

The Effect of Punitive Sanctions on the Transition Rate from Welfare to Work: Evidence from Denmark

Atef Qureshi

Finansministeriet, mail: ategu@fm.dk

SUMMARY: Applying a mixed proportional hazard timing-of-events model in the confines of a search model punitive sanctions are in the current study found to have positive effect on the transition rate from welfare to work. Furthermore, the empirical analysis of this paper shows that the magnitude of this positive effect depends on the type of sanction. This effect diminishes over time and is heterogeneous. Finally, the existence of alternate »escape routes« from the welfare system, other than employment, does not undermine the positive effect of a sanction.

1. Introduction

The use of punitive sanctions against recipients of welfare in Denmark ought to be seen in the light of the Danish labour market model, the so-called flexicurity model. This model comprises following three interacting elements in a difficult balance: Flexibility, security and active labour market policies. Flexibility is ensured by a legal structure, which to a large extent makes hiring and firing relatively simple and cost-free. This gives employers a relatively free hand to expand or contract their workforce as needed throughout the business cycle. It also ensures that workers may quickly be allocated to sectors where their labour is most urgently needed. Security is ensured by a broad array of transfer incomes in times of unemployment. The third and final element of flexicurity, active labour market policies, comprises a range of vocational training and workfare programs designed to ensure employment. As a result unemployed workers are required to participate in a number of courses and job-search activities.

Active labour market policies have become a central element of Danish labour market and the structure of these policies as we see them today have been changed a lot during the recession in the 1980s and the economic boom in the 1990s. According to the recent design of the Danish labour market unemployed workers who receive trans-

I am grateful to the Ministry of Employment for providing access to data. Furthermore, I also gratefully acknowledge very constructive comments from Karsten Albæk, Michael Svarer, Michael Rosholm, Thomas Mølsted Jørgensen, Anders Bruun Jonassen, and Ulla Nørskov Nielsen.

fer income are generally required to meet some form of workplace readiness demands, and welfare recipients are no exception. For welfare recipients, workplace availability requires that the recipients accept reasonable job offers, or participate in vocational training or other programs designed to improve their employment prospects. Should the recipient fail to meet these requirements – for instance if he or she does not show up for a job interview – this is registered as a negative incident that may potentially lead to economic sanctions, i.e. the worker's welfare payment may be docked.

The objective of this paper is to determine to what extent economic sanctions being imposed if the welfare recipient does not comply with the requirement regarding workplace availability, influence the welfare recipients' transition rate from unemployment to work. Welfare recipients who began receiving welfare benefits from January 2007 to the end of August 2008 are divided into two groups: Those who receive a sanction, and those who do not. In addition to quantifying the effect of sanctions the analysis will illuminate the following:

- How does the time-profile of the effect of sanctions vary? I.e. do sanctions permanently change the behaviour of welfare recipients or does the effect attenuate over time?
- How do the worker's personal characteristics interact with sanctions? Are they more effective against some groups (for instance women) than others?
- Does the effect of a sanction depend on its magnitude? I.e. if an unemployed worker loses her benefits for a just a week, is she then less likely to find a job than if she loses her benefits for a whole month?

The econometric model for this analysis is the mixed proportional hazards (MPH) model. The chosen model allows us to include unobserved heterogeneity by explicitly modelling unobserved characteristics.

A natural objection to this type of analysis is that welfare recipients who receive a sanction have a fundamentally different behaviour from those who do not, and any perceived effect of sanctions is really describing these unobserved differences in the workers' behaviour – i.e. a selection bias exists. To deal with this potential bias I implement a variation of the MPH model known as the time-of-events model. This approach assumes explicitly that the risk of receiving a sanction is endogenously determined, and at the same time models the chances of making the transition from welfare to work simultaneously.

The current study is the first empirical analysis regarding the effect of a punitive sanction on the exit rate from welfare to work in Denmark. However, a comparable empirical analysis was made by Van den Berg et al. (2004) for the Dutch labour market

who find that the imposition of punitive sanctions considerably increase the exit rate of welfare in the Netherlands. Furthermore, they also find that this effect does vary over time after the imposition of a sanction and does also depend on the magnitude.

A part from the study mentioned above, an analysis has been made by Svarer (2007) on Danish labour market. He analyse the effect of punitive sanctions against people receiving unemployment benefits in Denmark. He concludes that sanctions imposed against people who do not fulfil the eligibility criteria for receiving unemployment benefits increase the exit rate from unemployment to work. The current study will reveal whether the same conclusion holds for welfare recipients.

The main problem in any empirical study regarding estimation of effect of punitive sanctions concerns the endogenous selection involved. Neglecting the problem with endogenous selection gives biased estimates while handling the selection bias makes sure that the causal effect is identified. With the timing-of-events approach exploiting the information regarding the timing of events, namely the timing of imposition of a sanction and the timing of exit to work, identifies this.

The outline of this paper is as follows. First I provide the regulatory framework for sanctions against welfare recipients with negative job-search behaviour. Next follow some theoretical considerations, introduction to the timing-of-events model, description of the data, the empirical analysis, and finally the conclusion.

2. Welfare and sanctions in Denmark

The non-working part of the population in Denmark who do not subscribe to an unemployment insurance fund are generally eligible for welfare assistance in case of unemployment, provided they can continually demonstrate workplace-availability.¹ The requirements these workers must meet to demonstrate workplace-availability and to remain eligible for welfare vary depending on whether the worker faces other problems than unemployment, such as alcoholism, chronic illness or poor language skills. Such social ills can prove a major stumbling block to finding a job, and the demands made on unemployed workers to remain eligible for welfare vary considerably depending on whether they face such problems.

Social workers use a coding system – the so-called ‘match group’ system – to designate the degree to which welfare recipients are struggling with social ills. Welfare recipients categorized as match 1, 2, 3 and ‘temporary match’ are expected to start working any time if they face no immediate obstacles to accepting a job.² The rest of the wel-

1. To be eligible for welfare, the worker must have resided in Denmark for 7 of the last 8 years. In addition, married workers whose spouses receive welfare may only receive welfare if they meet certain employment requirements.

