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Diskussionspapiere
Discussion Papers

Discussion Paper No. 50

**The Effect of Unemployment Compensation
on Unemployment
Duration in Germany**

from
*Jennifer Hunt**
(*Harvard Universität*)

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Deutsches Institut für Wirtschaftsforschung

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The Effect of Unemployment Compensation on Unemployment Duration in Germany

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ABSTRACT

In West Germany during the 1980's, law changes cut the level of unemployment compensation for the unemployed without children, and extended the duration of unemployment insurance for unemployed aged 42 and over, leaving other groups unaffected. This paper takes advantage of these natural experiments to estimate the disincentive effects of unemployment compensation in Germany, using the German Socio-Economic Panel. The analysis of the cut in level is inconclusive. However, the extension of the duration by as much as three times for some older unemployed had a large impact, decreasing the escape rate from unemployment for affected groups by 44-62 percent. Transitions to out of the labor force and transitions of unemployed under 50 were more responsive to extensions of unemployment insurance than transitions to employment and transitions of unemployed 50 or over. The implied elasticity for escapes of men to employment is similar to estimates for men in the United States. The elasticities imply that differences in the potential duration of unemployment insurance only partially explain the difference in spell lengths between Germany and the United States.

During the 1980's several law changes were enacted in West Germany affecting the level and duration of unemployment compensation for certain groups, leaving the remainder of the unemployed unaffected. This paper takes advantage of the experiments provided by these law changes to estimate the impact of unemployment compensation on transitions out of unemployment.

The disincentives of unemployment benefits are important in the context of the debate over unemployment differences between Europe and the United States. Since the 1960's unemployment spells in Europe have been longer on average than in the United States, and there is agreement that this has reduced Europe's ability to recover from shocks to the economy, contributing to a rise in unemployment relative to the United States in the 1970's and 1980's.¹ Although an economy may have long unemployment spells and a low unemployment rate if economic conditions have been favorable for a long time, if inflows to unemployment rise temporarily during a recession, longer spells will increase the time until the rate of unemployment returns to its previous level. The rise in European unemployment rates has in large part been due to increases in spell length, however, rather than to higher inflows to unemployment, and thus not only the length of unemployment spells in Europe, but also their change must be explained. In 1973 Germany, for example, had 0.6 percent unemployment and an average duration of 21 weeks, compared with an unemployment rate of 4.9 percent and an average duration of only 10 weeks in the United States. After poor recoveries from successive recessions, Germany's unemployment rate and average duration had risen to 7.1 percent and 46 weeks in 1984, while the United States figures were 7.5 percent and 18 weeks.²

Disagreement arises as to the role played by Europe's relatively more generous unemployment compensation, and especially by the much longer duration of unemployment compensation, in causing long unemployment spells. In theory, more generous unemployment compensation may persuade recipients to remain unemployed longer, and this effect has been documented empirically for the United States and the United Kingdom.³ However, if recipients remain unemployed longer and thereby reduce labor supply, wages may rise (or the competition for available jobs may fall), and the ineligible will reduce their spell lengths in response. Empirical evidence for this has been found for the United States.⁴ Thus the net impact of more generous benefits on average spell length for all the unemployed may be much smaller than the impact on those eligible for unemployment insurance.

Burtless (1987) argues that the changes in the European unemployment compensation systems since the 1960's have been too minor to play any significant role in the increase in spell lengths. Further, he demonstrates that less than half of the German-American difference in average unemployment duration in 1973 may be explained by differences in unemployment insurance, if it is assumed that the elasticities estimated for covered workers in the United States apply to Europe. By contrast, Layard et. al. (1991) see the duration of unemployment benefits as a major cause of high European unemployment. Their arguments do not attempt to explain the change over time in European unemployment duration, but unlike those of Burtless emphasize the fact that in Europe further benefits are often available for an indefinite period once unemployment insurance has been exhausted.

This paper contributes to this debate by estimating for one European country, Germany, the magnitude of the disincentives of unemployment benefits, and in particular of long

unemployment insurance duration. Although much micro-econometric work has been done on the disincentive effects of unemployment insurance on covered workers in the United States, much less analogous work has been done on the European unemployment compensation systems. As replacement ratios (the level of benefit as a fraction of the previous wage), potential durations and eligibility requirements for German unemployment compensation are very different from those in the United States, elasticities estimated for Germany may be quite different from the American ones [see Atkinson and Micklewright (1991)]. For example, as many Germans exhausting unemployment insurance receive a different form of benefit paying less than unemployment insurance, their sensitivity to changes in unemployment insurance duration may be lower than that of Americans, who receive nothing when unemployment insurance is exhausted.

The reduction in spell length of covered workers in response to a 10 percent cut in the replacement ratio is estimated to be between 0.5 and 1.5 weeks for the United States, while estimates of the elasticity of unemployment duration with respect to benefit levels in the United Kingdom are between zero and 0.6. Previous estimates of the increase in spell length in response to the extension of benefits by one week are in the range 0.1 to 0.2 weeks for the United States, but no estimates from microdata are available for European countries.⁵ Previous papers on the disincentive effects of unemployment compensation in Germany found either no effect of unemployment compensation on spell duration [Galler and Pötter (1987), Wurzel (1990)], or perverse effects [Hujer, Löwenbein and Schneider (1990)].⁶

In contrast to the earlier German studies, this paper does find disincentive effects of unemployment compensation. The magnitude of these effects confirms the analysis of Burtless

suggesting that although unemployment insurance plays a role that cannot be ignored, the search for other causes of long German unemployment spells should continue. The exploitation of changes in laws, in a manner similar to that of Meyer's (1989) study of the United States, reduces the problem of correlation between unobserved individual characteristics and receipt of benefits which has plagued earlier work on unemployment compensation in Germany. Law changes cutting the level of benefits for unemployed without children, and extending the duration of unemployment insurance benefits for unemployed over age 41 are used to construct appropriate control and treatment groups, and the hazard rates for the treatment and control groups before and after the law changes are compared. Competing risks of transitions to employment and out of the labor force are estimated for both men and women using the Cox partial likelihood proportional hazards model. The data set used is the public use file of the German Socio-Economic Panel⁷, which covers the years 1983 to 1988.

THE GERMAN UNEMPLOYMENT COMPENSATION SYSTEM

Before the changes in unemployment compensation laws are considered, the main features of the system as it existed in 1983 will be described.⁸ Unemployment compensation consists of two parts: Arbeitslosengeld (unemployment insurance) and Arbeitslosenhilfe (unemployment assistance) (henceforth ALG and ALH). ALG is funded by contributions from workers and employers, while ALH is funded from general government revenues.

ALG payments are received by an unemployed person for a number of months that depends upon his or her previous experience, up to a maximum of twelve months. A minimum of one year must have been worked in the previous four (the base period) in order to receive any

benefits. The monthly amount received is 68 percent of the previous net monthly wage, and although a cap on the amount one may receive exists, it affects less than 1 percent of the unemployed. If the individual's last job was in a previous year, the previous wage is increased by the amount of the old-age pension indexation.

For those who have some experience but not enough for ALG, or who have exhausted their ALG benefits, ALH is available. The experience requirement for eligibility is five months in the previous four years. ALH pays 58 percent of previous net wages for an indefinite period, but is means-tested, and those judged to have too much wealth are subjected to a waiting period before they may receive ALH. ALH payments are reduced by the amount of other income of the unemployed person, and by the amount of earnings of family members beyond a certain deduction (DM 150 a week for the spouse, and DM 70 per week per other family member earning less than DM 150 per week). The cases of ALH recipients are reviewed once a year.

Workers who quit their job without good cause or are fired for misconduct are barred from receiving benefits for a period of time (usually twelve weeks). The unemployed register at the employment office in order to receive benefits and job placement services. In the first four months of unemployment they may refuse offers received through the office which are not suitable for their qualifications. After this they must accept an offer requiring fewer qualifications if no suitably qualified unemployed person accepts it. The penalty for refusing an offer unjustifiably is a loss of benefits for twelve weeks. Repeat offenders lose their benefits completely. At a given point in time about 55 percent of the unemployed receive ALG, and 20 percent ALH.⁹

As part of a larger budget-cutting package, a law took effect on 1 January 1984 cutting the replacement ratio for those without dependent children to 63 percent for ALG and 56 percent for ALH (the change was voted by the parliament in June 1983).¹⁰ The replacement ratio for those whose work experience was as an apprentice was cut to 50 percent of expected earnings (versus 75 percent previously) or the apprentice pay, whichever is larger. This change applied both to persons with ongoing spells and to persons with spells starting after the law change.

Beginning in 1985 a series of laws came into force which extended the duration of ALG for older workers with much work experience in the previous seven years. These changes applied to both new and ongoing spells, and were motivated by concern about hardship caused by the long average spells of older workers, whose unemployment rate was increasing. Those who had more experience in the base period than required for the previous maximum duration had their duration extended in proportion to their experience in the base period. These laws took effect on 1 January 1985, 1 January 1986 and 1 July 1987, and as shown in Figure 1 successively affected individuals 49 or older, 44 or older and 42 and older. Each law was passed by the parliament about three months before it took effect. The third law also changed the ratio of months worked in the base period to months benefits received for all workers, and changed the length of the base period from four years to three years for all workers. The months of benefits available to workers of different ages and months of experience are shown in Table 1. As summarized in Table 2, the maximum months ALG duration rose by 1988 to 32 months for unemployed 54 or older, 26 months for those aged 49-53, 22 months for those aged 44-48, and 18 months for those aged 42-43.

Additional laws were passed which essentially facilitated the transition of the older unemployed to retirement, by allowing them to collect benefits without being registered at the employment office. These laws affected those 58 or older.

DATA

The data set used is the public use version of the household based German Socio-Economic Panel (GSOEP), set up in 1984 through an initially random sampling of German households and an oversampling of foreign households in Germany. Panel members sixteen or older are asked demographic questions relating to the interview year, and a series of labor market questions relating to the previous year. Specifically, respondents must mark on a calendar their labor force status in each month and the type of income received in each month. It is thus possible to construct spells of employment and unemployment, and of receipt of ALG and ALH. Individuals checking the box "registered as unemployed" (that is, at the employment office) are considered unemployed, while individuals checking any other boxes except "full time work" and "part time work" are considered out of the labor force. Left censored spells (spells in progress at the start of the data set) are not used, and individuals joining households in the survey after the first interview year are dropped, as they have zero weight in the data set. The spells of people older than 57 when unemployment began are not used, and ongoing spells are censored if the individual reaches age 58, in order to avoid the effects of special programs for people of this age. The information is available from January 1983 to December 1988.

One problem with the data which becomes apparent later is that the most common month in the data for the end of a spell is December. In aggregate data, however, unemployment

increases from November to December to January. It seems that many people, especially those leaving the labor force at the end of the spell, tend to remember that their spell ended in December even if it ended a bit earlier or later (they also tend to remember that it began in January). Conversely, there is very little problem with individuals oscillating between unemployment and out of the labor force, unable to decide in which state they are.

