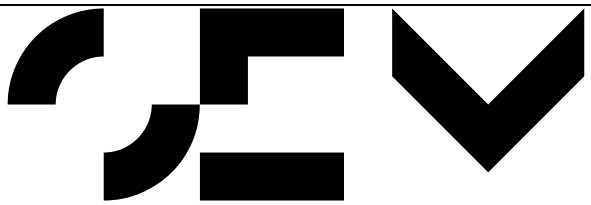


Economics Working Paper

2009-14

The Effect of Sanctions and Active Labour Market Programmes on the Exit Rate From Unemployment

Nisar Ahmad and Michael Svarer

School of Economics and Management
Aarhus University
Bartholins Allé 10, Building 1322
DK-8000 Aarhus C - Denmark
Phone +45 8942 1610
Mail: oekonomi@econ.au.dk
Web: www.econ.au.dk

The Effect of Sanctions and Active Labour Market Programmes on the Exit Rate From Unemployment

Nisar Ahmad
School of Economics and Management,
University of Aarhus.

Michael Svarer
School of Economics and Management,
University of Aarhus.

November 2009

Abstract

This paper simultaneously investigates the effectiveness of benefit sanctions and active labour market programmes on the exit rate from unemployment using Danish data. In the data about one third of the individuals who are sanctioned also participate in some active labour market programmes (ALMPs). Hence, modeling only one of them as treatment might over or underestimate the true effect. Therefore, by using a multivariate mixed proportional hazard model (MMPH), we model the hazard rate out of unemployment along with the sanction rate and hazard rate into active labour market programmes. We optimally select the number of supports point for the distribution of unobserved heterogeneity. Results show that pre-specifying two support points underestimates the effect of sanctions and active labour market programmes. Failing to control for selectivity for sanctions not only underestimates the treatment effect of sanctions but also biases the treatment effect of ALMPs.

Jel Classification: C14, C15, C41, J64, J65, J68

Keywords: competing risks, unemployment insurance, timing of events , NPMLE, MMPH

1 Introduction

There are two basic components of active labour market policies (ALMP). The principal component is the right and duty of all unemployed individuals to participate in an active labour market programme (ALMPs) if they do not find employment sufficiently fast. The second component is the area of monitoring and sanctions, which ensures that unemployed individuals are available for employment and also they make an effort to obtain employment. In the evaluation literature on active labour market policies, these two components are considered as treatment on the unemployed individuals. However, majority of these studies have used non-experimental data. The effect of the treatment is identified using different identification strategies, for example, matching estimators, timing of events method. A comprehensive recent review is presented in Kluve (2006).

Treatments like participation into active labour market programmes or being sanctioned are simultaneously used depending upon the personal characteristics, unemployment duration or search behavior of the unemployed individual. For example, the observed sample shows that about one third of the individuals being sanctioned also participate in some active labour market programmes (ALMPs). Hence, in order to correctly identify the effect of one treatment, it is important to effectively control for the other treatment(s). Otherwise, there might be either under or over estimation of the true effect of a treatment. For example, if we are evaluating the effect of participation into ALMPs on the exit rate out of unemployment, then the natural control group includes unemployed individuals who do not have any other treatment. But if the control group also includes unemployed individuals who are sanctioned, then the average hazard rate out of unemployment for this group is expected to be higher compared to the average hazard rate when the control group does not include any person being sanctioned. If we do not control for this effect in empirical specification, then the effect of participation into active labour market programmes will be underestimated. On the other hand, if only the treated group (participation into ALMPs) includes individuals who are also being sanctioned then we will end up overestimating the effect of ALMP. This is purely an empirical question which will be addressed in this paper. Therefore, by using a multivariate mixed proportional hazard model (MMPH), we model the hazard rate out of unemployment along with the sanction rate and hazard rate into active labour market programmes.

As far as we know, there is only one recent study by Røed et al. (2007) on Norwegian data that simultaneously evaluates both participation into ALMPs and benefits sanctions. Røed has used multivariate mixed proportional hazard rate model with six competing events, i.e., employment, another benefit, education, ALMP, a benefit sanction, and part time work. The first three events terminate the spell, whereas last three events do not terminate the spell, but are assumed to have causal effects on future hazard rates. The results show that activity oriented UI regimes (regimes with high likelihood of participation in ALMP, duration limitation on unconditional UI entitlements and high sanction probabilities) deliver substantially shorter unemployment spells then pure income-insurance regimes. Results also show that mild sanctions (temporary benefits terminations for inadequate job search) cause a significant rise in job hazard.

Svarer (2007) has controlled for participation into ALMP while evaluating the effect of benefit sanctions, but this is only done by including programme participation variables in the specification of the hazard rate out of unemployment and the sanction rate. However, participation into labour market programmes is clearly endogenous, in the sense that it depends on the outcome of the statistical process under consideration, and, hence, on unobserved heterogeneity. So it should be modeled along with the hazard rate out of unemployment and sanction hazard. The results of the study show that the exit rate out of unemployment increases by more then 50 percent following the imposition of a benefit sanction for both men and women. Svarer's study will provide a nice comparison with our finding since we have used the same data set.

In this paper we use timing of events method for the identification of the treatment effect, which is developed and discussed in detail by Abbring & van den Berg (2003). In this setting, all unemployed individuals who get the treatment (either participating in labour market programmes or being sanctioned) are considered in the treated group and the natural control group consists of individuals who are unemployed during the same period but who do not get any other treatment. For meaningful comparison of the treated group and the control group, it is assumed that there is some randomization in the assignment of treatment. In duration models, this randomization is allowed by way of the rate of imposition of treatment(s). Therefore, hazard rate out of unemployment, sanction hazard, and hazard rate for participation into labour market programmes are simultaneously modeled.

In timing-of-events method, the standard practice is to pre-specify a (relatively low) number of support points for the specification unobserved heterogeneity, see for example Van den Berg et al.

(2004), Lalive et. al. (2005), Svarer (2007), Rosholm and Svarer (2008). Gaure et al. (2007) shows that a pre-specified number of mass points may result in substantial bias. Following Guare et at. (2007), we impose no priori restriction on the number of support points of the mixture distribution. To select the number of support points, we calculate the value of the AIC (Akaike Information Criteria) when an additional point of support is added. We stop adding more support points to the model when AIC stops decreasing. Gaure et. al. (2007) also shows that the most reliable information criterion is the likelihood itself, or the likelihood based AIC, especially for large samples.

Results show that failing to control for selectivity for sanctions not only underestimates the treatment effect of sanctions but also substantially biases the treatment effect of ALMPs. Furthermore, pre-specifying two support points underestimates the effect of sanctions and active labour market programmes.

The rest of the study is organized as follows. A review of some recent studies on active labour market policy is presented in section 2. Section 3 gives brief introduction of labour market policies in Denmark. The data and descriptive analysis are presented in section 4. Section 5 explains the econometric framework. The summary and conclusion are presented in section 6.

2 Existing Literature on Evaluation of Active Labour Market Policies

There exists a huge literature on the evaluation of active labour market policies, especially on the participation into skill enhancing labour market programmes. These studies differ in identification strategies, design, and methodology. A recent review on the effectiveness of active labour market policies is presented in Kluve (2006). In this section we would like to review some of the recent studies on the evaluation of active labour market policies, especially Danish studies. Our study will provide a comparison with the existing literature on both sanctions and participation into labour market programmes.

Lalive et. al. (2005) investigates the effectiveness of benefit sanctions in reducing the unemployment duration of unemployed Swiss workers. The paper focuses on the quantitative importance of both ex ante and ex post effects of benefit sanctions. The Swiss data allows Lalive to separate the effect of warning from the actual effect of the enforcement of benefits sanctions. The results of the study show that both warning and enforcement of benefit sanctions have a positive

effect on the exit rate out of unemployment. Specifically, increasing the strictness of the sanction policy by one standard deviation will reduce the duration of unemployment by one week. In another paper, Lalive et. al. (2008) have analyzed Swiss active labour market programmes on job chances of unemployed workers. They have compared the results using two different estimators, i.e., matching estimator and timing of events method. They have shown that both of these estimators generate different treatment effects. Using the timing of events method, none of the Swiss active labour market programme shortens unemployment duration, whereas the matching estimator only shorten unemployment duration for temporary subsidized jobs.

Using Danish data, Rosholm and Svarer (2008) have estimated the threat effect (prior to actual participation) of active labour market programmes for unemployed men in Denmark. The timing of events method is used for identification. The results of the study show that locking in effect is overestimated, whereas, the post programme effect is underestimated if the threat effect of participation in ALMP is not controlled for. Using a matching estimator, Jespersen et. el. (2008) have estimated long run treatment effects of active labour market programmes for the period 1995-2005 for Denmark. The important aspect of the paper is that it performs a cost and benefit analysis of the active labour market programmes. They find that job training programmes generate a very high social surplus. Public job training also generates significant social surplus, whereas class room training generates significant deficit.