2. Welfare recipients who are yet to be categorized as either match 1, 2 or 3 are categorized as ‘temporary match’.

fare recipients are categorized as match 4 and 5. The job search behaviour of these welfare recipients is likely to diverge significantly from that of workers who face no other problems than unemployment.³ To receive welfare, workplace-ready unemployed workers must:

- Register with their local Job Center.
- Submit and continually update their résumé in the Job Center's online job bank.
- Maintain contact with their social worker.
- Actively apply for jobs, including participating in interviews set up by their social worker.
- Comply with Job Center demands that they seek particular jobs that the social worker finds appropriate.

Furthermore, workers on welfare are expected to accept reasonable job offers or participate in active labour market programs, such as extra training or seminars on job search. If they receive an appropriate job or training offer, workers are expected to start the next day.

When the worker receives a job offer, the Job Center registers the event. The same is true if the worker is called to an interview, or asked to update her CV. What happens next determines the welfare recipient's continued eligibility for welfare payments.

3. Workplace unavailability and punitive Sanctions

If the worker fails to meet the above requirements – for instance by not showing up for a meeting with her caseworker – the action is counted as a negative event. At this point the case worker must evaluate whether this came about because the unemployed worker is not workplace-available, or whether her failure to meet the requirement is excusable on valid grounds, for instance because of illness or childcare issues. If the event is excusable, the worker will not receive a sanction. However, if she was absent without valid reason, she will receive a sanction.

Initially, welfare recipients who are in workfare programs and fail to participate in that program fully will lose a portion of their benefits corresponding to the level of non-participation in the program in question. For instance, if the welfare recipient is participating in a job training program and fails to report for work one day during a five day work-week, she will lose 20% of her benefits. This type of economic sanction will, in the empirical analysis, be referred to as a proportional reduction of welfare.

3. Beskæftigelsesministeriet (2006), 'Kulegravning af kontanthjælpsområdet', chapter 1 and 2.

Table 1.

Proportional reduction of welfare
1/3 reduction of welfare for 3 weeks
Sanctions regarding repeated offences
Temporary loss of benefits
Loss of benefits for a longer period of time

If the recipient fails to meet her obligations, she may lose a third of her benefits for a number of weeks. This type of sanction is used against welfare recipients who refuse work or do not at all participate in a workfare program (e.g. job training or education), and who do so without providing a legitimate excuse. First-time offenders have their benefits cut for three weeks (1/3 reduction for 3 weeks). A repeated offence within 12 months of the first offence leads to 20 weeks of reduced benefits (1/3 reduction for 20 weeks).

Other offences are punished with a temporary loss of benefits. This type of sanction is used if the welfare recipient misses a meeting concerning her CV or concerning a job offer. The offender loses all benefits until she meets with her case worker or otherwise informs about the reason for not meeting her obligations, this loss of benefits typically lasts for a few days. After a contact is re-established, the welfare recipient may resume her benefits.

However, repeated offences of this nature within a 12 month period are punished by a subsequent loss of 1/3 of benefits for 2 weeks the first time they occurs. While offences of this nature repeated for the second time are punished by a subsequent loss of 1/3 of benefits for 20 weeks.

Finally, chronic offenders may lose their benefits entirely for a longer period of time to be determined by their case workers.⁴

4. Modified search theory

Labour supply theory describes a fundamental utility maximization problem under which workers decide what amount of labour they are willing to supply at a given wage;

4. Some recipients may be required to pay back the benefits received. This could for example be the case if the welfare recipient has started a new job but fails to inform her case worker and thus continues to receive welfare without being qualified. The pay back period in this case is defined as the period of 'double' income. If this type of sanction is imposed, then the welfare recipient is required to pay back the welfare benefits, after reemployment is obtained. Furthermore, if the recipient does not obtain reemployment in the period of two years, after imposition of this sanction, then the welfare recipient is not required pay back the welfare benefits at all. This sanction is excluded from the empirical part of this paper, due to the fact that the structure of this sanction is completely different from the other types of sanctions. In fact, I performed an empirical analysis including this type of sanction. The inclusion of this sanction had no significant effect on the exit rate from welfare to work; neither did it change any of the other results in the empirical analysis.

see e.g. Varian (1999).⁵ Supply theory assumes efficient spot markets for labour, and thus falls short of describing the many imperfections of real world labour markets, in particular involuntary unemployment and variable wages. Mortensen (1977) has therefore proposed a search framework that explicitly accounts for the costly process of seeking employment as well as the variability of wages. This framework has proven useful for the analysis of policies to reduce unemployment, and the present context is no exception.

Abbring, Van den Berg and Van Ours (1997) have modified the job search framework of Mortensen (1977) and they explicitly incorporate punitive sanctions. In this model the anticipated theoretical effects of punitive sanctions are more precise and the following main assumption is made: Sanctions are imposed if an unemployed worker's search intensity, s , is under a certain threshold value. Some unemployed workers will be willing to take the risk of being sanctioned than others.⁶ Therefore, for an unemployed worker who has not yet been punished, there is a rate, $p(s)$, at which a sanction is imposed, with $p(s)$ decreasing in s . The unemployed worker knows the shape of $p(s)$, but she does not know in advance when a sanction is imposed.

Taking these assumptions into account, the modified search model predicts following main results as listed below (however, I am only trying to identify the ex-post effects of sanctions in the current study, therefore only the last three of the following five results are of interest in the current study).

Theoretical prediction # 1 (ex-ante effect): Strengthening the eligibility criteria and/or increasing the monitoring effort and/or increasing the sanctions imposed might induce the unemployed workers to search harder and sooner accept job offers, even before a sanction is imposed.⁷

Theoretical prediction # 2 (ex-post effect): Warning effect: Typically an unemployed person is notified when eligibility criteria are not met, but before a sanction may be imposed - this warning might increase the job search effort since the expected value of continued unemployment drops. However due to non-availability of the date this effect can not be identified in the current study.

Theoretical prediction # 3 (ex-post effect): Temporary sanction effect: During the sanction period, the utility of being unemployed is lowered, and unemployed individuals find it more attractive to work.

Theoretical prediction # 4 (ex-post effect): Permanent sanction effect: The period after the sanction period ends might be followed by increased monitoring, or at least the sanctioned unemployed individuals expects to be more intensively monitored, which in both circumstances results in a higher exit rate from unemployment.