PREVIOUS STUDIES OF EFFECT OF UNEMPLOYMENT BENEFITS IN GERMANY

Galler and Pötter (1987) and Wurzel (1990) estimated parametric hazard rate models for escapes to employment, using the first two years of the GSOEP. The covariates included a dummy for receipt of either ALG or ALH in the current month. Both Galler and Pötter, who focussed on men, and Wurzel found the coefficient on this dummy to be insignificant.

Hujer et. al. (1990) used the first three years of the GSOEP, and estimated two parametric models for men. These authors included as covariates the amount of unemployment compensation received and separate dummies for the receipt in a month of ALG or ALH. The amount of unemployment compensation received was found to have no effect, while ALG receipt had a positive sign but was insignificant, and ALH receipt had a negative and significant sign.¹¹

The conclusion to be drawn from previous work is that recipients of ALG and ALH differ from each other and from non-recipients in ways difficult to control for, and that dummies for receipt of benefits are likely to be picking up this heterogeneity. In particular, ALG recipients have positive unobserved qualities, and thus tend to leave unemployment more quickly. Hence a more sophisticated approach is needed.

EMPIRICAL MODEL

The theory behind the disincentive effects of unemployment compensation on compensation recipients has been treated extensively in other papers.¹² For both the level and duration of benefits there are two effects which work in opposite directions. With a higher level of benefits the disutility associated with unemployment in the present is lower, and there is less incentive to find a job. However, unemployment in the future is less unpleasant too, and an unemployed individual can afford a higher risk that the job accepted will end in unemployment, thus making more job offers acceptable. If benefits last longer the incentive to accept a job is lower, but the argument about future unemployment also holds true, as longer benefits reduce the probability that they will be exhausted, thus raising the expected utility of a future spell. On balance, however, more generous benefits are expected to make unemployment spells longer for recipients of benefits. As already mentioned, more generous benefits should make the spells of those ineligible for benefits shorter, as they take advantage of the reduction in labor supply (and search intensity) of benefit recipients.

The strategy used to identify the impact of the law changes is a "differences in differences" approach. Individuals are divided into treatment and control groups: the treatment group is the group of individuals to whom a law change applies, while the control group is the group of individuals unaffected by the law change. The outcome for the treatment and control groups are compared before and after a law change, and if the temporal change for the treatment group is not the same as for the control group, the difference is ascribed to the law change. In a regression framework, period-specific and treatment group-specific effects are controlled for using dummies, in addition to other variables thought to influence the outcome. The variable

of interest is then the interaction between the period dummy indicating the period when the new law is in effect, and the treatment group dummy. This captures the effect of the law change.

The analysis of the extensions of the potential duration of ALG will be examined separately from the cut in the level of benefits. For the cut in the level of benefits the obvious way to proceed is to assign individuals without children to the treatment group, and individuals with children to the control group. The case of the cut in benefits for those finding no job after their apprenticeship is not examined separately, but as apprenticeships are finished at age 19 in general, most of these people are childless.¹³ In the case of the extensions of benefits, four age groups are affected by the laws, but for reasons of sample size, two of these are considered together. There are therefore three treatment groups: individuals aged 42 to 43, 44 to 48 and 49 to 57. The control group consists of those 41 years old or less. Table 3 shows the sample sizes involved in the analysis.

The hazard model used to analyze the durations of the unemployment spells is the Cox partial likelihood proportional hazards model. The hazard is assumed to be of the form:

$$\lambda(t; z) = \lambda_0(t) e^{z(t)\beta} \quad (1)$$

where $z(t)$ contains time-varying covariates describing the unemployed individuals, and $\lambda_0(t)$ is the "baseline" hazard, which is allowed to be non-parametric (if the covariates are measured as deviations from means, the baseline hazard may be interpreted as the hazard for the mean individual).

A problem encountered in hazard rate analysis of unemployment is that of unobserved heterogeneity, especially the fact that individuals with poor unobserved qualities are a larger

proportion of the unemployed at longer durations than at shorter durations. The empirical work of Meyer (1990) and others suggests that if the hazard rate is allowed to be non-parametric, explicitly modelling unobserved heterogeneity changes the coefficients on the covariates little. This paper will therefore merely test for heterogeneity (or mis-specification).

The Peto-Breslow approximation is used to deal with ties (more than one spell ending in a given period), which implies that the likelihood function is approximated as:

$$L = \prod L_i \quad (2)$$

$$L_i = \frac{e^{\sum_j z_{ij}(t)\beta}}{[\sum_{h \in R^i} e^{z_h(t)\beta}]^{m_i}} \quad (3)$$

where m_i is the number of individuals leaving unemployment at time i , the set R^i contains all observations which could have left at time i , and z_{ij} are covariates for the j th observation leaving at time i [see Kalbfleisch and Prentice (1980) p.74.].

The fact that an unemployment spell may end with the individual either getting a job or leaving the labor force is taken into consideration by estimating a competing risks model. This assumes that the hazard rate for both transitions is defined, and the hazard rate for all exits from unemployment is the sum of the two. When estimating the hazard for transitions to employment, spells ending with a transition to out of the labor force are recorded as censored, and vice versa.

If there were only one law change to be analyzed, the hazard estimated would have the form:

$$\lambda(t) = \lambda_0(t) \exp [X(t) \beta_1 + \beta_2 \text{after} + \beta_3 \text{treat} + \beta_4 \text{after} * \text{treat}] \quad (4)$$

AFTER is a time dummy equal to one after the law change, and TREAT is the treatment dummy equal to one for those in the treatment group. The coefficient β_4 on the interaction term indicates the effect of being in the after period and in the treatment group, which I assume is the effect of the law change.

The equation actually estimated is more complicated as several law changes must be taken into consideration. The hazard rate has the form:

$$\lambda(t) = \lambda_0(t) \exp [X(t) \beta_1 + P(t) \beta_2 + T \beta_3 + \beta_4 \text{period0} * \text{nokids} + \beta_5 \text{period3} * \text{age4243} + \beta_6 \text{period2} * \text{age4448} + \beta_7 \text{period3} * \text{age4448} + \beta_8 \text{period1} * \text{age4957} + \beta_9 \text{period2} * \text{age4957} + \beta_{10} \text{period3} * \text{age4957}] \quad (5)$$

P(t) contains the four period dummies period0, period1, period2 and period3, whose starting and ending dates are indicated in Figure 1. T contains four treatment dummies: nokids, age4243, age4448 and age4957. Proceeding in this manner assumes that the impact of a cut in the level of benefits and an extension of potential ALG duration on the same spell may be found by adding the separate effects together.

DESCRIPTIVE STATISTICS AND GRAPHICAL ANALYSIS

Before turning to the regression analysis, it is helpful to examine the data more simply. First, an idea of the proportion of unemployed covered by ALG and ALH is given in Table 4. Most interesting is the low proportion of unemployed receiving ALG who actually exhausted ALG (12 percent of uncensored spells). Of these, about half then received ALH. About a third of ALH recipients received no ALG during the unemployment spell.

Figure 2 documents the large increase in the unemployment rate among older workers compared to all workers, which presumably prompted the changes in the laws. Participation rates increased at the same rate for all age groups over this period (these numbers are not shown). Trends in spell length are discussed below.

Table 5 gives the means of key variables both for the whole sample and for the different treatment groups. It is worth noting that nineteen individuals claimed to be unemployed for all six years considered (they were dropped, as their spells are left censored), while ten more had spells of between five and six years.

Kaplan-Meier survival curves, indicating the probability of still being unemployed at a given duration, may be used effectively to describe the behavior of the unemployed. Figure 3 graphs survival curves for the whole sample (that is, unemployed under age 58) using the Kaplan-Meier technique. The figure has curves for all escapes from unemployment, and for the competing risks of escapes to employment and out of the labor force.¹⁴ The curve for exits to employment is fairly smooth, while that for exits to out of the labor force indicates large numbers of escapes at 12 and 24 months. Many of these 12 and 24 month spells begin in

January and end in December, so the drop at 12 months does not principally reflect exhaustion of ALG.

Figures 4-6 graph similar curves for treatment and control groups before and after law changes. The first two sets of graphs consider the extensions to the benefits of older workers, in particular the groups aged 44 to 48 and 49 to 57. In both sets the control group is unemployed aged 41 or younger. Survival curves are plotted for control and treatment groups for the periods before and after the first law change affecting the treatment group considered (for simplicity the date of the start of the unemployment spell is used for period classification). In the case of the extension of benefits, one would expect a shift outward of the treatment group curve relative to the control group curve (that is, the treatments are more likely to remain in unemployment after the law change than before, relative to the controls). In Figure 4, the 44-48 group seems to shift out after the law change in the graphs for all escapes, and escapes to employment, while the control group moves little. There is no obvious shift in the curves for escapes to out of the labor force. Figure 5 for the 49-57 year old group is similar, except that the change seems to be in the transition to out of the labor force, with little change in escapes to employment.

Figure 6 examines the cut in the level of benefits. As the "before" period is so short, for this graph spells which began before the law change and continued beyond the date of the law change were censored at that date, which means that the longest "before" spell is eleven months. Spells beginning in the first two years were used. Here the treatment group is expected to shift inward after the law change. There is some evidence in the graph for exits to out of the labor force that the control group shifted out more than the treatment group, which

would accord with expectations about relative movements. In the escapes to employment graph, however, there are no noticeable shifts.

The relative movements of treatment and control groups in Figures 4 and 5 are what one would expect in response to the changes in laws, but they could be due to a trend in the relative spell lengths of older workers which is independent of changes in the laws. If this were the case, the curves of the treatment groups would shift out over time, relative to the control group, from the beginning of the data set. In Figure 7 survival curves have been plotted for all escapes from unemployment of the control group and 44-48 year olds, and for escapes to out of the labor force for 49-57 year olds, for four time periods. For the 49-57 year olds the six available years were divided into two one-year and two two-year periods, while for the others the division made was into four 18 month periods. In this way the first two curves for both the 44-48 year olds graph and the 49-57 year olds graph are before any law change affected the group in question. These curves should therefore move in the same way as those of the control group, while the third and fourth curves should shift out, reflecting the law changes. Figure 7 shows that the control group curves do not shift, and that the curves of the 44-48 year olds move more or less as predicted under the assumption that only the changes in the laws were affecting them. The sample sizes are very small for the graph for transitions to out of the labor force for the 49-57 year olds, but there is certainly a shift out between periods 0 and 1, which could lead to spurious results if not captured by covariates in the regressions.

REGRESSION RESULTS

First, a competing risks model which does not use changes in laws is estimated. The results in Table 6 confirm broadly the results of earlier studies, especially that ALG recipients leave unemployment more quickly than those not receiving ALG. The ALG dummy probably proxies for recent experience, and does this better than the experience variable itself, which if added to the covariates has an insignificant coefficient (these results are not shown). The coefficients are more significant than those in previous German studies as more years of data are used. The level of benefit received is not found to be significant. In these as in later regressions, a dummy for the month of December is used to control for the memory effect of respondents.

