DISCUSSION PAPER SERIES

IZA DP No. 1368

# Job Stability Trends, Layoffs, and Transitions to Unemployment: An Empirical Analysis for West Germany

Annette Bergemann
Antje Mertens

October 2004

Forschungsinstitut
zur Zukunft der Arbeit
Institute for the Study
of Labor

# Job Stability Trends, Layoffs, and Transitions to Unemployment: An Empirical Analysis for West Germany

**Annette Bergemann**
*Free University of Amsterdam, Tinbergen Institute, University of Mannheim and IZA Bonn*

**Antje Mertens**
*Max Planck Institute for Human Development*

Discussion Paper No. 1368
October 2004

IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
Email: iza@iza.org

IZA Discussion Paper No. 1368
October 2004

# ABSTRACT

# Job Stability Trends, Layoffs, and Transitions to Unemployment: An Empirical Analysis for West Germany*

This paper studies the evolution of job stability in West Germany. Using data from the German Socio-Economic Panel, we first show that the median elapsed tenure declined for men between 1984 and 1999. Second, estimating proportional Cox hazard models with competing risks and controls for stock sampling, we are able to distinguish the reasons for job separation and different transition states. We show that the decline in the stability of men's jobs can be attributed partly to an increase in layoffs and partly to an increase in transitions to unemployment. However, these two developments are not significantly related to each other. Some evidence is presented that downsizing of large firms might be responsible for part of the decline in job stability.

JEL Classification: J63, C41

Keywords: job stability, labor mobility, layoffs, duration analysis

Corresponding author:

Annette Bergemann
Free University Amsterdam
FEWEB
De Boelelaan 1105
1081 HV Amsterdam
The Netherlands
Email: bergemann@tinbergen.nl

* We are grateful for comments and discussion to Jörg Breitung, Felix Büchel, Michael Burda, Simon Burgess, Bernd Fitzenberger, Wolfgang Franz, Steffen Hillmert, Jenny Hunt, Jürgen Kolb, Michael Kvasnicka, Ineke Maas, Karl Ulrich Mayer, Stefan Profit, Hilmar Schneider, Lioba Trabert and Gerard van den Berg. We also benefited from feedback received at the EALE Annual Conference in Jyväskylä, Tagung des Vereins für Socialpolitik in Magdeburg, ESEM in Lausanne, PANEL Conference in Berlin, and CEPR Final Conference of the SER project 'A Dynamic Approach to Europe's Unemployment Problem' in Bristol. Annette Bergemann acknowledges the support of a Marie Curie Fellowship (contract number HPMF-CT-2002-02047) granted as part of the European Community Programme 'EU Training and Mobility of Researchers' and of the European Community's SER project 'A Dynamic Approach to Europe's Unemployment Problem'.

## 1 Introduction

In the recent past the question of job security and the stability of employment relationships has been increasingly discussed. The general notion is that job stability is on the decline in most OECD countries, although the actual empirical evidence is scarce and ambiguous. Several studies for Germany and other OECD countries like the United States, the United Kingdom and France show some limited evidence of increasing job instability.[1]

It is well known to economists that job stability is not necessarily always a good thing. Indeed, if we believed that separations were always efficient (see e.g. McLaughlin 1991 or Parsons 1986), there would be nothing to worry about. However, most contracting mechanisms – like the bonding schemes or fixed wage contracts in the early models by Oi (1962), Becker (1962) and Parsons (1972), for example, or the later models with costly or suppressed renegotiations of wages by Hashimoto (1981) and Hall and Lazear (1984) – yield separations that are not efficient. Too much job stability can in fact be harmful at the macroeconomic level; for example, if firms have difficulties restructuring their workforce in times of structural change. Indeed, job relationships in Europe have often been termed too inflexible, as have the labor market institutions themselves; this phenomenon is sometimes dubbed *Eurosclerosis*. Even at the individual level, job stability is not always desirable, as reflected by voluntary quits.

One major reason for some economists to be concerned about declines in job stability is the potential effect on individual career paths. Too many job switches and periods of unemployment may lead to losses in human capital, decreasing earnings potentials and a limited capability to obtain work due to disadvantage signals (Spence 1973). Furthermore, economy-wide long-term labor relationships might be one prerequisite for a highly educated workforce (Acemoglu and Pischke 1998), which is, in turn, amongst other things responsible for the economic success of a

[1] See Bergemann and Schneider 1998; Burgess and Rees 1996, 1997, 1998; Booth et. al. 1999; Swinnerton and Wial 1995; Diebold et al. 1997; Schmidt and Svorny 1998; Givord and Maurin 2004; and the articles in the Journal of Labor Economics 17 (4, part 2) and in Neunmark 2000; OECD 1997; ILO 1996.

country. Therefore, it is important to interpret potential declines carefully. The question of whether jobs terminate due to quits or layoffs is of particular relevance, and is too often neglected in the literature. While quits tend to be associated with improved job conditions elsewhere, permanent layoffs and worker displacement usually lead to at least temporary unemployment and frequently to wage losses upon re-employment. In Germany the latter problem is of less relevance than in the United States, as wage losses tend to be relatively small (compare Burda and Mertens 2001; Dustmann et al. 2002). After looking at job stability patterns, we will therefore examine whether individuals find another job immediately after leaving their old one. Furthermore, we will test a number of hypotheses that have been put forward as potential explanations for a decline in job stability: downsizing of firms, skill-biased technological change, weakening bonds with the firm, and flexible work arrangements. Finally, another important question is how to measure a potential decline in job stability properly. We will address these questions using data from the German Socioeconomic Panel (hereafter GSOEP).

After surveying very briefly the literature on job stability and describing the data set, we will proceed to a detailed analysis of elapsed firm tenure. The elapsed firm tenure of those currently in work is the most commonly used measure of job stability and has not yet been properly explored for Germany. The GSOEP data show that there was indeed some decline in elapsed tenure in West Germany during the 1980s and 1990s. However, one serious problem of elapsed tenure is that it does not take into account the problem of right censoring. We do not know how long the jobs will actually last. This is a particular problem in times when many new hires are made. Logically, we will observe a decline in average elapsed tenure in that case. To combat the problem of right censoring, we use competing risk hazard rate models in our major analysis of separation risks in section 3. These models show that the decline in job stability can be attributed primarily to an increase in layoffs and transitions to unemployment. Finally, in section 4 we summarize our findings and give an outlook for future research.

## 2 General Trends in Job Stability

### *2.1 The Literature*

Although the literature on job stability is primarily empirical,[2] it is firmly based on well-known theories describing mobility in the labor market. Human capital theory offers an explanation for why separations usually decline with labor market experience and tenure (see e.g. Becker 1962, Mincer 1962 and 1974, Oi 1962, Parsons 1972 and Hashimoto 1981). Search and matching theory also concludes that mobility decreases with tenure and experience, as good matches are the ones that survive the longest and older workers have simply had more time to locate well-paid jobs (see e.g. Stigler 1962, Mortensen 1970, Burdett 1978, Jovanovic 1979a, 1979b). Therefore, it seems reasonable to use the elapsed tenure of those currently employed, i.e. the time spent with a particular employer, as a common measure of job stability. If we find a general tendency toward decreasing average tenure over time, this will be interpreted as an indication of declining job stability.

Most of the original US studies found little evidence for a drop in job stability between the 1970s and early 1990s (see Farber 1995; Diebold et al. 1996, 1997).[3] Only Swinnerton and Wial (1995, 1996) reported declines in job stability, although these declines were far smaller in their re-estimated results. Farber (1995) notes that men are increasingly less likely to be in long-term jobs, while women's chances of being in long-term employment have increased significantly. Moreover, Farber concludes that groups that have experienced greater declines in earnings, such as the young and especially the less educated, have also experienced a greater decline in job stability. Some more recent evidence of declining job stability is collected in an edited volume (Neumark 2000) and in a special issue of the Journal of Labor Economics (1999 [4, part 2]). In the latter, Neumark et al. (1999) report that job stability declined modestly in the first half of the 1990s. However, men with substantial tenure experienced a sharp decline in job stability in the first half of the

[2] One exception being Valetta (1999b), who offers an implicit contract model to explain inefficient separations. In this model workers' job security declines if they are dismissed although they had reasonable expectations of not being dismissed.

[3] For overviews of the US literature see Schmidt and Svorny (1998) or Valetta (1999a). See also the special issue of the Journal of Labor Economics 17 (October 1999, part 2), where Gottschalk and Moffit present an interesting comparison of studies. The latest compilation of articles on the topic can

1990s. These results were confirmed by Jaeger and Stevens (1999), who show a declining proportion of workers with less than 10 years of tenure. However, Gottschalk and Moffitt (1999) found no such evidence when estimating Cox Proportional Hazard Rate Models for different demographic groups. Separation rates did not increase; on the contrary, the results indicate a *decline* in the hazard of job exits for white males of all educational levels. These findings persist even when considering only those workers who report involuntary job terminations. However, while there is evidence for some changes in job stability in the 1990s, these changes did not persist for very long and, as Neumark (2000) argues, it would be premature to infer long-term trends towards a decline in long-term employment relationships.

Apart from studies directly aimed at analyzing job stability patterns, the literature on worker displacement yields some further interesting insights. In the United States job losses have increased since the 1970s, with high-tenure and white-collar workers being increasingly affected (see Hamermesh 1989; Farber 1993, 1997; Hall 1995; Fallick 1996 and Kletzer 1998 for surveys). The figures reported by researchers such as Farber (1997) cast some doubt on the notion that job stability has not changed: some 13% of the workforce experienced job loss in the recession of 1981-1983. The three-year rate of job loss decreased until 1987-89, and then rose to its highest level since 1981: 15% of the workforce lost their job in the period of expansion between 1993 and 1995. As Kletzer (1998) puts it, "These high rates of job loss are consistent with public perceptions of rising job insecurity."

Previous studies of job stability in Germany have applied different measures, and yielded apparently conflicting results. Winkelmann and Zimmermann (1998) report decreasing numbers of job changes as evidence for an increase in job stability, whereas Bergemann and Schneider (1998) use descriptive duration analysis to show that job stability has declined. Likewise, Grotheer and Struck (2003) report that the percentage of short jobs increased in the 1990s. Prolonged periods of unemployment and non-participation might make explain these disparate results. With the present paper, we intend to give a detailed overview of the evolution of job duration. We

---

be found in Neumark (2000). Comparable studies for Europe are only available for the UK (see e.g. Burgess and Rees 1996, 1997, 1998; Booth et al. 1999) and France (e.g. Givord and Maurin, 2004).

start by presenting some statistics on elapsed tenure to gain a first insight into the information provided by the GSOEP data.

Even more tricky than analyzing the pattern of job stability is explaining the reasons for any changes observed. Several hypotheses have been formulated in the literature; these will be tested in our empirical analysis. First of all, the business cycle has a strong impact. We know that (voluntary) quits are pro-cyclical, while (involuntary) layoffs are counter-cyclical, both influencing the tenure distribution. In boom periods more new jobs are created, automatically leading to more jobs of short duration. Hence, tenure decreases, even if layoffs are reduced. In recessions there are more layoffs, fewer quits, and average tenure is likely to increase as new hires are rare (Burgess and Rees 1996, Schettkatt 1996). It is therefore vital to control for business cycle effects. Secondly, changes in the composition of the workforce may influence average job stability. We are able to control for such effects using the abundant information provided by the GSOEP data. Apart from those two rather conventional hypotheses, the influence of flexible work arrangements (e.g. Levenson 2000), the downsizing of firms (Capelli 2000), skill-biased technological change (Givord and Maurin 2003; Autor et al. 2002) and weakening bonds with the firm (Valetta 1999b) will be discussed. We will test for all these hypotheses in our multivariate analysis in section 3. Before that, however, we will take a look at the data and some cross-sectional findings.

*2.2 The Data Set*

The GSOEP is a representative panel survey of households and their members, which has been running in West Germany since 1984. The concept of the GSOEP is to annually re-interview the households and their split-offs, usually in March.[4] In 1984, the sample consisted of approximately 4500 households and 9000 persons. The GSOEP questionnaire covers a wide variety of economic and social characteristics of households and their members. In particular, the occupational situation of the interviewees is one of the main themes. No other German data set provides this breadth of information, especially where the reasons for a job

[4] For further information about the GSOEP, see SOEP Group (2001).

termination are concerned. Of course, this data set also has its limitations, which we will take into account in our empirical analysis as far as possible.

In the GSOEP, employed respondents are asked how long they have already been with their current employer. This information allows us to easily calculate our first major indicator *"median of elapsed tenure"*. However, extracting data on the length of job spells for the duration analysis is not as trivial as it might seem.[5] Workers report changes in their employment situation together with the reasons for this change in the year before or during the year of the interview (starting with interview year 1985). Parallel to this, respondents complete a monthly calendar providing information on their labor market states. We combine these two sets of information to extract job durations. In the case that a job spell is left censored, information provided mainly by way of the calendar, we add the information on the elapsed tenure to the job spell information. This results in a so-called *stock sample*, which must be taken into account in the duration analysis.

Having thus created a (job) spell data set, we add individual and job-specific information to each spell. The individual information is available for all job spells, whereas the job-specific information is only available if the respondent was actually in the job at the time of an interview. Consequently, we only have job-specific information on a representative basis for jobs lasting at least 12 months.

The analysis distinguishes two different sets of destination states. The first set relates to the reason for job termination: quits, which are initiated by the employee; layoffs, which are initiated by the firm; and a third category, termed ‘other reasons’, that includes such reasons as the end of a fixed-term contract and retirement. It also includes sabbatical leave and maternity leave if these result in termination of the job. The GSOEP only taps the reason for the termination of the job that ended closest to the interview date, even if the individual had more than one job between two interviews. Therefore, we are less likely to know the reasons for exits from short jobs. Finally, it is important to note that the questions tapping the reasons for job separation were changed in 1991. We conducted extensive checks, which confirmed

that the variable we generated to reflect the reasons for job change is essentially consistent over time. However, there is one minor exception: in 1990, maternity leave as reason for job termination was introduced as an explicit response alternative. Therefore, we find an increase in exits in our variable *"other reasons"* as this variable contains job exits due to maternity leave. In order to correct for the effect of this change in the questionnaire, we incorporate a dummy variable in our multivariate analysis. Unfortunately, the wording of the question changed again after 1997, but now making it impossible to create a consistent variable. Therefore, our multivariate analysis only covers the 1990s until 1997.

In our second part of the analysis, we investigate a second set of destination states. These are the labor market states that an individual enters after exiting a job: unemployment, employment (full- or part-time) or education and non-participation combined. The data on these destination states are drawn from the monthly calendar. The same problem arises with respect to maternity leave as, here again, maternity leave was not introduced as an employment status in its own right until the 1991 questionnaire.

