < 0.01$; underlined = $p < 0.05$; italics = $p < 0.10$; normal type = not statistically significant ($p > 0.10$).

Estimating the relative importance of the establishment for job quality

Analytical methods

We use the method of ordinary least squares to regress each measure of job quality on a vector of independent variables comprising employee demographic characteristics; a vector of occupations; a year dummy; and a set of establishment IDs. The specification is as follows:

$$Y_{ij} = b_0 + b_1 Dem_{ij} + b_2 Occ_{ij} + b_3 Year_{ij} + b_4 Est_j + \varepsilon_{ij} \quad (\text{Eq. 1})$$

where:

- Y_{ij} is a measure of job quality (either the overall index or one of its components) for the job of employee i in establishment j
- Dem_{ij} is a vector of demographic characteristics for employee i in establishment j comprising: gender, ethnicity, disability status, age, highest educational qualification (8 dummies); and highest vocational or professional qualification (9 dummies).
- Occ_{ij} is a vector of occupational categories for employee i in establishment j , measured at the four-digit level of the UK Standard Occupational Classification (2000), together with a dummy variable indicating whether the employee supervises other employees
- $Year_{ij}$ is a dummy variable indicating whether employee i in establishment j was observed in 2004 or 2011⁷
- Est_j is a vector of unique establishment identifiers.

The coefficients b_4 capture the between-establishment variance in average job quality.⁸ The coefficients b_1 , b_2 and b_3 then capture the average within-establishment variance in job quality according to employee characteristics, occupation codes and by year.⁹

Our analyses use the establishment-level and employee-level weights that are provided with the survey data to correct for the use of variable probabilities of selection within the WERS sample

⁷ It is possible to have within-establishment variation by year because some establishments are observed in both 2004 and 2011. Thus, the year dummy is not collinear with the establishment identifiers.

⁸ We constrain the establishment residual to be the same over the pooled years. However, we reran the model on separate years and checked the correlation in the establishment residuals across years. These are presented in Appendix Figure A.1 as scatterplots where the x-axes depict the 2004 values of the establishment residuals and the y-axes the 2011 values. For all nine job quality metrics the establishment residuals are positively and significantly correlated across years. Our interpretation is that establishments which in 2004 were ‘good’/‘bad’ employers (from the employees’ perspective) were more likely than not to have remained ‘good’/‘bad’ in 2011. The correlations range from 0.63 for Earnings to 0.16 for Skill Development and Utilization.

⁹ Appendix Table A2 shows the density of employee observations across occupations and workplaces in the pooled data.

design, and any observable non-response bias (see Forth and Freeth, 2014). Standard errors account for the clustering of employee observations within establishments.

We identify the total share of the variance in Y_{ij} that is explained by these covariates (the R^2 from the model). We also run F-tests of the overall significance of each set of predictors and establish whether, in each case, the specified set of predictors makes a statistically significant contribution to model fit.

We then use dominance analysis to identify the contribution each predictor (or set of predictors) makes towards explaining variance in our dependent variable, both by itself and in combination with other predictor variables (Budescu, 1993). The method sits within a broader set of approaches for relative importance analysis, which includes relative weights analysis. Tonidandel and LeBreton (2011) provide a non-technical introduction to such methods. The advantage of these methods is that they allow for more accurate variance partitioning than other common approaches to determining variable importance, such as the inspection of standardized regression coefficients (which may not appropriately partition variance when predictors are correlated) or inspection of changes in the adjusted R^2 (which is sensitive to the ordering in which variables are entered into the regression) (see Johnson and LeBreton, 2004).

There are alternative measures of dominance, but we focus on the computation of ‘general dominance’ statistics. These provide an additive decomposition of the fit statistic (the adjusted R^2) into the independent components attributable to each set of predictors X_v , where X_v is some subset of the independent variables (IVs) in the model. The statistic originated in psychology and is used in disciplines such as organisational behaviour (see Johnson and LeBreton, 2004). It is more commonly known in economics as a Shapley value decomposition (Israeli, 2007).

To introduce the notion of the ‘general dominance’ statistic, let us first refer to the ‘order’ of a regression model, k , as the number of sets of predictors included in that model. We denote the maximum order of a regression model as p where, in our case, $p=4$ (see Eq. 1). To arrive at a general dominance statistic for one set of predictors, X_v , we first compute the marginal contribution of X_v to all models that include k of the p possible sets of predictors. This within-order average, $D_{X_v}^k$, is referred to as the “conditional dominance statistic” (i.e. the dominance of X_v conditional on k) and is computed as follows:

$$D_{X_v}^k = \sum_{l=1}^{\binom{p-1}{k-1}} \frac{R_{X_v S_l}^2 - R_{S_l}^2}{\binom{p-1}{k-1}} \quad (\text{Eq.2})$$

where S_l is a distinct subset of $k - 1$ sets of predictors that excludes X_v (but which can include the null set of no additional predictors), and $\binom{p-1}{k-1}$ is the number of distinct combinations of $k - 1$ predictors that can be constructed from the $p - 1$ available.

The general dominance statistic, D_{X_v} , for the set of predictors X_v is then computed as the between-order average of the various within-order averages (that is, the average of the p conditional dominance statistics):

$$D_{X_v} = \sum_{k=1}^p \frac{D_{X_v}^k}{p} \quad (\text{Eq. 3})$$

Findings

Appendix Table A1 presents F-tests for the joint statistical significance of the four groupings of variables present in the job quality models based on nine job quality regressions on the pooled employee data for 2004 and 2011. Each row presents results for a different job quality measure. The first seven rows present results for the seven separate job quality domains described in Table 1. The last two rows present results for the two composite indices for non-pecuniary and all job quality respectively.

