Transitions in the German Labour Market*

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Abstract

The implications of search theory, when extended to allow for incomplete markets and discouragement of searchers are tested for the German labour market. To do this, we analyse transitions between the three states working, searching for a new job and staying at home using a discrete-time duration model.

A Bayesian, semiparametric estimation technique allows for dynamic flexibility concerning the presumably time-varying influence of non-wage income, that is interest income, partner income and unemployment benefit.

1 Introduction

The phenomenon of unemployment is due to frictions in the labour market, i.e. demand for labour and supply of labour are not simultaneously adjusted, as it takes time for both, job searchers, to find a job and firms to find workers. Additionally, wages are not always set at levels that clear the market, so that there is a stock of unemployed agents who cannot find a job at or above their

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reservation wages. To analyse the evolution of the stock of unemployment, one has to look at the flows into and out of unemployment. In November 2000 in Germany, to give an example, 3.9 million people were unemployed. During that year, 6.9 million people entered unemployment and 7.2 million people left unemployment.

In order to explain job search, an economic model has to take into account agents' heterogeneity in abilities. Also, in a dynamic setting, we have to deal with income uncertainty, reductions in income due to layoffs, and uncertainty about future wage offers.

Decisions of agents are thus driven by their expected future income, in relation to current income, wages or unemployment benefits. In such a model, it is natural to assume that agents accumulate or consume wealth in order to smooth consumption over time. Agents with different wage histories due to differences in human capital and to different realisations of wage offers are therefore heterogeneous in their wealth, too. On the other hand, at different levels of wealth, and thus of consumption, they will have different reservation wages. So, the employment history influences the level of wealth and wealth influences the decision to accept or reject a job.

The argument developed so far leads to a model of job search with agents heterogeneous in expected wage income and in wealth. Alvarez and Veracierto (1998), Hansen and İmrohorğlu (1992), Acemoglou and Shimer (2000) and Gomes, Greenwood and Rebelo (2001) analyse search models with these extensions.

A model that wants to explain the effect of unemployment policies on the flows into and out of unemployment, has to take into account the flows into and out of the labour market. Thus, additionally to working and searching, a third state "staying at home" should be included. Alvarez and Veracierto (1999) and Andolfatto and Gomme (1996) are examples. Maidorn (2001) combines the two extensions of the search model, i.e. allowing for incomplete markets and discouragement of searchers.

Empirically, however, we know little about the effects of wealth on the transitions between employment, unemployment and non-participation. Bloemen and Stancanelli (2001) test the search model with incomplete markets for the Netherlands. They find a small but significant effect of wealth on reservation wages.

Hujer and Schnabel (1992) include non-wage income estimating a model of women's labour supply in Germany. According to their results, non-wage income reduces women's labour supply. The impact of wage income of the

partner is also tested in the present study, to see if it raises reservation wages in a similar way as interest income.

In Licht and Steiner (1991), transitions from unemployment into both, employment and non-participation are considered. In the reverse direction, Holst (2000) compares transitions into employment from unemployment and non-participation. In the following, we set up two models, one for unemployment and one for non-participation, allowing for transitions into the respective other states.

We estimate the transition probabilities with a discrete-time duration model using the data set of the German Socio-Economic Panel (GSOEP) 1984 - 2000. Our approach is Baysian and semiparametric as in Fahrmeir and Knorr-Held (1997), who used the same data set to analyse unemployment duration. The advantage of this approach is its dynamic flexibility concerning a (duration-)time-varying influence of non-wage income, that is interest income, partner income and unemployment benefit. Thus, additionally to the theoretical predictions about the effect of wealth on unemployment duration, we can test if these effects change over time.

We come to clear-cut results in favour of search theory. There is a positive impact of wealth on the duration of unemployment, first increasing and then declining with wealth due to two different effects at work, as explained in Section 2. Also, evidence for the effect of the unemployment benefit is more in line with search theory if tested at different levels of wealth.

The estimation method is explained in Section 3. Section 4 and 5 describe the data set and give the results, respectively. Section 6 concludes.

2 Search theory

Job search theory provides the means to model the flows into and out of unemployment as a result of explicit decisions of workers. They maximise their lifetime utility conditional on expected wage offers by choosing between the states "working" and "searching for a new job". Most of the search models, however, assume complete capital markets, i.e. agents can perfectly insure against their income risk. With this assumption, these models can proceed within an representative agent framework.

A more realistic approach allows for incomplete markets, so that agents can only smooth their consumption by saving. Agents then are heterogeneous in the employment offer they get and in their endowment with assets. Also,

a general equilibrium has to be found, in which the sum of transfer payments in the form of an unemployment benefit equals the sum of tax payments.

It turns out that this extension of the search model refines the results known from the simple search model. The reservation wage increases with wealth, i.e. search time increases. Competing this effect, wealthier agents tend to have jobs with higher income, therefore they have a higher probability to find a job above their reservation wage, i.e. opportunity costs of search rise. Thus, search time first increases with wealth, because the reservation wage-effect dominates, but at higher wealth levels, search times are reduced with increasing wealth.

One of the main results from the simple search model is that search times rise with the replacement ratio, i.e. the ratio between the unemployment benefit and the expected wage offer. With incomplete markets, this effect is most pronounced for agents with relatively longer search times, that is in the middle of the wealth spectrum. The effect is small when agents possess little wealth and even smaller when agents are relatively wealthy.[1]

To endogenise labour supply, a third state can be included into the model. When searching and working cause disutility, an agent may prefer to withdraw from the labour market, if the expected wage offers are low.

In fact, withdrawal from the labour market cannot be neglected when considering the flows into and out of unemployment. In the data set used below, from the flows out of unemployment 64 percent are into employment, 13 percent into non-participation and 23 percent into some other activity (e.g. vocational training). Looking at the data for women, flows into non-participation become even more important, making up 24 percent of the flows out of unemployment. Of the flow out of non-participation, on the other hand, 60 percent of the cases observed started to work, whereas 16 percent became registered as unemployed.

The model predicts that the probability to become discouraged declines with wealth. Intuitively, with concave utility functions of the form $U(c-l)$ common in search models, where c denotes consumption and l disutility of working or searching, the loss in utility due to labour/searching effort is higher when c is lower, and c is lower for relatively poorer agents.

As the unemployment benefit has a negative impact on discouragement, the joint effect of the replacement ratio and wealth therefore is that a cut in

[1] See Gomes et al. (2001) for the positive effect of wealth on reservation wages, see Maidorn (2001) for the other results concerning wealth.

the unemployment benefit causes more agents at the lower end of the wealth spectrum to leave the labour market.[2]

3 Estimation Model

The variable of interest in the analysis of duration is the length of time that elapses from the beginning of some event either until its end or until the measurement is taken, which may precede termination. Observations consist of a cross section of durations, $T_1, ..., T_n$, where n denotes the number of individuals, and a set of covariates, $x_{i1}, ..., x_{iT_i}$ for each individual i that affect duration time. Time is divided into intervals $[a_0 = 0, a_1), ..., [a_{q-1}, a_q)$ and $[a_q, \infty)$, where a_q can be assumed as the end of the observation period and the intervals are assumed to be of equal length. Note that time is not measured as calender time but as duration time, $T \in \{1, ..., q\}$, where $T = t$ denotes end of duration within interval $[a_{t-1}, a_t)$.

The hazard rate gives the conditional probability of the end of duration in interval t, given that the interval is reached and given the history of covariates, $x(t) = (x_1, ..., x_t)$

$$\lambda(t \mid x(t)) = \Pr(T = t \mid T \geq t, x(t)). \tag{1}$$

A common specification of the hazard function is the binary logit model of the form

$$\lambda(t \mid x(t)) = \frac{\exp(\gamma_t + x_t'\beta)}{1 + \exp(\gamma_t + x_t'\beta)}. \tag{2}$$

The parameter γ_t represents a time-varying baseline effect and β is the vector of fixed covariate effects. These parameters can be estimated by maximum likelihood.

If the covariate effects may change over duration time, however, as for example the effect of wealth on unemployment, fitting each parameter in each time interval would involve too many parameters and eventually lead to non-existence and divergence of ML-estimates. To avoid this, we could model (some of) the parameters as a function of time, but unknown patterns are then difficult to detect.

[2] See Maidorn (2001)

Instead, we can assume some distributional form for the stochastic variation of $\{\alpha_t\}$, where $\alpha_t = [\gamma_t, \beta_t']'$, and specify the hazard function as

$$\lambda(t \mid x(t), \alpha_t) = \frac{\exp(\gamma_t + x_t'\beta_t)}{1 + \exp(\gamma_t + x_t'\beta_t)}. \tag{3}$$

Note that now α_t is a random variable, too, and β_t has a time index.

This leads to a Bayesian approach, in which prior specifications for the distribution of α_t are made and then updated through the estimation process. Using Markov Chain Monte Carlo estimation techniques, samples of α_t are drawn from its distribution, to be specified below, and the contribution to the likelihood of the hazard function, given α_t and the data, is computed. Improvements in the likelihood leads to acceptance of a sample of α_t and to an updating of the believes about its distribution. After a certain number of iterations, the distribution of α_t has converged and is interpreted as the posterior distribution of α_t. This estimation method follows Fahrmeir and Knorr-Held (1997).

Finally, we can allow for multiple terminating events, so that in each interval either one of the terminating events occurs or no event occurs and, in our case, unemployment is continued into the next interval.

Dynamic discrete duration models are defined hierarchically by 1. an observation model (the hazard function), given the unknown parameters, 2. a transition model for the parameters that imposes some smoothness on the parameters over time and 3. priors for unknown hyperparameters of the transition model.[3]

3.1 Observation model

Let m be the number of terminating events. The event-specific hazard function gives the conditional probability of the end of duration in interval t caused by event $R \in \{1, ..., m\}$, given that the interval is reached and given the history of p covariates, $x(t) = (x_1, ..., x_t)$, $x_t = (x_{t1}, ..., x_{tp})$,

$$\lambda_r(t \mid x(t)) = \Pr(T = t, R = r \mid T \geq t, x(t)), \tag{4}$$

$r = 1, ..., m$, $t = 1, ..., q$. Let λ_r be specified as a multinomial logit model

$$\lambda_r(t \mid x(t)) = \frac{\exp(\gamma_{tr} + x_t'\beta_{tr})}{1 + \sum_{j=1}^{m} \exp(\gamma_{tj} + x_t'\beta_{tj})}, \tag{5}$$

[3] See Fahrmeir and Knorr-Held (1997) for further discussion of dynamic discrete-time duration models.

where γ_{tr} and β_{tr} are event-specific, time-varying baseline and covariate effects, respectively.