We selected the original West German sample A, containing German citizens only, for our analysis. We did not include East Germany, where job tenure patterns in the 1990s were obviously subject to different mechanisms than in West Germany. Only workers aged between 16 and 56 were included in the analysis of elapsed tenure, and only workers who started the job aged between 16 and 56 in the multivariate analysis. Civil servants, apprentices and the self-employed were dropped from our sample, as were workers in agriculture, non-profit organizations and private households. Finally, we did not include workers with missing values for age, sex, job status, industry affiliation or tenure in the elapsed tenure analysis.[6]

### *2.3 The Empirical Analysis of Elapsed Tenure*

The results presented in Table 1 and Figure 1 substantiate the established fact that median elapsed tenure differs significantly by gender. Women's median tenure

[5] For a more extensive discussion, consult the data appendix.
[6] For the missing value treatment in the duration analysis, see section 3.2.

fluctuates at around 6 years. Men's median tenure drops from 9.4 years in 1984 to 8.7 years in 1985, and stays relatively constant until the end of the 1980s. It declines further at the beginning of the 1990s, but returns to 8.5 years in 1994. Thereafter, median tenure falls to 7.5 years in 1999. Even if we assume that 1984 was a year with exceptionally high elapsed tenure, there are some signs of a decline in median elapsed tenure for men, primarily in the 1990s.

It is also important to distinguish different age groups because older workers are obviously able to accrue longer tenure than young workers. Age is therefore used as a (non-ideal) proxy for labor market experience. In Figure 2, median elapsed tenure is reported for the groups aged 16-25, 26-45 and 46-56 years. A gender difference is evident only in the older age groups. The tenure of female workers aged between 16 and 25 is comparable to that of their male counterparts. What is noticeable, however, is that median elapsed tenure decreases slightly for the young and middle-aged men between 25 and 45 years of age, but increases substantially for males aged between 46 and 56 during the early 1990s before starting to fall again. The female experience is strikingly different from the results reported by Farber (1995), Marcotte (1995) and Burgess and Rees (1998) for the United States and the UK. It seems that, while women in the US and the UK have been able to accrue longer tenure over time, German women have only been able to maintain the level acquired in the mid-1980s.

Another interesting detail in the tenure pattern has been pointed out by Gregg and Wadsworth (1995), who show significant differences in the median elapsed tenure of part-timers and full-timers in the UK. Moreover, part-timers face increasing separation rates over time. Therefore, Figure 3 shows median elapsed tenure by regular hours worked. Men in part-time jobs (including marginal employment)[7] have lower median elapsed tenure than full-time workers. However, only around 3% of male respondents were not in full-time jobs (own calculations from the GSOEP, see

[7] Marginal employment in Germany was defined as either working less than 15 hours per week in the period of observation or receiving monthly wages below a certain threshold (e.g. approximately 310 Euros in 1998).

also Hoffmann and Walwei 1998).[8] As no clear pattern can be observed for part-time workers, the reported decrease in median elapsed tenure can be assumed to be caused by males in full-time work only. As expected, women are more likely to work part-time (around 30%). It is interesting to see that, for women, part-time work is in fact associated with slightly higher median tenure than full-time work – at least until 1996. Apart from that, there are no clear tendencies over time for females in either full-time or part-time work.

Similarly, tenure by industry differs more strongly for men than for women, as shown by Figure 3, which depicts the most important sectors. We subsumed manufacturing, construction, energy and mining to the *"industry"* sector, where we observe a decrease of around one year of tenure. In the late 1990s, however, this trend reversed. Services, credit and insurance, and trade are pooled into *"trade and services"*. Here, we observe a significant decline in median tenure of around 2 years.

Because we still do not know the reasons for the slight decline observed in median elapsed tenure for men, we cannot know whether this is a positive or an alarming development. Considering the business cycle, as pointed out in section 2, (voluntary) quits are pro-cyclical, while (involuntary) layoffs are counter-cyclical, and both influence the tenure distribution. Between 1984 and 1989, the West German economy recovered from the recession of the early 1980s, leading to falling unemployment rates and slightly better job prospects for workers, as shown in Figure 5. In 1990, the year of re-unification, however, there was a pronounced boom, bringing West German capacities to their limits. This was primarily due to the increased demand for West German products in East Germany. This boom ended dramatically in 1993, followed by a recession from which the West German economy has been recovering very slowly ever since. Unemployment in West Germany has increased and growth rates are at relatively low levels. The business cycle does seem to have had some influence on the evolution of elapsed tenure, but it cannot account fully for the pattern observed. Figure 1 shows that median tenure was slightly higher in the recession of 1993-94 than in the following years. But

[8] In 1988, around 3000 male workers were in full-time employment and only around 60 in part-time or marginal employment.

comparing 1987 and 1997, two years with relatively similar GDP growth rates, we see that median tenure declined by nearly one year.

A related and alternative explanation for the decline in job tenure is the increasing number of employees in West Germany, as increasing numbers of new hires lead to a decline in elapsed tenure. If new hires were the reason for decreasing job stability, there would be nothing to worry about. As shown by Figure 5, new hires only accounted for the decline in median elapsed tenure in the last two years of our observation period. From 1993 to 1997, the number of employees declined.

Having ruled out these two possibilities, the effects of the "usual suspects" can be investigated, namely, structural change, "globalization" and technological progress leading to both increased layoffs and quits as new job opportunities arise. The result would again be reduced average tenure. Astonishingly little is known about these interdependencies, although the effects on wage differentials have been of some concern.[9] Moreover, few previous studies have focused on the reasons for increasing job instability. Booth et al. (1999) show that, over a period of some forty years, the likelihood of individuals exiting their jobs has increased in the UK, with layoffs increasing more than quits. Their findings clearly illustrate the increased job instability in the 1980s. For the US, Valetta (1999b) shows that male workers with substantial job tenure experienced a rising incidence of permanent layoffs between 1976 and 1992. Keeping this in mind, we now go on to explore the development of job duration in West Germany, the reasons for separation and the employment state after separation in more detail.

## 3 Do Jobs Tend to End Earlier and, if so, Why?

A good way to look at the development of job duration is to perform duration analysis. This type of analysis has several advantages. The basic building blocks of duration analysis are hazard rates, which indicate the rate at which a job will end at a specific point of time, given that it has lasted until that time. Changes in this rate can be interpreted as changes in the evolution of job stability. A second advantage of duration analysis is that it offers estimation approaches that are insensitive to

changes in the inflow rate. Remember that elapsed tenure is a retrospective measure, where the inflow rate is very influential.

Thirdly, duration models use information on the exact termination date of each job and control for the right censoring of spells (i.e. the fact that the jobs observed at a certain point in time will continue for an unknown time span). Furthermore, elapsed tenure is usually only considered on a yearly basis (as are retention rate estimates). The GSOEP, however, includes monthly information on job duration that can and should be exploited. Finally, our duration analysis in the tradition of Booth et al. (1999) and Gottschalk and Moffitt (1999) is multivariate, with all observations and influences being combined in a single estimation, adding to the clarity of the results. In more conventional multivariate analyses separate models are needed for workers with different elapsed tenures.[10]

Nevertheless, it is important to note that this shift in the type of analysis also entails a shift in perspective. We sample jobs rather than people. As most people tend to be in long-term jobs, but most jobs are short lived, the average duration of a job spell is rather short compared to the elapsed firm tenure (Topel and Ward 1992, Farber 1999). Indeed, we believe that it is important to test the influence of short jobs when addressing the question of changing job stability.

Many previous studies on job stability have neglected another important aspect – what happens to workers who leave a job? Do they become unemployed, employed, or do they even leave the labor force altogether (see also Neumark, 2000)? It would certainly be more alarming to find that job duration declines due to increased transitions to unemployment rather than to increased transitions to new jobs or training. Therefore, following our analysis of job duration until layoffs or quits, we perform an analysis of job duration until transition to unemployment or to a new job in another firm. An advantage of this analysis is that the employment calendar in the GSOEP provides us with data on the transition state for a large proportion of the

[9] See e.g. Katz and Murphy 1992; Levy and Murnane 1992; Krugman 1994; Leamer 1994, 1997.
[10] For Logit regressions on the probability of being in short or long jobs, see Mertens 1999.

short jobs. However, the downside is that we do not have job-specific information for a significant share of the short jobs.

*3.1 Empirical Modeling*

We chose the popular Semi-Parametric Proportional Cox Model as a basis for our estimation. The model works on the usual assumption of a proportional effect of covariates on the hazard rate $\theta(t)$.

(1) $$\theta(t \mid x) = \theta_0(t)\exp(x'\beta)$$

The major advantage of this model is that it leaves the form of the so-called 'baseline hazard' $\theta_0(t)$ unspecified. Thus, no special assumption concerning the duration dependence is necessary.

We extend this standard Cox Model in three ways to address our research question. First, the model is specified in an independent competing risk form to distinguish between the determinants that are responsible either for the different reasons of job termination or for the different transition states. In the independent competing risk specification, the hazard of dismissal is, for example, estimated by treating termination due to quitting or due to other reasons as censored, and vice versa.

Second, to capture time trends in the hazard of job termination, we incorporate covariates into the regression ($x_\tau^a$) which capture the influence of calendar time $(\tau)$ on the hazard rates (either dummies for each year of the 1984-1997 period or a time trend variable taking value 1 for 1984 to 14 for 1997).

Third, we remove the proportionality assumption for these calendar time variables and allow for different effects on the hazard rates, depending on how long the job had already lasted. In varying combinations, we distinguish job durations of up to one year, more than one year but less than or equal to 10 years, and more than 10 years. Furthermore, we try to take account of the changing economic conditions as

well as changing individual determinants over the length of a spell $x_\tau^b$ by allowing these covariates to vary on an annual basis.

We estimate exit-specific hazard rates of the Semi-Parametric Proportional Cox Model consisting of elements of the following equation:

$$(2) \qquad \theta_e(t \mid x) = \theta_{e0}(t) \exp(x_\tau^a \beta_e^a + I(t \leq 12) x_\tau^a \beta_e^{a1} + I(t > 120) x_\tau^a \beta_e^{a2} + x_\tau^b \beta_e^b)$$

where $\theta_{e0}(t)$ is the 'baseline' hazard for the respective termination state (e) and $x_\tau = (x_\tau^a, x_\tau^b)$ are the time-varying covariates. These hazard rates are estimated separately for each gender, as the employment behavior of men and women shows clear differences.

Note that our model can deal with left-truncated spells. This is necessary as part of our sample is a stock sample, meaning that our analysis includes job spells for which we know the start date and that they had not ended by the date on which the stock sample was drawn. Had these spells ended before this date, we would not have observed them. By far the largest part of our stock sample was drawn in January 1984. Starting with January 1984, we have data on the monthly employment status and job changes of interviewees who regularly took part in the GSOEP. We therefore observe the end (or the time of censoring) of all jobs started in 1984 and later. However, jobs started before 1984 are only included in our sample if they ended in 1984 or later. The rest of the stock sample is drawn from newcomers to the GSOEP.

It is crucial to use a stock sample approach in order to be able to analyze jobs that have already existed for a long time. If we used only a flow sample, we would only be able to analyze jobs lasting a maximum of 14 years. Furthermore, by adding the stock sample we are able to increase our sample size considerably. We are not aware of other studies in the area of job stability that have exploited these advantages of a stock sample. To incorporate the stock sample in our empirical analysis, we assume that there is no unobserved heterogeneity – a common assumption in the job stability

literature. If we rule out unobserved heterogeneity, the following relationship is valid and is taken into account in the likelihood contribution of the stock sample:

(3) $\theta_{r|p}(r \mid p, x, S) = \theta(r + p \mid x)$

with $p$ denoting the elapsed duration, $r$ the residual duration and $S$ presence in the stock.

*3.2 Multivariate Estimation Results*

Let us first consider whether the risk of a job spell ending has increased in recent years. As mentioned in the data section, we can only use data collected between 1984 and 1997, as a subsequent change in the wording of the job change questions made it impossible to create a consistent variable over time. We start with an analysis as comparable as possible to the analysis of elapsed tenure by ignoring the reason for separation. Therefore, we regress job duration on yearly dummies for job durations of up to 12 months and job durations of more than 12 months.[11] Our base category is the year 1986, which is the third year in a row with relatively stable growth rates (see Figures 6 and 7). For jobs lasting longer than 12 months, the results are consistent with the results of our preceding analysis on elapsed tenure. There are some indications of an increase the hazard of job termination for men, less so for women. In contrast to job durations of more than 12 months, we find a slightly declining hazard for jobs lasting up to 12 months, indicating that short jobs somewhat became longer, especially for men. It should be mentioned that here, and in the following step of our duration analysis, the results for women have to be interpreted very carefully, as due to identification problems, we cannot yet control for the change in the wording of the questionnaire since 1991.

With these results in mind, we now go on to look at whether there are any changes in the way a job ended. Using our spell data, we are able to address this question in a differentiated analysis. As outlined above, job-specific information is consistently available only for jobs lasting longer than 12 months. Moreover, these are the jobs

for which data on the reason for separation are most often available. Therefore, only jobs lasting longer than 12 months are included in the analysis of the reason for job termination. This approach is justified by the fact that short jobs are often substantially different in nature from jobs lasting longer than 12 months, consisting mainly of holiday jobs for students or short-term replacement jobs. This might also explain the diverging evolution over time of the hazard of job termination. Nevertheless, when analyzing jobs by destination state, we will again consider job durations of up to 12 months.

In order to get an idea of how job duration evolved until dismissal, quit or termination for other reasons, we first regress job duration until each of these three exit states on calendar time dummies. Figures 8, 9 and 10 present the estimation results. The coefficients on the yearly dummies vary strongly over time. Roughly speaking, the hazard of men being laid off declines until 1989, increases again until 1993, and then remains at a relatively high level compared to the 1984-1992 period (the year 1985 being an exception, with relatively high hazard rates). There is a similar pattern for women, but neither the decline up to the year 1989 nor the subsequent increase is as pronounced as for men. Indeed, women's hazard of being laid off in the mid-1980s is similar to that in the late 1990s, following the peak in 1993. Because the coefficients on the year dummies capture not only a potential secular trend, but also other calendar time effects, parts of the movement can logically be explained by business cycle effects. The direction of movement strongly coincides with the West German economic cycle (see Figure 5 and section 2.3).

Turning now to the hazard of quitting, we find exactly the opposite pattern to the hazard of being laid off. Compared to the year 1986, however, the coefficients are rarely significant and the trend is much less pronounced. The hazard of men leaving their job due to other reasons increased in the economic boom period of 1991, as compared to 1986, and remained at a relatively high level. For women, however, we see a strong increase in the hazard of job termination due to other reasons starting in

[11]For jobs of up to 12 months duration, we do *not* exclude spells with missing values for variables such as job status and industry affiliation, as the sample size would otherwise be too small.

1990. This can probably be partly explained by the introduction of maternity leave as an explicit response category in the questionnaire (see the data section above).

To examine whether the evolution of the hazard of job termination due to dismissal, quit or other reasons can be understood as a secular trend, we will now partly compress and partly expand our econometric model. Instead of the yearly dummies, we include a time trend variable, taking value 1 in 1984, 2 in 1985 and so forth, up to value 14 in 1997. We expand the model by controlling for the influence of the business cycle by including the average growth rate of real GDP at the current point in time and lagged by one year, as well as the average of the two- and three-year lagged growth rates. Additionally, we control for possible changes in the composition of the workforce by including determinants known to influence job duration (e.g. Mertens 1998) in the econometric model. Two different types of covariates can be distinguished. First, individual characteristics known to influence job duration such as age and kind of professional education. Second, job-specific variables such as part-time status (regular part-time and marginal employment), firm size and industry affiliation. Finally, we incorporate a dummy in the econometric model for women to account for the change in the wording of the questionnaire as of 1990.

