Received November 2004
Revised May 2005
Accepted January 2006

Do job disamenities raise wages or ruin job satisfaction?

Petri Böckerman
Labour Institute for Economic Research, Helsinki, Finland, and
Pekka Ilmakunnas
Helsinki School of Economics and HECER, Helsinki, Finland

Abstract

Purpose – The objective of this paper is to analyse the role of adverse working conditions in the determination of individual wages and job satisfaction in the Finnish labour market.

Design/methodology/approach – The paper uses estimation of econometric models for wages and job satisfaction scores by using the Quality of Work Life Survey of Statistics Finland.

Findings – The paper finds that adverse working conditions have a very minor role in the determination of individual wages. In contrast, adverse working conditions substantially decrease the level of job satisfaction and the perception of fairness of pay at the workplace. This evidence speaks against the existence of compensating wage differentials, but is consistent with the view that the Finnish labour market functions in a non-competitive fashion.

Practical implications – Provides useful information for improvement of working conditions.

Originality/value – Very few papers have analysed the data sets that include, besides wages and job satisfaction scores, detailed information on several different aspects of self-reported working conditions at the workplace, not just conditions typical of some occupations or industries.

Keywords Pay differentials, Job satisfaction, Conditions of employment

Paper type Research paper

1. Introduction

The view that workers should be compensated for adverse working conditions is almost as old as the profession of economics itself. This perspective on the functioning of labour markets originates from the writings of Adam Smith and was later formulated as the theory of compensating wage differentials (Rosen, 1986). The theory states that workers receive wage premia related to harms and hazards at their workplace and the utilities of workers are therefore equalised between industries and occupations by means of competition in the labour market. In particular, the theory implies that the marginal worker receives a compensated wage just enough to persuade him to accept the work conditions, whereas those who are not risk-averse or do not mind adverse conditions are paid more than is necessary to have them work in jobs that are risky or have bad working conditions.

Empirical studies on compensating wage differentials have applied several different measures for job disamenities in hedonic wage equations. Perhaps the clearest result in this field of research is that the risk of death at the workplace has some positive influence on individual wages (Viscusi and Aldy, 2003), but there is some empirical evidence that shows that compensating wage differentials are also related to other job disamenities. On the other hand, there are several empirical studies that do not support the hypothesis of compensating wage differentials.

International Journal of Manpower
Vol. 27 No. 3, 2006
pp. 290-302

0143-7720
DOI 10.1108/01437720610672185

Some reasons for rejection of the hypothesis in empirical studies are unobserved heterogeneity, selectivity of workers into risky workplaces, and the endogeneity of working conditions (Brown, 1980; Hwang *et al.*, 1992). In addition, labour market search and frictions in worker mobility may yield outcomes that deviate from the hedonic wage models (Hwang *et al.*, 1998; Lang and Majumdar, 2004).

The large literature on job disamenities has almost solely focused on pecuniary rewards for adverse working conditions. However, there are some recent empirical studies that have aimed at understanding the determination of overall job satisfaction in relation to adverse working conditions. This interest has, for the most part, arisen owing to inconsistencies in the results of earlier studies and enduring scepticism regarding the existence of competitive labour markets and compensating wage differentials.

This paper contributes to the literature in three ways. First, there are no earlier estimates available about the compensating wage differentials in the Finnish labour market. The Finnish case is interesting, because the binding collective labour agreements already contain some compensation for adverse working conditions. However, the collective agreements put only an effective floor to wage levels in particular occupations (or jobs). There is no upper limit for wages as such. In addition, the collective labour agreements adjust quite slowly to take into account the changes in general working conditions and they cannot account for all specific working conditions in different firms. Furthermore, only some of the working conditions are such that they would be negotiated together with the (floor) wage in centralized negotiations[1]. In other words, the heterogeneity of workplaces makes it hard for collective agreements to take into account all the relevant aspects of working conditions that may matter for individual workers. Therefore, there is still room for additional monetary compensation, because workers' subjective valuations about their working conditions can differ greatly from the ones that have been stipulated in the collective agreements.

Second, the Finnish data make it possible to investigate the impact of a broad range of working conditions on individual wages and overall job satisfaction. In particular, by considering the impact of job disamenities both on wages and job satisfaction, we are able to say something about the competitive character of the Finnish labour markets. Most of the earlier empirical studies on compensating wage differentials and job satisfaction have used only a very limited set of variables that are used to describe work disamenities[2]. In contrast, the data set that we use in this paper contains detailed information on several different aspects of self-reported working conditions at the workplace, not just conditions typical of some occupations or industries[3]. Third, in addition to overall job satisfaction, we investigate an alternative, indirect measure of satisfaction by considering the potential influence of adverse working conditions on self-reported fairness of pay. In this respect, consideration of fairness of pay completes the picture painted by adverse working conditions on workers' satisfaction.