Let T_i denote duration time and U_i right-censoring time for individual $i = 1, ..., n$,[4] so $t_i = \min(T_i, U_i)$. Censoring is assumed to occur at the end of the interval[5], so that the risk set R_t, the set of those individuals for whom duration could end in interval t, includes individuals censored in interval t. Compute a censoring process

$$c_{it} = \begin{cases} 1, & U_i \geq a_t, \text{ i.e. } i \text{ not censored up to } [a_{t-1}, a_t) \\ 2, & U_i < a_t, \text{ i.e. } i \text{ censored in } [a_{t-1}, a_t) \text{ or earlier,} \end{cases} \tag{6}$$

and event indicators $y_{it} \in \{0, 1, ..., m\}$, $i \in R_t$, $t = 1, ..., t_i$

$$y_{it} = \begin{cases} r, & \text{event of type } r \text{ occurs in } [a_{t-1}, a_t) \\ 0, & \text{no event occurs in } [a_{t-1}, a_t). \end{cases} \tag{7}$$

Rearrange the data so that covariates, event and censoring indicators are represented by column vectors $x_t = (x_{it}, i \in R_t)$, $y_t = (y_{it}, i \in R_t)$, $c_t = (c_{it}, i \in R_t)$.

3.2 Transition model

Adopting a Bayesian approach, we are looking for the posterior distribution of the parameters, given the observed data. As before, let α_t denote a vector of the unknown parameters, $\alpha_t = (\gamma_{t1}, ..., \gamma_{tm}, \beta'_{t1}, ..., \beta'_{tm})'$. Assume that α_t follows a random walk,

$$\alpha_t = \alpha_{t-1} + u_t, \quad u_t \sim \mathrm{N}(0, Q), \tag{8}$$

where a prior specification is needed for Q. The posterior distribution of the parameters, $\mathrm{p}(\alpha \mid y, x, c)$ is not directly computed but simulated by Markov Chain Monte Carlo (MCMC) techniques. In an updating procedure new values of α_t are drawn from that factor of the full conditional distribution,

$$\mathrm{p}(\alpha_t \mid \alpha_{s \neq t}, Q, y, x, c) \propto \prod_{i \in R_t} \mathrm{p}(y_{it} \mid x_{it}, \alpha_t) \times \mathrm{p}(\alpha_t \mid \alpha_{s \neq t}, Q), \tag{9}$$

that is given by the transition model, i.e. $\mathrm{p}(\alpha_t \mid \alpha_{s \neq t}, Q)$ at each iteration step. If the likelihood of the observation model, $\mathrm{p}(y_t \mid \alpha_t) \equiv \prod_{i \in R_t} \mathrm{p}(y_{it} \mid$

[4] If individual i is right-censored, $T_i > q$.

[5] Note that the monthly GSOEP data are retrospective, see Section 4.

$x_{it}, \alpha_t)$ is increased by the new proposal for α_t, it is accepted. As soon as a stationary distribution is achieved, further iteration steps are performed in order to get samples of α from the posterior distribution. The posterior mean of α can then be estimated by the arithmetic average of the samples. See the Appendix for further discussion of the estimation method.

4 Data

We estimate two models, one for the duration of unemployment and one for the duration of non-participation. Estimations are based on data of the German Socio-Economic Panel (GSOEP) 1984 - 2000. Monthly observations are available as people are asked about their employment status each month of the year preceding the interview, taken each year from 1984 to 2000. Period length is therefore one month for both models, where the maximum number is set at 25 months in the first and at 37 months in the second model. In cases of repeated unemployment and non-participation, respectively, only first spells are considered. From 6393 cases of unemployment, 1101 left censored records, i.e. people already unemployed when entering the panel, have to be excluded.[6]

Wealth is both, one of the most important and one of the most critical covariates in the models. Taking interest income, the only available indicator of a person's wealth in the panel, as the corresponding covariate, we have to deal with the problem of many missing observations. We cannot assume that this information missing means a person does not possess wealth, but rather that she is reluctant to reveal her interest income. Under this assumption, 2240 further spells of unemployment have to be excluded, leaving 3052 spells of unemployment. From the data used to estimate the non-participation model, 2557 left censored cases and 1665 cases of missing observations concerning interest income have to be excluded, leaving 2300 records of non-participation.

Each model is estimated for the men and women separately. The hazard functions are set up with four terminating events. Unemployment may end in full-time or part-time employment, discouragement or other (e.g. Vocational training, education, retirement or military service). Non-participation may

[6] In the first wave of the panel, 1984, people are asked to indicate their employment status for each year back to 1973. Based on this information, people not unemployed in 1982, were not excluded.

	Men		Women	
All	1434	*(7.39)*	1618	*(9.19)*
1) Full time	908	*(5.10)*	564	*(7.01)*
2) Part time	31	*(5.65)*	228	*(7.18)*
3) Discour.	25	*(10.28)*	336	*(11.21)*
4) Other	309	*(17.93)*	315	*(17.48)*
Censored		161		175
5) Int0	996	*(6.63)*	1132	*(8.99)*
6) Baseline	321	*(8.97)*	372	*(9.22)*
7) Int2	76	*(9.09)*	80	*(10.41)*
8) Int4	30	*(10.43)*	19	*(12.95)*
9) Int5	11	*(10.09)*	15	*(11.60)*
10) No partner	242	*(5.58)*	230	*(7.34)*
11) Baseline	419	*(8.97)*	157	*(9.39)*
12) Inc1	253	*(8.01)*	194	*(12.77)*
13) Inc2	197	*(7.58)*	346	*(10.19)*
14) Inc3	98	*(7.53)*	310	*(8.79)*
15) Inc4	60	*(6.45)*	163	*(8.28)*
16) Inc5	165	*(6.72)*	218	*(7.83)*
17) Baseline	502	*(4.91)*	614	*(6.95)*
18) R2	111	*(8.55)*	310	*(11.17)*
19) R3	260	*(9.08)*	283	*(11.05)*
20) R4	561	*(8.60)*	411	*(9.74)*
21) E1	219	*(7.00)*	301	*(10.16)*
22) E2	115	*(9.54)*	141	*(7.74)*
23) Baseline	673	*(7.14)*	758	*(10.21)*
24) E3	28	*(3.68)*	33	*(7.03)*
25) E4	196	*(8.57)*	226	*(7.58)*
26) E5	80	*(8.75)*	56	*(8.63)*
27) E6	123	*(5.54)*	103	*(5.36)*

Table 1: Unemployment spells and average duration (in parenthesis) in categories. For definitons of categories, see text.

	Men		Women	
All	412	*(11.40)*	1888	*(23.55)*
1) Full time	159	*(10.46)*	403	*(12.21)*
2) Part time	33	*(8.48)*	528	*(24.28)*
3) Unempl.	52	*(6.27)*	242	*(13.41)*
4) Other	122	*(19.89)*	336	*(69.88)*
Censored		46		379
5) Int0	262	*(10.80)*	1228	*(20.81)*
6) Baseline	94	*(11.49)*	458	*(30.12)*
7) Int2	37	*(11.24)*	124	*(28.06)*
8) Int3	11	*(19.82)*	52	*(21.13)*
9) Int4	8	*(19.13)*	26	*(20.69)*
10) No partner	122	*(6.23)*	312	*(14.37)*
11) Baseline	102	*(16.45)*	143	*(16.38)*
12) Inc1	53	*(14.13)*	146	*(21.30)*
13) Inc2	41	*(11.37)*	363	*(26.05)*
14) Inc3	39	*(9.21)*	371	*(29.99)*
15) Inc4	16	*(10.19)*	249	*(26.42)*
16) Inc5	39	*(13.36)*	304	*(24.23)*
17) E1	81	*(7.49)*	467	*(22.85)*
18) E2	39	*(7.10)*	190	*(21.64)*
19) Baseline	142	*(12.98)*	723	*(26.10)*
20) E3	14	*(4.14)*	56	*(17.57)*
21) E4	52	*(12.46)*	255	*(23.97)*
22) E5	31	*(12.71)*	64	*(25.84)*
23) E6	53	*(16.40)*	133	*(15.53)*

Table 2: Non-participation spells and average duration (in parenthesis) in categories. For definitons of categories, see text.

end in full-time or part-time employment, unemployment or other. Tables 1 and 2, row 1 to 4 display the number of cases and average duration split into terminating events and gender. Average duration of unemployment is around 7 months for men and 9 months for women. Unemployment ending in employment lasted much shorter than unemployment ending in discouragement or other activities. Non-participation lasted around 23 months for women and around 11 months for men on average.

4.1 Human capital

In order to measure human capital, seven categories of education are considered as covariates:

1. Secondary modern school, no education (E1).
2. Intermediate secondary school, other school (E2).
3. Apprenticeship.
4. Comprehensive school, high school (E3).
5. Vocational school, trade school, school for public health (E4).
6. Civil service training, other training (E5).
7. University, vocational college (E6).

Being the biggest group, apprenticeship is used as baseline in both models. Categories 1 and 2 and 4 to 7 are transformed into dummy variables E1 to E6 as indicated in the list above.

4.2 Personal characteristics

Given our focus on transitions between unemployment, employment and non-participation, it seems important to include covariates covering a person's family background. Especially the flow into and out of non-participation may be influenced by an additional child and existence of a partner. Note that in our definition, non-participation includes all people who stay at home with or without caring for a child, and do not follow any other activity. Existence of a partner is part of the covariates covering wage income of the partner, as

explained below. Existence of children is captured by C1 for one child, C2 for two or more children, therefore not having children is the baseline. These dummy variables can be measured with monthly frequency, as the month of a child's birth is contained in the data. As age can be expected to influence unemployment and non-participation duration, it is added in the form of two covariates: A1 for people between 15 and 30 years old and A2 for people older than 45, so people older than 30 but younger than 46 are the baseline.

4.3 Wealth

When asked about their interest income per year, people have two possibilities to answer, either giving the amount in DM or choosing one of the following five categories:

1. $0 \leq$ interest income $<$ 500 DM (Int0).
2. 500 DM $\leq$ interest income $<$ 2000 DM.
3. 2000 DM $\leq$ interest income $<$ 5000 DM (Int2).
4. 5000 DM $\leq$ interest income $<$ 10 000 DM (Int3).
5. Interest income of more than 10 000 DM (Int4).

Both answer possibilities are integrated into the dummy variables indicated in the list above. It would be preferable to take the lowest wealth group as baseline because then the effect of additional wealth on duration of unemployment compared to zero or low interest income could be measured. Unfortunately, the lowest wealth group separates cases from the rest in still another respect, as people possessing wealth are not eligible for "Arbeitslosenhilfe" (unemployment pay when there is no entitlement for unemployment benefit), a measurement problem that has to be kept in mind when analysing the results, too. Therefore, we use the second lowest wealth group as baseline and add another dummy variable for receiving "Arbeitslosenhilfe", named A. Note that the data are consistent in that unemployed receiving "Arbeitslosenhilfe" do not appear in any wealth class but the lowest. Although this problem does not apply to the non-participation model, we stay with this classification for the sake of comparability.