5. For more detail on an agent or a worker maximization problem see e.g.. Cahuc and Zylberg (2004).

6. This is because they have a higher non-pecuniary utility of being unemployed.

7. Svarer (2007) finds some evidence of ex-ante effect for the unemployed workers receiving UI benefits in Denmark.

Theoretical prediction # 5: Both the exit rate from unemployment to employment and the rate at which a sanction is carried out depend on all the variables that the individual uses to determine her strategy. Due to this result the exit rate and sanction rate, in the empirical model, depend on the same set of observed variables.

5. The empirical model

In order to investigate the effect of a sanction on the exit rate from welfare to work, I estimate a Mixed Proportional Hazard (MPH) duration model in which the random variable is the time spent in unemployment. Furthermore, in order to meet the fact that sanctions are not given randomly to welfare recipients, but rather as a result of their behaviour, I apply a timing-of-events strategy in the MPH framework. This strategy makes it possible to disentangle the selection effect from the causal effect of receiving a sanction on the exit rate from welfare to work. More precisely I will follow van den Berg et al. (2004), Abbring et al. (2005), Lalive et al. (2005) and Svarer (2007) and apply the timing-of-event strategy of Abbring and van den Berg (2003a). That is, to estimate the process out of unemployment simultaneously with the process of receiving a sanction allowing the two processes to be interdependent through the error term.

5.1. Timing-of-event

Consider $T_{W(elfare)}$ and $T_{S(anction)}$ as continuous non-negative random variables denoting the duration of a welfare spell and the duration until a sanction is imposed on a welfare recipient. Furthermore, let t denote the unit of time in which an individual receives welfare benefits and let t_s denote the unit of time until an individual receive a sanction. Distribution of T is allowed to vary across all N individuals, where all variation is assumed to be described by a vector of (potentially time dependent) covariates and an element of (time independent) unobserved heterogeneity.

More formally, with the above definition of the random variables, the MPH timing-of-event model can be expressed as a system of the following two equations.

$$\begin{aligned} \theta_s(t|x_{s,t},v_s) &= \lambda_s(t)\phi_s(x_{s,t},v_s) \\ \theta_w(t|t_s,x_{w,t},v_w) &= \lambda_w(t)\phi_w(x_{w,t},v_w) \end{aligned}$$

The first dependent variable, $\theta_s(t|x_{s,t},v_s)$, denotes the sanction rate at time t conditional on x_s and v_s for an individual receiving welfare benefits for t units of time. The exit rate from welfare to work at time t , $\theta_w(t|t_s,x_{w,t},v_w)$, is the second dependent variable, given t_s , $x_{w,t}$ and v_w . Furthermore, $x_{s,t}$ and $x_{w,t}$ denotes vectors of possibly time-dependent and time-varying covariates in the system of the above equations and the unobserved heterogeneity is expressed by v_s and v_w .

The two dependent variables are articulated as a function of a baseline hazard and a scaling function. The basic intuition in a MPH model is that baseline hazards refer to individuals who exhibit baseline characteristics. And individuals who do not exhibit baseline characteristics, the sanction rate and the exit rate change relatively to the baseline hazards through the scaling function. These functions can have different shapes depending on the purpose and the nature of a study. In the current case I follow the related studies and specify the baseline hazards as $\exp(\lambda_i(t))$ and the scaling function as $\exp(\beta'_i x_{i,t} + v_i)$ for $i = s, w$. With these specifications the system of equations in a timing-of-events model can be stated as:

$$\begin{aligned}\theta_s(t|x_{s,t}, v_s) &= \exp(\lambda_s(t) + \beta'_s x_{s,t} + v_s) \\ \theta_w(t|t_s, x_{w,t}, v_w) &= \exp(\lambda_w(t) + \delta D(t_s) + \beta'_w x_{w,t} + v_w)\end{aligned}$$

Where $D(t_s)$ is a time-varying indicator variable taking the value 0 before the sanction is imposed, and 1 after it has been imposed.⁸ The model can be estimated using the maximum likelihood procedure, with parameters obtained by maximizing the likelihood function.

The main point in using the MPH timing-of-event model in the present context is that the occurrence of a sanction and the exit rate out of unemployment are characterized by the moments at which they occur. The distributions of the random variables are expressed in terms of their hazard rates $\theta_s(t|x_{s,t}, v_s)$ and $\theta_w(t|t_s, x_{w,t}, v_w)$.

5.2. Parameterization

I specify the duration dependence functions as well as the bivariate unobserved heterogeneity distribution as flexible as possible. This implies that the hazard functions have a piecewise constant specification and the unobserved heterogeneity terms are assumed to follow a discrete distribution with only two mass-points. This specification is flexible since it does not assume too much structure and the parameterization may more formally be written as follows.

The hazard of leaving employment $\lambda_w(t)$ as well as the hazard of receiving a sanction $\lambda_s(t)$ can be written as:

$$\lambda_i(t) = \exp\left(\sum_{j=1,2} \lambda_{ij} I_j(t)\right), \quad i = s, w$$

j is a subscript for time intervals and $I_j(t)$ is time-varying dummy variables that are one in consecutive time intervals. The bivariate discrete distribution of the unobserved he-

8. In the extended model five dummy variables are introduced in order to differentiate between effects of different types of sanctions on the exit rate from welfare.

terogeneity terms v_s and v_w with two unrestricted mass-point locations for each term can be denoted as (v_w^a, v_w^b) and (v_s^a, v_s^b) .

$$Pr(v_w = v_w^a, v_s = v_s^a) = p_1$$

$$Pr(v_w = v_w^a, v_s = v_s^b) = p_2$$

$$Pr(v_w = v_w^b, v_s = v_s^a) = p_3$$

$$Pr(v_w = v_w^b, v_s = v_s^b) = p_4$$

represent the associated probabilities. Note that $0 \leq p_i \leq 1$ for $i = 1, 2, 3, 4$ and $\sum p_i = 1$.

5.3. Identification and the assumptions of the model

In this section the main assumptions of the model, presented in the previous section, will be followed by an intuitive explanation regarding identification strategy of parameters to be estimated.

First of all it should be highlighted that while estimating the above model a multispell data set is used. This means that an individual can occur with several spells in the data set. Using a multispell data adds more variation over time for an individual, and allows for weaker assumption regarding the statistical model. Along all the assumption of the model the covariates are assumed to be uncorrelated with the unobserved heterogeneity term. In order to fulfil this assumption a large number of covariates are included in the estimation. Especially inclusion of covariates regarding labour market association makes the above assumption more reliable.

