

# **Job characteristics as determinants of job satisfaction and labour mobility**

**Thomas Cornelißen\***

DISCUSSION PAPER NO. 334

April 2006

ISSN: 0949-9962

## **Abstract**

This paper investigates the effects of detailed job characteristics on job satisfaction, job search and quits using data from the German Socio-Economic Panel (GSOEP) in a fixed effects framework.

Using a factor analysis, seventeen job characteristics are reduced to seven factors that describe different aspects of a job, which are qualified as status, physical strain, autonomy, advancement opportunities, social relations at the work place, work time and job security. The effects of these factors on job satisfaction, job search and quits differ. For example, job insecurity reduces job satisfaction, increases the subjective probability of job search but it decreases quits. In circumstances of higher job insecurity it seems to be hard to find a job to quit into.

Regressing job satisfaction, job search and quits on the detailed job characteristics shows that, when judging from the number of statistically significant coefficients, the job characteristics explain satisfaction best, while it is harder to explain job search and quits by these characteristics. Job satisfaction, however, is confirmed as a strong predictor of job search and quits after controlling for both, individual fixed effects and a set of detailed job characteristics.

**KEYWORDS:** job satisfaction, job mobility, quits, job search, fixed effects

**JEL-CLASSIFICATION:** J28, J62, C23

---

\* Institute of Quantitative Economic Research, University of Hannover, Germany,  
cornelissen@ewifo.uni-hannover.de

## **1. Introduction**

In the mid 1970s economists began to study job satisfaction, which had previously predominantly been analysed by psychologists. Freeman (1978a) provides an early analysis of the association between job satisfaction and quits. Since then, this association has been extensively analysed by economists and one regularity that has been found in data sets for many countries, including the U.S., the U.K., Denmark and Germany, is that job satisfaction reduces quits, quit intentions and job search (Freeman 1978a, Akerlof/Rose/Yellen 1988, Clark/Georgellis/Sanfey 1998, Clark 2001, Kristensen/Westergaard-Nielsen 2004, Lévy-Garboua et al. 2004, Schields/Wheatley Price 2000, Böckerman and Ilmakunnas 2004).

Job satisfaction is used as an explanatory variable in job mobility regressions because it is a proxy variable for otherwise not observed job characteristics that enter the utility function of workers. Warr (1999) proposes a classification of ten main job characteristics that affect a person's well-being at the workplace. The aim of this paper is to study the effects of a large number of job characteristics on job satisfaction, job search and quits. A worker's decision to quit may be seen as a sequential decision: the worker is dissatisfied with his job, he thus searches for other jobs and, if the search is successful, eventually quits. Job characteristics or job amenities should therefore influence all three variables: job satisfaction, job search and quits. However, they may not influence all three of them to the same extent. It is interesting to see which job characteristics are most important for satisfaction, search and quits respectively. The analysis also asks whether detailed job characteristics can replace job satisfaction as determinants in job search and quit equations.

Otherwise than including a large number of job characteristics into the comparative analysis of job satisfaction and job mobility this paper adds to the literature by paying special attention to individual fixed effects in order to investigate how the inclusion of unobserved heterogeneity affects the answers to the aforementioned questions. While individual fixed effects have been implemented in the research on the determinants of job satisfaction (Ferrer-i-Carbonel / Frijters 2004) as well as in studies that analyse job mobility (for example as early as Freeman 1978b), it seems that most of the research that has looked into job satisfaction as a determinant of quits has employed either pooled regressions or random effects regressions (Clark et al. 1998, Clark 2001, Kristensen / Westergaard-Nielsen 2004, Lévy-Garboua et al. 2004, Freeman 1978a). The present analysis therefore also pays attention to the question whether the inclusion of individual fixed effects into mobility equations changes the effects of job satisfaction and job characteristics on labour mobility.

The paper proceeds as follows. Section 2 reviews related literature. Section 3 presents the data and the methodology. Section 4 presents results and section 5 concludes.

## **2. Related literature**

Clark, Georgellis and Sanfey (1998) analyse the effect of job satisfaction on quitting using the GSOEP waves 1984 – 1993. In pooled probit as well as random effects probit estimations they establish a strong negative effect of job satisfaction on quits. The effect of high job satisfaction (reference category: low job satisfaction) is equal to the effect of about 20-30 months of tenure on quitting.

Clark (2004) analyses the 1997 ISSP data over 19 OECD countries and regresses job satisfaction on self-reported job outcomes. By comparing the coefficients of the dummy variables in the ordered probit estimation, he establishes a ranking of the extent to which the job outcomes contribute to satisfaction. The overall ranking from important to less important is: good relations, job content, promotion opportunities, work time, income, job security and hard work (see Table 11 for an overview of the results of Clark 2004). For women, job security, job content and relations are more important than for men.

Van Praag and Ferrer-i-Carbonel (2005) regress job satisfaction on different domains of job satisfaction that are available in the data set of the British Household Panel Survey (BHPS). They control for individual heterogeneity by doing random effects regressions of different domain satisfaction regressions and extracting principal components of the random effects from the different regressions. These components are included as controls into the job satisfaction regression. From the regression coefficients of the sub-domains, they construct a ranking of job satisfaction domains: Work itself stands out before pay and supervision, which is followed by promotion and hours. The lowest influence seems to stem from job security and initiative.

Clark (2001) applies duration analysis to the British Household Panel Survey (BHPS) from 1991 to 1998 to explain quits and separations. Besides typical labour market regressors, he includes individual overall job satisfaction or, alternatively, satisfaction with seven single job components (job security, pay, promotion, relations, initiative, work itself, hours). The results are that overall job satisfaction clearly and significantly reduces quits and separations. In regressions, where the single components of job satisfaction are included, their importance can be ranked by the log-likelihood of the estimation. A general result is that job security and satisfaction with pay seem to be the most important elements of job satisfaction judging from their power to predict quits and separations (see Table 12). The ranking of job characteristics differs between labour market groups. For young workers and female workers, the ability to work on one's own initiative ranks first. This ranking is quite different from that found by Van Praag and Ferrer-i-Carbonel (2005) who use the same data set, but regress job satisfaction instead of quitting behaviour on the job satisfaction domains.

In a Danish household panel from 1994-2000 Kristensen and Westergard-Nielsen (2004) analyse the effect of job satisfaction on quits in a Danish panel data set. Using random effects logit models, they investigate whether overall job satisfaction, different domain satisfactions or actual job search predict quits best. They find that overall job satisfaction significantly reduces the propensity to quit. Among the different satisfaction domains, the one delivering the greatest contribution is „type of work“ followed by „earnings“. This is opposed to Clark's (2001) finding for the UK where job security plays the most important role. Kristensen and Westergard-Nielsen (2004) attribute the difference to the more generous unemployment benefits in Denmark as compared to the UK. When comparing job search and job satisfaction as predictors, Kristensen and Westergard-Nielsen (2004) find that job search does best in explaining quits.

### 3. Data and Methodology

#### 3.1 Data

I use data from the German Socio-Economic panel (GSOEP) household survey that contains a rich set of socio-economic variables. The data cover the period from 1984 – 2003. An overview of the structure of the GSOEP is provided by Haisken-DeNew and Frick (2003).

I restrict the sample to employed West German workers of the private sector between 16 and 60 years of age.