We would like to mention two recent studies which are also the only ones on the Danish data to evaluate the effect of benefits sanctions on exit rate out of unemployment. Both studies have used the same methodology but on different types of unemployed individuals. The study by Svarer (2007) is on the recipients of unemployment insurance, whereas the study by Qureshi (2008) is on recipients of social welfare or assistance. Both studies show that benefits sanctions have a positive effect on the exit rate out of unemployment.

3 Active Labour Market Policies (ALMP) in Denmark

Unemployed individuals in Denmark are either eligible to receive unemployment insurance benefits (henceforth UI benefits) or social assistance. Due to data constraints, this paper focuses on

unemployed individuals who are insured[1]. To qualify for UI benefits, membership of a UI fund is required. Membership is voluntary and requires that the individuals pay a monthly tax deductible fee to the UI funds. Entitlement to disbursement is obtained after at least 1 year's membership and a minimum of 52 weeks of employment within the last three years. The UI funds cover only a part of the UI benefit payments, the rest is paid by the state. Around 80% of the labour force are members of a UI fund and hence qualify for UI payments.

As mentioned earlier there are basically two components of ALMP. The principal component is the right and duty of the unemployed individual to participate in labour market programmes if he is unable to find a job sufficiently fast. The second component is the area of monitoring and sanctions, which ensures that unemployed individuals are available for employment and make an effort to obtain employment. In the following section, a brief introduction of these policies is presented.

3.1 Active Labour Market Programmes (ALMPs)

Under the current regulations, an unemployed individual can receive UI benefits for a maximum duration of 4 years. This duration can be divided into two periods. The first period, the passive phase, lasts for 9 months with voluntary participation into active labour market programmes; however participation is quit low in this phase. If an unemployed individual is unable to find a job during this first phase, then he is required to participate in active labour market programmes in the second period, the active phase, which starts after 9 months of continuous unemployment. If a person remains unemployed even after 26 weeks of the programme completion, then he has to participate in another type of active labour market programme.

Labour market programmes are design to enhance the skills of unemployed individuals with the objective of bringing them out of unemployment. These programmes are categorized into 4 types. The first of these is ***subsidized employment (private firms)***, private firms are paid roughly 50% of the minimum wage if they employ an unemployed individual on a short term contract typically lasting for 6-9 months. The second one is ***subsidized employment programmes (public employers)***, an individual is offered a temporary (6-12 months) job in the public sector institutions. The third is ***education/training programmes,*** these programmes offers a training programme based on the background of the unemployed individual. All programmes other then first three types of

[1] Sanctions data for individuals on social assistance is only available from 2007 and we do not have access to that dataset.

programmes are classified as ***other programmes***, for example job search assistance, specialized job training.

3.2 Benefits and Sanctions

There are a number of eligibility criteria that the unemployed person has to fulfill in order to receive UI benefits. If the right to UI benefits stops, the unemployed can apply for social assistance, which, however, is also conditional on a set of eligibility criteria. UI benefits constitute up to 90% of the previous wage. There is a rather low cap on the total payments; on average the level of compensation is around 60%. Social assistance is means tested and is typically around 20% lower than UI benefits. The remainder of this section describes the eligibility criteria for unemployed people who receive UI benefits.

Basically, the eligibility criteria can be divided into two sets of requirements. The first set is based on the individual initiative and states that the unemployed actively have to seek employment and undertake measures to increase the possibility of obtaining employment. These measures are quite difficult to verify, and case workers assess whether the obligations are sufficiently fulfilled. The second set of requirements is related to initiatives by the public employment service (henceforth PES). The PES can ask the unemployed to accept a given employment opportunity, require that the unemployed submit and maintain a CV on the internet based job bank, and require that the unemployed participate in active labour market programmes.

When the PES observes that an unemployed individual is not fulfilling the eligibility criteria it submits a notification to the relevant UI fund[2]. The UI fund evaluates the notification and decides whether to impose a sanction and what kind of sanction is relevant. It is potentially important to note that the UI funds decide on the sanctions[3].

To sum up, the eligibility criteria are:

- Register at a PES.
- Submit electronic CV to internet based job bank.

[2] There are 32 different UI funds in Denmark. They each represent different levels and types of education. Recently UI funds that operate across types of education and industries have emerged. The main part of the UI recipients are however still organised according to their main education and occupation (National Directorate of Labour, 2006a).

[3] The UI funds are under supervision by the National Directorate of Labour, which may imply minor differences in the administration of the rules. There are, however, still rather larger discrepancies, as will be clear later in the paper.

- Update CV each quarter.
- Apply for jobs suggested by PES.
- Actively search for jobs.
- Accept job offers arranged by PES.
- Attend meetings with PES to discuss job plans and plans for participation in active labour market programmes etc.
- Participate in other activities initiated by PES.

If any of these criteria are violated, the UI fund may initiate a sanction. These can be summarized by three categories:

- Loss of UI benefits for 2-3 days (temporary exclusion).
- Loss of UI benefits for 3 weeks.
- Loss of UI benefits until the unemployed individual has worked for 300 hours within a 10 week period.

Not all non-compliance results in a sanction. If there are sufficiently good reasons for non-compliance, the UI fund may reject the notification from the PES.

According to the law[4] the mapping from non-compliance to sanction is clear. Failure to attend meetings with the PES not related to the job plan is sanctioned until the unemployed contacts the PES. In these circumstances the PES notifies the UI fund. The UI fund stops UI payments and informs the unemployed that UI benefits are stopped until they contact the PES. These sanctions are normally of a duration of 2-3 days, but can last longer if the unemployed person does not contact the PES.

If the unemployed individuals do not attend meetings related to the job plan or a specific job opportunity or if they decline job offers or interviews, their status as unemployed is classified as self-inflicted and they are consequently sanctioned for 3 weeks. The possibility of sanctioning someone who is unemployed until they have accumulated 300 hours of paid work within a 10 week period is enforced when the PES regards the unemployed person as being non-eligible for employment. This enforcement can be used in relation to all possible actions of non-compliance if the PES assesses that the individual is not available for employment opportunities.

[4] In Danish: Bekendtgørelse om rådighed and Bekendtgørelse om selvforskyldt ledighed, June 17 2003.

4 Data and Descriptive Analysis

The analysis uses data from two administrative registers. The first data set, which is collected by the Danish Labour Market Authority, contains detailed information on individual labour market histories. This is the same data that the employment offices have access to. It has the advantage that it is updated with a very short time lag. The disadvantage is that it basically only contains labour market data. The register is called DREAM (Danish Register for Evaluation Of Marginalization), and it is basically an event history file, which includes weekly information on each individual's receipt of public transfer incomes, unemployment registrations, and participation in active labour market programmes. Based on these information, a weekly event history is constructed, where the individual each week either occupies one of a number of public transfer states or is not receiving public transfers. When an individual is not registered as receiving public transfers, the person can either be employed or be outside the labour force without receiving transfer income. In the Danish welfare state, the latter is very unlikely[5]. Hence, the assumption that not receiving public transfers in a given week corresponds to employment is innocuous[6]. From DREAM, we sample the inflow to unemployment in the UI system in the period January 2003 to November 2005[7]. All exits from unemployment to states other than (what we assume to be) employment are treated as independently right censored observations.

The second data set entails information on sanctions. This information is collected from a database containing information on the interaction between case workers and unemployed (AMANDA). When the public employment office submits a notification to the relevant UI fund it is registered in AMANDA. More specifically, the date of notification, the type of violation and the sanction type (if given) is registered. In practice, the date of notification coincides with the sanction date, since UI payments stop when the UI-fund receives the notification only to begin again when the right to benefits is re-earned. If the notification does not give rise to a sanction, the unemployed individual gets the lost UI payments reimbursed.

[5] Danish labour directorate tried to map individuals who leave public income transfer to employment and they found that more than 90% move to employment.

[6] In practice an individual is registered to have become employed, when the individual has not collected benefits for 4 consecutive weeks.

[7] January 2003 is chosen as the starting point due to changes in the regulations on monitoring and sanctions. These changes imply a more strict set of requirements and that the number of sanctions per unemployed individual increases afterwards. To have a period of comparable rules we disregard the period prior to 2003.

We follow all UI recipients who enter unemployment in the period from January 2003 to November 2005. They are followed until they leave unemployment or the sampling period ends, in which case the spell is treated as right censored. We have weekly information on labour market status and also transform information on sanctions on a weekly frequency. That is, we measure weeks until a sanction occurs. We only look at the effect of the first sanction (this is the common approach in the literature (van den Berg et al., 2004, Abbring et al., 2005, and Lalive et al., 2005)) and the advantage is that we only have to model time until the first sanction in the empirical part of the paper. We right-censor spells that experience a second sanction. Due to data collection issues we also ignore the most severe sanctions in the analysis.

