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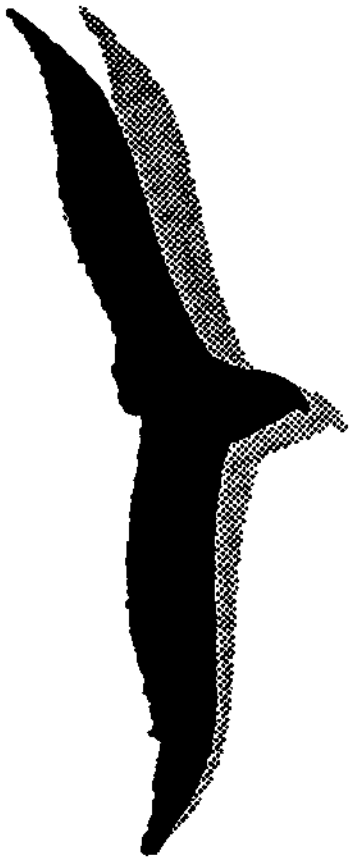

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Elena G. F. Stancanelli

abstract

The purpose of this paper is to estimate the relationship between the duration of entitlement to unemployment benefit and the individual re-employment probability for Britain. There are no previous studies that use individual data to estimate this relationship for Britain. To estimate the effect of benefit entitlement duration on the individual re-employment probability, I take into account the institutional features of the unemployment benefit system in the UK. This leads to the definition of two different groups of the unemployed with respect to the duration of entitlement to unemployment benefit. I find some evidence in favour of the hypothesis that the (conditional) probability of leaving unemployment rises considerably near the time of exhaustion of unemployment benefit. However, the expected exhaustion of unemployment benefit is found to raise the hazard of exit into "other states" more than the full-time work hazard.

Keywords: duration analysis C41, unemployment duration J64, social security H55.

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Unemployment Duration and the Duration of Entitlement to Unemployment Benefit[1]

Elena G. F. Stancanelli

In this paper, I investigate the relationship between the duration of entitlement to unemployment benefit and the individual probability of leaving unemployment for Britain. Interest in this topic is heightened by the 1993 UK Budget announcement that the duration of entitlement to the national insurance unemployment benefit will be reduced to six months from 1995.

According to the theory, the individual probability of leaving unemployment increases near the time of exhaustion of entitlement to unemployment benefit because of increased search intensity and lowered reservation wage. (Mortensen, 1977, Moffit and Nicholson, 1982, Van den Berg, 1990). Generally, empirical studies have confirmed the theoretical predictions. Examples are: for the U. S. , Katz (1986), Katz and Meyer (1988, 1990), Meyer (1990), Han and Hausman (1990); for Canada, Ham and Rea (1987); for the Netherlands, van den Berg (1990) and Lindeboom and Theeuwes (1993).

No attempt has been made until the present study to estimate the impact

[1]Part of the analysis contained in this paper was carried out while I was a PhD student at the European University Institute, in Florence. I am indebted for helpful advice to John Micklewright, Robert Waldmann, Geert Ridder, Göetz Rohwer, Lavan Mahadeva, Gerard van den Berg, Jan van Ours and the participants of seminars at the Vrije Universiteit of Amsterdam, the University of Tilburg and the University of Leiden. Patrick Heady is to be thanked for having made the data available. All errors are mine.

of the exhaustion of entitlement to unemployment benefit on the individual re-employment probability for the UK, at least to my knowledge. However, on the basis of cross-countries comparisons, based on aggregate time-series data, it was possible to conclude that the duration of entitlement to unemployment benefit influences the rate of unemployment and the expected duration of unemployment in a number of countries among which also the U. K. (Burda, 1988). The main drawback of these studies is that it is difficult to construct a satisfactory aggregate measure of the level and the duration of unemployment benefit since normally benefit payments vary considerably across individuals.

Previous UK studies have investigated how the impact of the level of unemployment benefit on the hazard rate varies over time with the lengthened duration of the unemployment spell (Narendranathan et al. 1985, Narendranathan and Stewart, 1993a ad 1993b). The impact of the level of unemployment benefit on the hazard rate has been found to decline as the individual spell of unemployment progresses. In particular, the effect of the level of unemployment benefit becomes statistically insignificant after the first five or six months of unemployment. However, the UK unemployment benefit schemes are such that the level of unemployment benefit paid does not necessarily decline during the course of the unemployment spell. Therefore, this evidence is inconclusive with respect to the impact of unemployment benefit exhaustion. Some limited evidence on the effect of the entitlement to unemployment benefit on the duration of unemployment is gathered by Wadsworth (1991), who analyses data matched from two years of the British Labour Force Survey (1983/84). The author finds that non-claimants of unemployment benefit have lower unemployment durations, due however to a higher withdrawal rate from the labour force. Similar results are obtained by Schimdt and Wadsworth (1993), who also analyse matched data from the Labour Force Survey, for the period 1983–89. The authors investigate the impact of entitlement to unemployment benefit on individual search intensity and conclude that excluding workers from the benefit system leads them to search less extensively.

The structure of the paper is the following. In Section I, the main features of the unemployment benefit scheme in Britain are briefly described. The expected impact of the duration of entitlement to unemployment benefit on the re-employment probability is discussed. The data are described in Section

II. The econometric model is presented in Section III. This is a reduced form model of the probability of leaving unemployment. Two destination states out of unemployment are distinguished (full-time work and other states) and modelled using a competing risks specification. The results of estimation are discussed in Section IV. Conclusions follow.

I. The institutional features of unemployment benefit and the entitlement effect

In Britain, the unemployed has access to two different schemes of unemployment benefit. The first is the national insurance benefit, Unemployment Benefit (UB), which is paid conditional on the unemployed showing satisfactory work contributions records. UB has a maximum duration of 52 weeks[2]. The other benefit scheme is the social assistance benefit, Supplementary Benefit (SB) —called Income Support since 1988— which is means-tested and unlimited in time. The two schemes of unemployment benefit do not differ substantially in amount. They are both flat rate[3] with additions for dependent spouse and children. The two benefits can be received simultaneously, if the unemployed resources including UB fall below their needs.

The expected impact of the exhaustion of entitlement to unemployment benefit on the hazard rate is summarized in Figure 0.1. Two groups of the unemployed are distinguished: recipients of UB (only) and recipients of SB (either on its own or in addition to UB). The type of unemployment benefit received is assumed not to vary over time, at least until time "p" when the national insurance unemployment benefit UB expires. The hazard rate of recipients of UB (only) at the start of their unemployment spell is expected to rise near the time of UB exhaustion. The theory is inconclusive with regards to the exact length of time to the left of point p, when the hazard rate for UB recipients starts to rise. I assume this time to coincide with about ten weeks before the exhaustion of entitlement to UB.

[2]The maximum duration of entitlement to UB in a given spell of unemployment might actually be less than 52 weeks for some unemployed because of the so called "link spell" rule; following which unemployment spells separated by less than eight weeks of employment are counted together as single spells for benefit entitlement purposes.

[3]The Earnings Related Supplement which used to link the amount of UB received to the level of previous earnings was abolished in January 1982.

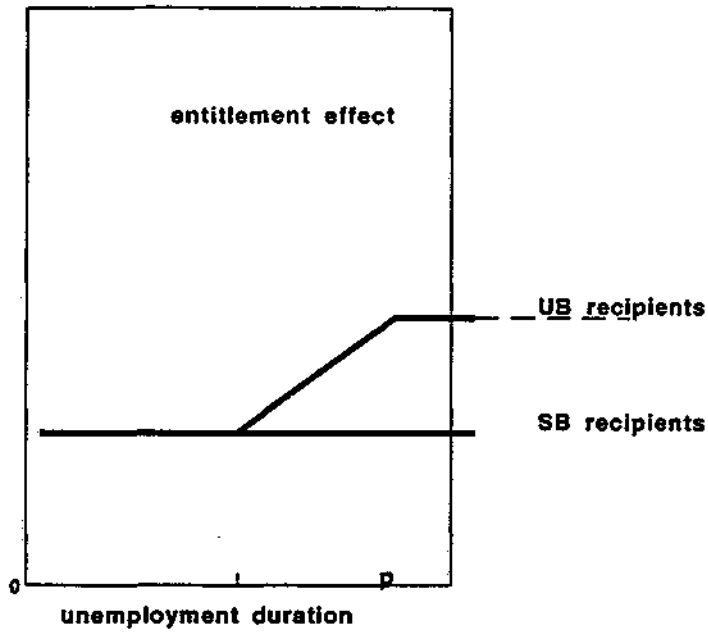

Figure 0.1: *The duration of entitlement effect*

After the exhaustion of UB (time p) the hazard rate of the (once) recipients of UB might remain constant or decrease. However, if the (once) UB unemployed start to receive SB upon UB exhaustion, from time p onwards their behaviour is likely to resemble that of the SB unemployed. The hazard rate might sharply decrease and then remain constant.

The hazard rate for the recipients of SB is not assumed to vary as a function of the potential duration of the benefit, since SB is unlimited in time. I assume that the unemployed that receive both types of benefit (UB and SB) at the start of their unemployment spell behave as SB recipients (rather than as UB recipients) with regard to their expectations of the potential duration of the unemployment benefit. Indeed, having successfully passed the means test for the award of the social assistance benefit (SB) when they were already receiving the national insurance benefit (UB) (especially, at the start of their unemployment spell) should make the unemployed quite confident that upon exhaustion of entitlement to UB the foregone UB payment will be replaced by a corresponding SB payment. Consequently, their job search behaviour will not be influenced by the limited duration of UB. This assumption is partly supported by the information available in the data on the time pattern of unemployment benefit receipts, which is reviewed in the next section.

