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ABSTRACT

German Job Mobility and Wages*

The paper investigates the relative importance of job mobility for wages in comparison with the human capital framework and the industry approach. Using German panel data, changes of workplaces within the firm as well as between the firms are carefully separated from occupational changes. Results suggest: Germans are much more flexible than is generally conjectured. The internal labor market is more important than the external labor market. The job approach is the most relevant framework. Firm tenure is no relevant determinant of earnings. Past mobility and sectoral and regional factors determine individual mobility.

JEL Classification: J31, J62
Keywords: internal labor markets, intra-firmmobility, occupational changes, wages

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1. Introduction

Unemployment has been a major concern of policy makers recently across Europe. Job flexibility was considered as a major cause for the differences in the development of unemployment between the European Union (EU) member countries and the US. (See the OECD (1994a) Job Study, and Bean (1994), for instance.) It is true that the evolution of unemployment had been against western Europe in the last two decades. Figure 1 contains the OECD standardized unemployment rates for the period 1967 to 1994 and the regions US, EU, Japan, and the Nordic Countries (NC) in Europe, as for some selected countries like western Germany, Canada, Sweden, France and the UK. The remarkable rise in unemployment in the EU in comparison to the US is non-debatable even for such stable countries as Germany. Japan, and for a long time also the NC, have done quite well in contrast to both the US and the EU. The NC are well-known for their active labor market policy, and Japan has its myth of superior work habits.

This ignores the reported unhappiness of many Americans about the increasing share of the working poor in the US. Also quite recently, the NC have joined the party with a dramatic adjustment in their unemployment levels. Even Japan, with record levels of currently more than 3 % unemployment in 1995, shows signs of weakness: Popular views suggest that due to labor hoarding, the real unemployment rate is twice as high. Since Japanese firms are expected to revise their labor hoarding policies, a further increase in unemployment has to be expected. There is also a recent CEPR (1994) study suggesting that the debate about losses in flexibility in Europe might be misleading because of shaky statistics. It is also unclear whether inflexibility of workers is a problem, since after all, it might be sufficient and efficient if internal labor markets would work well. If there exists substantial firm-specific human capital, inter-firm mobility might be too costly. Therefore, more weight

should be given to the analysis of size, performance and evolution of internal labor markets.

While the traditional (neoclassical) analysis of mobility and wages has emphasized inter-firm changes and wage evolution according to the development of human capital, the internal labor market approach (see Lazear, 1992, and Creedy and Whitfield, 1988, for recent reviews) argues that the major impact on wages is by changes of jobs. A movement between firms may or may not involve a change in occupation since the worker may be in the same kind of job as before. Hence, intra-firm mobility should cause larger wage growth than inter-firm mobility if it is more associated with occupational changes. If wages are attached to jobs instead to workers, as empirical evidence suggests, wages for workers should be more flexible than wages for jobs. Intra-firm job mobility also seems to be more frequent than inter-firm mobility.

There has also been much debate about whether seniority wages are associated with worker´s productivity (see Hutchens, 1989). In the framework of the internal labor market, wages (as intra-firm mobility) seem to decline with job tenure. The explanation for this surprising evidence is that hiring focuses on lower-level positions, while upper-level jobs are filled by internal promotions. As a consequence, seniority wages can be explained by promotions across jobs.

Due to lack of appropriate data, there has been not much empirical support for the various conjectures listed above. Therefore, this paper concentrates on an investigation of the major questions derived in the internal labor market framework: (i) Is internal mobility larger than external mobility? (ii) Are wages associated to jobs more or at least equally variable than individual wages? (iii) Are wages more affected by intra-firm changes than by inter-firm changes? (iv) What is the effect of job tenure on wages? (v) What determines changes of workplace, movements between firms and occupational mobility? To answer these questions, a vast German household panel data set is employed. Section 2

provides some stylized facts on German firm and occupational mobility. Section 3 examines the relative contribution of human capital, industries and jobs to wages. Section 4 then investigates how wages are affected by firm tenure and changes of jobs and occupations, whereas section 5 goes into the nature and determinants of those changes. Section 6 concludes.

2. Some Stylized Facts on German Job Mobility

How mobile is the German labor force? To answer this question properly we first have to define what we mean by mobility. There is voluntary and involuntary mobility. Workers are forced by unemployment to change their job. This movement is documented in Table 1, where the unemployment rates and the inflow and outflow rates are documented for 1975 to 1993 according to national and OECD statistics. Note that the inflow rates provided here from the national statistics measure either the complete inflow per month divided by the average stock of employed workers (2a) or only newly unemployed that have been previously employed as percent of average employment in that particular year (2b), whereas the outflow rate is defined as the monthly average of all individuals leaving unemployment divided by the average stock of unemployed of the particular year. As it is well-known, the standardized OECD unemployment rate for Germany is much lower than the national statistic under use. The same is true for inflow and outflow rates.

Whatever statistic one relies on, it is clear that the rise in unemployment was associated with a decline in the outflow rates from the 70s to the 80s and 90s, and an increase in the overall inflow rates over the same period. It is however quite remarkable that the direct inflow rate from employment (see column (2b)) is declining or stagnating in the 80s and 90s. This implies that the significant rise in the inflow stems primarily from individuals previously out of the labor force. In absolute numbers, this

group is nearly three times as large in 1993 than it was in 1982. Further, the national outflow rates are much larger than the OECD rates and they decline much slower. As a consequence the lack of flexibility is seen to be much less problematic from the national statistics as from those that are part of the European debate on unemployment.

Voluntary mobility has to do with movements in and out of the labor force, for instance with educational choices and family decisions, but also with changes of the status in the labor force. We concentrate here on the latter aspect, where one may wish to differentiate between inter-firm and intra-firm changes, and at both levels between changes of occupation or changes of workplaces. Exhibit 1 defines this particular structure. Note that at the level of the present firm, a person may change its workplace, occupation or both. (The first column of Exhibit 1.) If she changes firm, she automatically changes her workplace, and perhaps also the occupation. It is, however, impossible to change firm and occupation without changing the workplace. (This is documented in Exhibit 1.) It seems that changes of the workplace are underreported in official statistics. This is because intra-firm changes are only reported in case when there is also a change in job status involved. Promotions at the workplace or changes of the workplace within the current occupation are not recorded.

Table 2 summarizes the available published evidence on the basis of the German microcensus for two year periods from May of the first year to April of the third year for 1983/85 to 1991/93. The data is differentiated between the categories changes of the firm (not necessarily the company), changes of occupation, both, only firm, only occupation and total changes. It is important to note that changes of occupation are not objectively defined but refer to what a person considers individually as a change in occupation. There is also no question about changes of workplace within the firm. It is therefore clear that occupational changes as well as changes of workplace are underreported. While

all changes are in percent, the respective stock is provided in the last column. The sub-tables differentiate again for age, occupational status, sector, and educational attainment. About 11 - 12 percent overall changes were observed for the period with a general rise in mobility from the eighties to the nineties. As Table 2 demonstrates, this is supported especially by a rise in mobility of the youngest age group (15-25 years), by civil servants and white collar workers, and by individuals from the service sector and with lower educational degrees. The overall changes (first row in each subtable) for the whole labor force state that within a period of two years about 10-12 percent of the workers change their firm, about 5 percent change occupation or only the firm, or firm and occupation, and less than 1 percent change occupation within the firm. This implies that changes in occupation are mostly related to changes of the firm.

Table 2 (a) reports job status and mobility. At the beginning of the period (1983/85) blue collar workers were the most mobile followed by the white collar workers, the individuals in vocational training, the civil servants and the self-employed as their relatives working with them. This ranking has changed in that blue and white collar workers were about equal in 1991/92 while the mobility of people in vocational training was increasing permanently to become the most mobile group. This should be caused by a change in employer´s take-over decisions after a completion of vocational training. A major cause of this trend is a strong increase in the change of both employer and occupation for this group from about 6.3 percent to about 11.4 percent. This is an important observation, since this implies that many more people have changed their occupation directly after they have completed their education. This not necessarily means that this education is wasted since for instance a vocational training within a bank is seen as a good qualification for jobs in manufacturing.