The evolution of layoffs and quits over time is of particular interest. Therefore, let us first consider the coefficient on the time trend in Table 2. Despite controlling for the business cycle, as well as individual and job characteristics, we find a clear tendency towards an increase in the hazard of men being laid off. The coefficient is positive and significant. The hazard of men quitting, on the other hand, is not influenced by calendar time, but there is an increasing trend in the hazard of men leaving a job due to other reasons. For women, there is no significant trend in the hazard of being laid off, quitting or leaving due to other reasons.

Let us now consider the influence of the economic conditions on job duration. As expected, the state of the economy has a significant impact on job duration. In an economic slowdown, the risk of being given notice increases, whereas in an economic upturn, the odds of resigning increase. The hazard of men leaving due to

other reasons increases in times of positive economic development. These results again emphasize the importance of distinguishing between business cycle influences and secular trends in job duration. This fact was not taken into consideration by Gottschalk and Moffitt (1999), for example. Similar to our study, they included a linear trend term for the year of observation in their analysis, but they did not include measures of labor market tightness.

The results concerning the influence of age on job duration can be summarized as follows: Men aged 56 and older are more likely to be laid off. The younger workers are, the more likely they are to quit voluntarily. For men, the hazard of leaving due to other reasons initially decreases with age, but increases again among those aged 56 and older. For women, it increases for the age 26-35 group, then decreases, and increases again among those aged 56 and older. Education also plays only a limited role in determining job duration. Having a college degree increases the odds of men resigning, whereas women with a college degree are more likely to leave the job due to other reasons.

Working part-time increased the odds of both men and women quitting, and of men ending their job due to other reasons. For women, working part-time is associated with less risk of being laid off.

Firm size has the expected effect on job separation. The risk of being laid off is higher in small firms than in medium-sized or larger firms, and individuals employed in large firms are less likely to quit. As expected, industry affiliation also influences job duration. For example, working in the credit and insurance sector decreases the hazard of being laid off, and working in public administration reduces the hazard of women quitting. Finally, it should be mentioned that the hazard of women ending a job due to other reasons has increased significantly since 1990. This can be attributed to the introduction of maternity leave as a potential reason for job termination in the GSOEP questionnaire.

We will now continue to study potential reasons for the decline in job security. Naturally, one reason that suggests itself is a change in labor market regulations.

However, only a few small changes occurred during the observation period, and were introduced either at the beginning or at the end of this period (see Walwei 1998). Thus, they can hardly explain the trend observed. Since 1985, the regulations concerning fixed-term contracts have become slightly less restrictive, and a formal reason is no longer necessary to justify a contract of this type. Furthermore, since October 1996, the maximum length of fixed-term contracts has been increased from 18 to 24 months, and employment protection has been slightly weakened. The list of social criteria used to determine which employees should be dismissed last has been trimmed. Finally, firms with less than 11 employees no longer fall under the employment protection law. Before October 1996, the number of employees was 6. Finally, more account should now be taken of the firm's interests when applying employment protection law – a ruling which is difficult to implement.

The rise in flexible work arrangements such as part-time work has also been suggested as a possible explanation for the decline in job stability (see e.g. Levenson 2000). As we controlled for potential changes in the composition of part-time vs. full-time contracts in our reference model, the trend towards an increase in the hazard of men being laid off or ending a job due to other reasons cannot attributed to any change in the composition of hours worked. In order to identify any changes in the hazard of ending a part-time job, we interact the time trend with a part-time dummy in an extended model.[12]

Other reasons that have been proposed for a decline in job security include downsizing of firms (see e.g. Cappelli, 2000), skill-biased technological change (Givord and Maurin, 2003), and weakening bonds with the firm (Valetta 1999b). We will test the downsizing hypothesis by interacting the trend variable with firm size in order to test whether larger firms are mainly responsible for the increased incidence of layoffs. To test for skill-biased technological change, we will interact the skill level of the individual with the time trend. If skill-biased technological change is responsible for the trend in the hazard of job termination, we would expect low-skilled workers to be most strongly affected by the changes.

In addition, we examine whether long-tenured workers are at higher risk of being laid off by including a time trend variable only valid for individuals with more than 10 years of tenure. This constitutes another aspect of skill-biased technological change, which eliminates routine tasks where high-tenured workers are at a comparative advantage (Autor et al. 2003). If high-tenured workers are found to have not only an increasing hazard of being laid off, but also an increasing hazard of quitting, this might be understood as a general weakening of the bonds between the firms and their workers (Valetta 1999b).

The results of our extended model (see Table 3) show that men in part-time jobs do not face an increasing hazard of being laid off as compared to men in full-time jobs; rather, the hazard of being laid off from a part-time job declines over time.

Another important result of our extended model is that the increased risk of men being laid off is concentrated in large firms. This can be interpreted as some evidence for the hypothesis that the downsizing of large firms has lead to decreased job security.

We find no evidence for an increase in the risk of long-tenured employees being laid off. In fact, we see the opposite pattern, with long-tenured male employees experiencing a decline in the hazard of being laid off. This might be due to stricter court rulings concerning the dismissal of long-tenured employees (see Franz and Rüthers 1999). Likewise, there is no evidence that low-skilled employees experience an increase in the hazard of being laid off. As neither the hazard of quitting nor the hazard of being laid off rises for long-tenured employees, we find no evidence for a general weakening of the bonds between firms and their employees.

We now turn to the second aspect of job stability, namely, whether individuals are unemployed, employed, in training or out of the labor force after a job ends. Table 4 summarizes the estimation results when time trend variables are used to capture the evolution of the hazard of job termination with transition to unemployment,

[12] Another flexible work arrangement which might be responsible for the trends in the hazard rate is fixed-term contracts. Unfortunately, the GSOEP variable on limited term contracts has many

employment or non-participation. We use all job durations in this analysis because, in contrast to the reason for job termination, the transition state is available for nearly all jobs, irrespective of their length. The downside of this, however, is that we cannot control for job-specific characteristics, except for part-time status.[13] To capture potential diverging trends for jobs of different durations, we incorporate interaction terms for job durations of up to 12 months.

Let us first summarize the results for men. There is a significant increase over time in the hazard of entering unemployment for men in a job already lasting one year or longer. For men in short jobs, in contrast, the hazard of entering unemployment declines significantly over time, as a test of the joint significance of the time trend and the interaction term for short job durations revealed. With respect to transitions towards new jobs or non-participation, there are no significant changes in the hazard rates for men who had already been in a job for more than 12 months. For women, we do not detect any significant changes in the hazard of entering unemployment, but the hazard of changing jobs increased slightly and the hazard of entering nonparticipation increased significantly for women who had already been in a job for longer than 12 months. The fact that short jobs are substantially different in nature from jobs lasting longer than a year is again shown in the hazard of entering nonparticipation. This hazard declined significantly for both men and women for jobs of up to 12 months duration.

An important result of this analysis of transition states is the increasing hazard over time of entering unemployment for men in jobs of more than 12 months. A natural hypothesis is that this development coincides with the increase in the hazard of men being laid off. To investigate this, we now distinguish between layoffs leading to unemployment and layoffs leading to a new job or nonparticipation. Furthermore, we analyze transitions into unemployment initiated by quits or other reasons. The hazards of these three competing risks are again only estimated for job durations of

missings, meaning that a reliable analysis of limited term contracts is not possible in our context.

[13] The results for the hazard of transitions from jobs lasting more than 12 months to unemployment, a new job or non-participation persist when we analyze these jobs only and include further job-specific covariates. Extending the model concerning termination due to layoffs, quits and other reasons in the same way does not provide any additional insights into the reasons for the evolution of the hazard of entering one of the three transition states. Therefore, we only present this short version.

more than 12 months, as the reasons for job termination play a role here (see Table 5).

Astonishingly, we do not find such a close relationship between layoffs and transitions to unemployment. The results for men show a positive but insignificant coefficient on the trend variable. In contrast, there is a slight trend towards an increase in the hazard of men being laid off when the dismissal is followed by a new job or nonparticipation Furthermore, there is a slightly significant trend for transitions into unemployment initiated by quits or other reasons.

## 4 Conclusion

Our results provide some evidence to support the view that job stability in West Germany declined in the 1980s and 1990s. However, not all demographic groups in the labor market were equally affected. Using repeated cross-sections from the German Socioeconomic Panel (GSOEP), we show that male workers aged between 16 and 56 experienced a decrease in median elapsed tenure from 9.4 years in 1984 to 7.5 years in 1999. While women in countries like the US or the UK were able to accrue higher median tenure, there was no such an increase in Germany between 1984 and 1997.

These simple cross-sectional results are confirmed by our analysis of the hazard of job termination. Estimating a Cox Model with only calendar time dummies, we show that there are signs of an increase in the risk of job termination over the observation period for men who had already been in a job for 12 months.

Extending our analysis to a Competing Risks Model with respect to the reasons for job termination, and controlling for the business cycle as well as demographic and job characteristics, we are able to show that this increase was caused primarily by a rise in layoffs and terminations due to other reason.

When analyzing the hazards of becoming unemployed, entering a new job or non-participation, we find that men face an increasing risk of entering unemployment if they have already been in their job for more than one year. In addition, women face

an increasing hazard of non-participation if they have already been in a job for more than one year.

However, the increased risk of men being laid off does not coincide with an increased risk of men entering unemployment, as one might have expected. Instead, there are signs that the increased hazard of being laid off coincides with transitions to a new job or to non-participation. Similarly, the increased hazard of entering unemployment is related to transitions that are initiated by quits or other reasons.

The results of the duration analysis described thus far are only valid for jobs which have already lasted one year. The pattern of results for short jobs is substantially different, however. For job durations of up to one year, we find a decreasing hazard of job termination, especially for men, coinciding with a decreasing hazard of being laid off, becoming unemployed, and entering non-participation.

Where the reasons for the decline in job stability are concerned, some of the increased risk of job termination seems to be related to the downsizing of large firms, as the increased risk of men being laid off is concentrated in these firms. However, the hypothesis that skill-biased technological change (see Givord and Maurin 2004) or a general weakening of the bonds between firms and their workers are responsible for this development (see Valetta 1999b) cannot be confirmed for West Germany.

Considering our empirical results, it would certainly be exaggerated to claim that there has been a serious deterioration in job stability. Still, there is cause for concern. With men increasingly exposed to layoffs and increased transitions to unemployment, the willingness to accrue education and specific capital may be limited.

Moreover, although wage losses upon re-employment are not as large as in the United States for the majority of workers, prolonged unemployment may lead to severe income losses (Burda and Mertens 2000). Finally, it may be the case that increasing layoff risks affect 'outsiders' more severely, leading to stronger

dualization of the labor market. On the other hand, it could be argued that the decrease in job stability simply shows that the German economy is adjusting to the globalization and technological innovation process – especially considering that the increased risk of men being laid off is not accompanied by a similar significant increase in the risk of transitions to unemployment. The interpretation that the economy is becoming more flexible, with positive side-effects on macroeconomic development is, however, questionable in view of persistently high unemployment rates. Further studies are clearly needed to shed more light on the background to this development.

## References


**Acemoglu, Daron and Jörn-Steffen Pischke (1998).** Why do Firms Train? Theory and Evidence. *The Quarterly Journal of Economic,* 113 (1), 79-119.

**Autor, David, F. Levine and D. Murname (2003).** The Skill Content of Recent Technological Change: An Empirical Exploration. *Quarterly Journal of Economics.* 118(4), 1279-1334.

**Becker, Gary S. (1962).** Investment in Human Capital: A Theoretical Analysis. *Journal of Political Economy*. 70 (5), 9-49.

**Bergemann, Annette and Hilmar Schneider (1998).** Ist der deutsche Arbeitsmarkt beweglicher geworden? - Eine Analyse anhand der Unternehmenszugehörigkeits-dauer in Westdeutschland. *Wirtschaft und Wandel*. 1998 (11), 15-21.

**Booth, Alison L., Marco Francesconi and Carlos Garcia-Serrano (1999).** Job Tenure and Job Mobility in Britain. *Industrial and Labor Relations Review*. 53 (1), 43-70.

**Bundesanstalt für Arbeit (1988).** *Amtliche Nachrichten der Bundesanstalt für Arbeit, Arbeitsstatistik 1987.* Bundesanstalt für Arbeit, Nürnberg.

**Bundesanstalt für Arbeit (1992).** *Amtliche Nachrichten der Bundesanstalt für Arbeit, Arbeitsstatistik 1991.* Bundesanstalt für Arbeit, Nürnberg.

**Bundesanstalt für Arbeit (1996).** *Amtliche Nachrichten der Bundesanstalt für Arbeit, Arbeitsstatistik 1995.* Bundesanstalt für Arbeit, Nürnberg.

**Bundesanstalt für Arbeit (2000).** *Amtliche Nachrichten der Bundesanstalt für Arbeit, Arbeitsstatistik 1999.* Bundesanstalt für Arbeit, Nürnberg.

**Burda, Michael and Antje Mertens (2001).** Estimating Wage Losses of Displaced Workers in Germany. *Labour Economics*. 8, 15-41.

**Burdett, Kenneth (1978).** A Theory of Employee Job Search and Quit Rates. *American Economic Review*. 68 (1), 212-220.

**Burgess, Simon and Hedley Rees (1996).** Job Tenure in Britain 1975-1992. *The Economic Journal*. 106 (435), 334-344.

**Burgess, Simon and Hedley Rees (1997).** Transient Jobs and Lifetime Jobs: Dualism in the British Labour Market. *Oxford Bulletin of Economics and Statistics*. 59 (3), 309-328.

**Burgess, Simon and Hedley Rees (1998).** A Disaggregate Analysis of the Evolution of Job Tenure in Britain, 1975-1993. *British Journal of Industrial Relations*. 36 (4), 629-657.

**Cappelli, Peter (2000).** Examining the Incidence of Downsizing and Its Effect on Establishment Performance. In: David Neumark (ed.). *On the job: Is long-term employment a thing of the past?* New York: Russell Sage Foundation, 463-516.

**Diebold, Francis X., David Neumark and Daniel Polsky (1996).** Comment on Kenneth A. Swinnerton and Howard Wial, "Is Job Stability Declining in the U.S. Economy?". *Industrial and Labor Relations Review*. 49 (2), 348-352.

**Diebold, Francis X., David Neumark and Daniel Polsky (1997).** Job Stability in the United States. *Journal of Labor Economics*. 15 (2), 206-233.

**Dustmann, Christian, David Margolis, Costas Meghir and Stefan Bender (2002).** Worker displacement in France and Germany. In: Peter Kuhn (ed.): *Loosing Work: International Perspectives on Job Displacement,* Upjohn Institute, Kalamazoo, Michigan, 375-471.

