Unemployment duration in West-Germany: do the IAB employment subsample and the German Socio-Economic Panel yield the same results?

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Abstract

We compare information on the length of unemployment spells contained in the IAB employment subsample (IABS) and in the German Socio-Economic Panel (GSOEP). For the purpose at hand, both data sets have their advantages and disadvantages. The advantage of the IABS is its large sample size and the fact that it is derived from administrative data, while the advantage of the GSOEP is the large variety of individual and household characteristics that can be related to individual unemployment duration. One disadvantage of the IABS is the lack of explicit information on registered unemployment, while self-reported information on registered unemployment is available in the GSOEP. For our analysis, we use two proxies for unemployment in the IABS as introduced by Fitzenberger/Wilke (2004). The first proxy comprises all periods of nonemployment after an employment spell which contain at least one period with unemployment compensation transfers from the German Federal Labour Office. The second proxy includes all episodes between two employment spells during which an individual continuously received unemployment benefits.

Our results suggest that the distribution of unemployment durations in the GSOEP lies between the distribution of our wide (first proxy) and our narrow (second proxy) definition of unemployment in the IABS. Estimation of standard duration models further indicate that conclusions drawn from the IABS and the GSOEP differ in many cases. While the GSOEP suggests that the hazard rate has a maximum at about 12 months of unemployment for both men and women, the IABS results suggest that this maximum is at about 20 months. Contrary to our GSOEP results and contrary to many results based on the GSOEP found in the literature, we find a weak positive relationship between longer maximum entitlement periods of unemployment benefits ('Arbeitslosengeld') and longer unemployment durations for some cases in the IABS. However, the existence of this relationship is not robust with respect to changes in model specification and the definition of unemployment. Our results for men indicate that the hazard of exiting unemployment as measured in both the IABS and the GSOEP decreases with age, and that recipients of unemployment assistance ('Arbeitslosenhilfe') have longer unemployment spells than those of unemployment benefits ('Arbeitslosengeld'). The results for women do not show such clear patterns. The large sample size of the IABS also allows one to trace out statistically significant effects of characteristics such as regional and industry indicators, which is generally not possible in the relatively small GSOEP.

1 Introduction

The issue of German unemployment durations has received considerable attention in the recent literature. Prominent examples include Hunt (1995), Hujer/Schneider (1996), Schneider/Hujer (1997), Steiner (1997, 2001), Plaßmann (2002), Fahrmeir et al. (2003), Fitzenberger/Wilke (2004), Lüdemann et al. (2004) and Wilke (2004). While past contributions were usually based on the German Socio-Economic Panel (GSOEP), the more recent literature has employed a relatively new data set, the employment sample of the Institute for Labour Market and Employment Research (IABS). In her influential article, Hunt (1995) used the GSOEP to evaluate the effects of increased maximum entitlement periods of unemployment benefits on the duration of unemployment. She concluded that the reforms increased the unemployment duration for certain age groups, but generally found it difficult to establish a statistically significant relationship between maximum entitlement periods and unemployment duration. Hujer/Schneider (1996) also used the GSOEP to study different aspects of unemployment duration in Germany. They found a unimodal pattern of duration dependence, where the re-employment hazard first increases and then decreases with elapsed unemployment duration. Hujer/Schneider (1996) also obtained that older workers had more difficulty escaping unemployment than younger workers, and that the length of the maximum entitlement period had a significant but very small negative effect on re-employment hazards. By contrast, Schneider/Hujer (1997) were not able to measure any statistically significant relationship between maximum entitlement periods and unemployment duration. Steiner (1997) considered remaining entitlement instead of maximum entitlement periods, but obtained the implausible result that lower remaining entitlement periods *decreased* re-employment hazards.

Starting with Plaßmann (2002), researches have increasingly used the IABS as the data base for their analyses. Using a similar setup as Hunt (1995), Plaßmann (2002) established significant reform effects for the same age groups as Hunt (1995) and for additional age groups (older workers). Similar to Hunt (1995), Plaßmann (2002) provided no direct evidence for a relationship between maximum entitlement periods and unemployment duration but employed a difference-in-difference approach comparing how certain age-groups fared before and after the reform. Also based on the IABS, Fahrmeir et al. (2003) estimated a sophisticated semi-parametric Bayesian model for unemployment durations. They confirmed results found earlier in the literature that older workers face lower re-employment hazards, that individuals receiving unemployment assistance ('Arbeitslosenhilfe', ALH) have longer unemployment durations than those receiving unemployment benefits ('Arbeitslosengeld', ALG), and that the temporal structure of unemployment spells is characterized by negative duration dependence over wide ranges. More recently, Fitzenberger/Wilke (2004) have argued that the finding of Hunt (1995) and others, namely that longer entitlement periods increased the unemployment durations for some age groups during the 1980s and 1990s, is not due to the disincentive effects caused by longer entitlement periods for unemployment benefits but instead the exit rates out of the labor force seem to have increased due to stronger incentives for early retirement. Koenker/Geling (2001) criticize the use of sensitive parametric assumptions in duration analysis. Van den Berg (2001) stresses that the results of single spell proportional hazard models have to be read with caution. Following their line, Lüdemann et al. (2004) and Wilke (2004) seek to provide more robust evidence on the effect of individual characteristics on unemployment durations using the IABS.

In view of this mixed and partly inconclusive evidence based on the two different data sets, the aim of this paper is to explicitly compare the information on unemployment durations contained in the IABS and the GSOEP, and to study to what extent standard duration models based on the two data sets yield similar results. We check the robustness of the results in terms of data source, definition of unemployment and model specification. We do this by extracting two comparable samples from both the IABS and the GSOEP, and by providing descriptive as well as econometric evidence on the length, the temporal structure and the determinants of unemployment durations in West Germany for the years 1983 to 1997. By doing so, we are also able to highlight the advantages and disadvantages of both data sets for the purpose at hand. The main advantage of the IABS is its large sample size and the fact that it is derived from administrative data. A disadvantage of the IABS is the lack of explicit information on registered unemployment. On the other hand, an important advantage of the GSOEP over the IABS is the large variety of individual and household characteristics that can be related to individual unemployment duration. Another advantage of the GSOEP is the detailed monthly employment calendar which also contains information on registered unemployment. However, a clear disadvantage of the GSOEP is its relatively small sample size and the fact that the retrospective information in the employment calendar is likely to be affected by recall error and the specific design of the questionnaire.

The issue of possible misreporting in the GSOEP is analyzed in detail by Jürges (2004) for unemployment periods and by Schräpler (2002) for income variables.

The rest of the paper is organized as follows. Section 2 provides more details about the two data sets and presents first descriptive evidence on the length and the distribution of unemployment durations. Section 3 then discusses the results of some duration models and compares to what extent both data sets yield similar results. Section 4 concludes the paper.

2 Data

We use three different samples for our estimations. Two samples were extracted from the IABS 1975-1997 and one was extracted from the GSOEP. All three samples cover the period 1983 to 1997 and contain the same set of regressors for West German individuals aged 26 to 48 years when entering unemployment. The age limit of 48 years was chosen in order to avoid problems with early retirement programs that have been widely used in the period under consideration.

The IABS is based on German register data. It is a one percent random sample drawn from the population of gainfully employed individuals who are covered by social insurance. See Bender et al. (2000) for more details about the IABS. The IABS contains employment trajectories with daily information on employment periods and compensation transfers from the Federal Employment office (BA) of about 500K individuals. The recorded transfer payments are unemployment benefits (ALG), unemployment assistance (ALH) and maintenance payments during training measures (UHG). The unemployment information in the IABS is incomplete insofar as it only includes information about the receipt of unemployment compensation transfers from the Federal Employment Office (BA) during a period of nonemployment. It does not include explicit information on periods of registered unemployment as periods without unemployment compensation transfers are not recorded. Unemployment spells have therefore to be constructed from the individual employment and transfer trajectories using a particular definition of unemployment. In this paper we use two proxies for unemployment in the IABS as introduced by Fitzenberger/Wilke (2004): nonemployment (IABS-NE) and unemployment between jobs (IABS-UBJ).

The first proxy comprises all nonemployment periods after an employment period in which the individual received unemployment compensation from the BA for at least one day. The nonemployment period is regarded as censored (at the end of the benefit payment) if the last record involves an unemployment benefit payment that is not followed by an employment spell. The second proxy requires an employment period before and after the nonemployment period and a continuous flow of unemployment compensation during this period. Both IABS-NE and IABS-UBJ periods therefore require transfer payments from the BA. In addition, the IABS samples are conditional on ALG or ALH as the first compensation payment during the unemployment period, i.e. unemployment periods starting with UHG are excluded. IABS-NE is a broad proxy with possibly upward biased unemployment durations as it contains also periods which may not be related to unemployment. IABS-UBJ is a narrow proxy that ensures that any duration time corresponds to registered unemployment. It is selective by conditioning on a future employment period since in particular individuals with very long unemployment spells who never leave to employment are not considered. For further details about the unemployment proxies, see Fitzenberger/Wilke (2004). To be comparable with the GSOEP, we created monthly spell length information from the IABS data by rounding towards the nearest integer and by dropping all observations shorter than half a month.

The GSOEP is a representative German panel survey that was started in 1984 in West Germany and extended to East Germany after reunification in 1990. See Haisken-DeNew/Frick (2003) for more details about the GSOEP. As we are interested in the period 1983 to 1997, and in order to be comparable to the IABS, we use the West German part only. This part of the data also contains over-proportionally many individuals of foreign nationality living in West Germany. We do not use information on these individuals as it is unclear how observations in duration models have to be weighted to account for oversampling of certain individuals. As a result, we also dropped foreign individuals from our IABS sample. The GSOEP contains a monthly retrospective employment calendar that records in which months (if any) in the year prior to the interview the individual was registered unemployed. It is important to note that this retrospective information may be subject to measurement error if individuals do not (or do not want to) remember when or even whether at all they were unemployed. For example, Kraus/Steiner (1998) found heaping effects at the end of each year. Furthermore, by comparing retrospective with contemporaneous unemployment information in the GSOEP, Jürges (2004) concludes that up to one quarter of all retrospectively reported unemployment spells may be subject to error, and that the amount of error may be related to other observed characteristics.

In both the IABS and the GSOEP, we use all unemployment periods after an employment period. We restricted unemployment spells to begin before 1 January 1997. Moreover, all unemployment information is cut off at 31 December 1997. This induces systematic right censoring in the IABS-NE and GSOEP samples. By construction, IABS-UBJ is a subset of IABS-NE, and we expect longer unemployment periods for the IABS-NE proxy since right censored durations without exit to employment are expected to be longer than periods with observed exit to employment. For our analysis we construct separate samples for males and females, i.e. in fact we have two times three samples.