Job satisfaction of employed respondents is surveyed each year by the question “How satisfied are you today with your job? Please answer by using the following scale [ranging from 0 to 10]: 0 means totally unhappy, 10 means totally happy.” The survey also contains different job characteristics. Some of them, such as wages, work time and worries about job security are surveyed each year. The more detailed job characteristics, such as task diversity, hard manual labour, relations with colleagues and others have only been surveyed in the years 1985, 1987, 1989, 1995 and 2001. I do all estimations on the sub-sample where detailed job characteristics are available in order to compare the results between different specifications. Table 1 gives an overview of the job characteristics included in the analysis and presents the wording of the questionnaire associated with each characteristics.

The GSOEP survey includes several questions about job mobility. In most years (excluding 1984, 1986, 1988, 1990, 1995, 1997, 2000) there is a question on the subjective probability of job search. The wording is “How probable is it in the next two years that you will look for a new job?” Since this question is missing in 1995, the job search regressions in this paper are done on a smaller sample than the quit and job satisfaction regression. Up to 1998 the answer to the job search question is coded in 4 integers from ‘unlikely’ to ‘certain’. Since 1999 respondents are asked to indicate the probability in percent, choosing between 11 options ranging from 0%, 10%, 20 % etc. up to 100%<sup>1</sup>. Furthermore, there are retrospective questions on objective job mobility events. Respondents are asked whether there were any employment changes since the first of January of the preceding year and, if so, which types of changes. I use the response option „I have started a new position with a different employer“ to identify external job mobility. External job moves can be further classified through another question that asks how the previous employment relationship was terminated. I use the option „My resignation“ to identify quits. More details on the job mobility variables available in the GSOEP are presented in Cornelißen/Hübler (2005, appendix A).

Besides a set of socio-demographic control variables available in the GSOEP I use the unemployment rates of the different Federal States as published by the German Federal Statistical Office as a control variable.

---

<sup>1</sup> I harmonise the reply options by recoding 0% to unlikely, 10%-50% to probably not, 60%-90% to probable, and 100% to certain. The recoding is chosen in such a way that in the years before and after the change of the reply options, similar fractions of respondents are in the four categories.

### **3.2 Methodology**

#### *Factor analysis*

In the first part of the analysis, a factor analysis is carried out in order to reduce seventeen job characteristics to seven factors that reflect different aspects of a job. The factors are a set of independent and mutually orthogonal linear combinations of all job characteristics. As there is an unlimited number of solutions of how to predict a given number of factors from a given number of variables, one searches for solutions that can be well interpreted in the sense that groups of variables that have a meaningful interpretation load strongly on one factor and not on others. While determining a set of factors that can meaningfully be interpreted allows to reduce the dimensionality of the analysis, it can also hide what is going on at the disaggregated level. Therefore, not only the factors are used as regressors in satisfaction, search and quit equations, but also the set of detailed job characteristics.

#### *Fixed effects models*

Psychological research has shown that wages and job characteristics enter the utility function in a complex way. The utility of job outcomes is determined in an individual reference framework relative to the outcomes of relevant peer groups, as well as relative to expectations, aspirations and values (Warr 1999). Personality traits and other individual unobserved aspects influence satisfaction. In other words, it is to be expected that the scaling of self-reported job satisfaction differs systematically between individuals. Pooled regression would implicitly assume interpersonal comparability of the satisfaction scale. If the individual effects are related to other characteristics, estimates of the effect of these characteristics on job satisfaction will be biased. This may especially be the case when both the dependent and the independent variable are subjective measures (Hamermesh 2004). Then, both include a person specific effect and the estimates are affected by this effect and do not reveal the true relationship of the underlying objective measures. As long as the individual effects are time-invariant, fixed effects can control for them.

It is also important to control for unobserved heterogeneity in mobility regressions. If unobserved heterogeneity is correlated with the observed determinants of job mobility, the coefficients of the observed determinants are biased in a pooled regression. For example, there is an ongoing debate on the question whether the negative effect of tenure on quitting is due to unobserved heterogeneity in mobility rates (Farber 1999). Self-selection of workers with different intrinsic mobility rates into jobs with different characteristics would lead to biased estimates in the framework of the present analysis. Holding fixed individual effects constant can alleviate these problems.

However, most of the literature on mobility that exploits panel data uses random effects models, although these models are inappropriate if regressors are correlated with the individual effect, which is to be expected. The popularity of random effects models is partly due to the inconveniences of fixed effects models for binary or more general ordinal dependent variables such as the (ordered) probit and the (ordered) logit model. The fixed effects probit model has undesirable statistical properties: In panels with finite time dimension it delivers inconsistent estimates (see for example Baltagi 2001, p. 206 or Hsiao 2003, p.194). The fixed effects logit model estimated by conditional maximum likelihood can only be estimated on the sub-sample of individuals that have variation over time in the dependent

variable. Therefore, the sample size usually shrinks significantly, especially in the case of a binary dependent variable<sup>2</sup>. This is a disadvantage of applying non-linear models which goes further than the usual inconvenience that time invariant dependent variables drop out of the analysis as they get swept out together with the individual fixed effects, which is the case in linear and non-linear models alike. In order to circumvent this problem, I apply linear fixed effects models to ordinal variables. In the case of binary variables, this is the linear probability model. In the case of multinomial variables with more than two classes (job satisfaction and job search), I apply a linear model where the dependent variable is “roughly cardinalised” by a methodology close to the one proposed by van Praag / Ferrer-i-Carbonel (2005).

*“Rough cardinalisation” of the ordinal dependent variable*

Van Praag / Ferrer-i-Carbonel (2005) propose several methods in order to “roughly cardinalise” ordinal variables. In principle, cardinalising an ordinal variable is not possible, but it is possible to rescale the variable in order to make the application of a linear model somewhat more appropriate under certain assumptions. The method of probit adapted OLS (POLS) proposed by van Praag / Ferrer-i-Carbonel (2005) consists of deriving those Z-values of a standard normal distribution that correspond to the cumulated frequencies of the different categories of the ordinal dependent variable. Suppose an ordinal variable  $x$  coded from 1 to 4 has the following distribution:  $p(x=1) = 0.1$ ,  $p(x=2) = 0.3$ ,  $p(x=3) = 0.5$  and  $p(x=4) = 0.1$

The cumulated frequencies are then  $P(x=1) = 0.1$ ,  $P(x=2) = 0.4$ ,  $P(x=3) = 0.9$  and  $P(x=4) = 1$ , and the corresponding Z-values of the standard normal distribution are:  $Z_{0.1} = -1.28$ ,  $Z_{0.4} = -0.25$ ,  $Z_{0.9} = 1.28$  and  $Z_1 = \infty$ .

For a given value of the original ordinal variable, the value of the “cardinalised” dependent variable is constructed by taking the expectation of a standard normally distributed variable under the condition that it is in the interval between those two Z-values that correspond to the class of the value of the original variable. Call the cardinalised variable  $x_c$ . In the above example, this means that  $x_c$  takes on the values:

$$x_c = \begin{cases} E(Z | Z < -1.28) = -\phi(-1.28) / \Phi(-1.28) & \text{if } x=1 \\ E(Z | -1.28 < Z < -0.25) = [\phi(-1.28) - \phi(-0.25)] / [\Phi(-0.25) - \Phi(-1.28)] & \text{if } x=2 \\ E(Z | -0.25 < Z < 1.28) = [\phi(-0.25) - \phi(1.28)] / [\Phi(1.28) - \Phi(-0.25)] & \text{if } x=3 \\ E(Z | 1.28 < Z) = \phi(1.28) / [1 - \Phi(1.28)] & \text{if } x=4 \end{cases}$$

where  $Z$  is a standard normal random variable,  $\phi$  being the standard normal pdf and  $\Phi$  being the standard normal cdf, which leads to:

---

<sup>2</sup> In this respect, the conditional logit model differs from the linear fixed effects model. In the linear fixed effects model observations that have no variation in the dependent variable still contribute to the estimation of the slope parameters as long as they have some variation in the independent variables. Only observations that have no variation in both, the independent and the dependent variables, do not contribute to the estimation of the slope parameters in the linear fixed effects model.

$$x_c = \begin{cases} -1.75 & \text{if } x=1 \\ -0.70 & \text{if } x=2 \\ 0.42 & \text{if } x=3 \\ 1.75 & \text{if } x=4 \end{cases}$$

In principle I follow this approach but I replace the Z-values from the standard normal distribution by the cut-off points from an ordered probit or ordered logit regressions instead. I prefer this approach because it uses the information of the whole model and not only the frequency distribution of the dependent variable for the “rough cardinalisation”. In the style of van Praag / Ferrer-i-Carbonel (2005) I term this procedure “ordered logit adapted OLS” and use the acronym OLOLS to refer to the estimation of a linear model based on the roughly cardinalised dependent variable.