**Fallick, Bruce C. (1996).** A review of the recent empirical literature on displaced workers. *Industrial and Labor Relations Review.* 50 (1), 5-16.

**Farber, Henry S. (1993).** The incidence and costs of job loss: 1982-91. *Brooking Papers: Microeconomics,* 73-132.

**Farber, Henry S. (1995).** *Are Lifetime Jobs Disappearing? Job Duration in the United States: 1973-1993*. National Bureau of Economic Research Working Paper No. 5014.

**Farber, Henry S. (1997).** The Changing Face of Job Loss in the United States, 1981-1995. *Brookings Papers: Microeconomics*, 55-142.

**Farber, Henry S. (1999).** Mobility and Stability: The Dynamics of Job Change in Labor Markets. In: Orley C.. Ashenfelter and David Card (eds.), *Handbook of Labor Economics* Volume 3B: North Holland, Amsterdam, 2439-2484.

**Franz, Wolfgang and Bernd Rüthers (1999).** Arbeitsrecht und Ökonomie. Mehr Beschäftigung durch eine Flexibilisierung des Arbeitsrechts. *Recht der Arbei.t* 53, 32-38.

**Givord, Pauline and Eric Maurin (2004).** Changes in Job Security and their Causes: An Empirical Analysis for France. *European Economic Review*. 48 (3), 595-617.

**Gottschalk, Peter and Robert Moffitt (1999).** Changes in Job Instability and Insecurity Using Monthly Survey Data. *Journal of Labor Economics.* 17 (4, part 2) S91-S120.

**Gregg, Paul and Jonathan Wadsworth (1995).** A Short History of Labour Turnover, Job Tenure, and Job Security, 1975-93. *Oxford Review of Economic Policy*. 11 (1), 73-90.

**Grotheer, Michael and Olaf Struck (2003).** Beschäftigungsstabilität: Entwicklung und Arbeitszufriedenheit. *Mitteilungen aus der Arbeitsmarkt- und Berufsforschung.* 3/2003, 300-328.

**Hall, Robert E. (1995).** Lost Jobs. *Brookings Papers on Economic Activity*. 1995 (1). 221-273.

**Hall, Robert E. and Edward P. Lazear (1984).** The Excess Sensitivity of Layoffs and Quits to Demand. *Journal of Labor Economics.* 2 (April), 233-257.

**Hamermesh, Daniel S. (1989).** What do we Know about Worker Displacement in the United States? *Industrial Relations*. 28 (1), 51-59.

**Hashimoto, Masanori (1981).** Firm-Specific Human Capital as a Shared Investment. *American Economic Review*, 71 (3), 475-482.

**Hoffmann E. and Walwei U. (1998).** Längerfristige Entwicklung von Erwebsformen in Westdeutschland. *IAB Kurzbericht* .2 (27.1.1998).

**International Labour Office (1996).** *World Employment 1996/97: National Policies in a Global Context*. ILO, Geneva.

**Jaeger, David A. and Ann Huff Stevens (1999).** Is Job Stability in the United States Falling? Reconciling Trends in the Current Population Survey and Panel Study of Income Dynamics. *Journal of Labor Economics*. 17 (4, part 2), S1-S28.

**Jovanovic, Boyan (1979a).** Job Matching and the Theory of Turnover. *Journal of Political Economy*. 87 (6), 1246-1260.

**Jovanovic, Boyan (1979b).** Firm-Specific Capital and Turnover. *Journal of Political Economy*. 87 (6), 1246-1260.

**Katz, Lawrence F. and Kevin M. Murphy (1992).** Changes in Relative Wages, 1963-1987: Supply and Demand Factors. *Quarterly Journal of Economics*. 107 (1), 35-78.

**Kletzer, Lori G. (1998).** Job Displacement. *Journal of Economic Perspectives*. 12 (1), 115-136.

**Krugman, Paul (1994).** Past and Prospective Causes of High Unemployment. In: *Reducing Unemployment – Current Issues and Policy Options*, Proceedings of a Symposium by the Federal Reserve Bank of Kansas, 68-81.

**Leamer, Edward E. (1994).** *Trade, Wages and Revolving-Doors Ideas*. Working Paper No. 4716, National Bureau of Economic Research, Cambridge.

**Leamer, Edward E. (1996).** In Search of Stolper-Samuelson Effects on U.S. Wages. In: Susan Collins (ed.), *Important, Export, and the American Worker*. Brookings, 141-214.

**Levenson, Alec R. (2000)**. Long-Run Trends in Part-time and Temporary Employment: Towards an Understanding. In: David Neumark (ed.). *On the job: Is long-term employment a thing of the past?* Russell Sage Foundation, New York, 335-397

**Levy, Frank and Richard J. Murnane (1992).** U.S. Earnings Levels and Earnings Inequality: A Review of Recent Trends and Proposed Explanations. *Journal of Economic Literature*. 30 (3), 1333-1381.

**Marcotte, Dave M. (1995).** Declining Job Stability: What We Know and What is Means. *Journal of Policy Analysis and Management*. 14 (4), 590-598.

**McLaughlin, Kenneth J. (1991).** A Theory of Quits and Layoffs with Efficient Turnover. *Journal of Political Economy*. 99 (1), 1-29.

**Mertens, Antje (1998).** *Labor Mobility and Wage Dynamics - An Empirical Study for Germany in Comparison with the United States*. Doctoral Dissertation Humboldt-University Berlin and Aachen: Shaker Verlag.

**Mertens, Antje (1999).** *Job Stability Trends and Labor Market (re-)Entry in West Germany 1984-1997*. Humboldt-University Berlin, Sonderforschungsbereich 373 Discussion Paper 60-1999.

**Mincer, Jacob (1962).** On-the-Job Training: Costs, Returns and Some Implications. *Journal of Political Economy*. 70 (5), S50-S79.

**Mincer, Jacob (1974).** *Schooling, Experience and Earnings*. New York: Columbia University Press for National Bureau of Economic Research.

**Mortensen, Dale T. (1970).** Job Search, the Duration of Unemployment, and the Phillips Curve. *American Economic Review*. 60, 847-862.

**Neumark, David (ed.) (2000).** On the job: Is long-term employment a thing of the past? Russell Sage Foundation, New York.

**Neumark, David, Daniel Polsky and Daniel Hansen (1999).** Has Job Stability Declined Yet? New Evidence from the 1990s. *Journal of Labor Economics,* 17 (4, part 2), S29-S64.

**OECD (1997**). *Employment Outlook 1997.* OECD, Paris.

**Oi, Walter Y. (1962).** Labor as a Quasi-Fixed Factor. *Journal of Political Economy.* 70 (5), S538-S555.

**Parsons, Donald O. (1972).** Specific Human Capital: An Application to Quit Rates and Layoff Rates, *Journal of Political Economy.* 80 (3), 1120-1143.

**Parsons, Donald O. (1986).** The Employment Relationship: Job Attachment, Work Effort, and the Nature of Contracts. In: Orley Ashenfelter and Richard Layard (eds.), *Handbook of Labor Economics*, Volume II, North and Holland, Amsterdam, 789-848.

**Schettkatt, Ronald (1996).** *The Flow Analysis of Labour Markets*. Routledge, London.

**Schmidt, Stefanie R. and Shirley Svorny (1998).** Recent Trends in Job Security and Stability. *Journal of Labor Research*. 19 (4), 647-668.

**SOEP Group (2001).** The German Socio-Economic-Panel (GSOEP) after more than 15 years – Overview. In: Elke Holst, Dean R. Lillard and Thomas A. DiPrete (eds.). Proceedings of the 2000 Fourth International Conference of German Socio-Economic Panle Study Users, *Vierteljahreshefte zur Wirtschaftsforschung*, 70 (1), p. 7-14.

**Spence, M. (1973).** Job Market Signaling. *Quarterly Journal of Economics*. 355-374.

**Stigler, George J. (1962).** Information in the Labor Market. *Journal of Political Economy*. 70 (5), S94-S105.

**Swinnerton, Kenneth .A. and Howard Wial (1995).** Is Job Stability Declining in the U.S. Economy?. *Industrial and Labor Relations Review*. 48 (2), 291-304.

**Swinnerton, Kenneth A. and Howard Wial (1996).** Is Job Stability Declining in the U.S. Economy?. Reply to Diebold, Neumark, and Polsky. *Industrial and Labor Relations Review*. 49 (2), 352-355.

**Topel Robert H. and Michael P. Ward (1992).** Job Mobility and the Careers of Young Men. *Quarterly Journal of Economics*.107 (2), 445-479.

**Valetta, Robert (1999a).** Recent Research on Job Stability and Security. *FRBSF Economic Letter*. Number 99-2.

**Valetta, Robert (1999b).** Declining Job Security. *Journal of Labor Economic.* 17 (4, part 2), S170-S197.

**Walwei, Ulrich (1998).** Bestimmungsfaktoren für den Wandel der Erwerbsformen. *IAB-Kurzbericht.* 3/28.1.1998.

**Winkelmann, Rainer and Klaus F. Zimmermann (1998).** Is Job Stability Declining in Germany? Evidence from Count Data Models. *Applied Economics*. 30, 1413-1420.

**Working Group "Volkswirtschaftliche Gesamtrechnung der Länder" (2004).** *Bruttoinlandprodukt in Preisen von 1995 und Rückrechnungsergebnisse.* http://www.vgrdl.de/Arbeitskreis_VGR

# Appendix

## Tables

**Table 1: Median Tenure in Years**

| | Men | | Women | |
|---|---|---|---|---|
| | Median tenure | N of observations | Median tenure | N of observations |
| 1984 | 9.4 | 1891 | 5.5 | 1305 |
| 1985 | 8.7 | 1726 | 5.5 | 1258 |
| 1986 | 8.5 | 1649 | 6 | 1189 |
| 1987 | 8.5 | 1629 | 6.1 | 1160 |
| 1988 | 8.5 | 1560 | 6 | 1140 |
| 1989 | 8.5 | 1540 | 6 | 1158 |
| 1990 | 7.8 | 1541 | 5.8 | 1172 |
| 1991 | 7.6 | 1548 | 5.7 | 1212 |
| 1992 | 7.8 | 1509 | 5.8 | 1184 |
| 1993 | 8 | 1486 | 5.8 | 1179 |
| 1994 | 8.5 | 1398 | 6.1 | 1141 |
| 1995 | 7.95 | 1372 | 6 | 1072 |
| 1996 | 7.7 | 1361 | 6.4 | 1083 |
| 1997 | 7.8 | 1318 | 5.5 | 1093 |
| 1998 | 7.6 | 1261 | 5.8 | 1057 |
| 1999 | 7.5 | 1277 | 5.4 | 1087 |

*Source:* Own calculations based on the GSOEP 1984-1999. Only German citizens living in West Germany (Sample A), aged 16-56, working full- or part-time. Excluding civil servants, apprentices, self-employed respondents, workers in agriculture, non-profit organizations and private households, and observations with missing values for age, sex, job status, industry affiliation or tenure.

**Table 2: Competing Risk Model of the Hazard of Job Termination with Respect to the Reasons for Termination of Jobs Lasting Longer than One Year - Reference Model**

| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| | Layoff | Quit | Other Reasons | Layoff | Quit | Other Reasons |
| Time Trend | **0.040*** (0.016) | **-0.009** (0.012) | **0.052**** (0.014) | **-0.049** (0.041) | **0.032** (0.025) | **-0.028** (0.030) |
| Average of Current and One-Year Lagged Growth Rate (State Level) | **-0.173**** (0.039) | **0.105**** (0.024) | **0.062*** (0.031) | **-0.146**** (0.040) | **0.102**** (0.027) | **0.029** (0.030) |
| Average of Two- and Three-Year Lagged Growth Rate (State Level) | **-0.021** (0.032) | **0.046*** (0.023) | **0.042** (0.027) | **0.051** (0.037) | **0.035** (0.025) | **-0.005** (0.027) |
| Age<br>Base Category: *16-25 Years* | | | | | | |
| *26-35 Years* | **-0.130** (0.216) | **-0.079** (0.128) | **-1.239**** (0.205) | **0.147** (0.215) | **-0.214** (0.132) | **0.339*** (0.158) |
| *36-45 Years* | **0.143** (0.238) | **-0.568**** (0.154) | **-1.469**** (0.284) | **0.176** (0.230) | **-0.428**** (0.154) | **-1.361**** (0.239) |
| *46-55 Years* | **0.178** (0.251) | **-1.314**** (0.230) | **-0.896**** (0.234) | **0.395** (0.253) | **-1.070**** (0.201) | **-1.553**** (0.264) |
| *56 and Older* | **0.580+** (0.297) | **-1.394**** (0.346) | **1.508**** (0.206) | **0.120** (0.427) | **-1.090**** (0.380) | **0.900**** (0.211) |
| Vocational Education<br>Base Category: *Vocational Training* | | | | | | |
| *No Vocational Training* | **0.270** (0.170) | **-0.138** (0.145) | **0.206** (0.146) | **0.316+** (0.163) | **-0.151** (0.123) | **0.142** (0.111) |
| *College Degree* | **-0.249** (0.234) | **0.422**** (0.116) | **-0.025** (0.160) | **-0.052** (0.362) | **0.231** (0.219) | **0.550**** (0.178) |
| Part-time or Marginal | **0.227** (0.455) | **0.520*** (0.244) | **1.239**** (0.268) | **-0.471**** (0.163) | **0.246*** (0.112) | **0.123** (0.108) |
| Firm Size<br>Base Category: *20-199 Employees* | | | | | | |
| *1-19 Employees* | **0.503**** (0.155) | **0.119** (0.107) | **0.055** (0.169) | **0.578**** (0.164) | **0.227+** (0.119) | **0.148** (0.143) |
| *>= 200 Employees* | **-0.437**** (0.153) | **-0.611**** (0.107) | **-0.018** (0.114) | **-0.528**** (0.186) | **-0.229*** (0.116) | **0.133** (0.115) |

Table 2 continues next page...