As indicated in the introduction, a particular relevant aspect of unemployment durations is their possible relationship with the length of entitlement to unemployment compensation. Such a relationship is suggested by job search models (see e.g. Mortensen (1986)) and is highly relevant from a policy point of view. Several changes of the German unemployment compensation system were conducted during the 1980s and 1990s. These reforms modified the maximum entitlement period for ALG for individuals aged over 41 years. A summary of the resulting maximum entitlement periods for different age groups is presented in Table 1. More details on these reforms can be found in Hunt (1995) and Plaßmann (2002). As pointed out by Hunt (1995), these institutional changes can help to identify the effect of maximum entitlement periods on the duration of unemployment because given individuals may change their search behaviour in reaction to the reform and because different individuals with the same characteristics can be compared before and after the reform. In our analysis, we also use information on maximum entitlement periods. It should be emphasized however, that these may differ from actual entitlement periods if the individual's prior employment record does not meet certain minimum employment durations.

— Table 1 about here —

Tables 2 and 3 give a descriptive summary for the six samples. Sample sizes for the IABS samples are in the range of ten thousands whereas, at around 500 observations, they are much lower for the GSOEP samples. There are more observations for females in the GSOEP compared to the IAB samples. This is not due to the conditioning on transfer payments during the unemployment period since the share of non-recipients in the GSOEP sample is almost independent of gender. As expected, the average IABS-NE spell length is greater than the average IABS-UBJ spell length. The amount of censoring is between 7% and 23%. We observe less censoring in the GSOEP, and the amount of censoring diverges when we compare men and women. When we look at the regressors we find that descriptive statistics for the two IABS proxies are much more similar to each other than to those of the GSOEP sample. The conditioning on future employment in the IABS-UBJ proxy does not affect the sample averages of many observed regressors. We only observe remarkable deviations in the length of the previous employment spell and for males in the composition of the blue/white collar variable. Since average unemployment duration for IABS-UBJ is less than half of IABS-NE for males and females, the selection seems to be due to unobserved terms. As already stated by Lüdemann et al. (2004), work history variables such as the length of the previous employment spell, having recently been unemployed before and being rehired by the previous employer have high explanatory power for long term unemployment without exit to employment. The composition of these variables is therefore likely to change if one conditions on future employment as in the IABS-UBJ proxy. We observe this for the length of the previous employment spell but not for the recently unemployed. Note that information on job recall is not available in the GSOEP and is therefore not considered.

We observe that in the GSOEP sample there are more individuals with children, more married individuals and that individuals tend to have higher educational degree than in the IABS. The regional distribution and distribution over the business sectors is very similar for all samples. White collar workers are much more numerous, and wages tend to be higher in the GSOEP sample. The distribution over the quintiles of the wage distribution is similar for women but for men, the GSOEP distribution appears rather different and somewhat implausible. The distribution over the type of unemployment compensation transfer at the beginning of the spell shows that in the GSOEP sample we have $10 - 15\%$ of individuals without any transfer payment. We observe fewer ALH recipients in the GSOEP.

— Tables 2 and 3 about here —

Figures 1 and 2 show the cumulative distribution function of unemployment durations in the six samples. For men, the distribution of the GSOEP durations lies everywhere between the distributions of the wide and the narrow unemployment definition of the IABS. This is an indication that for men the length of (self-reported) registered unemployment is between the IABS proxies. For women, this only seems to be the case for durations up to 20 months, after which the GSOEP durations have practically the same distribution as the narrowly defined unemployment durations in the IABS. Figures 3 and 4 present unconditional hazard functions for the different samples. The shape of the GSOEP hazards differs considerably from the shape of the two hazards based on the IABS data. For both men and women, the latter two peak at around 20 months, whereas the GSOEP hazard has a peak at around 12 months. This peak at 12 months might be related to the fact that individuals tend to round retrospectively reported unemployment durations. It is remarkable that GSOEP and IABS differ considerably in this important aspect of unemployment durations.

— Figures 1 to 4 about here —

3 Estimation results

3.1 Cox proportional hazard model

In order to investigate further to what extent the two samples share the same information on unemployment durations, we estimate the Cox proportional hazard model

$$h(t) = h_0(t) \exp\left(\beta_1 x_{i1}(t) + \beta_2 x_{i2}(t) + \ldots + \beta_k x_{ik}(t)\right) \tag{1}$$

(see e.g. Kalbfleisch/Prentice (2002)), where $h(t)$ is the hazard of leaving unemployment and $x_{i1}(t), x_{i2}(t), \ldots, x_{ik}(t)$ are (possibly time-varying) characteristics of individual i. The unspecified baseline hazard $h_0(t)$ captures how the probability of exiting unemployment depends on the already elapsed unemployment duration.

Our results for this model are shown in Tables 4 and 5. As it turned out, the inclusion of too many regressors in the case of the GSOEP led to a very large number of insignificant coefficients. We therefore decided to exclude the set of regional, sectoral and income dummies from our GSOEP estimations. In general, this did not alter the estimates for the remaining variables but increased their statistical significance. The results for men in Table 4 show that both IABS and GSOEP yield a similar age pattern, i.e. individuals aged more than 35 years have lower exit probabilities from unemployment than younger ones, although this pattern is less marked for the IABS-UBJ definition. Married individuals have higher hazards in the IABS, whereas no such effect can be measured in the GSOEP. On the other hand, men with children face higher hazards for leaving unemployment in the GSOEP but not in the IABS. As to the influence of educational qualifications, the conclusions from both samples also differ. University education appears to increase hazards in the GSOEP but not in the IABS. An explanation could be that, as an administrative data set for social insurance purposes, some variables in the IABS that are not directly related to this purpose might be affected by measurement error to a large extent. It is known that these variables include educational qualifications (see e.g. Fitzenberger (1999)). Similarly, white collar workers have lower hazards than blue collar workers in the IABS, but not in the GSOEP.

— Tables 4 and 5 about here —

An advantage of the IABS is that it allows one to trace out statistically significant differences in re-employment hazard across regions, sectors of the economy and income classes, which is not possible in the GSOEP. For example, the results in Table 4 show that workers in Bavaria find it much easier to end unemployment than those in other regions. The results on income classes further suggest that low-wage earners also have lower re-employment probabilities. Contrary to IABS-NE, in both the IABS-UBJ and the GSOEP hazards do not seem to depend in a statistically significant way on the length of the previous employment spell. By contrast, in both samples having been unemployed in the last 12 months significantly increased the probability of returning to employment quickly. This effect is probably due to seasonal employment.

As to the effect of maximum entitlement periods, the IABS yields a negative relationship, i.e. longer maximum entitlement periods are associated with lower exit probabilities. It is interesting to note that this pattern is much less pronounced in the case of unemployment between jobs (IABS-UBJ). The question of whether this monotone relationship can be interpreted as evidence for a disincentive effect will be discussed in more detail below.

In contrast to the IABS, no association of entitlement periods and unemployment duration can be measured in the GSOEP. As discussed in the introduction, this is in line with much of the literature on German unemployment durations based on the GSOEP. Note that the category of zero months of unemployment benefits also includes the case of ALH. If one replaces the dummies indicating maximum entitlement periods by two dummies indicating ALG and ALH, then both GSOEP and IABS yield the statistically significant result that recipients of ALH have longer unemployment durations than recipients of ALG. Table 4 also shows that the IABS results pick up the more favourable labour market conditions during the boom period 1988 to 1991 and the less favourable conditions around the recession 1993. Both IABS and GSOEP show that re-employment probabilities fall in the last quarter of the year. Finally and surprisingly, neither IABS nor GSOEP find that individual and aggregate outflow rates from unemployment are significantly correlated.

Table 5 presents the corresponding results for women. A first observation is that except for two cases, all GSOEP estimates are insignificant. The IABS results also seem to be less clear and much less robust across the different unemployment definitions than those for men. Moreover, the conclusions drawn from the IABS estimates for women seem to differ significantly from those for men in many cases. For example, there is no clear age or income pattern and there is no statistically significant relationship between maximum entitlement periods and unemployment durations for women. Also, women do not seem to have been as vulnerable as men to worsening labour market conditions at the beginning of the 1990s. Lüdemann et al. (2004) suggest that this may be due to the introduction of parental leave benefits during the second half of the 1980s which prevented recent mothers from registering as unemployed.

Hazard functions implied by these estimates evaluated at average characteristics are shown in Figures 5 and 6. They resemble very much the unconditional hazard functions shown in Figures 3 and 4. This suggests that even after controlling for observed differences in individual characteristics, there is first positive and then negative duration dependence. However, the conclusion often drawn from the GSOEP, that negative duration dependence plays the dominant role is questioned by the IABS results, where the hazard keeps increasing up to month 20, suggesting that no form of duration dependence dominates over the relevant range of durations.

— Figures 5 and 6 about here —

In the remaining part of this section, we take a closer look at the relationship between longer maximum entitlement periods and longer unemployment durations as measured in the IABS. In order to disaggregate the effects further we re-estimated the Cox model for the IABS by replacing the age, year and maximum entitlement categories by a full set of dummies indicating each age, year and maximum length of unemployment benefits. Following Hunt (1995), the idea here is to separate as good as possible the effects of age, macroeconomic environment and changes in entitlement periods.

The results of this exercise are shown in Tables A1 and A2. The estimates for men (see Table A1) again indicate a generally positive relationship between the length of the entitlement period and unemployment duration in the case of the non-employment sample (IABS-NE). The pattern for unemployment between jobs is similar but much weaker. Although the coefficients are statistically significant individually, the size of the standard errors casts doubt on whether differences between them are also significant. Explicitly testing for these differences, we find that in the case of IABS-NE, the hypothesis that all six of them are equal is clearly rejected, as well as the hypothesis that the first five, four, three and two of them are equal. We also find that the coefficient for maximum entitlement of 12 months differs in a statistically significant way from that for 16 and for 22 months.

— Tables A1 and A2 about here —

An important question is to what extent these differences can be interpreted as evidence for a causal disincentive effect. First of all, it should be noted that the coefficients for entitlement periods over 22 months probably suffer from a selection effect as these maximum entitlement periods can only be reached by individuals who have entered unemployment before age 49 (this is a feature of our sample selection) and have stayed so for at least one year (or five years in the case of a maximum entitlement period of 32 months, see Table 1). These individuals are likely to represent bad risks, biasing the corresponding coefficients. More generally, and despite the additional variation introduced by the reforms, it seems very difficult to identify causal effects of changes in entitlement periods on the duration of unemployment. The problem is that long maximum entitlement periods can only be reached by older individuals. It is very likely that older workers have been facing very different labour market conditions than younger workers, especially during the times when the reforms were introduced. After all, the reforms were introduced to soften worsening labour market conditions for the elderly. In this sense, the reforms were endogenous, biasing estimation results upwards if these worsening conditions for older workers are not explicitly controlled for (which seems difficult). However, the point for our analysis is not so much whether the relationship between entitlement periods and unemployment duration is causal, but that it can be measured in the IABS, whereas it is hard to measure it in the GSOEP.