Employee characteristics, occupation and establishment identifiers are each jointly statistically significant in all nine models. Only the year dummy distinguishing 2004 from 2011 observations is not significant in all cases.¹⁰

In Table 3 we go a step further than identifying the joint statistical significance of groups of variables in the job quality models by partitioning the total explained variance (the adjusted R^2 shown in column 1) into the portions explained by the four sets of regressors (employee characteristics, occupation, year and establishment ID), using the method of dominance analysis described above. The final column shows the variance in the dependent variable that remains unaccounted for by the model.

Column 2 shows the model explains between 21 and 31 percent of non-pecuniary job quality, whereas it accounts for nearly two-thirds (62%) of earnings variance. Thus, although the models leave more of non-pecuniary job quality unexplained, they nevertheless account for a larger

¹⁰ Results are similar for estimates run on separate years available from the authors on request.

percentage of the variance in non-pecuniary job quality than studies which are solely reliant on data provided by workers (Naswall and de Witte, 2003; Green et al. 2021).¹¹

Table 3: General dominance statistics

	Adj-R ² : full model	D_{Demij}	D_{Occij}	D_{Yearij}	D_{Estij}	Unexplained
Earnings	0.624	0.140	0.246	0.001	0.237	0.376
Prospects	0.181	0.010	0.045	0.001	0.125	0.819
Working time quality	0.313	0.024	0.092	0.004	0.193	0.687
Autonomy and involvement	0.229	0.006	0.094	0.001	0.128	0.771
Skill	0.184	0.013	0.060	0.000	0.111	0.816
Work intensity (reversed)	0.208	0.025	0.088	0.002	0.092	0.792
Social environment	0.252	0.009	0.051	0.000	0.192	0.748
<i>Composite indices:</i>						
Non-pecuniary job quality	0.233	0.010	0.057	0.000	0.166	0.767
All-items job quality	0.269	0.011	0.089	0.000	0.169	0.731
Standardised values:						
Earnings		0.224	0.395	0.001	0.381	
Prospects		0.054	0.250	0.003	0.693	
Working time quality		0.075	0.294	0.014	0.617	
Autonomy and involvement		0.027	0.409	0.004	0.560	
Skill		0.071	0.324	0.001	0.604	
Work intensity (reversed)		0.123	0.426	0.011	0.441	
Social environment		0.037	0.201	0.001	0.761	
<i>Composite indices:</i>						
Non-pecuniary job quality		0.041	0.245	0.001	0.713	
All-items job quality		0.043	0.329	0.001	0.627	

Note: Estimated on the pooled sample of employees from 2004 and 2011, weighted. Number of observations = 39,150. Standardised values express the dominance statistic as a proportion of the adjusted-R² for the full model.

The lower panel standardises these values with respect to the total explained variance – that is to say, we ignore the unexplained variance and partition the explained variance into the four sets of variables entering the model.

In eight of the nine job quality models the dominant explanatory factor is the set of establishment indicators. The exception is earnings, where occupation accounts for a slightly higher percentage of the variance. The establishment indicators account for between 38% and 76% of the explained variance in job quality, depending on the metric used. The second most dominant factor is within-establishment occupational structure, accounting for between 20 and 43 percent of the explained variance in job quality. Differences in worker characteristics within establishment also matter,

¹¹ Unfortunately, many studies of the determinants of job quality do not report the explained variance.

though they play a relatively small role in accounting for the explained variance in job quality, apart from in the case of earnings where they account for 22% of the explained variance.

The fact that the establishment indicators are least dominant in the case of earnings is consistent with the proposition that the visibility of wages to job seekers and incumbent workers who may ‘shop’ between jobs to maximise earnings, constrains employers in terms of variability in the wages they offer. Even here, the establishment indicators remain important, accounting for almost two-fifths of the explained variance – similar to the variance explained by 4-digit occupation and supervisory status within establishment.

If we turn to the overall index for non-pecuniary job quality in the penultimate row of Table 3, 71% of the explained variance is attributable to the establishment that the employee works in, with the bulk of the remainder linked to the employee’s occupation. A mere 4% of the explained variance in non-pecuniary job quality is associated with within-establishment worker traits.¹²

The full models underpinning this dominance analysis are presented in Appendix Table A5. They present detailed information on the factors associated with job quality variance within the establishment. For instance, the first row shows that, compared with similar women in the same establishment, men have higher pay but lower non-pecuniary job quality, driven by lower working time quality, less job autonomy and poorer prospects. The age profile of job quality in the establishment is also interesting: whilst earnings rise with age before tailing off later in life – the classic hump-shape observed in much of the literature – non-pecuniary job quality follows a U-shape.

Table 4 shows the variance in job quality that is explained when we adjust the model specification. Each row represents a different job quality metric, with the model specifications varying across the columns in the table. Column 2 only contains the occupation identifiers and whether the employee has supervisory responsibilities contained in the vector Occ_{ij} . These models account for between 6% and 16% of the variance in non-pecuniary job quality, but 46% of the variance in earnings. Column 3 only contains the vector of establishment identifiers Est_j . This model specification accounts for between 12% and 26% of non-pecuniary job quality and 42% of earnings variance. Comparing the variance explained by occupations only and establishments only, the establishment identifiers explain twice as much of the variance in the non-pecuniary job quality index than the occupation identifiers (penultimate row). The final two columns in the table

¹² The general dominance statistics are similar when we compare 2004 and 2011 separately (Appendix Tables A.3 and A.4).

indicate that the additional variance explained by the introduction of employee characteristics and the survey year is relatively modest, excepts for earnings.

Table 4: Fit statistics for variants of the full model

	Occupations only	Establishment identifiers only	Employee characteristics, year and occupations	Employee characteristics, year and establishment identifiers
Earnings	0.457	0.421	0.510	0.529
Prospects	0.059	0.139	0.069	0.149
Working time quality	0.160	0.264	0.175	0.274
Autonomy and involvement	0.121	0.158	0.129	0.161
Skill	0.086	0.140	0.097	0.146
Work intensity (reversed)	0.122	0.118	0.135	0.146
Social environment	0.080	0.225	0.090	0.228
<i>Composite indices:</i>				
Non-pecuniary job quality	0.085	0.197	0.094	0.201
All-items job quality	0.133	0.213	0.137	0.218

Note: Estimated on the pooled sample of employees from 2004 and 2011, weighted. Number of observations = 39,150. Fit statistic: adjusted-R².