Even though such rescaling seems to be suited for the application of a linear model, it does not change the fact that a non-linear model such as ordered probit or logit would be more appropriate due to the ordinal character of the data. I prefer to stay with the linear model, in order to circumvent the drawback mentioned earlier that observations are lost when a conditional fixed effects model is estimated. This approach seems to be justified by the results of Ferrer-i-Carbonel and Frijters (2004) who report that when explaining the ordinal variable of general satisfaction coded in integers from 0..10, including fixed effects affected results more strongly than taking into account the ordinal character of the dependent variable. However, in order to compare how the results might change by using a linear model instead of the non-linear model I compare at each time the pooled logit and the pooled linear model before proceeding to the fixed effects linear model.

## 4. Results

### 4.3 Descriptive statistics

Table 2 presents descriptive statistics by gender on 20 job characteristics and overall job satisfaction. Overall, West German private sector workers seem to be relatively satisfied with their jobs. Mean job satisfaction is 7.25 out of the ordinal scale which ranges from 0 to 10. Judging from the mean of the ordinal job satisfaction variable, men report slightly higher job satisfaction, albeit the difference is only 0.1 points. With respect to the detailed job characteristics, men seem to benefit from more task diversity, learning and promotion opportunities, influence, higher wages and fringe benefits. But they also report being more strongly controlled, working longer hours, being more subject to shift work, hard manual labour, environmental risks and suffering more from stress and worries about job security.

### 4.4 Factor analysis of job characteristics

By means of a factor analysis, seventeen job characteristics are reduced to seven factors that describe different aspects of a job<sup>3</sup>. A priori, the number of factors that should be retained is not clear.

---

<sup>3</sup> Wage growth, fringe benefits and the correspondence of the activity to the job learned are not included into the factor analysis, because a preliminary analysis showed that these variables do not load on the factors in a way that could be meaningfully interpreted. In the factor analysis all variables have been treated as continuous. It remains a project of future research to see how methods of factor analysis for categorical data would change results in the present context.

Different sub-domains of job satisfaction have been proposed in the literature. Warr (1999) proposes a classification of ten main job characteristics that affect a person's well-being at the workplace. As another example, the British Household Panel (BHPS) surveys seven sub-domains of job satisfaction (see van Praag / Ferrer-i-Carbonel 2005, p.91 and Clark 2001). In the present analysis, models with 1 to 10 factors have been computed, and the model with seven factors has been retained because it minimises the BIC information criterion among these models.

Table 3 presents the results of the factor analysis of job characteristics. Factor 1, interpreted as *status*, loads on influence, wages and work time. Factor 2, interpreted as *physical strain* at work, loads on hard manual labour and exposure to an adverse environment. Factor 3, interpreted as *autonomy* at work, loads on independence, extent of control and shift work. Factor 4, interpreted as *advancement* opportunities, loads on diverse tasks, learning opportunities and the subjective probability of promotion. Factor 5, interpreted as social *relations* at work, loads on stress, conflicts with the supervisor and good relations with colleagues. Factor 6, interpreted as *work time* arrangements, loads on the deviation of actual from desired work time and on actual work time. Finally, factor 7, interpreted as *job security*, loads on worries about job security and on the regional unemployment rate.

The seven factors are predicted from the regressors in such a way that a higher factor value corresponds to a more positive job outcome. Furthermore they are standardised to a mean of 0 and a standard deviation of 1.

#### **4.5 The effects of job characteristics on job satisfaction**

In the following discussion, the expression "significant" means statistical significance at the 5 percent level, and the expression "weakly significant" refers to statistical significance between the 5 percent and the 10 percent level.

Table 4 presents the effects of the job quality factors on job satisfaction. The effects of the control variables are in line with expectations and they are not reported here. In all three specifications of Table 4 all factors show a positive and significant association with job satisfaction. This reassures us that they measure job characteristics that are relevant to the individuals. As the factors are standardised, coefficients can be compared in order to assess their effect on job satisfaction. In the pooled regressions, where fixed effects are not controlled for, the ranking of the job aspects from their coefficients is exactly the same whether the non-linear ordered logit model or the linear "OLOLS" model is used. According to the fixed effects regression, which is preferable because it controls for unobserved time-constant heterogeneity, the importance of job aspects in terms of job satisfaction is the following: Autonomy, social relations at the workplace and advancement opportunities seem to have the greatest impact on job satisfaction. Next important are status and physical strain. Job insecurity and work time rank last. It is noteworthy that status, which is associated with wages and influence, is only in the second half of the ranking.

Clark (2004), who also ranks job outcomes by their effect on job satisfaction in the ISSP data set comprising 14000 workers across 19 OECD countries, finds similar results: good relations, job content and promotion opportunities rank before work time, income and job security. Van Praag and Ferrer-i-Carbonel (2005) analyse satisfaction regressions in British panel data and find that work itself stands out, but at the difference with the present analysis and with Clark (2004) pay and supervision rank

next, is followed by promotion and hours, and then job security and initiative. The relatively low ranking of job security in the satisfaction equation seems to be a regularity in these studies.

Table 5 presents the effects of detailed job characteristics on job satisfaction. The coefficients of control variables not reported here are in line with expectations. The first two columns refer to pooled regressions and the last column to a fixed effects regression. Comparing the pooled ordered logit regression with the pooled “OOLS” regression, all effects are similar in sign and significance. In the pooled regressions most effects of job characteristics on job satisfaction have the expected sign. Task diversity, learning opportunities, promotion opportunities, independence, influence, the wage level, wage growth, fringe benefits, and good relations with colleagues increase job satisfaction significantly. Strong control at work, a deviation of desired from actual work time, hard manual labour, adverse environmental impacts, stress, conflict with supervisors and perceived job insecurity all significantly reduce job satisfaction. These results also hold in the fixed effects specification with the exception of the wage level (insignificant) and only weak significance of promotion opportunities, a deviation of actual from desired work time and hard manual labour.

In the pooled regression, somewhat counter-intuitively the effect of shift work on job satisfaction is positive. This effect becomes insignificant once controlled for individual fixed effects.

The fixed effect in the satisfaction equation can be interpreted as intrinsic satisfaction. For example, the fact that the wage level is positive and significant in a pooled regression but insignificant in a fixed effects regression suggests that intrinsically more satisfied workers seem to receive higher wages.

In this context, “intrinsically more satisfied” means that a worker is more satisfied due to a time-invariant characteristic, which may be a personality trait, but which may also be due to objective time-invariant characteristic that are not controlled in the regression, e.g. the profession a worker works in, as far as it is time-constant, influences of the family and childhood or ability.