Another disadvantage of the data on interest income is that they are observed only yearly. As people probably do not receive interest income

each month, this may not be very important, but a change from one wealth group to another within a year thus cannot be measured. Given the very coarse classification of interest income owing to the structure of the data, this neither seems to be much loss of information.

A first inspection of unemployment duration in the different wealth groups, rows 5 to 9 in Tables 1 and 2, suggests there is a correlation between wealth and search time, the latter increasing from one class to the next up to the fourth group.

4.4 Wage income of the partner

Existence and wage income (at prices of 1991) of the partner presumably has an impact on search and non-participation times, too. The covariates are constructed as described below.

1. No partner (NP):
2. $0 \leq$ Partner income $<$ 1000 DM.
3. 1000 DM $\leq$ Partner income $<$ 2000 DM (Inc1).
4. 2000 DM $\leq$ Partner income $<$ 3000 DM (Inc2).
5. 3000 DM $\leq$ Partner income $<$ 4000 DM (Inc3).
6. 4000 DM $\leq$ Partner income $<$ 5000 DM (Inc4):
7. Partner income of more than 5000 DM (Inc5).

Average duration of both, unemployment and non-participation first increases with income of the partner and then declines in higher classes, see rows 10 to 16 in Tables 1 and 2.

4.5 Replacement Ratio

In order to construct adequate covariates for the replacement ratio, we compute average income of people in full employment conditional on age, industry, education and observation year. We take the finest classification available for education, but choose the same classification of age as above. People are also asked to indicate the industry they are (were) employed in,

with 37 to 45 industries considered, depending on the year of observation. They are merged into 10 classes of industries for our purposes, with the tenth class including those without any indication of industry (see Appendix). As unemployed people also give the hours they wish to work, we use this information to divide the expected wage by 2 when only part-time work is demanded.

In a second step, the replacement ratio is computed as the ratio between unemployment benefit ("Arbeitslosenhilfe" excluded) and the expected wage. We construct one dummy variable for a replacement ratio of 0.3 to 0.6 (R2), one for a replacement ratio of 0.6 to 0.9 (R3) and one for a replacement ratio of more than 0.9 (R4). Thus, a replacement ratio of 0 to 0.3 is the baseline, see Table 1, rows 17 to 20.

The number of unemployed in the last class is surprisingly high. This may be due to people coming from shrinking industries, who have difficulties in finding a job at their previous wage level. It is also possible that the average wage is not a very accurate measure of the expected wage at higher income levels.

For men and women, average duration of unemployment is considerably rising from the first class to the second, and further rises from the second to the third class for men.

4.6 Labour Market

Finally, covariates that capture the general situation in the labour market and the previous state of a person in the labour market, are included. We decided for the ratio between job offers to the number of unemployed to be an appropriate variable to reflect expansions and contractions of the labour market. L1 takes the value 1 if this ratio has increased compared to the last quarter, and zero otherwise. L2 takes the value 1 if this ratio lies above 0.1, which was the case during the two periods of relatively higher economic growth from 1989:2 to 1992:3 and 1998:2 to 1999:4 (except 1998:4). A person's previous state in the labour market is captured by the covariate L3, which takes the value 1 if she was employed in at least one of the two months before unemployment or non-participation. A distinction between voluntary and involuntary unemployment is included into the unemployment model. The covariate L4 takes the value 1 if a person quit the previous job and zero if she was laid off.

5 Results

In this section, we will first establish the results concerning the hazard rates estimated for both men and women with one child, having completed a vocational school[7] and having the baseline characteristics else. We will then in turn discuss the effects of the covariates constructed for wealth, the replacement ratio and wage income of a partner. These effects are expressed as contributions to the hazard functions. Let λ_b denote the hazard function we are considering and λ_c the same hazard function but including some other covariate, then $\lambda_c - \lambda_b$ is shown in the tables and figures.

In the setting we have chosen, the probability for men to leave unemployment for a full-time job after one month is around 18 percent, falling by about one percent over the next 15 months and increasing again up to around 17.5 percent at the end of the second year (see Figure 2). The probabilities to start a part-time job, to get discouraged or to start another activity are steadily rising, maybe due to an increasing willingness to accept something else during continuing unemployment. The probability to re-enter the labour market when staying at home is similar for all terminating events (see Figure 4). It lies between 16 and around 17 percent in the second month and is rising up to around 19 percent in the next three years.

For women, the probability to end unemployment with a full-time job stays at around 16 percent, although slightly increasing after ten months and again decreasing after 20 months (see Figure 3). The probability to find and accept a part-time job is 17 percent at the beginning of job search, decreasing down to less than 15 percent after two years.[8] The hazard rates are rising for terminating events discouragement and other activity. Similar to the argument used above, the willingness to accept something else than a job seems to increase. Women's probability to re-enter the labour market with a full-time job is around 19 percent each month in the first two years, but then falls by one percent during the third year (see Figure 5). The probability to

[7] Including trade schools and schools for public health.

[8] Fahrmeir and Knorr-Held (1997) estimate the probability of men to end unemployment (with one terminating event) to be around 20 percent at the beginning of unemployment, and to be around 10 percent after two years. The according probability of women is around 16 percent at the beginning of unemployment and also around 10 percent after two years. These hazard rates are for people who receive unemployment insurance and with age between 31 and 40. They are very low compared to our results. Note, however, that we get quite similar hazard rates as the ones in the text when employing ML-estimation with our data set, except, of course, the time-varying effects.

start a part-time job goes up from 20 percent in the second month to over 24 percent after three years, clearly reflecting women's preferences for less working hours while caring for a child. Also, the probabilities to become registered as unemployed or to start another activity are rising.

5.1 Wealth

As explained in Section 3.3, the lowest wealth group, Int0, includes all unemployed receiving "Arbeitslosenhilfe" (250 out of 996 unemployed in the category Int0 receive "Arbeitslosenhilfe" in the first month), hence all unemployed whose working times before unemployment are not sufficient to be entitled for "Arbeitslosengeld" or whose entitlement for "Arbeitslosengeld" has expired. As it can be assumed that the chances to find and accept a job are influenced by the work history before unemployment, a group with a lower probability to leave unemployment than the rest entirely falls into category Int0. We therefore took the second lowest wealth group, Int1, as the baseline. Accordingly, belonging to Int0 decreases the chance to leave unemployment for both, men and women and for all terminating events (see Tables 3 and 4 and Figures 6 and 7).

A higher interest income decreases the probability to end job search with a full-time job for unemployed men, but only in the fourth and fifth category. The effect is reduced over time and when moving from the fourth to the fifth category (from 1.2 percent to 0.9 percent as for Int3 and from 0.5 percent to even a 0.1 percent positive effect as for Int4). The first result is intuitive, as the willingness to continue job search partly relying on past savings will decline during unemployment. The second result supports the theoretical predictions of a first decreasing and then declining impact of wealth when moving along the wealth spectrum, only that the peak of the effect lies in a relatively high category of interest income of between 5 000 DM and 10 000 DM per year.

Similarly, the hazard function for terminating event "part-time employment" is reduced by 0.7 percent when belonging to Int2 in the second month and by 0.4 percent in the 25th month. Belonging to Int3 reduces the hazard rate by 1.5 percent in the second month, even slightly increasing over time. In the highest wealth group, this effect has diminished. The peak again lies in Int3.

Women in the third, i.e. middle wealth category have a 0.5 percent lower probability per month to end in a full-time or part-time job compared to

the baseline. For those in the fourth and fifth category, the probability is decreased by 0.8 percent and 1.1 percent, respectively. For women, there is no diminishing effect of wealth over time or in higher wealth groups.

Note that for both, men and women, the probability to become discouraged is higher in the third wealth group, Int2, compared to the baseline. It is reduced in higher wealth groups, being still above the baseline for men belonging to Int3, but lower than the baseline for both in the fifth wealth group. This indeed confirms the theoretical prediction that wealth has a negative impact on discouragement, as the loss in utility due to working or searching effort declines, but only at relatively high levels of wealth.

When looking at the non-participation model estimated for women (see Table 5), these predictions are only supported for part-time jobs. The probability to accept a part-time job is rising with wealth. In the second month, it is 3.5 percent higher due to Int1, and even 5.4 percent higher in the 37th month. It is even 4.2 percent higher in the wealthiest group in the second month, rising to 6.3 percent in the 37th month. Entering the labour market for a full-time job is less likely for women with higher interest income, by around 3 percent in the third wealth group and by around 4 percent in the fourth. This might be due to women's preference for part-time jobs when having a child and due to their acceptance to earn less increasing with wealth.

5.2 Replacement ratio

The impact of the replacement ratio on men's probability to end unemployment with full employment is not or not significantly lower for replacement ratios up to 0.9 compared to the baseline (see Table 7). This contrasts the theoretical results of both, the simple search model and the search model extended for incomplete markets and discouragement of searchers. Only a replacement ratio of more than 0.9 reduces the probability to take up a full-time job, by 4 percent at the beginning of unemployment and by 2.5 percent after two years.

Concerning the effect of the replacement ratio, theory better predicts women's behaviour. Their probability to find and accept a full-time job is declining with the replacement ratio, by 0.3 and 0.5 percent in the second and third categories and by 2.2 percent in the last (see Table 8). They are less likely to start a part-time job when falling into R2 and more likely to become discouraged when falling into R4, both by around 4 percent. A rise in the replacement ratio prolongs women's search times and eventually

increases their tendency to withdraw from the labour market when search is unsuccessful. The latter effect, however, may be due to a greater incentive to register as unemployed, without actually searching for a job, when the unemployment benefit is higher.

Remember that we argued for the effect of the replacement ratio first to increase with wealth and then to become smaller again at higher levels of wealth. In order to observe this, we estimate a model using cross effects of the replacement ratio and interest income instead of the above classification of the replacement ratio[9], i.e. R1·Int0, R2·Int0, R3·Int0,...,R3·Int4, where R1·Int0 is taken as the baseline. The first two categories of the replacement ratio and the last two categories of interest income are merged, so that all of the thus constructed categories contain observations.

The results for terminating event full employment are given in Tables 9 and 10. If interest income is smaller than 500 DM per year, a rise in the replacement ratio from R1 to R2 reduces men's probability to accept a full-time job by 1.5 percent, a rise from R2 to R3 reduces it by 0.5 percent. In the next category, R2 has a negative impact of 1.4 percent compared to R1, R3 even has a positive effect. One category higher, neither R2 nor R3 have a negative effect compared to R1. Up to an interest income of 5000 DM, the above considerations are thus confirmed, only that the peak lies in the lowest category of wealth. If interest income is higher, however, R2 again reduces the hazard rate. It can be stated for men, altogether, that the predictions of search theory concerning the negative impact of the replacement ratio on reservation wages are better supported by our empirical evidence if heterogeneity of searchers in their wealth is taken into account.