…Table 2 continued

| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| | Layoff | Quit | Other Reasons | Layoff | Quit | Other Reasons |
| …. | | | | | | |
| Industry Affiliation<br>Base Category: *Manufacturing* | | | | | | |
| *Energy* | **-1.871+**<br>(0.985) | **-0.987***<br>(0.471) | **-0.315**<br>(0.355) | | **0.295**<br>(0.634) | **-0.100**<br>(0.656) |
| *Mining* | **-0.537**<br>(0.980) | | **0.615***<br>(0.308) | | | |
| *Construction* | **0.219**<br>(0.171) | **0.262***<br>(0.127) | **0.178**<br>(0.154) | **0.451**<br>(0.332) | **-0.452**<br>(0.414) | **-0.121**<br>(0.399) |
| *Trade* | **-0.068**<br>(0.211) | **0.416****<br>(0.142) | **-0.369**<br>(0.231) | **-0.223**<br>(0.191) | **0.134**<br>(0.134) | **-0.371***<br>(0.150) |
| *Traffic and Communication* | **0.151**<br>(0.226) | **0.484****<br>(0.157) | **-0.049**<br>(0.208) | **-1.040+**<br>(0.600) | **0.077**<br>(0.264) | **-0.160**<br>(0.267) |
| *Credit and Insurance* | **-2.345***<br>(1.000) | **0.113**<br>(0.261) | **-0.361**<br>(0.307) | **-1.780****<br>(0.588) | **-0.195**<br>(0.220) | **-0.408+**<br>(0.212) |
| *Other Services* | **0.036**<br>(0.215) | **0.471****<br>(0.136) | **0.236**<br>(0.171) | **-0.416***<br>(0.175) | **0.088**<br>(0.124) | **-0.040**<br>(0.125) |
| *Government and Social Security* | **-0.377**<br>(0.314) | **-0.558***<br>(0.275) | **0.221**<br>(0.159) | **-2.140****<br>(0.586) | **-0.417+**<br>(0.220) | **-0.360***<br>(0.179) |
| Change of Questionnaire | | | | **0.412**<br>(0.329) | **-0.221**<br>(0.199) | **1.283****<br>(0.245) |
| No. of Spells<br>No. of Destination States | 2988<br>290 | 2988<br>543 | 2988<br>390 | 2415<br>216 | 2415<br>493 | 2415<br>426 |
| LR Chi2 | 147.54 | 212.76 | 688.77 | 109.53 | 95.11 | 381.78 |

*Note:* Robust standard errors with respect to individuals reported in brackets; * indicates significance at the 5% significance level, ** at the 1% significance level and + at the 10% significance level.
*Source:* Own calculations based on the GSOEP 1984-1998. Only German citizens living in West Germany (Sample A), aged 16-56 at the beginning of the job spell, working full- or part-time. Excluding civil servants, apprentices and self-employed respondents, workers in agriculture, non-profit organizations and private households, and observations with missing values on the reason for separation, age, sex, education, job status, industry or firm size. Data on GDP growth rates are taken from the Working Group "Volkswirtschaftliche Gesamtrechnung der Länder" (2004).

**Table 3**: **Competing Risk Model of the Hazard of Job Termination with Respect to the Reasons for Termination of Jobs Lasting Longer than One Year - Extended Model**

| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| | Layoff | Quit | Other Reasons | Layoff | Quit | Other Reasons |
| Time Trend | **0.054+** (0.030) | **-0.018** (0.021) | **0.088**** (0.033) | **0.002** (0.054) | **0.003** (0.032) | **-0.006** (0.040) |
| Time Trend*I(t>120) | **-0.066+** (0.034) | **0.018** (0.036) | **-0.045** (0.029) | **0.013** (0.041) | **0.014** (0.039) | **0.023** (0.029) |
| Time Trend*No Education | **-0.058** (0.040) | **-0.012** (0.034) | **-0.041** (0.038) | **-0.007** (0.037) | **0.083**** (0.030) | **-0.048** (0.032) |
| Time Trend*College | **-0.065** (0.045) | **0.015** (0.030) | **-0.052** (0.038) | **0.014** (0.078) | **0.025** (0.049) | **-0.046** (0.045) |
| Time Trend*Part-time | **-0.204*** (0.087) | **0.097** (0.074) | **-0.088** (0.054) | **-0.016** (0.038) | **0.050*** (0.024) | **-0.020** (0.030) |
| Time Trend*Small Firm | **0.020** (0.037) | **0.028** (0.030) | **0.005** (0.044) | **-0.079*** (0.040) | **-0.024** (0.027) | **0.006** (0.039) |
| Time Trend*Large Firm | **0.061+** (0.036) | **-0.016** (0.027) | **0.015** (0.031) | **-0.041** (0.049) | **-0.000** (0.030) | **-0.019** (0.030) |
| Further covariates included correspond to reference model, see Table 2. | | | | | | |
| No. of Spells<br>No. of Destination States | 2988<br>290 | 2988<br>543 | 2988<br>390 | 2415<br>216 | 2415<br>493 | 2415<br>426 |
| LR Chi2 | 153.83 | 216.94 | 691.77 | 117.40 | 107.16 | 392.68 |

For notes and sources, see Table 2.

**Table 4: Competing Risk Model of the Hazard of Job Termination with Respect to Transition States**

| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| | Unemp-loyment | New Job | Non-participa-tion | Unemp-loyment | New Job | Non-participa-tion |
| Time Trend | **0.047**** (0.014) | **0.007** (0.011) | **0.021** (0.015) | **-0.036** (0.028) | **0.043**+ (0.023) | **0.040*** (0.017) |
| Time Trend*I(t<=12) | **-0.079**** (0.017) | **0.003** (0.016) | **-0.053**** (0.017) | **-0.030** (0.021) | **0.008** (0.018) | **-0.121**** (0.014) |
| Average of Current and One-Year Lagged Growth Rate (State Level) | **-0.099**** (0.022) | **0.064**** (0.020) | **0.026** (0.018) | **-0.099**** (0.028) | **0.083**** (0.025) | **-0.003** (0.017) |
| Average of Two- and Three-Year Lagged Growth Rate (State Level) | **-0.035**+ (0.018) | **0.017** (0.018) | **0.067**** (0.018) | **0.029** (0.026) | **0.050*** (0.022) | **0.000** (0.015) |
| Age<br>Base Category: *16-25 Years* | | | | | | |
| *26-35 Years* | **-0.118** (0.114) | **0.022** (0.089) | **-0.863**** (0.095) | **-0.117** (0.122) | **-0.199**+ (0.104) | **-0.144**+ (0.079) |
| *36-45 Years* | **0.149** (0.128) | **-0.187**+ (0.110) | **-1.460**** (0.166) | **-0.343*** (0.152) | **-0.306*** (0.126) | **-0.583**** (0.108) |
| *46-55 Years* | **0.550**** (0.139) | **-0.813**** (0.161) | **-1.058**** (0.174) | **-0.077** (0.180) | **-0.798**** (0.175) | **-0.767**** (0.137) |
| *56 and Older* | **1.415**** (0.180) | **-1.369**** (0.366) | **1.729**** (0.154) | **0.049** (0.298) | **-1.588*** (0.666) | **0.676**** (0.147) |
| Vocational Education<br>Base Category: *Vocational Training* | | | | | | |
| *No Vocational Training* | **0.449**** (0.106) | **-0.228*** (0.115) | **0.639**** (0.089) | **0.157** (0.111) | **-0.042** (0.098) | **0.442**** (0.068) |
| *College Degree* | **-0.633**** (0.211) | **0.182**+ (0.093) | **-0.236** (0.150) | **0.110** (0.223) | **0.452**** (0.149) | **0.606**** (0.148) |
| Part-time or Marginal | **-0.284** (0.208) | **0.665**** (0.147) | **1.470**** (0.092) | **-0.398**** (0.111) | **-0.141** (0.100) | **0.846**** (0.066) |
| Change of Questionnaire | | | | **0.235** (0.192) | **-0.275** (0.178) | **0.335**** (0.117) |
| No. of Spells<br>No. of Destination States | 5266<br>996 | 5266<br>996 | 5266<br>1179 | 4582<br>628 | 4582<br>751 | 4582<br>1593 |
| LR Chi2 | 177.76 | 87.13 | 1451.70 | 52.97 | 70.62 | 521.98 |

*Note:* Robust standard errors with respect to individuals reported in brackets; * indicates significance at the 5% significance level, ** at the 1% significance level and + at the 10% significance level.

*Source:* Own calculations based on the GSOEP 1984-1998. Only German citizens living in West Germany (Sample A), aged 16-56 at the beginning of the job spell, working full- or part-time. Excluding civil servants, apprentices and self-employed respondents, workers in agriculture, non-profit organizations and private households, and observations with missing values for age, sex, or education. For jobs lasting more than 12 months, observations are also excluded if reasons for job separation, job status, industry or firm size are missing. Data on GDP growth rates are taken from the Working Group "Volkswirtschaftliche Gesamtrechnung der Länder" (2004).

**Table 5: Competing Risk Model of the Hazard of Job Termination with Combinations of Reasons for Job Separation and Transition States**
**Panel A – Men**

| | Men | | |
|---|---|---|---|
| | Layoff + Unemployment | Layoff + (New Job or Non-participation) | (Quit or Other Reason) + Unemployment |
| Time Trend | **0.029**<br>(0.020) | **0.054+**<br>(0.028) | **0.042+**<br>(0.023) |
| Average of Current and One-Year Lagged Growth Rate (State Level) | **-0.254****<br>(0.048) | **-0.042**<br>(0.066) | **-0.040**<br>(0.047) |
| Average of Two- and Three-Year Lagged Growth Rate (State Level) | **-0.025**<br>(0.042) | **-0.023**<br>(0.049) | **-0.021**<br>(0.039) |
| Age<br>Base Category: *16-25 Years* | | | |
| *26-35 Years* | **-0.370**<br>(0.263) | **0.330**<br>(0.395) | **-0.361**<br>(0.299) |
| *36-45 Years* | **-0.124**<br>(0.299) | **0.585**<br>(0.418) | **-0.266**<br>(0.340) |
| *46-55 Years* | **0.228**<br>(0.291) | **0.077**<br>(0.459) | **-0.170**<br>(0.334) |
| *56 and Older* | **0.771***<br>(0.333) | **-0.197**<br>(0.674) | **1.356****<br>(0.324) |
| Vocational Education<br>Base Category: *Vocational Training* | | | |
| *No Vocational Training* | **0.541****<br>(0.187) | **-0.411**<br>(0.366) | **0.551***<br>(0.222) |
| *College Degree* | **-0.596+**<br>(0.326) | **0.076**<br>(0.322) | **-0.127**<br>(0.267) |
| Part-time or Marginal | **-1.278**<br>(1.023) | **1.425****<br>(0.541) | **0.813**<br>(0.506) |
| Firm Size<br>Base Category: *20-199 Employees* | | | |
| *1-19 Employees* | **0.574****<br>(0.190) | **0.389**<br>(0.257) | **0.447+**<br>(0.240) |
| *>= 200 Employees* | **-0.462***<br>(0.195) | **-0.525***<br>(0.248) | **-0.166**<br>(0.209) |
| …Industry Affiliation as in Reference Model, see Table 2 | | | |
| No. of Spells<br>No. of Destination States | 2988<br>186 | 2988<br>104 | 2988<br>150 |
| LR Chi2 | 192.38 | 50.63 | 125.22 |

For notes and sources. see Table 2.

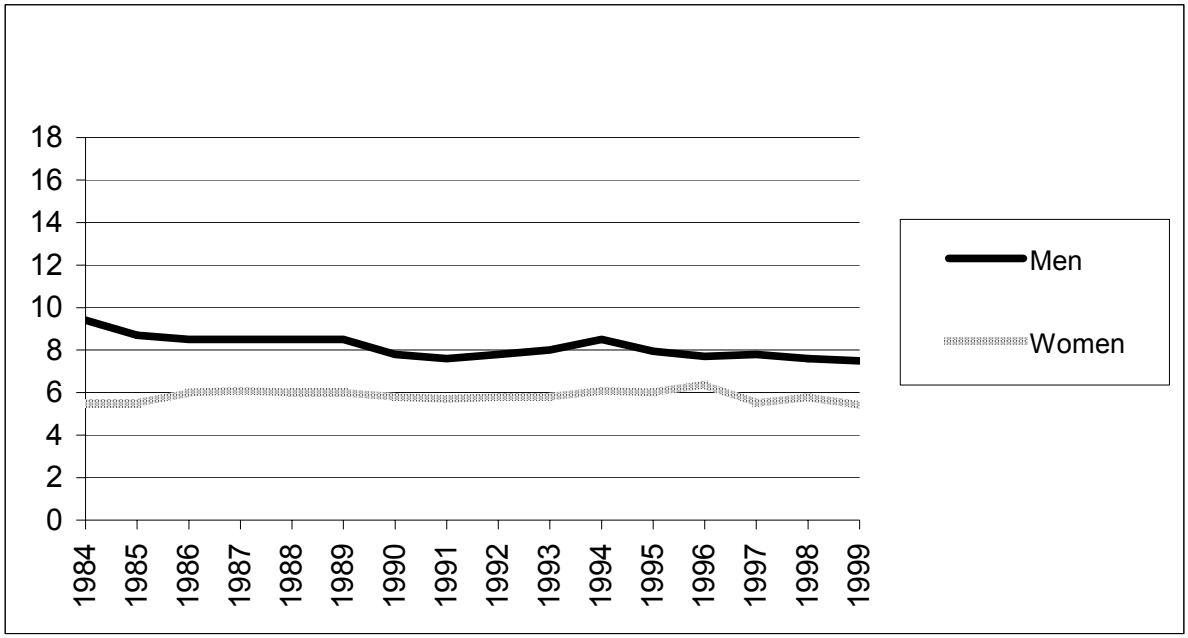
**Panel B – Women**

| | (4) | (5) | (6) |
|---|---|---|---|
| | Layoff + Unemployment | Layoff + (New Job or Non-participation) | (Quit or Other Reason) + Unemployment |
| Time Trend | **-0.086**<br>(0.054) | **0.019**<br>(0.064) | **0.049**<br>(0.047) |
| Average of Current and One-Year Lagged Growth Rate (State Level) | **-0.188****<br>(0.049) | **-0.080**<br>(0.063) | **0.043**<br>(0.053) |
| Average of Two- and Three-Year Lagged Growth Rate (State Level) | **0.037**<br>(0.048) | **0.084**<br>(0.059) | **0.032**<br>(0.049) |
| Age<br>Base Category: *16-25 Years* | | | |
| *26-35 Years* | **0.678***<br>(0.309) | **-0.411**<br>(0.313) | **-0.103**<br>(0.275) |
| *36-45 Years* | **0.831***<br>(0.330) | **-0.606+**<br>(0.334) | **-0.475**<br>(0.337) |
| *46-55 Years* | **0.959****<br>(0.356) | **-0.213**<br>(0.369) | **-0.183**<br>(0.363) |
| *56 and Older* | **0.607**<br>(0.530) | **-0.319**<br>(0.746) | **0.710**<br>(0.445) |
| Vocational Education<br>Base Category: *Vocational Training* | | | |
| *No Vocational Training* | **0.255**<br>(0.205) | **0.387**<br>(0.265) | **-0.184**<br>(0.246) |
| *College Degree* | **-0.219**<br>(0.483) | **0.215**<br>(0.522) | **0.463**<br>(0.383) |
| Part-time or Marginal | **-0.678****<br>(0.209) | **-0.135**<br>(0.251) | **-0.053**<br>(0.247) |
| Firm Size<br>Base Category: *20-199 Employees* | | | |
| *1-19 Employees* | **0.694****<br>(0.217) | **0.412+**<br>(0.250) | **0.567***<br>(0.262) |
| *>= 200 Employees* | **-0.473***<br>(0.240) | **-0.606***<br>(0.301) | **0.212**<br>(0.236) |
| …Industry Affiliation as in Reference Model, see Table 2 | | | |
| Change of Questionnaire | **0.512**<br>(0.409) | **0.186**<br>(0.558) | **-0.318**<br>(0.363) |
| No. of Spells<br>No. of Destination States | 2415<br>129 | 2415<br>87 | 2415<br>120 |
| LR Chi2 | 94.41 | 48.10 | 22.51 |

For notes and sources, see Table 2.