#### **4.6 The effects of job characteristics on job search**

Table 6 reports the effects of the aggregated job quality factors on job search. The effects of the control variables are in line with expectations and they are not reported here.

The subjective probability of job search is an ordinal variable coded in 4 categories (from “unlikely” to “certain”). In the case of the pooled regressions, the ordered logit regression is compared with the linear “OOLS” regression. The pooled regressions of job search in columns 1 and 2 of Table 6 indicate that all seven factors of job quality significantly reduce job search. As the factors are standardised, their coefficients can be compared. The ranking of job aspects according to their effect on job search is slightly different in the non-linear and the linear pooled model. The three strongest influences are the same in both models, namely autonomy, social relations at the work place and work time. Once fixed effects are introduced (column 3 of Table 6), the most important influences become job security, physical strain, autonomy and status. Social relations and advancement opportunities rank next, while work time has the least influence.

The different ranking in the fixed effects regression comes about mainly by the quintupling of the coefficient of the “no physical strain”, the doubling of the coefficient of the effect of “job security”, and the halving of the coefficient of “work time”. In other words, the coefficients of “no physical strain” job security” are biased upwards and the coefficient of “work time” is biased downwards in the pooled

regression. Persons who are intrinsically more inclined to be on the search (who have a higher fixed effect in the job search regression) seem to be more likely to be in jobs with absence of strain and good job security, but with less favourable work time arrangements. High ability workers might be in such jobs and might also be more likely to be on the search because they have good career opportunities. Career-oriented workers may work longer hours and at the same time search more intensively for outside career opportunities. Once controlled for this effect in the fixed effects regression, the effect of work-time arrangements on job search is rather small. The factor that captures work-time arrangements aggregates the actual working hours as well as the difference between desired and actual hours. There may be two opposite effects from these variables on job search. While higher working hours than desired may induce job search, a high amount of working hours per se may reduce job search, because people who work more have less time to search. Columns 4 and 5 of Table 6 show that job satisfaction has a strong predictive power for job search over and above the job quality factors. Comparing a regression with the job quality factors and job satisfaction (column 4 of Table 6) to a regression with only job satisfaction (and control variables) as regressor (column 5 of Table 6) reduces the effect of job satisfaction not by much.

Table 7 reports job search regressions with detailed job characteristics. Columns 1 and 2 present the pooled ordered logit and pooled linear “OLOLS” regressions. All influences have the same sign and broadly the same significance levels. In the fixed effects specification of column 3 job search is reduced by task diversity, learning opportunities, the net wage, fringe benefits and good relations with colleagues. Job search increases when there are strong control of performance, long working hours, hard manual labour, conflicts with the supervisor and worries about job security.

A number of job characteristics are not significant in the job search equation although they were significant in the job satisfaction equation. These are independence, influence, wage growth and adverse environmental conditions. Being dissatisfied with these dimensions of a job does not seem to trigger job search in a systematic way.

When overall job satisfaction is taken as a predictor of job search instead of the detailed job characteristics it has a clear negative effect on job search (column 5 of Table 7), which only decreases slightly when the detailed job characteristics are added (column 4 of Table 7).

#### ***4.7 The effects of job characteristics on quits***

Table 8 reports the effects of aggregate job aspects on quits. In the case of the binary variable of quits the difference in the estimates between the pooled non-linear (logit) and the and pooled linear (linear probability model) estimates are larger than was the case before in the regressions of the ordinal variables job satisfaction and job search. The comparison of columns 1 and 2 of Table 8 show that the factors “relations” and “security” are only significant at the 6 percent level in the logit regression while they are significant at the 1 and 3 percent level respectively in the linear probability model.

In the pooled linear regression of quits, four of the factors representing job characteristics have a negative and statistically significant effect: autonomy, advancement opportunities, social relations and work time. Status and absence of physical strain are insignificant. Status was significant in the pooled job search equation. Possibly it does not capture the right wage measure that is relevant for explaining

quits. Wage growth rather than the wage level might be of interest in order to explain quitting (Clark/Georgellis/Sanfey 1998, Galizzi/Lang 1998). Wage growth will be added to the analysis in the next step when the detailed job characteristics are analysed.

Job security has a positive significant effect in the pooled quit equation. Taken together with the previous results this implies that job security increases job satisfaction, decreases job search, and increases quitting.

In the linear fixed effects regression of quits (column 3 of Table 8) the influences of all job quality indicators are insignificant at any conventional significance level. It is puzzling that job quality factors that do affect job satisfaction so clearly seem to have so little to say for explaining actual job mobility. This is all the more so as columns 4 and 5 of Table 8 show that job satisfaction remains a powerful indicator of quitting in a fixed effects regression, whether the other job aspects are included into the regression (column 4) or not (column 5). If we take the point estimates of the coefficients at face value, the ranking of job aspects according to their influences on quits would have status and advancement opportunities in the first place, social relations, work time and absence of physical strain second, and autonomy last.

Table 9 reports the regressions of quits on detailed job characteristics. The pooled estimations reveal similar signs and significances of the influences in the non-linear logit model (column 1) and the linear probability model (column 2). When fixed effects are introduced (column 3) some coefficients increase significantly (wage growth and strong worries about job security), while others decrease significantly (strong control of performance, the wage level, hard manual labour and conflicts with the supervisor), when compared to the pooled regression of column 2. This suggests that high mobility workers (those with a high fixed effect in a quit regression) seem to earn higher wages and to be in jobs with more control of performance, more hard manual labour and more conflicts with supervisors, and also to have slower wage growth and to be in jobs with less worries about job security. In a pooled regression of quits the effects of wage level, performance control, hard manual labour and conflicts with supervisors therefore tend to be biased upwards, while the effects of wage growth and worries about job security tend to be biased downwards.

The coefficient of 'activity corresponds to the job learned' is positive and significant throughout the different specifications of the quit equation. Workers who are employed in the job they have been trained for may have better outside career opportunities than those who do not.

While in the fixed effects analysis relatively few of the detailed job characteristics seem to be statistically significant determinants quits, job satisfaction remains a strong predictor of quits after accounting for fixed effects and after including the detailed job characteristics into the analysis.

One reason why the present model is less successful in explaining quits compared to job satisfaction and job search may be that for the quitting decision not only the characteristics of the present job play a role but also the utility in the new occupation, e.g. the characteristics of the new job in the case of job-to-job moves.

Table 10 summarises the rankings of the factors according to their influence on job satisfaction, job search and quits respectively. Some differences in importance of the aspects emerge. While social

relations at the work place seem to influence job satisfaction strongly, they only rank second in determining job search and quits. On the other hand, while status (the factor associated with pay and influence) seems to contribute only moderately to job satisfaction, it is relatively important as a determinant of job search and quits. Autonomy influences job satisfaction and job search strongly while apparently being of minor importance as a determinant of quitting. Job security seems to show relatively little importance for job satisfaction, but to be a strong predictor of job search, in the sense that job insecurity increases job search. However, in the quit equation the coefficient of job security has a positive sign: quitting seems to be more difficult out of an insecure job than out of a secure job. Even if in the quit regression the regional unemployment rate has been included as a control variable, the job insecurity variable may still capture aspects of low labour demand in the specific occupation or local area that is relevant to the worker.