The following sub-tables provide numbers only for dependent employees without those in

vocational training. This means that Table 2 (b) to (d) report only for white collar and blue collar workers and for civil servants.

Table 2 (b) provides detailed information about the interaction between age and job changes. It comes at no surprise, that younger age cohorts (15-25 years) are substantially more mobile and the older age cohorts (55-65 years) are much less mobile than age groups 25-55. Total changes of the young are between 23 and 32 percent. The middle generation has rates between 10 - 12 percent, and the old not more than 4 percent. Change of occupation for all age groups was about 50 percent of the changes of firms at the beginning of the period; it however increased especially for the young and also for the old. There is also a significant increase in the number of occupational changes for the young, and not so much for the other groups. Otherwise, the overall picture is reconfirmed.

Sectoral differences between the primary sector, construction and manufacturing industries and the service sector are covered by Table 2 (c). The structure of the changes within these sectors are very much the same as that for all workers. Total changes in these sectors are also not so different; nevertheless, the service sector seems to be the most mobile followed by construction and manufacturing and the primary sector. Table 2 (d) finally deals with mobility according to the highest educational degrees, with categories no degree, vocational training, technical school, technical college, and university. Somewhat surprisingly, the overall mobility and its structure is very similar for all these groups, whereas the groups with vocational training or university degree rank highest at the margin.

The conclusion to this analysis is that neither education nor sectoral differences are really important, at least not at the level measured, but age and occupation. This is especially interesting since the literature on internal labor markets stresses that it is occupational status that is important for behavioral differences.

The previous analysis of job mobility was based on published tables of microcensus results using retrospective information based on subjective evaluations. This study further uses data of the first 8 waves (for 1984-1991) of the German Sozio-ökonomisches Panel (SOEP) for western Germany, but here we have access to micro data. The data is a large household survey produced by the Deutsche Institut für Wirtschaftsforschung (DIW). (The international public use file is explained in Wagner, Burkhauser and Behringer (1993).) The SOEP explicitly asks employed individuals whether they have changed the employer or changed their position inside the firm. It also requests the respondents to describe their job in detail. Based on this description, two occupational variables are created by the DIW which follow the 1- and 3-digit level of the International Standard Classification of Occupations of the International Labor Office, the so-called ISCO code. We have cleaned this data and followed the individuals up through the years to study occupational changes. We also combine the information about changes of position between firms and within firms with the occupational changes on the 1-digit and 3-digit level. Furthermore, the breakdown is also refined by studying the various characteristics that were already used in Table 2. The result is a unique picture of German job mobility that was to the best of our knowledge not provided before.

Table 3 contains the results of this excercise. To conserve space, and also because of the much smaller sample sizes in the SOEP, results are only provided for the whole period. Since the analysis is based on changes, we loose the first wave (1984) so that calculations are only based on 7 waves. Also, one should know that across the waves there are changes in the sample size because individuals fail to respond to one of the relevant questions or because they drop out of the sample. As a consequence, the table entries refer to the average number of changes over the period in the respective category divided by the average size of the sample. The number is then the average

percentage of job changes in the respective period. Direct comparisons between Table 2 and Table 3 are not possible since Table 2 contains bi-annual changes and also incomplete subjective evalutions of occupational changes and no information about intra-firm changes of workplaces.

According to the SOEP data provided in Table 3 individuals are about twice as mobile as reported in the microcensus data from Table 2. We observe more than 13 percent changes of occupation and/or workplaces within a year. This largely relies on occupational changes within the firm, about 8 percent. Changes of occupation are more important than changes of workplace, and changes inside the firm are more relevant (twice as large) than changes outside the firm. Only few changes of occupation and workplace interact. These findings are at odds with many conjectures in the public debate. Individuals are much more flexible than generally suggested. Intra-firm flexibility has been largely overlooked. Occupational flexibility is given not sufficient credit.

Table 3a contains a breakdown according to job status. Individuals in vocational training have the largest mobility (24.6 %) followed by white collar workers (14.2 %), blue collar workers (13.1%), self-employed (10.9 %) and civil servants (10 %). Among the strongest groups (blue collar and white collar workers) white collar workers change the firm more frequently while blue collar workers change more often their occupation. Total changes within the firm are very similar between both groups. Not surprising, self-employed mostly change occupation, but not the workplace, and individuals in vocational training experience major changes of the workplace.

Table 3b exhibits the interaction between age and change. As in Table 3c and Table 3d numbers now exclude self-employed and their relatives as well as individuals in vocational training. As expected, mobility declines strongly with age. Also here most changes are inside the firm, although in the youngest age group intra-firm mobility is not much stronger than inter-firm mobility. Table 3c

demonstrates that intersectoral differences in mobility are not very large. All sectors exhibit a similar pattern and, again, changes inside the firm are much more important than changes across firms.

The present analysis has shown that (i) the internal labor market is much more important than the external labor market, (ii) occupational mobility is more relevant than changes of workplace, and (iii) German work flexibility is much more important than often suggested. The next section therefore will investigate to what extent earnings are determined by occupational status and what role competitive frameworks like the industry or the human capital approach may play.

3. Wages and the Concept of a Job

Are wages attached to individuals and their productivity, to industries or to jobs? And what, please, is a job? Human capital theory suggests that all what counts is marginal productivity which is captured by human capital variables such as schooling, general work experience, job, firm and country tenure. Tenure may reflect firm-specific, job-specific or country-specific human capital. However, the industry wage literature in industrial organization suggests that human capital theory cannot explain away the stable influence of inter-industry wage differentials. And the strand of papers dealing with internal labor markets claim that it is not the marginal productivity of the individual but jobs and the movement of individuals between them and the job distribution across industries that explain the variation. Instead, the internal labor market approach predicts job status as the key variable of explanation.

We will first tackle the issues in a more descriptive way using data from the SOEP. A detailed description of the variables used in this and the following sections is given in the data appendix. Labor remunerations can be defined as gross monthly earnings or gross hourly wages. In a panel data context, it is useful to make observations comparable over time by deflating them with a price index.

Data is also often used in a logarithmic transformation. This defines 8 variables where we used monthly hours worked as provided by the survey responses and a consumer price index from the German Statistical Office as additional information to adjust the gross monthly earnings data: Nominal and real gross monthly earnings and gross hourly wages in actual and logged form. We concentrate on males from the SOEP. The individual pooled data was aggregated according to the 34 industry groups given in the survey and to the levels of the ISCO 1-digit and ISCO 3-digit code. By this excercise, we can compare wages at the various levels of conventional analysis.

Table 4 contains the calculations of means, variances, minima and maxima of the various earnings variables. The basis is a sample of 14, 909 observations covering blue and white collar workers as well as civil servants in the SOEP over the 1985-1991 period. A comparison of the variances provides more facts about the actual variation of wages across the different levels. It is interesting to notice that across all definitions of earnings/wages the same structure occurs: Industry wages exhibit the lowest variance followed by the 1-digit ISCO code, and the 3-digit ISCO code. This leaves the individual earnings/wages as the most variable case. However, it is surprising how close the variances of the ISCO 3-digit occupations are to the variance of the individual data. This indicates that 224 occupational averages of wages/earnings mimic well the differences of a much more diverse population. This provides additional support for the conjecture that occupational differences are the dominant source of wage/earnings differentials.

The analysis so far relies on one-way descriptions of the data on the basis of the alternative approaches. In the following, we wish to work out in more detail the particular strength of the human capital approach in comparison with the industry variation and the job specific approach. The human capital approch is condensed to the variables schooling, experience and firm tenure and their squared

values. Industry and job-specific information can be brought in by a set of dummy variables. The basic methodological approach is pooled OLS applied to the earnings and wage measures discussed above. To ensure estimability in the case of the ISCO 3-digit level (there would be 224 dummies involved), a fixed effects model was used. The base case is a constant and a foreigner dummy to take care of the fact that foreigners are slightly over-sampled in the SOEP.

Table 5 reports adjusted R^2´s, the Akaike information criterion (AIC) and the log-likelihood value for a number of distinct cases: The base case enriched by the various alternative specifications suggested by the rival theories, a full specification of all variables as the nested lower specifications of this hyper-specification. This enables us not only to compare the explanatory power of the various models, but also to perform comparisons between the most crucial specifications. The analysis is provided for four types of measures of labor remuneration, namely gross monthly earnings (Y) and the hourly wage as their deflated versions.