Moving on to the case of unemployment between jobs (IABS-UBJ, second column of Table A1), the hypothesis that the first six, five, four, three coefficients are equal is rejected, but not the hypothesis that the first two of them are equal. We further find that the coefficients for 12 months only differ significantly from those for 20 and 22 months but not from those for 16 and 18 months. Overall, differences are much less significant for IABS-UBJ than for IABS-NE. This seems to confirm the finding in Fitzenberger/Wilke (2004) that reforms in maximum entitlement periods did not increase unemployment durations for those who are unemployed between jobs, but only for those who in effect did not return to the labour market. This is also confirmed by the results for women shown in Table A2. There is a weak positive (and partly significant) relationship between longer maximum entitlements and longer unemployment durations in the case of non-employment (IABS-NE, see first column) but there is no relationship whatsoever in the case of unemployment between jobs (IABS-UBJ, second column).

3.2 Accelerated failure time models with unobserved heterogeneity

A general caveat to the results of the Cox model is that they do not take account of possible unobserved heterogeneity. Ignoring unobserved differences in individuals' propensities to exit unemployment may make a pure sorting effect erroneously appear as duration dependence, where individuals with favourable unobserved characteristics exit first, leaving behind those with bad characteristics, and may bias other estimated coefficients. We tried to estimate the Cox model with unobserved heterogeneity but the estimates failed to converge in every single case. In order to test the robustness of our results we therefore estimated in addition a number of further models that take into account unobserved heterogeneity.

Accelerated failure time models (see e.g. Kalbfleisch/Prentice (2002)) model the log of the unemployment duration of individual i as

$$\log T_i = \alpha_0 + \alpha_1 x_{i1} + \alpha_2 x_{i2} + \ldots + \alpha_k x_{ik} + u_i \tag{2}$$

where u_i has density $f(\cdot)$. For our analysis we used as densities the normal density (leading to the log-normal model), the logistic density with parameter γ (leading to the log-logistic model) and the gamma density with parameters κ and σ (leading to the gamma model). We did not use the widely employed Weibull or exponential models as they assume a monotonic or even constant hazard, which seems to be ruled out by Figures 5 and 6 (a non-monotonic hazard cannot be the result of a pure sorting effect). Also note that (2) does not allow for time-varying covariates.

Model (2) implies a hazard rate

$$h(t) = \frac{f(t)}{1 - F(t)} \tag{3}$$

where $F(\cdot)$ denotes the cumulative distribution function corresponding to $f(\cdot)$. Unobserved heterogeneity can be incorporated into the accelerated failure model by perturbing this hazard rate multiplicatively, i.e.

$$h(t|\alpha) = \alpha h(t), \tag{4}$$

where α is usually assumed to follow a gamma distribution with expectation one and variance θ. In this context, the individual effect α is also called 'frailty'. The model can be estimated by deriving the unconditional hazard, i.e. by integrating out the 'frailties' α, taking into account that multiple spells of the same individual share the same α.

Our results for the accelerated failure time models are shown in Tables A3 to A6. Note that in these models, the interpretation of the coefficients is reversed when compared to the Cox results in Tables 4 and 5: positive (negative) coefficients increase (decrease) the unemployment duration and therefore reduce (increase) the hazard rate. The estimates for the log-normal model were very similar to the ones of the log-logistic model and are therefore not reported. The results for the log-logistic model for men in Table A3 show that most of the conclusions drawn from the Cox model also hold when unobserved heterogeneity is modelled. The only important exception is that in the case of the IABS the age pattern found in the Cox model is destroyed when taking account of unobserved heterogeneity, and that the relationship between higher maximum entitlement periods and higher unemployment duration is much weaker. The last line of the table further shows that the hypothesis of no unobserved heterogeneity is overwhelmingly rejected for both IABS and GSOEP in this model.

The results for the log-logistic model for women given in Table A4 are also broadly similar to the results of the Cox model, except for the fact that there is now a weak positive relationship between maximum entitlement periods and unemployment duration. However, this relationship does not seem statistically significant. Interestingly, in the case of the GSOEP, the hypothesis of no unobserved heterogeneity is *not* rejected.

Tables A5 and A6 present the corresponding results for the gamma model. With two parameters, the gamma model is more flexible than the log-logistic or the log-normal model. However, this added flexibility also led to convergence problems in the case of the GSOEP where we do not report any results. The results of the gamma model in Tables A5 and A6 and the ones of the corresponding log-logistic model differ in the important respect that the relationship between maximum entitlement periods and unemployment duration becomes very weak. Moreover, the hypothesis of no unobserved heterogeneity is not rejected. Otherwise, results are similar to the log-logistic and the Cox model.

4 Conclusion

In this paper we compared the information on West German unemployment durations contained in the two data sets that are in principle suited to study this question, the IAB employment subsample (IABS) and the German Socio-Economic Panel (GSOEP). We checked the robustness of the results by employing different duration models and definitions of unemployment. Our results suggest that there are similarities but also important differences. Starting with the similarities, both data sets yield a similar age pattern of unemployment duration for men (men aged over 35 years face longer unemployment durations) and agree in that there is no discernible age pattern for women. They also agree with respect to the effect of a number of other variables on unemployment duration. For example, in both the IABS and the GSOEP, having been unemployed during the last 12 months increases, and being unemployed in the last quarter of the year decreases re-employment hazards. This finding is clearly related to seasonal unemployment. Another finding common to both data sources is that individuals receiving unemployment assistance experience longer unemployment spells than those receiving unemployment benefits.

However, there are also important differences. A first difference is that hazards in the GSOEP first increase until about 12 months and decrease afterwards, whereas they keep increasing until about 20 months in the IABS. It is unclear what causes this remarkable difference. A possibility are rounding errors in the GSOEP in the sense that the yearly questionnaire design of the GSOEP makes interviewees report more often full 12 months of unemployment where in fact a different number of months were experienced. On the other hand, the peak in the hazard at 20 months in the IABS may also appear surprising as in many cases unemployment benefits end after 12 months suggesting that individuals are unemployed for exactly 12 months more often. However, since the IABS is derived from administrative data on actual flows of transfer payments, its results seem much more credible in this respect than the GSOEP data.

Another difference between the IABS and the GSOEP is that the GSOEP often yields insignificant coefficients when estimating duration models, which is generally not the case if one uses the IABS. This may be due to the much larger sample size of the IABS, which allows one in particular to disaggregate hazard effects to a large extent, e.g. to study highly disaggregated sectoral, regional, age and time effects. But it may be also due to different degree of a measurement error in the two data sets. In some cases, IABS and GSOEP differ in their predictions concerning the influence of individual covariates. For example, the GSOEP suggests that individuals holding an university degree have higher re-employment hazards, while this is not the case for the IABS. An important difference between results based on the IABS and the GSOEP is that it is possible to get a more precise estimate of the relationship between maximum entitlement periods of unemployment benefits. In some cases the IABS suggests a weak positive association, while this is not case in the GSOEP. However, we argued that one should be very cautious not to interpret such a relationship as a causal disincentive effect and showed that it is not robust to changes in model specification. We also showed that it concerned mainly the IABS-NE and not the IABS-UBJ proxy.

Overall, we conclude that the IABS added a lot of new possibilities to the analysis of unemployment duration in Germany and led to more significant results that were also more robust with respect to model specification. The analysis of the effect of the unemployment compensation system did not yield a definite answer and suggests that further research is warranted.

5 Appendix

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7 Figures

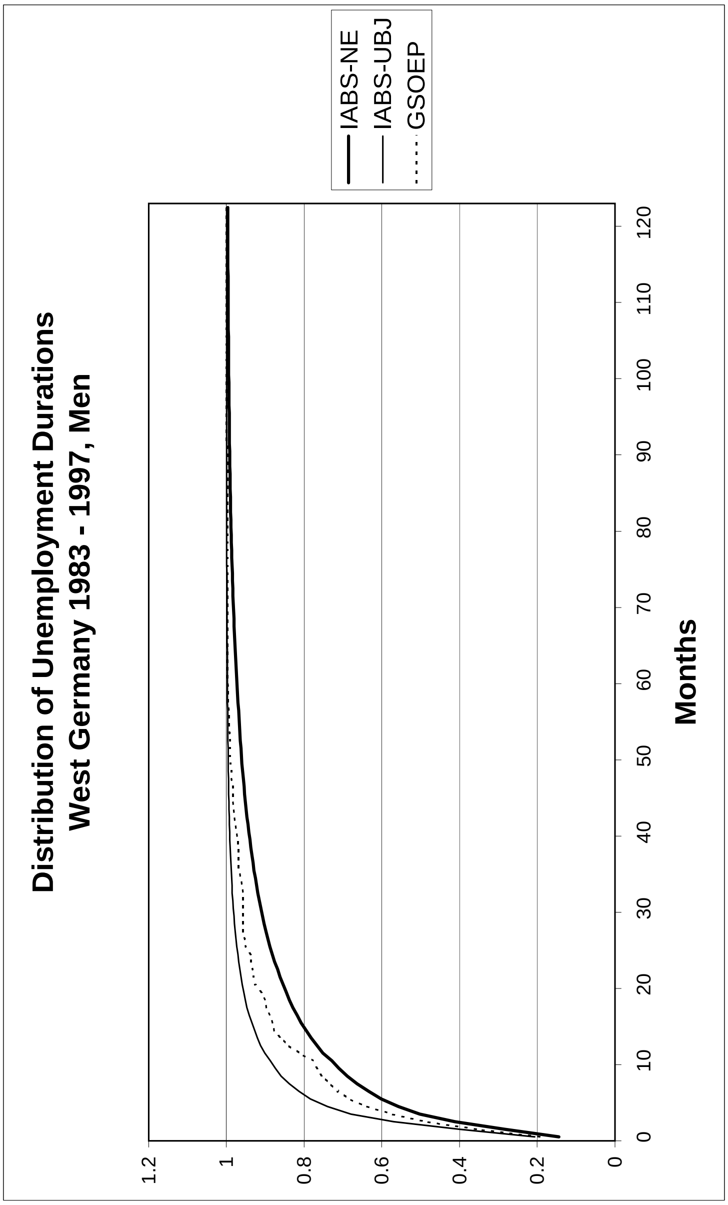


Figure 1:

Distribution of Unemployment Durations,

West Germany 1983 - 1997, Men

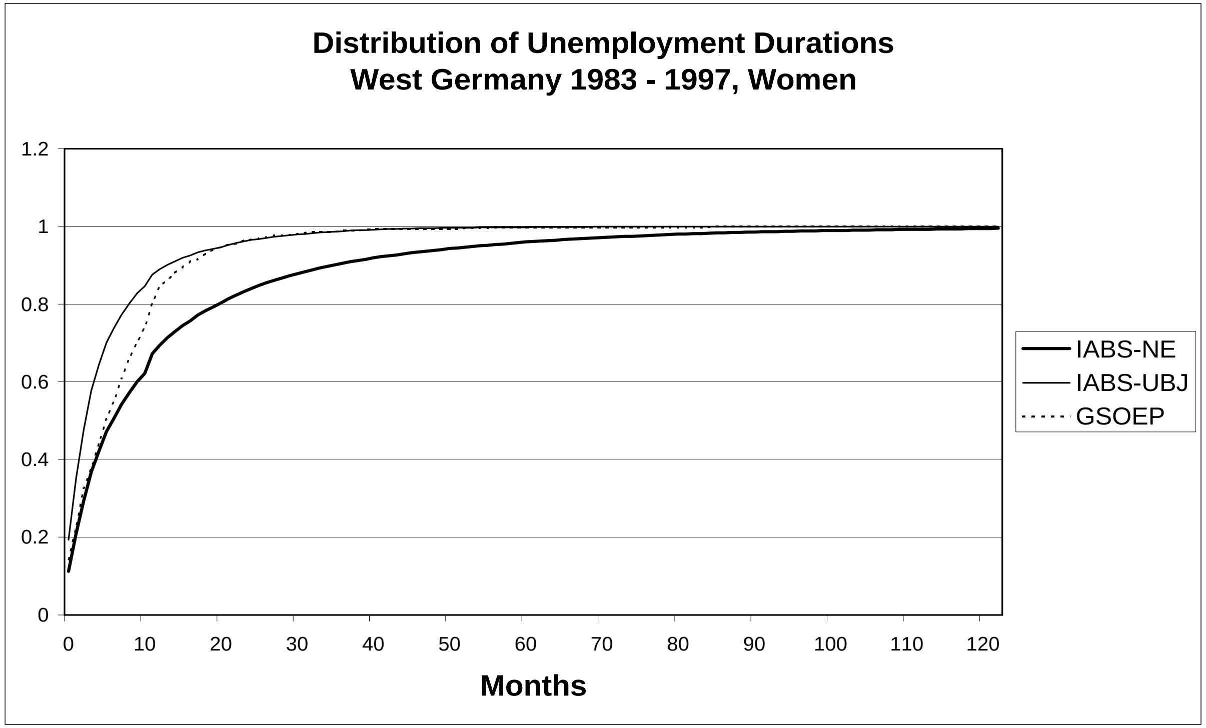


Figure 2:
Distribution of Unemployment Durations,
West Germany 1983 - 1997, Women