Table 11 summarises the results of Clark (2004) in a comparative cross-country study. He also finds that job security does not rank high in a satisfaction regression, although workers cite job security as one of the most important aspects of a job. In a study using British data Clark (2001) finds a strong negative association between the satisfaction with job security of workers and their inclination to quit (see Table 12) and therefore ranks job security as a job aspect strongly valued by workers. In this respect the results of the British study differ from the present analysis. Dissatisfaction with job security seems to increase quits in Britain but to decrease quits in Germany. However, the methodology in both analyses differs (linear fixed effects methods in the present analysis, duration analysis in Clark 2001) and the model specifications are different. Therefore it would need to be investigated to what extent workers really behave differently in both countries and to what extent the different methods drive the differences in results.

## **5. Conclusion**

This paper has analysed the effects of detailed job characteristics on job satisfaction, job search and quits in German panel data. Descriptive statistics have shown that men report more task diversity, learning and promotion opportunities, influence and higher wages and fringe benefits than women. But they also report being more strongly controlled, working longer hours, being more subject to shift work, hard manual labour and environmental risks and suffering more from stress and worries about job security. Mean overall job satisfaction is very similar for men and women in the sample.

By means of a factor analysis, seventeen detailed job characteristics could be aggregated into seven job quality factors, which were interpreted as status, absence of physical strain, advancement opportunities, autonomy, social relations at work, work time arrangements and job security.

When regressing job satisfaction, job search and quits on the aggregated job quality factors while controlling for fixed effects, different rankings with respect to the importance of the job quality factors occur. Job satisfaction increases strongest with autonomy, advancement opportunities and social relations, while status and absence of physical strain rank lower, and job security and work time rank last. For job search the ranking is different. An important difference is that job security and status rank considerably higher while social relations and advancement opportunities rank lower in the job search equation than in the job satisfaction equation. When it comes to actual quits, advancement opportunities and status seem to be the most important determinants. With respect to job insecurity, it

is found that it reduces job satisfaction, increases the subjective probability of job search but does not increase quits. In circumstances of higher job insecurity it seems to be hard to find a job to quit into.

The analysis has shown that when comparing pooled non-linear regressions that take into account the categorical character of the data with linear regressions, the results do not change dramatically, although the difference is higher in the case of the binary variable than in the case of the ordinal variables. Results change much more after controlling for individual fixed effects, as has been noticed before by Ferrer-i-Carbonel and Frijters (2004).

The fixed effects regressions of job satisfaction, job search and quits show that detailed job characteristics are important determinants of job satisfaction and job mobility. However, while many characteristics are important determinants of job satisfaction, fewer are significant in the job search regression, and still fewer in the quits regression. Job satisfaction remains a strong predictor of job search and quits even after controlling for a large number of job characteristics and for individual fixed effects. Job satisfaction may be a better predictor than objective job characteristics not only because it implicitly contains more job aspects than can be surveyed in a questionnaire, but also because it weights the job aspects according to the individual preferences and the reference framework of each individual.

A route of future research would be to model the interdependence of job satisfaction, job search and quits in a more elaborate way and to take into account the fact that quits, when they are job-to-job moves, do not only depend on the characteristics of the present job but also on those of the new job.

## References:

- Akerlof, G.A., A.K. Rose and J.L. Yellen (1988): Job Switching and Job Satisfaction in the U.S. Labor Market, *Brookings Papers on Economic Activity*, 2, 495-582.
- Baltagi (2001): *Econometric Analysis of Panel Data*, 2<sup>nd</sup> ed., John Wiley & Sons, New York.
- Böckerman, P. and P. Ilmakunnas (2004): Job disamenities, job satisfaction, and on-the-job search: is there a nexus ?, *HECER Discussion Paper No. 36*, University of Helsinki.
- Clark, A. (2004): What makes a good job? Evidence from OECD countries. *Delta Working Paper no. 2004-28*.
- Clark, A. (2001): What really matters in a job ? Hedonic measurement using quit data, *Labour Economics*, 8, pp. 223-242.
- Clark, A., Y. Georgellis and P. Sanfey (1998): Job Satisfaction, Wage Changes, and Quits: Evidence from Germany, *Research in Labor Economics*, 17, pp. 95-121.
- Cornelißen, T. and O. Hübler (2005): Downward Wage Rigidity and Labour Mobility, *IZA DP no. 1523*, Bonn.
- Farber, H. S. (1999): Mobility and Stability: The Dynamics of Job Change in Labor Markets, in: O. Ashenfelter and D. Card (eds.): *Handbook of Labor Economics*, Vol. 3.
- Ferrer-i-Carbonel, A., Frijters, P. (2004): How important is methodology for the estimates of the determinants of happiness?, *The Economic Journal*, 114, 641-659.
- Freeman, R.B. (1978a): Job Satisfaction as an Economic Variable, *American Economic Review (Papers and Proceedings)*, 68 (2), pp. 135-141.
- Freeman, R.B. (1978b): A Fixed Effect Logit Model of the Impact Of Unionism on Quits, *NBER working paper 280*.
- Galizzi, M. and K. Lang (1998): Relative Wages, Wage Growth, and Quit Behaviour, *Journal of Labor Economics*, 16 (2), 367-391.
- Haisken-DeNew, J.P. and J.R. Frick (Eds.) (2003): Desktop Companion to the German Socio-Economic Panel Study, Version 7.0, DIW Berlin.
- Hamermesh, D.S. (2004): Subjective Outcomes in Economics, *NBER Working Paper 10361*.
- Hsiao (2003): *Analysis of Panel Data*, Cambridge University Press, Cambridge.
- Kristensen, N. and N. Westergård-Nielsen (2004): Does Low Job Satisfaction Lead to Job Mobility?, *IZA Discussion paper no. 1026*.
- Lévy-Garboua, L., C. Montmarquette and V. Simonnet (2004): Job Satisfaction and Quits, mimeo.

Shields, M.A. and S.W. Wheatley Price (2002): Racial Harassment, Job Satisfaction and Intentions to Quit: Evidence from the British Nursing Profession, *Economica*, 69, 295-326.

Van Praag, B. and A. Ferrer-i-Carbonel (2004): *Happiness Quantified: A Satisfaction Calculus Approach*, Oxford University Press.

Warr (1999): Well-being and the workplace, in : Kahnemann, D, Diener, E., Schwarz, N. (eds.): *Well-being : the foundations of hedonic psychology*, Russell Sage Foundation, New York.