It is obvious that all rival approaches provide a much better description in terms of the data than the simple base model with a constant and the foreigner dummy only. In the overall explanatory power, the occupational dummies on the ISCO 3-digit level are doing best. The AIC that enables a direct comparison between the non-hierarchical models ranks clearly ISCO 3-digit (J3) with all its many dummies in front of human capital (HC), ISCO 1-digit (J1) and industry (I). (Note that the AIC adjusts for the number of parameters estimated so that J3 has no ´natural´ advantage.) A different way to examine the issue is to compare the full model involving either HC, I and J1 or HC, I and J3 with variants that exclude one of the set of regressors. Results are also contained in Table 5. These findings also suggest that reductions in explanatory power are strongest in the case of J3 followed by HC and I, whereas J1 is less important than HC but more important than I. This all confirms the conjecture that

the job is a very significant concept in the analysis of wage or earnings differentials.

This section has provided additional evidence that occupational differences play a major role for differences in wages and earnings. In the next section, the analysis is refined for logged real earnings only, since this is the most convincing concept in a panel framework, and the analysis so far has shown no evidence that results would be significantly different between the different concepts of measuring labor remuneration. In the sequel, however, we will separate for distinct jobstatus groups, namely blue collar and white collar workers and examine the relevance of job changes and tenure on earnings and earnings growth.

4. Earnings, Tenure and Mobility

This section investigates logged real monthly earnings for blue and white collar workers. To deal with the panel nature of the data, we estimate random effects panel models for both groups separately. Of major interest will be the effect of tenure and mobility on earnings and earnings growth.

The variables chosen to represent the human capital framework are years of education (YRSEDT), experience (EXPER), and tenure (TEN) as their squared terms (YRSEDT2, EXPER2, TEN2). The industry level information is captured by 10 industry dummies. Variables measuring occcupation and job mobility involve 7 ISCO 1-digit dummies, various dummies measuring quality levels of jobs (JOBTYPE-2, JOBTYPE-3, JOBTYPE-45), number of employers before 1984 (NJOBS), unemployment experience before 1984 (MONTHSUN), and job mobility dummies reflecting change to the previous year. Here, OC-1 refers to a change in the ISCO 1-digit code, JIN is a change of workplace within the firm, and JOUT is a change of the firm.

Furthermore, there is union-specific information: UNION is a dummy, if the individual is a

member of a union, and UW is the union-bargained standard wage (deflated with a consumer price index), which is different for blue and white collar workers and for different industries. (Note that in the German system unions bargain with employers´ assocations at a sectoral and regional level. Results of negotiations have to be taken over by most firms, and are something similar to a minimum wage. However, firms often pay substantially more than this standard wage, which causes a wage gap.) There are also other individual and regional controls like a foreigner dummy (FOR), MARRIED, percentage handicapped (HAND), firmsize measures (FIRMSIZ3, FIRMSIZ4), size of town or city (CITYSMALL), and regional unemployment (UNEMP). The appendix provides more details on data construction.

The estimated random effects panel models are given in Table 6. The explanatory power is much better for white-collar than for blue-collar workers. Many of the (not reported) 7 ISCO 1-digit dummies and 10 industry dummies have coefficients that are statistically different from zero. Experience seems to be the most important human capital variable. Tenure is insignificant for blue-collar workers and exhibits a U-shaped relationship for white-collar workers. JOBTYPE variables play a significant role. Regional unemployment affects individual wages negatively, at least for blue-collar workers, but is insignificant and small for white-collar workers, Union status has a positive effect for blue-collar and a negative effect for white-collar workers, which could be the effect of self-selectivity. This would indicate that qualified blue-collar and unqualified white-collar workers are more likely to join a union. (One should keep in mind that in the German system workers choose a union as part of a more long-run decision.) Standarized union wages (UW) affect individual wages in a powerful way. Surprisingly, the coefficient for white-collar workers is not statistically different from unity (t: -0.7), while that for blue-collar workers is (t: -8.8).

Mobility affects earnings in a particular way: NJOBS has a positive effect on earnings. MONTHSUN depresses earnings significantly for both groups: perhaps this reflects a devaluation of human capital, perhaps it reveals ´unobservable´ individual risks. The measures of recent mobility have not worked well. Earnings are affected negatively by recent changes of the workplace (JIN, JOUT). Previous occupational changes have positive effect parameters. Since promotions and better matches are captured by the actual dummies for industries, occupations and jobtypes (if a blue collar-worker would become a white-collar worker, she would even change the sample), these negative effects are more likely measuring the missing firm-specific/workplace-specific human capital. Perhaps a more direct way to deal with the mobility issue is to estimate both blue and white collar workers together, and to regress earnings on lagged industry and occupational status plus the change variables.

The ISCO 3-digit occupational change dummy was delivering very similar findings to those in Table 6. For this reason, results were not listed separately. Findings were somewhat more different in case of real earnings growth, so that Table 7 contains both regressions for both sub-groups. The overall explanatory power of the regressions are very low. The most relevant variables are the growth rates of union-bargained standard wages and the industry-specific growth of value-added (GROWTH). It is however very surprising that industry growth affects blue-collar workers positively, but white-collar workers negatively. Perhaps growth has been labor-saving for white-collar workers in recent years. Again, changes of occupation and workplace provide no clear pattern. Occupational changes (OC) are positive for blue-collar wage growth, but insignificant for white-collar workers. Changes of workplace (JIN, JOUT) have negative effects in all cases, but the estimates are not significant for internal changes of blue-collar workers. Joint changes of occupation and workplace (JIN*OC) provide mostly positive effects on earnings growth; however, the estimates are only significant for the

ISCO1 version for blue-collar workers and the ISCO3 version for white-collar workers.

The findings in this section are more mixed and more preliminary than the ones we have achieved before. Still in line with the previous sections is that we do not obtain clear effects of tenure on earnings (after carefully controlling for mobility) which is against ´received wisdom´ about the German labor market. However, the direct earnings effects of mobility are still disguised and may require further econometric work. One suggestion has been to estimate both blue and white collar workers together, and to regress earnings on lagged industry and occupational status plus the change variables. Another could be to allow the effects of change to operate over a sequence of periods in the future.

5. The Nature of Change: Workplace, Firm and Occupation

This section provides some insights into the nature of change: What are the determinants of individual changes of workplace, firm or occupation. Since we deal here with (0,1)- dummies as endogenous variables, a probit approach is chosen for the analysis. A first set of regressors are individual characteristics, namely foreigner (FOR), MARRIED, UNION, AGE and its squared term (AGE2), education and education squared (YRSEDT, YRSEDT2), percentage handicapped (HAND), unemployment experience (MONTHSUN), and number of previous employers (NJOBS). A second set of regressors contains regional or sectoral determinants (all lagged), namely regional unemployment (UNEMP), sectoral GROWTH, union density (UD) and the share of foreign workers in the industry (AUSL).

Estimates in Table 8 contain results for changes in the ISCO1/ISCO3 code as well as for changes of workplace (within the firm) or the firm; findings are for white and blue-collar workers

separately. The overall explanatory power can be judged by the likelihood-ratio test statistic (LRT) and a Pseudo-R^2 suggested as valuable by Veall and Zimmermann (1992), because it mimics the underlying true OLS-R^2. All LRT values are supportive, but the R^2_{MZ}´s provide a differentiated picture: Changes of workplace receive a higher explanatory power than occupational changes, and white-collar workers perform somewhat better than blue-collar workers.

Most estimates deliver an unsystematic pattern. White-collar union members seem to change workplaces more within the firm. Age and education exhibit rarely significant estimates. Individual unemployment experience (MONTHSUN) causes changes of ISCO3 jobs among both types of workers. Previous firm changes (NJOBS) causes further firm changes. This interesting persistence effect is stronger for white-collar workers than for blue-collar workers. Regional unemployment (UNEMP) affects occupational changes (ISCO3) negatively. Sectoral growth (GROWTH) causes a rise in occupational changes, and a fall or halt of firm changes, and an increase or halt for internal changes of the workplace for all workers. Union density (UD) seems to exhibit a negative effect on various forms of mobility, however mostly for blue-collar workers.