In the following section, we describe the empirical strategies that we use for testing compensating wage differentials. Then we describe the data and the estimation results. The final section concludes the paper.

2. Empirical strategy

Assume that the utility of an individual depends on wage and working conditions: $U = U(w, D, Z)$, where w is wage, D a measure of disamenity related to work, and Z all other variables that affect utility. It is assumed that $\partial U/\partial w = U_w > 0$ and

$\partial U/D = U_D < 0$. On the other hand, if the disamenity is compensated in the form of higher wages, we have $w = w(D, X)$ with $\partial w/\partial D = w_D > 0$. The vector X includes all other determinants of wages, such as education and experience. Inserting the wage equation in the utility function gives $U = U(w(D, X), D, Z)$. Compensation of the disamenity implies that, in the margin, D does not affect utility, i.e. $\mathrm{d}U = U_w w_D \mathrm{d}D + U_D \mathrm{d}D = 0$. This finally gives $w_D = -U_D/U_w$. That is, the marginal compensation of an adverse working condition in terms of wage has to equal the marginal rate of substitution of wage and the disamenity. In a competitive labour market, the trade-off in terms of firms' profits between wage and working conditions would also be equal to the slope of the wage equation. Most of the literature on compensating wage differentials has tested their existence on the basis of a hedonic wage equation $w = \theta + \phi D + X\rho$, where wage (or log of wage) is regressed on the usual control variables X and the disamenity variable D (which can also be a vector of various disamenities). If the disamenity obtains a significant positive coefficient, the existence of compensating wage differentials is supported. This is the first approach we will follow, using as disamenities the workers' subjective views about the factors of harms and hazards at their current workplaces.

We also use an alternative way of testing for compensating differentials, which is based on the utility function (Godechot and Gurgand, 2000; Stutzer and Frey, 2003). Measurement of utility is by no means a trivial task. A natural alternative is overall job satisfaction. It is a typical feature of workplace surveys that job satisfaction is expressed in an ordinal scale with a few (often 3-5) alternatives. This is also the case with the data that we are using. If utility depends on wage and disamenities, and wage fully reflects compensation for the working conditions (i.e. $w_D = -U_D/U_w$) then inserting the wage as a function of disamenities in the utility function should wipe out the disamenities. This is easily demonstrated in the linear case $U = \alpha + \delta w + \beta D + Z\gamma$ and $w = \theta + \phi D + X\rho$, where U is measured by job satisfaction and X and Z denote all other variables. Inserting the wage function in the utility function gives the reduced form utility $U = \alpha + \delta\theta + (\beta + \delta\phi)D + Z\gamma + X\rho\delta$. The existence of compensating wage differentials implies that $\phi = -\beta/\delta$. If this constraint holds, the disamenities D are wiped out, so neither wage nor disamenity appears in the utility function. Compensating wage differential can therefore be tested by testing whether the hypothesis $\beta^* = 0$ holds in the job satisfaction equation $U = \alpha^* + \beta^* D + X\gamma^* + Z\rho^*$, where wage is not included. A significant negative coefficient for the disamenity would be evidence against compensating differentials. This is the second testing that we will use[4]. The categorical job satisfaction data require the use of ordered probit or logit estimation. Note that the variables Z that affect utility and the variables X that affect wage can be partly the same. In this case the estimated coefficients of these variables would be combinations of utility function and wage function parameters. However, since our interest is in testing for compensating differentials, we need not identify these effects separately.

As our third test of compensating differentials we examine the nature of wage formation by taking advantage of information about workers' perception about the fairness of pay. This constitutes a direct measure of utility derived from wage so that the impact of disamenities can be tested in the same way as with job satisfaction as the measure of utility. Again, the fairness information is available as an ordinal variable.

3. The data

The data set that we are using in this study is the Quality of Work Life Survey (QWLS) of Statistics Finland (SF). The survey is conducted at irregular intervals; we use the 1997 survey. QWLS is able to provide a representative sample of Finnish wage and salary earners, because the initial sample for QWLS is derived from a monthly Labour Force Survey (LFS) of SF, where a random sample of the working age population is selected for a telephone interview. The 1997 QWLS was based on LFS respondents in September and October who were 15-64-year-old wage and salary earners with a normal weekly working time of at least five hours. A random sample of 3,795 individuals in this group was selected for QWLS and invited to participate in a personal face-to-face interview. Out of this sample, 2,978 persons, or around 78 per cent, participated (see Lehto and Sutela, 1999). Owing to missing information on some variables for some workers, the sample size used in estimations varies by equation and is around 2,850 observations.