Women are only searching longer with a higher replacement ratio if they earn less then 500 DM interest income per year. The change in their probabilities to end unemployment with a full-time job when moving from R1 to R2 or R3 in higher wealth categories is always positive (except from R1 to R2 in the wealthiest group). Thus, the negative effect of the replacement ratio on women's willingness to accept a full-time job is reduced in a rather extreme way: it diminishes at any considerable level of wealth.

Concerning discouragement of searchers we stated that a cut in the unemployment benefit is more likely to cause agents to leave the labour market if they possess less wealth. Tables 11 and 12 give the corresponding results,

[9]The covariates constructed for interest income are not dropped, in order to separate the effect of wealth from that of the replacement ratio.

which support the statement when moving from R3 to R2 and from the third wealth category to the first in Table 9. Whereas the probability of men to become discouraged in the second month of unemployment is not lower in R2 compared to R3 when interest income is relatively high, the difference is more than 3 percent in the second class and more than 5 percent in the first.

Unemployed women are less influenced by the replacement ratio in their decision to supply labour, except for the above observed positive effect of R3, now confined to the third wealth group.

5.3 Wage income of the partner

Not having a partner decreases the probability of men to become employed when being unemployed or staying at home, whereas women are more likely to accept a full-time job (by 4 to 5 percent) instead of a part-time job (see Tables 13 and 14). Intuitively, this reflects the distinct roles of men and women in a family. Having a partner with a relatively low paid job (between 1000 DM and 3000 DM) gives men an incentive to accept full-time jobs (+1.2 to +1.7 percent) instead of part-time jobs (-1.4 percent), in order to increase the family income. Only a partner income of 3000 to 5000 DM makes men search for a longer time. If the partner income exceeds 5000 DM, men again have a higher chance to start a full-time job, by 1.7 percent in the second month of unemployment and by 1.2 percent after two years.[10]

For women, a relatively low income of the partner decreases the probability to start a full-time job by 3 percent per month, but increases it by 7 percent in the case of a part-time job. The effect is reduced in the next category, but rises up to 4.5 percent thereafter. At very high levels of partner income, women have a 4 to 5 percent higher probability to accept part-time jobs each month. Altogether, it can be said about women, but less conclusive about men, that income of the partner, similar to interest income, is rising the reservation wage and thus search time.

Income of the partner also has a negative impact on discouragement of women, so that the same argument as with interest income can be applied: the loss in utility caused by searching or working effort is declining with non-wage income of women. Women's probability to start a full-time job is rising

[10]The latter effect may be due to a measurement problem, as the majority of men with income of the partner in the highest category have a high school education or higher. A high school or university degree, on the other hand, seems to decrease the probability to leave unemployment by 0.2 percent per month, so that the two effects offset each other.

with income of the partner when staying at home, too (the only exception is a partner income of 1000 to 2000 DM, which decreases the probability to start a full-time job by around 6 percent each month), while those for a part-time job are declining (see Table 15). To a lesser extent, this is also true for men (see Table 16).

Note that this contrasts the results for interest income, which has the opposite effect. This is a surprising result: Wage income of the partner tends to increase women's demand for working hours in the non-participation model, whereas interest income decreases it. We can think of two arguments explaining the difference. First, income of the partner may be more often used for consumption than interest income, thus moving the latter further right on the utility function and increasing the willingness to reduce leisure time. Second, there may be a tendency to increase family wage income in order to accumulate wealth before a certain level of wealth is reached. Beyond that level, women reduce their demand for working hours. Both arguments are related to each other, as people would not want to dissave once a desired level of wealth has been reached, leading back to the first argument.

In times of an unintended reduction of wage income, i.e. during unemployment, on the other hand, interest income is consumed, so that the reservation wage rises[11]. Thus, wealth and partner income have comparable effects during unemployment, but have opposite effects while being out of the labour force, i.e. while following an alternative activity, for example child care.

6 Conclusions

The implications of search theory, when extended to allow for incomplete markets and discouragement of searchers are to a large extent confirmed by the data. We look at each in turn.

Wealth does have a positive effect on the duration of unemployment and this effect does first increase and then decline with wealth, at least for men. We can conclude that wealth rises the reservation wage by a small, but

[11] In the data of the unemployment model, there is a constant constant inflow into lower wealth categories, but a declining inflow into the third to fifth wealth categories, as search times increase. In the non-participation model, inflow into al wealth categories is constant over duration time.

significant amount, but, at relatively high levels of interest income searchers chances to find a job above the reservation wage have risen enough to offset this effect. This is due to the correlation between an agent's employment history and his past savings.

As we expected intuitively, the effect of wealth on search is diminishing over time. First, unemployed agents smooth their consumption by decreasing their wealth. But, apart from that, the influence of wealth at the same level is reduced over time.

The negative effect of the replacement ratio on the probability to become employed does decline with wealth. For women, it even diminishes if interest income exceeds 500 DM per year on the probability of full employment.

A cut in the unemployment benefit is indeed more likely to discourage men if they possess less wealth, because the loss in utility due to working or searching effort declines with the level of consumption. No conclusions can be drawn about women.

While being unemployed, income of the partner does reduce women's probability to accept a full-time job. This effect is rising with duration time and partner income. While staying at home, wage income of the partner tends to increase women's demand for working hours, whereas interest income decreases it. Thus, wealth and partner income have comparable effects on the behaviour of women during unemployment, i.e. in times of unintended reductions of income, but have opposite effects while being out of the labour force.

A Transition model

As explained in the main text, the prior specification for the stochastic variation of $\{\alpha_t\}$ is the random walk model (8). Under a number of conditional independence assumptions the joint distribution of $y = (y_1, ..., y_q)$, $x = (x_1, ..., x_q)$, $c = (c_1, ..., c_q)$, $\alpha = (\alpha_1, ..., \alpha_q)$ and Q is proportional to a product of individual conditional likelihood contributions, a product of transition densities of α and the prior for Q

$$\mathrm{p}(y, x, c, \alpha, Q) \quad \propto \quad \left\{ \prod_t \prod_{i \in R_t} \mathrm{p}(y_{it} \mid x_{it}, \alpha_{it}) \right\} \times \tag{10}$$

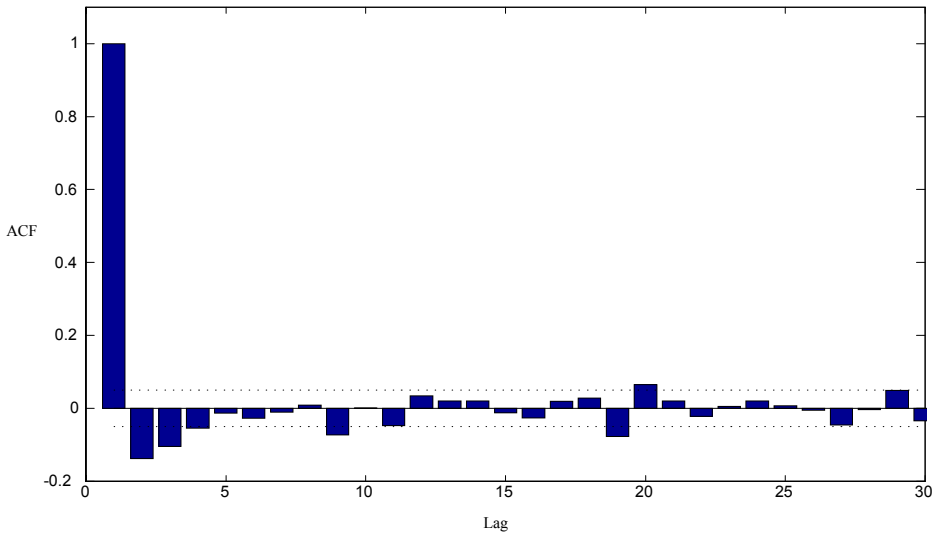

Figure 1: Estimated autocorrelation function of a selected parameter.

$$\left\{\prod_{t>1} \mathrm{p}(\alpha_t \mid \alpha_{t-1}, Q\right\} \times \mathrm{p}(Q).$$

Individual densities in the first factor are given by the observation model (5), transition densities in the second factor are derived from the transition model (8) and the third factor, $\mathrm{p}(Q)$ is the prior for Q, to be specified below.

From (8) the transition densities take the form

$$\mathrm{N}(\mu_t, \Sigma_t) = \begin{cases} \mathrm{N}(\alpha_{t+1}, Q), & t = 1 \\ \mathrm{N}(\frac{1}{2}\alpha_{t-1} + \frac{1}{2}\alpha_{t+1}, \frac{1}{2}Q), & t = 2, ..., q-1. \\ \mathrm{N}(\alpha_{t-1}, Q), & t = q \end{cases} \tag{11}$$

A new proposal for each α_t is drawn in turn from this distribution. If it produces improvement in the likelihood at time t it is accepted.[12]

A Gibbs step is used for updating Q, i.e. each proposal of Q is accepted. Assume Q to be diagonal and choose an inverse gamma distribution as a prior,

[12]Note that Fahrmeir and Knorr-Held (1997) use a different updating procedure, computing the acceptance probability δ for a proposal for α_t', $\delta = \min\left\{1, \frac{\mathrm{p}(y_t|\alpha_t')}{\mathrm{p}(y_t|\alpha_t)}\right\}$. We prefer to reduce acceptence to the case of an improvment of the likelihood as this already produces an acceptance of 30 percent of the proposals.

i.e. $Q_{jj} \sim \mathrm{IG}(a, b)$. The resulting full conditional is still inverse gamma with parameters $a + (q-1)/2$ and $b + \sum u_{tj}^2$. We start with values $a = 2$ and $b = 0.05$, so that the expectation of the inverse gamma distribution exists and the variances Q_{jj} are large enough to produce diverse proposals for α_t.

After convergence, further iteration steps are performed to get samples from the marginal distribution $\mathrm{p}(\alpha \mid y, x, c)$. Samples from the hazard function of a specific covariate sequence $x_i(t)$ are calculated by plugging the samples from $\mathrm{p}(\alpha \mid y, x, c)$ into (5). The arithmetic average of the hazard function is computed together with boundaries cutting off, e.g., 5 percent of it's sample.

We performed 6000 iterations, starting to store every 5th parameter after the first 1000 iterations, thus storing 1000 values for each parameter. Low values of the autocorrelation function that can be estimated of the sampled parameter indicate good mixing, i.e. a high rate of acceptance of the new proposals of parameters in the iteration steps. Figure 1 shows the estimated autocorrelation function of the 50th parameter (i.e. NP at t = 25). Plots of other parameters look quite similar and resemble the plot shown by Fahrmeir and Knorr-Held (1997).