6. Discussion

This paper is novel in its attempt to study all major components of labor mobility in Germany: changes of occupation, movements between firms and intra-firm mobility. Previous German studies (see Mühleisen and Zimmermann (1994), Winkelmann and Zimmermann (1993a, 1993b), among others) have concentrated on inter-firm changes of workplace. This literature ignores most of actual labor mobility. As suggested already by Doeringer and Piore (1971), intra-firm mobility contains the bulk of labor mobility. A first result of this study using a large German household panel is excactly a

confirmation of this point.

According to the analysis of our data, Germans are twice as mobile than currently assumed. More than 12 percent changes of occupation and/or workplaces within a year are observed. This is largely based on occupational changes within the firm, about 8 percentage points. Changes of occupation are more important than changes of workplace, and changes inside the firm are twice as large as changes outside the firm. Only few changes of occupation and workplace interact. These findings provide objections against conventional views on the issue.

A second step has been to examine the hypothesis that wages are attached to jobs and not to industries or individual productivity measured by human capital. Doeringer and Piore (1971), Creedy and Whitfield (1988), Lazear (1992), and Demougin and Siow (1994) have argued along this line. It turns out that jobs defined at the ISCO 3-digit level have about the same earnings variance as the individual data. A joint regression involving all three approaches jointly supports the view that the job-type approach receives the strongest support, while the human capital approach places second, and the industry variation approach third.

Extending previous work with German data on the earnings function (see Schmidt and Zimmermann (1991) and De New and Zimmermann (1994), for instance), a third step has investigated the specific role firm tenure and mobility play for earnings. Recent papers by Altonji and Williams (1992), Brown (1989), Brown and Light (1992), Farber (1995), Hutchens (1989), Ruhm (1990), and Topel (1991) demonstrate that there are no final answers on this issue. Here we have been able to include information on mobile and immobile workers with the finding that there is not much evidence for firm-specific tenure effects.

The final task has been to study mobility as such. In line with Mühleisen and Zimmermann

(1994), but in contrast to Winkelmann and Zimmermann (1993a, 1993b) we find no effect of education on mobility. What counts here are past experiences with unemployment and changes of employers as regional unemployment, industry growth and union desity.

Various extensions are in order. One issue certainly is to study the long-run effects of occupational changes and workplace mobility as well as their determinants. Another important field is a more explicit analysis of promotions, job hierarchies and their relationship to the internal labor market. Recent papers by Bernhardt and Scoones (1993), Demougin and Siow (1994) and Prendergast (1993) could provide some guidance into this direction.

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Appendix: Data Construction

The survey data used in this study are the first 8 waves for 1984-1991 of the German Socio-Economic Panel (SOEP) for western Germany. The panel is provided by the Deutsche Institut für Wirtschaftsforschung (DIW, Berlin), and a general introduction can be found in Wagner, Burkhauser and Behringer (1993). The group of foreigners is slightly oversampled. Since our analysis involves changes, the first wave is lost. Hence we study the period 1985- 1991. We concentrate on males only. The definition of the variables is like follows:

(i) Data from the SOEP:

General background information:
FOR: (0,1) - dummy variable for foreigner (Turks, Yugoslaves, Greeks, Italians, Spaniards)
AGE: Year - year of birth
MARRIED: (0,1) - dummy for marriage
UNION: (0,1) - dummy for union member in 1985
HAND: Percentage handicapped
FIRMSIZ: Firmsize, 1: <20, 2: <200, 3: <2000, 4: 2000 and more
FIRMLARGE: 3 and 4
CITYSMALL: < 100,000 inhabitants

Industry breakdown:
BRANCH: Potentially available are 34 industries

Human capital variables:
YRSEDT: Own calculation on the basis of individual degrees
EXPER: Experience= AGE - YRSEDT - 6
TEN: Current year - first year in current firm

Jobtype and mobility variables:
ISCO1: ISCO 1-digit: 8 job categories
ISCO3: ISCO 3-digit: 224 job categories with observations available
JOBTYPE-blue collar worker: 1: no training, 2: some training, 3: vocational training, 4:foreman, 5: Meister
JOBTYPE-white collar worker: 1: Werkmeister, 2: simple job, 3: qualified job, 4: very qualified, 5: manager
MONTHSUN: Number of months unemployed in the last 10 years, asked in 1984
NJOBS: Number of employers in the last 10 years, asked in 1984
OC-1, OC-3: Change of ISCO1 or ISCO3 (0,1)
JIN: Change of workplace within firm (0,1)
JOUT: Change of firm (0,1)

(ii) Data merged by us from other sources:

The merging process was undertaken by connecting the industry code in the various sources with the industry code in the SOEP.

- AUSL: Total foreigner share in the labor force detailed per year and industry. Source: Bundesanstalt für Arbeit.
- UNEMP: Unemployment rate, detailed per year and German state (Länder). Source: Statistisches Bundesamt, Statistisches Jahrbuch, various issues.
- GROWTH: Industry growth calculated as the growth rate of value added. Detailed per year and industry according to the Statistisches Bundesamt, Statistisches Jahrbuch, various issues.
- UW-Blue: Union-bargained standard wage at the industry level for blue collar workers, yearly. Source: Statistisches Bundesamt, Statistisches Jahrbuch, various issues.
- UW-White: Union-bargained standard wage at the industry level for white collar workers, yearly. Source: Statistisches Bundesamt, Statistisches Jahrbuch, various issues.
- UD: Union density, share of union members to total workers in that industry. Source: Statistisches Bundesamt, Statistisches Jahrbuch, various issues.
- CPI: Consumer price index for a worker (blue and white collar) with a family of average income and 2 children.

Note: In the regressions in the text we use deflated standard wages where we devide by CPI to obtain UW-Blue and UW-White.

Exhibit 1: Structure of Mobility

Change of

	Firm			
	No	Yes	Sum	
Only Workplace	X_{11}	X_{12}	$X_{1•}$	Only changes of workplace
Only Occupation	X_{21}	-	X_{21}	Only changes of occupation
Both	X_{31}	X_{32}	$X_{3•}$	Both
	$X_{•1}$	$X_{•2}$		

Note: $X_{•1}$ is total number of individuals with changes within the firm. $X_{•2}$ is total number of individuals changing the firm.

Table 1: Unemployment, inflow and outflow rates in West Germany in percent, 1975-1993[a]

	National statistic				OECD statistic		
	Unemployment rate	Inflow rate		Outflow rate	Unempl. rate	Inflow rate	Outflow rate
	(1)	(2a)	(2b)	(3)	(4)	(5)	(6)
1975	4.7	1.11	-	24.50	3.6	-	-
1979	3.8	0.93	-	28.30	3.2	0.18	19.6
1980	3.8	0.95	-	26.55	2.9	-	-.
1981	5.5	1.09	-	19.29	4.2	-	-
1982	7.5	1.16	0.88	14.49	5.9	-	-
1983	9.1	1.18	0.85	13.21	7.7	0.27	6.2
1984	9.1	1.16	0.82	13.60	7.1	-	-
1985	9.3	1.18	0.83	13.48	7.1	-	-
1986	9.0	1.13	0.79	14.08	6.4	-	-
1987	8.9	1.14	0.80	13.59	6.2	-	-
1988	8.7	1.12	0.74	14.08	6.2	0.26	6.3
1989	7.9	1.14	0.66	16.13	5.6	0.30	7.6
1990	7.2	1.08	0.59	17.58	4.8	0.20	8.0
1991	6.3	1.05	0.58	18.33	4.2	-	-
1992	6.6	1.13	0.61	16.90	4.6	-	-
1993	8.2	1.32	0.72	14.91	5.8	-	-

[a] "-" indicates that there is no data available. National statistics are taken from Amtliche Nachrichten der Bundesanstalt für Arbeit, Arbeitsstatistik 1993 - Jahreszahlen, Statistisches Bundesamt, Statistisches Jahrbuch 1994, and unpublished material provided by the German Labor Office, Nürnberg. The OECD data are from OECD (1990, 1993, 1994b). Own calculations. (1) is the official German unemployment while (4) is the OECD standardized rate. (2a) is the monthly average of total inflow into unemployment divided by the average annual stock of employed persons. (2b) concentrates on the inflow from employment to unemployment only. (3) is he monthly average outflow from unemployment divided by the average annual stock of unemployed persons. (5) and (6) are similarily defined statistics published by the OECD.