For our research purposes, a major strength of the QWLS data set is that it contains a number of questions about the subjective views of workers with respect to their working conditions, including factors of perceived harms and hazards[5]. The survey also contains information about the level of overall job satisfaction and considerations for fairness of pay, among many other things. In addition, QWLS includes a number of questions on the personal characteristics and work experience of the respondents that can be used as control variables.

SF supplements QWLS with information from the LFS on, for example, working time and exact labour market status. Supplementary information on the industry and location of the employer, and on the level and field of education of the respondents, is gathered from various registers maintained by SF. In addition, SF obtains information on annual taxable earnings from tax registers. The variables that we are using are explained in detail in the Appendix.

Two alternative measures for wages are applied, one continuous and the other categorical[6]. The first one is the logarithm of hourly earnings that have been calculated from annual taxable earnings divided by annual hours, which, in turn, are based on regular weekly hours from LFS. An alternative measure is based on self-reported monthly wage groups. The categorical variable that we use (in interval regression) is the logarithm of the limits of the groups. The correlation coefficient between the hourly earnings and the mid points of the self-reported wage groups is 0.46.

The variable for job satisfaction is an ordered discrete variable with 4 categories, 4: very satisfied (the number of observations in this category is 880), 3: quite satisfied (1,813), 2: rather dissatisfied (152), and 1: very dissatisfied (29). As an alternative satisfaction measure we use the variable for the perception of fairness of pay, which is an ordered discrete variable with 5 categories, 5: the wage is clearly higher than it should be (the number of observations in this category is 8), 4: the wage is somewhat higher than it should be (53), 3: the wage is about right (1,269), 2: the wage is somewhat lower than it should be (1,055), and 1: the wage is clearly lower than it should be (543). As expected, there are only a few observations in the highest categories.

We base the empirical investigation of compensating wage differentials and the level of job satisfaction on the subjective valuation of adverse working conditions that are related to wages and job satisfaction. Although such data have been used in some other analyses, Viscusi and Aldy (2003), in their survey of the literature on compensating

wage differentials, point out that very few empirical studies have actually compiled workers' subjective perceptions regarding factors of discomfort at the workplaces.

The subjective valuations of harms and hazards related to working conditions are measured in the QWLS data by the use of different categories. For perceived harms, there is a five-point scale in which the highest category corresponds to the perception by the worker that a feature of working conditions is "very much" an adverse factor at the workplace. For perceived hazards, the highest category among three possibilities is the one in which the respondent considers a feature at the workplace "a distinct hazard". Responses to the questions about adverse working conditions are aggregated by forming a dummy variable that equals one if there is at least one clearly adverse factor and a dummy that equals one if there is at least one distinct hazard. These variables are able to capture different aspects of the workplaces, as implied by the relative small correlation of 0.31 that prevails between these two key variables that are used to describe adverse working conditions. The mean values for the job disamenity variables that are used in the models are reported in Table I[7].

We have dummy variables for the difficulty of taking breaks, for working mostly outdoors, and for the presence of at least one clear insecurity factor at the workplace as other job disamenities. Additionally, we have dummy variables for physically or mentally very demanding work. We include the "usual suspects" as control variables that are well-known determinants of wages and job satisfaction in the literature. These include age, sex, education, tenure, working hours, past unemployment, union membership, and physical condition[8]. In addition, we include some employer characteristics; ownership (public, foreign), plant size, employment growth, and an indicator for the financial instability of the firm. Finally, we include industry dummies (14 industries), occupation dummies (81 occupations), and regional dummies (12 regions)[9].

4. Estimation results

We estimate the basic wage equation using OLS with the logarithm of hourly earnings as the dependent variable (Table II, Column 1). We concentrate here on the effect of working conditions[10]. There is empirical evidence for compensating wage differentials arising from uncomfortable working hours. Workers that are engaged in 3-shift work get around 20 per cent higher hourly wages. This particular finding is not surprising as such, because higher wages for the 3-shift workers are stipulated in the collective labour agreements. This effect remains when industry dummies are included (Table II, Column 2), but disappears with the inclusion of occupation dummies (Table II, Column 3). The most likely reason for this is that there is a strong correlation between occupation and the presence of shift work. In other words, this compensation is specific for some

Table I.
Mean values of the job disamenity variables

Variable	Mean
Shift work	0.04
Harm	0.29
Hazard	0.34
No breaks	0.10
Working outdoors	0.05
Uncertainty	0.58
Heavy physically	0.05
Heavy mentally	0.06