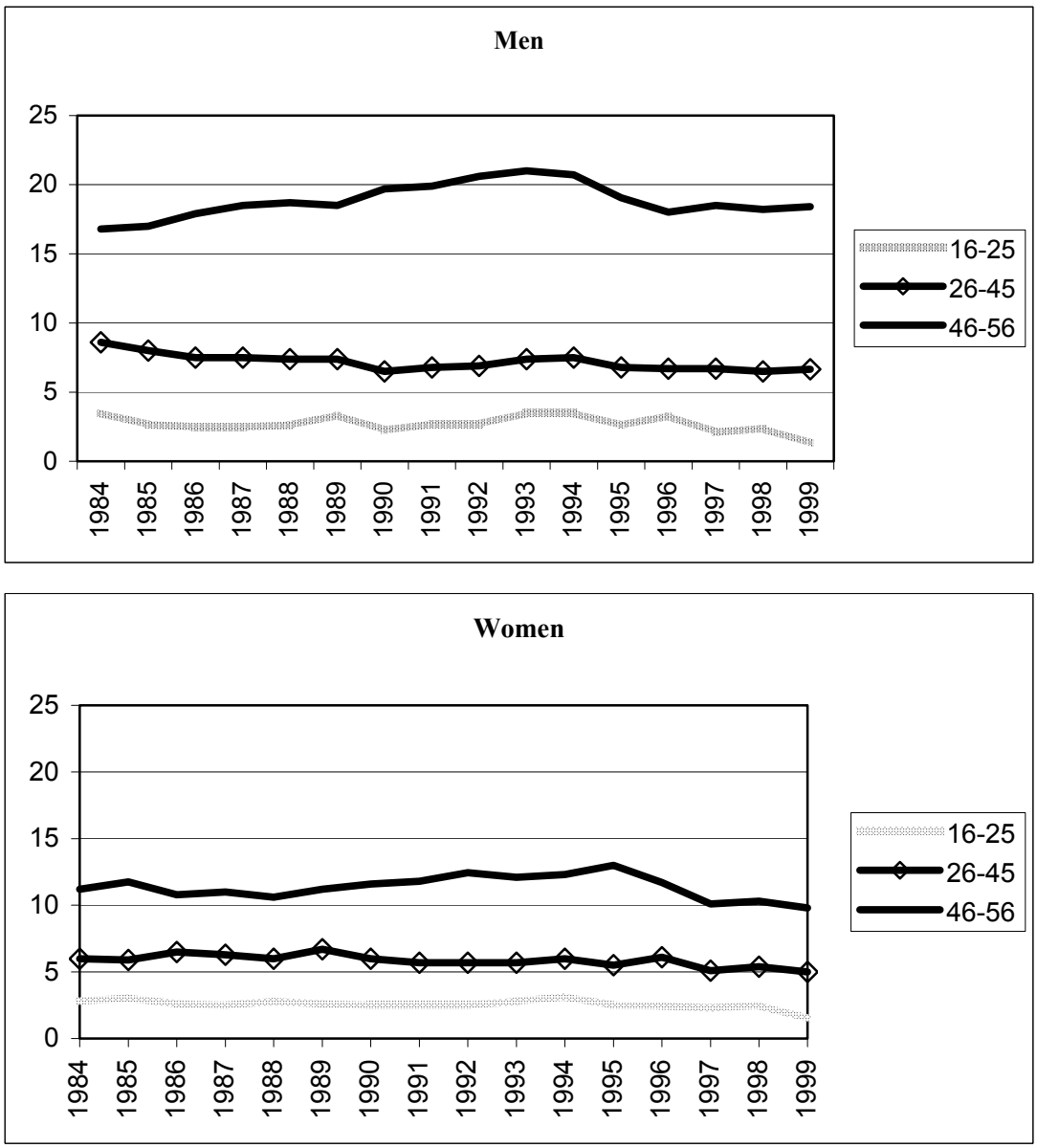
## Figures

**Figure 1: Evolution of Median Elapsed Tenure by Gender (in Years)**



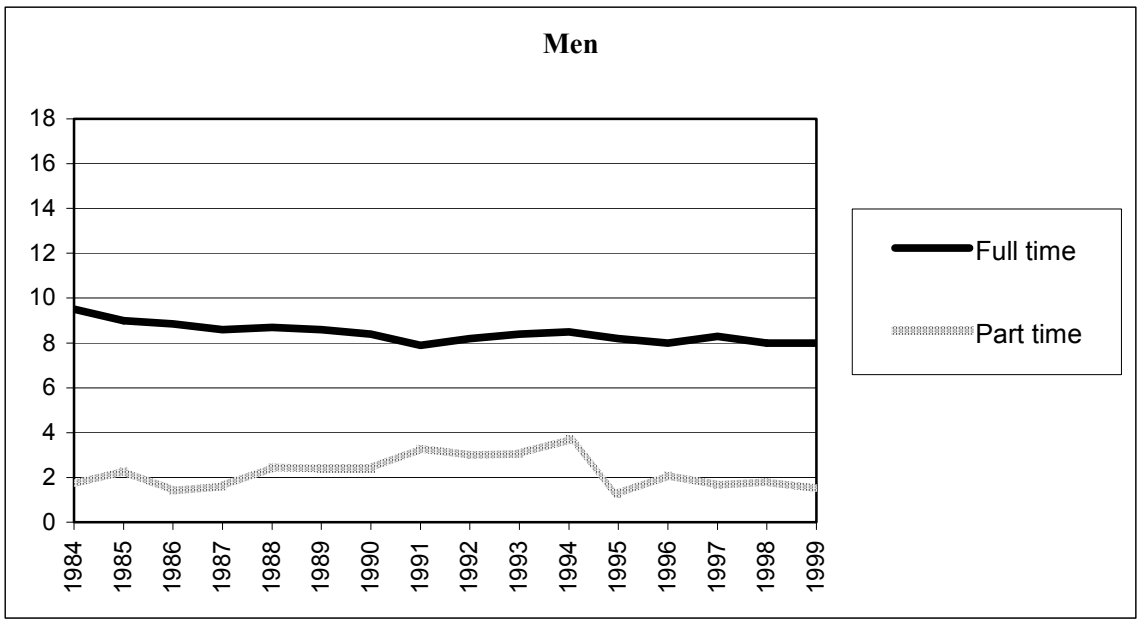

*Source:* Own calculations based on the GSOEP 1984-1999. Only German citizens living in West Germany (Sample A), aged 16-56, working full- or part-time. Excluding civil servants, apprentices and self-employed respondents, workers in agriculture, non-profit organizations and private households, and observations with missing values for age, sex, job status, industry affiliation or tenure.

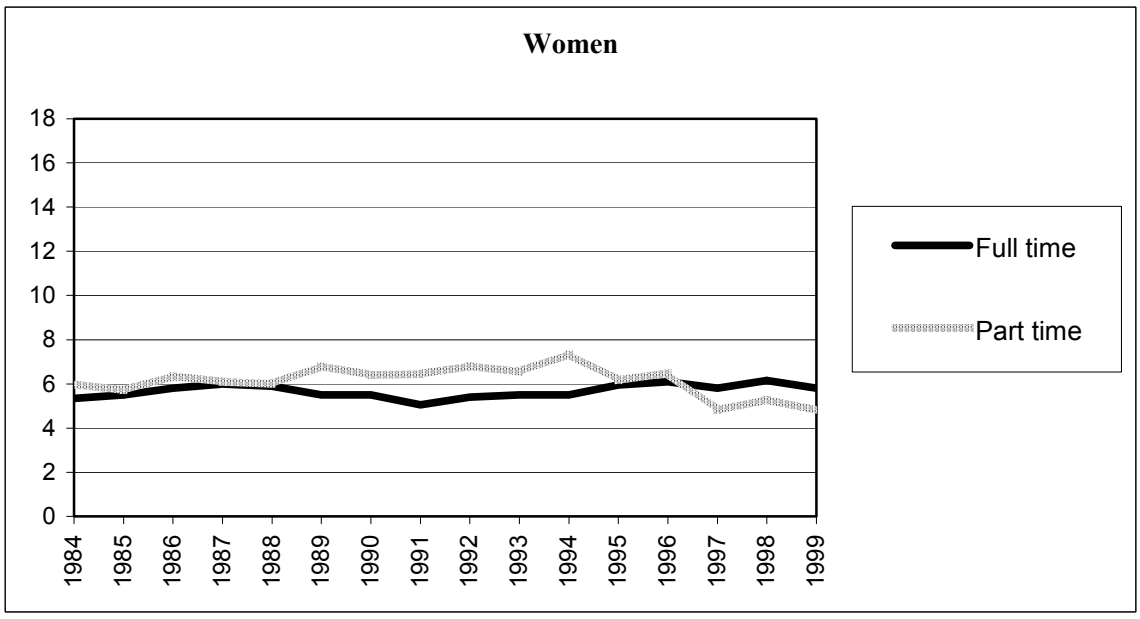
**Figure 2: Evolution of Median Elapsed Tenure by Age (in Years)**




*Source:* Own calculations based on the GSOEP 1984-1999. For sample selection, see note to Figure 1.

**Figure 3: Evolution of Median Elapsed Tenure by Hours Worked (in Years)**

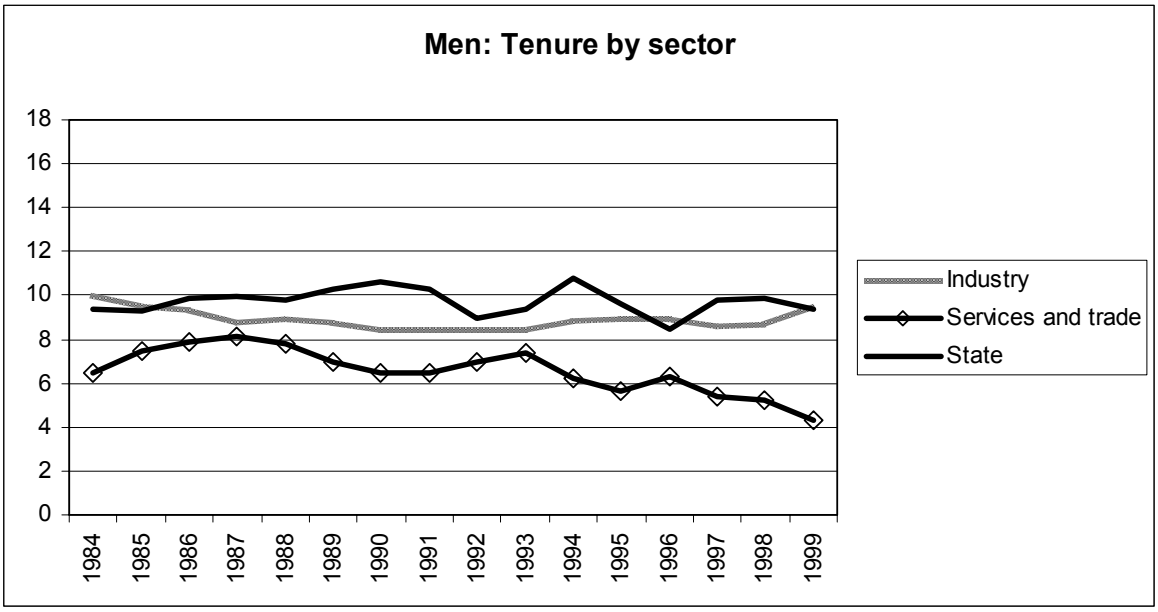


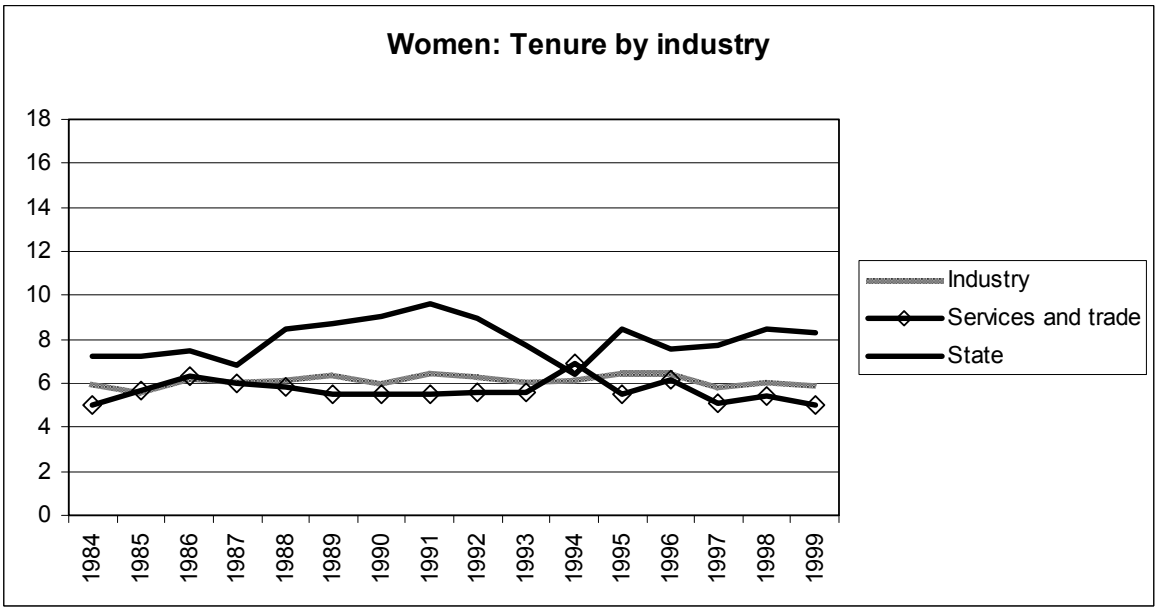

*Source:* Own calculations based on the GSOEP 1984-1999. For sample selection, see note to Figure 1.