Table 2: Inter and intra firm changes of workplace and occupation[a]

Table 2a: Total and job status in %

	Change of firm	Change of occupation	Both	Change of firm only	Change of occupation only	Total changes	Size of group (in thousands)
1983-1985							
Total	10.1	5.4	4.7	5.4	0.7	10.8	26,626
Self-employed or family member	6.2	3.6	3.1	3.1	0.5	6.6	3,136
Civil servant	6.6	4.9	4.5	2.2	0.4	7.0	2,367
White collar worker	10.7	4.4	3.7	7.0	0.8	11.4	9,831
Blue collar worker	11.8	6.9	6.0	5.8	0.9	12.7	9,746
In vocational training	9.1	6.9	6.3	3.4	0.6	9.7	1,546
1985-1987							
Total	10.1	5.5	4.8	5.3	0.7	10.8	27,073
Self-employed or family member	5.7	3.2	2.8	2.9	0.4	6.1	3,089
Civil servant	8.8	6.8	6.3	2.5	0.5	9.2	2,363
White collar worker	10.9	4.7	3.9	7.0	0.8	11.7	10,251
Blue collar worker	11.1	6.5	5.8	5.4	0.8	11.9	9,698
In vocational training	9.7	7.4	6.8	2.9	0.6	10.3	1,674
1987-1989							
Total	10.9	5.8	5.1	5.8	0.8	11.6	27,742
Self-employed or family member	6.1	3.4	3.0	3.0	0.4	6.4	3,024
Civil servant	8.3	6.5	5.9	2.5	0.6	9.0	2,424
White collar worker	11.9	5.2	4.2	7.6	0.9	12.8	10,908
Blue collar worker	12.1	6.9	6.1	5.4	0.8	12.9	9,894
In vocational training	9.4	7.1	6.4	3.7	0.7	10.1	1,492

[a] Source: Statistisches Bundesamt; Bevölkerung und Erwerbstätigkeit; Fachserie 1; Reihe 4.1.2.; ed. 1985, 1987, 1989, 1991, 1993; and own calculations based on this material. Data refers to a two year period from May of the first year to April of the third year. Change of firm includes changes of firm within one company. Change of

occupation is based on the question whether the occupation had been changed during the two recent years. Includes changes of occupation within a firm and changes of occupation without additional schooling.

Table 2a continued

	Change of firm	Change of occupation	Both	Change of firm only	Change of occupation only	Total changes	Size of group (in thousands)
1989-1991							
Total	12.0	6.7	5.9	6.2	0.9	12.9	29,684
Self-employed or family member	6.6	3.7	3.2	3.4	0.5	7.1	3,205
Civil servant	7.7	6.2	5.5	2.2	0.7	8.5	2,421
White collar worker	13.2	6.0	5.1	8.2	1.0	14.2	12,369
Blue collar worker	13.2	8.2	7.3	5.9	0.9	14.1	10,389
In vocational training	12.6	9.6	8.8	3.8	0.8	13.4	1,301
1991-1993							
Total	11.5	6.3	5.5	6.0	0.8	12.3	29,782
Self-employed or family member	7.6	3.9	3.5	4.1	0.4	8.0	3,220
Civil servant	8.5	6.5	5.8	2.7	0.7	9.1	2,352
White collar worker	12.9	6.0	5.1	7.8	0.9	13.8	12,896
Blue collar worker	11.2	6.8	6.0	5.2	0.8	12.0	10,091
In vocational training	15.8	12.3	11.4	4.4	0.9	16.7	1,224

Table 2b: Total and age groups in %[a]

	Change of firm	Change of occupation	Both	Change of firm only	Change of occupation only	Total changes	Size of group (in thousands)
1983-1985							
Total	10.74	5.52	4.81	5.99	0.77	11.52	21,879
15-25	22.2	12.2	11.2	10.9	0.9	23.1	3,833
25-55	9.1	4.5	3.8	5.4	0.8	9.9	15,954
55-65	2.3	1.1	0.8	1.5	0.3	2.7	2,092
1985-1987							
Total	10.82	5.71	5.01	5.91	0.78	11.53	22,239
15-25	23.5	13.7	12.8	10.8	0.9	24.4	3,665
25-55	9.1	4.5	3.8	5.4	0.8	9.8	16,444
55-65	2.3	1.3	0.9	1.4	0.4	2.7	2,130
1987-1989							
Total	11.61	6.05	5.24	6.44	0.88	12.49	23,164
15-25	24.9	14.1	13.0	11.9	1.1	26.0	3,559
25-55	10.0	5.0	4.2	5.9	0.9	10.9	17,567
55-65	2.3	1.0	0.7	1.6	0.3	2.6	2,038
1989-1991							
Total	13.26	7.3	6.36	6.89	0.98	14.31	25,088
15-25	29.8	17.9	16.5	13.3	1.7	31.5	3,459
25-55	11.6	6.1	5.2	6.4	0.9	12.6	19,186
55-65	2.9	1.7	1.1	1.7	0.6	3.4	2,443
1991-1993							
Total	11.82	6.4	5.54	6.17	0.85	12.69	25,242
15-25	25.1	15.1	14.1	10.0	1.0	26.1	2,920
25-55	11.0	5.7	4.8	6.2	0.9	11.9	19,684
55-65	3.2	2.0	1.6	1.7	0.3	3.7	2,638

[a] The first row refers to the total numbers as in Table 2a for the purpose of comparison. All other numbers refer to the groups civil servant and blue and white collar workers only. Footnote a in Table 2a is also valid here.

Table 2c: Total and sectors in %[a]

	Change of firm	Change of occupation	Both	Change of firm only	Change of occupation only	Total changes	Size of group (in thousands)
1983-1985							
Total	10.75	5.58	4.78	5.96	0.74	11.54	21,945
Primary sector	7.5	4.0	3.0	4.4	1.0	8.4	724
Construction and manufactoring	10.8	5.8	4.9	5.9	0.9	11.7	9,237
Service sector	10.9	5.5	4.8	6.1	0.6	11.6	11,984
1985-1987							
Total	10.76	5.69	4.94	5.82	0.74	11.52	22,313
Primary sector	7.3	3.9	3.1	4.2	0.8	8.6	712
Construction and manufacturing	10.3	5.4	4.6	5.7	0.8	11.1	9,213
Service sector	11.3	6.0	5.3	6.0	0.7	12.0	12,388
1987-1989							
Total	11.58	6.05	5.24	6.39	0.85	12.44	23,226
Primary sector	7.9	4.3	3.3	4.6	1.0	8.8	694
Construction and manufacturing	11.0	5.7	4.9	6.1	0.9	11.8	9,563
Service sector	12.2	6.4	5.6	6.7	0.8	13.1	12,969
1989-1991							
Total	12.69	6.96	6.08	6.67	0.94	13.63	25,181
Primary sector	7.6	4.6	3.6	4.0	1.0	8.6	694
Construction and manufacturing	12.2	6.8	5.8	6.4	1.0	13.2	10,377
Service sector	13.3	7.2	6.4	7.0	0.9	14.2	14,110
1991-1993							
Total	11.8	6.35	5.51	6.3	0.84	12.64	25,338
Primary sector	9.5	5.6	4.6	5.0	1.0	10.3	702
Construction and manufacturing	9.9	5.3	4.4	5.5	0.9	10.8	9,958
Service sector	13.2	7.1	6.3	6.9	0.8	14.0	14,678

[a] See footnote a in Table 2b. The primary sector is farming, forestry, fishery, energy and water services,mining. The service sector consists of trade, transport and postal services, banks, insurance, services provided by private companies and self-employed persons, non-profit-organizations and private households,municipalities and social insurance.