	Wage, OLS	Wage, OLS	Wage, OLS	Wage group, Interval regression
Shift work	0.202 (2.69)***	0.204 (2.71)***	0.128 (1.58)	0.233 (6.99)***
Harm	−0.018 (0.46)	−0.016 (0.41)	−0.004 (0.09)	−0.022 (1.32)
Hazard	0.019 (0.52)	0.025 (0.67)	0.040 (1.09)	0.017 (1.04)
No breaks	−0.010 (0.18)	−0.007 (0.12)	−0.024 (0.43)	−0.006 (0.26)
Working outdoors	0.095 (1.37)	0.134 (1.87)*	0.165 (2.19)**	−0.052 (1.38)
Uncertainty	0.007 (0.21)	0.010 (0.27)	0.005 (0.14)	0.021 (1.36)
Heavy physically	−0.027 (0.35)	−0.008 (0.09)	0.046 (0.59)	−0.042 (1.14)
Heavy mentally	0.021 (0.33)	0.020 (0.30)	−0.012 (0.19)	0.059 (2.30)**
Industry dummies	No	Yes	Yes	Yes
Occupation dummies	No	No	Yes	No
Regional dummies	Yes	Yes	Yes	Yes
Observations	2,859	2,859	2,859	2,859
R-squared	0.39	0.40	0.44	

Notes: Robust *t*-statistics in parentheses. *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent. The models include personal background variables, labour market experience variables, job and employer characteristics as unreported control variables, as listed in Appendix

Table II.
Estimation results for the wage equations

occupations. In addition, there is some evidence that those workers that work mostly outdoors get around 13-17 per cent higher hourly wages in compensation for their adverse working conditions (Table II, Columns 2 and 3). Interestingly, there is no evidence for the existence of compensating wage differentials arising from various perceived harms and hazards. All in all, the basic results support the notion that working conditions have a very minor role in the determination of individual wages. There seem to be no pecuniary rewards for adverse working conditions[11].

Next, instead of the continuous hourly wage variable we use a self-reported categorical wage variable and estimate the model with interval regression in order to study the robustness of the results (Table II, Column 4)[12]. This gives a significant positive coefficient for shift work, in line with the basic wage equation. In addition, mentally heavy work obtains a positive and significant coefficient. Otherwise, there are no indications of compensation for adverse working conditions. The slight differences in the results obtained with a continuous wage variable and the categorical wage variable are most likely due to the less than perfect correlation between the measures and the different estimation methods used.

In the literature on compensating wage differentials it has been a common finding that disamenities may obtain insignificant or even wrong-signed coefficients (Brown, 1980). One reason for this is that groups of the labour force with very low unobserved productivity characteristics end up with poor jobs with adverse working conditions, but they have little bargaining power to negotiate higher wages. We are not able to address this issue, because the QWLS data set is not a panel and it does not contain a direct measure of workers' productivity[13].

To account for the observed heterogeneity of the workers, we estimate the continuous wage equation for men and women separately[14]. The results reveal that males who do not have enough opportunities for breaks at their workplace get around 26 per cent higher hourly wages, other things being equal (Table III, Column 2). In addition, there is some evidence that males in tasks that are physically "very

	Wage, OLS for females	Wage, OLS for males
Shift work	0.217 (2.03)**	0.124 (1.21)
Harm	0.016 (0.31)	−0.051 (0.89)
Hazard	0.023 (0.47)	0.021 (0.35)
No breaks	−0.101 (1.38)	0.264 (3.39)***
Working outdoors	0.187 (1.13)	0.106 (1.31)
Uncertainty	0.004 (0.07)	−0.014 (0.27)
Heavy physically	−0.157 (1.26)	0.143 (1.72)*
Heavy mentally	−0.042 (0.45)	0.103 (1.18)
Industry dummies	Yes	Yes
Occupation dummies	No	No
Regional dummies	Yes	Yes
Observations	1,521	1,338
R-squared	0.38	0.46

Notes: Robust *t*-statistics in parentheses. * significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent. The models include personal background variables, labour market experience variables, job and employer characteristics as unreported control variables, as listed in Appendix

Table III.
Estimation results for the wage equations separately for females and males

demanding" obtain around 14 per cent higher wages. Otherwise, the results show no signs of compensating differentials. In particular, there is no empirical evidence for the existence of compensating wage differentials for females beyond that for the 3-shift workers (Table III, Column 1).

The job satisfaction equation is estimated with ordered Probit. The results reveal that adverse working conditions substantially decrease the level of overall job satisfaction (Table IV, Column 1). Strongly experiencing at least one kind of harm, not having enough breaks, perceiving uncertainty and physically or mentally heavy work all decrease job satisfaction[15]. As these disamenities should not affect job satisfaction when the wage includes a compensating differential (and wage is not included in the estimated model), these results clearly speak against the existence of compensating differentials[16].