In order for unemployed individual to collect UI benefits they need a UI card from their UI fund. As long as they have a valid UI card they are registered as UI recipients and are visible in the data set. If they are sanctioned with the toughest sanction and have to collect 300 hours of paid work within a 10 week period, they should have their valid UI card revoked. Unfortunately, some UI funds do not withdraw the UI card, which implies that the individuals are registered as UI benefit recipients and therefore unemployed, although they do not collect benefits. The date they are observed to leave unemployment for employment is then based on the date the UI fund cancels the UI card, and accordingly this date is not informative on the actual length of unemployment. The number of sanctions of this type basically corresponds to the amount of sanctions of 3 weeks duration. The main bulk of sanctions are therefore still the very short ones and it is also these sanctions that drive the main results[8]. The sample is split according to gender. In addition, we discard unemployed individuals under the age of 26. For this group of individuals the rules are particularly strict. After 6 months of unemployment they have a right and a duty to participate in active labour market programmes and they are more actively monitored. For an investigation of this group of individuals see Jensen et al. (2003).

The data set samples individuals between 26 and 65 years of age. The UI recipients younger than 26 are subject to a special youth programme that has much stricter requirements and regulations[9]. We include 5 age group dummies and the section of unemployed people below 30 serve as the reference group. An indicator variable is used for marital status, which is defined if an individual is unmarried

[8] We also carried out an analysis including the 10 weeks sanction. The main results are unaffected by this, but not surprisingly the magnitude of the effects is somewhat smaller when they are left out.

[9] For details on the Youth programme see Jensen et al. (2003).

and does not cohabit either. We have two indicators for whether the individual is an immigrant from more or less developed countries. The reference category is native Danes. For the UI-funds, we have a set of indicators for unemployment insurance fund membership. There are 32 UI-funds in Denmark, and membership is in most cases categorized according to education/skills and/or by industry. These funds may be seen as broad proxies for the missing information concerning education and skills. Most UI-funds only accept members with certain types of educations or people who work in certain types of industries. Take for example a trained economist. She will qualify for membership of the UI-fund for academics, but not for the metal workers UI-fund. This observation is important in the subsequent analysis.

The rather large differences in sanction propensity have inspired the National Directorate of Labour to look closer at the administration of the eligibility criteria by different UI-funds (National Directorate of Labour, 2006c). They find that some of the differences in sanction rates are driven by differences in the labour market situation for the members of the particular UI-fund. There is a tendency that UI-funds with lower unemployment rates are tougher on their members. To accommodate this pattern, we include the unemployment rate for the UI-funds in the analysis.

For active labour market programmes, we have a set of time-varying variables indicating whether the individual is currently in a labour market program, and whether the individual has completed a labour market program during the past 26 weeks. We distinguish between 4 types: private job training, public job training, education, and other. Regarding labour market history, we have rather detailed information on the history of past labour market performance. We include, for each of the two years preceding the current unemployment spell, the fraction of the year spent on some kind of income transfer (UI, SA, temporary leave schemes including parental leave, or other public transfer schemes). Moreover, we use the number of unemployment spells the individual has had over the same period. Finally, we include a variable for accumulated tenure in the UI system. If an unemployed individual has been unemployed for, say, 3 months and then gets a job for less than 12 months his tenure when he reenters the UI system is 3 months. This information enables us to test whether the imposition of sanctions are less effective for individuals with longer UI experience and hence who are expected to have a weaker attachment to the labour market.

The final data set consists of 85,628 women and 79,334 men, who experience a total of 109,872 and 109,476 unemployment spells respectively. Table 1 shows the distribution of unemployed

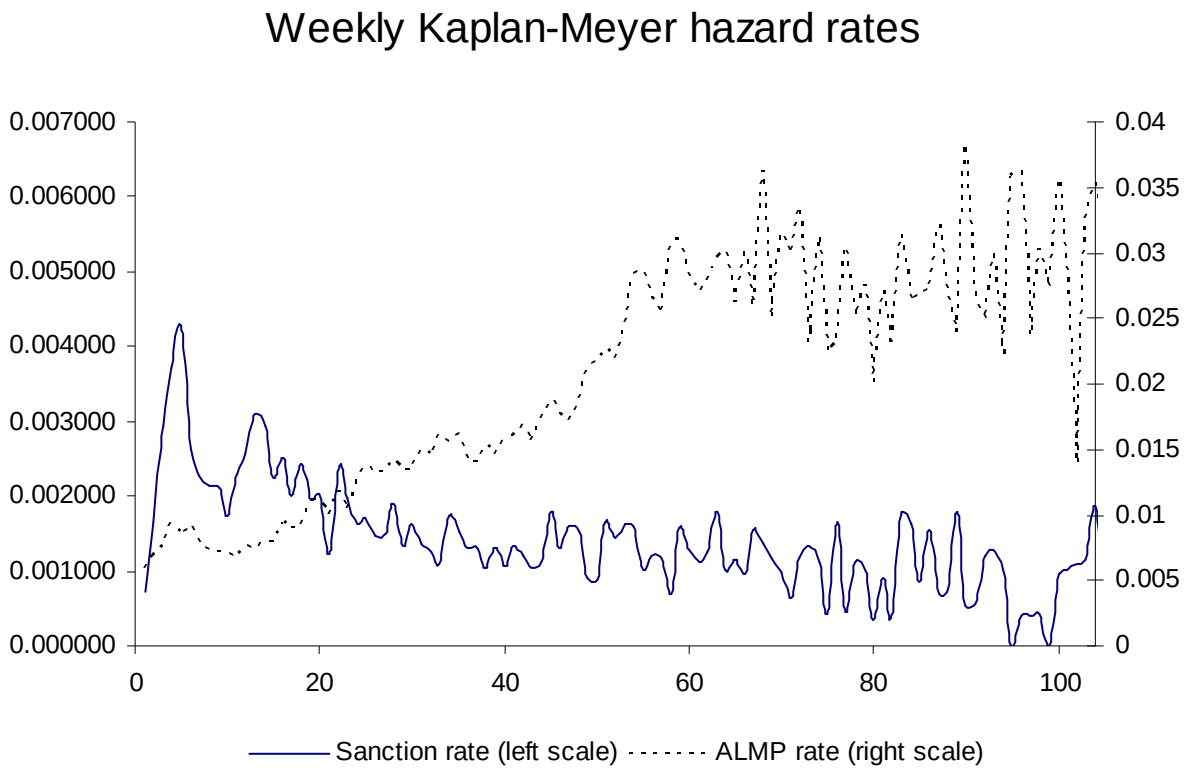
individuals in each type of labour market programmes and sanctions. Descriptive statistics of all variables for both women and men are presented in appendix Table A1.

Table 1 Distribution of Treatments in the Sample

Number of Individuals	Men	79334	Women	85628
Number of Spells		109476		109872

	Active Labour Market Programmes					Sanctions
	Private-Sector Employment Subsidy	Public-Sector Employent subsidy	Other Programmes	Education	Total	
Men	1131	1107	8928	11344	22510	3410
%	5.02	4.92	39.66	50.4	100	
Women	546	2060	10891	12602	26199	1940
%	2.47	7.86	41.57	48.1	100	

Timings of the sanctions and participation into ALMPs might determine the interdependence of the treatment effects. Figure 1 shows the sanction rate along with ALMPs participation rate for men. The sanction rate and rate of participation in ALMPs are Kaplan-Meier hazard rates for the transition into a sanction and an ALMPs respectively over the course of the unemployment spell. The figure shows that sanction rate is relatively higher in the early stages of the unemployment



spell, whereas participation rate in ALMPs is higher in the later stages of the spell. Given this pattern, one can say that both sanctions and participation in ALMPs occur at different time of the unemployment spell so they might be independent but this is an empirical question.

5 Econometric Model

The theoretical foundation of the empirical model comes from the theoretical job search model. Several authors have presented more formal models to discuss the expected effects of benefit sanctions and participation into ALMPs. See for example, van den Berg et al. (2004), Abbring el al. (2005), Boon & van Ours (2006), and Lalive et al. (2005).

In order to identify the effect of both sanction and participation into ALMP programmes, we simultaneously model the transition rate out of unemployment, the participation rate into the active labour market programmes, and the sanction rate using a multivariate mixed proportional hazard model. We define a separate transition for each type of labour market programme. In total there are six hazard rates to be modeled simultaneously. These hazards are allowed to be interdependent through error structure and identification is achieved through the timing of events method, developed by Abbring & van den Berg (2003). The effect of each treatment (being sanction or participation in ALMPs) is identified non-parametrically under the assumption of mixed proportional hazards and a non defective distribution of time until being sanctioned or participation is required into ALMPs. As a result, there is no need for an exclusion restriction. In simple words, variation in the timing events (being sanctioned or participation into ALMPs) separates the treatment effect from the distribution of unobserved heterogeneity.

Let $T_{u(uemployemnt),}$ $T_{s(sanction),}$ and $T_{pj(programme\ participation)\ where\ j=1,\ldots4}$ denote duration of unemployment, duration until an agent receives a sanction, and duration until an agent participate into one of the four types of labour market programmes respectively. These durations are non-negative random variables and are allowed to correlate through unobservable and through a possible treatment effect of being sanctioned or participation into ALMPs on the unemployment hazard. We are interested in the effect of the realization of T_s and T_{pj}, $j = 1,\ldots4,$ on the distribution of T_u. Conditional on observed and unobserved variables, we can therefore ascertain that the realization of T_s affects the shape of the hazard of T_u from t_s onwards in a deterministic way. This independence assumption implies that the causal effect is captured by the effect of t_s on unemployment hazard for $t > t_s$: This

rules out that t_s affects unemployment hazard for $t < t_s$, i.e. anticipation of the sanction has no effect on the unemployment hazard. This assumption is likely to be fulfilled in the current analysis since the date of sanction is when the public employment office notify the UI-fund and hence when the sanction is imposed. The distribution of random variables is expressed in terms of their hazard rates H_k where k=1,…6. We modeled these hazard rates using a multivariate mixed proportional hazard model (MMPH) with six competing events: employment (k=1), a benefit sanction (k=2), participation into one of the four ALMPs (k=3, 4, 5, 6).