Estimating the establishment characteristics that account for establishment-level variance in job quality

To identify those establishment characteristics that explain establishment-level variance in job quality, we return to the OLS regression in Equation (1). We recover the coefficients b_4 on the establishment identifier vector (Est_j), which are the establishment indicators of job quality in each dimension that are not accounted for by a job's occupational classification, or by the skills and other characteristics of workers. Table 5 shows how these establishment components of job quality are related to each other. Strikingly, most of the non-pay indicators (an exception is work intensity) are quite strongly positively correlated with each other, suggesting that where jobs in an establishment are good (bad) in one non-pay dimension it increases the likelihood that they are good (bad) in another. However, the correlation coefficients between the establishment-specific components of non-pay job quality and earnings are small and non-significant, which is not consistent with Rosen's (1986) compensating wage differentials story in which employers pay higher wages to compensate workers for poor non-pecuniary job quality.

To what extent can the variations in residual job quality be accounted for by observed establishment factors? To investigate, we undertake a regression analysis at establishment level in which we regress those parameters on a set of establishment characteristics Z_j .¹³

$$Est_j = c_0 + c_1 Z_j + \mu_j$$

(Eq. 4)

We focus on structural characteristics of the workplace and aspects of workplace governance. We avoid management practices that are directly related to our outcomes of interest (e.g. the extent of training provision) because they become tautological. Missing values on workplace characteristics reduce the estimation sample to 34,983 employees across 3,065 establishment years from 2,613 workplaces. We generate standard errors via bootstrapping (100 replications), due to the estimated nature of the dependent variables.¹⁴ Results are shown in Table 6. The models account for around 18% of the variance in the establishment component of non-pecuniary job quality and 29% of the variance in the establishment component of earnings.

¹³ In doing so we follow others who have previously used this method, for example Black and Lynch (2001) who use it to establish the role of establishment practices and information technology on productivity.

¹⁴ We have reduced the number of parameters in the model by collapsing organizational size, workplace age and region to dummy variables.

Table 5: Pairwise correlations between establishment-specific components of job quality

	Earnings	Prospects	Working time quality	Autonomy and involvement	Skill	Work intensity (reversed)	Social environment	Non-pecuniary job quality	All-items job quality
Earnings	1.00								
Prospects	-0.02	1.00							
Working time quality	0.02	0.04	1.00						
Autonomy and involvement	0.05	0.20	0.55	1.00					
Skill	<u>0.08</u>	0.17	0.38	0.43	1.00				
Work intensity (reversed)	-0.02	0.01	0.22	0.20	-0.02	1.00			
Social environment	-0.02	0.19	0.58	0.78	0.50	0.21	1.00		
Non-pecuniary job quality	0.02	0.40	0.72	0.83	0.64	0.41	0.86	1.00	
All-items job quality	0.25	0.38	0.71	0.81	0.63	0.39	0.83	0.97	1.00

Notes:

1. Pairwise correlations are computed on the pooled (2004+2011) sample of 3,479 establishment*years from 2,919 establishments, weighted.
2. Key to statistical significance: bold type = $p < 0.01$; underlined = $p < 0.05$; italics = $p < 0.10$; normal type = not statistically significant ($p \geq 0.10$).

Table 6: Characteristics associated with the establishment-specific component of job quality

	Earnings	Prospects	Working time quality	Autonomy and involvement	Skill	Work intensity (reversed)	Social environment	Non- pecuniary job quality	All-items job quality
	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se
Establishment size (Ref. 5-19 employees)									
10-19	0.069** [0.033]	-0.016 [0.041]	-0.179*** [0.045]	-0.192*** [0.037]	-0.095*** [0.035]	-0.089** [0.038]	-0.281*** [0.043]	-0.239*** [0.043]	-0.205*** [0.043]
20-49	0.113*** [0.036]	0.005 [0.041]	-0.136*** [0.036]	-0.183*** [0.043]	-0.057* [0.034]	-0.074* [0.045]	-0.296*** [0.042]	-0.208*** [0.042]	-0.165*** [0.043]
50+	0.126*** [0.033]	0.041 [0.045]	-0.137*** [0.034]	-0.245*** [0.044]	-0.101*** [0.035]	-0.036 [0.043]	-0.380*** [0.045]	-0.241*** [0.041]	-0.192*** [0.041]
Part of a larger organisation	-0.101** [0.040]	-0.071* [0.041]	-0.177*** [0.049]	-0.145*** [0.041]	-0.059 [0.037]	-0.119*** [0.043]	-0.179*** [0.043]	-0.210*** [0.043]	-0.223*** [0.043]
Private sector	-0.143** [0.059]	0.124* [0.068]	-0.126* [0.071]	0.008 [0.073]	-0.062 [0.055]	0.076 [0.079]	-0.045 [0.080]	-0.007 [0.075]	-0.044 [0.075]
Foreign owned, 51%+	0.117* [0.062]	0.041 [0.059]	-0.161** [0.076]	-0.112* [0.063]	0.061 [0.071]	0.007 [0.069]	-0.149* [0.087]	-0.088 [0.078]	-0.052 [0.073]
Family ownership (Ref. Not family owned)									
Family-owned and managed	-0.043 [0.045]	0.082* [0.044]	-0.088 [0.057]	0.015 [0.053]	-0.091* [0.051]	0.023 [0.049]	-0.001 [0.059]	-0.017 [0.061]	-0.027 [0.063]
Family-owned, not family managed	-0.070	0.028	-0.110**	-0.057	-0.041	0.036	-0.067	-0.059	-0.074