	Job satisfaction, ordered probit	Fairness of pay, ordered probit
Shift work	0.187 (1.69)*	0.200 (1.89)*
Harm	−0.264 (4.75)***	−0.255 (4.62)***
Hazard	−0.067 (1.26)	−0.154 (3.00)***
No breaks	−0.250 (3.05)***	−0.334 (4.20)***
Working outdoors	−0.159 (1.50)	−0.167 (1.68)*
Uncertainty	−0.205 (4.15)***	−0.072 (1.56)
Heavy physically	−0.271 (2.28)**	−0.186 (1.62)
Heavy mentally	−0.321 (2.92)***	−0.221 (2.24)**
Industry dummies	Yes	Yes
Occupation dummies	No	No
Regional dummies	Yes	Yes
Observations	2,842	2,842

Notes: Robust *t* statistics in parentheses. *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent. The models include personal background variables, labour market experience variables, regular monthly working hours, and job and employer characteristics as unreported control variables, as listed in Appendix

Table IV.
Estimation results for the satisfaction equations

Wage satisfaction can be tried as an alternative to overall job satisfaction (Table IV, Column 2). The key difference between these variables is that fairness is constructed as being in relation to others. For this reason, the results for overall job satisfaction and fairness may differ from each other. In particular, the reference group that workers apply in their answers to the question about fairness can vary a lot across wage and salary earners, making the results harder to interpret. For instance, it could be dissatisfying overall to have a job with a great number of adverse characteristics, but, seeing that one is treated as badly as everyone else can make one feel that one is not treated unfairly in relative terms. Based on this, we prefer overall job satisfaction to fairness as a measure of discomfort. Having said that, it is interesting to note that perceived job harms and hazards have a significant negative effect on the feeling of the fairness of pay. However, some disamenities included are no longer statistically significant at the 5 per cent level. The fact that there are disamenities, such as the perception of uncertainty that decrease the level of overall job satisfaction, but do not undermine the sense of fairness, may mean that workers think that these particular disamenities should not be compensated. One reason for this is that workers are treated in jobs with these particular characteristics equally badly. Thus, their existence does not ruin workers' satisfaction with wage.

5. Conclusions

This paper uses the QWLS to investigate the role of adverse working conditions in the determination of individual wages and the level of job satisfaction in the Finnish labour market. The data set also includes, besides wages and job satisfaction scores, detailed information on several different aspects of self-reported working conditions at the workplace, not just conditions typical of some occupations or industries that have commonly been used in the literature. Subjective valuations of working conditions can provide a useful data source in the analysis of compensating wage differentials, because they enable a direct comparison of the effects of adverse working conditions on wages and the level of job satisfaction. This is essential, because workers' subjective valuations about the appropriate monetary compensation of unpleasant working conditions can differ greatly from the ones that have been covered in the collective agreements.

Our reading of the evidence obtained is that working conditions have a very minor role in the determination of individual wages. The three-shift workers get higher wages, but that particular compensation scheme has already been stipulated in the collective labour agreements. In addition, that compensation is specific for some occupations. In contrast, adverse working conditions substantially decrease the level of job satisfaction and the perception of fairness of pay. This evidence speaks against the existence of compensating wage differentials.

These results are consistent with the view advocated recently by Manning (2003), according to which utilities of workers are not equalised between industries and occupations in labour markets characterized by frictions and monopsony power by employers. There are lots of frictions in the labour market at least in the short-run, because it takes a substantial amount of time and/or money for individual workers to change their current jobs. Frictions in worker mobility can prevent the market for disamenities from reaching equilibrium. In this respect, it is important to keep in mind that working conditions fully reveal themselves to workers after the employment contract has started and the very presence of frictions means that it is often not possible for workers to move immediately from adverse working conditions. In addition, frictions in worker mobility

support wage-setting power by employers, making individual firms face upward-sloping labour supply curves. As a result, it is possible that even workers with identical abilities can obtain different levels of utility and compensating wage differentials are not able to explain the observed wage variation. This non-competitive behaviour of labour markets explains the pattern that workers may report lower levels of job satisfaction in adverse working conditions, while getting no monetary compensation for the existence of job disamenities.

Interestingly, the overall deterioration in job quality along with the intensification of work effort during the 1990s documented by Green (2006) provides an additional explanation for the non-existence of compensating wage differentials. The overall worsening of working conditions reduces workers' outside options and their bargaining power. Therefore, it is more difficult for individual workers to negotiate higher wages in compensation for their adverse working conditions[17]. Comprehensive longitudinal data on job disamenities, wages and job satisfaction scores would be an invaluable tool in analysis of these effects.