II. A description of the data

The LSUS survey and the selection of the sample for analysis

The data used for the analysis are the Survey of the Living Standard of the Unemployed (LSUS), which was carried out by the Office of Population Censuses and Surveys on behalf of the Department of Health and Social Security (DHSS)[4] in 1983/1984. These data are largely unexploited[5]. They relate to a time when the rate of unemployment in the UK was high and close to the current levels (about 12-13%). Most previous UK applied studies on unemployment duration use data that relate to the late seventies when the rate of unemployment was much lower.

The LSUS sample is drawn from the population of the unemployed that started to register at Great Britain Unemployment Benefit Offices (UBOs) in the Summer of 1983, between 21st June and 20th August 1983 (both unemployment benefits, UB and SB, are paid at UBOs). The unemployed with the following characteristics were sampled: they were either married men or single people of either gender living on their own or with their children; they were aged between 20 and 58; they had been "signing on"[6] continuously for three months following the start of their registered unemployment spell. Two interviews were carried out with the sample participants. The first took place about three months after the start of the sampled unemployment spell, in the Autumn of 1983, the second a year later, i. e. in the Autumn of 1984, about fifteen months after the start of the sampled unemployment spell.

Only the male unemployed that participated in the both survey interviewes are analysed here. Female unemployed are analysed in a separate piece of work (Stancanelli, 1994). Non-participants to the second interview are dropped from the sample since the information on the duration of the unemployment spells was collected retrospectively at time of the second interview[7]. The final sample for econometric analysis is made up of 1941

[4]Now called simply DSS.

[5]Until recently, only the survey planners have analyzed the LSUS data, at least to my knowledge, and mostly from a descriptive point of view (Heady and Smith, 1989). Previous work on these data has been carried out by myself (Stancanelli, 1993) and Jones et al. (1993).

[6]"Signing on" means in the British jargon going to social security offices to confirm that one is unemployed in order to get state benefits.

[7]Non-respondents could have been considered as right-censored at the time of the first

male unemployed that reported to receive unemployment benefit (UB or SB) at the time of the first interview.

Benefit receipts

Out of the 1941 observations selected for econometric analysis, 736 (38%) reported to receive UB (only) at the start of their registered unemployment spell —approximated by the time of the first interview— and 1205 (62%) reported to receive SB, either on its own or in addition to UB, at the same point in time. About 89% of the unemployed that reported to receive joint payments of UB and SB at the time of the first interview and that were still unemployed at the time of the second interview reported to receive only SB at the time of the second interview. The corresponding figure for recipients of UB (only) at the time of the first interview was 54.4% (about 40% of them report not to receive any benefit at the time of the second interview). Overall, about 95% of the unemployed that reported to receive SB, either on its own or in addition to UB, at the time of the first interview and that were still unemployed at the time of the second interview reported to receive SB at the time of the second interview. It therefore emerges that the unemployed that receive SB, with or without UB, at the start of their unemployment spell are likely to continue to receive SB throughout their unemployment spell.

Definition of the explanatory variables considered

Descriptive statistics of the explanatory variables considered are given in Table 0.1. I have distinguished two groups of the unemployed: recipients of UB (only)[8]; recipients of SB (with or without UB).

I have constructed some dummies that take value one if the unemployed person was, respectively, in full-time work or unemployed or sick for the largest part of the year preceding the start of the observed spell of registered unemployment. The base group for these dummies is made up of those per-

interview. However, given the sample design these observations are also left truncated at the time of the first interview. This implies that their contribution to the sample likelihood function would cancel out.

[8]Some "UB only" unemployed (about 6%, i. e. 49 out of 736) that reported at the time of the first interview benefit amounts obviously different from the flat rates UB amounts (which are fixed by law) were recoded for the purpose of the construction of these dummies as receiving SB.

sons whose main activity in the year before the sampled unemployment spell was any other, i. e. part-time work, full-time education, government traning scheme, housework, prison, non-registered unemployment. The occupation dummies take value one if the unemployed's person last job was respectively, in a "professional or intermediate" occupation or in an "unskilled" occupation. The base group for these dummies are the skilled and semi-skilled workers.

Table 0.1: *Descriptive statistics of the economic variables*

	Receive UB only		*Receive SB*		*Benefit receipients*	
Variable	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
Left truncation interval (weeks)	*13.3736*	*1.0473*	*13.4241*	*1.0527*	*13.4049*	*1.0507*
Unemployment duration (weeks)	*45.5340*	*19.3854*	*48.2415*	*18.7074*	*47.2148*	*19.0078*
F/t work most part year before U.	*0.8111*	*0.3917*	*0.5693*	*0.4954*	*0.6610*	*0.4735*
Unemployed most part year before U.	*0.1141*	*0.3182*	*0.2896*	*0.4538*	*0.2231*	*0.4164*
Sick, out of work most part year before U.	*0.0272*	*0.1627*	*0.0398*	*0.1957*	*0.0350*	*0.1839*
Professional/Intermediate Occupation	*0.2269*	*0.4191*	*0.1295*	*0.3358*	*0.1664*	*0.3725*
Unskilled Occupation	*0.0584*	*0.2347*	*0.0614*	*0.2402*	*0.0603*	*0.2381*
Occupation not available	*0.0421*	*0.2010*	*0.0846*	*0.2785*	*0.0685*	*0.2527*
Age 20–24	*0.0924*	*0.2898*	*0.1477*	*0.3550*	*0.1267*	*0.3328*
Age 25-34	*0.2065*	*0.4051*	*0.4033*	*0.4908*	*0.3287*	*0.4699*
Age 35-44	*0.1929*	*0.3949*	*0.2805*	*0.4494*	*0.2473*	*0.4316*
Age 45-54	*0.2948*	*0.4563*	*0.1286*	*0.3349*	*0.1917*	*0.3937*
Age 55-58	*0.2133*	*0.4099*	*0.0398*	*0.1957*	*0.1056*	*0.3074*
Has any child old less than 5	*0.1630*	*0.3697*	*0.4639*	*0.4989*	*0.3498*	*0.4770*
Married	*0.8859*	*0.3182*	*0.8506*	*0.3566*	*0.8640*	*0.3429*
Spouse working 1 month before U.	*0.4565*	*0.4984*	*0.1261*	*0.3321*	*0.2514*	*0.4339*
Searches less than before U.	*0.1399*	*0.3472*	*0.0622*	*0.2417*	*0.0917*	*0.2887*
Values Leisure more than Labour	*0.1875*	*0.3906*	*0.0988*	*0.2985*	*0.1324*	*0.3390*
Experience some shortage of money	*0.5897*	*0.4922*	*0.8274*	*0.3781*	*0.7372*	*0.4402*
House owner outright/with mortgage	*0.4715*	*0.4995*	*0.3129*	*0.4639*	*0.3730*	*0.4837*
County unemployment rate	*13.4753*	*3.2963*	*13.6656*	*3.1372*	*13.5935*	*3.1990*
UB/SB amount in £, logs	*3.3945*	*0.2979*	*3.7999*	*0.4316*	*3.6462*	*0.4335*
Expected earnings, in £, logs.	*4.5001*	*0.4325*	*4.4200*	*0.5330*	*4.4504*	*0.4987*
Expected earnings not available	*0.0068*	*0.0822*	*0.0124*	*0.1109*	*0.0103*	*0.1010*
total savings at tk, £	*2990.7*	*8694.8*	*367.5*	*1488.0*	*1362*	*5624.7*
total debt at tk, £	*488.5*	*1881.0*	*673.8*	*3146.7*	*633.7*	*2753.9*
Weeks of UB left, 10–6					*0.1053*	*0.3070*
Weeks of UB left, 5–1					*0.0985*	*0.2980*
Weeks of UB left, 0					*0.0910*	*0.2877*
1–3 weeks after UB exhaustion					*0.0894*	*0.2853*
4 or more weeks after UB exhaustion					*0.0820*	*0.2743*

The number of unemployed receiving UB only is 736; 1205 get SB or jointly SB and UB. The total number of benefit recipients is then 1941. "U. " stands for the observed unemployment spell. The time "tk" relates to one month before the start of the observed unemployment spell. The dichotomous variables take value one when the condition stated for each of them is satisfied. The mean duration is taken over all obsrevations (including the right-censored observations). The logarithms are taken over the non-zero observations.

The expected earnings from work are the fitted earnings from earnings equations[9]. Indeed, the earnings from the last job might be endogenous to the model (Narendranathan and Nickell, 1985). The level of unemployment benefit is a time varying variable (see Stancanelli, 1993). It is allowed to vary for recipients of the national insurance benefit (UB) at the time of exhaustion of entitlement to UB.

Individual wealth or the tightness of the budget constraint is proxied by a dummy that takes value one if the unemployed reported to "suffer from money shortage" at the time of the first interview. Access to credit or perhaps also wealth is proxied by a dummy for house ownership. This variable might capture also other unobserved individual characteristics such as capacity to plan forward or stability.

Individual leisure valuation is proxied by a dummy constructed using replies to the following question, asked at the time of the first interview: "*If you were to get enough money to live as comfortably as you would like for the rest of your life, would you want to have a job or would you prefer not to work?*". Diminished search intensity is measured by a dummy contructed on the basis of the replies given to the following question at the time of the first interview: "*Here is a list of things people do. We would like to know whether you do each thing more or less than you did four or five months ago, before you started/restarted signing on at an unemployment benefit office* $\cdots$ *Visiting an unemployment benefit office or a job centre*". These variables are measured at the start (or sometime before the start) of the unemployment spell to avoid potential endogeneity problems.