	Earnings	Prospects	Working time quality	Autonomy and involvement	Skill	Work intensity (reversed)	Social environment	Non- pecuniary job quality	All-items job quality
	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se
	[0.045]	[0.063]	[0.053]	[0.053]	[0.061]	[0.064]	[0.068]	[0.060]	[0.058]
Female managers as a proportion of all managerial employees	-0.172*** [0.042]	0.009 [0.044]	0.073 [0.049]	-0.036 [0.051]	0.025 [0.044]	-0.074 [0.050]	-0.002 [0.053]	-0.001 [0.049]	-0.047 [0.048]
ER manager has HR qualification	0.020 [0.028]	-0.021 [0.029]	-0.026 [0.029]	-0.065** [0.031]	0.000 [0.031]	-0.013 [0.035]	-0.020 [0.034]	-0.041 [0.032]	-0.033 [0.031]
Trade union recognised	0.122*** [0.039]	-0.141** [0.057]	-0.046 [0.042]	-0.181*** [0.049]	-0.030 [0.042]	-0.041 [0.044]	-0.195*** [0.052]	-0.178*** [0.048]	-0.134*** [0.046]
High product market competition	0.023 [0.044]	0.000 [0.048]	0.053 [0.039]	-0.015 [0.048]	0.006 [0.040]	-0.026 [0.040]	-0.022 [0.049]	-0.001 [0.046]	0.005 [0.047]
Demand highly sensitive to price	-0.059 [0.038]	-0.071* [0.039]	-0.043 [0.044]	-0.047 [0.040]	-0.083** [0.041]	0.021 [0.036]	-0.077 [0.051]	-0.085* [0.046]	-0.094** [0.046]
Demand highly sensitive to quality	-0.092** [0.045]	-0.069* [0.039]	-0.014 [0.050]	-0.040 [0.040]	-0.023 [0.038]	-0.001 [0.042]	0.008 [0.050]	-0.039 [0.046]	-0.061 [0.046]
Establishment less than 5 years old	-0.005 [0.060]	-0.107* [0.064]	-0.012 [0.071]	-0.022 [0.064]	-0.104 [0.065]	0.019 [0.064]	-0.083 [0.068]	-0.087 [0.080]	-0.082 [0.079]
Industry (SIC07) Section (Ref. D: Manufacturing): E: Electricity, gas and water	0.461*** [0.083]	-0.169* [0.093]	0.162 [0.102]	-0.051 [0.088]	0.129 [0.100]	0.139 [0.091]	-0.143 [0.134]	0.019 [0.103]	0.138 [0.101]

	Earnings	Prospects	Working time quality	Autonomy and involvement	Skill	Work intensity (reversed)	Social environment	Non- pecuniary job quality	All-items job quality
	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se
F: Construction	-0.120 [0.106]	0.054 [0.093]	0.110 [0.107]	-0.085 [0.081]	0.178* [0.103]	-0.090 [0.116]	0.048 [0.078]	0.060 [0.088]	0.025 [0.093]
G: Wholesale and retail	-0.183*** [0.063]	0.081 [0.066]	0.022 [0.073]	-0.103* [0.062]	-0.018 [0.058]	0.088 [0.070]	0.004 [0.080]	0.021 [0.075]	-0.029 [0.078]
H: Hotels and restaurants	-0.481*** [0.073]	-0.162* [0.095]	0.164* [0.093]	-0.184** [0.088]	-0.102 [0.081]	0.170* [0.092]	-0.061 [0.116]	-0.049 [0.101]	-0.172* [0.098]
I: Transport and communication	0.019 [0.080]	0.009 [0.075]	-0.391*** [0.109]	-0.300*** [0.093]	-0.008 [0.092]	0.021 [0.092]	-0.212 [0.140]	-0.247** [0.117]	-0.226** [0.114]
J: Financial services	0.122 [0.075]	0.058 [0.088]	-0.154 [0.096]	-0.274*** [0.100]	0.201** [0.099]	-0.180 [0.111]	-0.042 [0.104]	-0.110 [0.111]	-0.071 [0.103]
K: Other business services	0.115* [0.069]	-0.031 [0.077]	0.008 [0.088]	-0.210*** [0.065]	0.048 [0.064]	0.049 [0.079]	-0.070 [0.087]	-0.058 [0.081]	-0.024 [0.084]
L: Public administration	-0.151* [0.090]	-0.332** [0.144]	0.276** [0.108]	-0.331*** [0.091]	-0.052 [0.106]	0.143 [0.108]	-0.339*** [0.107]	-0.178* [0.105]	-0.206* [0.107]
M: Education	-0.368*** [0.081]	0.016 [0.083]	0.160* [0.086]	0.057 [0.070]	0.111 [0.082]	0.017 [0.094]	0.180** [0.088]	0.152* [0.087]	0.045 [0.088]
N: Health	-0.148** [0.075]	0.005 [0.078]	0.127 [0.082]	-0.046 [0.075]	0.209*** [0.069]	0.075 [0.087]	-0.098 [0.085]	0.076 [0.083]	0.033 [0.085]
O: Other community services	-0.169** [0.085]	-0.071 [0.078]	0.161 [0.099]	-0.107 [0.090]	0.078 [0.081]	0.144 [0.090]	-0.059 [0.107]	0.041 [0.097]	-0.006 [0.098]