In Table 7 the treatment and period dummies and their interaction have been added to the covariates of Table 6, to assess the impact of the changes in potential durations and levels of benefits. For spells in progress at dates of law changes the period dummy for the next period turns to one in the middle of the spell. In the first column, which considers all escapes from unemployment, the coefficient on the period 3 (July 1987 - December 1988) - aged 44-48 interaction is significantly negative, indicating that the law change in period 3 lowered the relative hazard rate for this group, as would be expected. The coefficient on the interaction of age 44-48 with period 2 is significantly negative at the 10 percent level. However, the coefficients on the age 49-57 interactions are not significant, and a χ^2 test fails to reject the hypothesis that all the age-period interaction coefficients are zero. The interaction term for the cut in the level of benefits is not significant. The period 3*aged 44-48 interaction's coefficient is still significant in the equation for escapes to employment, but the other age-period interaction

coefficients are insignificant, and the χ^2 test fails to reject the hypothesis that the interaction coefficients are equal to zero. In the third column considering escapes to out of the labor force, the coefficients on period 3*aged 44-48 and period 3*aged 49-57 are significant at the 10 percent level - the much smaller number of uncensored spells in this column is probably responsible for the lower significance level. The χ^2 test again fails to reject the hypothesis that the age-period interactions are equal to zero. The coefficient on the interaction term for the cut in the level of benefit is significant at the 5 percent level, where the positive sign indicates that the cut in benefits increased the hazard rate. Also reported in the table are the results of the Clayton and Cuzick (1985) test for heterogeneity based on the score statistic and its standard deviation¹⁵. The statistic used for the one-sided test has a standard normal distribution. In no case is the hypothesis of no unobserved heterogeneity rejected, which suggests that heterogeneity not controlled for is being captured by the flexible baseline hazard function.

These results confirm the picture given by Figures 4-6. The 44-48 year olds moving both to employment and out of the labor force remained unemployed for longer due to the extension of their benefits, but the impact on transitions to out of the labor force is much larger than on transitions to employment. The 49-57 year olds seem to be unaffected in their transitions to employment, but those moving to out of the labor force remained unemployed much longer, although the coefficient is smaller than that for 44-48 year olds. The true coefficient may be even smaller, as the graphs of Figure 7 suggested the hazard rate of the 49-57 year olds for transitions to out of the labor force may have been trending upward before the law changes. As some of the oldest in this group would have been able to make a bridge to early retirement at 60, it is the more interesting that the coefficient found is smaller than that of the 44-48 year

olds. The finding that the transitions of older workers respond less to changes in benefits confirms the analysis of Narendranathan (1985). The 42-43 year old treatment group is rather small, experienced a smaller change in benefits, and contains some spells from the control group, as the birth month of individuals is not known. The insignificant coefficient on its interaction covariate is therefore not surprising. The unemployed without children seemed to be encouraged by the cut in their benefits to move to out of the labor force, but the cut apparently did not increase flows to employment; indeed the sign on the interaction coefficient is wrong, although it is insignificant.

In column 2, the coefficient of -0.58 on period 3*aged 44-48 implies that the law change made 44-48 year olds 44 percent less likely to leave unemployment in a given month, relative to unemployed 42 or younger. A more intuitive grasp of the size of the coefficient may be given by estimating the hazard function for a particular set of covariates using a non-parametric technique similar to the Kaplan-Meier technique. A married, childless, German male aged 47, who had completed an apprenticeship, would have a 55 percent chance of finding a job in the first six months in the absence of changes in the law. Adjusting the hazard function obtained in this way using the period 3 interaction coefficient for the 44-48 year olds indicates that after the July 1987 changes the probability of such an individual finding a job in the first six months of his spell would fall to 36 percent. This discussion makes it clear that for transitions to out of the labor force the magnitude of the interaction coefficient for the cut in benefits (0.89) is implausibly large in view of the small cut in benefits. The coefficients on the period 3 interactions in the same regression imply a 62 percent fall in the relative hazard for 44-48 year olds, and a 57 percent fall for 49-57 year olds.

The large magnitude of the escapes to out of the labor force coefficients compared with the escapes to employment coefficients suggests that many who left the labor force were individuals who were not looking for work, but called themselves unemployed while receiving benefits to which they were entitled, and out of the labor force when those benefits were exhausted. Extending benefits for such individuals ostensibly extends their unemployment spell although their job search behavior has not been affected, and this is important for official unemployment statistics, even if the individuals were never unemployed in the economic sense. This cannot be the only effect of longer ALG on transitions to out of the labor force, however, for in that case the impact would almost certainly be larger for 49-57 year olds than for 44-48 year olds.

The coefficients estimated in Table 7 will be biased toward zero if individuals changed their behavior to anticipate law changes once they had been announced but not yet enacted. In the case of the cut in benefits, individuals with no children might have exited in unusually large numbers just before 1 January 1984, so as not to be unemployed with lower benefits. The opposite effect could occur with the extensions to ALG, if older individuals who would have searched intensively for a job prolonged their spells so as to benefit from the extension. The importance of anticipation may be judged by redefining the period dummies as though the laws had changed one month earlier than they did. The results of the regressions run in this way yield coefficients on the age-period interactions very similar to those in the original specification, although the coefficients for transitions to out of the labor force are less significant (these results are not shown). This suggests that anticipatory behavior is not biasing the results. The sign of the coefficient on the cut in benefit interaction changes in the escapes to out of the labor force

regression, however. The fact that this coefficient is very sensitive to the specification may be due to there being insufficient spells in the "before" period or too small a cut in benefits to estimate the coefficient reliably.

As ALG was extended only for older unemployed with considerable experience in the previous seven years, it might be thought the treatment groups should be comprised of individuals in the relevant age group with more than a certain amount of experience in the previous seven years. As initially defined, the treatment group includes some older inexperienced individuals who would not be affected by the extension of ALG. This would bias the coefficients toward zero. If the regressions are run with the treatment groups defined as a function of experience, the estimated coefficients are slightly larger (these results are not shown).¹⁶

Certain other specifications were estimated, although the results are not reported here. Adding the individual's work experience or past years of unemployment to the covariates changed the result little, as did controlling for the macro-economic climate by adding the monthly (national) unemployment rate or dummies for every six month period to the covariates. Grouping the interactions so as to have only one per treatment group did not lead to greater insight. Dropping 42, 44 and 49 years olds, some of whom had not in fact yet reached their 42nd, 44th or 49th birthday (only their birth year is known, not the birth month) changes the results little. These individuals should bias the results toward zero, as they are placed in the treatment group, but are not affected by the new laws.

All regressions discussed so far include both men and women, and individuals who had been working immediately prior to becoming unemployed as well as those who had not.

Individuals may behave differently according to their attachment to the labor force, and to test this additional regressions were run. Table 8 contains results from the estimation of the original specification of Table 7 for the sub-sample of individuals who moved from employment to unemployment. The coefficients on the age-period interactions are larger and more significant, especially in the column for transitions to out of the labor force, but qualitatively confirm the original results, in particular that the coefficient for 49-57 year olds is smaller than that for 44-48 year olds in the transitions to out of the labor force regression.

Estimating the equations for men raises the coefficients considerably in the regressions for all escapes and for escapes to employment, as Table 9 shows. The coefficient for 44-48 year old men (-0.93) implies the hazard fell by 61 percent by 1988 for transitions to employment. The small number of transitions to out of the labor force for men does not permit precise estimates of the coefficients in column 3. Although the sample size is rather small, the results for male job losers were similar (these are not shown). The results for women in Table 10 show a large response of transitions to out of the labor force. The 49-57 year olds' transitions to employment do not appear to be affected, but the coefficient on period2*age 44-48 is significant and large, although the coefficient on period3*age 44-48 is insignificant. Note that 63 percent of uncensored women's spells ended in employment and 75 percent began after a job loss, and that ALG was received in 69 percent of women's spells (compared with 76 percent of men's spells).

The analysis of men allows a comparison with studies of American men. The magnitudes of the coefficients estimated here are most easily compared with the results of Moffitt (1985), whose estimates are in the middle of the range found for the United States. As Moffitt analyzes

the exits from unemployment of male unemployment insurance recipients, most of the escapes in his data would be to employment. He includes potential duration of unemployment (in weeks) as a covariate in his semi-parametric model, and estimates a coefficient of -0.020. This would imply a hazard rate lower by 58 percent in response to a 10 month increase in potential unemployment insurance receipt, the increase given to the 44-48 year old Germans between 1985 and 1987. This is close to the 61 percent effect found for German men in Table 9 for transitions to employment. Katz and Meyer (1990) find a slightly larger effect. It should be noted that as not all 44-48 year olds had enough experience to receive the full 10 month extension, the true implied elasticity may be somewhat higher. On the other hand, as the effect on older workers relative to younger workers is examined here, these elasticities may overestimate the effect which would result from an extension of benefits for all age groups.

Burtless (1987) and Katz and Meyer (1990) have used the elasticities for transitions of American men to employment to assess how much of the American-European difference in spell length may be attributed to generous European unemployment insurance (Burtless applies Moffitt's elasticities to Germany). A more correct elasticity is that for all exits from unemployment for both sexes, an elasticity which Table 7 show to be smaller (-0.66 rather than -0.93). Thus the conclusions of Burtless and Katz and Meyer that generous unemployment insurance accounts for less than half the 1973 difference, and less than a third of the 1984 difference, are confirmed. The role of ALH has yet to be rigorously examined, however, and the existence of ALH may explain more of the difference in average spell length.

CONCLUSIONS

The effect of the cut in benefit level for the childless is unclear, as even the sign changes with the specification, and some coefficients are of implausibly large magnitude. However, the large increases in potential ALG duration for older workers increased their unemployment duration greatly relative to younger workers. While the extensions had large effects on all transitions out of unemployment for 44-48 year olds, the effect on 49-57 year olds was smaller, and principally through transitions to out of the labor force rather than to employment. The relative hazard rates for 44-48 year olds, whose potential duration increased from 12 to 22 months, fell by about 44 percent for transitions to employment, and by about 62 percent for transitions to out of the labor force. The relative hazard rate for 49-57 year olds leaving the labor force fell by about 57 percent in response to a potential duration increase from 12 to 32 months. However, the coefficients are imprecisely estimated. The larger response of transitions to out of the labor force is probably explained by individuals not seeking work who called themselves unemployed while they were receiving benefits and out of the labor force when these were exhausted.

The subsample of individuals entering unemployment from employment was found to be more sensitive to the law changes. When men and women were examined separately, it was found that the response of women to changes in ALG was greater through escapes to out of the labor force than through escapes to employment, and that the response of escapes to employment was mainly due to men. The magnitude of the effect found for transitions of men to employment was very close to that found by Moffitt (1985), whose results are in the middle of the range for the United States.