**Table 1: Overview of job characteristics**

Variable	Surveyed	Wording
Activity corresponds to job	A)	Is [your] position the same as the profession for which you were educated or trained?
Fringe Benefits	A)	Did you receive any of the following additional payments from your employer last year? (13th month salary, 14th month salary, Additional Christmas bonus, Vacation pay, Profit-sharing, premiums, bonuses, Other or 'No, I received none of these'.)
		What is your attitude towards your job security - are you concerned about it?
Some worries about job security	A)	Somewhat concerned
Strong worries about job security	A)	Very concerned
		We would like to know more about work and the conditions at your place of employment. Please answer the following questions by stating whether it applies to your work completely, partly or not at all.
Conflicts, difficulties with supervisor	B)	Do you often have conflicts and difficulties with your boss?
Exposed to adverse environment	B)	Are you exposed to undesirable working conditions (cold, heat, wetness, chemicals, gases)?
Get along well with colleagues	B)	Do you get along well with your colleagues?
Hard manual labour	B)	Do you have to do hard manual labor at your job?
Stress	B)	Does your work involve a high level of stress?
Independence	C)	Do you decide yourself how to complete the tasks involved in your work?
Influence on pay and promotion of others	C)	Do you have an influence in determining whether employees receive more pay or promotion?
Learning opportunities	C)	Do you often learn something new on the job, something which is relevant for your career?
Shift work	C)	Do you work the night shift or another type of special shift?
Strong control of performance	C)	Is your work strictly monitored?
Task diversity	C)	Is your job varied?
Subjective probability of promotion	B)	How likely is it that the following career change will take place in your life within the next two years: receive a promotion at your current place of employment? Please estimate the probability of such a change according to a scale from 0 to 100.
Deviation of actual from desired work time	D)	Difference of desired actual work time. Desired work time is taken from the question "If you could choose your own number of working hours, taking into account that your income would change according to the number of hours: How many hours would you want to work?"
Actual work time	A)	How many hours do your actual working-hours consist of including possible over-time?
Logarithm of net wage	A)	How high was your income from employment last month? If you received extra income such as vacation pay or back pay, please do not include this. Please do include overtime pay. Fill in your net income, which means the sum after deduction of taxes, social security, and unemployment and health insurance.
Wage growth rate	A)	$= \ln \text{netto}[t] - \ln \text{netto}[t-1]$
<p>A) yearly            B) 1985, 1987, 1989, 1991 to 1994, 1996, 1998, 1999, 2001, 2003            C) 1985, 1987, 1989, 1995, 2001            D) yearly, except 1996</p>		

**Table 2: Descriptive statistics of job characteristics**

Variable	Unit of measurement	Female	Male	Total			
		Mean	Mean	Mean	Std. Dev.	Min	Max
Task diversity	a)	0.55	0.66	0.62	0.49	0	1
Learning opportunities	a)	0.29	0.38	0.35	0.48	0	1
Subjective probability of promotion	b)	1.58	1.84	1.74	0.74	1	4
Activity corresponds to job	a)	0.58	0.60	0.59	0.49	0	1
Independence	a)	0.38	0.41	0.40	0.49	0	1
Strong control of performance	c)	0.45	0.53	0.50	0.50	0	1
Shift work	c)	0.11	0.19	0.16	0.37	0	1
Influence on pay and promotion of others	c)	0.13	0.26	0.22	0.41	0	1
Logarithm of net wage	log monthly wage	6.59	7.27	7.02	0.59	3.2	9.9
Wage growth rate	diff. log wage	0.08	0.05	0.06	0.24	-2.5	2.4
Fringe Benefits	a)	0.85	0.93	0.90	0.30	0	1
Actual work time	weekly hours	33.44	43.81	40.03	10.75	1	80
Deviation of actual from desired work time	weekly hours	6.08	6.33	6.24	7.57	0	57
Hard manual labour	a)	0.08	0.17	0.14	0.35	0	1
Exposed to adverse environment	a)	0.08	0.26	0.19	0.39	0	1
Stress	a)	0.21	0.30	0.26	0.44	0	1
Conflicts, difficulties with supervisor	a)	0.03	0.03	0.03	0.16	0	1
Get along well with colleagues	a)	0.81	0.79	0.80	0.40	0	1
Strong worries about job security	a)	0.08	0.10	0.09	0.29	0	1
Some worries about job security	a)	0.35	0.39	0.38	0.48	0	1
Job satisfaction	d)	7.20	7.28	7.25	1.99	0	10

N=8778

a) fraction saying the job characteristic applies to their job

b) coded from 1=unlikely to 4=certain

c) fraction saying the job characteristic applies or partly applies to their job

d) coded in integers from 0=totally unhappy to 10=totally happy

Table 3: Factor analysis of job characteristics

	Factor1	Factor2 *(-1) <sup>a)</sup>	Factor3	Factor4	Factor5 *(-1) <sup>a)</sup>	Factor6 *(-1) <sup>a)</sup>	Factor7 *(-1) <sup>a)</sup>	Uniqueness
Factor interpretation:	status	nostrain	autonom	advance	relations	time	secur	
Task diversity	<b>0.2291</b>	0.0199	<b>0.2073</b>	<b>0.4384</b>	0.0222	-0.011	-0.0064	0.7113
Learning opportunities	0.1416	0.0373	0.076	<b>0.4985</b>	0.0153	0.0125	0.0016	0.7239
Subjective probability of promotion	0.1333	-0.1233	-0.1291	<b>0.2556</b>	-0.0776	<b>-0.0219</b>	-0.0205	0.8781
Independence	<b>0.1796</b>	-0.0242	<b>0.4389</b>	<b>0.2237</b>	0.0623	0.024	0.0142	0.7198
Strong control of performance	-0.0393	<b>0.121</b>	<b>-0.4665</b>	-0.0388	0.0639	-0.0149	0.0271	0.7597
Shift work	0.0592	<b>0.1203</b>	<b>-0.2322</b>	-0.1052	0.0076	-0.089	0.0006	0.9091
Influence on pay and promotion of others	<b>0.4007</b>	<b>-0.1223</b>	<b>0.281</b>	0.14	0.088	-0.0014	0.0291	0.7173
Logarithm of net wage	<b>0.6672</b>	-0.0548	0.0503	0.0489	0.0122	-0.0906	-0.0033	0.5385
Actual work time	<b>0.6682</b>	<b>0.1096</b>	-0.0001	0.0815	-0.0001	<b>0.1217</b>	0.0056	0.5201
Deviation of actual from desired work time	<b>0.2563</b>	0.0558	0.1243	0.0046	<b>0.0969</b>	<b>0.295</b>	0.0248	0.8187
Hard manual labour	-0.0039	<b>0.5549</b>	-0.0481	-0.0107	-0.0123	0.0265	0.0044	0.6888
Exposed to adverse environment	0.0563	<b>0.5723</b>	-0.0523	0.0333	0.0445	-0.0059	0.0067	0.6634
Stress	<b>0.2931</b>	<b>0.1371</b>	0.0258	0.1493	<b>0.2744</b>	0.0825	<b>0.0499</b>	0.7877
Conflicts, difficulties with supervisor	0.0091	0.0852	-0.0525	0.0116	<b>0.2282</b>	0.0728	-0.0337	0.9313
Get along well with colleagues	-0.0464	-0.0029	0.0668	0.165	<b>-0.1363</b>	-0.1228	-0.01	0.9324
Some or strong worries about job security	0.0363	0.0778	<b>-0.2158</b>	-0.0874	<b>0.1187</b>	0.0188	<b>0.1729</b>	0.8941
Regional unemployment rate	0.0498	0.0483	-0.0301	0.024	0.0114	<b>0.0652</b>	<b>0.1978</b>	0.9502

Principal factor analysis with orthogonal varimax rotation

Grey shaded factor loadings: Highest loadings of the factor; used for interpretation of the factor

Bold non-shaded factor loadings: Second-highest loadings; may also influence factor.

<sup>a)</sup> Factor will be multiplied by (-1) in order to get positive effect on satisfaction.

Sample: GSOEP waves 1987, 1989, 1995, 2001, West-German private sector employees, N = 11767

**Table 4: Regression of job satisfaction on aggregated job quality factors**

	Pooled		Fixed Effects
	Ordered Logit	OLOLS a)	OLOLS a)
status	0.201 [0.000]**	0.164 [0.000]**	0.139 [0.008]**
nostrain	0.204 [0.000]**	0.189 [0.000]**	0.149 [0.000]**
autonom	0.234 [0.000]**	0.212 [0.000]**	0.253 [0.000]**
advance	0.381 [0.000]**	0.344 [0.000]**	0.194 [0.000]**
relations	0.307 [0.000]**	0.302 [0.000]**	0.246 [0.000]**
time	0.271 [0.000]**	0.237 [0.000]**	0.103 [0.004]**
secur	0.186 [0.000]**	0.138 [0.000]**	0.083 [0.034]*
Observations	10100	10100	10100
Number of groups	-	-	5919
Log likelihood	-19265.3	-19161.0	-12500.4
R-squared	-	0.17	0.13

P-values in brackets, \* significant at 5%; \*\* significant at 1%

Sample: GSOEP waves 1987, 1989, 1995, 2001  
West-German private sector employees

a) "Ordered logit adapted OLS" as described in section 3.2.