This study has been supported by The Finnish Work Environment Fund (Työsuojelurahasto). The authors are grateful to Mika Haapanen, Kari Hämäläinen, Reija Lilja and Roope Uusitalo for comments. In addition, authors would like to thank three anonymous referees for valuable comments and suggestions that have greatly improved the paper. The usual disclaimer applies.

Notes

1. Bargaining over both wage and working conditions would be one possible reason for observing a positive relationship between good working conditions and wage (Daniel and Sofer, 1998).
2. Johansson (2004) investigates the determinants of job satisfaction in Finland using the European Community Household Panel, but the data set has no information on working conditions.
3. A drawback of the data set is that it is a single cross-section. However, Clark (2001) stresses that cross-sectional estimates of the determinants of job satisfaction are typically robust to endogeneity concerns.
4. Compensating wage differentials can also be evaluated by testing the hypothesis $\delta = 0$ in the job satisfaction equation $U = \alpha^* + \delta^* w + Z\gamma^* + X\rho^*$ where disamenities are not included, but wage is (Lalive, 2002). Clark (2003) also uses an approach that is based on a similar simple model. He explains both job satisfaction and wages with occupation dummies.
5. The QWLS data do not include information on actual accidents in the firms.
6. Both wage measures have some merits and some disadvantages. The one based on annual earnings does not contain a lot of reporting errors, because it is based on tax registers. The downside is that it is an annual measure and can contain wages from several employment relationships and some non-wage income. On the other hand, the self-reported wage is directly tied to the current employment contract, but it may be more prone to reporting errors for the very reason that it is reported by employees themselves.
7. There are some interesting differences in the mean values of the HARM and HAZARD variables across industries. The highest mean value of HARM is 0.5 (mining) and the lowest 0.17 (electricity, gas and water supply). The highest mean value of HAZARD is 0.67 (mining) and the lowest 0.21 (finance).
8. We include self-assessment of work capacity (condition) among the explanatory variables. It can be regarded as a proxy variable for self-reported health that has been found to be related to job satisfaction (Clark, 1996). Collective labour contracts are almost always binding even for the non-union members in Finland. This means that endogeneity of union status should not be an issue of great importance in the Finnish labour market.

9. There are different notions in the literature on entering industry and occupational dummies in the hedonic wage equations. For instance, Dorman and Hagstrom (1998) argue strongly that the non-competitive aspects of wage formation are very important in terms of compensating wage differentials. This implies that the estimated wage equation should include a number of industry-level controls (such as profitability and capital/labour ratio) or, alternatively, a full set of dummies attached to industries. Importantly, in our case, we get the same result on the non-existence of compensating wage differentials with different specifications regarding industry and occupational dummies. Thus, when we exclude both industry and occupational dummies from the hedonic wage equation, we still get the result that job disamenities do not raise wages.
10. The results on the control variables and some additional job disamenity variables are reported and discussed in detail in the working paper version (Böckerman and Ilmakunnas, 2004), which also includes investigations of the robustness of the results.
11. It is possible that the non-existence of compensating wage differentials is merely a short-run phenomenon. For this reason, we have estimated the wage equation separately for those workers with tenure over ten years, because those workers are fully informed about their working conditions and they have a better bargaining position to demand compensation for adverse conditions. It turns out that our basic conclusion about the non-existence of compensating wage differentials remains the same, but there is some evidence that workers in mentally heavy work get higher wages when their tenure is over ten years.
12. The model with wage group as the dependent variable includes regular monthly working hours as an additional control variable that is not reported in the table. There is no need to control separately for working hours in the first three models of the table, because hourly earnings are explained in those models.
13. In panel data fixed effects or random effects are able to pick up unobserved productivity differences across individuals. For example, Brown (1980) uses fixed effects in hedonic wage equations. The approach works if job changes are exogenous. For this reason, information on plant closures have sometimes been used in research.
14. We estimated the wage equation separately for the highly educated employees (those with at least some university education), because they should have more individual-level bargaining power compared with unskilled workers. However, we were unable to find evidence for compensating wage differentials for the highly educated employees. We also estimated the model separately for persons working in low unemployment and high unemployment regions, since workers in low unemployment regions may have more bargaining power in firm-level negotiations and have more opportunities for job switches. Again, we found no evidence for compensating differentials.
15. Our uncertainty variable captures mostly factors that are related to perception of job instability, which should be harmful for workers. However, it is possible that transfer to other duties (i.e. job rotation) that is included in the variable, is not a disamenity at least for some workers. Indeed, Eriksson and Ortega (2004) provide evidence on the positive effects of job rotation that are based on employee and employer learning.
16. The reason for positive effect of shift work on job satisfaction is most likely self-selection of workers into this particular scheme, which is quite rare in the Finnish labour market as reported in Table I.
17. In particular, Green and Tsitsianis (2005) show that the intensification of work effort is able to explain part of the fall in job satisfaction in Britain. Lehto and Sutela (2004) report that there are some indications about the overall worsening of working conditions (e.g. increase of unpaid overtime) in Finland during the 1990s.