The large increase in potential duration of ALG provoked a large response, and the implied elasticity confirms that the duration of ALG plays a significant role in explaining why German unemployment spells are so much longer than American spells. The elasticity is not nearly large enough to explain the whole difference, however, and further research is thus required to ascertain the importance of other factors, such as ALH, in causing long spells in Germany.

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NOTES

1. See Atkinson and Micklewright (1990), Burtless (1987) and Layard et. al. (1991)
2. See Bundesanstalt für Arbeit (1989), Burtless (1987), OECD Employment Outlook (1990) and Statistical Abstract of the United States (1981,1990).
3. See Katz and Meyer (1990a,1990b), Meyer (1990), Moffitt (1985), Moffitt and Nicholson (1982) for studies of the United States. See Lancaster and Nickell (1980), and Narendranathan et. al. (1985) for studies of the United Kingdom. Atkinson and Micklewright (1991) survey the literature for all countries.
4. See Atkinson and Micklewright (1991), Layard et. al. (1991) and Levine (1991) for discussion, and Levine (1991) for empirical analysis.
5. See references in note 2.
6. These studies will be discussed in more detail once the German unemployment compensation system and the data have been described (all German studies including this paper have used the same data set).
7. See Projektgruppe 'Das Sozio-ökonomische Panel' (1990). The public use file contains a 95% random sample of the original GSOEP data.
8. See Arbeitskammer des Saarlandes (1988) for the most complete description.
9. Author's tabulation of German Socio-Economic Panel data.
10. Offspring through age 16 are counted as children, as are offspring from 17 to 27 who are studying (studying includes doing an apprenticeship).
11. They also included a dummy indicating whether ALG had two months or fewer until exhaustion. The data set does not allow one to know the number of months to which an ALG recipient is entitled, so presumably this dummy is zero for those with spell lengths of less than twelve months, even if their ALG entitlement was almost exhausted; thus it is not so surprising

that the coefficient on this dummy was found to be negative and significant, given its endogenous definition.

12. See the references in note 2, and Mortensen (1977).

13. Twelve percent of the treatment group entered unemployment from some form of education, which includes apprenticeships.

14. When escapes to one state are focussed on, escapes to the other state are recorded as censored.

15. The statistic T used to test the hypothesis of no unobserved heterogeneity is calculated as follows:

$$T = \frac{1}{2} \left\{ \sum_{i=1}^N (h_i - d_i)^2 - d_i \right\}$$

where N is the number of spells in the sample, d_i is an indicator for an exit (rather than a censoring) for spell i, and

$$h_i = \sum_{t_j \leq t_i} \frac{m_{t_j}}{\sum_{l \in R^{t_j}} \theta_l} \theta_{t_j} \quad \theta_{t_j} = e^{\beta x_{t_j}}$$

where t_i is the duration of spell i and m_{t_j} is the number of exits from unemployment at duration t_j . The set R^{t_j} contains all spells which could have ended at time t_j .

The variance of T is:

$$\text{var}(T) = \sum_{i=1}^N h_i^2 \left[\frac{2}{3} h_i - d_i \right]$$

T divided by its standard deviation has a standard normal distribution. The test is a one-sided test for converging hazards (heterogeneity) versus the null hypothesis of proportional or diverging hazards.

16. It is difficult to construct the experience of all unemployed in the previous seven years, which is why these results are not emphasized. For the years prior to the start of the survey, respondents check activities for each year since age 16. If full time work is checked for a given year, for example, it could be for any number of months, and this is particularly uncertain if unemployment is checked for the same year. A further and more serious problem is how to combine experience from before the start of the survey with experience during the survey.

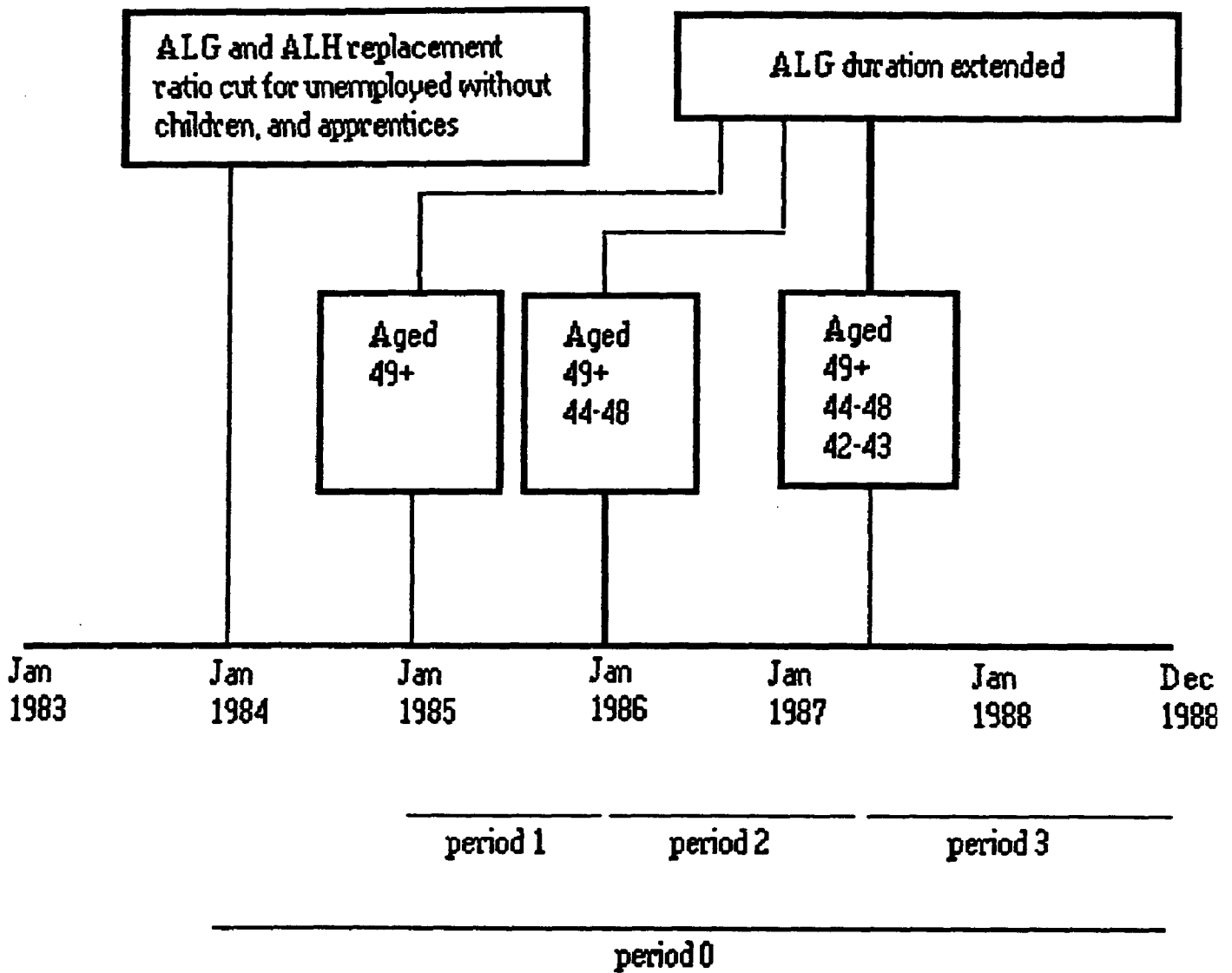


Figure 1: Timing of Changes in Unemployment Compensation Laws 1983-1988

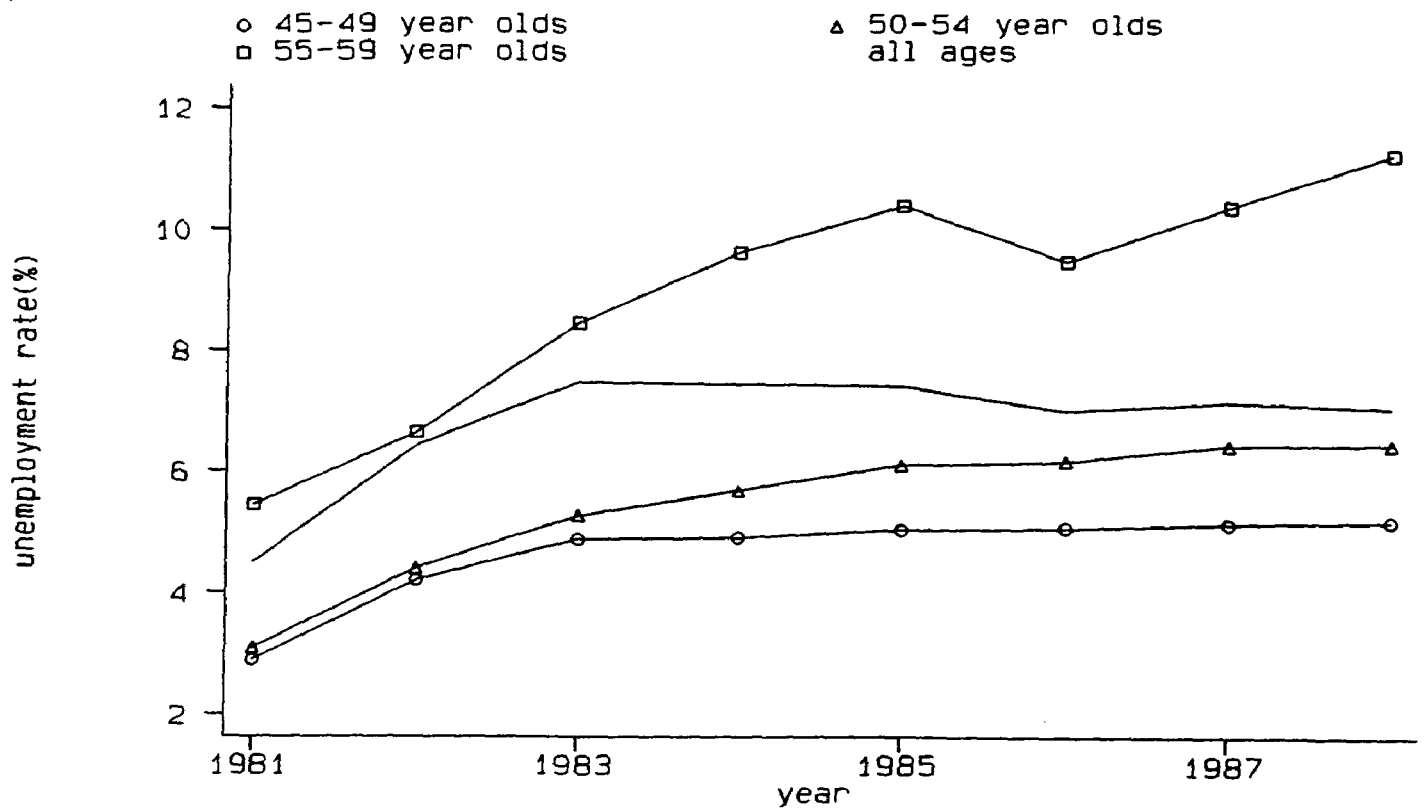


Figure 2: Unemployment Rates by Age Group 1981-1988
 Source: ILO Yearbook, Statistisches Jahrbuch