I consider the following variables for age and family composition: age dummies, marital status dummy, a dummy for the presence of any child aged less than 5 in the nuclear family. I model the spouse's labour force participation with a dummy that takes value one if the spouse was working in a full-time or part-time job one month before the start of the partner's sampled unemployment spell. This reference time is chosen to avoid endogeneity problems due to the possibility the two partners' labour force participation decisions are simultaneously determined.

The rate of unemployment in the local area (the county) is used to capture

[9]The procedure adopted was slightly more complicated and it involved imputing expected earnings for the unemployed for whom the last earnings information was not available (see Stancanelli, 1993).

demand side conditions.

Do the two groups of unemployment benefit recipients differ?

From inspection of Table 0.1, it emerges that recipients of UB on its own (at the time of the first interview) are more likely on average to have hold a full-time job for most part of the year before the start of their observed spell of registered unemployment. This finding is plausible given the rules that regulate entitlement to UB.

Recipients of "UB only" seem also more likely to be older on average than other types of unemployment benefit recipients. Perhaps, this might be explained by the fact that the category "recipients of UB only" exclude the unemployed receiving SB in addition to UB, i. e. joint payments of UB and SB. The recipients of UB that are aged over forty-five might be more likely to have higher levels of savings and therefore they may not be entitled to SB. Indeed, recipients of "UB only" at the time of the first interview are on average much wealthier than recipients of SB (with or without UB).

From inspection of Table 0.1, it emerges that the proportion of the unemployed with diminished search intensity is higher among recipients of "UB only". Similarly the proportion of the unemployed that value leisure more than labour is higher among the "UB only" group. Perhaps, this is explained by the fact that the "UB only" unemployed are on average wealthier than the unemployed that receive SB (either on its own or in addition to UB). Indeed, higher levels of wealth may result in lower intensity of search and higher valuation of leisure as relative to labour (Jones et al. , 1993).

The distribution of total savings of the unemployed receiving only UB or SB (with or without UB) at the time of the first interview is shown in Table 0.2 below. The recipients of "UB only" are wealthier than the recipients of "SB". The percentage of the "UB only" unemployed that report zero amounts of savings (about 28%) is considerably lower than the corresponding figure (about 51%) for the "SB" unemployed. Almost 100% of the unemployed receiving SB (with or without UB) at the time of the first interview report savings below £3000. The same figure for recipients of "UB only" is about 73%. Savings of £3000 were the treshold level of savings above which the unemployed was not entitled to the means-tested benefit (SB) in 1982/83.

Table 0.2: *The amounts of savings at time of the first interview*

amounts, £	*Receive UB only*		*Receive SB with or without UB*	
	%	*cum. %*	*%*	*cum. %*
0	*28.3*	*28.3*	*51.3*	*51.3*
≤ 100	*17.1*	*45.4*	*29.4*	*80.7*
≤ 200	*5.4*	*50.8*	*4.5*	*85.2*
≤ 500	*5.0*	*55.8*	*4.4*	*89.6*
≤ 1000	*6.0*	*61.8*	*5.0*	*94.6*
≤ 2000	*6.3*	*68.1*	*4.5*	*99*
≤ 3000	*4.7*	*72.8*	*0.7*	*99.8*
≤ 5000	*7.8*	*80.6*	*0.1*	*99.9*
≤ 10000	*7.2*	*87.8*	*0.1*	*100*
≤ 15000	*3.9*	*91.7*		
≤ 20000	*2.1*	*93.8*		
≤ 30000	*3.5*	*97.3*		
≤ 50000	*1.7*	*99.0*		
≤ 100000	*1.0*	*100*		
mean value, £	*4248.1 (SD 11047.0)*		*153.9 (SD 427.6)*	
The total amounts of savings relate to the principal respondent, i. e. the spouse's savings (if any) are not taken into account.				

The "time left to benefit exhaustion " dummies

The impact of the expected exhaustion of UB is modelled by using a set of time varying dummies which take value one in some chosen intervals of time for the unemployed that reported to receive only UB at the time of the first interview[10]. The base for these dummies are the unemployed reporting to receive SB (either on its own or in addition to UB) and the remaining time intervals.

The following intervals of time before exhaustion of entitlement to unemployment benefit were considered:

- ten to six weeks of entitlement to UB left before exhaustion of entitlement;
- five to one weeks of entitlement to UB left;
- zero weeks of entitlement to UB left, i. e. last week of entitlement to UB, which corresponds to the 52nd week of unemployment for more than 90% of the recipients of UB at the time of the first interview;
- from one to three weeks after exhaustion of entitlement to UB;
- four weeks or more passed the exhaustion of entitlement to UB.

[10]This approach is basically the same than that adopted by Katz and Meyer (1988).

Introducing these additional time varying dummies for recipients of "UB only" in the time intervals going from week 42 onwards is equivalent to shifting the baseline hazard rate for the recipients of "UB only" from week 42 onwards.

III. The econometric model

I adopt a reduced form approach to modelling the individual probability of leaving unemployment. The probability of leaving unemployment is modelled as a conditional probability using the hazard rate. Job search theory guides the choice of covariates and the interpretation of the results.

Defining time since the start of the unemployment spell as a continuous random variable T —where T does not need to be calendar time— with cumulative distribution function $F(t) = P(T < t)$ and density function $f(t) = dF/dt$, the hazard rate can be written as follows:

$$\theta(t) = \lim_{dt \to 0} \frac{P(t \leq T < t + dt | T \geq t)}{dt} = \frac{f(t)}{1 - F(t)}, \tag{0.1}$$

where $1 - F(t) = G(t)$ is the survivor function. This expression describes the probability of leaving unemployment at any time, t, conditional on being still unemployed an infinitesimal amount of time to the left of t.

Different destination states out of unemployment are modelled together with the probability of leaving unemployment using a a competing risks specification. The destination states considered are assumed to be mutually exclusive. The conditional probability of leaving unemployment at time t and of exiting to a specific destination state k —given the set D of destination states— can be written as:

$$\theta_k(t) = \lim_{dt \to 0} \frac{P(t \leq T < t + dt, D = k, | T \geq t)}{dt}, \tag{0.2}$$

which is the so-called cause-specific hazard. The overall hazard rate can be written as the sum of the hazards of exiting into the different states:

$$\theta(t_i, x_i(t)) = \sum_{k \epsilon D} \theta_k(t_i, x_i(t)), \tag{0.3}$$

where D is the set of destination states.

The destination states considered here are exit into a full-time job and exit into "other states". Other states includes part-time work, full-time education, government training schemes, household work, sickness and withdrawal

from the labour force. The small number of observations exiting to these different states does not allow to model them separately.

I model the hazard rate using a piecewise exponential functional form. This specification has the advantage of not imposing severe constraints on the behaviour of the baseline hazard rate, at least if enough "time segments" or "pieces" are specified. I allow the baseline hazard rate to vary each week. The competing risks hazard rate can be written as follows:

$$\theta(t_i, x_i(t)) = \sum_{k \epsilon D} exp\{a_m^k + \beta^k x_i^k(t)\} \tag{0.4}$$

where "m" are the different time intervals specified for the baseline hazard rate; "x" is a vector of explanatory variables; "i" relates to the individual unemployment spell; "t_i" is the ending time of the unemployment spell for completed spells and the time of right-censoring for right-censored spells. Two destination states k are considered, full-time work and other states.

It is conventional to use maximum likelihood techniques to estimate hazard rate models. One of the main reasons is that maximum likelihood techniques allow one to deal with right-censoring of the unemployment spells. The contribution to the likelihood of completed spells of unemployment is the density function, evaluated at the time of exit from unemployment. The contribution of right-censored spells is the survivor function, evaluated at the time of censoring. In the case of the LSUS data, it is necessary to allow for the the left truncation of the sample at about three months from the start of the unemployment spell. The left truncation interval is set equal to the lapse of time between the start of the unemployment spell and the time of the first interview, which varies for each unemployed person between 11 and 17 weeks. Allowing for left truncation, the log-likelihood function for the LSUS sample is the following:

$$LogL = \sum_{i \epsilon A} \{(a_m)\beta x_i(t)\} + \sum_i \{- \int_{t_s}^{t_i} [exp(a_m)\beta x_i(u)du], \tag{0.5}$$

where A is the set of the completed spells. In the competing risks case, the log-likelihood function can be written as follows:

$$LogL = \sum_{k \epsilon D} \sum_{i \epsilon A_k} \{a_m^k + \beta^k x_i^k(t)\} + \sum_{k \epsilon D} \sum_i \{- \int_{t_s}^{t_i} exp\{a_m^k + \beta^k x_i^k(u)du\} \tag{0.6}$$

$$\begin{cases} \text{full-time work, } k = 1 \\ \text{other economic states, } k = 2. \end{cases}$$

where A_k is the set of completed spells ending into destination state k.

Unobserved heterogeneity is not allowed for. It would seem to be the case that unobserved heterogeneity is more of a problem when the functional form adopted for the baseline hazard is rather restrictive, such as, for instance, the monotonic Weibull, than if a flexible baseline is allowed for. Allowing for unobserved heterogeneity requires one to make assumptions on its possible correlation across the two cause-specific hazards which are often rather unrealistic[11]. Moreover, in this case one should also allow unobserved heterogenity to differ across the two groups of unemployment benefit recipients and consequently make further assumptions about the possible correlation of the errors across the two exit states and the two groups. There is no reason to believe that imposing these additional restrictions on the estimating model would result in less distortions than not controlling for unobserved individual heterogeneity. The main finding of previous studies that have allowed for unobserved heterogeneity in a competing risks framework and that have specified a flexible baseline hazard rate is that allowing for unobserved heterogeneity tends to increase the absolute value of the estimated coefficients (Katz and Meyer, 1988).