	Earnings	Prospects	Working time quality	Autonomy and involvement	Skill	Work intensity (reversed)	Social environment	Non-pecuniary job quality	All-items job quality
	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se
Region (Ref. Rest of England):									
London	0.446*** [0.055]	-0.035 [0.063]	-0.096* [0.055]	-0.011 [0.052]	-0.119** [0.050]	-0.017 [0.061]	-0.123** [0.061]	-0.113** [0.054]	0.012 [0.053]
South East	0.251*** [0.052]	0.028 [0.053]	-0.051 [0.060]	0.034 [0.055]	-0.005 [0.059]	0.192*** [0.053]	-0.002 [0.070]	0.055 [0.065]	0.117* [0.064]
East of England	0.099 [0.064]	-0.012 [0.060]	-0.150** [0.071]	-0.083 [0.058]	-0.053 [0.061]	0.021 [0.069]	-0.197*** [0.068]	-0.133** [0.059]	-0.098 [0.064]
Scotland	0.102** [0.047]	0.015 [0.065]	-0.031 [0.065]	0.043 [0.050]	-0.006 [0.053]	0.084 [0.062]	-0.013 [0.055]	0.026 [0.055]	0.051 [0.051]
Wales	-0.037 [0.050]	-0.045 [0.072]	0.034 [0.074]	0.220*** [0.073]	0.194*** [0.063]	-0.006 [0.066]	0.195** [0.078]	0.166** [0.077]	0.145** [0.071]
Year=2011	-0.077** [0.030]	0.079*** [0.028]	-0.082** [0.033]	0.011 [0.034]	0.099*** [0.031]	0.024 [0.034]	-0.015 [0.037]	0.033 [0.036]	0.010 [0.036]
Constant	0.118 [0.094]	0.049 [0.096]	0.404*** [0.112]	0.586*** [0.094]	0.118 [0.090]	0.021 [0.103]	0.709*** [0.112]	0.529*** [0.105]	0.526*** [0.110]
R ²	0.289	0.106	0.159	0.177	0.104	0.086	0.190	0.178	0.150
<i>N establishment-years</i>	3,078	3,078	3,078	3,078	3,078	3,078	3,078	3,078	3,078
<i>N establishments</i>	2,624	2,624	2,624	2,624	2,624	2,624	2,624	2,624	2,624

Notes:

1. Estimated on the pooled (2004+2011) sample of establishments, weighted. Bootstrapped standard errors (100 replications).
2. Key to statistical significance: * p<0.10; ** p<0.05; *** p<0.01

The model contains two variables capturing organizational size – the size of the establishment, and a dummy variable capturing whether the establishment is part of a multi-site organization. In common with the literature on wage determination, earnings (in this case, the unobserved establishment component of earnings) are positively correlated with establishment size. However, in stark contrast, the smallest establishments (those with fewer than 10 employees) have the highest non-pecuniary job quality, a finding consistent with recent studies (Gomez-Salcedo et al., 2017; Bryson et al., 2021; Gebrehiwot, 2022; Brummund et al., 2022; Green and Lee, 2024). Perhaps surprisingly, having accounted for establishment size, the establishment components of both non-pecuniary job quality and earnings are negatively correlated with employment in a multi-site organization.

Industry plays a significant role in accounting for variance in the unobserved establishment component of earnings, reminiscent of the industry wage differentials that are well-established in the literature (Krueger and Summers, 1988). It also plays a role in explaining the unobserved establishment component of non-pecuniary job quality, with Transport and Communication and Public Administration exhibiting poorer job quality than the reference category, Manufacturing.

There is significant regional variance in the unexplained establishment component in earnings, with establishments in London and the South-East among those with the highest earnings, consistent with regional variation in the cost of living which is highest in these parts of Britain. However, the unexplained establishment component of non-pecuniary job quality is highest in Wales.

Trade union recognition for bargaining purposes is strongly positively correlated with the unexplained variance in establishment earnings, a finding consistent with the literature on the union wage premium (Forth and Millward, 2002). However, unionization is also associated with poorer non-pecuniary job quality compared to non-union establishments. Union recognition is linked to poorer job prospects, lower job discretion and a poorer social environment, the latter being reminiscent of the literature identifying a negative union effect on the climate of employment relations (Bryson and Wilkinson, 2001).

Discussion

Using linked employer-employee data for Britain we decompose earnings and various aspects of non-pecuniary job quality into four components – the establishment an employee works in; the occupation the employee undertakes; employee characteristics; and the year of the survey. Recent literature has pointed to the importance of ‘where you work’ in explaining variance in earnings,

but this is the first study to identify the role of the establishment in accounting for variance in non-pecuniary job quality.

We find that the establishment is more important in explaining variance in non-pecuniary job quality than it is in explaining variance in pay – it accounts for around two-fifths of the explained variance in earnings, but around 70% of the explained variance in non-pecuniary job quality. This difference is, perhaps, unsurprising, since employers may be constrained in their ability to adjust wages by competition for talent in the labour market. This is because the posting of wages is more common, and easier to convey, than information on the relative position of an establishment in the provision of non-pecuniary job quality.

It is often assumed that the chief factor accounting for variance in job quality is the occupation one performs. We have shown this is not the case. Across the seven components of job quality in our data, the establishment an employee works in explains by far the largest share of the variance in job quality in five of them (prospects; working time quality; autonomy and involvement; skill; social environment). When it comes to earnings and work intensity, the share of variance explained by the establishment and an employee's occupation is similar – establishment and occupation account for roughly two-fifths of the explained variance in both. Employee characteristics play a fairly minor role, except in the case of earnings variance, where they account for 22% of the explained variance.

We show that the establishment-components to various aspects of non-pecuniary job quality are highly positively correlated, indicating that there are some establishments that appear to have 'good' job quality in several domains and, at the same time, those establishments that tend to offer 'poor' job quality in one non-pecuniary job quality domain also offer poor job quality on other dimensions.

We seek to account for the establishment-specific component of job quality by regressing it against establishment characteristics. Most (80-90%) of the establishment-specific component cannot be accounted for by the observed establishment traits in our data. However, some clear patterns emerge. The most notable one is the negative correlation between the residual establishment component of non-pecuniary job quality and establishment size. At the same time, the residual establishment component of earnings is positively correlated with establishment size.

One might be tempted to conclude that these findings are consistent with the payment of wages to compensate employees in larger establishments for poorer non-pecuniary job quality. However, if we consider the correlation between the establishment-specific component of earnings and non-

pecuniary job quality in the sample as a whole, it is virtually non-existent, a finding that runs counter to expectations from compensating wage differentials theory.