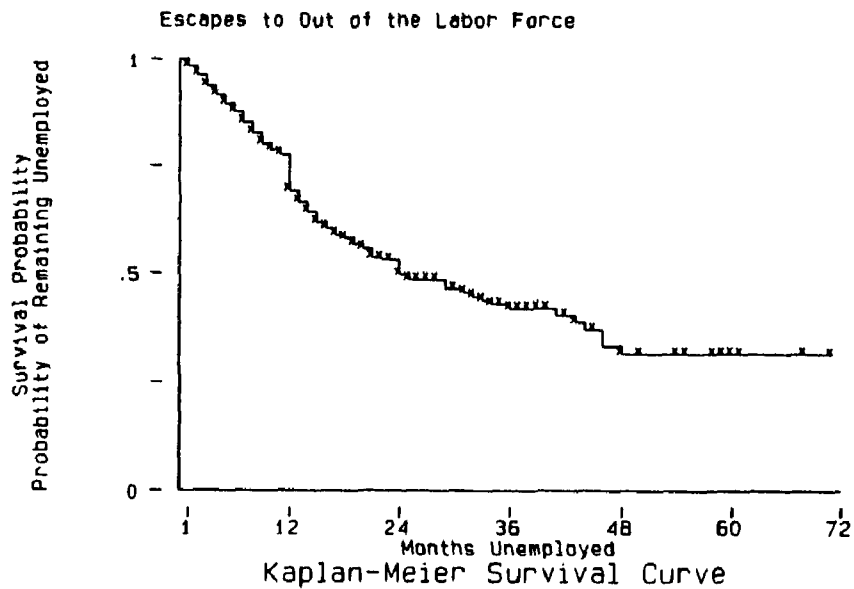
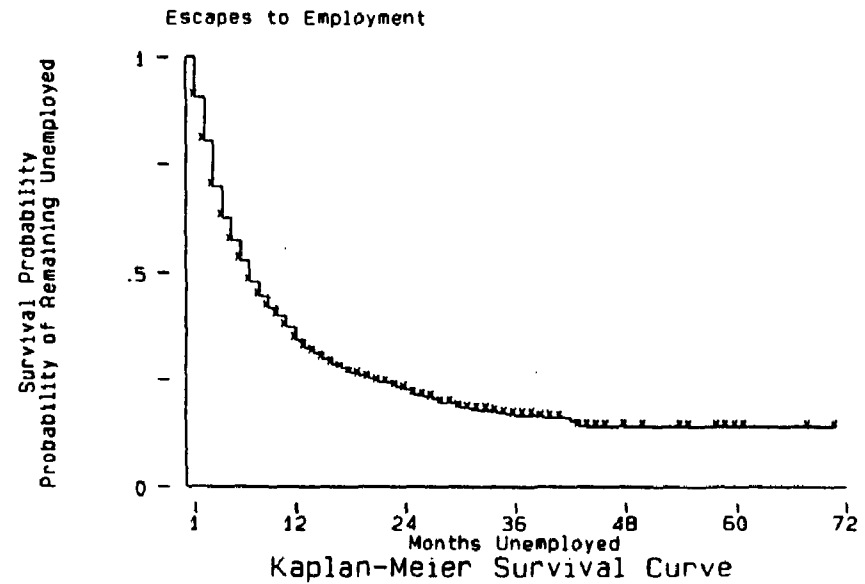
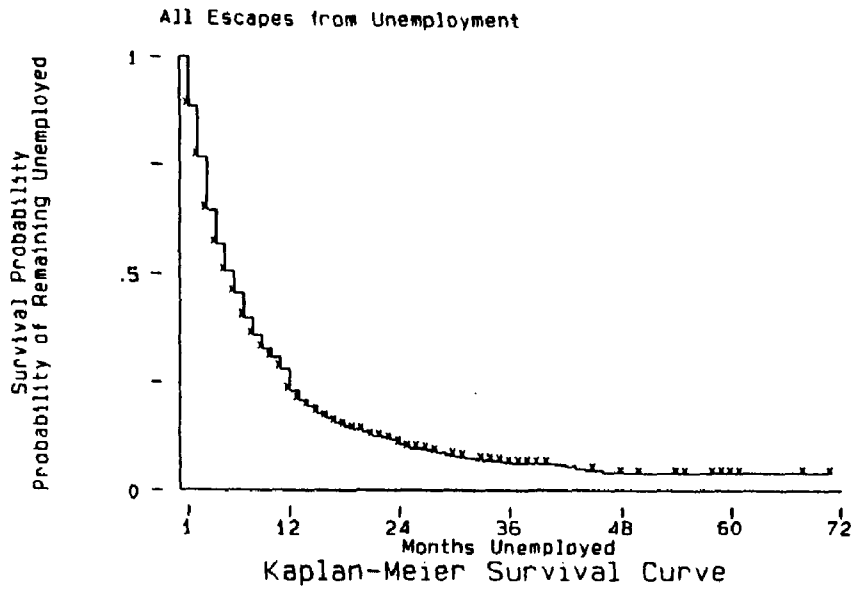


Figure 3: Survival Curves for Unemployed Aged 16-57

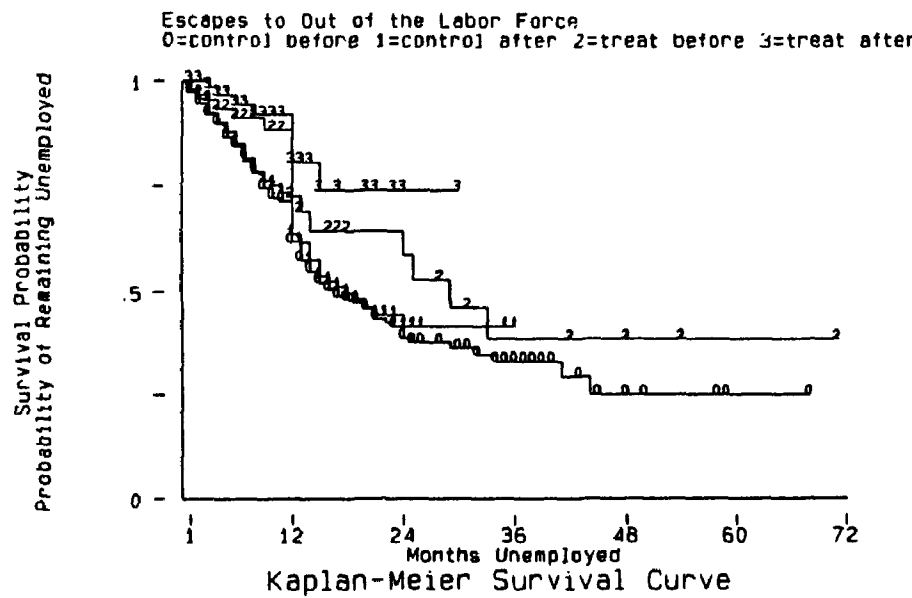
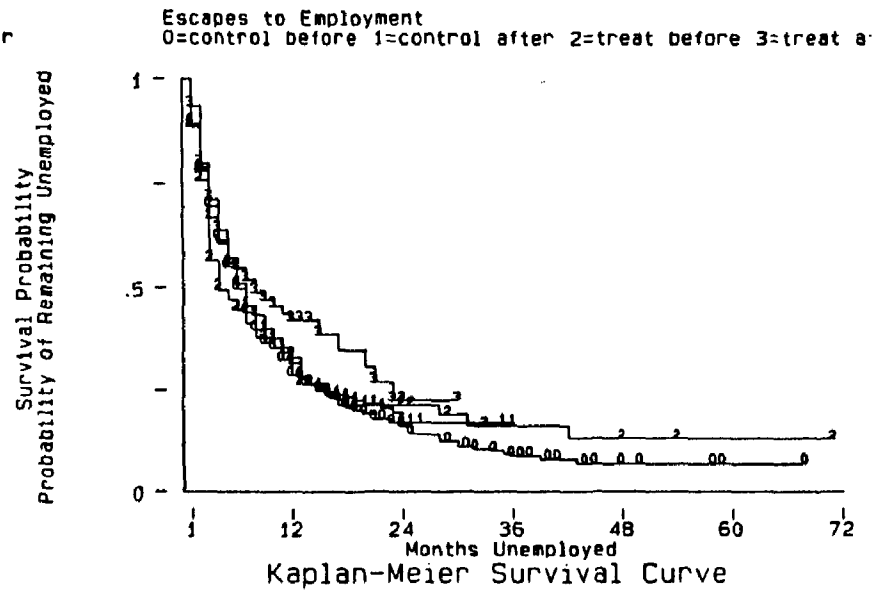
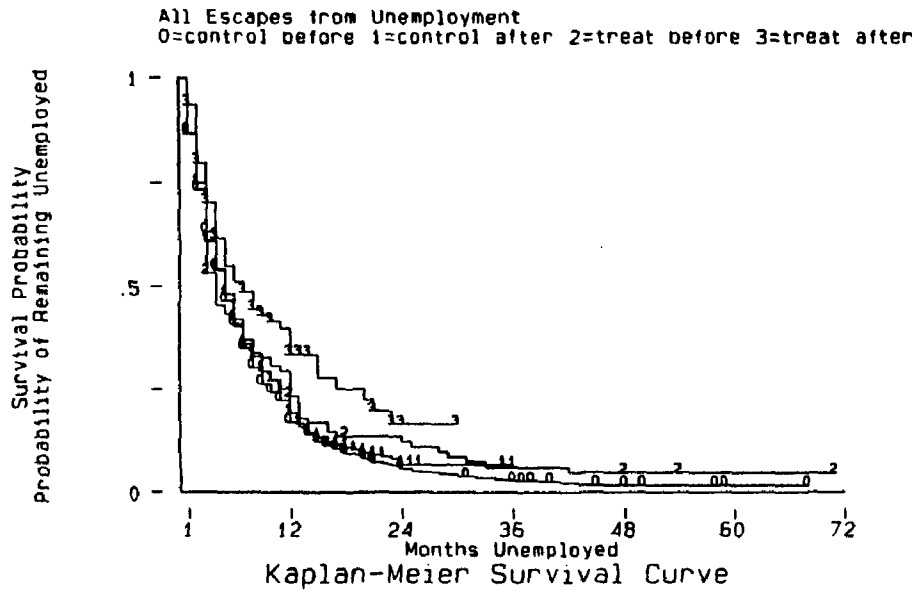