IV. Results of estimation

Non-parametric Kaplan-Meier estimates

I have first estimated the single risk survivor functions for the two groups of "UB only" and "SB" recipients[12] non-parametrically, using the Kaplan-Meier method (see Kalbfleish and Prentice, 1980, for a description of this method). The duration of the completed spell of unemployment by exit state for the recipients of UB only and for the recipients of SB (with or without UB) is shown in Table 0.9, in the Appendix. The estimated survivor functions are plotted in Figure 0.2.

The survivor function for recipients of "UB only" lies above that for the other benefit recipients until about week 50. Thereafter, the two curves tend to coincide. This suggests that the (conditional) probability of leaving un-

[11] Normally either zero or perfect correlation is assumed.

[12] These two groups are defined with respect to benefit receipts reported at the time of the first interview.

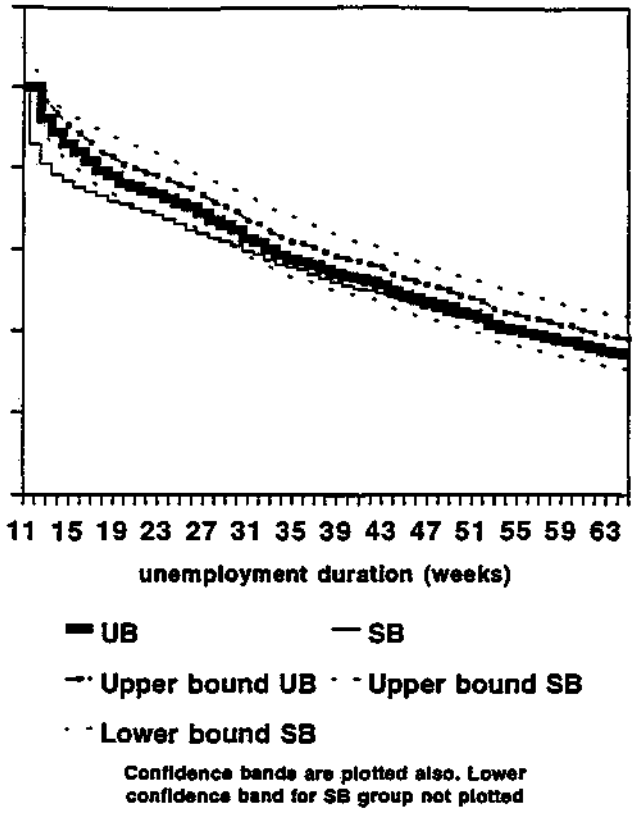

Figure 0.2: *Single risk survivor functions*

employment is higher for the "SB, with or without UB" group rather than for the "UB only" group at any point in time until about the 50th week of unemployment. Perhaps, this phenomen is explained by the fact that the "UB only" unemployed are considerably "richer" than the "SB" unemployed. Indeed, higher levels of savings are likely to rise the unemployed's reservation wage and with thate the duration of the unemployment spells (Jones et al. ,1993). On the basis of a Log-Rank test statistics[13], the null hypothesis that the survivor functions of the two groups of benefit recipients are not statistically different ($\chi^2_2 = 9.0$) is rejected. The 95% confidence intervals are also plotted in Figure 0.2. Except during the first few weeks of unemployment, the survivor curve for the "SB" group lies between the two 95% confidence bands for the survivor curve of the "UB only" group; the survivor curve for the "UB only" group lies between the two 95% confidence bands of the survivor function for the "SB" group[14].

[13]See Kalbfleish and Prentice, 1980, pp. 16–18, for a description of this test which is based on the Kaplan-Meier standard errors of the two survivor functions.

[14]The lower bound of the survivor curve for the "SB" group is not plotted since the survivor function for this group lies behind or coincides with the UB survivor function at each point in time, which implies that its confidence band lies also behind the "UB" survivor function at each point in time. This confidence band is not plotted in order not

Results of estimation of the model for the two groups pooled together

The results of estimation of the econometric model estimated for the two groups of the unemployed pooled together are given in Table 0.3. The reader is referred to Stancanelli (1993) for a discussion of the estimated impact of the explanatory variables. The discussion below focus on the estimated impact of the duration of entitlement to unemployment benefit.

Table 0.3: *Results of estimation of the competing risks model*

Variable	*Full-time job hazard*		*Other states hazard*	
label	*Coeff*	*SE*	*Coeff*	*SE*
F/t work most of the year before U.	*0.3658**	*0.1457*	*-0.6759**	*0.2132*
Unemployed most of the year before U.	*0.3389**	*0.1559*	*-0.4452*	*0.2349*
Sick, out of work, most of the year before U.	*-0.4124*	*0.3114*	*0.1916*	*0.1629*
Professional or Intermediate Occupation	*0.2003**	*0.1008*	*0.4823**	*0.1992*
Unskilled Occupation	*-0.4585**	*0.1745*	*-0.1580*	*0.2903*
Age 20-24	*0.2097*	*0.1090*	*-0.0901*	*0.2417*
Age 35-44	*-0.1877**	*0.0918*	*0.1172*	*0.1910*
Age 45-54	*-0.6489**	*0.1133*	*-0.2286*	*0.2194*
Age 55-58	*-1.2946**	*0.1759*	*-0.0489*	*0.2496*
Has any child aged < 5	*-0.2225**	*0.0886*	*-0.2079*	*0.1891*
Married	*0.1779*	*0.1251*	*-0.2789*	*0.2007*
Spouse working in the month before U.	*0.3389**	*0.0905*	*0.3193*	*0.1743*
Experience some money shortage	*0.2490**	*0.0889*	*-0.2170*	*0.1918*
Searches less than before U.	*-0.8005**	*0.1794*	*-0.0829*	*0.3430*
Values Leisure more than Labour	*-0.2672**	*0.1185*	*-0.1121*	*0.2170*
House owner	*0.3000**	*0.0752*	*0.2145*	*0.1823*
County unemployment rate	*-0.0212*	*0.0109*	*-0.0764*	*0.0891*
Receives UB only	*-0.0905*	*0.0943*	*0.1911*	*0.1478*
UB/SB time varying, £, logs.	*-0.0375*	*0.0643*	*-0.0269*	*0.0204*
Expected earnings, £, logs.	*0.6631**	*0.2079*	*-0.8274**	*0.4152*
Expected earnings not available	*3.1247**	*0.9846*	*-3.1826*	*1.9351*
- 6-10 weeks of UB left	*0.9313**	*0.2452*	*0.5486*	*0.6013*
- 5-1 weeks of UB left	*0.1513*	*0.2768*	*1.2464**	*0.3880*
0 weeks of UB left	*0.6993*	*0.6799*	*3.6317**	*0.6735*
+ 1-3 weeks after UB exhaustion	*0.3488*	*0.3074*	*1.7034**	*0.4178*
+ 4 weeks after UB exhaustion	*0.5463**	*0.2051*	*0.9519**	*0.3490*

*The model is estimated for all benefit recipients, i. e. 1941 observations. Descriptive statistics of explanatory variables are provided in Section II. "U. " stands for the observed unemployment spell. The dichotomous variables take value one when the condition stated for each of them is satisfied. A weekly baseline is estimated. The estimated coefficients on the weekly segments of the baseline hazard rate are given in Table 0.10 in the Appendix. The value of the max. log-likelihood is: 6142.7. A * indicate statistical significance at the two-sided 5% level.*

to burden the figure with several curves.

A perhaps surprising result is that the expected exhaustion of entitlement to the national insurance unemployment benefit (UB) is found to influence the probability of leaving unemployment to exit to states other than full-time work more than the probability of re-employment in a full-time job. In the full-time job hazard, only the coefficients on the first and the last entitlement dummy are found to differ significantly from zero. However, the estimated coefficients on the UB entitlement duration dummies are all positive, as expected. In the other states hazard, all the UB entitlement duration dummies except the first are found to have a statistically significant impact. The estimated coefficients are positive as predicted by economic theory.

When there are five to one weeks of benefit entitlement left, the chances of leaving unemployment to enter "other states" increase for the "UB only unemployed" by three and half times as much in each of these weeks, in relation to the base. In the last week of entitlement to UB, the probability of exiting to states other than full-time work for "UB only" recipients increases enormously, by about 38 times (in relation to the base). Then, from one to three weeks after benefit exhaustion, the probability of exiting to other states is five and a half times higher in each of these weeks, in relation to the base. From four weeks after exhaustion onwards the chances of exiting to other states are in each week two and half times larger, in relation to the base.

It is possible that part of the enormous increase in the probability of exiting to other states in the last week of entitlement is due to some unemployed classifying themselves as non-registered unemployed under the category "other economic activities". Rounding error in the replies is another possible explanation since the year, i. e. week 52, corresponds for more than 90% of the "UB only" unemployed with the time of exhaustion of UB. However, this does not seem a plausible explanation since the coefficient on the dichotomous variable "0 weeks of UB entitlement left" is not significantly different from zero in the full-time work hazard.