Apart from the assumption that the unobserved heterogeneity term of the model is uncorrelated with the covariates (exogeneity assumption), the estimation also follows a »predictable process«. This means that the values of time dependent covariates at time t are only affected by past events and that these events are observable.⁹

The baseline hazards are assumed to be piecewise constant over time. This is assumed in order not to impose a structure on the duration dependence. Assuming a particular distribution (for example Weibull distribution) of the duration dependence would mean that one has to estimate fewer numbers of parameters, which would be more efficient. On the other hand if the assumed distribution of the duration dependence is not true it would lead to biased estimates.

The unobserved heterogeneity terms are assumed to follow a discrete distribution with two mass-points. First of all, not including an unobserved term would lead to a Proportional Hazard model (PH-model). In the presence of some unobserved characteristics affecting the exit rate and sanction rate applying the PH-model it would lead to biased estimates. In the current study and in other studies with the nature of un-

9. Van den Berg (2001) denotes this as »past and out random variation«.

employment being analyzed it is natural to believe that there exist unobservable characteristics affecting the unemployment.¹⁰ This is the obvious reason for including the unobserved term and estimating a MPH-model.

Numbers of mass-points, in the current study, are a priori chosen to be two in each of the two marginal distributions. A correct way of choosing the number of mass-points is to a priori assume a few numbers of mass-points, and then increase the number until the most likely distribution of the unobserved heterogeneity is found, based on a Likelihood ratio test. According to Heckman and Singer (1984), Van den Berg (2001), Baker and Melino (2000) and Gaure et al. (2007) in practice only a few mass-points are found.

Finally, identification of the model is obtained with multiple spell data under following assumptions:

- The unobserved heterogeneity term of the model is uncorrelated with the covariates (exogeneity assumption).
- Statistical independence between unemployment spells, given observable characteristics of an individual.
- Every unemployment spell is affected by the set of observable characteristics.
- v_s and v_w are constant across different spells of an individual.
- The periods between different unemployment spells of an individual do not depend on v_s and v_w .

So, the conclusion is that the identification strategy is that the variation of unemployment duration and the duration until a sanction is used to identify the unobserved heterogeneity distribution. The selection effect is captured by the correlation between v_s and v_w while the causal effect of a sanction on unemployment duration is captured by the effect of being sanctioned conditional on the observed and unobserved terms.¹¹

6. Data

The data used in the empirical analysis is based on the following five administrative registers: DREAM, KMD, COR, MIA and the CPR-Register.

DREAM (Danish Register for Evaluation of Marginalization) is essentially an event history database. For each individual who has ever received any form of public transfer income, weekly information is provided. The types of payments include unemployment insurance, welfare benefits, payment for participation in workfare pro-

10. Lancaster (1979) was the first to prove that the hazard function in a PH-model is more negative duration dependent than the hazard function of a MPH-model, due to a process of »weeding-out«.

11. In Abbring and Van den Berg (2003) a more detailed identification strategy is discussed.

grams, student stipends, pensions, and the like. The data in this register is collected and compiled by the Danish Ministry of Employment.

Using DREAM, a weekly event history is constructed for each individual receiving welfare payments in the period from January 1st 2007 to August 31st 2008. In Denmark when an individual is not registered as receiving public transfers, she may either be employed or not be participating in the labour force, which seldom occurs. Nevertheless, in order to check whether workers gain employment or do not participate in the labour force in the period after ending an unemployment spell, I combine information from DREAM with information from the MIA register, which contains monthly information about workers who gain some form of regular job income.

The KMD data set provides information on sanctions collected from a database containing information on the interaction between case workers and unemployed (KMD). This data set contains the dates and types of a given sanction.

The information regarding an unemployed person's total yearly income in 2006 is obtained from COR, and finally the information in relation to number of children less than 18 years of age is obtained from CPR-Register.

6.1. The population of interest

The fact that the empirical model basically compares individuals who receive a sanction with individuals who do not receive a sanction must be given some consideration to the construction of the populations of interest in order to make them as comparable (homogeneous) as possible.

I construct a flow sample on new welfare recipients and calculate the number of weeks until a worker may be sanctioned. I 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), Lalive et al. (2005) and Svarer (2007), and the advantage of this approach is that I only have to deal with time until the first sanction. Spells concerning further sanctions are right-censored.

In order to construct the population of interest in a way that makes individuals as comparable as possible, I only include individuals who are workplace-ready i.e. recipients in match 1, 2, 3 and 'temporary match'. Furthermore, I exclude individuals who are under 25 years of age and singles between 25 and 30. This exclusion is due to the fact that these individuals are subject to a special youth welfare program with much stricter requirements and regulations.

The final dataset contains 42.783 welfare recipients who experience a total of 52.023 numbers of unemployment spells of which 6.348 were characterized as spells with imposition of a sanction.

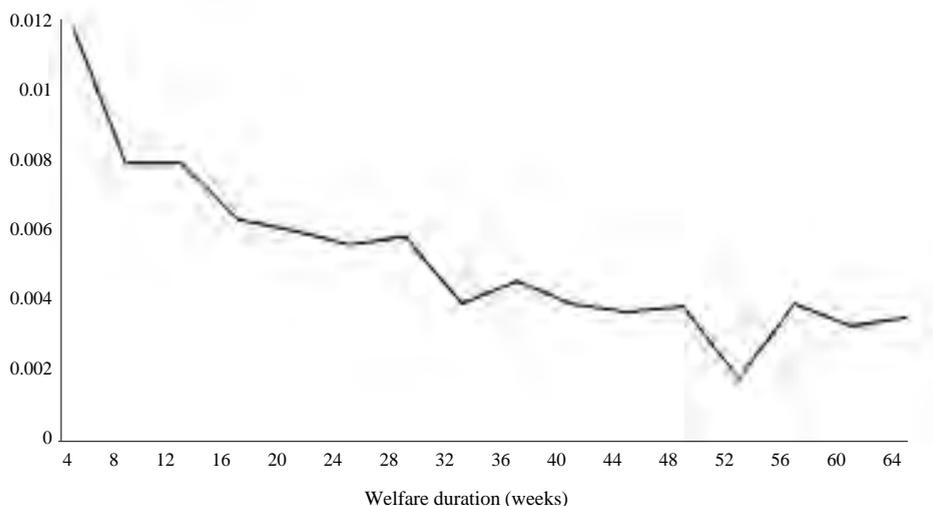


Figure 1. The empirical exit rate.