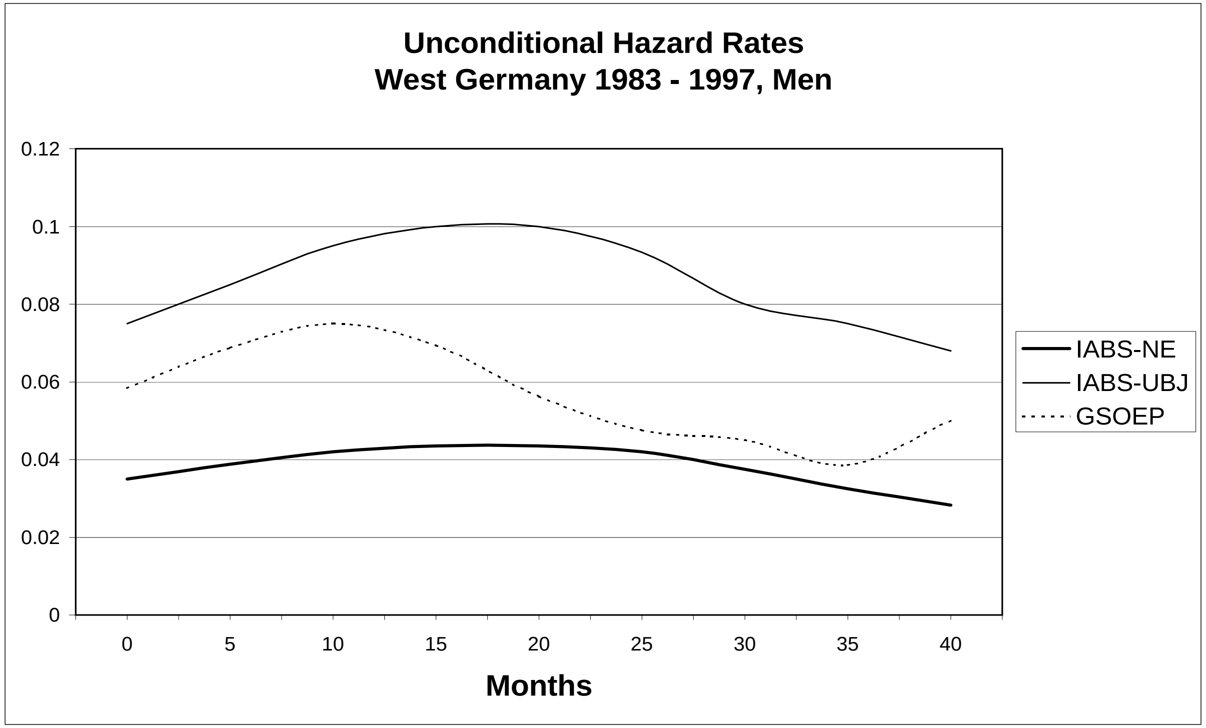


Figure 3:
Unconditional Hazard Rates,
West Germany 1983 - 1997, Men

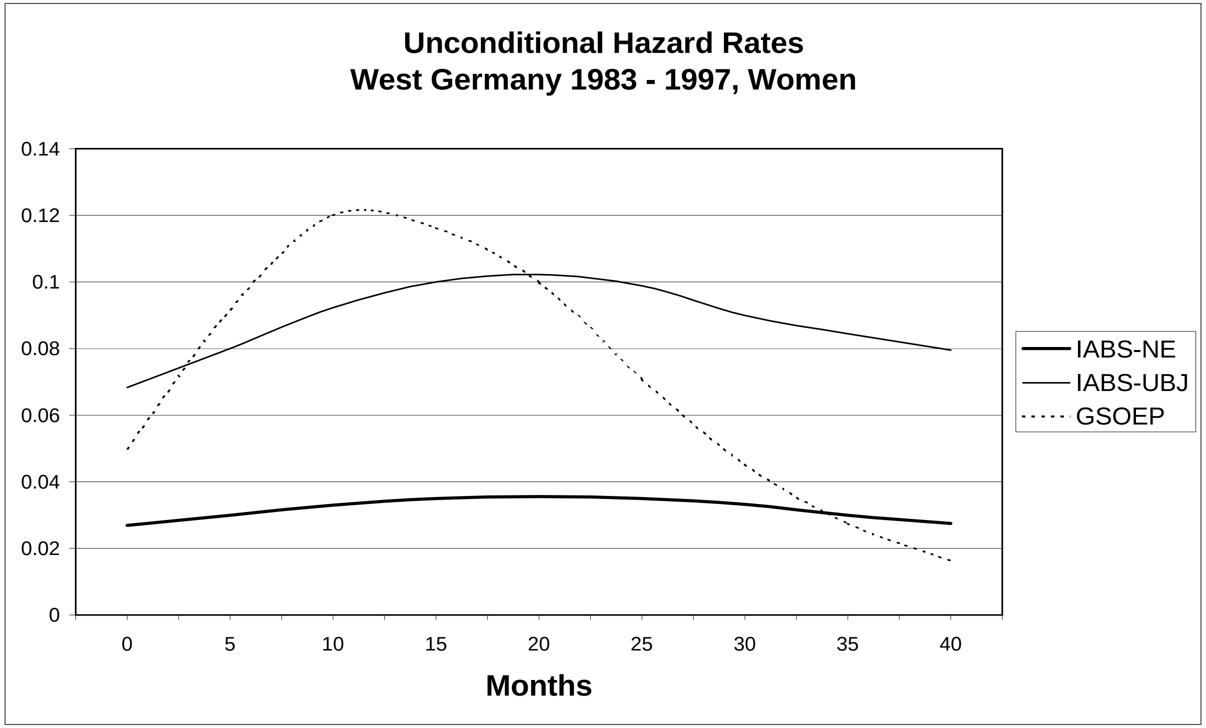


Figure 4:
Unconditional Hazard Rates,
West Germany 1983 - 1997, Women

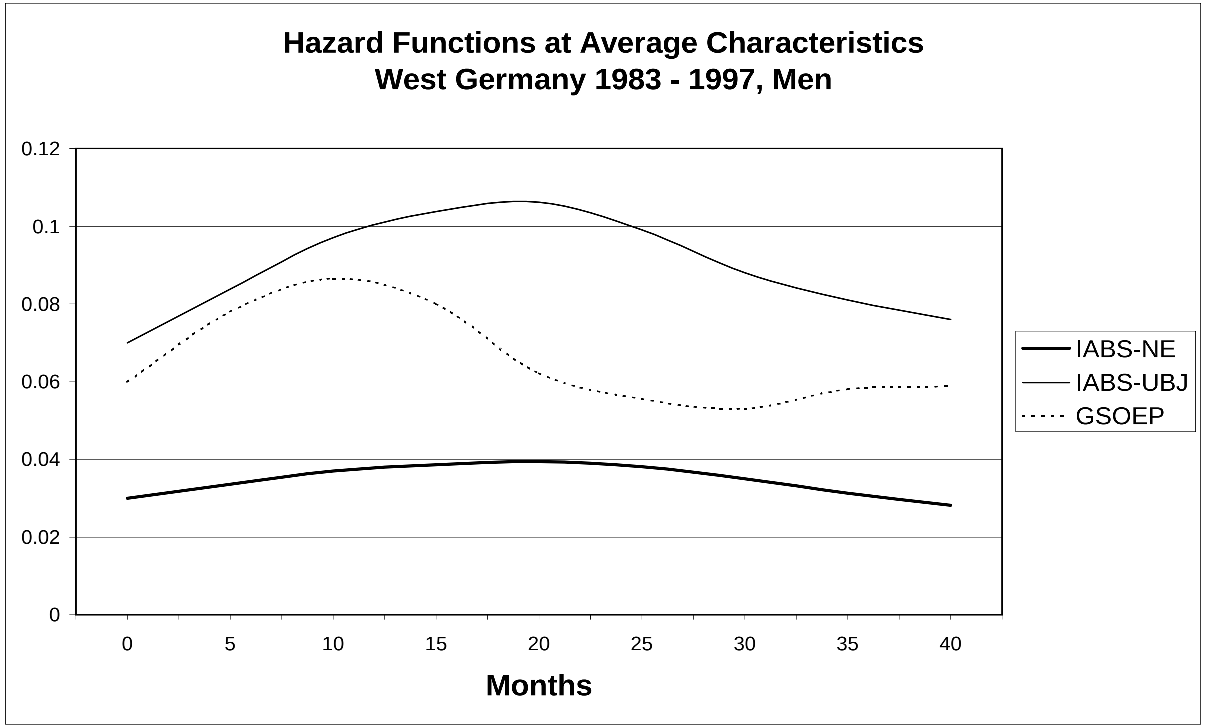
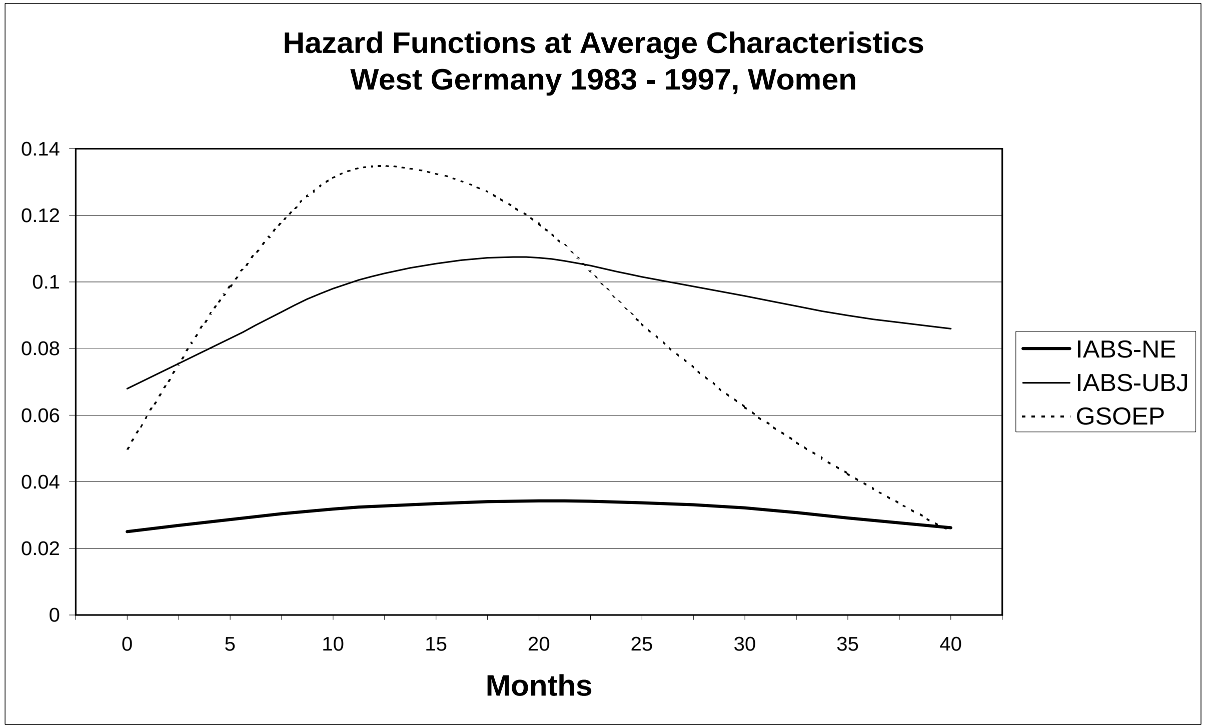


Figure 5:
Hazard Functions at Average Characteristics,
West Germany 1983 - 1997, Men

Figure 6:
Hazard Functions at Average Characteristics,
West Germany 1983 - 1997, Women



8 Tables

Table 1. Maximum entitlement period of unemployment benefits, months

Year	up to age in years							
	42	44	45	47	49	52	54	57
before 01/1985	12	12	12	12	12	12	12	12
01/1985 - 12/1985	12	12	12	12	18	18	18	18
1986 - 06/1987	12	16	16	16	20	20	24	24
07/1987 - 03/1997	18	20	22	22	26	26	32	32
from 04/1997 on	12	12	18	22	22	26	32	32

Source: Hunt (1985), Plaßmann (2002)

Table 2. Descriptive statistics for unemployment spells, Men
(characteristics as of spell beginning, standard deviations in parentheses)

	IABS-NE		IABS-UBJ		SOEP	
Number of obs.	54669	-	36050	-	487	-
Spell length[a]	11.25	(17.34)	5.51	(7.73)	7.76	(10.70)
Uncensored	0.8489	(0.3581)	1	(0)	0.9014	(0.2983)
Age	35.14	(6.6435)	35.17	(6.69)	34.89	(6.53)
Married	0.5026	(0.4999)	0.5418	(0.4982)	0.6098	(0.4882)
Child	0.4247	(0.4943)	0.4552	(0.4980)	0.4948	(0.5004)
Vocational training	0.6965	(0.4597)	0.7102	(0.4536)	0.7515	(0.4325)
University	0.0457	(0.2088)	0.0370	(0.1889)	0.0924	(0.2898)
Berlin	0.0320	(0.1761)	0.0238	(0.1526)	0.0328	(0.1784)
Northern states	0.2283	(0.4197)	0.2364	(0.4248)	0.2361	(0.4251)
North-Rhine Westfalia	0.2448	(0.4299)	0.2285	(0.4198)	0.2546	(0.4360)
Hesse/Rh.-Pal./Saarland	0.1560	(0.3629)	0.1517	(0.3587)	0.1334	(0.3404)
Baden-Württemberg	0.1078	(0.3102)	0.0947	(0.2929)	0.0841	(0.2779)
Bavaria	0.2305	(0.4211)	0.2643	(0.4409)	0.2566	(0.4372)
Blue collar	0.7939	(0.4044)	0.8302	(0.3754)	0.6406	(0.4803)
White collar	0.2060	(0.4044)	0.1697	(0.3754)	0.3593	(0.4803)
Farm./mining/energy	0.0399	(0.1958)	0.0463	(0.2103)	0.0328	(0.1784)
Basic industry	0.0729	(0.2599)	0.0791	(0.2700)	0.0266	(0.1613)
Investment goods	0.1296	(0.3358)	0.1180	(0.3226)	0.1581	(0.3652)
Consumption goods	0.0608	(0.2391)	0.0574	(0.2327)	0.0636	(0.2443)
Food/recreation	0.0249	(0.1560)	0.0223	(0.1477)	0	(0)
Construction	0.1875	(0.3903)	0.2255	(0.4179)	0.2628	(0.4406)
Auxiliary construction	0.0829	(0.2758)	0.0955	(0.2940)	0	(0)
Retail	0.1153	(0.3194)	0.1029	(0.3039)	0.0944	(0.2927)
Transport/communic.	0.0648	(0.2461)	0.0638	(0.2445)	0.0390	(0.1938)
Services (for firms)	0.0852	(0.2792)	0.0682	(0.2521)	0.0800	(0.2716)
Services (for households)	0.0402	(0.1965)	0.0380	(0.1912)	0.0657	(0.2480)
Services (public)	0.0545	(0.2270)	0.0433	(0.2037)	0.0780	(0.2684)
State	0.0409	(0.1982)	0.0389	(0.1935)	0.0205	(0.1419)
Wage[b]	110.96	(40.62)	111.20	(38.11)	162.86	(66.29)
First quintile[c]	0.0946	(0.2926)	0.0750	(0.2634)	0.0462	(0.2103)
Second quintile[c]	0.3458	(0.4756)	0.3429	(0.4747)	0.1828	(0.3870)
Third quintile[c]	0.2792	(0.4486)	0.3044	(0.4601)	0.3310	(0.4711)
Fourth quintile[c]	0.1750	(0.3800)	0.1841	(0.3875)	0.2314	(0.4222)
Fifth quintile[c]	0.1052	(0.3068)	0.0933	(0.2909)	0.2083	(0.4065)
Length prev. employment[a]	35.60	(44.82)	26.94	(36.52)	34.41	(35.29)
Unemployed last 12 months	0.4955	(0.4999)	0.5113	(0.4998)	0.2689	(0.4438)
Unemployment benefit	0.8880	(0.3153)	0.9084	(0.2884)	0.8583	(0.3490)
Unemployment assistance	0.1119	(0.3153)	0.0915	(0.2884)	0.0375	(0.1901)
Maximum entitlement period[d]	11.76	(5.0529)	11.99	(4.74)	11.04	(5.40)

[a] in months
[b] of last job in deutschmarks per day
[c] quintiles of whole population of wage earners
[d] maximum entitlement period of unemployment benefits in months

Table 3. Descriptive statistics for unemployment spells, Women
(characteristics as of spell beginning, standard deviations in parentheses)

	IABS-NE		IABS-UBJ		SOEP	
Number of obs.	26587	-	14344	-	472	-
Spell length[a]	14.56	(20.15)	6.45	(8.10)	8.47	(8.91)
Uncensored	0.7775	(0.4159)	1	(0)	0.9300	(0.2552)
Age	34.82	(6.70)	35.03	(6.71)	34.30	(6.51)
Married	0.5317	(0.4989)	0.4841	(0.4997)	0.6504	(0.4773)
Child	0.3927	(0.4883)	0.3713	(0.4831)	0.4576	(0.4987)
Vocational training	0.6927	(0.4613)	0.7045	(0.4562)	0.6758	(0.4685)
University	0.0605	(0.2384)	0.0563	(0.2305)	0.0932	(0.2910)
Berlin	0.0340	(0.1812)	0.0288	(0.1674)	0.0466	(0.2110)
Northern states	0.2164	(0.4118)	0.2225	(0.4159)	0.2118	(0.4090)
North-Rhine Westfalia	0.2577	(0.4373)	0.2401	(0.4271)	0.2584	(0.4382)
Hesse/Rh.-Pal./Saarland	0.1577	(0.3645)	0.1572	(0.3640)	0.1504	(0.3578)
Baden-Württemberg	0.1394	(0.3464)	0.1428	(0.3499)	0.1483	(0.3557)
Bavaria	0.1943	(0.3957)	0.2083	(0.4061)	0.1822	(0.3864)
Blue collar	0.3803	(0.4854)	0.3919	(0.4882)	0.3114	(0.4635)
White collar	0.6196	(0.4854)	0.6080	(0.4882)	0.6885	(0.4635)
Farm./mining/energy	0.0158	(0.1248)	0.0195	(0.1383)	0.0148	(0.1210)
Basic industry	0.0364	(0.1874)	0.0361	(0.1865)	0.0487	(0.2155)
Investment goods	0.0998	(0.2998)	0.0884	(0.2839)	0.0911	(0.2880)
Consumption goods	0.0883	(0.2838)	0.0912	(0.2879)	0.0995	(0.2997)
Food/recreation	0.0432	(0.2034)	0.0435	(0.2039)	0.0042	(0.0650)
Construction	0.0125	(0.1113)	0.0147	(0.1203)	0.0211	(0.1441)
Auxiliary construction	0.0119	(0.1088)	0.0142	(0.1186)	0	(0)
Retail	0.1807	(0.3848)	0.1793	(0.3836)	0.1779	(0.3828)
Transport/communic.	0.0299	(0.1703)	0.0315	(0.1748)	0.0233	(0.1510)
Services (for firms)	0.1149	(0.3189)	0.1068	(0.3089)	0.1165	(0.3211)
Services (for households)	0.1252	(0.3309)	0.1412	(0.3482)	0.0762	(0.2657)
Services (public)	0.1982	(0.3986)	0.1901	(0.3924)	0.2033	(0.4029)
State	0.0426	(0.2019)	0.0428	(0.2025)	0.0317	(0.1755)
Wage[b]	89.82	(39.75)	89.71	(37.26)	109.49	(59.11)
First quintile[c]	0.3339	(0.4716)	0.3352	(0.4720)	0.3285	(0.4702)
Second quintile[c]	0.3763	(0.4844)	0.3976	(0.4894)	0.3764	(0.4850)
Third quintile[c]	0.1496	(0.3567)	0.1467	(0.3538)	0.1558	(0.3631)
Fourth quintile[c]	0.0894	(0.2853)	0.0821	(0.2746)	0.0935	(0.2915)
Fifth quintile[c]	0.0506	(0.2192)	0.0381	(0.1915)	0.0455	(0.2087)
Length prev. employment[a]	47.19	(48.59)	34.58	(41.24)	30.69	(26.95)
Unemployed last 12 months	0.3398	(0.4736)	0.3634	(0.4810)	0.1885	(0.3915)
Unemployment benefit	0.9278	(0.2586)	0.9276	(0.2590)	0.8055	(0.3961)
Unemployment assistance	0.0721	(0.2586)	0.0723	(0.2590)	0.0576	(0.2334)
Maximum entitlement period[d]	12.41	(4.61)	12.50	(4.69)	10.53	(5.92)