The estimated coefficients on the benefit entitlement dummies are significantly different from each other, as shown in Table 0.4 —at least for those dummies that were found to affect significantly the hazard rate. This implies that the impact of the expected exhaustion of entitlement to unemployment benefit is different over time.

Table 0.4: *The significance of the differences between the estimated coefficients on the benefit entitlement duration dummies*

Benefit duration dummy	$\hat{\beta}_n - \hat{\beta}_m$	$\hat{SE}(\beta_n - \beta_m)$
Full-time exit		
-6–10 weeks, -5–1 weeks	0.78*	0.36
-5–1 weeks, 0 weeks	0.55	0.729
0 weeks, +1–3 weeks	0.37	0.74
+1–3weeks, +4 weeks	0.10	0.35
Other states exit		
-6–10 weeks, -5–1 weeks	0.69	0.59
-5–1 weeks, 0 weeks	2.39*	0.76
0 weeks, +1–3 weeks	1.93*	0.75
+1–3weeks, +4 weeks	0.75*	0.48
A * indicates significance at the two sided 5% level.		

The estimated baseline hazard for the exit into full-time work is plotted in Figure 0.3. The baseline of the same model estimated without controlling for the entitlement effect is also plotted for comparison purposes. The estimated coefficients on the weekly steps of the baseline hazard are shown in Table 0.10, in the Appendix. The two estimated baselines follow a similar pattern over time. However, if the effect of the expected exhaustion of entitlement to UB is controlled for (with the UB entitlement dummies) the spikes after week forty are smaller in size. The other exits baseline is not plotted since the estimated coefficients of the weekly baseline for the exit into other states are not statistically significantly different from zero.

The sensitivity of the estimated benefit entitlement effects to different specification of the hazard rate is tested below.

Some sensitivity analysis

I have tested for the robustness of the estimated coefficients on the two sets (for the two exit states out of unemployment considered) of the benefit entitlement duration dummies. The results are shown in Table 0.7, in the Appendix. First, I compare the results of the competing risks model with those of a corresponding single risk model. All the estimated coefficients on the UB entitlement duration dummies are significantly different from zero

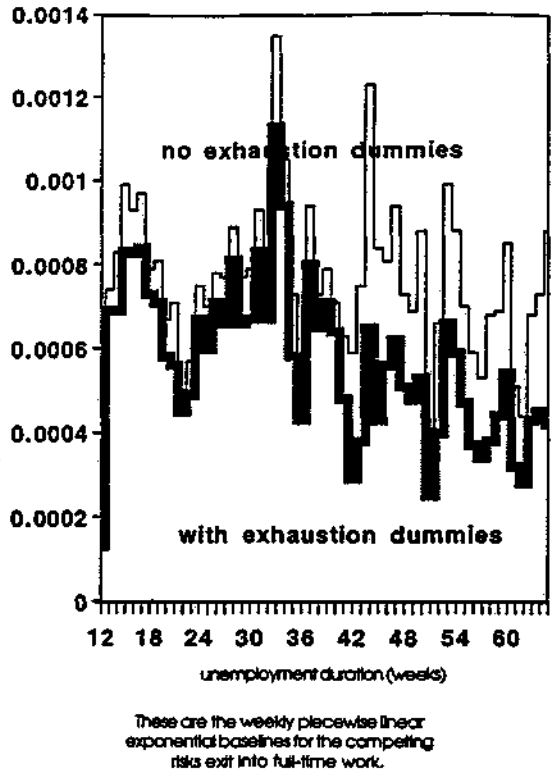

Figure 0.3: *Baseline with/without benefit entitlement duration dummies*

and positive in the single risk model. The estimated coefficient on the dummy for the last week of entitlement to UB is more than twice the size of the coefficients on the other entitlement dummies. However, following the results of estimation of the competing risks model (see Table 0.3) we know that the expected exhaustion of entitlement to unemployment benefit affects the hazard of exit into other states more than the full-time work hazard. This confirms the importance of using competing risks models of the hazard rate. Many previous studies on the benefit entitlement effect were instead carried out in a single risk framework of analysis.

The main model of Table 0.3 was then re-estimated excluding the dummy for recipients of "UB only" from the regressors (Model (1) of Table 0.7). The likelihood ratio test, which is given in the last column of Table 0.7, indicates that the null hypothesis that the coefficient on this additional regressor (dummy for receipt of "UB only") is not significantly different from zero cannot be rejected. However, the significance and the sign of the coefficients on the two sets (for the two exits) of time varying dummies for the duration of entitlement to UB are not affected. The magnitude of the estimated coefficients on the entitlement duration dummies does not change substantially.

The model (without the dummy for receipt of "UB only") was then estimated with an additional time varying dummy taking value one from week 11 (corresponding to the observed start of the unemployment spell because

of the left truncation of the sample) to week 41 for recipients of UB only (Model (2)[15]). The addition of this variable allows the baseline hazard rate to shift for recipients of "UB only" from the start of the unemployment spell rather than from week 42. The estimated coefficient on this additional variable is statistically not significant for any of the two competing risks exits. On the basis of a likelihood ratio test, the null hypothesis that the impact of the additional regressor is not significantly different from zero cannot be rejected.

Model (3) include only the entitlement duration dummies (and the weekly "pieces" of the baseline hazard rate) as explanatory variables. On the basis of a likelihood ratio test, the model with more regressors performs better. The interest of estimating model (3) is to test the robustness of the estimated coefficients on the entitlement duration dummies. The significance and the sign of the coefficients is not affected except for the coefficient of the dummy "week 0 to week 41", which becomes significant for the hazard of exit into full-time work. Also, the sign of the estimated coefficient on the dummy "week 47–51" (not significant) becomes now negative for the full-time work hazard. The magnitude of the estimated coefficients does not change substantially, at least for those coefficients that are statistically significant (except for the coefficient on the dummy "week 0–41" in the full-time work hazard).

In model (4), the baseline hazard rate is allowed to vary every two weeks rather than each week. On the basis of a likelihood ratio test, of model (4) against model (2) —which is the right unrestricted model to consider given that both model (2) and (4) include the dummy "week 0 to week41" and exclude the dummy for receipt of "UB only"— model (4) performs better than model (2). However, the statistical significance, the sign and the magnitude of the UB entitlement coefficients do not change considerably except for the coefficients on the last week of entitlement (week 52). The coefficients on the last week of entitlement (for both hazards of exit into full-time work and into other states) are in model (4) almost half the size than the corresponding coefficients of model (2). In particular, the other exits hazard is found to

[15]Model (2) does not include the dummy for receipt of "UB only" among the regressors since when the time varying dummy "week 0 to week 41" is added to the model, the set of time varying dummies for the duration of entitlement to UB and the dummy for the receipt of "UB only" are highly collinear. This is the reason why model (2) is compared with model (1) rather than with the "Base" model.

increase during the last week of UB entitlement for "UB only" recipients by seven times (in relation to the base), according to model (4), and by about 34 times, according to model (2).

Finally, I have estimated a Weibull model (see Table 0.7). The signes of the coefficients on the benefit duration dummies are the same as in model (2). The significance and the magnitude of the coefficients on the UB entitlement dummies are quite different from those of model (2). In particular, the estimated coefficients for the other states hazard rate are larger in magnitude than in model (2). The estimated coefficient on the last dummy ("+ 4 weeks onwards") is not significant in any of the two exits, while it is significant for both exits in model (2). Significant negative time dependency is detected in both hazards.

To sum up, it is possible to conclude that there is some firm evidence that the expected exhaustion of the national insurance benefit (UB) raises the hazard rate of the "UB only" unemployed. In particular, the hazard of exit into states other than full-time work is found to rise significantly for recipients of UB (only) near the time of exhaustion of the national insurance unemployment benefit. However, the size of the estimated effects is not robust to different specification of the baseline hazard rate.

Results of the model estimated separately for the two groups

The competing risks model presented in Section III was next estimated separately for the two groups of benefit recipients. The UB entitlement dummies are dropped from the two models. The results of estimation for the explanatory variables and for the exit into full-time work are given in Table 0.6 in the Appendix.

The hypothesis that the two groups of benefit recipients do not differ with regards to their (conditional) probability of leaving unemployment is strongly rejected on the basis of a likelihood ratio test ($\chi^2_{150} = 186.8$). One can then conclude that the type of benefit received at about the start of the unemployment spell affects significantly the individual probability of leaving unemployment. A possible explanation for this result is to be found in the different duration of entitlement to the two types of unemployment benefit: UB lasts for a year; SB may last for ever.

The estimated hazard rates for a representative individual for both groups of benefit recipients and for exit into full-time work are plotted in Figure 0.4.