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B Classification of industries

1. Land-Forstwirtschaft; Fischerei; Energie und Wasser; Bergbau; Ton, Steine, Erde.
2. Chem. Industrie; Kunststoffverarbeitung; Textil, Bekleidungsgew.; Holz-Papier-Druck; Nahrung - Genussmittel; Industrie, nicht einzuordnen; Leichtindustrie, nicht einzuordnen; Handwerk, nicht einzuordnen.
3. Eisen- u. Stahlverarb.; Maschinen - Fahrzeugbau; Elektro - Feinmechanik; Schwerindustrie, nicht einzuordnen;
4. Bauhauptgewerbe; Ausbau, Bauhilfgsgewerbe.
5. Grosshandel; Handelsvermittlung; Einzelhandel.
6. Bahn; Post; Sonst. Verkehr - Nachrichten; Gebietskörperschaft; Sozialversicherung.
7. Banken, Sparkassen; Versicherungsgewerbe; Bildung, Wissenschaft, Sport; Gesundheitswesen; Rechtsberatung, Immobilien u. ä.
8. Gaststätten, Beherbung; Persönl. Dienstleistung; Gebäudereinigung, Abfall; sonst. Dienstleistungen; Private Haushalte; Dienstleistungen, nicht einzuordnen.
9. Org. o. Erwerbscharakter; sonstige Branche; falsche Angabe Branche; keine Angabe Branche
10. missing values, nicht zutreffend.

	Terminating event is full employment		
	2nd month	13th month	25th month
Int0	-0.021*	-0.021*	-0.018*
Int2	-0.001	-0.000	0.002*
Int3	-0.012*	-0.011*	-0.009*
Int4	-0.005*	-0.004*	0.001*
	Terminating event is part time empl.		
	2nd month	13th month	25th month
Int0	-0.027*	-0.025*	-0.019*
Int2	-0.007*	-0.007*	-0.004*
Int3	-0.015*	-0.016*	-0.017*
Int4	-0.000	0.000	0.004*
	Terminating event is discouragement		
	2nd month	13th month	25th month
Int0	-0.032*	-0.030*	-0.023*
Int2	0.012*	0.014*	0.022*
Int3	0.005*	0.006*	0.010*
Int4	-0.014*	-0.014*	-0.013*
	Terminating event is other activity		
	2nd month	13th month	25th month
Int0	-0.011	0.000	0.027*
Int2	-0.038*	-0.040*	-0.044*
Int3	-0.005*	-0.005*	-0.005*
Int4	-0.041*	-0.043*	-0.045*

Table 3: Contribution to the hazard rate by interest income in the unemployment model for men. For calculations see Section 5, for categories, see Section 4.3. An * denotes significance at the 10 percent level.

	Terminating event is full employment		
	2nd month	13th month	25th month
Int0	-0.005*	0.001	0.008*
Int2	-0.004*	-0.004*	-0.005*
Int3	-0.008*	-0.009*	-0.011*
Int4	-0.073*	-0.078*	-0.089*
	Terminating event is part time empl.		
	2nd month	13th month	25th month
Int0	-0.022*	-0.019*	-0.018*
Int2	-0.004	-0.004*	-0.005*
Int3	-0.011*	-0.012*	-0.014*
Int4	-0.010*	-0.015*	-0.026*
	Terminating event is discouragement		
	2nd month	13th month	25th month
Int0	-0.026*	-0.022*	-0.017*
Int2	0.006*	0.009*	0.018*
Int3	-0.014*	-0.016*	-0.023*
Int4	-0.042*	-0.052*	-0.085*
	Terminating event is other activity		
	2nd month	13th month	25th month
Int0	-0.019*	-0.012*	0.020*
Int2	-0.013*	-0.012*	-0.013*
Int3	0.040*	0.043*	0.056*
Int4	0.251*	0.261*	0.291*

Table 4: Contribution to the hazard rate by interest income in the unemployment model for women. For calculations see Section 5, for categories, see Section 4.3. An * denotes significance at the 10 percent level.

	Terminating event is full employment			
	2nd month	13th month	25th month	37th month
Int0	-0.016*	-0.015*	-0.010*	-0.005*
Int2	-0.005*	-0.004*	-0.004*	-0.004*
Int3	-0.032*	-0.033*	-0.033*	-0.035*
Int4	0.013*	0.013*	0.015*	0.019*
	Terminating event is part time empl.			
	2nd month	13th month	25th month	37th month
Int0	-0.034*	-0.032*	-0.024*	-0.011*
Int2	-0.013*	-0.012*	-0.012*	-0.012*
Int3	0.006*	0.007*	0.009*	0.015*
Int4	-0.022*	-0.023*	-0.025*	-0.028*
	Terminating event is unemployment			
	2nd month	13th month	25th month	37th month
Int0	-0.019*	-0.017*	-0.014*	-0.008*
Int2	-0.005*	-0.005*	-0.003*	0.001*
Int3	-0.005*	-0.005*	-0.005*	-0.004*
Int4	0.001	0.002*	0.003*	0.006*
	Terminating event is other activity			
	2nd month	13th month	25th month	37th month
Int0	-0.021*	-0.019*	-0.011*	0.003*
Int2	0.007*	0.008*	0.010*	0.013*
Int3	0.001	0.002	0.004*	0.005*
Int4	-0.004*	-0.005*	-0.006*	-0.007*

Table 5: Contribution to the hazard rate by interest income in the non-participation model for men. For calculations see Section 5, for categories, see Section 4.3. An * denotes significance at the 10 percent level.

	Terminating event is full employment			
	2nd month	13th month	25th month	37th month
Int0	-0.002	0.002	0.011*	0.016*
Int2	-0.041*	-0.041*	-0.042*	-0.042*
Int3	-0.031*	-0.032*	-0.035*	-0.036*
Int4	0.001	0.001	-0.000	-0.001*
	Terminating event is part time empl.			
	2nd month	13th month	25th month	37th month
Int0	-0.032*	-0.030*	-0.027*	-0.020*
Int2	0.035*	0.037*	0.044*	0.054*
Int3	0.049*	0.050*	0.052*	0.054*
Int4	0.042*	0.044*	0.051*	0.063*
	Terminating event is unemployment			
	2nd month	13th month	25th month	37th month
Int0	-0.050*	-0.049*	-0.047*	-0.038*
Int2	0.002	0.003*	0.005*	0.006*
Int3	-0.006*	-0.007*	-0.010*	-0.017*
Int4	-0.009*	-0.010*	-0.012*	-0.018*
	Terminating event is other activity			
	2nd month	13th month	25th month	37th month
Int0	-0.010	-0.007	0.000	0.015*
Int2	-0.015*	-0.016*	-0.017*	-0.020*
Int3	0.021*	0.021*	0.023*	0.025*
Int4	-0.022*	-0.023*	-0.025*	-0.030*

Table 6: Contribution to the hazard rate by interest income in the non-participation model for women. For calculations see Section 5, for categories, see Section 4.3. An * denotes significance at the 10 percent level.

	Terminating event is full employment		
	2nd month	13th month	25th month
R2	0.000	0.002	0.006*
R3	-0.006	-0.001	0.010*
R4	-0.041*	-0.035*	-0.025*
	Terminating event is part time empl.		
	2nd month	13th month	25th month
R2	-0.041*	-0.035*	-0.025*
R3	0.002	0.004	0.016*
R4	-0.012*	-0.009	0.000
	Terminating event is discouragement		
	2nd month	13th month	25th month
R2	-0.012*	-0.009	0.000
R3	-0.011*	-0.012*	-0.014*
R4	0.017*	0.020*	0.030*
	Terminating event is other activity		
	2nd month	13th month	25th month
R2	0.017*	0.020*	0.030*
R3	-0.003	-0.001	0.005*
R4	-0.014*	-0.010	0.007*

Table 7: Contribution to the hazard rate by the replacement ratio in the unemployment model for men. For calculations see Section 5, for categories, see Sections 4.5. An * denotes significance at the 10 percent level.

	Terminating event is full employment		
	2nd month	13th month	25th month
R2	-0.003*	-0.002*	-0.003*
R3	-0.005*	-0.003	0.001*
R4	-0.022*	-0.022*	-0.021*
	Terminating event is part time empl.		
	2nd month	13th month	25th month
R2	-0.022*	-0.022*	-0.021*
R3	-0.000	0.003	0.012*
R4	0.013*	0.019*	0.033*
	Terminating event is discouragement		
	2nd month	13th month	25th month
R2	0.013*	0.019*	0.033*
R3	-0.041*	-0.042*	-0.043*
R4	0.012*	0.012*	0.012*
	Terminating event is other activity		
	2nd month	13th month	25th month
R2	0.012*	0.012*	0.012*
R3	-0.013*	-0.012*	-0.012*
R4	-0.006*	-0.003*	-0.002*

Table 8: Contribution to the hazard rate by the replacement ratio in the unemployment model for women. For calculations see Section 5, for categories, see Sections 4.5. An * denotes significance at the 10 percent level.

	0 DM < Interest Income ≤ 500 DM		
	2nd month	13th month	25th month
R1**	0.178*	0.174*	0.178*
R2	-0.015*	-0.013*	-0.013*
R3	-0.005*	-0.008*	-0.009*
	500 DM < Interest Income ≤ 2000 DM		
	2nd month	13th month	25th month
R1	0.009*	0.010*	0.015*
R2	-0.005*	-0.005*	-0.003*
R3	0.057*	0.061*	0.079*
	2000 DM < Interest Income ≤ 5000 DM		
	2nd month	13th month	25th month
R1	-0.001	-0.003*	-0.003*
R2	0.007*	0.007*	0.009*
R3	0.038*	0.039*	0.046*
	5000 DM < Interest Income		
	2nd month	13th month	25th month
R1	-0.007*	-0.008*	-0.010*
R2	-0.052*	-0.054*	-0.060*
R3	-0.006*	-0.004*	-0.001*

Table 9: Contribution to the hazard rate by the replacement ratio in different wealth groups in the unemployment model for men, terminating event is full employment. For calculations see Section 5, for categories, see Section 4.5. An * denotes significance at the 10 percent level, ** denotes the baseline.

	0 DM < Interest Income ≤ 500 DM		
	2nd month	13th month	25th month
R1**	0.185*	0.189*	0.204*
R2	-0.024*	-0.023*	-0.022*
R3	-0.016*	-0.011*	0.003*
	500 DM < Interest Income ≤ 2000 DM		
	2nd month	13th month	25th month
R1	-0.025*	-0.026*	-0.029*
R2	0.014*	0.014*	0.016*
R3	-0.008*	-0.005*	-0.001*
	2000 DM < Interest Income ≤ 5000 DM		
	2nd month	13th month	25th month
R1	-0.045*	-0.048*	-0.059*
R2	-0.026*	-0.027*	-0.029*
R3	-0.014*	-0.014*	-0.017*
	5000 DM < Interest Income		
	2nd month	13th month	25th month
R1	0.017*	0.018*	0.022*
R2	0.013*	0.013*	0.014*
R3	0.044*	0.046*	0.054*

Table 10: Contribution to the hazard rate by the replacement ratio in different wealth groups in the unemployment model for women, terminating event is full employment. For calculations see Section 5, for categories, see Section 4.5. An * denotes significance at the 10 percent level, ** denotes the baseline.