The integrated period-specific hazard rates, H_{kit}, conditional on observed time variant, w_{kit}, and unobserved time constant individual characteristic, v_{ki}, can be written as:

$$H_{kit} = \int_{t-1}^{t} H_{kis} ds = \exp(w_{kit} + v_{ki}), k = 1,...6 \qquad (1)$$

We assume that sanctions and participation into ALMPs have a casual effect on the exit rate out of unemployment. Moreover, participation into ALMPs may have effect both during the programme (locking in) and after the completion of the programme (post programme). These effects are kept track of in ongoing as well as completed events by time varying dummy variables. w_{kit} also includes other explanatory variables explained in the previous section.

Intuitively, the timing-of-events method uses variation in unemployment duration and duration until a sanction or participation into ALMPs (conditional on observed characteristics) to identify the unobserved heterogeneity distribution. The selection effect is captured by the correlation between unobserved components, v_{ki} *where k = 1,…,6* while the causal effects of the sanction and participation into ALMPs on unemployment duration are captured by the effect of being sanctioned and participation is required into ALMPs conditional on the observables and unobservable components. The advantage of this identification strategy is that it does not require an exclusion restriction. The data do not contain any obvious candidate as instrument. In addition, it is hard to imagine that policy makers would conduct a social experiment where unemployed individuals are sanctioned or participated into ALMPs at random , although such an experiment could provide a cleaner picture of the effects of treatments on the exit rate from unemployment[10].

[10] There have been some recent experimental studies focusing Danish ALMPs, for example Rosholm (2008)

The unobserved heterogeneity terms, v_{ki} *where k = 1,…,6* , are assumed to follow a discrete distribution with no priori restrictions on number of mass points. They capture time constant individual specific effects. To select the number of support points, we calculate the value of the AIC (Akaike Information Criteria) when an additional point of support is added. We stop adding more support points to the model when AIC stops decreasing. Gaure et. al. (2007) shows that the most reliable information criterion is the likelihood itself, or the likelihood based AIC, especially for large samples.

If K_{it} is the set of feasible transitions for an individual *i* at period *t* then the transition probability for state *k* can be written as follows[11]:

$$P_k\left(w_{kit}+v_{ki}\right)=\left(1-\exp\left(-\sum_{k\in K_{it}}\exp\left(w_{kit}+v_{ki}\right)\right)\right)\frac{\exp\left(w_{kit}+v_{ki}\right)}{\sum_{k\in K_{it}}\exp\left(w_{kit}+v_{ki}\right)} \tag{2}$$

Let $y_{kit}\in Y_i$ be an indicator variable for a transition to state *k*, then likelihood contribution by particular individual *i*, conditional on observed and unobserved characteristics can be written as

$$L_i\left(v_i\right)=\prod_{y_{kit}\in Y_i}\left(\prod_{k\in K_{it}}\left(P\left(w_{kit}+v_{ki}\right)^{y_{kit}}\right)\times\left(\exp\left(-\sum_{k\in K_{it}}\exp\left(w_{kit}+v_{ki}\right)\right)\right)^{\left(1-\sum_{k\in K_{it}}y_{kit}\right)}\right) \tag{3}$$

Following Gaure et al. (2007), the unknown distribution of unobserved heterogeneity is approximated in a non-parametric way with the help of discrete distribution. Let *M* denote the number of mass points (*M* types of individuals) in this distribution. The associated location parameter (intercept) is denoted by v_l with the probability mass p_l , *where l = 1,…,M*. The joint likelihood function is then given as

$$L=\prod_{i=1}^{N}E_{v_i}\left(L_i\left(v_i\right)\right)=\prod_{i=1}^{N}\sum_{l=1}^{M}p_l\left(L_i\left(v_l\right)\right)\ \text{where}\ \sum_{l=1}^{M}p_l=1 \tag{4}$$

This likelihood function is maximized with respect to all model and heterogeneity parameters repeatedly for alternative values of mass points M. We start with M=1, which corresponds to no unobserved heterogeneity, and then add more points until the value of AIC stops decreasing. The detailed maximization procedure, using alternative methods for verifying the maximization process, is discussed in Gaure et al. (2007).

[11] This section is based on Røed et al. (2007) and Gaure et al. (2007). Detailed derivations can be found in these papers.

6 Results

In this section, we report estimation results from maximizing the likelihood function given in equation 4 controlling for unobserved heterogeneity. First, we compare the results with different support points to show how biased the results would be to pre-specify number of support points. Second, we carry out a sensitivity analysis with respect to modeling selection into ALMPs and sanctions.

The estimation starts with only one intercept (one support point) and maximizes the likelihood function. After this has been done, we add another point and continue until AIC no longer decreases. New support points are found by using simulated annealing. The maximization procedure uses alternative algorithms to find the maximum of the likelihood function, i.e., BFGS, the newton-method or the trust-region (eigenvector) method[12]. We end up with four support points for men and three for women. In total there are 24 location parameters (4x6) for men and 18 (3x6) for women in the full model with all six transitions.

Tables 2 reports the estimation results for men showing the effect of sanctions and ALMPs on exit rate out of employment. The detailed results on other transitions and all explanatory variables can be found in Table A2 in the appendix. Column one shows the results with only one mass point of the unobserved heterogeneity. In this case, the effect of sanctions and ALMPs are extremely biased and most of them are statistically insignificant. Column two shows the results with two support points of unobserved heterogeneity. The results in this column correspond to the results in earlier studies where researchers pre-specify two support points in modeling sanctions or ALMPs, see for example, Van den Berg et al. (2004), Lalive et al. (2005), Abbring et al. (2005), Svarer (2007), Rosholm and Svarer (2008).

At this point (with two support points), the results show that the exit rate out of unemployment is increased by 56.7% after the imposition of a sanction. Since we are using the same data set as Svarer (2007), our results are almost similar to his study (equivalent figure of 55% in his study). Regarding the effect of ALMPs we find a statistically positive locking in effect for private sector employment subsidy and other programmes, whereas, public sectors employment subsidy and education have a negative locking in effect. The post programme effect is only positive for private

[12] The detail about the maximization routine can be found in this document http://www.frisch.uio.no/NPMLE_files/joeapp.pdf

Table 2 Effect of sanctions and ALMP on Exit Rate out of Unemployment for Men

Both Sanctions and ALMPs are Endogenous

Mass Points	1	2	3	4	5
Sanctions	-0.027	0.449	0.526	**0.538**	0.537
Locking in effect					
Private-sector employment subsidy	-0.044*	0.226	0.216	**0.216**	0.216
Public-sector employent subsidy	-0.041*	-0.352	-0.257	**-0.246**	-0.243
Education	-0.025*	-0.232	-0.187	**-0.185**	-0.186
Other programmes	-0.042*	0.112	0.112	**0.113**	0.112
Post Program Effect					
Private-sector employment subsidy	-0.020*	0.362	0.446	**0.444**	0.444
Public-sector employent subsidy	-0.001*	-0.305	-0.167	**-0.145**	-0.140
Education	-0.032	-0.032*	0.021*	**0.023***	0.023*
Other programmes	-0.036	-0.384	-0.372	**-0.369**	-0.369
AIC	683144.33	618206.62	617350.33	**617316.7**	617327.16
Likelihood	-341247.84	-308776.97	-308342.77	**-308321**	-308320.1
# of Parameters	323	330	337	**344**	351

* Statistically insignificant at 5% level of significance

sector employment subsidy. The exit rate out of unemployment increases by 25.3% during private sector employment subsidy and by 43.6% after the completion of the programme. The magnitude of these effects differs from the earlier studies. For example, the equivalent figures in Lauzadyte (2008) are -17.5% and 60%, and in Rosholm and Svarer (2008) they are -24% and 61% respectively. These differences might be caused by the different sample period used by these studies and the fact that they did not control for sanctions while evaluating the effect of the ALMPs.

In column three, we allow third support point for unobserved heterogeneity and we can see a substantial improvement in the likelihood function and a reduction in AIC. As a result, the parameter estimates change as well. We then experiment with 4^{th} and 5^{th} support point but the AIC started to increase after the 4^{th} one and the parameter estimates do not change. So we ended up with the best results in column four of Table 2. The estimate of mass (support) points literally implies that for a given observed characteristics there are four groups of unemployed individuals, which differ substantially in terms of re-employment, participation into ALMPs and sanctions rates. These four groups represent 36, 28, 18, and 18 per cent of the sample.