Table 2d: Total and educational degrees in %[a]

	Change of firm	Change of occupation	Both	Change of firm only	Change of occupation only	Total changes	Size of group (in thousands)
1983-1985							
Total	10.73	5.56	4.81	5.85	0.75	11.54	21,945
No degree	9.6	6.0	5.4	3.6	0.6	10.2	4,971
Vocational training	11.3	5.8	5.0	6.4	0.8	12.2	13,265
Technical school	9.5	3.9	3.1	6.4	0.7	10.3	1,501
Technical college	9.8	3.7	3.0	6.8	0.8	10.7	775
University degree	11.1	4.5	3.7	7.4	0.8	11.9	1,433
1985-1987							
Total	10.78	5.68	4.95	5.83	0.78	11.5	22,311
No degree	9.7	6.4	5.8	3.9	0.6	10.3	4,684
Vocational training	11.2	5.8	5.1	6.1	0.8	11.9	13,766
Technical school	9.7	4.4	3.3	6.4	1.1	10.8	1,482
Technical college	10.9	3.7	2.9	8.0	0.8	11.7	863
University degree	11.3	4.7	3.8	7.5	0.9	12.1	1,516
1987-1989							
Total	11.62	6.04	5.19	6.37	0.79	12.41	23,226
No degree	10.4	6.6	6.0	4.4	0.6	11.0	4,452
Vocational training	12.3	6.4	5.5	6.7	0.8	13.1	14,555
Technical school	9.9	4.5	3.4	6.5	1.1	11.0	1,620
Technical college	10.8	3.8	2.9	7.9	0.9	11.7	926
University degree	11.1	4.1	3.3	7.8	0.8	11.9	1,673
1989-1991							
Total	12.68	6.93	6.07	6.66	0.93	13.6	25,181
No degree	12.4	8.1	7.1	5.3	1.0	13.4	6,390
Vocational training	13.0	7.0	6.2	6.9	0.9	13.9	14,411
Technical school	12.1	5.4	4.3	7.8	1.1	13.2	1,738
Technical college	10.9	4.2	3.4	7.5	0.8	11.7	1,010
University degree	12.6	5.1	4.4	8.2	0.8	13.4	1,632
1991-1993							
Total	11.82	6.32	5.55	6.26	0.76	12.63	25,338
No degree	11.6	7.2	6.6	5.0	0.6	12.4	6,338
Vocational training	11.9	6.3	5.5	6.4	0.8	12.7	14,367
Technical school	10.9	5.0	4.0	6.9	1.0	12.0	1,739
Technical college	11.6	5.1	4.2	7.4	0.8	12.4	1,069
University degree	12.9	5.4	4.6	8.3	0.8	13.6	1,825

[a] See footnote a in Table 2b.

Table 3: Average yearly changes of workplace, occupation and firm, SOEP 1985 - 1991[a]

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Table 3a: Total and job status in %

	Changes inside firm				Changes outside firm			Total Changes				
	Only				Only			Only				Group
	place	occ.	Both	Total	place	Both	Total	place	occ.	Both	Total	size
Total	1.62	7.48	0.24	9.34	3.14	0.71	3.85	4.76	7.48	0.95	13.19	31,661
Self-employed or family	0.33	8.74	0.07	9.14	1.39	0.40	1.79	1.72	8.74	0.47	10.93	1,511
Civil servant	3.58	.4.84	0.37	8.79	1.08	0.11	1.19	4.66	4.84	0.48	9.98	2,685
White collar	2.07	7.19	0.31	9.57	3.88	0.76	4.64	5.95	7.19	1.07	14.21	11,621
Blue collar	0.98	8.05	0.18	9.21	3.07	0.79	3.86	4.05	8.05	0.97	13.07	15,571
Voc. training	7.33	6.23	0.73	14.29	5.86	1.47	7.33	13.19	6.23	2.20	24.62	273

[a] Own calculations on the basis of the SOEP using material from the waves 1-8 (1984-1991). Group size is total number of observations in 1985-1991. The sample contains males and females. Place is workplace, occ. is changes of occupation on the basis of the 3-digit level of ISCO.

Table 3b: Total and age groups in %[a]

	Changes inside firm				Changes outside firm			Total Changes				
	Only				Only			Only				Group
	place	occ.	Both	Total	place	Both	Total	place	occ.	Both	Total	size
Total	1.64	7.43	0.25	9.32	3.21	0.72	3.92	4.85	7.43	0.97	13.25	29,877
15-25	2.25	10.52	0.38	13.15	8.08	1.85	9.93	10.33	10.52	2.23	23.08	3,727
25-55	1.69	7.12	0.25	9.06	2.80	0.62	3.43	4.49	7.12	0.87	12.48	23,280
55-65	0.42	5.92	0.07	6.41	0.14	0.00	0.14	0.56	5.92	0.07	6.55	2,870

[a] The sub-sample considered here excludes individuals in vocational training and self-employed and their family members.

Table 3c: Total and sectors in %[a]

	Changes inside firm				Changes outside firm			Total Changes				
	Only				Only			Only				Group
	place	occ.	Both	Total	place	Both	Total	place	occ.	Both	Total	Size
Total	1.64	7.43	0.25	9.32	3.21	0.72	3.92	4.85	7.43	0.97	13.25	29,877
Primary	2.18	7.56	0.15	9.89	2.62	0.58	3.20	4.80	7.56	0.73	13.09	688
Construction and manufacturing	1.30	7.44	0.26	9.00	3.01	0.72	3.73	4.31	7.44	0.98	12.73	15,206

Service	1.97	7.41	0.24	9.62	3.45	0.72	4.17	5.42	7.41	0.96	13.79	13,983

[a] See footnote a in Table 3b.

Table 3d: Total and educational degrees in %[a]

	Changes inside firm				Changes outside firm			Total Changes				
	Only				Only			Only				Group
	place	occ.	Both	Total	place	Both	Total	place	occ.	Both	Total	size
Total	1.64	7.43	0.25	9.32	3.21	0.72	3.92	4.85	7.43	0.97	13.25	29,877
No degree	1.48	8.47	0.21	10.16	4.03	0.95	4.98	5.51	8.47	1.16	15.14	12,515
Vocational training	1.42	7.07	0.26	8.75	2.83	0.57	3.40	4.25	7.07	0.83	12.15	10,004
Technical School	2.26	5.29	0.16	7.71	2.30	0.45	2.75	4.56	5.29	0.61	10.46	4,914
Technical College	1.82	6.53	0.30	8.65	2.13	0.76	2.89	3.95	6.53	1.06	11.54	658
University degree	2.18	8.40	0.67	11.25	2.46	0.62	3.08	4.64	8.40	1.29	14.33	1,786

[a] See footnote a in Table 3b.

Table 4: Earnings and wages: Rival frameworks[a]

	Mean	Variance	Minimum	Maximum
Monthly earnings				
Individual	3,632.0	2,299,048.0	800.0	25,000.0
Industry	3,570.9	356,889.0	2,539.4	4,950.7
ISCO 1-digit	4,134.7	1,764,806.0	2,491.8	7,031.6
ISCO 3-digit	3,774.6	1,934,694.0	1,233.3	12,500.0
Monthly real earnings				
Individual	3,532.1	2,121,414.3	749.8	24,752.5
Industry	3,481.5	331,273.8	2,467.2	4,824.1
ISCO 1-digit	4,016.6	1,648,790.0	2,427.8	6,811.5
ISCO 3-digit	3,670.9	1,844,853.3	1,234.6	12,472.6
Monthly earnings, logged				
Individual	8.13	0.13	6.68	10.13
Industry	8.11	0.02	7.77	8.45
ISCO 1-digit	8.22	0.08	7.79	8.78
ISCO 3-digit	8.15	0.10	7.12	9.40
Monthly real earnings, logged				
Individual	8.10	0.12	6.62	10.12
Industry	8.09	0.02	7.74	8.43
ISCO 1-digit	8.20	0.08	7.77	8.75
ISCO 3-digit	8.12	0.10	7.12	9.40
Hourly wages				
Individual	19.3	62.7	5.0	152.3
Industry	18.6	11.2	10.5	26.1
ISCO 1-digit	21.0	31.6	13.4	32.1

ISCO 3-digit	20.1	54.9	5.2	71.0

Table 4 continued

	Mean	Variance	Minimum	Maximum
Real hourly wages				
Individual	18.7	57.9	5.0	152.6
Industry	18.1	10.3	10.6	25.4
ISCO 1-digit	20.4	29.5	13.1	31.1
ISCO 3-digit	19.5	53.0	5.2	70.9
Hourly wages, logged				
Individual	2.89	0.12	1.60	5.03
Industry	2.85	0.03	2.34	3.20
ISCO 1-digit	2.95	0.06	2.56	3.38
ISCO 3-digit	2.91	0.10	1.64	4.23
Real hourly wages, logged				
Individual	2.87	0.12	1.60	5.03
Industry	2.83	0.03	2.32	3.17
ISCO 1-digit	2.92	0.06	2.54	3.35
ISCO 3-digit	2.88	0.10	1.64	4.23

[a] Number of observations: 14,909. Variables are averaged at the 34 industry, 8 ISCO 1-digit and 224 ISCO 3-digit level. The above statistics are then calculated and compared with the direct calculations for the individual values.