There are limitations to our study. First, the analysis is purely correlational, seeking to establish the share of variance in job quality accounted for by demographic, job and establishment characteristics. We are unable to make any causal inferences based on our analysis. Second, our job quality measures are incomplete. Above all, they lack good measures of the quality of the physical working environment. Third, we may understate the importance of worker characteristics in accounting for variance in job quality because we rely on a relatively small number of observed traits. It is possible that unobserved fixed traits of individuals could make a significant contribution, but this would only be possible to establish with longitudinal data on individuals.

Notwithstanding these limitations, the study has potentially important practical implications because it suggests that a large part of the variance in both pecuniary and non-pecuniary job quality occurs across establishments. The implication is that, notwithstanding competition in product and labour markets, employers have some room for manoeuvre in terms of the quality of the jobs they offer. In this sense we are confirming what is often implicit in the normative literature regarding the effects of job quality on worker wellbeing, namely the assumption that employers and individual managers have partial autonomy with respect to job design (Grote and Guest 2017; Guest et al. 2021). If employers can use this opportunity to design wellbeing into jobs through improvements in job quality, this may provide opportunities to convert higher wellbeing into improved productivity.

Our findings also have implications for future research on job quality which has tended to focus on variance across occupations. Our study suggests the role of employers and the establishment deserve greater attention than they have received hitherto. It has already become apparent that the establishment has played an important role in driving growing wage inequality in countries like the United States and Germany. It is possible that the establishment may play a similar, or perhaps even more central role, in explaining inequalities in non-pecuniary job quality.

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Appendix Table A1: F-tests of joint significance of sets of regressors in the full model

	F-tests of joint significance			
	Employee characteristics (<i>Dem_{ij}</i>)	Occupations (<i>Occ_{ij}</i>)	Year dummy (<i>Year_{ij}</i>)	Establishment identifiers (<i>Est_j</i>)
Earnings	43.74***	19.27***	7.12**	3,453.31***
Prospects	4.42***	4.71***	14.97***	64,961.94***
Working time quality	4.97***	17.75***	53.10***	2,912.99***
Autonomy and involvement	4.21***	10.86***	2.46	2,387.43***
Skill	9.95***	5.25***	4.19**	1,240.56***
Work intensity (reversed)	7.13***	11.58***	22.59***	2,895.87***
Social environment	5.56***	5.51***	0.06	2,034.68***
<i>Composite indices:</i>				
Non-pecuniary job quality	6.42***	5.29***	0.31	1,504.38***
All-items job quality	3.05***	7.93***	0.00	8,012.39***

Note: Estimated on the pooled sample of employees from 2004 and 2011, weighted. Number of observations = 39,150

Appendix Table A2: Density of employee observations across occupations and workplaces

Note: here occupation means 4-digit SOC code

	Occupations	Establishments
Min	2	2
p1	12	3
p5	31	6
p25	113	12
p50	302	17
p75	712	23
p95	1,421	36
p99	1,520	41
Max	1,520	46

Notes: Calculated from the pooled (2004+2011) sample of establishments, unweighted.

Appendix Table A3: General dominance statistics, 2004

	Adj-R ² : full model	$D_{Dem_{ij}}$	$D_{Occ_{ij}}$	$D_{Est_{ij}}$	Unexplained
Earnings	0.632	0.148	0.251	0.233	0.368
Prospects	0.182	0.014	0.043	0.125	0.818
Working time quality	0.319	0.025	0.091	0.203	0.681
Autonomy and involvement	0.233	0.007	0.099	0.127	0.767
Skill	0.206	0.014	0.066	0.125	0.794
Work intensity (reversed)	0.211	0.024	0.094	0.093	0.789
Social environment	0.271	0.011	0.054	0.206	0.729
<i>Composite indices:</i>					
Non-pecuniary job quality	0.242	0.011	0.056	0.174	0.758
All-items job quality	0.271	0.013	0.088	0.169	0.729
Standardised values:					
Earnings		0.234	0.397	0.369	
Prospects		0.077	0.235	0.687	
Working time quality		0.077	0.287	0.636	
Autonomy and involvement		0.031	0.423	0.545	
Skill		0.070	0.321	0.609	
Work intensity (reversed)		0.116	0.445	0.439	
Social environment		0.040	0.199	0.761	
<i>Composite indices:</i>					
Non-pecuniary job quality		0.047	0.233	0.720	
All-items job quality		0.049	0.326	0.625	

Note: Estimated on the sample of employees from 2004 only, weighted. Number of observations = 20,477. Standardised values express the dominance statistic as a proportion of the adjusted-R² for the full model.

Appendix Table A4: General dominance statistics, 2011

	Adj-R ² : full model	$D_{Dem_{ij}}$	$D_{Occ_{ij}}$	$D_{Est_{ij}}$	Unexplained
Earnings	0.624	0.131	0.253	0.240	0.376
Prospects	0.205	0.007	0.063	0.134	0.795
Working time quality	0.310	0.021	0.105	0.183	0.690
Autonomy and involvement	0.239	0.006	0.101	0.133	0.761
Skill	0.185	0.016	0.070	0.098	0.815
Work intensity (reversed)	0.213	0.026	0.096	0.091	0.787
Social environment	0.257	0.010	0.060	0.186	0.743
<i>Composite indices:</i>					
Non-pecuniary job quality	0.248	0.010	0.071	0.166	0.752
All-items job quality	0.288	0.011	0.102	0.175	0.712
Standardised values:					
Earnings		0.211	0.405	0.384	
Prospects		0.036	0.309	0.655	
Working time quality		0.069	0.339	0.592	
Autonomy and involvement		0.023	0.421	0.556	
Skill		0.086	0.380	0.534	
Work intensity (reversed)		0.120	0.452	0.428	
Social environment		0.041	0.234	0.725	
<i>Composite indices:</i>					
Non-pecuniary job quality		0.041	0.287	0.672	
All-items job quality		0.039	0.354	0.607	

Note: Estimated on the sample of employees from 2004 only, weighted. Number of observations = 18,673. Standardised values express the dominance statistic as a proportion of the adjusted-R² for the full model.