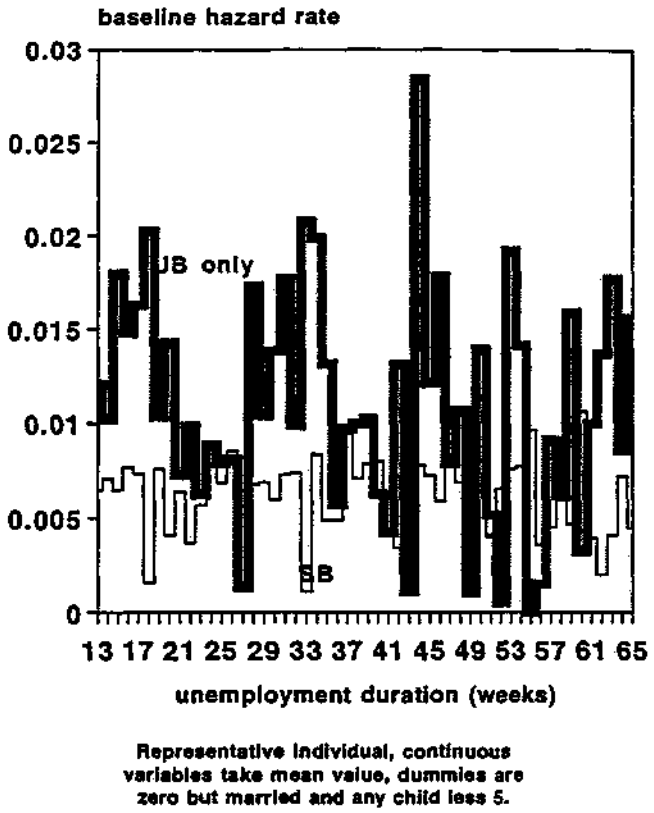

Figure 0.4: *Hazard rates. Full-time work exit*

The corresponding hazards for exit into other states are plotted in Figure . The representative individual is constructed assuming that all continuous variables take their mean value; the dummy for whether the unemployed is "married" and the dummy for whether he has "any child aged less than five" take value one; all the other dummies are set to zero, i. e. the unemployed person is assumed to be in the base group of these dummies.

Following the theoretical predictions, given the expected limited duration of entitlement to UB, the hazard rate for recipients of "UB only" should show larger spikes near the time of benefit exhaustion. The hazard rate for recipients of SB (with or without UB) should be smoother over time.

Indeed, the estimated hazard rate for recipients of "UB only" shows larger spikes and more variability over time than the estimated hazard for SB recipients. Of course, this finding is partly explained by the smaller number of the unemployed in the "UB only" group. It might, however, also indicate that the job search behaviour of recipients of "UB only" is more sensitive to the elapsing of time than that of recipients of SB (with or without UB).

Finally, I have tested how different levels of savings (and debt) affect the unemployment duration of the two groups. It was shown in Section III that the unemployed in the two groups have very different distributions

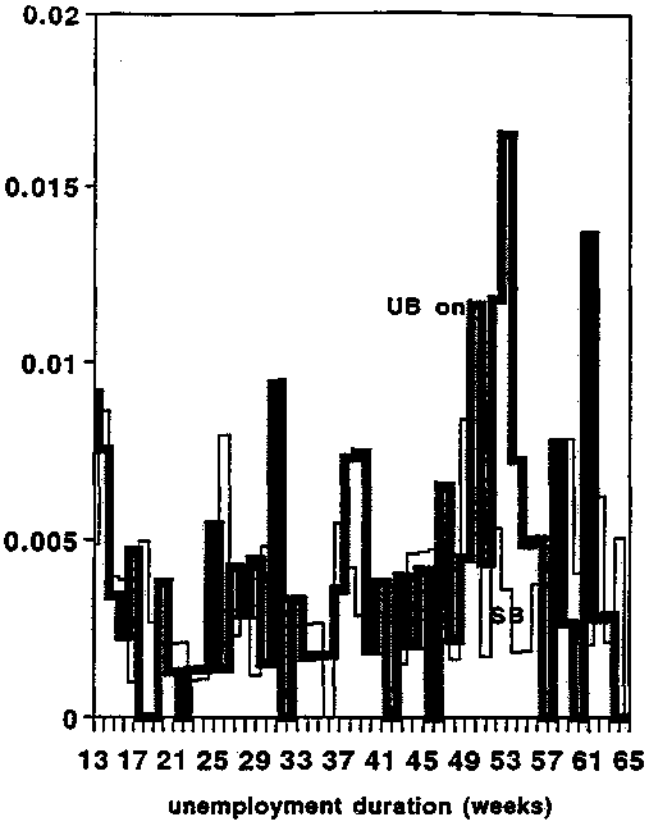

Figure 0.5: *Hazard rates. Other states exit*

of savings —I am interested in the unemployed's savings more than in the unemployed's debt since the award of SB is determined on the basis of the unemployed's level of savings[16]. The levels of savings and debt considered relate to one month before the start of the observed unemployment spell. This reference time is chosen in order to avoid potential endogeneity, since the unemployed's levels of savings (and debt) may vary as a function of the duration of the unemployment spells. These variables are entered in levels because the assumption of a constant elasticity of the hazard rate does not appear reasonable (given the large variation in the distribution of savings of the unemployed).

The estimated coefficients on levels of savings and debt are reported in Table 0.5. None of them is statistically significantly different from zero except for the coefficient on the debt variable for the full-time work hazard of the "SB with or without UB" group[17]. Therefore, the hazard rate of the "UB

[16]The relationship between the unemployed's wealth and the (conditional) probability of leaving unemployment is the subject of Jones et al. (1993)), to which the reader is referred.

[17]The negative sign on this coefficient is perhaps due to the fact that debt may proxy access to credit and probably access to credit has a positive impact on the reservation wage.

Table 0.5: *The impact of savings on the hazard rates of two groups*

Variable	*Recipients of UB only*		*Recipients of SB, with/witout UB*	
	Full-time work	*Other exits*	*Full-time work*	*Other exits*
Total savings, in 100 £	*-0.0012 (0.0010)*	*-0.0012 (0.0013)*	*0.0004 (0.0032)*	*0.0026 (0.0041)*
Total debt, in 100 £	*0.0009 (0.0032)*	*0.0054 (0.0053)*	*-0.0049* (0.0025)*	*-0.0027 (0.0043)*
Max. log-lik.	*-2326.9*		*-3636.1*	
Lik. ratio test	$\chi^2_4 = 3.6$		$\chi^2_4 = 37.8$	

*The estimated models are the same as those of Table 0.6, except for the inclusion of the savings and debt variables. The baseline hazard rates are allowed to vary each week. Descriptive statistics of the explanatory variables are provided in the Table 0.1. A * indicates statistical significance at the two-sided 5% level. Standard errors are given in brackets. The likelihood ratio tests are carried out against the models shown in Table 0.6.*

only" unemployed is not affected by their levels of savings (or debt). The hazard rate of the "SB with or without UB" unemployed is neither affected by the unemployed's savings. It is, instead, influenced though to a minor extent by the unemployed's level of debt.

On the basis of a likelihood ratio test, the null hypothesis that the additional variables (savings and debt levels) do not have a significant impact on the hazard rate cannot be rejected for the "UB only group". However, the same hypothesis is rejected for the "SB with or without UB" group. One might conclude that the level of savings (and debt) of the unemployed is unlikely to affect the estimated impact of the duration of entitlement to the national insurance unemployment benefit on the hazard rate.

V. Conclusions

In this paper, I have analysed the relationship between the duration of entitlement to the national insurance benefit (UB) and the individual probability of leaving unemployment, in the UK.

I have found some evidence in favour of the hypothesis that the (conditional) probability of leaving unemployment rises for the recipients of "UB only" near the time of exhaustion of entitlement to UB. However, the expected exhaustion of entitlement to UB is found to raise the (conditional) probability of exiting into "other states" more than the (conditional) probability of exiting into full-time work. This result is in line with the findings of Wadsworth (1991b), who concluded that non-claimants of unemployment

benefit have a higher withdrawal rate from the labour force than benefit claimants.

However, the estimates of the impact of the expected exhaustion of entitlement to UB are sensitive to the specification of the baseline hazard rate adopted. Therefore, it is not possible to conclude on the size of the estimated effect. A larger dataset would probably be needed in order to obtain robust estimates of the effect of the duration of entitlement to the national insurance unemployment benefit on the individual probability of leaving unemployment.

The results of the analysis carried out in this study highlight the importance of using competing risks specifications of the hazard rate.

Tinbergen Institute and Vrije Universiteit of Amsterdam
June 1994

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Appendix

Table 0.6: *Results of estimation of the re-employment probability*

Variable label	*Recipients of UB only*		*SB/ joint SB and UB*		*All benefits*	
	Coeff	*SE*	*Coeff*	*SE*	*Coeff*	*SE*
F/t work year before	*-0.1398*	*0.2535*	*0.5969**	*0.1778*	*0.3584**	*0.1556*
Unemployed year before	*0.1673*	*0.2859*	*0.4420**	*0.1868*	*0.4197**	*0.1448*
Sick year before	*-0.6378*	*0.5591*	*-0.3729*	*0.3765*	*-0.4257*	*0.3113*
Profes. /Interm. Occ.	*0.3244**	*0.1609*	*0.0739*	*0.1337*	*0.2034**	*0.1003*
Unskilled Occupation	*-0.5214*	*0.2999*	*-0.4298**	*0.2158*	*-0.4485**	*0.1744*
Age 20–24	*0.3357*	*0.1993*	*0.1531*	*0.1318*	*0.2035*	*0.1087*
Age 35-44	*-0.1134*	*0.1617*	*-0.2378**	*0.1133*	*-0.2084**	*0.0919*
Age 45-54	*-0.8165**	*0.1693*	*-0.4552**	*0.1590*	*-0.6067**	*0.1123*
Age 55-58	*-1.4538**	*0.2243*	*-0.7950**	*0.3173*	*-1.2036**	*0.1742*
Has any child aged < 5	*-0.6509**	*0.1767*	*-0.0672*	*0.1070*	*-0.2355**	*0.0883*
Married	*0.5777**	*0.2366*	*-0.0791*	*0.1554*	*0.1682*	*0.1244*
Spouse working month before	*0.2697**	*0.1292*	*0.3375**	*0.1323*	*0.4071**	*0.0874*
Searches less than before	*-1.1211**	*0.2712*	*-0.4995**	*0.2368*	*-0.7646**	*0.1794*
Values Leisure more	*-0.1046*	*0.1730*	*-0.3279**	*0.1659*	*-0.2588**	*0.1182*
Experience money shortage	*0.1861*	*0.1269*	*0.2213*	*0.1281*	*0.1905**	*0.0875*
House owner	*0.1981*	*0.1253*	*0.2815**	*0.0988*	*0.3000**	*0.0748*
County unemployment rate	*-0.0273*	*0.0172*	*-0.0144*	*0.0141*	*-2.0014*	*1.0881*
UB/SB time varying	*-0.0958*	*0.0791*	*0.0852*	*0.1155*	*-0.0706*	*0.0556*
Predicted earnings	*0.6910**	*0.3551*	*0.7417**	*0.2612*	*0.6522**	*0.2076*
No pred. earn.	*3.8496**	*1.6559*	*3.1346**	*1.2504*	*3.0254**	*0.9831*