	0 DM < Interest Income ≤ 500 DM		
	2nd month	13th month	25th month
R1**	0.181*	0.190*	0.214*
R2	0.020*	0.022*	0.028*
R3	-0.031*	-0.028*	-0.016*
	500 DM < Interest Income ≤ 2000 DM		
	2nd month	13th month	25th month
R1	-0.036*	-0.037*	-0.040*
R2	0.009*	0.011*	0.014*
R3	-0.025*	-0.025*	-0.028*
	2000 DM < Interest Income ≤ 5000 DM		
	2nd month	13th month	25th month
R1	0.012*	0.014*	0.019*
R2	-0.024*	-0.026*	-0.032*
R3	-0.018*	-0.019*	-0.020*
	5000 DM < Interest Income		
	2nd month	13th month	25th month
R1	0.007*	0.008*	0.010*
R2	0.029*	0.032*	0.040*
R3	0.001	0.001	0.005*

Table 11: Contribution to the hazard rate by the replacement ratio in different wealth groups in the unemployment model for men, terminating event is discouragement. For calculations see Section 5, for categories, see Section 4.5. An * denotes significance at the 10 percent level, ** denotes the baseline.

	0 DM < Interest Income ≤ 500 DM		
	2nd month	13th month	25th month
R1**	0.161*	0.172*	0.190*
R2	0.000	0.002	0.005*
R3	-0.014*	-0.010*	-0.002*
	500 DM < Interest Income ≤ 2000 DM		
	2nd month	13th month	25th month
R1	-0.000	0.001	0.004*
R2	-0.003	-0.002*	-0.001*
R3	0.001	0.003*	0.011*
	2000 DM < Interest Income ≤ 5000 DM		
	2nd month	13th month	25th month
R1	0.019*	0.020*	0.022*
R2	-0.012*	-0.013*	-0.015*
R3	0.056*	0.061*	0.075*
	5000 DM < Interest Income		
	2nd month	13th month	25th month
R1	0.001	0.001	0.001*
R2	-0.008*	-0.009*	-0.010*
R3	-0.014*	-0.016*	-0.018*

Table 12: Contribution to the hazard rate by the replacement ratio in different wealth groups in the unemployment model for women, terminating event is discouragement. For calculations see Section 5, for categories, see Section 4.5. An * denotes significance at the 10 percent level, ** denotes the baseline.

	Terminating event is full employment		
	2nd month	13th month	25th month
NP	-0.012*	-0.011*	-0.010*
Inc1	0.012*	0.011*	0.014*
Inc2	0.017*	0.017*	0.017*
Inc3	-0.011*	-0.011*	-0.012*
Inc4	-0.005*	-0.005*	-0.004*
Inc5	0.017*	0.015*	0.012*
	Terminating event is part time empl.		
	2nd month	13th month	25th month
NP	-0.004*	-0.004*	-0.003*
Inc1	-0.014*	-0.014*	-0.015*
Inc2	0.001	0.003*	0.010*
Inc3	-0.005*	-0.005*	-0.006*
Inc4	0.003*	0.003*	0.004*
Inc5	0.009*	0.010*	0.011*
	Terminating event is discouragement		
	2nd month	13th month	25th month
NP	-0.002	-0.001	0.003*
Inc1	0.004*	0.005*	0.010*
Inc2	-0.015*	-0.015*	-0.014*
Inc3	0.003*	0.004*	0.007*
Inc4	0.003*	0.003*	0.005*
Inc5	-0.006*	-0.006*	-0.009*
	Terminating event is other activity		
	2nd month	13th month	25th month
NP	0.002	0.002	0.003*
Inc1	-0.008*	-0.004*	0.000
Inc2	-0.014*	-0.011*	-0.006*
Inc3	0.007*	0.009*	0.013*
Inc4	-0.001	-0.001	-0.002*
Inc5	0.002	0.003*	0.005*

Table 13: Contribution to the hazard rate by income of the partner in the unemployment model for men. For calculations see Section 5, for categories, see Section 4.4 An * denotes significance at the 10 percent level.

	Terminating event is full employment		
	2nd month	13th month	25th month
NP	0.047*	0.052*	0.060*
Inc1	-0.031*	-0.034*	-0.037*
Inc2	-0.007*	-0.004*	0.004*
Inc3	0.002	0.002*	0.006*
Inc4	-0.021*	-0.020*	-0.019*
Inc5	-0.045*	-0.048*	-0.056*
	Terminating event is part time empl.		
	2nd month	13th month	25th month
NP	-0.008*	-0.008*	-0.005*
Inc1	0.072*	0.073*	0.066*
Inc2	-0.009*	-0.006*	-0.009*
Inc3	-0.002	-0.001	-0.001*
Inc4	-0.002	-0.001	0.001*
Inc5	0.049*	0.048*	0.039*
	Terminating event is discouragement		
	2nd month	13th month	25th month
NP	-0.014*	-0.015*	-0.018*
Inc1	0.002	0.005*	0.015*
Inc2	-0.018*	-0.011*	0.001*
Inc3	-0.021*	-0.021*	-0.026*
Inc4	-0.005*	-0.004*	-0.005*
Inc5	-0.062*	-0.072*	-0.098*
	Terminating event is other activity		
	2nd month	13th month	25th month
NP	-0.021*	-0.024*	-0.029*
Inc1	-0.009*	-0.010*	-0.014*
Inc2	-0.030*	-0.024*	0.001*
Inc3	0.006*	0.010*	0.023*
Inc4	-0.001	0.001	0.008*
Inc5	0.121*	0.133*	0.168*

Table 14: Contribution to the hazard rate by income of the partner in the unemployment model for women. For calculations see Section5, for categories, see Section4.4. An * denotes significance at the 10 percent level.

	Terminating event is full employment			
	2nd month	13th month	25th month	37th month
NP	-0.004*	-0.004*	-0.003*	-0.004*
Inc1	0.025*	0.026*	0.028*	0.033*
Inc2	-0.012*	-0.011*	-0.008*	-0.000*
Inc3	0.032*	0.034*	0.043*	0.060*
Inc4	0.005	0.005*	0.008*	0.012*
Inc5	-0.007*	-0.008*	-0.012*	-0.020*
	Terminating event is part time empl.			
	2nd month	13th month	25th month	37th month
NP	-0.020*	-0.020*	-0.020*	-0.022*
Inc1	0.024*	0.026*	0.033*	0.041*
Inc2	-0.045*	-0.046*	-0.047*	-0.048*
Inc3	-0.142*	-0.149*	-0.168*	-0.199*
Inc4	-0.030*	-0.031*	-0.033*	-0.036*
Inc5	0.136*	0.140*	0.152*	0.166*
	Terminating event is unemployment			
	2nd month	13th month	25th month	37th month
NP	0.022*	0.024*	0.028*	0.033*
Inc1	-0.006*	-0.006*	-0.006*	-0.007*
Inc2	0.010*	0.012*	0.017*	0.027*
Inc3	0.016*	0.017*	0.023*	0.033*
Inc4	0.005*	0.006*	0.008*	0.011*
Inc5	-0.017*	-0.018*	-0.022*	-0.027*
	Terminating event is other activity			
	2nd month	13th month	25th month	37th month
NP	0.001	0.002*	0.003*	0.005*
Inc1	-0.031*	-0.032*	-0.036*	-0.044*
Inc2	-0.021*	-0.020*	-0.018*	-0.014*
Inc3	0.011*	0.013*	0.021*	0.036*
Inc4	-0.028*	-0.028*	-0.027*	-0.024*
Inc5	-0.033*	-0.035*	-0.041*	-0.052*

Table 15: Contribution to the hazard rate by income of the partner in the non-participation model for men. For calculations see Section 5, for categories, see Section 4.4. An * denotes significance at the 10 percent level.

	Terminating event is full employment			
	2nd month	13th month	25th month	37th month
NP	0.037*	0.038*	0.040*	0.039*
Inc1	0.100*	0.102*	0.106*	0.105*
Inc2	-0.062*	-0.061*	-0.060*	-0.062*
Inc3	0.030*	0.033*	0.038*	0.041*
Inc4	0.016*	0.016*	0.016*	0.014*
Inc5	0.002	0.003*	0.005*	0.006*
	Terminating event is part time empl.			
	2nd month	13th month	25th month	37th month
NP	-0.038*	-0.039*	-0.041*	-0.045*
Inc1	-0.008*	-0.008*	-0.008*	-0.006*
Inc2	-0.013	-0.011	-0.004	0.005*
Inc3	-0.120*	-0.125*	-0.135*	-0.153*
Inc4	-0.033*	-0.034*	-0.037*	-0.040*
Inc5	-0.070*	-0.072*	-0.078*	-0.088*
	Terminating event is unemployment			
	2nd month	13th month	25th month	37th month
NP	0.042*	0.046*	0.057*	0.078*
Inc1	-0.043*	-0.046*	-0.054*	-0.068*
Inc2	-0.030*	-0.028*	-0.017*	0.006*
Inc3	0.004	0.008*	0.018*	0.044*
Inc4	-0.011*	-0.011*	-0.010*	-0.007*
Inc5	0.033*	0.035*	0.047*	0.072*
	Terminating event is other activity			
	2nd month	13th month	25th month	37th month
NP	-0.056*	-0.058*	-0.063*	-0.072*
Inc1	-0.003*	-0.003*	-0.003*	-0.000*
Inc2	-0.012*	-0.009	0.003	0.025*
Inc3	0.002	0.004	0.009*	0.019*
Inc4	0.018*	0.020*	0.025*	0.033*
Inc5	-0.018*	-0.017*	-0.017*	-0.016*

Table 16: Contribution to the hazard rate by income of the partner in the non-participation model for women. For calculations see Section 5, for categories, see Section 4.4. An * denotes significance at the 10 percent level.