Appendix Table A5: Coefficients from employee-level job quality regressions

	Earnings	Prospects	Working time quality	Autonomy and involvement	Skill	Work intensity (reversed)	Social environment	Non- pecuniary job quality	All-items job quality
	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se
Gender (Ref. Female)									
Male	0.148*** [0.013]	-0.068*** [0.016]	-0.098*** [0.017]	-0.041** [0.017]	-0.024 [0.019]	0.065*** [0.017]	0.000 [0.017]	-0.047*** [0.017]	-0.005 [0.017]
Age (Ref. Less than 20 years):									
20-29 years	0.230*** [0.038]	0.332*** [0.059]	-0.139*** [0.037]	-0.045 [0.046]	-0.169*** [0.044]	-0.235*** [0.046]	-0.277*** [0.041]	-0.150*** [0.042]	-0.080** [0.041]
30-39 years	0.473*** [0.038]	0.355*** [0.060]	-0.118*** [0.037]	-0.061 [0.046]	-0.323*** [0.045]	-0.322*** [0.045]	-0.351*** [0.042]	-0.230*** [0.043]	-0.091** [0.041]
40-49 years	0.549*** [0.038]	0.345*** [0.060]	-0.119*** [0.038]	-0.080* [0.046]	-0.353*** [0.045]	-0.365*** [0.045]	-0.368*** [0.042]	-0.264*** [0.043]	-0.102** [0.041]
50-59 years	0.555*** [0.038]	0.368*** [0.060]	-0.142*** [0.039]	-0.104** [0.047]	-0.386*** [0.046]	-0.378*** [0.047]	-0.377*** [0.043]	-0.286*** [0.045]	-0.122*** [0.043]
60+ years	0.543*** [0.043]	0.358*** [0.067]	-0.004 [0.045]	0.011 [0.053]	-0.432*** [0.051]	-0.198*** [0.052]	-0.288*** [0.049]	-0.155*** [0.050]	-0.003 [0.049]
Ethnicity (Ref. White):									
Mixed	-0.078** [0.038]	-0.166* [0.085]	0.063 [0.063]	-0.044 [0.061]	-0.117** [0.058]	-0.013 [0.062]	-0.018 [0.063]	-0.083 [0.060]	-0.098* [0.059]
Asian	-0.091*** [0.025]	-0.075* [0.041]	0.218*** [0.039]	0.145*** [0.042]	-0.052 [0.046]	-0.031 [0.045]	0.062 [0.039]	0.075* [0.041]	0.046 [0.039]
Black	-0.050 [0.042]	-0.033 [0.065]	0.186*** [0.058]	0.210*** [0.062]	0.046 [0.057]	-0.039 [0.047]	0.186*** [0.055]	0.156** [0.061]	0.133** [0.059]
Other	-0.179***	-0.215	0.039	0.093	0.065	0.094	-0.016	0.017	-0.031