The parameter estimate of sanctions now shows that the imposition of a sanction increases the exit rate out of unemployment by 71.2%. This treatment effect of sanctions is clearly underestimated in column two (56.7%). Regarding participation into ALMPs, the locking in effect of private sector employment subsidy, public sector employment subsidy, education and other programmes are 24.1, -21.8, -16.9, and 12 percent respectively. If we compare these figures with column two, then the

locking in effect of private sector employment subsidy is slightly overestimated, whereas the locking in effects for public sector employment subsidy, education and other programmes are underestimated. The post programme effects of private sector employment subsidy, public sector employment subsidy and other programmes are 55.9, -13.5, and -30.9 percent respectively. These effects are underestimated in column two. The post programme effect of education is positive but statistically insignificant.

Table 3 shows the results for women. The model with three support points fitted the data best. Again, we can clearly see that the model with two support points underestimates the effect of the sanctions and the ALMPs. In the best fitted model (column three), the imposition of sanctions increases the hazard rate out of unemployment by 63.9%. Private sector employment subsidy increases the exit rate out of unemployment by 27.8% during programme and by 47.1% after the completion. Rest of the labour market programmes have negative effects both during and after the programme completion.

Table 3 Effect of sanctions and ALMP on the Exit Rate out of Unemployment for Women

Both Sanctions and ALMPs are Endogenous

Mass Points	**1**	**2**	**3**	**4**	**5**
Sanctions	0.225	0.408	**0.494**	0.494	0.503
Locking in effect					
Private-sector employment subsidy	0.041*	0.237	**0.246**	0.246	0.246
Public-sector employent subsidy	-0.535	-0.272	**-0.247**	-0.247	-0.246
Education	-0.792	-0.530	**-0.497**	-0.497	-0.496
Other programmes	-0.039*	-0.115	**-0.123**	-0.123	-0.122
Post Program Effect					
Private-sector employment subsidy	0.015*	0.349	**0.386**	0.386	0.387
Public-sector employent subsidy	-0.457	-0.159	**-0.126**	-0.126	-0.128
Education	-0.367	-0.040*	**-0.010***	-0.010*	-0.010*
Other programmes	-0.269	-0.397	**-0.378**	-0.378	-0.379
AIC	659705.34	652025.33	**651455.03**	651459.03	651466.78
Likelihood	-329546.57	-325699.52	**-325408.33**	-325404.28	-325402.11
# of Parameters	305	312	**319**	326	333

* Statistically insignificant at 5% level of significance

So we conclude that two pre-specified support points generally underestimate the causal effect of the benefit sanctions and participation into ALMPs on the exit rate from unemployment.

6.1 Sensitivity Analysis (with respect to modeling selectivity into ALMPs and Sanctions)

This subsection reports the sensitivity analysis if we do not control the endogeneity of either sanctions or ALMPs. Table 4 shows the results of such analysis for men. Column one shows the results when sanctions are considered as exogenous in the model, whereas column three reports the results when both sanctions and ALMPs are endogenous. By comparing these two columns, we notice that ignoring the selectivity for sanctions substantially underestimates the actual treatment effect of sanctions. For example, imposition of sanctions increases the hazard rate out of unemployment by 35.5% without modeling selectivity into sanctions. This treatment effect of sanctions increase by more then 100% after we control for endogeneity of sanctions. This suggests that based on unobservable those who are less likely to leave unemployment are more likely to receive a sanction. Svarer (2007) found the same result.

One of our objectives in this paper is to highlight the importance of modeling the endogeneity of sanctions while evaluating the effect of active labour market policies and vise versa. Column three (both sanctions and ALMPs endogenous) shows that the locking in and post programme effects of private sector employment subsidy increases the hazard rate out of unemployment by 24.1% and 55.9% respectively. The equivalent figures in column one (sanctions assumed exogenous) are 15.1% and 46.8%. Similarly, the locking in and post programmes effects of public sector employment subsidy and education are underestimated if we do not model the selectivity into sanctions. On the other hand, the locking in and post programmes effects of other programmes are overestimated if sanctions are assumed exogenous. The results are even more biased if one ignores the sanctions while evaluating the treatment effect of active labour market policies. For example, Svarer and Rosholm (2008) and Lauzadyte (2008) do not control for sanctions while evaluating the effect of ALMPs. Table A.4 in the appendix reports the treatment effect of ALMPs when sanctions are ignored completely.

Column two in Table 4 reports the results where participation into ALMPs is assumed to be exogenous. We can see that failure to account for selectivity into ALMPs has very little effect on the treatment effect of sanctions. This might be due to the fact that both sanctions and participation into ALMPs occurs at different stages of the unemployment spells as shown in figure 1 section 4. On the other hand, ignoring selectivity into ALMPs biases the treatment effects of ALMPs. For example, private sector employment subsidy shows a negative locking in effect on the exit rate out of unemployment but it becomes positive after we control for selectivity for ALMPs.

Table 4 Sensitivity Analysis (with respect to modeling selection into Sanctions and ALMPs) for Men

	Sanctions Exogenous ALMPs Endogenous	Sanctions Endogenous ALMPs Exogenous	Both Sanctions and ALMPs Endogenous
Sanctions	0.304	0.522	0.538
Locking in effect			
Private-sector employment subsidy	0.141	-0.149	0.216
Public-sector employent subsidy	-0.395	-0.728	-0.246
Education	-0.242	-0.731	-0.185
Other programmes	0.236	-0.295	0.113
Post Program Effect			
Private-sector employment subsidy	0.384	0.449	0.444
Public-sector employent subsidy	-0.319	-0.240	-0.145
Education	-0.041*	-0.004*	0.023*
Other programmes	-0.192	-0.158	-0.369

* Statistically insignificant at 5% level of significance

We conclude that failure to account for selectivity in the sanction process not only underestimates the causal effect of benefit sanctions on the exit rate from open unemployment but also biases the treatment effects of ALMPs. Ignoring sanctions completely further biases the results. On the other hand, failure to account for selectivity into ALMPs has very limited effect on the treatment effect of sanctions.

7 Conclusion

The objective of this paper is to simultaneously evaluate the effect of sanctions and active labour market programmes on exit rate out of unemployment. We use the Akike information criterion to optimally select the number of support points for unobserved heterogeneity. We performed sensitivity analysis with respect to controlling for selectivity into sanctions while evaluating the treatment effect of active labour market programmes and vise versa.

The results show that the imposition of sanctions increases the exit rate out of unemployment by 71.2%. The locking in effect of private sector employment subsidy, public sector employment subsidy, education and other programmes are 24.1, -21.8, -16.9, and 12 percent respectively. The post programme effects of private sector employment subsidy, public sector employment subsidy and other programmes are 55.9, -13.5, and -30.9 percent respectively. The Post programme effect of education is positive but statistically insignificant.

The pre-specification of two support points underestimates the treatment effects of sanctions and ALMPs. The sensitivity analysis shows that failure to control for selectivity for sanctions not only underestimates the treatment effect of sanctions but also substantially biases the treatment effect of ALMPs. On the other hand, failing to control for selectivity for ALMPs has very little effect on the treatment effect of sanctions.

References

Abbring, J. and G. van den Berg (2003,a). "The Non-Parametric Identification of Treatment Effects in Duration Models", Econometrica, 71, 1491-1517.

Abbring, J. and G. van den Berg (2003,b)."A Simple Procedure for the Evaluation of Treatment Effects on Duration Variables", IFAU Working Paper, 2003:19.

Abbring, J., G. van den Berg, and J. van Ours (2005). "The Effect of Unemployment Insurance Sanctions on the Transition Rate from Unemployment to Employment", Economic Journal, 115, 602--630.

Andersen, T. and M. Svarer (2007). "Flexicurity -- Labour Market Performance in Denmark", CESifo Economic Studies, 53 (3), 389--429

Black, D, J. Smith, M. Berger and B. Noel (2003): "Is the Threat of Reemployment Services More Effective than the Services Themselves? Evidence from Random Assignment in the UI System", American Economic Review, 93(4), 1313-1327.

Boone, J. A. Sadrieh and J.C. van Ours (2004). "Experiments on Unemployment Benefit Sanctions and Job Search Behavior", CentER Working paper 2004-8.

Boone, J., P. Fredriksson, B. Holmlund and J. van Ours (2007), "Optimal Unemployment Insurance with Monitoring and Sanctions", Economic Journal, Vol. 117, pp. 399-421.

Boone, J. and J. van Ours (2006). "Modeling Financial Incentives to Get Unemployed Back to Work", Journal of Institutional and Theoretical Economics, 162 (2), 227-252.

Cockx, B. and M. Dejemeppe (2007). "Is the Notofication of Monitoring a Threat to the Unemployed? A Regression Discontinuity Approach", IZA DP 2854.

Fredriksson P. and B. Holmlund (2005). "Optimal Unemployment Insurance Design: Time limits, Monitoring, or Workfare?", International Tax and Public Finance, 13, 565-585.