Source: DREAM and MIA.

Figure 1 shows that the empirical exit rate is highest at the beginning of the welfare period. During the first 2 months, the weekly reemployment probability is approximately 4 percent. In general the graph of the empirical exit rate seems to be peaking after three months. This could indicate a motivation affect as a result of the contact meetings held every 3rd month between a welfare recipient and a case worker.

The empirical sanction rate can be seen in figure 2. This rate is high in the beginning of an unemployment spell which coincides with the period at which the first systematic investigation regarding the welfare recipients' workplace-availability takes place. This investigation is done by the caseworker in a job center through various CV interviews and other active labour market programs.

Overall there seems to be a pattern of negative duration dependence for both processes i.e. longer unemployment spell reduces the probability of receiving a sanction, as well as the probability of finding a job. The decreasing probability of finding a job over time could be an indication of decreasing labour market association, as time goes by. While the overall decreasing sanction rate suggests that recipients who have been in the welfare system for a longer period of time know how to comply with the eligibility criteria.

6.2. The explanatory variables

All the discrete (dummy) variables included in the empirical analysis are self-

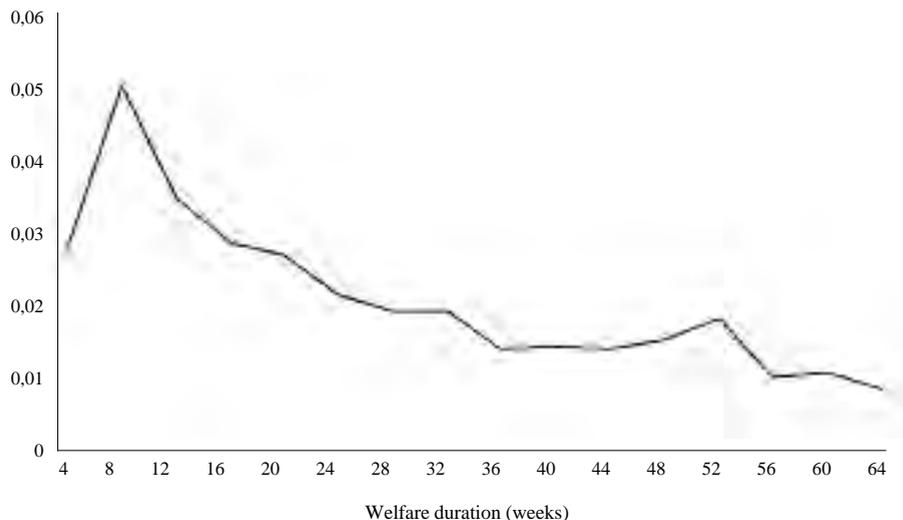


Figure 2. The empirical sanction rate.

Source: DREAM, KMD and MIA.

explainable. I also include the following two continuous variables: Fraction of preceding year public support and deviation from average income in 2006. The first one measures the degree of public support 12 months prior to the date of entering a welfare period. And the second measures the deviation of the income level in year 2006 from the average level of income among all welfare recipients. This variable is defined in terms of log, which means that the parameter estimate can be seen as an elasticity parameter. The purpose of including these two continuous variables is to account for variation in the sanction rate and exit rate caused by the history of public support and income. One can argue that welfare recipients with a higher degree of public support in the past might be recipients with low degree of labour market association and thus have a lower exit probability, Rosdahl and Petersen (2006). Furthermore, recipients with a higher level of previous income might be recipients who are used to this income level.

Table 2 provides some statistics regarding the explanatory variables in the model. The table gives a first impression of differences in exit probabilities between different groups. For example 44 percent of the welfare spells are female recipients of which 35 percent have gained employment before 31st of August 2008, whereas 43 percent of the male recipients have gained employment before this date. Recipients age seems to have negative effect on the exit probability. Recipients who are single, who have children, and who are living in different regional areas of Denmark seem to have more or less the same exit probability as of their counterparts. Finally recipients in match

Table 2. Descriptive statistics regarding the characteristics of the data.

Dummy variables	Exit rate (%)		Right censored (%)		Total	
	No sanction	Sanction	No sanction	Sanction	Number	(%)
Total number of spells	35	4	53	8	52,023	100
Ages 25-29	33	5	52	10	5,451	10
Ages 30-39	36	5	51	8	22,983	44
Ages 40-49	36	4	52	8	15,897	31
Ages 50+	31	3	61	6	7,692	15
Female	32	3	59	6	23,09	44
Male	37	6	48	9	28,933	56
Not married	33	5	52	9	31,316	60
Married	37	3	54	6	20,707	40
Match group 1	52	7	34	7	10,326	20
Match group 2	43	6	40	10	8,978	17
Match group 3	34	6	47	13	7,85	15
Temporary match	25	3	67	5	24,869	48
Without children under 18 years of age	33	5	55	7	20,395	39
With children under 18 years of age	36	4	52	8	31,628	61
Native	35	5	52	8	36,649	70
Immigrants from developed countries	37	4	52	6	2,621	5
Immigrants from less developed countries	34	3	57	6	12,753	25
Capital region of Denmark	35	4	56	6	21,057	40
Region Zealand	37	5	49	9	8,433	16
South Denmark Region	35	5	50	9	10,019	19
Central Denmark Region	33	5	54	8	8,07	16
North Denmark Region	33	4	53	9	4,444	9
	MeanStandard error					
<i>Continuous variables</i>						
Fraction of preceding year public support	0.572	0.379				
Deviation from average income in 2006	0	5.863				

Source: DREAM and MIA, COR, KMD, and CPR-register.

group 1 and recipients who are immigrants from developed countries seem to have higher exit probabilities than their counterparts.

Regarding the probability of receiving a sanction one can say that recipients who are single or are in match group 3 or having children under 18 years of age or are native Danes appear to have a higher probability of receiving a sanction than their counterparts. Overall, 12 percent of the recipients were sanctioned and 35 percent of them had left welfare before 31st of august 2008.

7. Results

The parameters to be estimated are: β_s , β_w , δ , v_s^a , v_w^a , p_1 , p_2 , p_3 , λ_s , λ_w . Both β_s and β_w are vectors of 17 parameters.