[a] in months
[b] of last job in deutschmarks per day
[c] quintiles of whole population of wage earners
[d] maximum entitlement period of unemployment benefits in months

Table 4. Cox proportional hazard model, Men
(standard errors in parentheses[a])

	IABS-NE		IABS-UBJ		SOEP	
Age 26 - 30 years[b]	-		-		-	
Age 31 - 35 years[b]	-0.0731	(0.0121)	-0.0842	(0.0129)	-0.2176	(0.1165)
Age 36 - 40 years[b]	-0.1530	(0.0139)	-0.1227	(0.0148)	-0.3968	(0.1418)
Age 41 - 45 years[b]	-0.1786	(0.0169)	-0.1285	(0.0177)	-0.4672	(0.1557)
Age $\geq$ 46 years[b]	-0.1909	(0.0212)	-0.1012	(0.0219)	-0.5920	(0.2063)
Married	0.1982	(0.0125)	0.1391	(0.0135)	-0.0940	(0.1124)
Child	0.0099	(0.0124)	-0.0035	(0.0130)	0.1939	(0.1045)
Vocational training	0.1263	(0.0119)	0.1174	(0.0126)	0.2410	(0.1399)
University	0.1216	(0.0278)	0.0764	(0.0322)	0.5245	(0.1896)
Northern states	-		-		-	
Berlin	-0.2119	(0.0283)	-0.0914	(0.0339)	-	
North-Rhine Westfalia	-0.0770	(0.0143)	-0.0268	(0.0154)	-	
Hesse/Rh.-Pal./Saarland	0.0114	(0.0163)	0.0679	(0.0172)	-	
Baden-Württemberg	0.0257	(0.0193)	0.1687	(0.0207)	-	
Bavaria	0.2408	(0.0148)	0.2161	(0.0148)	-	
Blue collar	-		-		-	
White collar	-0.2637	(0.0152)	-0.2346	(0.0174)	-0.0926	(0.0949)
Farm./mining/energy	-		-		-	
Basic industry	-0.1898	(0.0356)	-0.1625	(0.0341)	-	
Investment goods	-0.4060	(0.0328)	-0.3954	(0.0322)	-	
Consumption goods	-0.3392	(0.0359)	-0.2753	(0.0353)	-	
Food/recreation	-0.3527	(0.0418)	-0.3372	(0.0442)	-	
Construction	-0.1227	(0.0318)	-0.1847	(0.0296)	-	
Auxiliary construction	-0.8863	(0.0346)	-0.0899	(0.0327)	-	
Retail	-0.3264	(0.0329)	-0.0305	(0.0321)	-	
Transport/communic.	-0.2368	(0.0358)	-0.1876	(0.0346)	-	
Services (for firms)	-0.3741	(0.0342)	-0.3029	(0.0345)	-	
Services (for households)	-0.1994	(0.0404)	-0.1268	(0.0400)	-	
Services (public)	-0.4938	(0.0369)	-0.4344	(0.0377)	-	
State	-0.4573	(0.0406)	-0.4689	(0.0418)	-	
First quintile[c]	-		-		-	
Second quintile[c]	0.2029	(0.0185)	0.0693	(0.0202)	-	
Third quintile[c]	0.3837	(0.0199)	0.2188	(0.0218)	-	
Fourth quintile[c]	0.0455	(0.0213)	0.2778	(0.0232)	-	
Fifth quintile[c]	0.3471	(0.0247)	0.2399	(0.0268)	-	
Length prev. employment	-0.0008	(0.0001)	-0.0003	(0.0002)	0.0023	(0.0014)
Unemployed last 12 months	0.2499	(0.0178)	0.1089	(0.0121)	0.2122	(0.1147)
Max. entitlement 0 months[bd]	-		-		-	
Max. entitlement 1 - 12 months[bd]	0.4813	(0.0159)	0.3672	(0.0182)	0.1068	(0.1459)
Max. entitlement 13 - 24 months[bd]	0.4284	(0.0224)	0.3271	(0.0242)	-0.0422	(0.1916)
Max. entitlement $\geq$ 25 months[bd]	0.2169	(0.0469)	0.2649	(0.0475)	0.2944	(0.5150)
1983 - 1987[b]	-		-		-	
1988 - 1991[b]	0.1075	(0.0146)	0.1778	(0.0153)	-0.3122	(0.1602)
1992 - 1997[b]	-0.1202	(0.0118)	0.1043	(0.1177)	-0.4082	(0.1276)
Last quarter of year[b]	-0.5897	(0.0135)	-0.5852	(0.0154)	-0.3566	(0.1110)
Aggregate outflow rate[be]	-0.0790	(0.0332)	-0.0607	(0.0359)	0.6548	(0.3891)

[a] standard errors account for multiple spells of same individual
[b] time-varying covariate; all other covariates refer to spell beginning or last job
[c] quintiles of whole population of wage earners
[d] maximum entitlement period of unemployment benefits
[e] ratio of yearly outflow to yearly average unemployment

Table 5. Cox proportional hazard model, Women
(standard errors in parentheses[a])

	IABS-NE		IABS-UBJ		SOEP	
Age 26 - 30 years[b]	-		-		-	
Age 31 - 35 years[b]	0.0261	(0.1937)	-0.0921	(0.0220)	0.0524	(0.1156)
Age 36 - 40 years[b]	0.1039	(0.0216)	-0.7816	(0.0243)	-0.2424	(0.1353)
Age 41 - 45 years[b]	0.0940	(0.0290)	-0.0631	(0.0318)	-0.0725	(0.2039)
Age $\geq$ 46 years[b]	0.0223	(0.0383)	-0.0540	(0.0409)	-0.1575	(0.2446)
Married	-0.1024	(0.0165)	0.1668	(0.0175)	0.0510	(0.1017)
Child	-0.1258	(0.1639)	-0.1173	(0.0183)	-0.1522	(0.0952)
Vocational training	0.1416	(0.0210)	0.1409	(0.0232)	-0.0494	(0.1179)
University	0.0694	(0.0371)	0.0264	(0.0437)	-0.3090	(0.2093)
Northern states	-		-		-	
Berlin	-0.1733	(0.0407)	-0.0732	(0.0533)	-	
North-Rhine Westfalia	-0.0745	(0.0220)	-0.0268	(0.0245)	-	
Hesse/Rh.-Pal./Saarland	0.0258	(0.0245)	0.0914	(0.0263)	-	
Baden-Württemberg	0.1331	(0.0251)	0.1210	(0.2704)	-	
Bavaria	0.2294	(0.0246)	0.2293	(0.0259)	-	
Blue collar	-		-		-	
White collar	-0.0256	(0.0216)	-0.0361	(0.0238)	0.1333	(0.1185)
Farm./mining/energy	-		-		-	
Basic industry	-0.5012	(0.0715)	-0.4176	(0.0691)	-	
Investment goods	-0.3110	(0.0727)	-0.4732	(0.0611)	-	
Consumption goods	-0.2832	(0.0780)	-0.2678	(0.0610)	-	
Food/recreation	-0.1708	(0.0896)	-0.1899	(0.0687)	-	
Construction	-0.2245	(0.0924)	-0.2543	(0.0787)	-	
Auxiliary construction	-0.3318	(0.0706)	-0.2900	(0.0745)	-	
Retail	-0.2709	(0.0831)	-0.2748	(0.0590)	-	
Transport/communic.	-0.3614	(0.0715)	-0.1590	(0.0750)	-	
Services (for firms)	-0.1586	(0.0727)	-0.2738	(0.0611)	-	
Services (for households)	-0.3630	(0.0705)	-0.0522	(0.0594)	-	
Services (public)	-0.4701	(0.0782)	-0.2940	(0.0594)	-	
State	-0.1733	(0.0407)	-0.3941	(0.0669)	-	
First quintile[c]	-		-		-	
Second quintile[c]	0.0938	(0.0183)	0.0398	(0.0196)	-	
Third quintile[c]	0.0956	(0.0231)	-0.0174	(0.0273)	-	
Fourth quintile[c]	0.0714	(0.0291)	0.0301	(0.0338)	-	
Fifth quintile[c]	-0.0968	(0.0366)	0.0868	(0.0417)	-	
Length prev. employment	-0.0011	(0.0002)	-0.0010	(0.0002)	-0.0001	(0.0020)
Unemployed last 12 months	0.3534	(0.0213)	0.2376	(0.0208)	0.5564	(0.1266)
Max. entitlement 0 months[bd]	-		-			
Max. entitlement 1 - 12 months[bd]	0.3982	(0.0322)	0.2465	(0.0354)	0.0262	(0.1417)
Max. entitlement 13 - 24 months[bd]	0.3857	(0.0419)	0.1431	(0.0451)	0.0187	(0.2622)
Max. entitlement $\geq$ 25 months[bd]	0.3985	(0.0715)	0.0256	(0.0744)	-0.1697	(0.3367)
1983 - 1987[b]	-		-			
1988 - 1991[b]	0.1539	(0.0254)	0.1597	(0.0277)	-0.2257	(0.1764)
1992 - 1997[b]	0.0943	(0.0198)	0.1671	(0.0210)	-0.0392	(0.1286)
Last quarter of year[b]	-0.1840	(0.0178)	-0.2135	(0.0212)	0.2330	(0.0894)
Aggregate outflow rate[be]	0.1927	(0.0495)	-0.0689	(0.0565)	0.9110	(0.3376)