Control variables for schooling, sex, age tenure, firm size, the regional unemployment rate, number of past job changes as well as sector dummies and year dummies included.

**Table 5: Regression of job satisfaction on detailed job characteristics**

	Pooled		Fixed Effects
	Ordered Logit	OLOLS a)	OLOLS a)
Task diversity	0.538 [0.000]**	0.473 [0.000]**	0.271 [0.000]**
Learning opportunities	0.368 [0.000]**	0.305 [0.000]**	0.215 [0.000]**
Subjective probability of promotion	0.216 [0.000]**	0.206 [0.000]**	0.113 [0.096]
Activity corresponds to job	-0.052 [0.258]	-0.027 [0.513]	-0.045 [0.573]
Independence	0.287 [0.000]**	0.262 [0.000]**	0.267 [0.000]**
Strong control of performance	-0.180 [0.000]**	-0.167 [0.000]**	-0.259 [0.000]**
Shift work	0.174 [0.004]**	0.149 [0.005]**	-0.110 [0.270]
Influence on pay and promotion of others	0.212 [0.000]**	0.178 [0.000]**	0.188 [0.017]*
Logarithm of net wage	0.195 [0.007]**	0.158 [0.012]*	0.150 [0.279]
Wage growth rate	0.356 [0.000]**	0.317 [0.000]**	0.438 [0.000]**
Fringe Benefits	0.277 [0.000]**	0.236 [0.000]**	0.245 [0.036]*
Actual work time	-0.002 [0.564]	-0.002 [0.316]	-0.001 [0.843]
Deviation of actual from desired work time	-0.018 [0.000]**	-0.015 [0.000]**	-0.006 [0.084]
Hard manual labour	-0.293 [0.000]**	-0.235 [0.000]**	-0.150 [0.094]
Exposed to adverse environment	-0.192 [0.002]**	-0.209 [0.000]**	-0.166 [0.041]*
Stress	-0.471 [0.000]**	-0.426 [0.000]**	-0.328 [0.000]**
Conflicts, difficulties with supervisor	-1.375 [0.000]**	-1.299 [0.000]**	-0.759 [0.000]**
Get along well with colleagues	0.564 [0.000]**	0.499 [0.000]**	0.281 [0.000]**
Strong worries about job security	-1.021 [0.000]**	-0.877 [0.000]**	-0.720 [0.000]**
Some worries about job security	-0.524 [0.000]**	-0.432 [0.000]**	-0.329 [0.000]**
Observations	7764	7764	7764
Number of groups			4594
Log likelihood	-14601.7	-14529.6	-9368.8
R-squared		0.18	0.14

P-values in brackets, \* significant at 5%; \*\* significant at 1%

Sample: GSOEP waves 1987, 1989, 1995, 2001  
West-German private sector employees

a) "Ordered logit adapted OLS" as described in section 3.2.

Control variables for schooling, sex, age tenure, firm size, the regional unemployment rate, number of past job changes as well as sector dummies and year dummies included.

**Table 6: Regression of job search on aggregated job quality factors**

	Pooled		Fixed Effects		
	Ordered Logit	OLOLS a)	OLOLS a)	OLOLS a)	OLOLS a)
jobsatis				-0.164 [0.000]**	-0.189 [0.000]**
status	-0.158 [0.000]**	-0.092 [0.000]**	-0.107 [0.004]**	-0.087 [0.016]*	
nostrain	-0.006 [0.819]	-0.025 [0.059]	-0.121 [0.000]**	-0.086 [0.000]**	
autonom	-0.242 [0.000]**	-0.109 [0.000]**	-0.111 [0.000]**	-0.067 [0.006]**	
advance	-0.129 [0.000]**	-0.086 [0.000]**	-0.091 [0.000]**	-0.049 [0.028]*	
relations	-0.178 [0.000]**	-0.12 [0.000]**	-0.098 [0.000]**	-0.055 [0.019]*	
time	-0.212 [0.000]**	-0.117 [0.000]**	-0.059 [0.032]*	-0.039 [0.139]	
secur	-0.169 [0.000]**	-0.061 [0.001]**	-0.123 [0.000]**	-0.106 [0.001]**	
Observations	9575	9575	9575	9575	9575
Number of groups			6276	6276	6276
Log likelihood	-9334.287	-14539.183	-8018.32	-7693.35	-7795.113
R-squared		0.20	0.07	0.13	0.11

P-values in brackets, \* significant at 5%; \*\* significant at 1%

Sample: GSOEP waves 1987, 1989, 2001  
West-German private sector employees

a) "Ordered logit adapted OLS" as described in section 3.2.

Control variables for schooling, sex, age tenure, firm size, the regional unemployment rate, number of past job changes as well as sector dummies and year dummies included.

**Table 7: Regression of job search on detailed job characteristics**

	Pooled		Fixed Effects		
	Ordered Logit	OOLS a)	OOLS a)	OOLS a)	OOLS a)
Job satisfaction				-0.170 [0.000]**	-0.195 [0.000]**
Task diversity	-0.319 [0.000]**	-0.176 [0.000]**	-0.112 [0.049]*	-0.068 [0.218]	
Learning opportunities	-0.244 [0.000]**	-0.142 [0.000]**	-0.149 [0.009]**	-0.128 [0.020]*	
Subjective probability of promotion	0.090 [0.219]	0.030 [0.471]	0.014 [0.832]	0.026 [0.675]	
Activity corresponds to job	0.059 [0.289]	0.034 [0.270]	0.014 [0.853]	0.012 [0.869]	
Independence	-0.048 [0.412]	-0.010 [0.762]	-0.072 [0.178]	-0.024 [0.637]	
Strong control of performance	0.165 [0.003]**	0.090 [0.003]**	0.157 [0.003]**	0.098 [0.052]	
Shift work	-0.335 [0.000]**	-0.182 [0.000]**	-0.109 [0.254]	-0.122 [0.187]	
Influence on pay and promotion of others	-0.117 [0.097]	-0.075 [0.052]	0.010 [0.892]	0.037 [0.600]	
Logarithm of net wage	-0.150 [0.084]	-0.099 [0.038]*	-0.397 [0.002]**	-0.365 [0.003]**	
Wage growth rate	0.123 [0.284]	0.072 [0.262]	0.064 [0.573]	0.123 [0.267]	
Fringe Benefits	-0.155 [0.082]	-0.095 [0.059]	-0.298 [0.006]**	-0.231 [0.028]*	
Actual work time	0.004 [0.251]	0.002 [0.247]	0.008 [0.023]*	0.007 [0.022]*	
Deviation of actual from desired work time	0.013 [0.001]**	0.007 [0.000]**	0.003 [0.349]	0.001 [0.799]	
Hard manual labour	0.005 [0.955]	0.021 [0.649]	0.237 [0.005]**	0.214 [0.009]**	
Exposed to adverse environment	0.005 [0.944]	0.016 [0.698]	0.104 [0.159]	0.044 [0.539]	
Stress	0.194 [0.002]**	0.117 [0.001]**	0.115 [0.058]	0.051 [0.385]	
Conflicts, difficulties with supervisor	1.249 [0.000]**	0.837 [0.000]**	0.540 [0.000]**	0.442 [0.002]**	
Get along well with colleagues	-0.386 [0.000]**	-0.233 [0.000]**	-0.204 [0.001]**	-0.146 [0.012]*	
Strong worries about job security	0.692 [0.000]**	0.374 [0.000]**	0.330 [0.000]**	0.218 [0.014]*	
Some worries about job security	0.492 [0.000]**	0.228 [0.000]**	0.196 [0.000]**	0.138 [0.008]**	
Observations	6411	6411	6411	6411	6411
Log likelihood	-6005.816	-9916.435	-5301.682	-5088.294	-5194.726
R-squared		0.194	0.087	0.146	0.117
Number of persnr			4257	4257	4257

P-values in brackets, \* significant at 5%; \*\* significant at 1%

Sample: GSOEP waves 1987, 1989, 2001  
West-German private sector employees

a) "Ordered logit adapted OLS" as described in section 3.2.