UB only max. lik. -2328.7; SB / joint SB, UB max. lik. -3655; all benefit recipients max. lik. -6077.0. Likelihood ratio test: $186.6 \sim \chi^2_{150}$. *Descriptive statistics of explanatory variables are provided in the preceding table, in the data section. A * indicates statistical significance at the two-sided 5% level. The estimated baseline coefficients are given in the Appendix.*

Table 0.7: *Sensitivity analysis*

Estimated Model (Same covariates as main model)	*Unemployment Benefit entitlement duration Dummies*						*Max. Loglik.*
	9 52 weeks	*- 6–10 weeks*	*- 5–1 weeks*	*0 weeks*	*+ 1–3 weeks*	*+ 4–∞*	
Base Model, f-t		*0.9313**	*0.1513*	*0.6993*	*0.3488*	*0.5463*	*-6142.7*
		(0.2452)	*(0.2768)*	*(0.6799)*	*(0.3074)*	*(0.2051)*	
Base Model, oth		*0.5486*	*1.2464**	*3.6317**	*1.7034**	*0.9519**	
		(0.6013)	*(0.3880)*	*(0.6735)*	*(0.4178)*	*(0.3490)*	
Single risk model		*0.8695**	*0.4845**	*1.7570**	*0.8741**	*0.7070**	*-5656.3*
		(0.2268)	*(0.2183)*	*(0.4744)*	*(0.2258)*	*(0.1689)*	
Model (1), f-t,		*0.8862**	*0.1049*	*0.6652*	*0.3153*	*0.5073**	*-6143.7*
		(0.2404)	*(0.2724)*	*(0.6783)*	*(0.3047)*	*(0.2002)*	*M(1), Base M*
Model (1), oth.		*0.4349*	*1.1368**	*3.5145**	*1.6006**	*0.8418**	$\chi^2_2 = 2$
		(0.5924)	*(0.3740)*	*(0.6637)*	*(0.4050)*	*(0.3320)*	
Model (2), f-t	*-0.0905*	*0.8408**	*0.0608*	*0.6088*	*0.2583*	*0.4558**	*-6142.6*
	(0.0943)	*(0.2450)*	*(0.2762)*	*(0.6814)*	*(0.3109)*	*(0.2078)*	*M(2), M(1)*
Model (2), oth	*-0.2170*	*0.3316*	*1.0294**	*3.4147**	*1.4864**	*0.7349**	$\chi^2_2 = 2.2$
	(0.1918)	*(0.6003)*	*(0.3862)*	*(0.6704)*	*(0.4187)*	*(0.3467)*	
Model (3), ft	*-0.1929**	*0.6895**	*-0.1152*	*0.4978*	*0.1271*	*0.4068**	*-6308.1*
	(0.0785)	*(0.2417)*	*(0.2732)*	*(0.6836)*	*(0.2976)*	*(0.1945)*	*M(3), M(2)*
Model (3), oth	*-0.1833*	*0.3362*	*1.0533**	*3.5277**	*1.6134**	*0.8832**	$\chi^2_{40} = 331$
	(0.1628)	*(0.5924)*	*(0.3754)*	*(0.6477)*	*(0.3840)*	*(0.3089)*	
Model (4), f-t	*-0.0901*	*0.7524**	*0.0880*	*0.3795*	*0.3229*	*0.4452**	*-6170.0*
	(0.0943)	*(0.2324)*	*(0.2735)*	*(0.6252)*	*(0.3046)*	*(0.2065)*	*M(4), M(2)*
Model (4), oth	*-0.2128*	*0.2369*	*0.9454**	*1.9547**	*1.6666**	*0.7912**	$\chi^2_{54} = 54.8$
	(0.1917)	*(0.5723)*	*(0.3726)*	*(0.5998)*	*(0.3971)*	*(0.3434)*	
Weibull, f-t	*-0.1637*	*1.1873**	*0.2318*	*0.0760*	*0.6174*	*0.6565*	*-6210.4*
Weibull parameter exp(-0.55) (SE 0.13)*	*(0.1669)*	*(0.4114)*	*(0.4470)*	*(1.0253)*	*(0.5081)*	*(0.3732)*	
Weibull, oth	*-0.4433*	*0.1138*	*2.2906**	*3.5466 **	*3.2953**	*1.7266*	
Weibull parameter exp(-0.71) (SE 0.32)*	*(0.4217)*	*(1.0648)*	*(1.0697)*	*(1.6218)*	*(1.3758)*	*(0.9652)*	

*The base model is the model of Table 0.3. "f-t" stands for full-time work exit. "oth" stands for other states exit. Standard errors are given in brackets. The "UB only" dummy which takes value one for the recipients of "UB only" (which was however not significantly different from zero in the base model) is dropped from model (1), (2), (3), (4), (5). Model (1) is the same as the base model except for the exclusion of this "UB only" dummy from the regressors. Model (2) is the same as model (1) except for the inclusion of the dummy "Week 0–41", which takes value one from week 1 to week 41 for the recipients of "UB only". Model (3) has only the time varying dummies "time left to exhaustion of UB" as regressors and the weekly baseline constants. Model (4) is the same as model (2), but the baseline hazard rate is allowed to vary each two weeks rather than each week. A * indicate statistical significance at the two-sided 5% level. The value of the maximised log-likelihood and the value of the likelihood ratio test between the two models indicated in turns are given in the last column of the Table. The likelihood ratio-test is distributed as a "χ^2" with degrees of freedom equal to the number of restrictions.*

Table 0.8: *Baseline hazard: Benefit recipients types. Exit into full-time work.*

Weekly	Recipients of UB only		Recipients of SB, joint SB and UB		All benefit recipients	
Baseline	Coeff	SE	Coeff	SE	Coeff	SE
Week 11	-23.4951	14613.5149	-24.2043	6777.3044	-21.0798	2052.2847
Week 12	-23.6266	2839.1168	-9.3265*	1.6010	-8.8373*	1.3882
Week 13	-6.7597*	1.6600	-8.3058*	1.2917	-7.1689*	0.9950
Week 14	-6.9255*	1.6497	-8.2095*	1.2738	-7.1730*	0.9838
Week 15	-6.3620*	1.6321	-8.2986*	1.2741	-6.9696*	0.9783
Week 16	-6.5565*	1.6362	-8.1309*	1.2699	-6.9776*	0.9784
Week 17	-6.4617*	1.6349	-8.1742*	1.2707	-6.9587*	0.9781
Week 18	-6.2430*	1.6323	-8.7997*	1.2913	-7.1078*	0.9813
Week 19	-6.9114*	1.6491	-8.1414*	1.2703	-7.1230*	0.9817
Week 20	-6.5914*	1.6407	-8.7670*	1.2908	-7.3189*	0.9864
Week 21	-7.2682*	1.6660	-8.3106*	1.2754	-7.3538*	0.9877
Week 22	-6.9659*	1.6531	-8.8584*	1.2963	-7.5634*	0.9939
Week 23	-7.4240*	1.6753	-8.4371*	1.2798	-7.4886*	0.9918
Week 24	-7.0725*	1.6587	-8.1290*	1.2715	-7.1676*	0.9841
Week 25	-7.1925*	1.6658	-8.2428*	1.2756	-7.2835*	0.9877
Week 26	-7.1624*	1.6645	-8.0237*	1.2708	-7.1186*	0.9843
Week 27	-6.6246*	1.6447	-8.4419*	1.2833	-7.1887*	0.9864
Week 28	-6.3996*	1.6392	-8.2546*	1.2776	-6.9871*	0.9824
Week 29	-6.9071*	1.6571	-8.2370*	1.2775	-7.1879*	0.9873
Week 30	-6.6239*	1.6462	-8.3829*	1.2827	-7.1650*	0.9870
Week 31	-6.3785*	1.6408	-8.1923*	1.2768	-6.9528*	0.9826
Week 32	-6.9613*	1.6639	-8.1711*	1.2761	-7.1646*	0.9879
Week 33	-6.2185*	1.6382	-7.7610*	1.2668	-6.6389*	0.9776
Week 34	-6.2630*	1.6408	-8.0445*	1.2740	-6.8252*	0.9816
Week 35	-6.6758*	1.6570	-8.5874*	1.2949	-7.3141*	0.9952
Week 36	-7.5065*	1.7140	-8.5781*	1.2949	-7.6139*	1.0074
Week 37	-6.9767*	1.6747	-7.9216*	1.2718	-6.9923*	0.9867
Week 38	-6.9492*	1.6745	-8.2119*	1.2818	-7.1920*	0.9933
Week 39	-6.9257*	1.6742	-8.1062*	1.2785	-7.1124*	0.9913
Week 40	-7.4184*	1.7128	-8.0878*	1.2787	-7.2203*	0.9952
Week 41	-7.8158*	1.7607	-8.3574*	1.2890	-7.5152*	1.0070
Week 42	-6.6765*	1.6617	-8.9392*	1.3232	-7.5007*	1.0068
Week 43	-6.8241*	1.6716	-8.3364*	1.2891	-7.2394*	0.9972
Week 44	-5.9046*	1.6374	-8.1152*	1.2809	-6.7143*	0.9831
Week 45	-6.7555*	1.6732	-8.1915*	1.2846	-7.1209*	0.9951
Week 46	-6.3731*	1.6558	-8.3993*	1.2942	-7.0984*	0.9950
Week 47	-7.1891*	1.7138	-7.8888*	1.2750	-7.0093*	0.9929
Week 48	-6.8860*	1.6890	-8.2425*	1.2882	-7.2025*	1.0000
Week 49	-6.8626*	1.6888	-8.3347*	1.2934	-7.2573*	1.0031
Week 50	-6.6192*	1.6737	-8.3157*	1.2937	-7.1564*	1.0000
Week 51	-7.6157*	1.7487	-8.7769*	1.3223	-7.7896*	1.0282
Week 52	-7.5969*	1.7485	-8.2883*	1.2939	-7.4155*	1.0074
Week 53	-6.3004*	1.6430	-8.1480*	1.2884	-6.9170*	0.9885
Week 54	-6.6039*	1.6607	-8.1289*	1.2883	-7.0279*	0.9930
Week 55	-23.4084	1999.8754	-7.9049*	1.2808	-7.2512*	1.0029
Week 56	-6.5535*	1.6589	-8.9047*	1.3414	-7.4315*	1.0128
Week 57	-7.0485*	1.6987	-8.6652*	1.3222	-7.5327*	1.0194
Week 58	-7.4357*	1.7468	-8.3134*	1.3003	-7.3978*	1.0125
Week 59	-6.4868*	1.6580	-8.6316*	1.3222	-7.2705*	1.0069
Week 60	-8.0879*	1.8836	-7.8104*	1.2806	-7.0618*	0.9986
Week 61	-6.9569*	1.6967	-8.8117*	1.3412	-7.5828*	1.0279
Week 62	-6.6389*	1.6718	-9.4933*	1.4313	-7.7212*	1.0394
Week 63	-6.3788*	1.6567	-8.7743*	1.3411	-7.2858*	1.0123
Week 64	-7.1095*	1.7445	-8.1976*	1.3090	-7.2269*	1.0189
Week 65	-6.5076*	1.6894	-8.6855*	1.3708	-7.3085*	1.0371