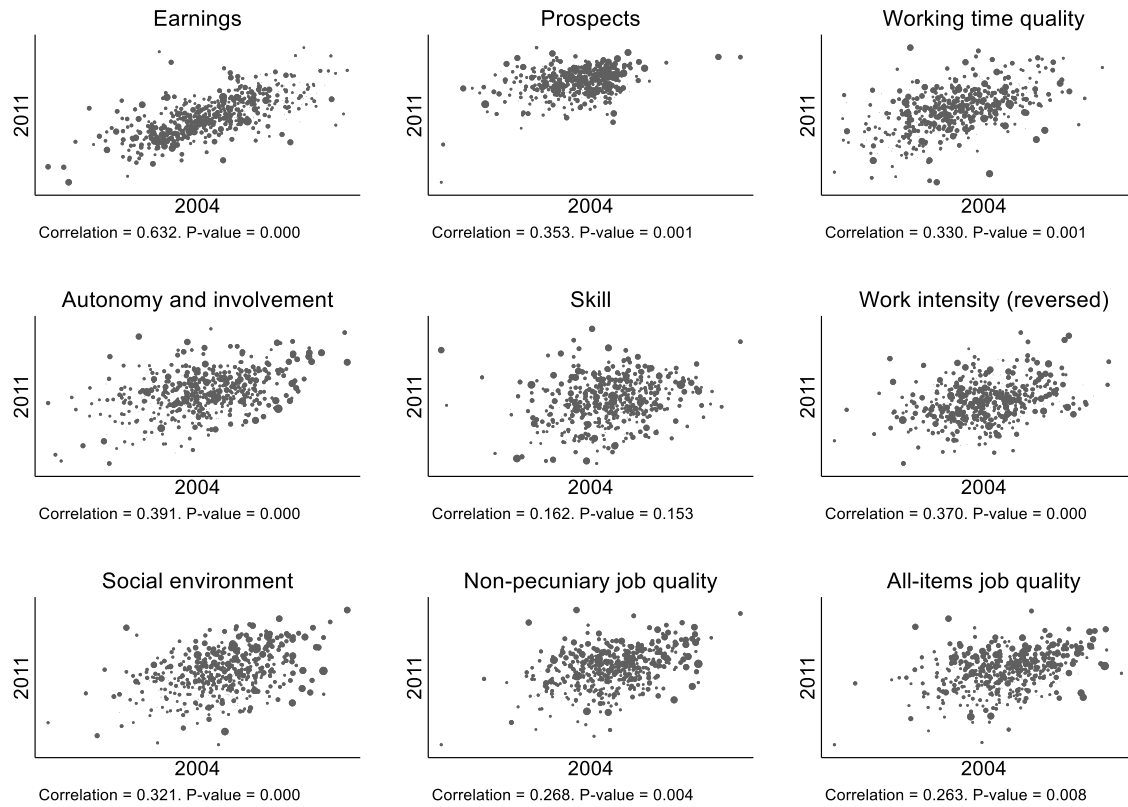
	Earnings	Prospects	Working time quality	Autonomy and involvement	Skill	Work intensity (reversed)	Social environment	Non- pecuniary job quality	All-items job quality
	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se
Educational qualifications (Ref. None):	[0.069]	[0.227]	[0.088]	[0.139]	[0.130]	[0.148]	[0.102]	[0.112]	[0.109]
Other educational qualification	0.076***	0.000	0.026	0.013	-0.116***	0.055	-0.028	-0.014	0.007
	[0.026]	[0.037]	[0.033]	[0.036]	[0.035]	[0.038]	[0.037]	[0.035]	[0.034]
CSE or equivalent	0.130***	-0.042	-0.001	-0.034	-0.127***	-0.038	-0.063**	-0.086***	-0.046
	[0.022]	[0.030]	[0.028]	[0.031]	[0.031]	[0.030]	[0.028]	[0.030]	[0.029]
O-level or equivalent	0.135***	-0.043	-0.040	-0.068**	-0.190***	-0.004	-0.074***	-0.117***	-0.075***
	[0.019]	[0.027]	[0.025]	[0.027]	[0.026]	[0.027]	[0.026]	[0.027]	[0.026]
1 A-level or equivalent	0.152***	-0.098***	-0.064*	-0.115***	-0.218***	-0.044	-0.101***	-0.179***	-0.128***
	[0.027]	[0.038]	[0.033]	[0.037]	[0.036]	[0.037]	[0.036]	[0.036]	[0.035]
2+ A-level or equivalent	0.229***	-0.092***	-0.019	-0.094***	-0.268***	0.027	-0.113***	-0.157***	-0.086***
	[0.024]	[0.034]	[0.032]	[0.033]	[0.032]	[0.034]	[0.031]	[0.032]	[0.031]
Degree or equivalent	0.300***	-0.101***	0.007	-0.152***	-0.285***	-0.005	-0.113***	-0.182***	-0.092***
	[0.021]	[0.032]	[0.030]	[0.031]	[0.030]	[0.031]	[0.029]	[0.031]	[0.030]
Postgrad or equivalent	0.356***	-0.140***	-0.013	-0.141***	-0.296***	-0.013	-0.078**	-0.191***	-0.085**
	[0.027]	[0.039]	[0.038]	[0.038]	[0.038]	[0.038]	[0.036]	[0.038]	[0.037]
Vocational qualifications (Ref. None):									
Other vocational/pre-vocational	0.004	-0.030	-0.018	-0.008	-0.015	-0.030	-0.031	-0.037	-0.034
	[0.018]	[0.030]	[0.024]	[0.026]	[0.026]	[0.027]	[0.025]	[0.026]	[0.025]
Level 1	-0.041	0.038	0.008	0.041	0.051	-0.049	0.015	0.029	0.017
	[0.029]	[0.039]	[0.038]	[0.041]	[0.041]	[0.039]	[0.038]	[0.039]	[0.038]
Level 2	-0.055**	0.004	-0.068***	-0.031	-0.015	-0.098***	-0.034	-0.068***	-0.078***
	[0.021]	[0.028]	[0.024]	[0.027]	[0.028]	[0.026]	[0.026]	[0.026]	[0.025]
Trade apprenticeship	0.016	-0.064**	-0.090***	-0.027	-0.073**	-0.002	-0.041	-0.083**	-0.074**

	Earnings	Prospects	Working time quality	Autonomy and involvement	Skill	Work intensity (reversed)	Social environment	Non- pecuniary job quality	All-items job quality
	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se
Level 3	[0.021] -0.004	[0.030] -0.008	[0.030] -0.038	[0.033] 0.003	[0.031] -0.019	[0.035] -0.070**	[0.033] -0.027	[0.033] -0.044*	[0.032] -0.043*
Other professional qualification	[0.020] 0.169***	[0.028] 0.014	[0.025] -0.020	[0.027] -0.024	[0.028] -0.028	[0.027] -0.114***	[0.027] -0.065***	[0.027] -0.067***	[0.026] -0.018
Level 4	[0.018] 0.082***	[0.024] -0.056	[0.023] -0.036	[0.023] -0.032	[0.026] -0.027	[0.025] -0.152***	[0.024] -0.061*	[0.023] -0.102***	[0.023] -0.074**
Level 5	[0.029] 0.136*	[0.037] -0.058	[0.038] -0.062	[0.034] 0.011	[0.041] -0.074	[0.045] -0.188**	[0.036] -0.054	[0.038] -0.119	[0.037] -0.076
Year (Ref. 2004):	[0.074]	[0.078]	[0.092]	[0.071]	[0.082]	[0.079]	[0.067]	[0.084]	[0.086]
2011	0.048***	-0.099***	0.164***	0.037	-0.047**	-0.112***	0.007	-0.014	-0.001
Constant	[0.018] -0.866***	[0.026] -0.201***	[0.023] 0.089**	[0.023] 0.067	[0.023] 0.471***	[0.024] 0.544***	[0.026] 0.439***	[0.026] 0.396***	[0.025] 0.143***
	[0.041]	[0.063]	[0.043]	[0.051]	[0.050]	[0.051]	[0.048]	[0.048]	[0.047]
R2	0.655	0.250	0.371	0.294	0.253	0.274	0.315	0.297	0.33
<i>N employees</i>	39,150	39,150	39,150	39,150	39,150	39,150	39,150	39,150	39,150
<i>N establishments</i>	3,479	3,479	3,479	3,479	3,479	3,479	3,479	3,479	3,479

Notes: Estimated on the pooled (2004+2011) sample of employees, weighted. Key to statistical significance: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Coefficients on occupation and workplace fixed effects omitted for brevity.

Appendix Figure A.1: Scatterplots of the establishment fixed effects from 2004 and 2011



Notes: Estimated on the 560 establishments with observations in both 2004 and 2011, weighted.