Figure 4: Survival Curves - Control Aged 16-41, Treatment Aged 44-48

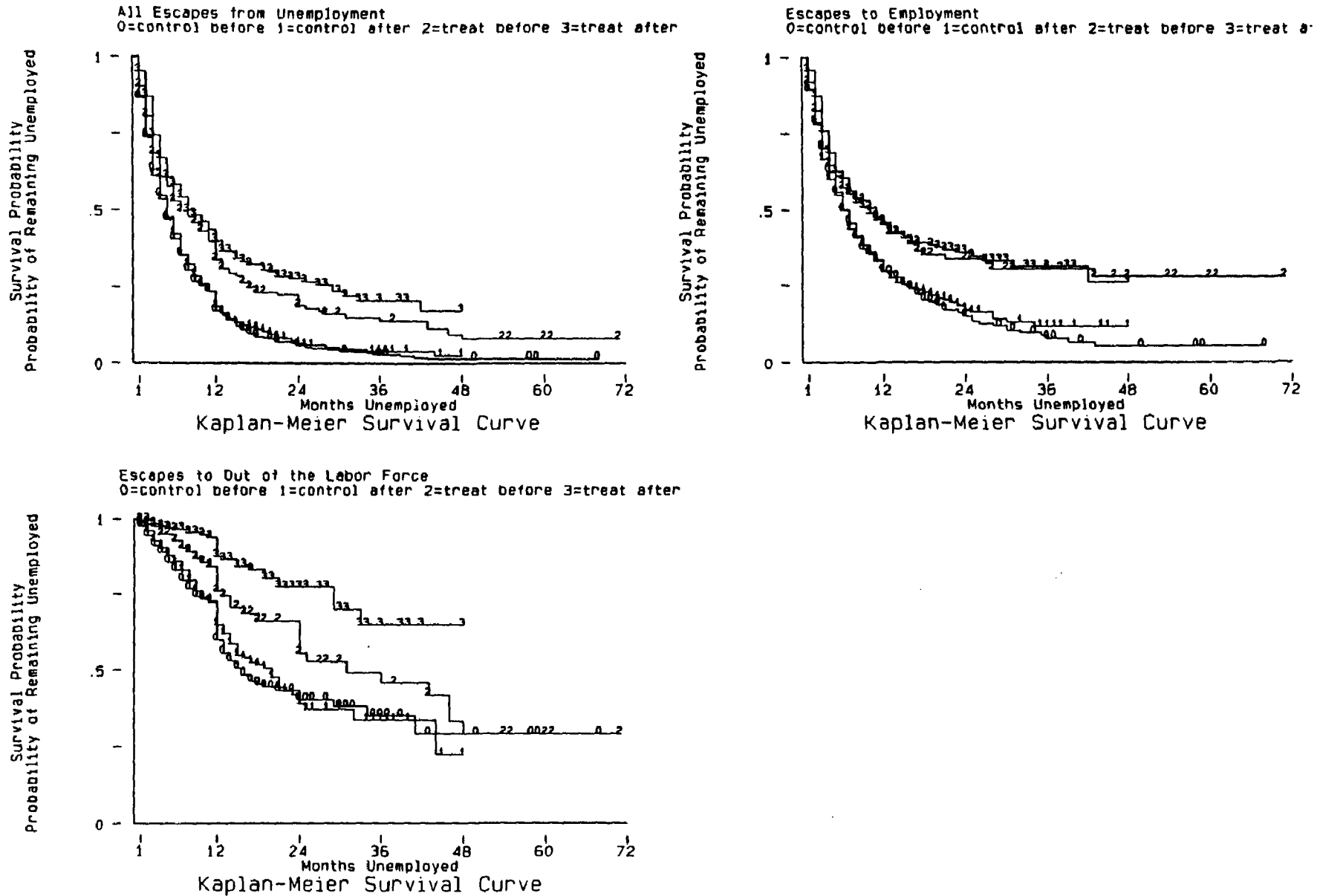


Figure 5: Survival Curves - Control Aged 16-41, Treatment Aged 49-57

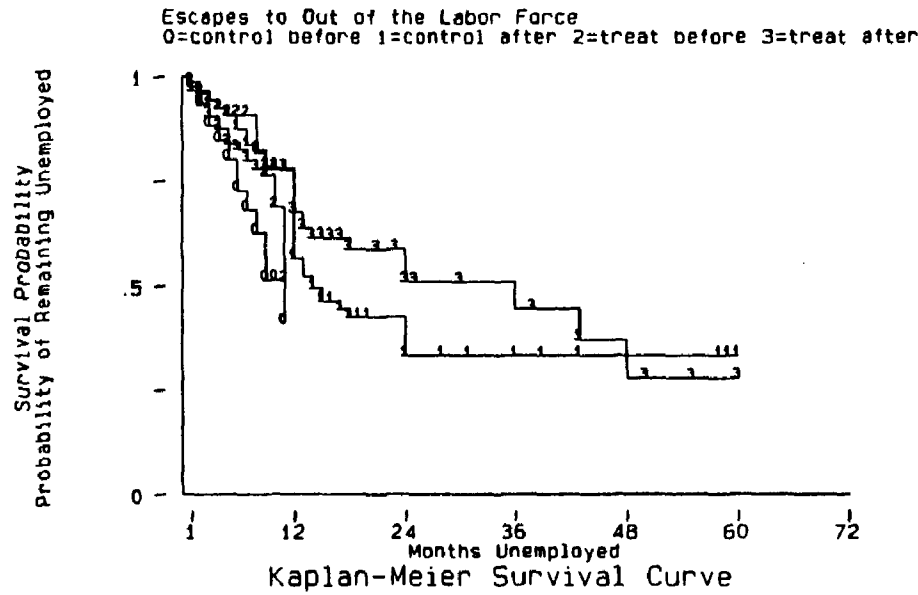
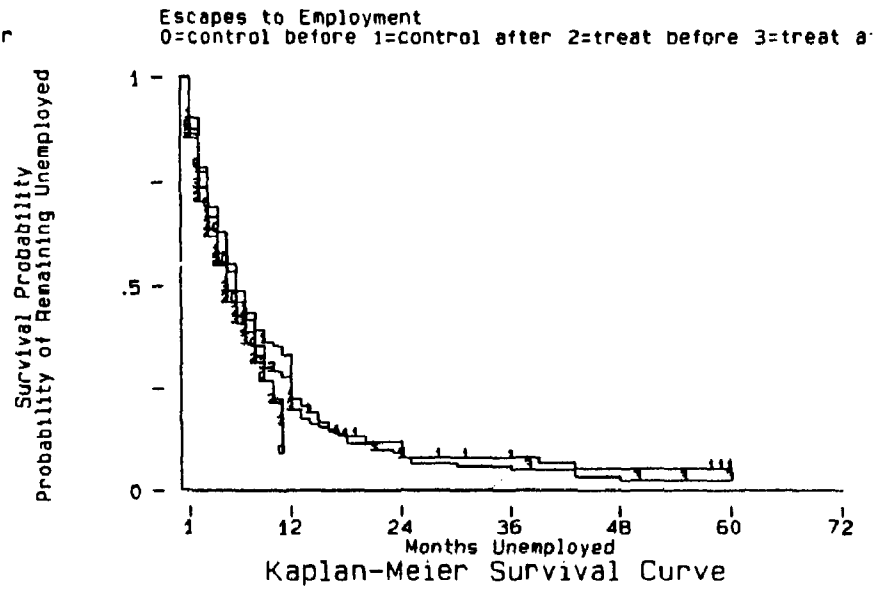
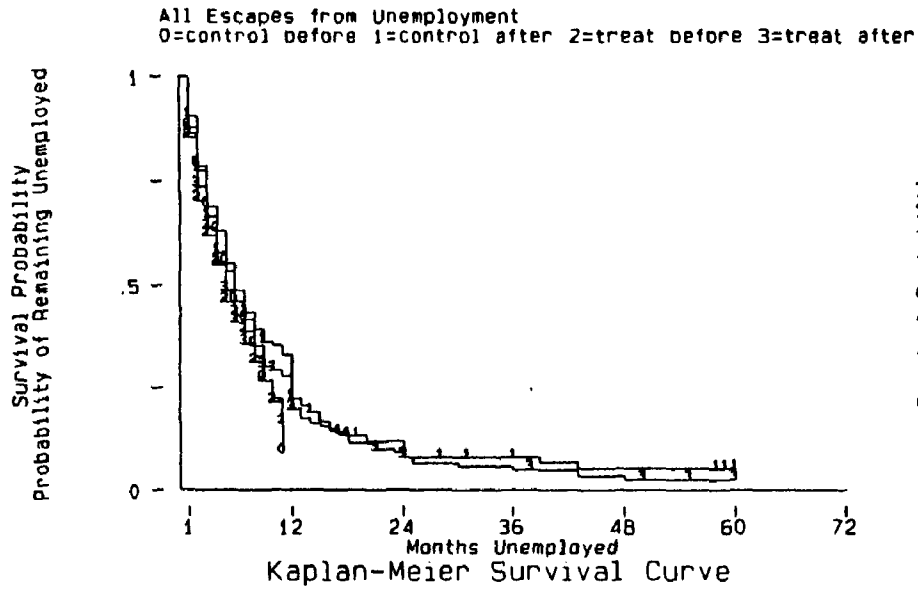