Gaure, S., Røed, K., Zhang, T. (2007). "Time and causality: A Monte Carlo assessment of the timing-of-events approach", Journal of Econometrics 141 (2007) 1159–1195

Geerdsen, L. (2006). "Is There a Threat Effect of Labour Market Programmes? A Study of ALMP in the Danish UI system", Economic Journal, 116, 738-750 .

Gray, D. (2003). "National versus Regional Finansing and Management of Unemployment and Related Benefits", OECD Social, Employment and Migration working papers no. 14.

Grubb, D. (2000). "Eligibility Criteria for Unemployment Benefits", OECD Economic Studies 32(2), 147-184.

Gorter, G. and G. R.J. Kalb (1996). "Estimating the Effect of Counceling and Monitoring the Unemployed Using a Job Search Model", Journal of Human Resources, 31, 590-610.

Hasenfeld, Y., T. Ghose and K. Larson (2004). "The Logic of Sanctioning Welfare Recipients: An Empirical Assessment", Social Service Review, June, 304-319.

Heckman, J., R. Lalonde and J. Smith (1999). "The Economics and Econometrics of ALMP", Handbook of Labor Economics, Vol. 3, North-Holland, Amsterdam.

Jensen, P., M. Rosholm and M. Svarer (2003). "The Response of Youth Unemployment. to Benefits, Incentives, and Sanctions", European Journal of Political Economy, 19, 301-316.

Jespersen S., Munch R., Skipper L., (2008), "Costs and benefits of Danish active labour market programmes", Labour Economics 15 (2008) 859–884.

Kluve, J. (2006). "The Effectiveness of European Active Labor Market Policy", IZA DP 2018.

Lalive, R., J. Van Ours and J. Zweimüller (2005). "The Effect of Benefit Sanctions on the Duration of Unemployment", Journal of the European Economic Association, 3(6):1-32.

Lalive, R., J. Van Ours and J. Zweimüller (2008). "The Impact of Active Labor Market Programs on the Duration of Unemployment in Switzerland", The Economic Journal, Vol. 118, Issue 525, pp. 235-257.

Lauzadyte, A., (2008), "Active Labour Market Policies and Labour Market Transitions in Denmark: an Analysis of Event History Data", PhD thesis, School of Economics and Management, University of Aarhus, 2008-5.

National Directorate of Labour (2006a). "Benchmarking af Arbejdsløshedskasserne 2006", Report (in Danish).

National Directorate of Labour (2006b). "Rådighedsstatistikken 2005 - Rådigheden hos Forsikrede Ledige", Report (in Danish).

National Directorate of Labour (2006c). "Notat om Forskelle i A-Kassernes Sanktionsandele ved Negative Hændelser 2005", Report (in Danish).

Qureshi A. (2008). "The Effect of Punitive Sanctions on the Transition rate from Welfare to Work -An empirical analysis of the Danish labour market", unpublished manuscript.

Rosholm, M., (2008), "Experimental Evidence on the Nature of the Danish Employment Miracle", IZA DP 3620.

Rosholm, M and M. Svarer (2008). "Estimating the Threat Effect of Active Labour Market Programmes", Forthcoming Scandinavian Journal of Economics.

Røed, K. and L. Weslie (2007). "Unemployment Insurance in Welfare States: Soft Constraints and Mild Sanctions", IZA DP 2877.

Svarer, M. (2007). "The Effect of Sanctions on the Job Finding Rate: Evidence from Denmark", Aarhus University, Economics Working Paper 2007-10

van den Berg, G. (2001). "Duration Models: Specification, Identification, and Mulitple Durations", in J.J. Heckman and E. Leamer, eds., Handbook of Econometrics, Vol. V, North Holland, Amsterdam.

van den Berg, G. and B. van der Klaauw (2005). "Job Search Monotoring and Sanctions - a Brief Survey of Some Recent Results", IFAU Report 2005-8.

van den Berg, G. and B. van der Klaauw (2006). "Counseling and Monitoring of Unemployed Workers: Theory and Evidence from a Controlled Social Experiment", International Economic Review, 47, 895-936.

van den Berg, G., B. van der Klaauw and j. van Ours (2004). "Punitive Sanctions and the Transition Rate from Welfare to Work", Journal of Labor Economics, 22, 211-241.

Table A1: Descriptive statistics

	Sample Averages	
	Men	Women
Age less than 30	0.134	0.158
Age 30-39	0.294	0.352
Age 40-49	0.255	0.242
Age 50-54	0.127	0.114
Age 55-59	0.147	0.117
Age more than 60	0.043	0.017
Native	0.889	88.9
Immigrant from developed country	0.048	0.051
Immigrant from less developed country	0.062	0.059
Single	0.46	0.359
Fraction of year on public transfers, last year	0.236	0.329
Fraction of year on public transfers, two years ago	0.223	0.321
Number of unempl. spells, last year	0.857	0.822
Number of unempl. spells, two years ago	1.434	1.338
Participate in ALMP:		
Private sector empl. subsidy	0.044	0.024
Public sector temp. job	0.029	0.051
Other programme	0.132	0.145
Education	0.174	0.185
Have ended participation in ALMP:		
Private sector empl. subsidy	0.021	0.013
Public sector temp. job	0.021	0.037
Other programme	0.127	0.141
Education	0.157	0.159
Average unemployment rate in UI-fund (per cent)	8.791	8.435
Experience as UI claimant (weeks)	20.782	28.179
Unemployment insurance funds, %:		
Restaurants	1.23	1.89
Wood and builders	5.72	1.11
Journalists	0.74	1.54
Social educations	0.62	2.23
General workers	34.01	9.99
FOA (Public sector employees)	0.9	7.35
Teachers	0.85	2.24
Nursery and childcare assistants	0.29	2.48
Wage-earners	0.93	0.75
Metal workers	9.01	0.31
Food and allied workers	1.87	1.98
Plummer and pipefitters	0.83	0.03
Electricians	1.61	0.51
Painters	1.45	8.71
Commercial and clerical workers	4.97	18.22
STA (public- and telecom employees)	0.63	0.5
Salaried employees	1.41	0.52
Managers and executives	2.95	0.81
Technicians	1.24	1.55
Christians	7.49	9.76
Health organizations	0.04	1.36
Childhood teachers and youth educators	0.56	3.79
Business (sales people)	1.4	0.4
Free salaried employees	0.45	1.18
Engineers	3.27	0.69
Masters Unemployment Insurance fund	2.47	3.82
Academics	2.26	3.37
FTF-A (Salaried empl. and civil servants)	4.25	7.81
ASE (Self-employed)	3.19	2.74
DANA (Self-employed)	1.26	0.83
Computer professionals	0.71	0.28
Business economists	1.28	1.11
Other UI-fund	0.1	0.14
Number of persons	79334	85628
Average duration of unemployment spells (weeks)	25.83	32.14
Number of unemployment spells	109476	109476
Proportion that are right censored	0.238	0.34