A * indicates statistical significance at the 5% two-sided level.

Table 0.9: *Unemployment duration by the exit states*

Unemployment duration in Weeks	*Recipients of UB only Frequency of Exits*		*Recipients of SB Frequency of Exits*	
	Full-Time Work Exit	*Other States Exit*	*Full-Time Work Exit*	*Other States Exit*
12	*0*	*0*	*1*	*1*
13	*7*	*5*	*9*	*3*
14	*9*	*6*	*15*	*8*
15	*17*	*3*	*15*	*4*
16	*14*	*2*	*18*	*4*
17	*15*	*4*	*17*	*1*
18	*18*	*0*	*9*	*5*
19	*9*	*0*	*17*	*2*
20	*12*	*3*	*9*	*1*
21	*6*	*1*	*14*	*2*
22	*8*	*0*	*8*	*2*
23	*5*	*1*	*12*	*1*
24	*7*	*1*	*16*	*1*
25	*6*	*4*	*14*	*2*
26	*6*	*1*	*17*	*7*
27	*10*	*3*	*11*	*2*
28	*12*	*2*	*13*	*3*
29	*7*	*3*	*13*	*1*
30	*9*	*1*	*11*	*4*
31	*11*	*6*	*13*	*6*
32	*6*	*0*	*13*	*0*
33	*12*	*2*	*19*	*2*
34	*11*	*1*	*14*	*2*
35	*7*	*1*	*8*	*2*
36	*3*	*1*	*8*	*0*
37	*5*	*2*	*15*	*4*
38	*5*	*4*	*11*	*3*
39	*5*	*4*	*12*	*2*
40	*3*	*1*	*12*	*2*
41	*2*	*2*	*9*	*2*
42	*6*	*0*	*5*	*0*
43	*5*	*2*	*9*	*1*
44	*12*	*1*	*11*	*3*
45	*5*	*2*	*10*	*3*
46	*7*	*0*	*8*	*3*
47	*3*	*3*	*13*	*2*
48	*4*	*1*	*9*	*1*
49	*4*	*2*	*8*	*5*
50	*5*	*5*	*8*	*3*
51	*2*	*2*	*5*	*1*
52	*2*	*5*	*8*	*3*
53	*7*	*7*	*9*	*2*
54	*5*	*3*	*9*	*1*
55	*0*	*2*	*11*	*1*
56	*5*	*2*	*4*	*2*
57	*3*	*0*	*5*	*2*
58	*2*	*3*	*7*	*2*
59	*5*	*1*	*5*	*4*
60	*1*	*0*	*11*	*2*
61	*3*	*5*	*4*	*1*
62	*4*	*1*	*2*	*3*
63	*5*	*1*	*4*	*1*
64	*2*	*0*	*6*	*2*
65	*3*	*0*	*2*	
66			*1*	
Sum	*347*	*112*	*548*	*126*

Table 0.10: *Baseline hazards: model with time varying benefit exhaustion dummies*

Weekly	Full-time exit		Other states exit	
Baseline	Coeff	SE	Coeff	SE
Week 11	-22.3227	3561.8353	-15.6797	3561.8353
Week 12	-8.9468*	1.3949	-1.0158	1.3949
Week 13	-7.2835*	1.0039	-0.0352	1.0039
Week 14	-7.2893*	0.9929	0.0726	0.9929
Week 15	-7.0883*	0.9874	-0.6833	0.9874
Week 16	-7.0966*	0.9874	-0.8675	0.9874
Week 17	-7.0782*	0.9872	-1.0390	0.9872
Week 18	-7.2289*	0.9903	-1.0022	0.9903
Week 19	-7.2477*	0.9907	-1.9192	0.9907
Week 20	-7.4478*	0.9955	-1.2434	0.9955
Week 21	-7.4855*	0.9967	-1.4816	0.9967
Week 22	-7.6970*	1.0030	-1.8848	1.0030
Week 23	-7.6206*	1.0008	-1.8546	1.0008
Week 24	-7.3033*	0.9931	-1.8626	0.9931
Week 25	-7.4183*	0.9967	-0.7222	0.9967
Week 26	-7.2530*	0.9933	-0.4059	0.9933
Week 27	-7.3249*	0.9955	-0.8591	0.9955
Week 28	-7.1240*	0.9916	-0.8841	0.9916
Week 29	-7.3260*	0.9965	-1.0862	0.9965
Week 30	-7.3031*	0.9962	-0.8430	0.9962
Week 31	-7.0911*	0.9918	0.0847	0.9918
Week 32	-7.3085*	0.9969	-15.5589	0.9969
Week 33	-6.7858*	0.9867	-1.0143	0.9867
Week 34	-6.9685*	0.9909	-1.2301	0.9909
Week 35	-7.4561*	1.0044	-1.2150	1.0044
Week 36	-7.7557*	1.0165	-2.3279	1.0165
Week 37	-7.1348*	0.9961	-0.4855	0.9961
Week 38	-7.3331*	1.0025	-0.3234	1.0025
Week 39	-7.2520*	1.0005	-0.4451	1.0005
Week 40	-7.3587*	1.0042	-1.1677	1.0042
Week 41	-7.6509*	1.0158	-0.8189	1.0158
Week 42	-8.1353*	1.0201	-15.8033	1.0201
Week 43	-7.8684*	1.0105	-1.4831	1.0105
Week 44	-7.3347*	0.9967	-1.1379	0.9967
Week 45	-7.7404*	1.0084	-0.8929	1.0084
Week 46	-7.4818*	1.0057	-1.6555	1.0057
Week 47	-7.3926*	1.0037	-1.1205	1.0037
Week 48	-7.5866*	1.0108	-2.0238	1.0108
Week 49	-7.6414*	1.0139	-0.7489	1.0139
Week 50	-7.5400*	1.0107	-0.5855	1.0107
Week 51	-8.3098*	1.0655	-3.4033	1.0655
Week 52	-7.8311*	1.0229	-0.8688	1.0229
Week 53	-7.3296*	1.0042	-0.7110	1.0042
Week 54	-7.4382*	1.0086	-1.5000	1.0086
Week 55	-7.6639*	1.0184	-1.7766	1.0184
Week 56	-7.8969*	1.0258	-1.0794	1.0258
Week 57	-7.9989*	1.0324	-1.7609	1.0324
Week 58	-7.8621*	1.0255	-0.8294	1.0255
Week 59	-7.7348*	1.0200	-0.8108	1.0200
Week 60	-7.5311*	1.0119	-1.7127	1.0119
Week 61	-8.0475*	1.0406	-0.5945	1.0406
Week 62	-8.1849*	1.0520	-0.9857	1.0520
Week 63	-7.7474*	1.0251	-1.6517	1.0251
Week 64	-7.6964*	1.0319	-1.4670	1.0319
Week 65	-7.7799*	1.0492	-15.9100	1.0492

A * indicates statistical significance at the two-sided 5% level.