Figure 6: Survival Curves - Control with Children, Treatment Childless

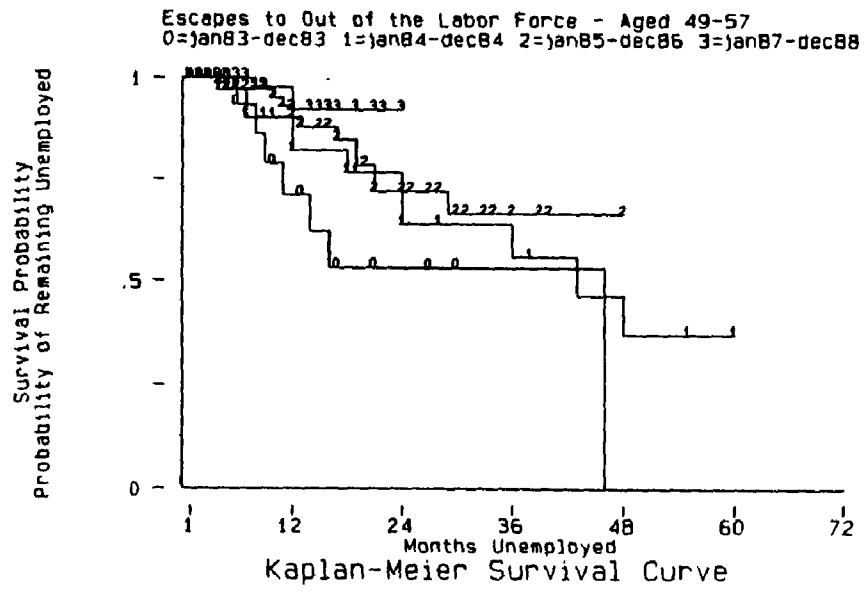
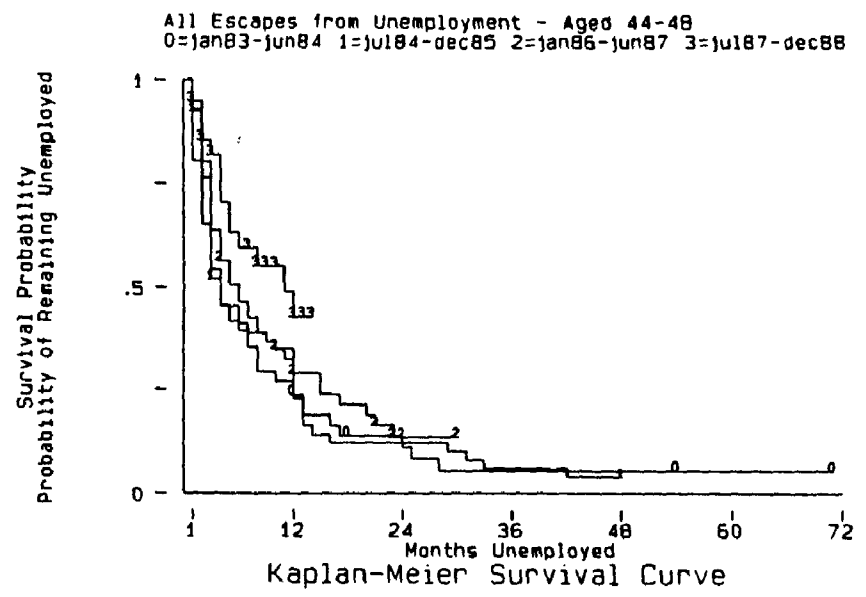
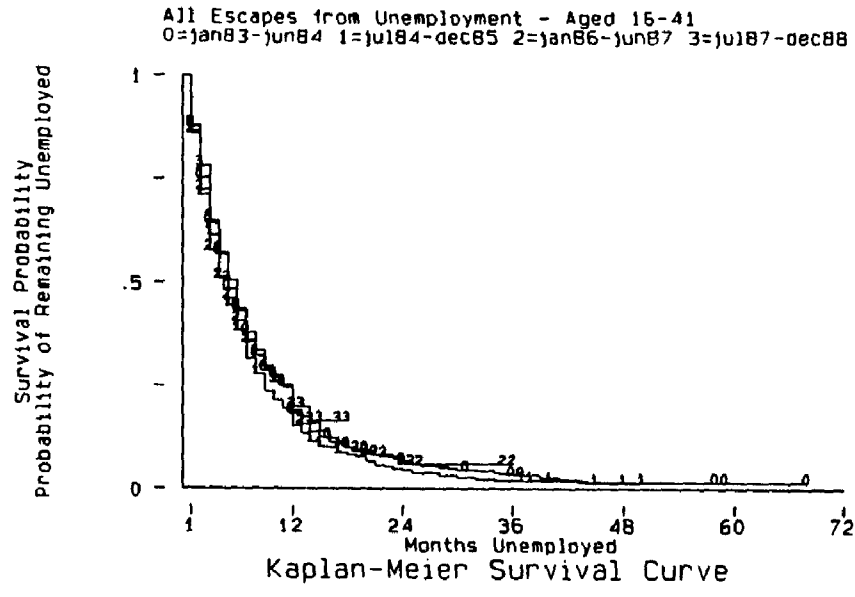


Figure 7: Survival Curves Over Time, by Age Group

Table 1: Relation Between Months Worked In The Base Period and Months of ALG Received in Different Periods 1983-1988

Months worked in base period	January 1983-December 1984	January 1985-December 1985	January 1986-June 1987	July 1987-December 1988
12	4	4	4	6
16	4	4	4	8
18	6	6	6	8
20	6	6	6	10
24	8	8	8	12
28	8	8	8	14 (≥42)
30	10	10	10	14 (≥42)
32	10	10	10	16 (≥42)
36	12	12	12	18 (≥42)
40	12	12	12	20 (≥44)
42	12	14 (≥49)	14 (≥44)	20 (≥44)
44	12	14 (≥49)	14 (≥44)	22 (≥44)
48	12	16 (≥49)	16 (≥44)	24 (≥49)
52	12	16 (≥49)	16 (≥44)	26 (≥49)
54	12	18 (≥49)	18 (≥49)	26 (≥49)
56	12	18 (≥49)	18 (≥49)	28 (≥54)
60	12	18 (≥49)	20 (≥49)	30 (≥54)
64	12	18 (≥49)	20 (≥49)	32 (≥54)
66	12	18 (≥49)	22 (≥54)	32 (≥54)
72	12	18 (≥49)	24 (≥54)	32 (≥54)

Notes:

a. Base period for potential durations of over twelve months is 7 years. Base period for potential durations of twelve months or less is:

- 4 years from January 1983 through June 1987
- 3 years from July 1987 through December 1988

b. Age restrictions applying to certain durations are in parentheses.

Source: Bundesgesetzblatt 1983-1988

Table 2: Summary of Maximum Durations of ALG for Different Age Groups (Durations in Months)

Age group	January 1983- December 1984	January 1985- December 1985	January 1986- June 1987	July 1987- December 1988
Under 42	12	12	12	12
42-43	12	12	12	18
44-48	12	12	16	22
49-53	12	18	20	26
Over 53	12	18	24	32

Source: Bundesgesetzblatt 1983-1988

**Table 3: Sample Sizes and Labor Force Status After Unemployment by Treatment Group,
for Unemployed Under Age 58**

Labor force status	All	Aged 49-57	Aged 44-48	Aged 42-43	No children
Full time work	1146	96	111	45	677
Part time work	136	10	11	9	72
Out of labor force	412	35	24	11	211
Censored	403	90	40	14	227
Total	2097	231	186	79	1187

Notes:

- a. Individuals reaching age 58 during the spell have their spell censored at that point.
- b. Sample size does not include spells dropped due to missing values among covariates.

Source: Author's tabulation of GSOEP public use data.

**Table 4: Coverage rates of ALG and ALH 1983-1988 for Unemployed Under 58
(Standard Deviations in Parentheses)**

Received ALG during spell [% all spells]	73 (45)
Received ALH during spell [% all spells]	14 (35)
Left unemployment before ALG was exhausted [% ALG recipients]	72 (45)
Spell censored before ALG was exhausted [% ALG recipients]	19 (35)
Exhausted ALG [% ALG recipients]	10 (34)
Received ALH upon exhaustion of ALG [% ALG exhausters]	51 (50)

Note:

Individuals reaching age 58 during the spell have their spell censored at that point.

Source: Author's tabulation of GSOEP public use data.

Table 5: Means of Variables (Standard Deviations in Parentheses)

Variable	All	Age 49-57	Age 44-48	Age 42-43	No children
Age	31 (11)	52 (3)	46 (1)	43 (.49)	29 (12)
Sex (Female=1)	.43 (.50)	.33 (.47)	.37 (.48)	.41 (.19)	.43 (.50)
Disabled?	.05 (.22)	.16 (.37)	.06 (.25)	.08 (.27)	.04 (.20)
Children	.77 (1.1)	.57 (.81)	1.1 (1.2)	1.4 (1.4)	0
Foreign?	.36 (.48)	.44 (.50)	.45 (.50)	.47 (.50)	.31 (.46)
Apprenticeship?	.54 (.50)	.53 (.50)	.58 (.50)	.62 (.49)	.53 (.50)
University?	.04 (.21)	.03 (.16)	.03 (.16)	.06 (.25)	.05 (.21)
Had job before unemployment ?	.79 (.40)	.93 (.25)	.91 (.28)	.91 (.29)	.75 (.43)
Married?	.50 (.50)	.79 (.41)	.80 (.40)	.71 (.46)	.27 (.44)
Married * Sex	.22 (.41)	.24 (.43)	.29 (.46)	.27 (.44)	.13 (.34)
Received ALG first month of spell?	.68 (.47)	.77 (.42)	.75 (.43)	.80 (.40)	.65 (.48)
Received ALH first month of spell?	.08 (.26)	.09 (.29)	.08 (.26)	.09 (.29)	.07 (.26)
Amount of ALG and ALH first month of spell (1985 DM)	706 (633)	927 (542)	921 (629)	910 (551)	615 (564)
Received ALG last month of spell? ^a	.65 (.48)	.77 (.42)	.75 (.44)	.78 (.41)	.62 (.48)
Received ALH last month of spell? ^a	.10 (.30)	.08 (.27)	.08 (.28)	.09 (.29)	.10 (.30)
Amount of ALG and ALG last month of spell (1985 DM) ^a	702 (688)	921 (523)	1015 (1126)	948 (568)	601 (535)
Spell length ^b	9.5	22.0	10.9	11.8	8.9
sample size	2097	231	186	79	1187

Notes:

- a. Uncensored spells only used for variable "Received ALG/H in last month of spell?".
- b. Exponential distribution of spells assumed in calculating mean spell length (measured in months).
- c. Only individuals under age 58 with no missing covariates are in sample.

Source: Author's tabulation of GSOEP public use data.

Table 6: Hazard Rate Analysis of Exits from Unemployment (Standard Errors in Parentheses)

Variable	All escapes	Escapes to employment	Escapes to out of the labor force
Age	-.027 (.003)	-.025 (.003)	-.032 (.006)
Sex (Female=1)	-.23 (.07)	-.26 (.08)	-.13 (.15)
Disabled?	-.36 (.12)	-.57 (.15)	.26 (.20)
Number of children	-.03 (.03)	-.08 (.03)	.08 (.05)
Foreign?	-.29 (.06)	-.30 (.06)	-.21 (.11)
Apprenticeship completed?	.11 (.05)	.09 (.06)	.16 (.11)
University completed?	.44 (.12)	.43 (.14)	.46 (.29)
Had job before unemployment?	.12 (.07)	.40 (.08)	-.42 (.12)
Married?	.20 (.08)	.35 (.09)	-.65 (.22)
Married * Sex	-.24 (.10)	-.76 (.12)	1.22 (.24)
Nov/Dec/Jan/Feb ?	-.46 (.07)	-.40 (.07)	-1.02 (.21)
December ?	.70 (.06)	.22 (.08)	1.69 (.11)
ALG received this month?	.16 (.07)	.21 (.09)	.25 (.17)
ALH received this month?	-.44 (.10)	-.37 (.12)	-.37 (.21)
Amount ALG/ALH received this month (1985 DM/1000)	-.05 (.05)	-.06 (.05)	-.18 (.18)
observations (escapes)	2097 (1689)	2097 (1280)	2097 (409)
$\chi^2(15)$	491	389	468
log likelihood	-11334	-8715	-2436

Notes:

- a. Estimation uses the Cox partial likelihood proportional hazards model.
- b. Escapes to out of the labor force are counted as censored for estimation of escapes to employment, and vice versa.
- c. Analysis is for individuals under age 58 at the start of the spell. Individuals reaching age 58 during the spell have their spell censored at that point.
- d. The excluded education dummy includes all those with no vocational or university degree (almost exclusively high school drop-outs).