Table A.2 Full Estimation Results for all six transitions for men

Variables	Employment		ALMP 1		ALMP 2		ALMP 3		ALMP 4		Sanctions	
	value	stderr	value	stderr	value	stderr	value	stderr	value	stderr	value	stderr
Sanctions	**0.538**	0.04	0.322	0.17	-0.049	0.22	-0.151	0.09	**0.138**	0.07		
Locking in effect												
Private-sector employment subsidy	**0.216**	0.04										
Public sector employment subsidy	**-0.246**	0.06										
Education	**-0.185**	0.03										
Other programmes	**0.113**	0.04										
Post Program Effect												
Private-sector employment subsidy	**0.444**	0.05									-0.262	0.20
Public sector employment subsidy	**-0.145**	0.06									**-0.804**	0.27
Education	0.023	0.02									**-0.500**	0.08
Other programmes	**-0.369**	0.02									**-0.538**	0.09
Age 30-39	**-0.131**	0.02	**-0.277**	0.09	-0.214	0.11	**-0.176**	0.04	**-0.203**	0.04	**-0.328**	0.05
Age40-49	**-0.294**	0.02	**-0.535**	0.10	-0.030	0.12	**-0.188**	0.04	**-0.222**	0.04	**-0.790**	0.06
Age 50-54	**-0.535**	0.02	**-0.613**	0.13	**0.328**	0.13	**-0.190**	0.05	**-0.194**	0.05	**-1.303**	0.08
Age 55-59	**-0.969**	0.02	**-1.028**	0.13	**0.264**	0.13	**-0.424**	0.05	**-0.474**	0.05	**-1.691**	0.08
Age 60 and Above	**-1.053**	0.03	**-1.585**	0.25	**0.397**	0.19	**-0.180**	0.07	-0.028	0.06	**-1.672**	0.15
single	**-0.227**	0.01	**-0.134**	0.07	**0.217**	0.07	**0.097**	0.03	0.024	0.03	**0.292**	0.04
Immigrant from developed country	**-0.317**	0.03	-0.053	0.14	-0.151	0.15	0.032	0.05	**0.216**	0.05	0.097	0.08
Immigrant from less developed country	**-0.635**	0.03	**-0.364**	0.14	-0.024	0.14	**0.106**	0.05	**0.414**	0.04	**0.212**	0.06
Year Dummy 2004	**-0.309**	0.01	**0.723**	0.07	**0.278**	0.07	**-0.119**	0.03	**0.409**	0.03	0.061	0.04
Year Dummy 2005	**-0.643**	0.02	**1.077**	0.12	-0.030	0.19	**-0.392**	0.06	**0.198**	0.05	**0.582**	0.08
Public transfers rate one year ago	-0.085	0.05	**0.680**	0.23	**0.790**	0.21	-0.053	0.09	**0.376**	0.08	0.143	0.13
Public transfers rate two years ago	**-0.849**	0.06	**-0.931**	0.28	-0.294	0.25	-0.147	0.11	**-0.477**	0.09	0.037	0.15
Number of unempl. spells, two years ago	**0.094**	0.01	**-0.145**	0.05	**-0.149**	0.04	**-0.036**	0.02	**-0.062**	0.02	0.012	0.03
Number of unempl. spells, last year	**-0.093**	0.01	**0.278**	0.07	**0.314**	0.07	**-0.118**	0.03	**0.245**	0.02	**-0.137**	0.04
Average unemployment rate in UI-fund	0.011	0.01	**-0.071**	0.03	-0.016	0.04	0.008	0.01	0.000	0.01	**0.155**	0.02
Experience as UI claimant (weeks)	**-0.002**	0.00	0.001	0.00	**0.003**	0.00	0.000	0.00	**0.002**	0.00	**-0.003**	0.00
Region Zeeland	**0.169**	0.02	**0.373**	0.10	**0.353**	0.11	-0.050	0.04	**-0.218**	0.04	-0.094	0.07
South Denmark	**0.126**	0.02	0.173	0.10	**0.199**	0.10	**-0.767**	0.04	**0.237**	0.03	**0.428**	0.05
Central Jutland	**0.095**	0.02	**0.358**	0.09	0.139	0.10	**-0.714**	0.04	**0.150**	0.03	0.059	0.05
Northern Jutland	**0.114**	0.02	0.154	0.11	0.150	0.11	**-0.524**	0.05	-0.033	0.04	**-0.168**	0.07
Unemployment Insurance Funds												
Academics	**-0.135**	0.05	-0.114	0.20	**0.783**	0.19	0.037	0.08	-0.163	0.08	**-0.773**	0.16
Plummer and Pipefitter	**0.523**	0.08	-0.555	0.46	-1.048	0.73	0.185	0.16	**-0.441**	0.17	-0.150	0.22
Childhood teachers and youth Educator	**-0.308**	0.09	-0.977	0.53	0.272	0.40	-0.251	0.18	**-0.589**	0.17	0.184	0.21
DANA (Self-Employed)	**-0.275**	0.06	-0.507	0.31	**-1.398**	0.53	-0.038	0.11	-0.130	0.09	**0.425**	0.14
Electricians	**0.292**	0.06	-0.307	0.27	-0.129	0.33	0.018	0.12	-0.156	0.11	-0.140	0.18
Free Salaried employees	**-0.342**	0.09	-0.060	0.39		0.00	0.079	0.17	-0.050	0.16	-0.088	0.26
Salaried employees	**-0.143**	0.06	-0.461	0.28	**0.677**	0.22	0.149	0.10	**-0.226**	0.09	-0.150	0.15
FTF (Salaried empl. And civil servant)	**-0.163**	0.04	**-0.772**	0.20	-0.253	0.20	**-0.173**	0.07	**-0.168**	0.07	-0.054	0.11
Commercial and clerical employees	**-0.549**	0.04	-0.010	0.15	0.175	0.17	-0.084	0.07	**-0.119**	0.06	**-0.694**	0.10
Engineers	**-0.216**	0.04	0.070	0.16	**-0.936**	0.29	-0.125	0.08	-0.024	0.07	**-0.623**	0.13
Computer Professionals	**-0.750**	0.07	0.068	0.30	0.142	0.36	**-0.301**	0.14	0.124	0.12	**-0.730**	0.19
Journalists	**-0.353**	0.07	-0.011	0.33	-0.142	0.41	**-0.379**	0.16	-0.208	0.14	**-1.402**	0.28
Christian trade union	**-0.063**	0.03	-0.055	0.14	-0.349	0.18	-0.057	0.06	**-0.259**	0.06	-0.123	0.08
Teachers	-0.111	0.07			-0.244	0.39	-0.060	0.15	**-0.425**	0.14	0.011	0.24
Managers and Executives	**-0.287**	0.04	0.031	0.19	**-0.826**	0.30	**-0.198**	0.09	-0.123	0.08	0.239	0.14
Painters	**0.659**	0.06	-0.615	0.43	0.141	0.36	0.052	0.14	**-0.529**	0.14	0.189	0.16
Food and allied workers	**-0.177**	0.05	-0.113	0.22	0.229	0.23	**0.238**	0.09	**-0.217**	0.08	-0.206	0.13
FOA - (Public sector employees)	**-0.526**	0.07	**-1.053**	0.43	**0.943**	0.24	0.025	0.12	**-0.270**	0.12	0.280	0.17
Nursery and childcare assistants	**-0.821**	0.12		0.00	**1.013**	0.41	-0.013	0.20	**-0.391**	0.19	**-1.274**	0.31
Restaurants	**-0.158**	0.05	**0.412**	0.19	0.016	0.29	-0.100	0.11	**-0.275**	0.10	**-1.377**	0.24
Business Denmark	-0.057	0.06	**0.422**	0.20	**-1.098**	0.44	0.055	0.12	-0.148	0.11	**-0.434**	0.22
Unemployment insurance fund	**-0.377**	0.04	-0.244	0.20	**-0.849**	0.30	-0.017	0.09	**-0.281**	0.08	**0.561**	0.13
Social educators	**-0.150**	0.08		0.00	0.103	0.40	-0.177	0.18	**-0.447**	0.17	-0.060	0.24
General workers	**0.298**	0.03	**-0.327**	0.15	0.149	0.17	0.089	0.06	**-0.368**	0.06	**-0.739**	0.10
STA (Public and telecom employees)	**-0.469**	0.08	**-1.017**	0.48	-0.613	0.50	0.280	0.15	**-0.354**	0.16	-0.126	0.31
Health organizations	0.544	0.29					-0.813	1.03	-0.479	0.73	0.646	1.02
Professional technicians	**-0.479**	0.06	0.077	0.24	**-0.778**	0.38	-0.060	0.11	0.064	0.10	**-0.503**	0.16
Wood industry and building workers	**0.586**	0.03	-0.355	0.19	0.098	0.19	-0.081	0.08	**-0.469**	0.07	-0.131	0.10
Probability Mass	**P1**	0.37		**P2**	0.28		**P3**	0.18		**P4**	0.18	
Log-likelihood:	-308320.912			**AICc:**	617317				**Parameters:**		**344**	

Note:- ALMP1 = Private Sector Employment Subsidy ALMP2 = Public Sector Employment Subsidy ALMP3 = Other Programmes ALMP4 = Education
Bold figures denote significance at 5% level