Table 3 presents the parameter estimates of a restricted model.¹² The parameter estimates of p_2 and p_3 are set to zero, which implies that the unobserved heterogeneity terms of $\theta_s(t|x_{s,t}, v_s)$ and $\theta_w(t|t_s, x_{w,t}, v_w)$ are restricted to be perfectly correlated. The restricted model passes the likelihood ratio (LR) test with 2 degrees of freedom and a critical value equal to 5.99.

As a starting point, the results showed that the exit rate from is higher in a timing-of-events model relative to a model where the imposition of a sanction is treated as an exogenous event, this indicates that, indeed, selectivity in the imposition of sanctions cannot be ignored.

The unobserved heterogeneity components of the model, presented in table 3, can be interpreted in the following way: There are two groups of welfare recipients. The group which represents 10.7 percent finds a job rather quickly and faces a higher sanction rate, because $v_w^b > v_w^a$ and $v_s^b > v_s^a$. The opposite is true for the second group which represents 89.3 percent.

The main parameter of interest is δ which represents the effect of a sanction on the exit rate from welfare to work. The estimated value of δ is 0.424 and is significantly different from 0 with a t -value of 16.575. Thus imposition of a sanction increases the transition rate from welfare to work with more than 52 percent.

An economic sanction is imposed on a recipient who does not have a valid reason for not demonstrating workplace-availability. When entering an unemployment spell the welfare recipients are required to demonstrate workplace-availability while they are unemployed. In doing so they should participate in active labour market programs. The aim of participating, seen from the authority's point of view, is to insure the workplace-availability, increase the qualifications, insure a certain level of search intensity and thereby increase the probability of getting a job. Thus, recipients who do not par-

12. Imposing restriction on the unobserved term is a common procedure implied in order to obtain identification (Svarer 2007).

ticipate either believe that participating does not increase their qualifications and thereby their probability of obtaining employment, or they believe that it is just a matter of time before employment is obtained hence entering an active labour market program is less meaningful. In this sense, the current study does not empirically identify the effect of forcing the welfare recipients to participate in active labour market programs, but rather measures the effect of economic incentive on the exit rate, caused by the reduction in the welfare level.

The intuition of the positive effect of punitive sanctions in the current study on the exit rate can thus be seen as a result caused by the economic motivation to gain employment. Relating this empirical result to the theoretical result, the theory in section xx argues that this economic motivation may be formulated as an outcome of reduction in the present utility of a welfare recipient. Hence, in order to increase the utility the recipient, according to the theory, reduces her reservation wage and increases her search intensity, which in turn increases the exit rate from welfare to work.

In relation to the length of an unemployment spell the rest of the parameter estimates in table 3 draw the following picture. Recipients who are older and recipients who have accumulated more time on public support experience a lower exit rate and hence a longer unemployment spell. Recipients who are immigrants from developed countries have a higher exit rate compared to native Danes, and recipients who are categorized as match category 2, 3 or as temporary match have a lower exit rate than recipients categorized as match 1. Furthermore, a parameter estimate equal to 0.009 of the variable »Deviation from average income in 2006« indicates that a one percent higher income level relative to the average income level in 2006 increases the exit rate from welfare to work by approximately one percent. Finally the exit rate seems to be higher in Region South Denmark, whereas it seems to be lower in Region North Jutland compared to the Capital Region.

Along with the process of the exit rate the process of sanction rate is also simultaneously estimated and the estimates in table 3 show that older recipients, non-Dane recipients and recipients who are married have a lower probability of receiving a sanction. This shows that recipients who are older know the welfare system better and have less negative search behaviour and so avoid a sanction. Furthermore, the estimation results in table 3 also indicate that recipients who live in other regions than the Capital Region or male recipients have a higher probability of receiving a sanction than their counterparts. Whereas recipients who are categorized as temporary match have a lower probability of receiving a sanction.

8. Sensitivity analysis

Until now, the effect of a sanction has been seen as an average effect. In the following I will give a more differentiated picture.

Table 3. Estimation results.

	Exit rate		Sanction rate	
	Estimate	Standard error	Estimate	Standard error
<i>Effect of a sanction</i>	0.424	16,575		
<i>Baseline hazard</i>				
0-12 weeks	-2,768	-76,196	-4,404	-68,603
12+ weeks	-3,213	-77,967	-5,104	-73,165
<i>Individual characteristics</i>				
Ages 30-39	0.073	2,871	-0.162	-3,619
Ages 40-49	0.026	0,968	-0.256	-5,418
Ages 50+	-0.112	-3,549	-0.687	-11,304
Immigrants from developed countries	0.147	4,707	-0.137	-2,136
Immigrants from less developed countries	-0.002	-0.124	-0.243	-6,320
Male	0.177	12,004	0.537	18,252
Married	0.190	11,732	-0.263	-8,396
Children (under 18 years of age)	0.005	0.276	0.044	1,455
<i>Labour market association</i>				
Fraction of preceding year	-0.809	-41,129	-0.520	-13,009
Fraction of preceding year public support	0.009	6,488	-0.027	-10,255
Deviation from average income in 2006	-0.281	-13,436	0.078	1,885
Match group 2	-0.567	-25,145	0.089	2,118
Match group 3	-0.334	-18,209	-0.400	-10,277
Temporary match	-0.809	-41,129	-0.520	-13,009
<i>Geographical association</i>				
Region Zealand	0.004	0.201	0.304	7,729
South Denmark Region	0.071	3,605	0.406	10,833
Central Denmark Region	-0.039	-1,852	0.346	8,596
North Denmark Region	-0.069	-2,588	0.280	5,430
	Estimate	Standard error		
<i>Unobserved heterogeneity</i>				
v_w^a	-3,059	-4,882		
v_s^a	-0.278	-2,513		
<i>Probability</i>				
p_1	0.892	14,620		
p_4	0.107			

Source: DREAM and MIA, COR, KMD, and CPR-register.

Note: $v_w^b = v_s^b = 0$ are normalized.

Note: A baseline welfare recipient is a 25-30 years of age, native female, Dane who is not married, does not has any children, have not received public support for 12 months, have middle income in year 2006, is a match category 1 welfare recipient and lives in Capital Region when she started her unemployment spell.

Number of spells: 52,023. Log likelihood: -147439.309.

Table 4. Parameter estimates of the effect of a sanction for different specifications of the model.