**Figure 4: The Evolution of Median Elapsed Tenure by Industry**

**Panel A – Men**

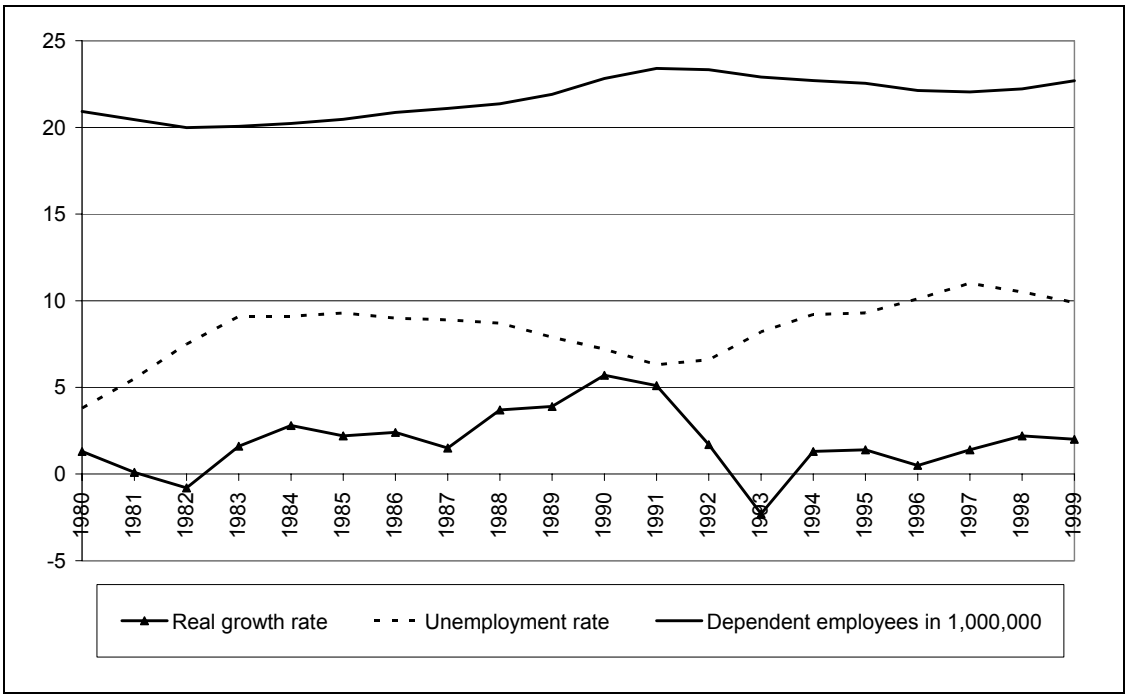



**Panel B – Women**



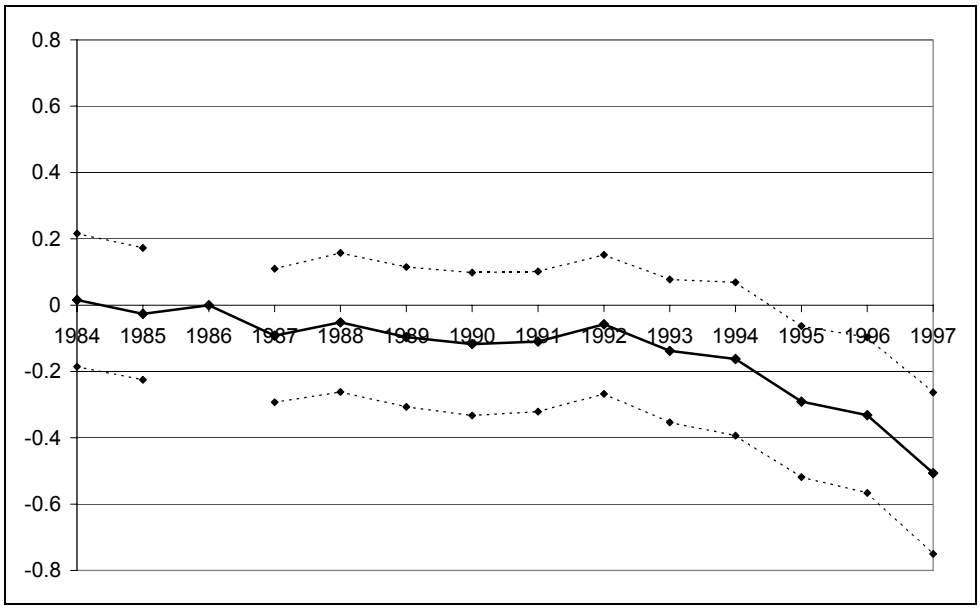

*Source:* Own calculations based on the GSOEP 1984-1999. For sample selections see note to Figure 1.

**Figure 5: Unemployment and the Business Cycle in West Germany**

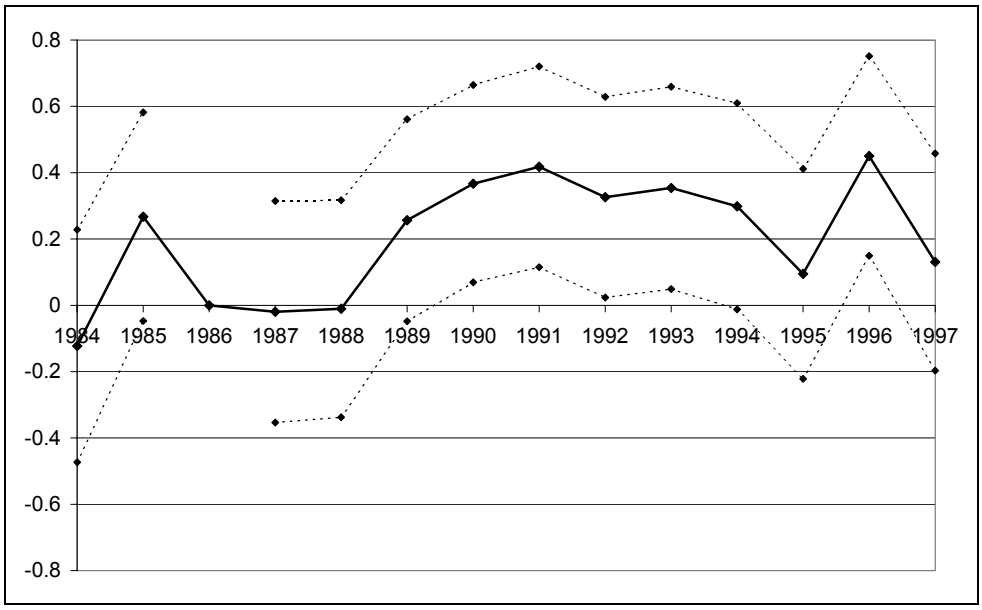



*Source:* Bundesanstalt für Arbeit (1988, 1992, 1996, 2000) and Working Group "Volkswirtschaftliche Gesamtrechnung der Länder" (2004).

**Figure 6: Estimated Coefficients for the Evolution of the Hazard of Job Termination**
**– Men**
Panel A - Job duration ≤ 12 months



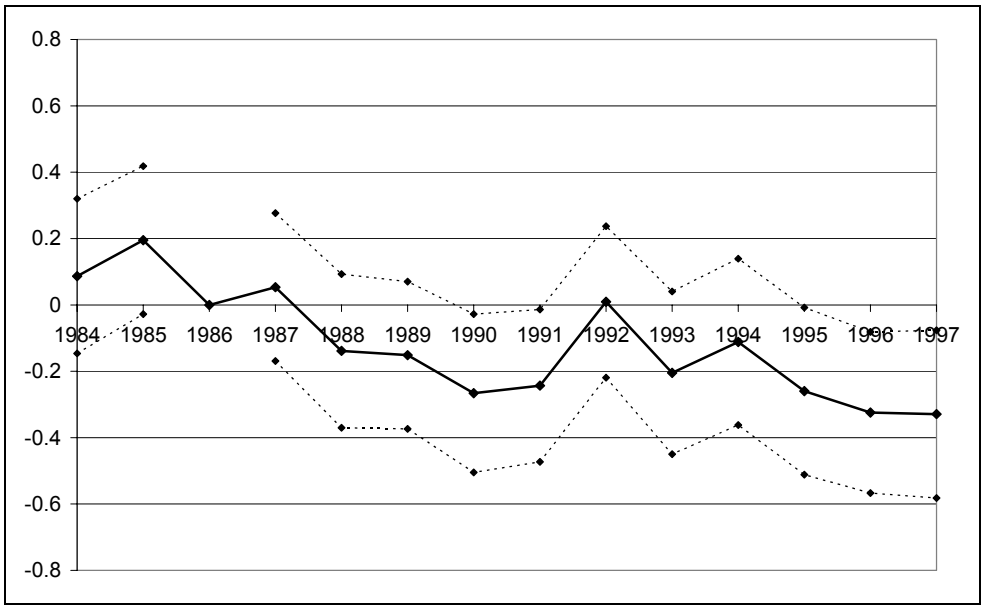

Panel B - Job duration > 12 months



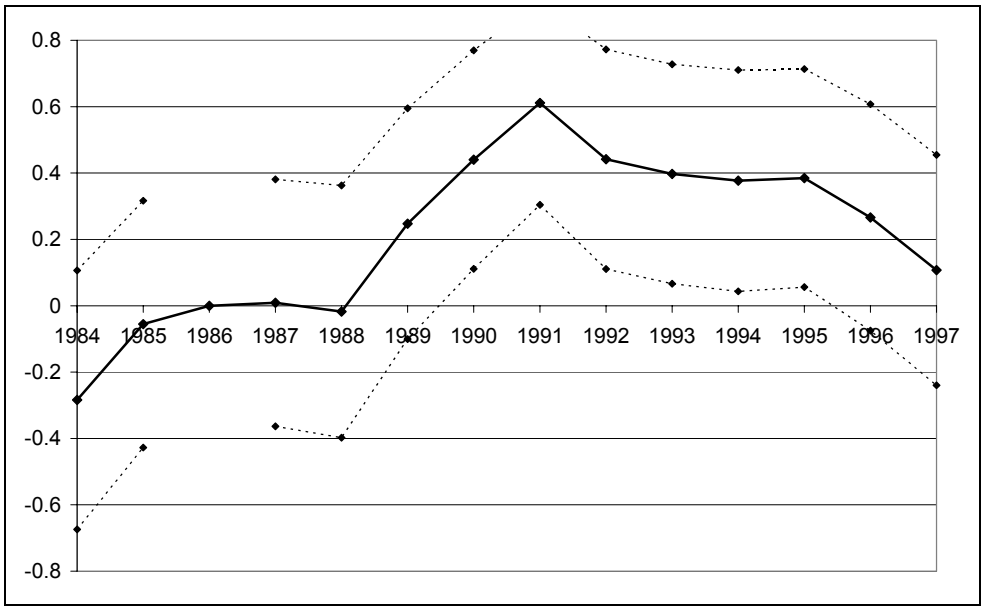

*Note:* Results are based on a duration models. The estimated coefficients on calendar time dummies are depicted. See text for details. Dotted lines represent 95% confidence intervals.
*Source:* Own calculations based on the GSOEP 1984-1998. Only German citizens living in West Germany (Sample A), aged 16-56 at the beginning of the job spell, working full- or part-time. Excluding civil servants, apprentices and self-employed respondents, workers in agriculture, non-profit organizations and private households, and observations with missing values for age, sex or education. For job spells longer than 12 months, observations with missing values on the reason for separation, job status, industry or firm size are also excluded. .

**Figure 7: Estimated Coefficients for the Evolution of the Hazard of Job Termination**
**- Women**

Panel A - Job duration ≤ 12 months




Panel B - Job duration > 12 months

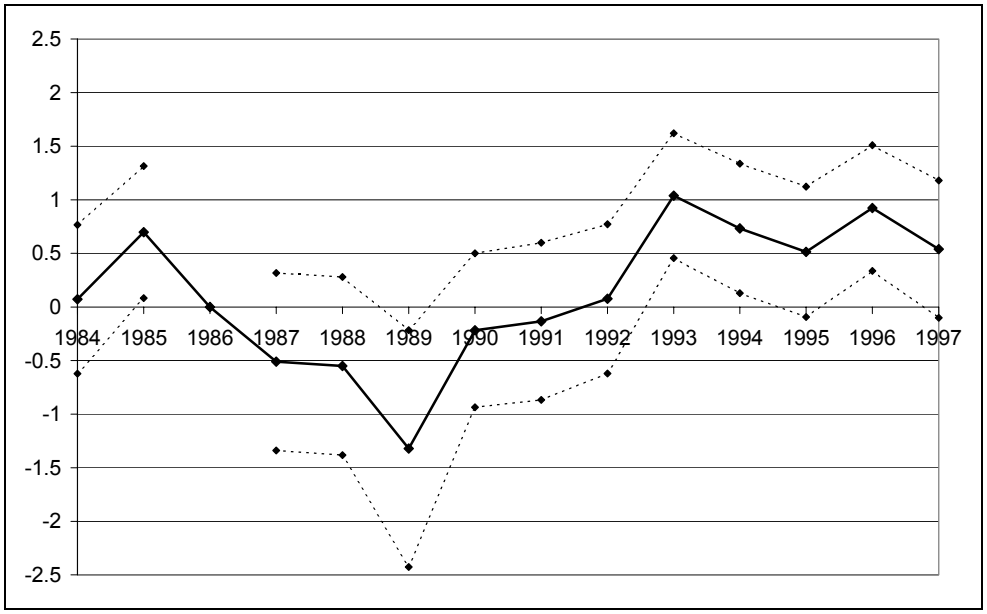



*Note:* Results are based on a duration models. See text for details. Dotted lines represent 95% confidence intervals.
*Source*: Own calculations based on the GSOEP 1984-1998. For sample selection, see note to Figure 6.

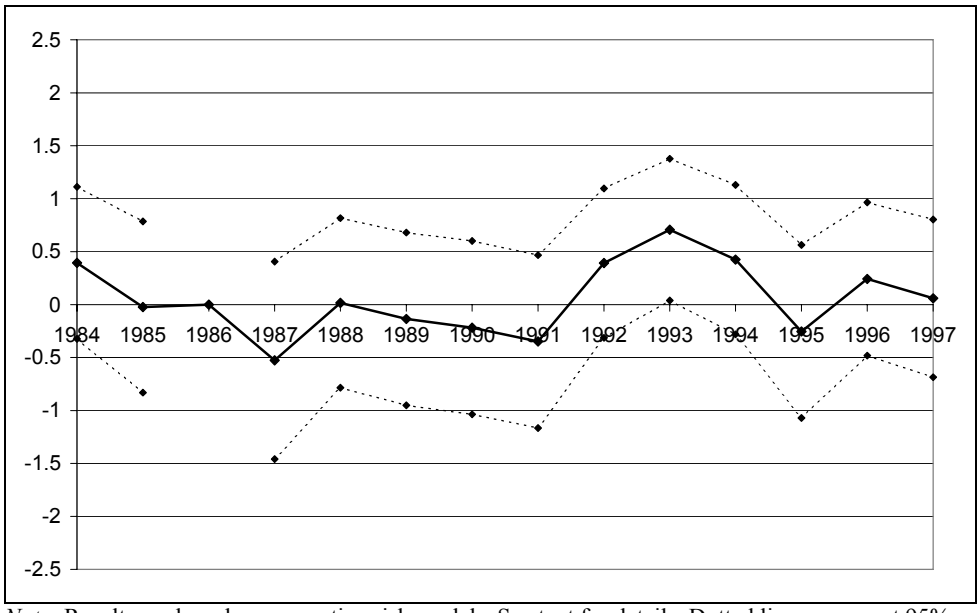
**Figure 8: Estimated Coefficients for the Evolution of the Hazard of Job Termination - Competing Risk Model**

**- Hazard of being Laid off**

Panel A – Men




Panel B – Women



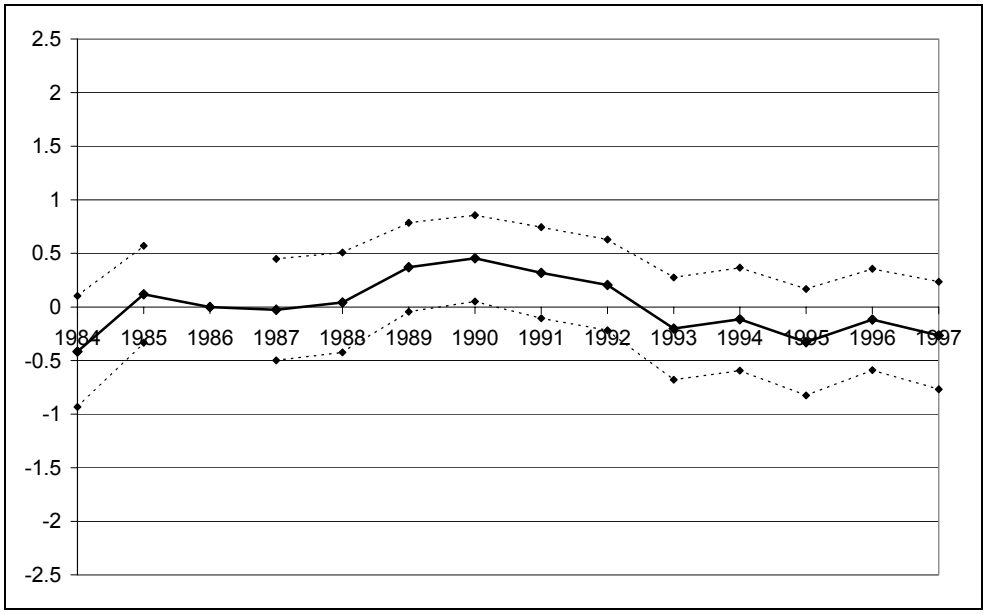

*Note:* Results are based on competing risk models. See text for details. Dotted lines represent 95%confidence intervals.