[a] standard errors account for multiple spells of same individual
[b] time-varying covariate; all other covariates refer to spell beginning or last job
[c] quintiles of whole population of wage earners
[d] maximum entitlement period of unemployment benefits
[e] ratio of yearly outflow to yearly average unemployment

Table A1. Cox proportional hazard model, full dummy specification, Men (standard errors in parentheses[a])

	IABS-NE		IABS-UBJ	
Controls include same variables as in Table 4 and a full set of time-varying year and age dummies				
Max. entitlement[b] 0 months	-		-	
Max. entitlement 12 months	0.4521	(0.0148)	0.3358	(0.0167)
Max. entitlement 16 months	0.5085	(0.0334)	0.3894	(0.0343)
Max. entitlement 18 months	0.3618	(0.0321)	0.2784	(0.0352)
Max. entitlement 20 months	0.3903	(0.0419)	0.2451	(0.0444)
Max. entitlement 22 months	0.2716	(0.0299)	0.2588	(0.0310)
Max. entitlement 26 months	0.2538	(0.0574)	0.2408	(0.0695)
Max. entitlement 32 months	0.0702	(0.4518)	0.1776	(0.4718)

[a] standard errors account for multiple spells of same individual

[b] maximum entitlement period of unemployment benefits, time-varying

Table A2. Cox proportional hazard model, full dummy specification, Women (standard errors in parentheses[a])

	IABS-NE		IABS-UBJ	
Controls include same variables as in Table 5 and a full set of time-varying year and age dummies				
Max. entitlement[b] 0 months	-		-	
Max. entitlement 12 months	0.3744	(0.0306)	0.2348	(0.0336)
Max. entitlement 16 months	0.5183	(0.0734)	0.1359	(0.0841)
Max. entitlement 18 months	0.2570	(0.0563)	0.1910	(0.0601)
Max. entitlement 20 months	0.4202	(0.0771)	0.0490	(0.0805)
Max. entitlement 22 months	0.4606	(0.0586)	0.1444	(0.0650)
Max. entitlement 26 months	0.3583	(0.1071)	0.0636	(0.1197)
Max. entitlement 32 months	1.0521	(0.7516)	-	

[a] standard errors account for multiple spells of same individual

[b] maximum entitlement period of unemployment benefits, time-varying

Table A3. Log-logistic accelerated failure time model with gamma distributed unobserved heterogeneity, Men (standard errors in parentheses[a])

	IABS-NE		IABS-UBJ		SOEP	
Age 26 - 30 years[b]	-		-		-	
Age 31 - 35 years	0.1116	(0.0131)	0.0620	(0.0118)	0.2342	(0.1301)
Age 36 - 40 years	0.1970	(0.0147)	0.1020	(0.0131)	0.3004	(0.1442)
Age 41 - 45 years	0.1979	(0.0186)	0.0750	(0.0165)	0.5020	(0.1815)
Age $\geq$ 46 years	0.2149	(0.0240)	0.0573	(0.0212)	0.6077	(0.2312)
Married	-0.2232	(0.0139)	-0.1234	(0.0123)	0.0279	(0.1424)
Child	-0.0070	(0.0133)	0.0053	(0.0118)	-0.3975	(0.1330)
Vocational training	-0.1455	(0.0120)	-0.0961	(0.0106)	-0.3534	(0.1459)
University	-0.1385	(0.0335)	-0.0589	(0.0321)	-0.7384	(0.2344)
Northern states	-		-		-	
Berlin	0.3368	(0.0331)	0.1396	(0.0321)	-	
North-Rhine Westfalia	0.0669	(0.0163)	0.0105	(0.0142)	-	
Hesse/Rh.-Pal./Saarland	-0.0139	(0.0180)	-0.0569	(0.0154)	-	
Baden-Württemberg	-0.0808	(0.0199)	-0.1646	(0.0175)	-	
Bavaria	-0.1763	(0.0160)	-0.1093	(0.0133)	-	
Blue collar	-		-		-	
White collar	0.2911	(0.0176)	0.1745	(0.0165)	0.0669	(0.1173)
Farm./mining/energy	-		-		-	
Basic industry	0.2105	(0.0302)	0.1270	(0.0252)	-	
Investment goods	0.4424	(0.0286)	0.3022	(0.0246)	-	
Consumption goods	0.3350	(0.0322)	0.1924	(0.0279)	-	
Food/recreation	0.3757	(0.0395)	0.2735	(0.0361)	-	
Construction	0.1683	(0.0268)	0.1930	(0.0220)	-	
Auxiliary construction	0.0670	(0.0302)	0.0582	(0.0249)	-	
Retail	0.3705	(0.0293)	0.2588	(0.0253)	-	
Transport/communic.	0.2797	(0.0315)	0.1616	(0.0268)	-	
Services (for firms)	0.3851	(0.0308)	0.2095	(0.0272)	-	
Services (for households)	0.1902	(0.0346)	0.0934	(0.0299)	-	
Services (public)	0.5822	(0.0356)	0.3792	(0.0326)	-	
State	0.5072	(0.0371)	0.3463	(0.0330)	-	
First quintile[c]	-		-		-	
Second quintile[c]	-0.2375	(0.0186)	-0.1019	(0.0179)	-	
Third quintile[c]	-0.3739	(0.0199)	-0.2242	(0.0188)	-	
Fourth quintile[c]	-0.4113	(0.0213)	-0.2336	(0.0200)	-	
Fifth quintile[c]	-0.3112	(0.0250)	-0.1896	(0.0233)	-	
Length prev. employment	0.0007	(0.0001)	0.0001	(0.0001)	-0.0017	(0.0017)
Unemployed last 12 months	-0.1213	(0.0133)	-0.0129	(0.0108)	-0.1263	(0.1220)
Max. entitlement 0 months[d]	-		-		-	
Max. entitlement 1 - 12 months[d]	-0.3469	(0.0178)	-0.2286	(0.0171)	0.1730	(0.1405)
Max. entitlement 13 - 24 months[d]	-0.2733	(0.0250)	-0.1666	(0.0233)	0.2792	(0.2539)
Max. entitlement $\geq$ 25 months[de]	-		-		-	
1983 - 1987	-		-		-	
1988 - 1991	-0.0599	(0.0197)	-0.0399	(0.0179)	0.4053	(0.2378)
1992 - 1997	0.1091	(0.0126)	-0.0587	(0.0111)	0.2678	(0.1308)
Last quarter of year	0.1341	(0.0101)	0.2260	(0.0091)	-0.0085	(0.1047)
Aggregate outflow rate[f]	0.35462	(0.7475)	0.7577	(0.6846)	0.2218	(0.8811)
Constant	1.5692	(0.0911)	0.5335	(0.0818)	-1.0504	(1.0069)
γ	0.5687	(0.0030)	0.4369	(0.0026)	0.5048	(0.0309)
Variance of unobs. heterog.	0.4695	(0.0111)	0.2107	(0.0079)	0.3800	(0.0966)
P-value of H_0 : no unobs. heterog.	0.0000		0.0000		0.0000	

[a] standard errors account for multiple spells of same individual
[b] all covariates refer to spell beginning
[c] quintiles of whole population of wage earners
[d] maximum entitlement period of unemployment benefits
[e] had to be dropped due to collinearity with age variable
[f] ratio of yearly outflow to yearly average unemployment

Table A4. Log-logistic accelerated failure time model with gamma distributed unobserved heterogeneity, Women (standard errors in parentheses[a])

	IABS-NE		IABS-UBJ		SOEP	
Age 26 - 30 years[b]	-		-		-	
Age 31 - 35 years	-0.0031	(0.0227)	0.0874	(0.0220)	-0.0237	(0.1200)
Age 36 - 40 years	-0.0931	(0.0251)	0.0739	(0.0241)	0.0634	(0.1473)
Age 41 - 45 years	-0.0696	(0.0336)	0.0809	(0.0326)	-0.0078	(0.1879)
Age $\geq$ 46 years	0.0315	(0.0448)	0.0905	(0.0429)	0.1487	(0.2391)
Married	0.1800	(0.0187)	-0.0902	(0.0176)	-0.0119	(0.1072)
Child	0.2573	(0.0297)	0.1305	(0.0180)	0.1860	(0.1048)
Vocational training	-0.2131	(0.0229)	-.0148	(0.0218)	-0.0471	(0.1204)
University	-0.0946	(0.0453)	-0.0238	(0.0444)	-0.0290	(0.2002)
Northern states	-		-		-	
Berlin	0.2635	(0.0507)	0.0175	(0.0525)	-	
North-Rhine Westfalia	0.0929	(0.0255)	-0.001	(0.0242)	-	
Hesse/Rh.-Pal./Saarland	-0.0737	(0.0287)	-0.094	(0.0268)	-	
Baden-Württemberg	-0.1618	(0.0292)	-0.1330	(0.0272)	-	
Bavaria	-0.2565	(0.0268)	-0.2011	(0.0246)	-	
Blue collar	-		-		-	
White collar	0.0213	(0.0237)	0.0641	(0.0220)	-0.0510	(0.1131)
Farm./mining/energy	-		-		-	
Basic industry	0.5859	(0.0775)	0.3681	(0.0684)	-	
Investment goods	0.7101	(0.0702)	0.4304	(0.0608)	-	
Consumption goods	0.4053	(0.0707)	0.1718	(0.0603)	-	
Food/recreation	0.2415	(0.0753)	0.0890	(0.0647)	-	
Construction	0.2359	(0.1001)	0.1963	(0.0860)	-	
Auxiliary construction	0.3631	(0.1002)	0.3357	(0.0858)	-	
Retail	0.3976	(0.0688)	0.1800	(0.0585)	-	
Transport/communic.	0.2720	(0.0828)	0.0360	(0.0717)	-	
Services (for firms)	0.4518	(0.0706)	0.1894	(0.0608)	-	
Services (for households)	0.1886	(0.0687)	0.0195	(0.0576)	-	
Services (public)	0.4760	(0.0687)	0.2070	(0.0585)	-	
State	0.5990	(0.0780)	0.3722	(0.0679)	-	
First quintile[c]	-		-		-	
Second quintile[c]	-0.1424	(0.0204)	-0.0802	(0.0192)	-	
Third quintile[c]	-0.0806	(0.0278)	-0.0460	(0.0268)	-	
Fourth quintile[c]	-0.0801	(0.0344)	-0.0971	(0.0338)	-	
Fifth quintile[c]	0.1863	(0.0437)	-0.0592	(0.0455)	-	
Length prev. employment	0.0016	(0.0002)	0.0013	(0.0002)	0.0011	(0.0019)
Unemployed last 12 months	-0.4120	(0.0237)	-0.1920	(0.0201)	-0.5184	(0.1259)
Max. entitlement 0 months[d]	-		-		-	
Max. entitlement 1 - 12 months[d]	-0.3358	(0.0361)	-0.1125	(0.0337)	0.0952	(0.1280)
Max. entitlement 13 - 24 months[d]	-0.2669	(0.0485)	-0.0244	(0.0455)	0.0131	(0.2303)
Max. entitlement $\geq$ 25 months[de]	-		-		-	
1983 - 1987	-		-		-	
1988 - 1991	-0.1292	(0.0358)	-0.0210	(0.0345)	0.4989	(0.1959)
1992 - 1997	-0.1168	(0.0225)	-0.1255	(0.0215)	0.0323	(0.1232)
Last quarter of year	-0.0828	(0.0184)	-0.0009	(0.0174)	-0.3923	(0.1083)
Aggregate outflow rate[f]	0.6837	(0.1299)	0.8613	(0.1245)	0.2656	(0.7526)
Constant	1.5675	(0.1661)	0.5514	(0.1547)	-1.0213	(0.8620)
γ	0.7058	(0.0051)	0.5334	(0.0046)	0.5633	(0.0222)
Variance of unobs. heterog.	0.2056	(0.0127)	0.0515	(0.0090)	0.0000	(0.0001)
P-value of H_0 : no unobs. heterog.	0.0000		0.0000		1.0000	