Table 7: Effect of Changes in Unemployment Benefits on Hazard Rate (Standard Errors in Parentheses)

Variable	All escapes	Escapes to employment	Escapes to out of the labor force
Period 0 (Jan 1984-Dec 1988)	.15 (.13)	.32 (.16)	-.31 (.22)
Period 1 (Jan 1985-Dec 1985)	-.03 (.08)	-.004 (.09)	-.07 (.16)
Period 2 (Jan 1986-Jun 1987)	.13 (.07)	.20 (.08)	-.08 (.15)
Period 3 (Jul 1987-Dec 1988)	-.13 (.08)	-.08 (.10)	-.24 (.16)
No children ?	-.007 (.17)	.30 (.20)	-.82 (.33)
Aged 42-43 ?	-.04 (.16)	.07 (.17)	-.66 (.41)
Aged 44-48 ?	.35 (.15)	.40 (.17)	.11 (.34)
Aged 49-57 ?	-.33 (.23)	-.52 (.28)	.04 (.41)
Period 0 * No children	.002 (.16)	-.29 (.19)	.89 (.32)
Period 3 * Aged 42-43	-.18 (.33)	-.33 (.39)	.49 (.66)
Period 2 * Aged 44-48	-.33 (.20)	-.35 (.22)	-.52 (.51)
Period 3 * Aged 44-48	-.66 (.24)	-.58 (.26)	-.98 (.59)
Period 1 * Aged 49-57	-.02 (.30)	.18 (.35)	-.56 (.61)
Period 2 * Aged 49-57	-.17 (.25)	-.02 (.30)	-.52 (.49)
Period 3 * Aged 49-57	-.06 (.26)	.23 (.31)	-.84 (.48)
observations (escapes)	2097 (1689)	2097 (1280)	2097 (409)
$\chi^2(30)$	536	433	491
log likelihood	-11311	-8693	-2424
$\chi^2(6)$ test of interaction coeffs ^e	9.0	7.7	6.8
$\chi^2(1)$ test for heterogeneity ^f	-.8	-2.2	1.0

Notes:

- a. Estimation uses the Cox partial likelihood proportional hazards model.
- b. Escapes to out of the labor force are counted as censored for estimation of escapes to employment, and vice versa.
- c. Analysis is for individuals under age 58 at the start of the spell. Individuals reaching age 58 during the spell have their spell censored at that point.
- d. All covariates included in the regressions of Table 6 are also included. The coefficients on the covariates not shown are similar to those in the corresponding columns of Table 6.
- e. χ^2 test of the hypothesis that all age interaction coefficients are zero. The critical 5% value is 12.6.
- f. Clayton and Cuzick (1985) test of the hypothesis of no heterogeneity. The critical 5% value is 1.65.

Table 8: Effect of Changes in Unemployment Benefits on Hazard Rate - Job Losers Only
(Standard Errors in Parentheses)

Variable	All escapes	Escapes to employment	Escapes to out of the labor force
Period 0 (Jan 1984-Dec 1988)	.13 (.14)	.32 (.17)	-.56 (.26)
Period 1 (Jan 1985-Dec 1985)	-.06 (.09)	-.058 (.10)	-.07 (.20)
Period 2 (Jan 1986-Jun 1987)	.20 (.08)	.23 (.09)	.05 (.19)
Period 3 (Jul 1987-Dec 1988)	-.10 (.10)	-.10 (.11)	-.13 (.20)
No children ?	-.16 (.19)	.10 (.22)	-.95 (.41)
Aged 42-43 ?	-.06 (.17)	.08 (.18)	-1.05 (.46)
Aged 44-48 ?	.43 (.17)	.51 (.18)	-.10 (.42)
Aged 49-57 ?	-.17 (.24)	-.39 (.29)	.47 (.46)
Period 0 * No children	.15 (.18)	-.07 (.21)	.89 (.40)
Period 3 * Aged 42-43	-.24 (.36)	-.28 (.42)	-.20 (.79)
Period 2 * Aged 44-48	-.47 (.21)	-.45 (.23)	-.72 (.64)
Period 3 * Aged 44-48	-.83 (.26)	-.65 (.27)	-1.65 (.81)
Period 1 * Aged 49-57	-.14 (.31)	.11 (.36)	-.97 (.80)
Period 2 * Aged 49-57	-.32 (.25)	-.09 (.30)	-.99 (.53)
Period 3 * Aged 49-57	-.14 (.26)	.21 (.32)	-1.30 (.51)
observations (escapes)	1667 (1348)	1667 (1079)	1667 (269)
$\chi^2(29)$	416	354	418
log likelihood	-8716	-7097	-1441
$\chi^2(6)$ test of interaction coeffs ^e	13.7	9.4	11.0
$\chi^2(1)$ test for heterogeneity ^f	-.2	-2.0	-.4

Notes:

- a. Estimation uses the Cox partial likelihood proportional hazards model.
- b. Escapes to out of the labor force are counted as censored for estimation of escapes to employment, and vice versa.
- c. Analysis is for individuals under age 58 at the start of the spell. Individuals reaching age 58 during the spell have their spell censored at that point.
- d. All covariates included in the regressions of Table 6 are also included, except "had job before unemployment". The coefficients on the covariates not shown are similar to those in Table 6.
- e. χ^2 test of the hypothesis that all age interaction coefficients are zero. The critical 5% value is 12.6.
- f. Clayton and Cuzick (1985) test of the hypothesis of no heterogeneity. The critical 5% value is 1.65.

Table 9: Effect of Changes in Unemployment Benefits on Hazard Rate - Men Only
(Standard Errors in Parentheses)

Variable	All escapes	Escapes to employment	Escapes to out of the labor force
Period 0 (Jan 1984-Dec 1988)	.31 (.18)	.39 (.20)	-.18 (.41)
Period 1 (Jan 1985-Dec 1985)	-.12 (.11)	-.09 (.12)	-.19 (.29)
Period 2 (Jan 1986-Jun 1987)	.18 (.10)	.27 (.11)	-.29 (.26)
Period 3 (Jul 1987-Dec 1988)	-.08 (.12)	-.06 (.13)	-.21 (.27)
No children ?	-.007 (.22)	.23 (.25)	-1.30 (.56)
Aged 42-43 ?	.11 (.20)	.10 (.21)	-.08 (.78)
Aged 44-48 ?	.45 (.20)	.41 (.21)	.63 (.61)
Aged 49-57 ?	-.18 (.30)	-.19 (.32)	-.07 (.90)
Period 0 * No children	-.20 (.21)	-.41 (.23)	1.02 (.53)
Period 3 * Aged 42-43	-.47 (.46)	-.78 (.55)	.95 (1.04)
Period 2 * Aged 44-48	-.25 (.25)	-.31 (.26)	-.54 (1.13)
Period 3 * Aged 44-48	-.99 (.34)	-.93 (.36)	-1.32 (1.13)
Period 1 * Aged 49-57	.02 (.36)	-.08 (.39)	.55 (1.04)
Period 2 * Aged 49-57	-.03 (.31)	-.19 (.33)	.93 (.91)
Period 3 * Aged 49-57	.13 (.33)	.09 (.35)	.33 (.97)
observations (escapes)	1185 (966)	1185 (823)	1185 (143)
$\chi^2(28)$	270	247	186
log likelihood	-5979	-5110	-787
$\chi^2(6)$ test of interaction coeffs ^e	10.1	10.1	3.6
$\chi^2(1)$ test for heterogeneity ^f	-.5	-2.1	2.2

Notes:

- a. Estimation uses the Cox partial likelihood proportional hazards model.
- b. Escapes to out of the labor force are counted as censored for estimation of escapes to employment, and vice versa.
- c. Analysis is for individuals under age 58 at the start of the spell. Individuals reaching age 58 during the spell have their spell censored at that point.
- d. All covariates included in the regressions of Table 6 are also included except sex and married*sex. The coefficients on the covariates not shown are similar to those in the corresponding columns of Table 6.
- e. χ^2 test of the hypothesis that all age interaction coefficients are zero. The critical 5% value is 12.6.
- f. Clayton and Cuzick (1985) test of the hypothesis of no heterogeneity. The critical 5% value is 1.65.

Table 10: Effect of Changes in Unemployment Benefits on Hazard Rate - Women Only
(Standard Errors in Parentheses)

Variable	All escapes	Escapes to employment	Escapes to out of the labor force
Period 0 (Jan 1984-Dec 1988)	-.11 (.19)	.19 (.29)	-.49 (.27)
Period 1 (Jan 1985-Dec 1985)	.10 (.12)	.14 (.15)	.06 (.20)
Period 2 (Jan 1986-Jun 1987)	.09 (.11)	.14 (.14)	.007 (.19)
Period 3 (Jul 1987-Dec 1988)	-.15 (.12)	-.09 (.15)	-.21 (.20)
No children ?	-.05 (.25)	.39 (.35)	-.71 (.42)
Aged 42-43 ?	-.29 (.26)	.06 (.31)	-.99 (.49)
Aged 44-48 ?	.28 (.25)	.54 (.31)	-.19 (.42)
Aged 49-57 ?	-.45 (.37)	-1.64 (.76)	.17 (.48)
Period 0 * No children	.33 (.25)	-.10 (.34)	.90 (.42)
Period 3 * Aged 42-43	.23 (.49)	.26 (.59)	.36 (.88)
Period 2 * Aged 44-48	-.74 (.36)	-.91 (.46)	-.42 (.59)
Period 3 * Aged 44-48	-.47 (.35)	-.33 (.41)	-.93 (.71)
Period 1 * Aged 49-57	-.14 (.52)	1.29 (.88)	-1.13 (.81)
Period 2 * Aged 49-57	-.64 (.44)	.57 (.82)	-1.21 (.64)
Period 3 * Aged 49-57	-.53 (.43)	.85 (.81)	-1.43 (.58)
observations (escapes)	912 (723)	912 (457)	912 (266)
$\chi^2(28)$	321	154	319
log likelihood	-4160	-2730	-1354
$\chi^2(6)$ test of interaction coeffs ^e	7.4	6.6	9.2
$\chi^2(1)$ test for heterogeneity ^f	-1.4	-1.4	-2.4

Notes:

- a. Estimation uses the Cox partial likelihood proportional hazards model.
- b. Escapes to out of the labor force are counted as censored for estimation of escapes to employment, and vice versa.
- c. Analysis is for individuals under age 58 at the start of the spell. Individuals reaching age 58 during the spell have their spell censored at that point.
- d. All covariates included in the regressions of Table 6 are also included except sex and married*sex.
- e. χ^2 test of the hypothesis that all age interaction coefficients are zero. The critical 5% value is 12.6.
- f. Clayton and Cuzick (1985) test of the hypothesis of no heterogeneity. The critical 5% value is 1.65.