References

Böckerman, P. and Ilmakunnas, P. (2004), "Do job disamenities raise wages or ruin job satisfaction?", HECER Discussion Paper No. 20.

Brown, C. (1980), "Equalizing differences in the labor market", *The Quarterly Journal of Economics*, Vol. 94 No. 1, pp. 113-34.

Clark, A.E. (1996), "Job satisfaction in Britain", *British Journal of Industrial Relations*, Vol. 34 No. 2, pp. 189-217.

Clark, A.E. (2001), "What really matters in a job? Hedonic measurement using quit data", *Labour Economics*, Vol. 8 No. 2, pp. 223-42.

Clark, A.E. (2003), *Looking for Labour Market Rents with Subjective Data*, DELTA, Mimeo.

Daniel, C. and Sofer, C. (1998), "Bargaining, compensating wage differentials, and dualism of the labor market: theory and evidence for France", *Journal of Labor Economics*, Vol. 16 No. 3, pp. 546-75.

Dorman, P. and Hagstrom, P. (1998), "Wage compensation for dangerous work revisited", *Industrial & Labor Relations Review*, Vol. 52 No. 1, pp. 116-35.

Eriksson, T. and Ortega, J. (2004), "The adoption of job rotation: testing the theories", Working Paper No. 04-03, Aarhus School of Business, Department of Economics.

Godechot, O. and Gurgand, M. (2000), "Quand les salariés jugent leur salaire", *Economie et Statistique*, Vol. 331 No. 1, pp. 3-24.

Green, F. (2006), *Demanding Work: The Paradox of Job Quality in the Affluent Economy*, Princeton University Press, Princeton, NJ.

Green, F. and Tsitsianis, N. (2005), "An investigation of national trends in job satisfaction in Britain and Germany", *British Journal of Industrial Relations*, Vol. 43 No. 3, pp. 401-29.

Hwang, H., Mortensen, D.T. and Reed, W.R. (1998), "Hedonic wages and labor market search", *Journal of Labor Economics*, Vol. 16 No. 4, pp. 815-47.

Hwang, H., Reed, W.R. and Hubbard, C. (1992), "Compensating differentials and unobserved productivity", *Journal of Political Economy*, Vol. 100 No. 4, pp. 835-58.

Johansson, E. (2004), "Job satisfaction in Finland results from the European Community Household Panel 1996-2001", Discussion Paper No. 958, The Research Institute of the Finish Economy.

Lalive, R. (2002), *Do Wages Compensate for Workplace Amenities?*, University of Zurich, Mimeo.

Lang, K. and Majumdar, S. (2004), "The pricing of job characteristics when markets do not clear: theory and policy implications", *International Economic Review*, Vol. 45 No. 4, pp. 1111-28.

Lehto, A.-M. and Sutela, H. (1999), *Efficient, more efficient, exhausted. Findings of Finnish Quality of Work Life Surveys 1977-1997*, Vol. 8, Statistics Finland, Labour Market, Helsinki.

Lehto, A.-M. and Sutela, H. (2004), *Uhkia ja mahdollisuuksia. Työolotutkimusten tuloksia 1977-2003*, Edita Prima, Helsinki.

Manning, A. (2003), *Monopsony in Motion. Imperfect Competition in Labor Markets*, Princeton University Press, Princeton, NJ.

Rosen, S. (1986), "The theory of equalizing differences", in Ashenfelter, O. and Layard, R. (Eds), *Handbook of Labor Economics*, Vol. 1, Elsevier, Amsterdam, pp. 642-92.

Stutzer, A. and Frey, B.S. (2003), "Stress that doesn't pay: the commuting paradox", Discussion Paper No. 151, Institute for Empirical Research in Economics.

Viscusi, W.K. and Aldy, J.E. (2003), "The value of a statistical life: a critical review of market estimates throughout the world", *Journal of Risk and Uncertainty*, Vol. 27 No. 1, pp. 5-76.