[a] standard errors account for multiple spells of same individual
[b] all covariates refer to spell beginning
[c] quintiles of whole population of wage earners
[d] maximum entitlement period of unemployment benefits
[e] had to be dropped due to collinearity with age variable
[f] ratio of yearly outflow to yearly average unemployment

Table A5. Gamma accelerated failure time model with gamma distributed unobserved heterogeneity, Men (standard errors in parentheses[a])

	IABS-NE		IABS-UBJ		SOEP[b]
Age 26 - 30 years[c]	-		-		-
Age 31 - 35 years	0.0898	(0.0124)	0.1670	(0.0516)	-
Age 36 - 40 years	0.1697	(0.0136)	0.0214	(0.0573)	-
Age 41 - 45 years	0.1846	(0.0172)	0.1218	(0.0700)	-
Age $\geq$ 46 years	0.2043	(0.0222)	0.1220	(0.0945)	-
Married	-0.1927	(0.0122)	-0.1216	(0.0509)	-
Child	-0.0101	(0.0119)	-0.0228	(0.0495)	-
Vocational training	-0.1418	(0.0108)	-0.1641	(0.0449)	-
University	-0.1361	(0.0280)	-0.1684	(0.1388)	-
Northern states	-		-		-
Berlin	0.2646	(0.0270)	0.0486	(0.1462)	-
North-Rhine Westfalia	0.0571	(0.0134)	0.0756	(0.0559)	-
Hesse/Rh.-Pal./Saarland	-0.0038	(0.0150)	-0.0296	(0.0626)	-
Baden-Württemberg	-0.0626	(0.0166)	-0.0862	(0.0706)	-
Bavaria	-0.1703	(0.0139)	-0.0556	(0.0557)	-
Blue collar	-		-		-
White collar	0.2206	(0.0150)	0.2401	(0.0633)	-
Farm./mining/energy	-		-		-
Basic industry	0.1927	(0.0281)	0.2305	(0.1087)	-
Investment goods	0.3951	(0.0264)	0.2767	(0.1051)	-
Consumption goods	0.3014	(0.0293)	0.2399	(0.1163)	-
Food/recreation	0.3347	(0.0361)	0.3186	(0.1370)	-
Construction	0.1572	(0.0252)	0.2710	(0.0984)	-
Auxiliary construction	0.0679	(0.0280)	0.1597	(0.1103)	-
Retail	0.3372	(0.0271)	0.2091	(0.1100)	-
Transport/communic.	0.2514	(0.0291)	0.1137	(0.1164)	-
Services (for firms)	0.3477	(0.0281)	0.2224	(0.1182)	-
Services (for households)	0.1796	(0.0313)	0.2078	(0.1313)	-
Services (public)	0.4913	(0.0318)	0.2542	(0.1297)	-
State	0.4587	(0.0329)	0.3919	(0.1281)	-
First quintile[d]	-		-		-
Second quintile[d]	-0.1985	(0.0166)	-0.0287	(0.0779)	-
Third quintile[d]	-0.3397	(0.0180)	-0.2798	(0.0828)	-
Fourth quintile[d]	-0.3841	(0.0195)	-0.1564	(0.0874)	-
Fifth quintile[d]	-0.2725	(0.0227)	-0.2928	(0.1063)	-
Length prev. employment	0.0008	(0.0001)	0.0008	(0.0006)	-
Unemployed last 12 months	-0.1934	(0.0126)	-0.1346	(0.0475)	-
Max. entitlement 0 months[e]	-		-		-
Max. entitlement 1 - 12 months[e]	-0.4049	(0.0157)	-0.2976	(0.0664)	-
Max. entitlement 13 - 24 months[e]	-0.3708	(0.0230)	-0.3393	(0.0962)	-
Max. entitlement $\geq$ 25 months[e,f]	-		-		-
1983 - 1987	-		-		-
1988 - 1991	-0.1368	(0.0128)	-0.1261	(0.0508)	-
1992 - 1997	0.0093	(0.0113)	-0.1942	(0.0468)	-
Last quarter of year	0.1218	(0.0097)	0.2423	(0.0458)	-
Constant	1.8533	(0.0371)	1.3846	(0.1502)	-
κ	-0.8018	(0.0162)	-0.4739	(0.0715)	-
σ	1.1299	(0.0045)	0.8221	(0.0164)	-
Variance of unobs. heterog.	0.0000	(0.0000)	0.0000	(0.0000)	-
P-value of H_0 : no unobs. heterog.	1.0000		1.0000		-

[a] standard errors account for multiple spells of same individual
[b] estimates for GSOEP did not converge
[c] all covariates refer to spell beginning
[d] quintiles of whole population of wage earners
[e] maximum entitlement period of unemployment benefits
[f] had to be dropped due to collinearity with age variable

Table A6. Gamma accelerated failure time model with gamma distributed unobserved heterogeneity, Women (standard errors in parentheses[a])

	IABS-NE		IABS-UBJ		SOEP[b]
Age 26 - 30 years[c]	-		-		-
Age 31 - 35 years	-0.0352	(0.0215)	0.1804	(0.0915)	-
Age 36 - 40 years	-0.1081	(0.0237)	-0.0905	(0.0983)	-
Age 41 - 45 years	-0.0440	(0.0310)	0.1324	(0.1355)	-
Age $\geq$ 46 years	0.0605	(0.0415)	0.2082	(0.1850)	-
Married	0.1550	(0.0173)	-0.2127	(0.0759)	-
Child	0.1890	(0.0174)	0.1859	(0.0759)	-
Vocational training	-0.2107	(0.0214)	-0.1783	(0.0894)	-
University	-0.1241	(0.0421)	0.1601	(0.1890)	-
Northern states	-		-		-
Berlin	0.1917	(0.0455)	0.1019	(0.2204)	-
North-Rhine Westfalia	0.0809	(0.0233)	-0.0508	(0.0986)	-
Hesse/Rh.-Pal./Saarland	-0.0637	(0.0263)	-0.1884	(0.1085)	-
Baden-Württemberg	-0.1507	(0.0270)	0.0160	(0.1149)	-
Bavaria	-0.2428	(0.0249)	-0.1881	(0.1056)	-
Blue collar	-		-		-
White collar	0.0346	(0.0221)	0.1203	(0.0927)	-
Farm./mining/energy	-		-		-
Basic industry	0.5283	(0.0745)	0.6009	(0.2876)	-
Investment goods	0.6728	(0.0674)	0.6247	(0.2491)	-
Consumption goods	0.3573	(0.0678)	0.4982	(0.2490)	-
Food/recreation	0.2211	(0.0721)	0.4256	(0.2714)	-
Construction	0.2291	(0.0965)	0.6265	(0.3200)	-
Auxiliary construction	0.3496	(0.0969)	0.5550	(0.3581)	-
Retail	0.3694	(0.0662)	0.2587	(0.2441)	-
Transport/communic.	0.2580	(0.0781)	0.3464	(0.2964)	-
Services (for firms)	0.4258	(0.0679)	0.3284	(0.2544)	-
Services (for households)	0.1631	(0.0662)	0.4345	(0.2398)	-
Services (public)	0.4371	(0.0661)	0.3666	(0.2441)	-
State	0.5755	(0.0748)	0.2196	(0.2871)	-
First quintile[d]	-		-		-
Second quintile[d]	-0.1384	(0.0193)	-0.0577	(0.0808)	-
Third quintile[d]	-0.0906	(0.0262)	-0.0865	(0.1086)	-
Fourth quintile[d]	-0.0790	(0.0323)	0.0176	(0.1477)	-
Fifth quintile[d]	0.1782	(0.0411)	-0.0558	(0.2194)	-
Length prev. employment	0.0014	(0.0002)	0.0020	(0.0009)	-
Unemployed last 12 months	-0.4549	(0.0224)	-0.0610	(0.0831)	-
Max. entitlement 0 months[e]	-		-		-
Max. entitlement 1 - 12 months[e]	-0.3334	(0.0326)	0.0923	(0.1329)	-
Max. entitlement 13 - 24 months[e]	-0.3349	(0.0447)	-0.0447	(0.1980)	-
Max. entitlement $\geq$ 25 months[e,f]	-		-		-
1983 - 1987	-		-		-
1988 - 1991	-0.3138	(0.0219)	-0.2067	(0.0908)	-
1992 - 1997	-0.2120	(0.0198)	-0.1808	(0.0863)	-
Last quarter of year	-0.0797	(0.0176)	0.1624	(0.0763)	-
Constant	2.3159	(0.0785)	0.8586	(0.2754)	-
κ	-0.3768	(0.0224)	-0.4372	(0.1174)	-
σ	1.3154	(0.0063)	0.9138	(0.0276)	-
Variance of unobs. heterog.	0.0000	(0.0000)	0.0000	(0.0000)	-
P-value of H_0 : no unobs. heterog.	1.0000		1.0000		-

[a] standard errors account for multiple spells of same individual
[b] estimates for GSOEP did not converge
[c] all covariates refer to spell beginning
[d] quintiles of whole population of wage earners
[e] maximum entitlement period of unemployment benefits
[f] had to be dropped due to collinearity with age variable