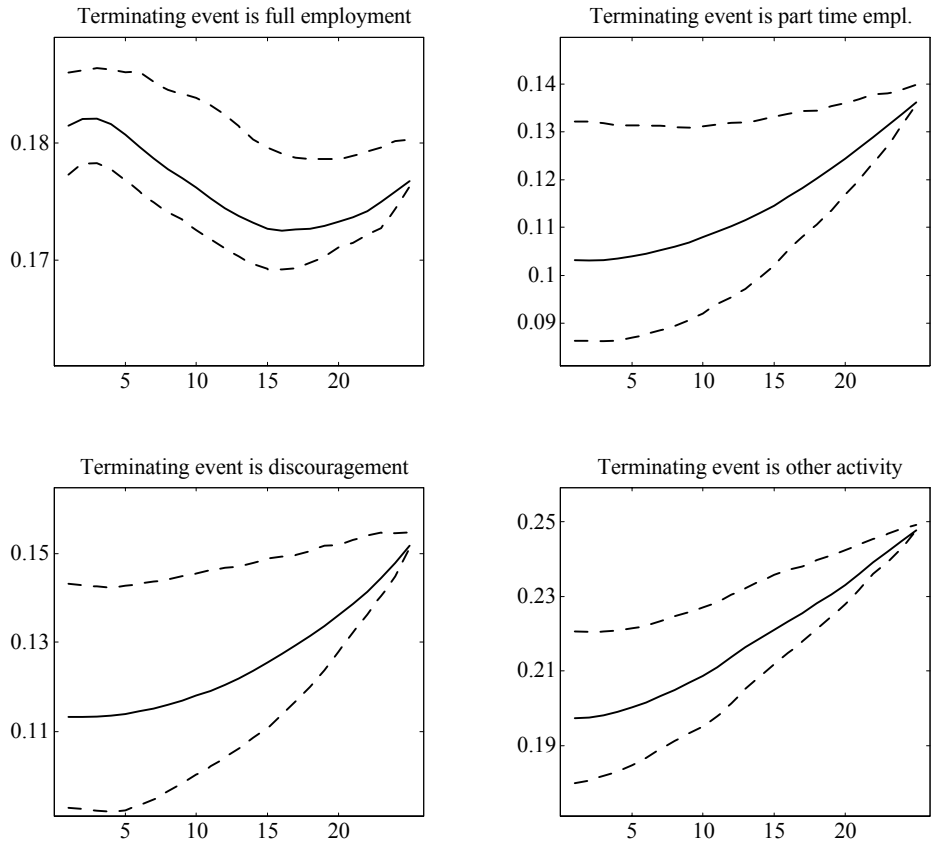

Figure 2: Hazard rate in the unemployment model for men with one child, having completed vocational school and having the baseline characteristics else, with 90 percent pointwise credible regions.

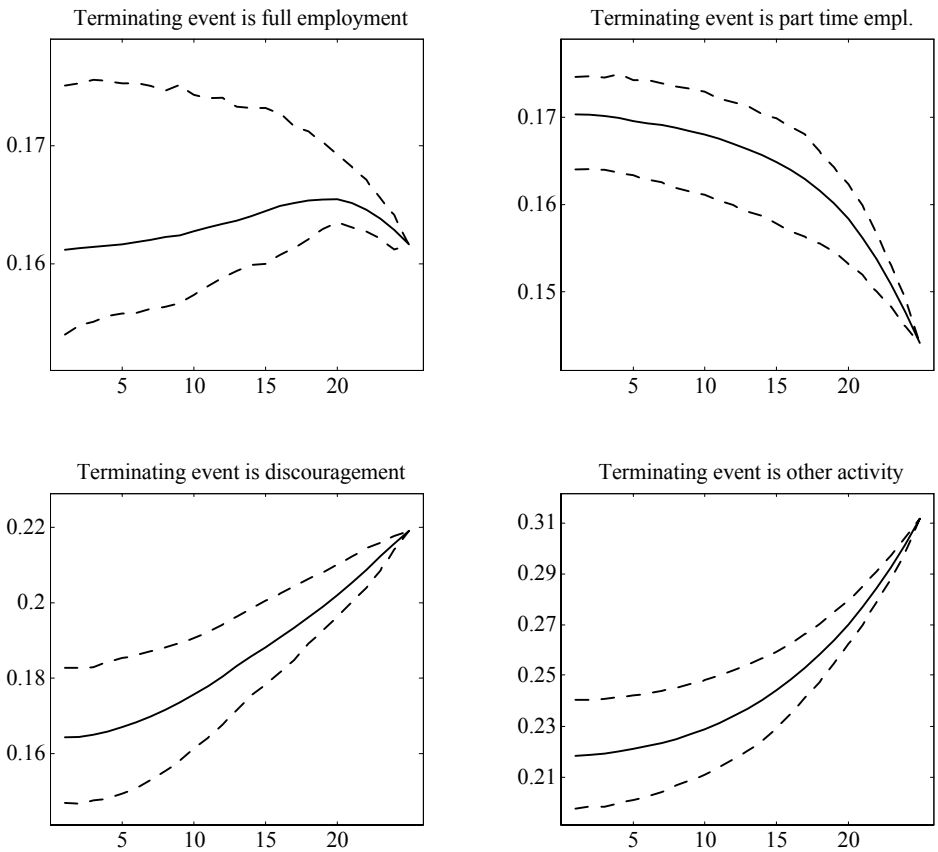

Figure 3: Hazard rate in the unemployment model for women with one child, having completed vocational school and having the baseline characteristics else, with 90 percent pointwise credible regions.

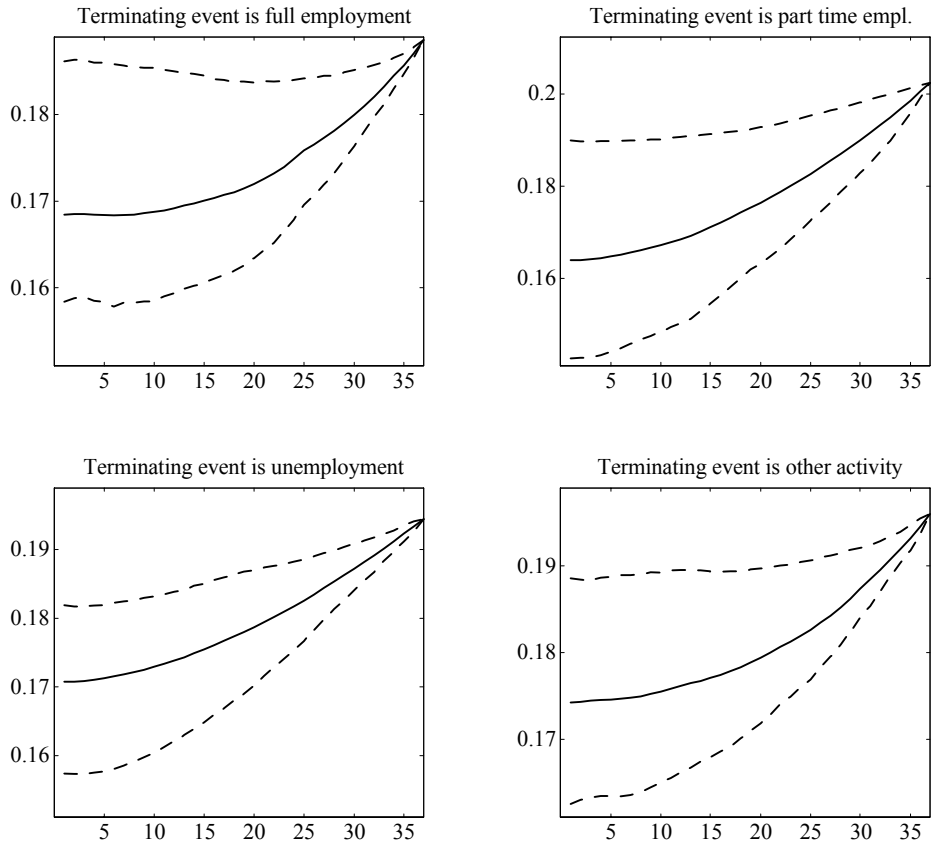

Figure 4: Hazard rate in the non-participation model for men with one child, having completed vocational school and having the baseline characteristics else, with 90 percent pointwise credible regions.

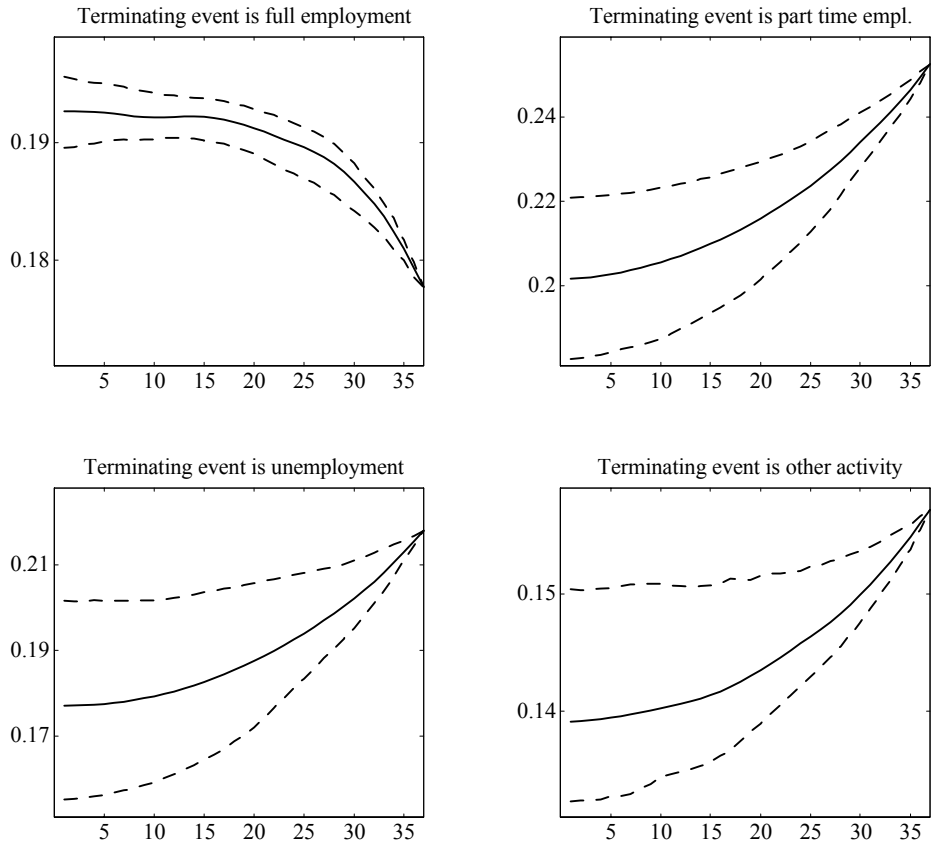

Figure 5: Hazard rate in the non-participation model for women with one child, having completed vocational school and having the baseline characteristics else, with 90 percent pointwise credible regions.