Table A. 3 Full Estimation Results for all six transitions for women

Variables	Employment		ALMPs 1		ALMPs 2		ALMPs 3		ALMPs 4		Sanctions	
	value	stderr	value	stderr	value	stderr	value	stderr	value	stderr	value	stderr
Sanctions	**0.494**	0.06	-0.017	0.37	-0.253	0.23	0.005	0.10	0.132	0.09		
Locking in effect												
Private-sector employment subsidy	**0.246**	0.05										
Public sector employment subsidy	**-0.247**	0.04										
Education	**-0.497**	0.03										
Other programmes	**-0.123**	0.05										
Post Program Effect												
Private-sector employment subsidy	**0.386**	0.06									-0.086	0.33
Public sector employment subsidy	**-0.126**	0.05									**-0.584**	0.24
Education	-0.010	0.02									**-0.500**	0.11
Other programmes	**-0.378**	0.02									**-0.757**	0.13
Age 30-39	**-0.133**	0.02	-0.188	0.11	**-0.268**	0.07	**-0.151**	0.03	**-0.089**	0.03	**-0.184**	0.06
Age40-49	**-0.138**	0.02	**-0.380**	0.13	-0.118	0.08	-0.039	0.04	0.016	0.04	**-0.535**	0.07
Age 50-54	**-0.434**	0.03	**-0.739**	0.18	**0.190**	0.09	-0.073	0.05	0.054	0.04	**-0.827**	0.10
Age 55-59	**-0.964**	0.03	**-1.225**	0.20	-0.139	0.09	**-0.311**	0.04	**-0.279**	0.04	**-1.349**	0.12
Age 60 and Above	**-1.004**	0.05	**-1.843**	0.60	-0.352	0.23	-0.074	0.08	**0.360**	0.08	**-1.001**	0.23
single	-0.001	0.01	**0.175**	0.09	**0.122**	0.05	**0.137**	0.02	**0.117**	0.02	**0.290**	0.05
Immigrant from developed country	**-0.205**	0.03	**-0.529**	0.24	**0.271**	0.10	-0.071	0.05	**0.233**	0.05	**0.296**	0.10
Immigrant from less developed country	**-0.378**	0.03	**-0.451**	0.22	**0.287**	0.10	**0.132**	0.05	**0.532**	0.04	**0.622**	0.08
Year Dummy 2004	**-0.389**	0.01	**0.504**	0.09	**0.198**	0.05	**-0.112**	0.02	**0.352**	0.02	**0.180**	0.05
Year Dummy 2005	**-1.149**	0.03	**1.011**	0.17	-0.222	0.15	**-0.302**	0.05	**0.275**	0.05	**0.497**	0.10
Public transfers rate one year ago	-0.052	0.04	0.429	0.26	**0.668**	0.14	-0.083	0.07	**0.347**	0.07	-0.088	0.14
Public transfers rate two years ago	**-0.505**	0.05	**-0.982**	0.31	-0.241	0.17	**-0.168**	0.09	**-0.380**	0.08	0.302	0.16
Number of unempl. spells, two years ago	**0.063**	0.01	-0.071	0.06	**-0.137**	0.03	-0.027	0.02	**-0.061**	0.01	-0.048	0.03
Number of unempl. spells, last year	**-0.045**	0.01	**0.168**	0.08	**0.210**	0.05	**-0.095**	0.02	**0.175**	0.02	**-0.101**	0.05
Average unemployment rate in UI-fund	**-0.020**	0.01	**0.115**	0.05	-0.006	0.02	0.001	0.01	0.013	0.01	-0.033	0.02
Experience as UI claimant (weeks)	**0.000**	0.00	**0.002**	0.00	**0.002**	0.00	0.000	0.00	**0.001**	0.00	**-0.001**	0.00
Region Zeeland	**-0.023**	0.02	0.243	0.14	**0.356**	0.08	**-0.110**	0.04	**-0.115**	0.04	**-0.197**	0.08
South Denmark	**-0.064**	0.02	0.074	0.13	**0.626**	0.07	**-0.683**	0.03	**0.240**	0.03	**0.290**	0.06
Central Jutland	**-0.102**	0.02	0.214	0.12	**0.423**	0.07	**-0.601**	0.03	**0.161**	0.03	**-0.134**	0.07
Northern Jutland	**-0.191**	0.02	**0.308**	0.14	**0.430**	0.09	**-0.667**	0.04	-0.046	0.04	**-0.744**	0.10
Unemployment Insurance Funds												
Academics	-0.047	0.05	0.000	0.29	**1.016**	0.22	**0.232**	0.09	0.126	0.09	-0.055	0.21
Childhood teachers and youth Educator	**-0.405**	0.05	**-2.571**	0.75	**0.725**	0.21	**-0.184**	0.09	**-0.387**	0.09	-0.075	0.20
DANA (Self-Employed)	**-0.611**	0.08	-0.079	0.51	-0.084	0.37	-0.185	0.14	**0.336**	0.11	**0.627**	0.25
Free Salaried employees	**-0.373**	0.07	0.270	0.38	-0.249	0.36	-0.242	0.13	0.132	0.12	-0.001	0.29
Salaried employees	**-0.555**	0.10	-1.482	1.05	0.423	0.37	-0.275	0.19	-0.024	0.16	**0.726**	0.30
FTF (Salaried empl. And civil servant)	**-0.293**	0.04	-0.344	0.28	0.312	0.21	-0.095	0.08	0.012	0.07	**0.361**	0.16
Commercial and clerical employees	**-0.548**	0.04	0.064	0.24	**0.556**	0.20	0.113	0.08	-0.055	0.07	0.223	0.16
Engineers	**-0.269**	0.08	**0.762**	0.37	0.384	0.37	-0.090	0.15	0.183	0.14	-0.382	0.37
Computer Professionals	**-0.689**	0.12	0.248	0.66	0.380	0.50	-0.105	0.20	0.306	0.19	0.485	0.40
Journalists	**-0.357**	0.07	-0.399	0.40	-0.207	0.36	-0.040	0.12	0.198	0.11	**-1.691**	0.53
Christian trade union	**-0.465**	0.05	-0.272	0.32	0.389	0.23	0.010	0.09	-0.089	0.09	**0.689**	0.20
Teachers	**-0.208**	0.05	-0.451	0.47	-0.616	0.34	-0.165	0.12	0.040	0.10	0.113	0.23
Managers and Executives	**-0.328**	0.08	**1.021**	0.38	-0.346	0.46	-0.222	0.15	**0.265**	0.13	**0.917**	0.24
Painters	**0.819**	0.10	-0.178	0.66	-0.454	0.75	-0.005	0.26	-0.159	0.22	0.459	0.45
Food and allied workers	**-0.184**	0.07	-0.579	0.46	0.068	0.32	**0.593**	0.12	-0.043	0.12	**0.643**	0.27
FOA - (Public sector employees)	**-0.448**	0.04	**-1.210**	0.38	**0.675**	0.20	0.113	0.08	-0.045	0.07	**0.488**	0.16
Nursery and childcare assistants	**-0.622**	0.07	**-1.969**	0.57	**0.972**	0.26	-0.187	0.12	**-0.379**	0.11	0.020	0.26
Restaurants	**-0.220**	0.09	-1.104	0.59	0.611	0.34	0.049	0.15	-0.106	0.14	**0.868**	0.32
Business Denmark	**-0.252**	0.10	**1.268**	0.37	-0.005	0.55	-0.090	0.20	0.005	0.19	0.234	0.42
Unemployment insurance fund	**-0.858**	0.05	0.524	0.30	**0.484**	0.23	-0.067	0.10	0.044	0.09	**0.633**	0.19
Social educators	**-0.270**	0.05	**-2.058**	0.56	0.180	0.26	-0.122	0.11	**-0.357**	0.10	0.122	0.22
General workers	-0.080	0.06	**-1.167**	0.45	**0.683**	0.26	**0.239**	0.11	-0.029	0.10	0.449	0.24
STA (Public and telecom employees)	**-0.485**	0.09	0.099	0.64	0.477	0.38	0.208	0.17	0.109	0.17	0.338	0.35
Professional technicians	**-0.473**	0.07	-0.098	0.40	-0.062	0.34	0.041	0.13	0.119	0.12	0.100	0.29
Wood industry and building workers	**0.041**	0.08	-0.951	0.56	**1.177**	0.31	0.214	0.16	0.128	0.14	0.452	0.34
Probability Mass	P1	0.51		P2	0.31		P3	0.18				
Log-likelihood:	-325408.33			AICc:	651455				Parameters:		319	

Note:- ALMP1 = Private Sector Employment Subsidy ALMP2 = Public Sector Employment Subsidy ALMP3 = Other Programmes ALMP4 = Education

Bold figures denote significance at 5% level

Table A.4 Treatment effect of ALMPs without control of Sacntions

	Without Sanctions	Both Sanctions and ALMPs Endogenous
Sanctions		**0.494**
Locking in effect		
Private-sector employment subsidy	0.139	**0.246**
Public-sector employent subsidy	-0.397	**-0.247**
Education	-0.244	**-0.497**
Other programmes	0.235	**-0.123**
Post Program Effect		
Private-sector employment subsidy	0.384	**0.386**
Public-sector employent subsidy	-0.319	**-0.126**
Education	-0.043*	**-0.010***
Other programmes	-0.194	**-0.378**

* Statistically insignificant at 5% level of significance

Economics Working Paper

2008-16: Alexander K. Koch and Eloïc Peyrache: Aligning Ambition and Incentives

2009-01: Alexander K. Koch, Albrecht Morgenstern and Philippe Raab: Career concerns incentives: An experimental test

2009-02: Maria Knoth Humlum and Rune Majlund Vejlin: The Effects of Financial Aid in High School on Academic and Labor Market Outcomes: A Quasi-Experimental Study

2009-03: Philipp J.H. Schröder and Allan Sørensen: Second Thoughts on Exporter Productivity

2009-04: Lene Kromann: Does Employee Body Weight Affect Employers' Behavior?

2009-05: Martin Paldam: The welfare state and Baumol's law

2009-06: Erich Gundlach and Martin Paldam: The agricultural and the democratic transitions - Causality and the Roundup model

2009-07: Torben M. Andersen: Fiscal policy and the global financial crisis

2009-08: Helena Skyt Nielsen: Causes and Consequences of a Father's Child Leave: Evidence from a Reform of Leave Schemes

2009-09: Marianne Simonsen and Lars Skipper: The Family Gap Reconsidered: What Wombmates Reveal

2009-10: Olaf Posch and Klaus Wälde: On the non-causal link between volatility and growth

2009-11 Torben Sørensen and Rune Vejlin: The Importance of Worker, Firm and Match Fixed Effects in the Formation of Wages

2009-12: Nisar Ahmad: State Dependence in Unemployment among Danish Immigrants

2009-13: Nisar Ahmad and Rayhaneh Esmaeilzadeh: Immigrant-Native Differences in Earnings Mobility Processes: Evidence from Canadian and Danish Data

2009-14: Nisar Ahmad and Michael Svarer: The Effect of Sanctions and Active Labour Market Programmes on the Exit Rate From Unemployment