*Source:* Own calculations based on the GSOEP 1984-1998. For sample selection, see note to Figure 6.

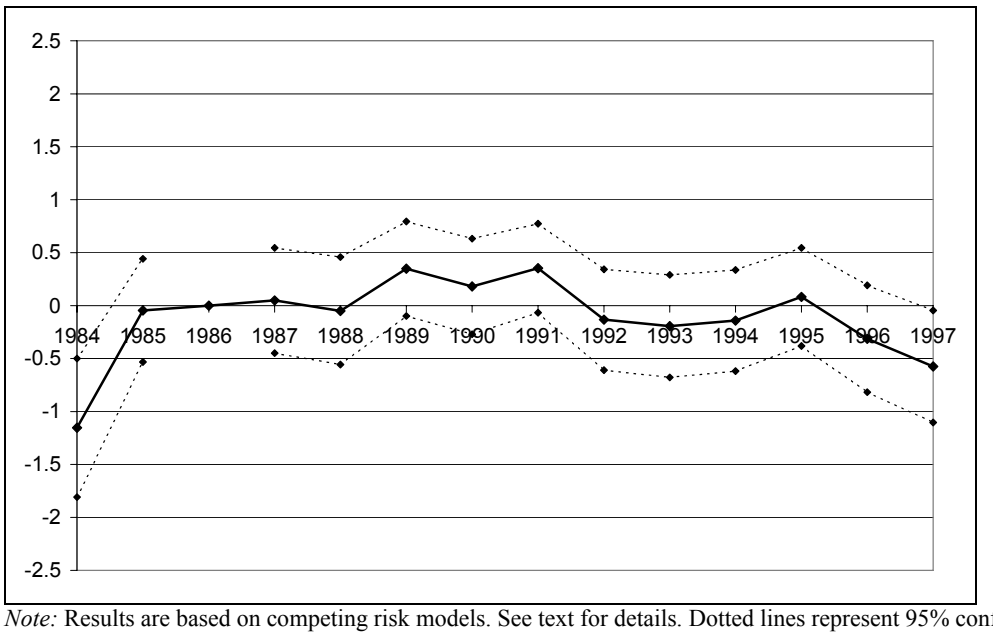
**Figure 9: Estimated Coefficients for the Evolution of the Hazard of Job Termination - Competing Risk Model**

**- Hazard of Quitting**

Panel A - Men




Panel B - Women

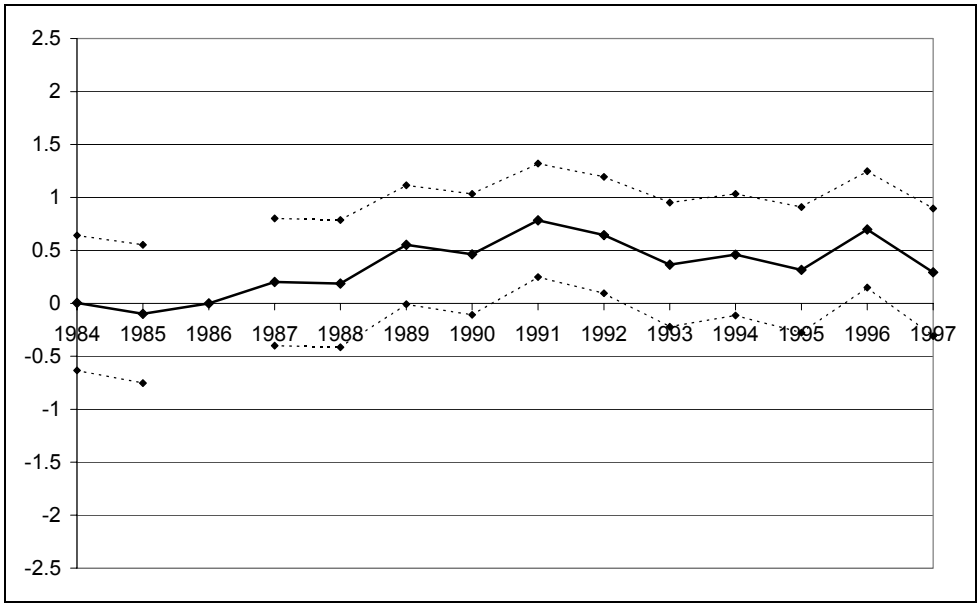



*Note:* Results are based on competing risk models. See text for details. Dotted lines represent 95% confidence intervals.
*Source:* Own calculations based on the GSOEP 1984-1998. For sample selection, see note to Figure 6.

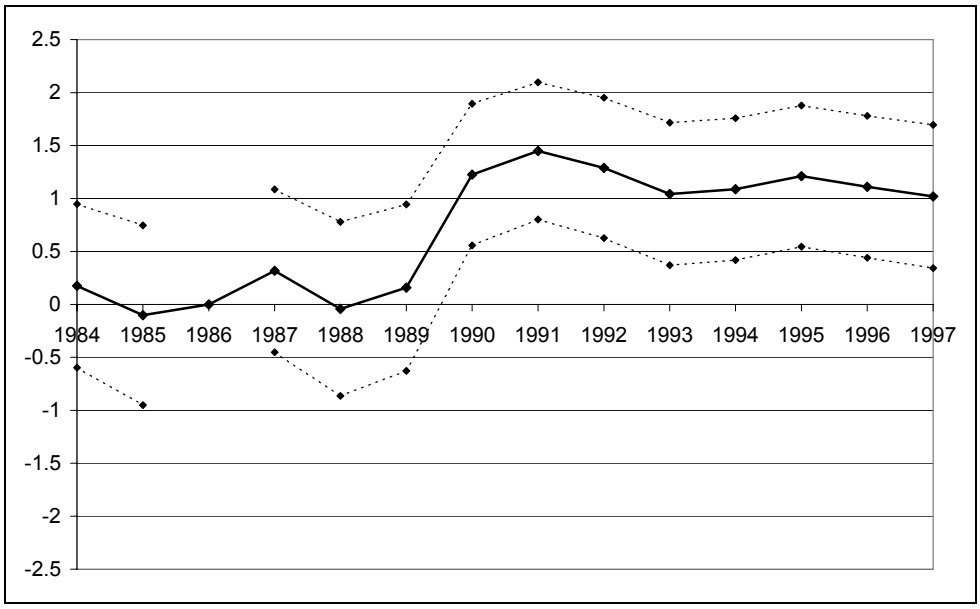
**Figure 10: Estimated Coefficients for the Evolution of the Hazard of Job Termination - Competing Risk Model**

**- Hazard of Leaving Due to Other Reasons**

Panel A - Men




Panel B - Women




*Note:* Results are based on competing risk models. See text for details. Dotted lines represent 95% confidence intervals.
*Source:* Own calculations based on the GSOEP 1984-1998. For sample selection, see note to Figure 6.

## Appendix II

## The Job Stability Data Set from the GSOEP

The data were extracted using the CD-Rom Version 2000 and SAS V8.

**Steps**

1. Extraction of Cross-Sectional Data
2. Calendar Information
3. Creation of Change Variables
4. Splitting Spells
5. Adding Cross-Sectional Information to the Calendar Information
6. Reasons for Job Termination
7. Combining Spells with Adjacent Spells
8. Left-Censored Spells
9. Additional Data Sources
10. Selection

### 1. Extraction of Cross-Sectional Data

The cross-sectional information is extracted and pooled into one data set where variables are named according to the wave of origin, i.e. branch85, branch86, etc.

### 2. Calendar Information

The calendar information is rather simple and includes only a few important variables: persnr, spelltype, begin, end, censor. Spelltyp can take the following values:

1=full-time
2=short work hours
3=part-time
4=vocational training
5=unemployed
6=retired
7=maternity leave (only since 1990)
8=school, college
9=military
10=housewife, husband
11=second job
12=other

These form the basis for our analysis. However, there are several steps necessary to transform calendar information into job-spell information. First, we create a new variable "typnew" as follows, to distinguish major labor market groups:

```
typnew=.;
  IF (spelltyp=1 or spelltyp=2)        THEN typnew=1;     /* Full-time */
  IF (spelltyp=4 or spelltyp=8)        THEN typnew=2;     /* School, training*/
  IF spelltyp=5                        THEN typnew=3;     /* Unemployment */
  IF spelltyp=3                        THEN typnew=4;     /* Part-time */
  IF (spelltyp=6 or spelltyp=7 or spelltyp=9 or
    spelltyp=10 or spelltyp=11 or spelltyp=12 )
                                       THEN typnew=5;     /*Non-participation */
  IF spelltyp=99                       THEN typnew=99;    /*missing*/
```

Parallel spells might be problematic in the following analysis. Take, for example, a worker with a full-time job, who reports a parallel spell at school or in a part-time job. For our job change analysis we are primarily interested in the main occupation. Therefore we eliminate parallel spells using the following procedure:

i) Within spelltypes "typnew" parallel spells are eliminated by shortening the first spell.
ii) Between spelltypes "typnew" the following hierarchy is used: full-time work, school/training, unemployment, part-time work, non-participation.

**3. Creation of Change Variables**

The cross-sectional and calendar information is then combined into a single data set. First of all, two switch variables are created from the information on changes in the current year (e.g. in the 1989 interview for switches since January 1989) and from the information on switches in the previous year (e.g. in the 1989 interview for switches between January 1988 and December 1988). The data structure is such that one switch can be mentioned twice if there is a switch, for example, in March 1988 and there are interviews in April 1988 and March 1989. The exact question asked in the GSOEP in 1989 is:

"When did you give up your last job?
-1988 in the month of..... (previous year)
-1989 in the month of..... (current year)

The creation of two change variables, however, might create unrealistically short spells if respondents remember switches inaccurately. Therefore we assume that switches occurring in the interval [-2 months, 2 months] are the same job change. Thus, if a switch is reported for "March 1988" in 1988 and for "April 1988" in 1989, we use the information provided closer to the event reported, i.e. March 1988.

**4. Splitting Spells**

The change variables are then used to split employment spells, full-time and part-time spells. Again, there might be problem with the information provided in the data set when respondents switch between full-time and part-time work (reported in the calendar) and report that switch with slight deviations in the cross-sectional question. To avoid unrealistically short spells, we check whether the split procedure creates short spells of up to two months. If this is the case, the split is not performed.

**5. Adding Cross-Sectional Information to the Calendar Information**

Following the split procedure, we match spells with the relevant cross-sectional information. We create a data set with time-varying variables.

First, there is information relevant to all spells within a year, like education and age. These data are added by simply checking whether the spell includes a certain year. By running the match procedure backwards from 1998 to 1985, we are sure to catch the earliest observation for each spell.

Second, there is job-relevant information (industry, occupation, firm size, worker status) from the cross-section that should only be used for the employment spell at the time of the interview. Therefore, we use the interview date to match the information. If the interview date is missing we use March, because this is the most frequent interview month.

**6. Reasons for Job Termination**

If the interviewee indicates that s/he has given up a job since the beginning of the year prior to the interview, the following questions are posed :

(i) When did you give up your last job?

(ii) Why did you leave this job? Which of the following applies?

We classify the answers to this question into three groups.

1) Lay-off: Terminations initiated by the firm.
2) Quits: Terminations initiated by the worker.
3) Other reasons: End of fixed-term contract, maternity leave, (early) retirement, and leave of absence.

However, the possible answers to the question "Why did you leave the job?" changed over our period of observation. One change was that severance by mutual agreement was a possible answer in the 1985-1990 period, whereas no such answer was possible in the interviews of 1991-1998. However, in the first period an additional question was posed concerning the motivation for job termination, such that we are able to deduce whether, in case of a mutual agreement, the termination was initiated by the firm or by the worker. We conducted a number of sensitivity checks and did not find any indication for a structural break in the frequency of our reason for job termination variable for the questionnaire years 1990 to 1991 (when using our classification).

A problematic change in the questionnaire was that, as of 1991, maternity leave was given as a possible reason for job termination. We could not generate corresponding information for the preceding years. Therefore we will take this structural break into account in our multivariate analysis.

**7. Combining Spells with Adjacent Spells**

The calendar reports short-time work which is not a job switch. Therefore, we combine short-time work with the immediately preceding employment spell. Along the same lines, we combine adjacent full-time and part-time spells for which no reason for separation is known. The latter does not seem to influence the results significantly.

**8. Left-Censored Spells**

The GSOEP gives a left-censored status to employment spells for which the start date is not known. In these cases, we match cross-sectional information on the time spent with the current employer, in order to deduce the start date of the job. In this way, left-censored spells become left truncated (a stock sample) and can be used in the duration analysis. We also use this approach for employment spells starting before 1984, as we do not have spell split information for the year 1983, the first year the monthly calendar was implemented in the GSOEP.

**9. Additional Data Sources**

We merged information on the yearly growth rate of real GDP in the German states to the individual job spells. These data are provided by the Working Group "Volkswirtschaftliche Gesamtrechnung der Laender", see http://www.vgrdl.de/Arbeitskreis_VGR .

**10. Selection**

The following selection applies:

- Aged 16-56 at the beginning of the spell
- Without self-employed respondents
- Without apprentices
- Without civil servants
- Without agriculture (including forestry and fisheries)
- Without non-profit organizations
- 1984-1997
- **NB: We could not include years 1998 onwards because the wording of the questionnaire changes in 1999 with respect to the job change information and thus, from 1998 onwards, we are unable to create the same variable for job change reason as before.**
- Without spells that report end of training as reason for switch
- Without spells that report end of own business as reason for switch
- Full-time and part-time
- Sample A (West Germans)