	Effect of a sanction	Standard error
<i>Different types of sanctions</i>		
Proportional reduction of welfare	0.458	12,253
1/3 reduction of welfare for 3 weeks	0.108	2,459
Sanctions regarding repeated offences	0.082	2,672
Temporary loss of benefits	0.652	14,573
Loss of benefits for a longer period of time	0.982	40,038
<i>Effect of sanctions over time</i>		
0-4 weeks	1,153	24,492
4-8 weeks	1,004	16,709
8-12 weeks	0.754	10,330
12+ weeks	0.050	0.314
<i>Heterogeneous effects</i>		
Ages 30-39	-0.067	-0.921
Ages 40-49	-0.121	-1,920
Ages 50+	-0.195	-2,007
Immigrants from developed countries	-0.179	-2,119
Immigrants from less developed countries	-0.348	-6,339
Male	-0.003	-0.050
Married	-0.161	-3,632
Children (under 18 years of age)	-0.079	-3,300
Fraction of preceding year	0.077	1,097
Fraction of preceding year public support	-0.046	-6,389
Deviation from average income in 2006	-0.010	-0.293
Match group 2	0.016	0.341
Match group 3	0.037	0.608
Temporary match	0.077	1,097
Region Zealand	-0.191	-3,352
South Denmark Region	-0.057	-1,068
Central Denmark Region	0.140	1,993
North Denmark Region	-0.135	-0.896
<i>Estimates from a competing risk model</i>		
Exit work	0.746	29,334
Exit other	0.926	-10,267

Source: DREAM and MIA, COR, KMD, and CPR-register.

Note: Only parameter estimates of effect of sanctions are reported in table. The parameter estimates of the explanatory variables from the different models are not reported. Heterogeneous effects are estimates from different models where I have interacted all the explanatory variables with the sanction dummy.

8.1 Effects of different types of sanctions

The estimation result in table 3 does not take into account that the amount of welfare benefit reduction differs according to different types of sanctions. Thus, in order to perform a sensitivity analysis with regard to the effect of different types of sanctions on the exit rate, I introduce a multivariate dummy variable. Table 4 shows the results.

First of all, the LR test rejects the null hypothesis that different types of sanctions do not affect the exit rate differently. Under the null the LR test is a chi-square distributed with four degrees of freedom. And, as it can be seen in table 4 all different types of punitive sanctions have significant and positive effects on the exit rate.

For instance, when the authority imposes a sanction and the welfare of a recipient is proportionally reduced the exit rate of this recipient increases with more than 58% ($\exp(0.458) - \exp(0) = 0.584$). The two sanctions 1/3 reduction of welfare for 3 weeks and sanctions regarding repeated offences increase the exit rate by respectively 11 and 9%. Whereas, 'temporary loss of benefits' and 'loss of benefits for a longer period of time' have the most pronounced effect increasing the exit rate with more than 167%.

8.2 Effect of a sanction over time

The estimation technique utilized in this study in order to explore the detailed (time varying) effect of a sanction during an unemployment spell has been the following. First, unemployment spells when a sanction has been imposed were transformed into sub-spells. Using the data set with these constructed sub-intervals the time varying effect of a sanction is evaluated. In particular, spells for which a sanction has been imposed are not integrated from start to end of an unemployment spell, but from start to end of the constructed sub-intervals in the likelihood function. The effect of a sanction over time using this technique is shown in table 4.¹³

The overall LR test rejects the null hypothesis that the effect of a sanction is constant over time. Furthermore, the time varying parameter estimates illustrate that the imposition of a sanction increases the exit rate with more than 217% in the period of the first four weeks. This positive effect decreases over time and vanishes after 12 weeks. In other words, the result of this estimation signifies that empirical evidence of a direct effect causing a temporary benefit reduction does indeed exist. On the other hand, the estimation does not give the same impression regarding the permanent effect, caused by (potentially) increased monitoring.

8.3 Heterogeneous effects

In order to investigate, whether some welfare recipients are less responsive to sanctions than others, I interact the sanction dummy from table 3 with the other explanatory variables in the exit hazard.

13. Models with different number of intervals were estimated. The final model is chosen using LR-test.

The results are shown in table 4, where only the interaction terms are reported. Due to fact that the TOE model is a non-linear model, in the following, only the signs and not the magnitudes of the estimation results will be interpreted. In order to evaluate the significance of the interaction terms the standard errors obtained by the delta-method.

The results in table 4 show that recipients who are older, recipients who are non-native Danes, recipients who are married, recipients who have children and recipients with a higher income level have a weaker response to sanctions than their counterparts. In addition to these results table 4 also shows that recipients who live in Region Mid Jutland response positively to sanctions whereas an imposition of a sanction for recipients in Region Zealand have a negative effect in comparison with recipients in Capital Region (baseline region).

All in all, the heterogeneous effects suggest that effect of sanctions indeed differs across the population. One interesting result is that welfare recipients with a background from less developed counties who are traditionally categorized as hard to get back in employment, are less affected by the punitive sanctions than native Danes. One way of explaining this result could be that these welfare recipients simply do not have the qualifications necessary to find employment and hence sanctioning these individuals have less incentive effect compared with their counter parts.

8.4 A model with competing risks

Notice that other destinations than work have until now been right censored in the analysis. Widening this assumption in the current analysis means that information on the subject of different destination states is utilized.

Applying a competing risks model to data the estimated effect of a sanction is depicted in table 4. The exit rate to work increases whereas the exit rate to other destinations decreases. In other words, introduction of information regarding other destinations than work does not undermine the result that the imposition of a sanction in general increases the probability of entering a period of employment. As a matter of fact, the exit rate to work is higher if a model with competing risks is applied. The parameter estimate of affect of a sanction on the exit rate increases from 0.424 (table 3) to 0.746 (table 4).

9. Concluding remarks

The Danish labour market experienced a very low level of unemployment prior to the recent financial crisis. Apart from the fact, that Denmark was on the positive side of a business cycle, commentators attributed the successful outcome to the design of the Danish labour market.