Control variables for schooling, sex, age tenure, firm size, the regional unemployment rate, number of past job changes as well as sector dummies and year dummies included.

**Table 8: Regression of quits on aggregated job quality factors**

	Pooled		Fixed Effects		
	Logit	LPM <sup>a)</sup>	LPM <sup>a)</sup>	LPM <sup>a)</sup>	LPM <sup>a)</sup>
jobsatis				-0.013 [0.000]**	-0.014 [0.000]**
status	-0.114 [0.052]	-0.006 [0.093]	-0.008 [0.314]	-0.005 [0.469]	
nostrain	-0.075 [0.130]	-0.004 [0.177]	-0.005 [0.315]	-0.002 [0.606]	
autonom	-0.11 [0.038]*	-0.005 [0.047]*	-0.002 [0.680]	0.002 [0.720]	
advance	-0.176 [0.000]**	-0.009 [0.000]**	-0.007 [0.126]	-0.003 [0.497]	
relations	-0.087 [0.060]	-0.008 [0.005]**	-0.006 [0.154]	-0.002 [0.593]	
time	-0.13 [0.017]*	-0.007 [0.030]*	-0.006 [0.254]	-0.005 [0.370]	
secur	0.133 [0.056]	0.008 [0.027]*	0.001 [0.834]	0.002 [0.688]	
Observations	10082	10082	10082	10082	10082
Number of groups			5858	5858	5858
Log likelihood	-1959.188	527.556	5995.248	6043.323	6039.548
R-squared		0.056	0.046	0.055	0.054

P-values in brackets, \* significant at 5%; \*\* significant at 1%

Sample: GSOEP waves 1987, 1989, 1995, 2001  
West-German private sector employees

a) Linear probability model.

Control variables for schooling, sex, age tenure, firm size, the regional unemployment rate, number of past job changes as well as sector dummies and year dummies included.

**Table 9: Regression of quits on detailed job characteristics**

	Pooled		Fixed Effects		
	Logit	LPM <sup>a)</sup>	LPM <sup>a)</sup>	LPM <sup>a)</sup>	LPM <sup>a)</sup>
Job satisfaction				-0.010 [0.000]**	-0.011 [0.000]**
Task diversity	-0.162 [0.175]	-0.007 [0.229]	-0.001 [0.925]	0.002 [0.820]	
Learning opportunities	-0.124 [0.319]	-0.004 [0.471]	-0.004 [0.656]	-0.002 [0.854]	
Subjective probability of promotion	-0.173 [0.224]	-0.011 [0.118]	-0.015 [0.140]	-0.014 [0.182]	
Activity corresponds to job	0.305 [0.009]**	0.012 [0.034]*	0.030 [0.011]*	0.030 [0.011]*	
Independence	-0.154 [0.205]	-0.006 [0.268]	0.004 [0.634]	0.007 [0.405]	
Strong control of performance	0.284 [0.013]*	0.014 [0.011]*	0.008 [0.364]	0.005 [0.579]	
Shift work	-0.182 [0.258]	-0.007 [0.331]	-0.009 [0.538]	-0.010 [0.496]	
Influence on pay and promotion of others	-0.248 [0.128]	-0.009 [0.183]	-0.018 [0.123]	-0.015 [0.189]	
Logarithm of net wage	-0.283 [0.088]	-0.013 [0.115]	-0.074 [0.000]**	-0.072 [0.001]**	
Wage growth rate	-0.082 [0.666]	-0.006 [0.590]	0.044 [0.022]*	0.049 [0.011]*	
Fringe Benefits	-1.048 [0.000]**	-0.090 [0.000]**	-0.089 [0.000]**	-0.085 [0.000]**	
Actual work time	0.012 [0.067]	0.001 [0.025]*	0.001 [0.048]*	0.001 [0.045]*	
Deviation of actual from desired work time	0.012 [0.086]	0.001 [0.066]	0.000 [0.554]	0.000 [0.636]	
Hard manual labour	0.364 [0.023]*	0.017 [0.040]*	0.013 [0.333]	0.012 [0.389]	
Exposed to adverse environment	-0.146 [0.371]	-0.007 [0.341]	0.003 [0.821]	0.001 [0.953]	
Stress	-0.066 [0.631]	-0.002 [0.721]	-0.002 [0.856]	-0.006 [0.574]	
Conflicts, difficulties with supervisor	0.556 [0.036]*	0.037 [0.018]*	0.035 [0.123]	0.026 [0.263]	
Get along well with colleagues	-0.211 [0.092]	-0.012 [0.070]	-0.014 [0.147]	-0.011 [0.275]	
Strong worries about job security	-0.513 [0.023]*	-0.019 [0.045]*	-0.012 [0.441]	-0.020 [0.181]	
Some worries about job security	0.061 [0.590]	0.004 [0.473]	0.017 [0.051]	0.014 [0.122]	
	7668	7668	7668	7668	7668
	-1354.088	729.862	5252.361	5274.455	5196.083
			4550	4550	4550
		0.078	0.08	0.085	0.066

P-values in brackets, \* significant at 5%; \*\* significant at 1%

Sample: GSOEP waves 1987, 1989, 1995, 2001  
West-German private sector employees

a) Linear probability model.

Control variables for schooling, sex, age tenure, firm size, the regional unemployment rate, number of past job changes as well as sector dummies and year dummies included.

**Table 10: Ranking of job aspects according to their effects on job satisfaction, job search and quits**

Rank	Job Satisfaction	Job Search	Quits
1	autonom	secur	status
2	relations	nostrain	advance
3	advance	autonom	relations
4	nostrain	status	time
5	status	relations	nostrain
6	time	advance	autonom
7	secur	time	

Job aspects are ranked according to the magnitude of their coefficients in the fixed effects job satisfaction, job search and quit equations in column 3 of the tables 4, 6 and 8 respectively.

**Table 11: Ranking of job aspects in Clark 2004**

ISSP 1997 (Clark 2004)	
Job values, ranked by % saying "very important"	Job outcomes, ranked by effect on job satisfaction
Job security	Good relations
Interesting Job	Good job content
Independent work	Good promotion opportunities
Help others	Work time as desired
Useful to society	High income
High income	Job secure
Advancement opportunities	Hard work
Flexible work time	

**Table 12: Ranking of job aspects in Clark 2001**

BHPS (1991-1997), Clark (2001)
<b>Ranking as revealed by quit behaviour</b>
Most important: Job security
Next most important: Pay, initiative, work itself, hours
Insignificant: Promotion, relations