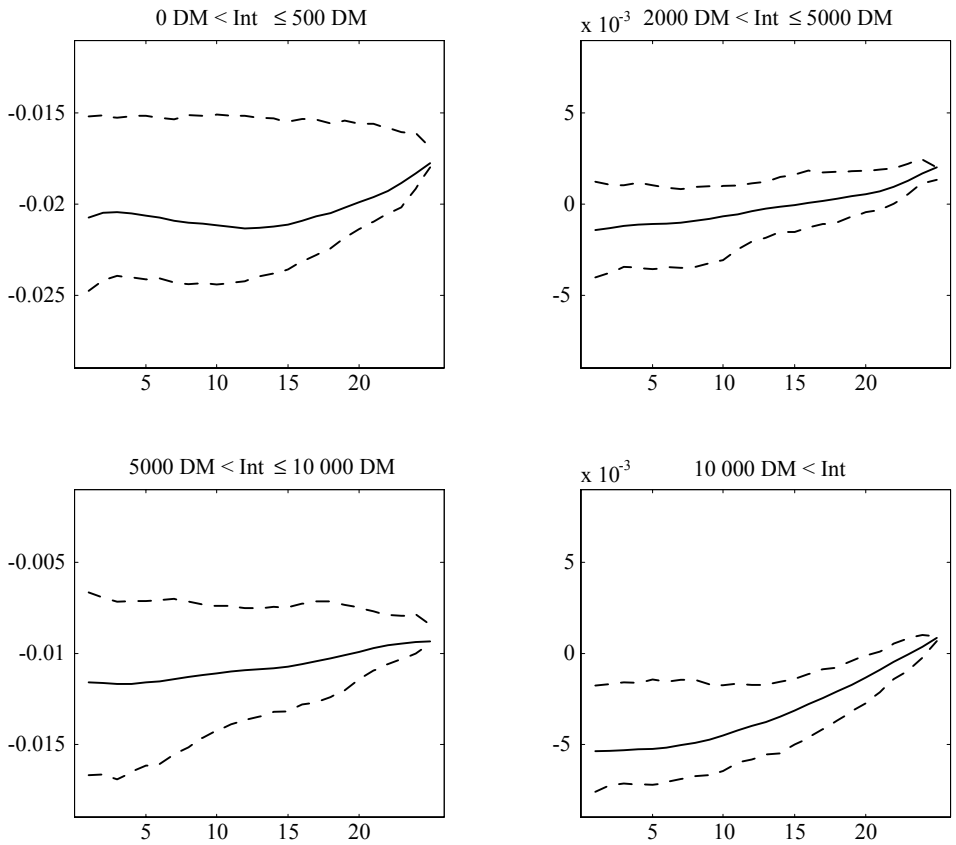

Figure 6: Contribution to the hazard rate by interest income in the unemployment model for men, terminating event is full employment, with 90 percent pointwise credible regions. For calculations see Section 5, for categories, see Section 4.4.

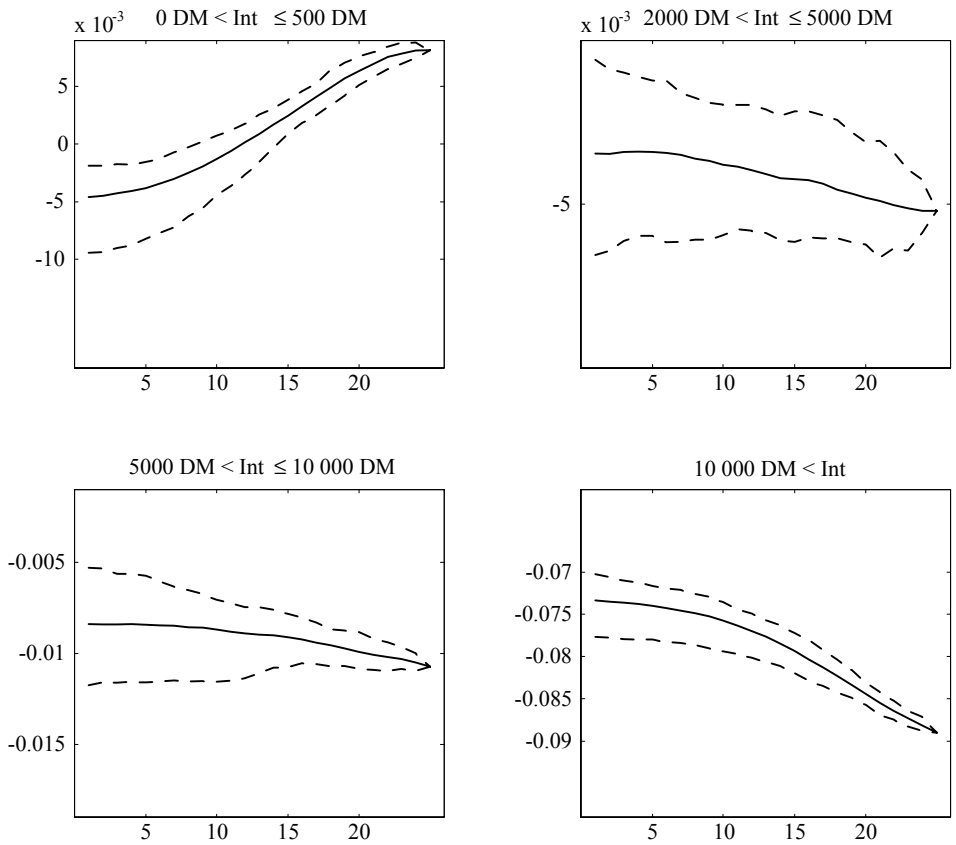

Figure 7: Contribution to the hazard rate by interest income in the unemployment model for women, terminating event is full employment, with 90 percent pointwise credible regions. For calculations see Section 5, for categories, see Section 4.4.

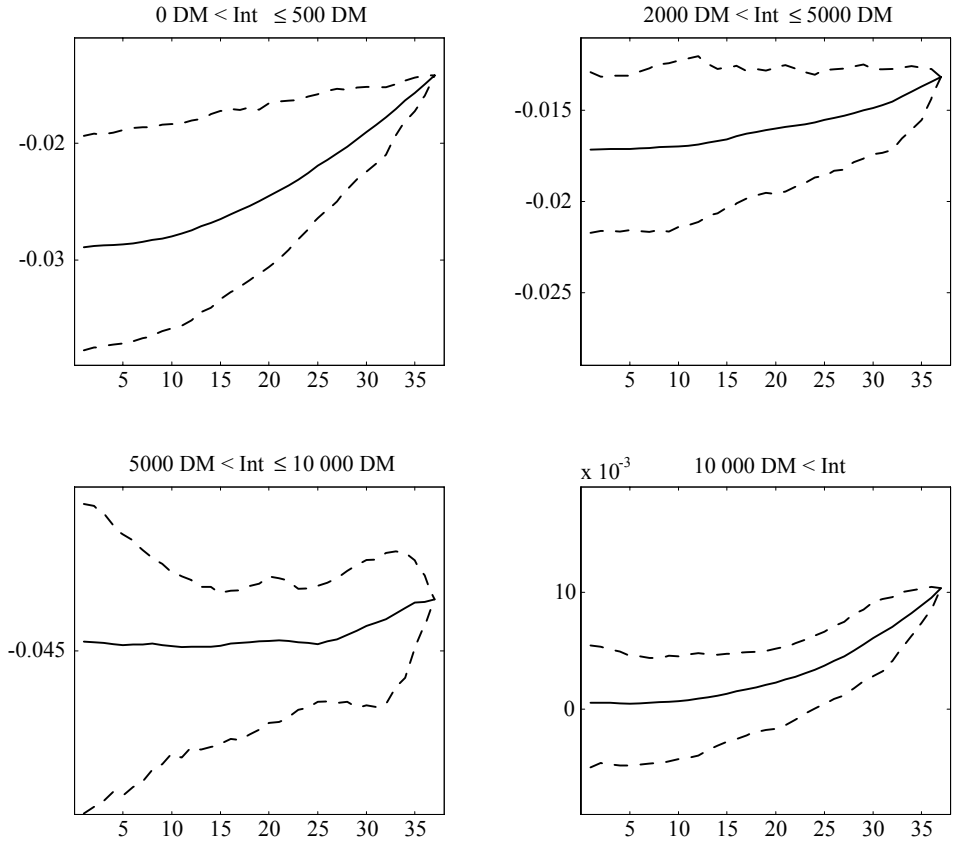

Figure 8: Contribution to the hazard rate by interest income in the non-participation model for men, terminating event is full employment, with 90 percent pointwise credible regions. For calculations see Section 5, for categories, see Section 4.4.

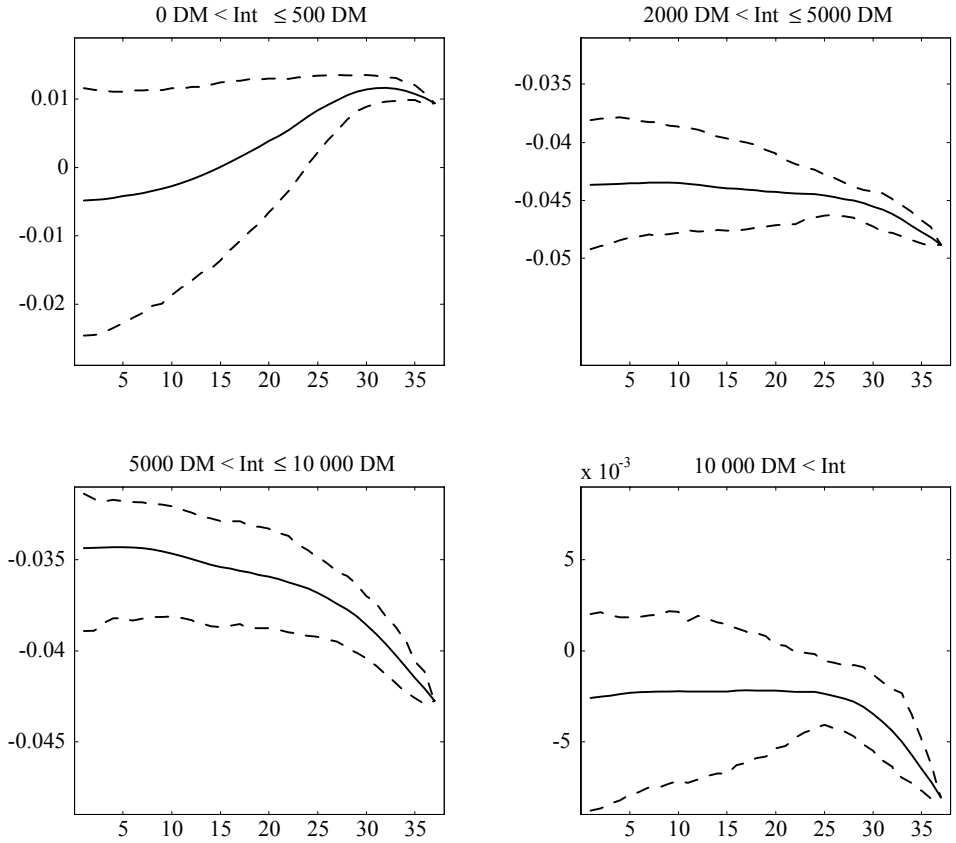

Figure 9: Contribution to the hazard rate by interest income in the non-participation model for women, terminating event is full employment, with 90 percent pointwise credible regions. For calculations see Section 5, for categories, see Section 4.4.