Punitive sanctions in terms of welfare reduction are imposed against welfare recipients who do not accept reasonable job offers, or participate in vocational training, or other programs designed to improve their employment prospects. The logic behind punitive sanctions is that the Danish authorities offer various active labour market programs as one of the eligibility criteria for receiving welfare benefits, as the authorities believe that entering these programs will improve employment prospects of the welfare recipients. Hence, not entering an active labour market program is seen as a violation of eligibility criteria and a punitive sanction is imposed. To be clear the purpose of this paper has not been to identify the effect of active labour market programs that the welfare recipient has been forced to enter by economic sanctions. The purpose has rather been to identify the direct effect of welfare reduction for recipients who do not comply with eligibility criteria on entering an active labour market program.

Applying a mixed proportional hazard timing-of-events model in the confines of a search model, punitive sanctions are in the current study found to have a positive effect on the transition rate from welfare to work. Furthermore, the empirical analysis of this paper also reveals that the magnitude of this positive effect depends on the type of sanction. This effect attenuates over time and is heterogeneous across the sample, and finally, that the existence of alternate »escape routes« from the welfare system, other than employment, does not undermine the positive effect of a sanction on the transition from welfare to work. In other words the result of the current study establishes that welfare recipients are in fact sensitive to financial punishments.

Finally, it is also natural to believe that the labour market, and hence the exit rate from welfare to work, is affected by labour market regime shifts and variation of business cycles as in general. In the period of the current study (2007-2008) the economic conditions in Denmark were very positive and no considerable regime shifts took place. That is why no statistically significant calendar time effects were found in the process of the above empirical analysis. The fact that demand for labour was quite high and many industries needed labour could affect the results of this study. In future research, it could be interesting to test whether the results are business cycle sensitive.

Literature

- Abbring, J. H. and G. J. Van-Den-Berg. 2000. The non-parametric identification of the mixed proportional hazards competing risks model, *Tinbergen Institute Discussion Paper* (TI-2000-066/3).
- Abbring, J. and G. van den Berg. 2003a. The Non-Parametric Identification of Treatment Effects in Duration Models. *Econometrica*, 71, 1491-1517.
- Abbring, J. and G. van den Berg. 2003b. A Simple Procedure for the Evaluation of Treatment Effects on Duration Variables, *IFAU Working Paper*, 2003:19.
- Ai, C. and E. C. Norton. 2003. Interaction terms in logit and probit models, *Economics Letters* 80 (1), 123-29.
- Aktivlov. Fleksydelseslov. Januar 2008. Jurainformations lovhæfter, Forlaget Jura Information.
- Arbejdsdirektoratet. 2007. Rådighedsstatistik-

- ken I. halvår 2006, Arbejdsdirektoratet.
- Andersen, T. M. and M. Svarer. 2005. *Flexicurity*, Afdeling for Nationaløkonomi, Institut for Økonomi, Aarhus Universitet, CAM, CEPR, CESifo and IZA.
- Baker, M. and A. Melino. 2000. Duration dependence and nonparametric heterogeneity: A Monte Carlo study, *Journal of econometrics* 96(2), 357-93.
- Beskæftigelsesministeriet. 2005. *Flexicurity, Grafisk production*: Kallow Graphic A/S.
- Beskæftigelsesministeriet. 2006. *Kulegravning af Kontanthjælpsområdet*, Schultz Grafisk.
- Cahuc, P. and A. Zylberberg. 2004. *Labour Economics*.
- Due, Jesper, J. S. Madsen and C. Jensen, S. Carsten. 1997. *Den Danske Model*, Jurist- og Økonomforbundets Forlag.
- Gaure, S., K. Roed and T. Zhang. 2007. Time and causality: A Monte Carlo assessment of the timing-of-events approach, *Journal of econometrics* 141(2), 1159-1195.
- Heckman, J. and B. Singer. 1984. A method for minimizing the impact of distributional assumptions in econometric models for duration data, *Econometrica* 52(2), pp. 271-320.
- Jørgensen, T. Mølsted and Pedersen, C. Damtoft. 2000. *Arbejdsmarkedspolitik*, Handelshøjskolens Forlag.
- Lancaster, T. 1979. Econometric methods for the duration of unemployment, *Econometrica* 47(4), pp. 939-956.
- Lov om aktiv socialpolitik jf. lovbekendtgørelse nr. 1460 af 12. december 2007.
- Madsen, P. K. 2006. Flexicurity – Hvordan kan fleksibilitet og sikkerhed forenes? *Søkelys på arbejdsmarkedet*, årgang 23, Institut for samfunnsforskning.
- Mortensen, Dale T. 1977. Unemployment Insurance and Job Search Decisions. *Industrial and Labour Relations Review*, Vol.30, No. 4 (Jul.1977), 505-17.
- Mortensen, D. T. 1986. Job search and labour market analysis, (O. Ashenfelter and R. Layard, eds.), *Handbook of Labour Economics*, pp. 849-920, Amsterdam: North-Holland.
- Pedersen, J. H. and A. H. Red. 2007. *Arbejdsløsheds Forsikringsloven 1907-2007*, Udvikling og perspektiver, Arbejdsdirektoratet og forfatterne.
- Rosdahl, A. and K. N. Petersen. 2006. *Modtagere af kontanthjælp*, Socialforskningsinstituttet (06:30).
- Svarer, M. 2007. The effect of sanctions on the job finding rate: Evidence from Denmark, Århus Universitet, *Economics Working Paper* (2007-10).
- Van-Den-Berg, G. J. 2001. Duration Models: Specification, Identification, and Multiple Durations, Vol. 5 of *Handbook of Econometrics*, Elsevier, chapter 55, pp. 3381-3460.
- Van-Den-Berg, G. J. 2005. Competing risks models, *IFAU Working Paper* (2005:25).
- Van-Den-Berg, G. J. and K. Richardson. 2008. Duration dependence versus unobserved heterogeneity in treatment effects: Swedish labour market training and the transition rate to employment, *IFAU Working Paper* (2008:7).
- Van-Den-Berg, G. J., B. Van-Den-Klaauw and J. C. Van-Ours. 2004. Punitive sanctions and the transition rate from welfare to work, *Journal of labour economics* 22(1), 211-41.
- Varian, Hal R. 1999. *Intermediate Microeconomics, A Modern Approach*, Fifth Edition, W. W. Norton and Company.
- Yu, X. 2006. Competing risks analysis of japan.s small .nancial institutions., *IMES Discussion Paper* (2006-E-7).
- Wooldridge, J. 2002. *Econometric Analysis of Cross Section and Panel Data*, MIT Press.