Table 5: Earnings regressions of rival approaches: Human Capital (HC), industry (I) and job (J)[a]

	Y	YR	W	WR
Base model				
$\bar{R}^2$	0.075	0.077	0.045	0.047
AIC	0.115	0.111	0.117	0.112
Logl	-5,028	-4,773	-5,145	-4,855
B, HC				
$\bar{R}^2$	0.380	0.389	0.322	0.331
AIC	0.077	0.074	0.083	0.079
Logl	-2,049	-1,691	-2,594	-2,212
B, I				
$\bar{R}^2$	0.167	0.171	0.162	0.166
AIC	0.104	0.100	0.103	0.098
Logl	-4,229	-3,956	-4,156	-3,837
B, J1				
$\bar{R}^2$	0.292	0.300	0.231	0.238
AIC	0.088	0.084	0.094	0.090
Logl	-3,028	-2,710	-3,527	-3,181
B, J3				
$\bar{R}^2$	0.414	0.426	0.358	0.371
AIC	0.074	0.070	0.080	0.075
Logl	-1,516	-1,117	-2,069	-1,641
B, HC, I, J1				
$\bar{R}^2$	0.483	0.494	0.431	0.443
AIC	0.064	0.061	0.070	0.066
Logl	-666	-264	-1,260	-828

Table 5 continued

B, HC, I, J3				
$\bar{R}^2$	0.541	0.555	0.486	0.500
AIC	0.058	0.055	0.064	0.060
Logl	335	793	-392	88
B, HC, I				
$\bar{R}^2$	0.423	0.434	0.387	0.398
AIC	0.072	0.068	0.075	0.071
Logl	-1,484	-1,110	-1,823	-1,411
B, HC, J1				
$\bar{R}^2$	0.446	0.456	0.379	0.389
AIC	0.069	0.066	0.076	0.072
Logl	-1,207	-824	-1,937	-1,534
B, HC, J3				
$\bar{R}^2$	0.527	0.540	0.471	0.485
AIC	0.060	0.056	0.066	0.062
Logl	92	536	-624	-155
B, I, J1				
$\bar{R}^2$	0.333	0.341	0.292	0.301
AIC	0.083	0.080	0.087	0.083
Logl	-2,574	-2,243	-2,894	-2,525
B, I, J3				
$\bar{R}^2$	0.430	0.443	0.377	0.390
AIC	0.072	0.068	0.077	0.073
Logl	-1,291	-883	-1,831	-1,395

[a] Number of observations: 14,909 from the SOEP, including blue and white collar workers and civil servants. The base model (B) contains a constant and a dummy for foreigners. The endogenous variables (all logged) are gross monthly earnings (Y), Y real (YR), hourly wage (W) and real W (WR). The other variable groups are human capital (HC: years of education, experience, job tenure and their squared values), industry dummies (I), and occupational dummies (J1: ISCO 1-digit; J3: ISCO 3-digit). $\bar{R}^2$: adjusted R^2; AIC: the Akaike information criterion calculated as the exponent of the sum of the logged estimated residual variance and twice the number of estimated parameters devided by the sample size; Logl: the log-likelihood value.

Table 6: Random effects panel models of log real earnings[a]

	Blue-collar workers	White-collar workers
FOR @ 10^{-1}	-0.28	-0.41
	(-2.5)	(-1.6)
YRSEDT @ 10^{-1}	0.28	1.12
	(1.6)	(3.9)
YRSEDT2 @ 10^{-2}	-0.05	-0.20
	(-0.6)	(-1.9)
EXPER @ 10^{-1}	0.18	0.44
	(10.5)	(19.3)
EXPER2 @ 10^{-3}	-0.31	-0.72
	(-9.8)	(-16.9)
TEN @ 10^{-2}	0.12	0.43
	(1.0)	(-3.4)
TEN2 @ 10^{-4}	-0.10	0.16
	(-0.3)	(4.3)
MARRIED @ 10^{-1}	0.26	0.21
	(2.9)	(1.9)
UW	0.66	0.96
	(17.0)	(15.9)
JOBTYPE-2 @ 10^{-2}	-0.11	-
	(-0.1)	
JOBTYPE-3 @ 10^{-1}	0.25	0.15
	(2.7)	(1.8)
JOBTYPE-45 @ 10^{-1}	0.78	0.54
	(6.4)	(5.8)
UNION @ 10^{-1}	0.32	-0.41
	(3.2)	(-2.1)
HAND @ 10^{-2}	-0.02	0.14
	(-0.5)	(-2.2)
FIRMSIZ3 (-1) @ 10^{-1}	0.22	0.21
	(2.7)	(2.3)
FIRMSIZ4 (-1) @ 10^{-1}	0.47	0.27
	(5.2)	(2.8)

Table 6 continued

CITYSMALL @ 10^{-1}	-0.32	0.12
	(-3.7)	(1.0)
UNEMP @ 10^{-2}	-0.66	-0.09
	(-4.0)	(-0.5)
NJOBS @ 10^{-2}	0.96	1.12
	(2.7)	(1.8)
MONTHSUN @ 10^{-1}	-0.05	-0.12
	(-5.1)	(-5.1)
OC-1 @ 10^{-1}	0.14	0.10
	(1.0)	(1.5)
JIN @ 10^{-1}	-0.31	-0.31
	(-1.8)	(-3.0)
JOUT @ 10^{-1}	-0.51	-0.45
	(-4.2)	(-4.5)
Observations	6,300	3,347
R^2	0.225	0.435

[a] All regressions contain a constant, 7 ISCO 1-digit dummies and 10 industry dummies which are not reported for lack of space. These dummies as well as those for FIRMSIZE refer to the previous period.

Table 7: Random effects panel models of real earnings growth[a]

	Blue-collar workers		White-collar workers	
	ISCO1	ISCO3	ISCO1	ISCO3
Constant @ 10^{-1}	0.26	0.26	0.35	0.36
	(4.6)	(4.6)	(5.3)	(5.4)
UW-growth	0.26	0.25	0.16	0.16
	(5.6)	(5.6)	(3.3)	(3.4)
FOR @ 10^{-2}	0.28	0.27	-0.46	-0.61
	(0.4)	(0.4)	(-0.3)	(-0.4)
FIRMLARGE (-1)	-0.66	-0.66	0.94	0.92
@ 10^{-2}	(-1.0)	(-1.0)	(1.3)	(1.3)
GROWTH	0.10	0.10	-0.12	-0.12
	(2.0)	(1.9)	(-2.2)	(-2.1)
OC @ 10^{-1}	0.43	0.19	-0.06	-0.02
	(2.5)	(2.0)	(0.7)	(-0.2)
JIN @ 10^{-1}	-0.24	-0.23	-0.38	-0.47
	(-1.1)	(-1.0)	(-2.6)	(-3.2)
JOUT @ 10^{-1}	-0.48	-0.44	-0.39	-0.44
	(-3.3)	(-2.9)	(-2.8)	(-3.2)
JIN * OC	0.16	0.01	0.04	0.11
	(2.0)	(-0.1)	(1.0)	(2.7)
Observations	6,244	6,244	3,274	3,274
R^2 @ 10^{-2}	0.675	0.578	0.264	0.443

[a] The dummy for FIRMLARGE refers to the previous period.