Appendix. Definitions of the variables

Variable	Definition/measurement
Dependent variables	
Wage	Logarithm of hourly earnings that is calculated based on the annual earnings (FIM) obtained from tax registers and by using regular weekly hours from LFS. This information is matched to the QWLS data by using personal identification codes. Regular weekly hours are multiplied by 48, which is the average amount of working weeks in Finland, in order to get yearly working hours
Wage group	Logarithm of the limits of self-reported monthly wage groups (19 groups). The first wage group is 3,000 FIM or less; after that there are 13 wage groups for every 1,000 FIM increase in monthly wage, two wage groups for every 2,000 FIM increase, two wage groups for every 5,000 FIM increase and, finally, the last wage group is for monthly wages that are more than 30,000 FIM
Job satisfaction	Satisfaction with current job, measured in four categories
Fairness of pay	Notion about the fairness of pay in comparison with the remuneration paid in other occupations. Measured in five categories
Personal background characteristics	
Female	1 = female, 0 = male
Age	Three age groups that are 15-24 (reference), 25-44, and 45-64
Union	Member of trade union = 1, otherwise = 0
Education	Four education groups that are comprehensive education (reference), upper secondary or vocational education, polytechnic or lower, and higher university degree
Past labour market experience	
Unemployment	Four groups based on the number of unemployment months during the past five years that are 1-6, 7-12, 13-24, and 25 or more
Tenure	Number of years in the current firm
$Tenure^2$	Tenure squared
Working time	
Hours	Regular monthly hours of work
Temporary	Fixed-term employment relationship = 1, otherwise = 0
Part-time	Part-time work = 1, otherwise = 0
Shift work	Uninterrupted 3-shift work = 1, otherwise = 0
Working conditions	
Harm	At least one adverse factor that affects work "very much" (includes heat, cold, vibration, draught, noise, smoke, gas and fumes, humidity, dry indoor air, dust, dirtiness of work environment, poor or glaring lighting, irritating or corrosive substances, restless work environment, repetitive, monotonous movements, difficult or uncomfortable working positions, time pressure and tight time schedules, heavy lifting, lack of space, mildew in buildings) = 1, otherwise = 0
Hazard	At least one factor is experienced as "a distinct hazard" (includes accident risk, becoming subject to physical violence, hazards caused by chemical substances, radiation hazard, major catastrophe hazard, hazard of infectious diseases, hazard of skin diseases, cancer risk, risk of strain injuries, risk of succumbing to mental disturbance, risk of grave work exhaustion, risk of causing serious injury to others, risk of causing serious damage to valuable equipment or product) = 1, otherwise = 0

(*continued*)

Table AI.

Variable	Definition/measurement
No breaks	Can take breaks or rest periods "far too seldom" = 1, otherwise = 0
Working outdoors	Does principally outdoor work = 1, otherwise = 0
Uncertainty	Work carries at least one insecurity factor (includes transfer to other duties, threat of temporary dismissal, threat of permanent dismissal, threat of unemployment, threat of becoming incapable of work, unforeseen changes) = 1, otherwise = 0
Heavy physically	Current tasks physically "very demanding" = 1, otherwise = 0
Heavy mentally	Current tasks mentally "very demanding" = 1, otherwise = 0
Status and health	
Manager	Tasks involve supervision of work of others or delegation of tasks = 1, otherwise = 0
Condition	Self-assessment of working capacity. The variable is scaled from 0 (total inability to work) to 10 (top working capacity)
Information about employer	
Public	Employer is state or municipality = 1, otherwise = 0
Foreign firm	Employer is private, mainly foreign-owned enterprise = 1, otherwise = 0
Plant size	Four size groups based on the number of employees that is less than 10 (reference), 10-49, 50-499, and over 499
Employment growth	The number of employees has increased in the plant during the past three years = 1, otherwise = 0
Unstable firm	Financial situation is "unstable" = 1, otherwise = 0
Industry, occupation and regions	
Industries	14 industry dummies based on Standard Industry Classification
Occupations	81 occupation dummies based on the classification of occupations
Regions	12 regional dummies based on the division of Finland into provinces

Table AI.

About the authors

Petri Böckerman is economist and Senior Researcher at the Labour Institute for Economic Research in Helsinki, Finland. He has graduated from Helsinki School of Economics. He has studied regional labour markets, working time issues, and job and worker flows, among other things. Petri Böckerman is the corresponding author and can be contacted at: petri.bockerman@labour.fi

Pekka Ilmakunnas is Professor of economics at Helsinki School of Economics. He holds a PhD degree from Rutgers University. Previously he has worked at Turku School of Economics, Bank of Finland, University of Helsinki, Research Institute of the Finnish Economy (ETLA), and Wissenschaftszentrum Berlin (WZB). He is doing applied econometric research in the fields of labour economics, entrepreneurship, and industrial economics.