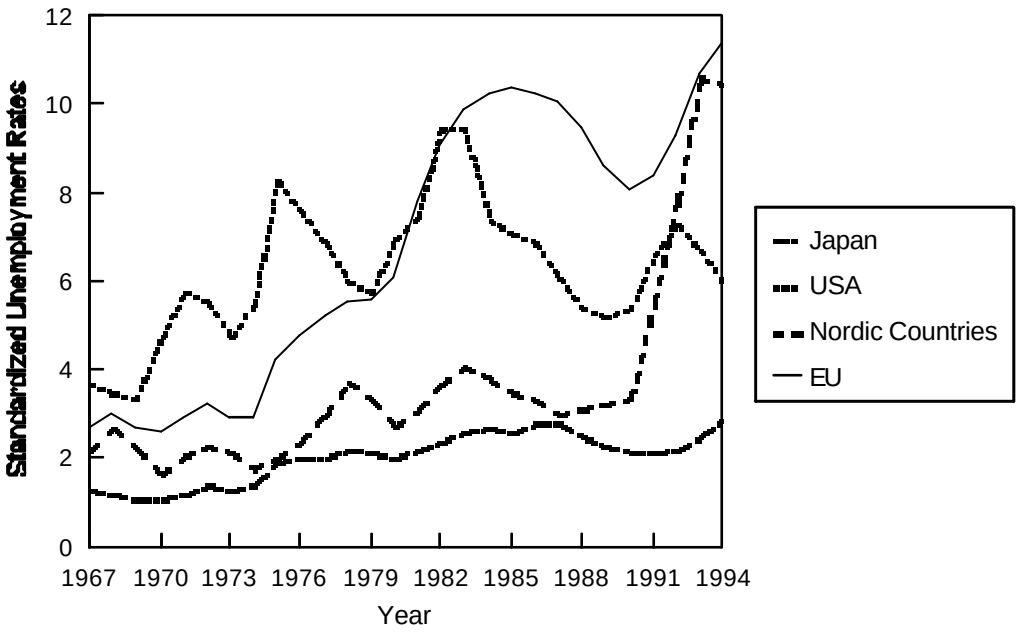
Table 8: Probit estimates of change[a]

	Blue-collar workers				White-collar workers			
	ISCO 1	ISCO 3	Place	Firm	ISCO 1	ISCO 3	Place	Firm
Constant	-0.26 (-0.5)	-0.02 (-0.1)	-2.01 (-2.6)	0.39 (0.7)	-0.03 (-0.1)	-0.02 (-0.0)	-1.65 (-1.3)	-0.92 (-0.8)
FOR	-0.04 (-0.5)	0.02 (0.3)	0.01 (0.1)	-0.13 (-1.5)	-0.07 (-0.6)	0.10 (0.9)	0.11 (0.6)	-0.36 (-1.7)
MARRIED	-0.10 (-1.0)	-0.08 (-1.1)	0.14 (0.9)	-0.07 (-0.8)	-0.26 (-3.1)	-0.23 (-2.9)	0.15 (1.1)	-0.02 (-0.2)
UNION	-0.06 (-0.8)	0.09 (1.9)	-0.05 (-0.5)	-0.06 (-0.7)	0.07 (0.9)	0.11 (1.5)	0.28 (2.5)	-0.22 (-1.7)
AGE @ 10^{-1}	-0.52 (-2.2)	-0.41 (-2.4)	-0.37 (-1.0)	-0.54 (-1.8)	-0.18 (-0.7)	-0.32 (-1.2)	-0.25 (-0.5)	-0.52 (-1.2)
AGE2 @ 10^{-3}	0.56 (2.0)	0.42 (2.0)	0.23 (0.5)	0.21 (0.5)	0.12 (0.4)	0.28 (0.9)	-0.14 (-0.2)	0.13 (0.2)
YRSEDT	-0.04 (-1.0)	-0.03 (-1.1)	-0.05 (-0.7)	-0.11 (-2.7)	-0.08 (-1.1)	-0.07 (-1.0)	0.05 (0.3)	0.10 (0.7)
YRSEDT2	0.33 (1.3)	0.05 (0.3)	0.54 (1.7)	0.70 (2.8)	0.27 (1.1)	0.34 (1.3)	0.08 (0.2)	-0.21 (-0.4)
HAND @ 10^{-2}	0.51 (1.8)	0.27 (1.2)	0.94 (2.9)	0.12 (0.3)	-0.67 (-2.1)	-0.54 (-1.8)	0.18 (0.4)	0.26 (0.6)
MONTHSUN	0.14 (3.1)	0.10 (2.5)	-0.14 (-1.1)	0.08 (1.5)	-0.00 (-0.0)	0.14 (2.1)	0.08 (0.6)	-0.16 (-1.2)
NJOBS	0.02 (1.0)	0.02 (0.9)	-0.04 (-1.0)	0.05 (2.6)	0.04 (1.8)	0.04 (1.6)	-0.12 (-2.1)	0.11 (3.6)
UNEMP(-1)	-0.15 (-1.1)	-0.28 (-3.0)	0.19 (1.0)	-0.12 (-0.8)	-0.39 (-3.1)	-0.32 (-2.5)	0.12 (0.6)	0.15 (0.8)
GROWTH(-1)	2.30 (2.1)	1.87 (2.3)	3.44 (2.1)	1.45 (1.1)	1.9 (1.8)	2.23 (2.1)	0.63 (0.4)	-3.77 (-2.1)
UD(-1)	-0.59 (-2.7)	-0.46 (-3.0)	0.51 (1.9)	-0.69 (-2.7)	0.14 (0.7)	-0.06 (-0.3)	0.24 (0.7)	-1.25 (-3.7)
AUSL(-1)	-1.47 (-1.7)	1.16 (1.8)	1.58 (1.2)	1.00 (1.0)	2.08 (2.2)	1.64 (1.8)	-1.12 (-0.7)	3.31 (2.3)
Observations	5,941	5,941	5,941	5,941	3,154	3,154	3,154	3,154
R^2_{MZ}	0.064	0.033	0.087	0.192	0.066	0.052	0.144	0.224
LRT (DF)	76.5 (14)	66.9 (14)	47.7 (14)	191.5 (14)	69.9 (14)	72.3 (14)	63.5 (14)	123.0 (14)

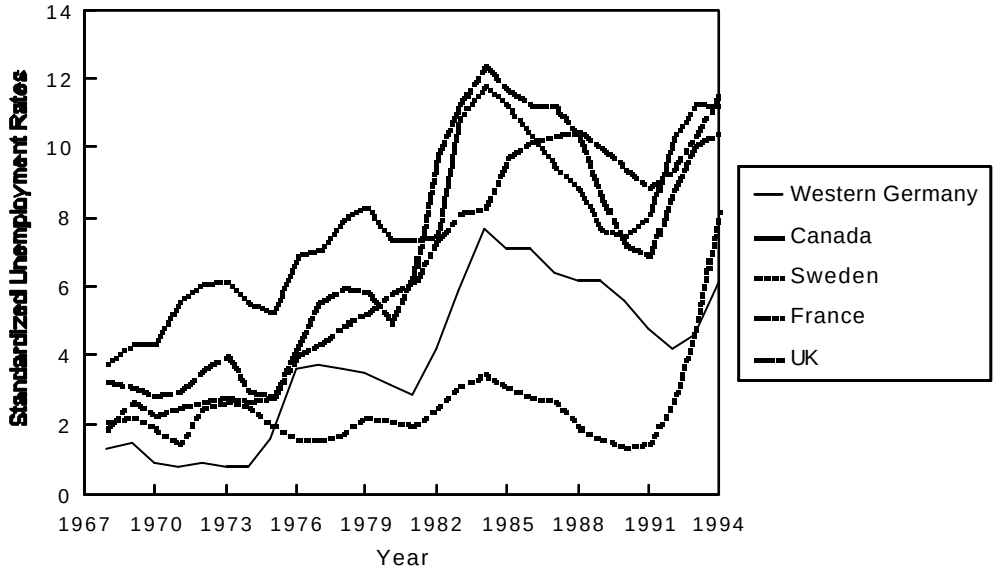
[a] (-1) is one period lagged.

Figure 1: Standardised Unemployment Rate

(a)



(b)



Source: OECD Employment Outlook