SCHOOL OF ECONOMICS AND MANAGEMENT

ECONOMICS WORKING PAPER 2007-18

Unemployment, Employment and Inactivity in Denmark: An Analysis of Event History Data

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October 6, 2008

Abstract

In this paper I estimate a discrete time hazard model for the exits from the different labour market states - unemployment, employment and inactivity (or OLF) - in the Danish labour market.

I find that women and individuals over fifty are more likely to experience long-term unemployment and inactivity. The less educated and unskilled workers are found to be another risk group to face the marginalisation from the labour market. Being previously employed reduces the risk of OLF, and increases the re-entry to employment probability, while long-term unemployment or inactivity makes workers more likely to return to these labour market states in the future. Living in the biggest Danish cities, where job competition is high, makes individuals disadvantaged, but has a positive effect on labour market performance of persons over fifty.

And finally, I find that those, who stayed in a job for one year, tend to remain employed, while persons inactive for longer than one year face much higher risk of marginalisation.

Keywords: Discrete time hazard model, Labour market transitions, Marginalisation.
JEL-code: C41, J64

1. Introduction

This paper examines the flows between the three labour market states - unemployment (U), employment (E) and inactivity (OLF) - in Denmark in the period 1994-2003, and distinguishes the factors having an impact on the transitions above. The goal of the analysis is twofold: firstly, I capture the phenomenon of repeated unemployment by observing the exits from work to unemployment of previously unemployed individuals, and secondly, I tackle the issue of marginalisation in the labour market[1] by examining the risks of leaving a job or unemployment for OLF, and of remaining inactive.

Unemployment was high in Denmark during the 1980s and 90s, but since 1994 it decreased significantly partly as a result of the Danish 'Flexicurity'model (see e.g. Andersen & Svarer (2006))[2]. At the same time, the reform in youth labour market policies (see Jensen et al. (2003)) resulted in a decline in the youth unemployment rate[3].

A register based sample of the labour market spells of 20-59 years old individuals in a representative 1 per cent sample of the 16-70 year old Danish population in 1994 - 2003 (see Appendix tables A.1.1. - A.1.3.) leads to the result that 42.3% of employment spells of the persons, who in the previous spell were unemployed, end in new unemployment, while those in the previous spell inactive tend to return back into inactivity (47.3% of the spells). Thus, the 'Flexicurity' model besides the strenghts also may have some weaknesses: flexible firing rules and high minimum wages (implied by the generous income transfer schemes) can lead some workers (e.g. least skilled, least educated ones) to become disadvantaged in the labour market[4].

A number of studies are focused on the transitions between labour market states. For example, Marston (1976) covers three labour market states - employment, unemployment and

[1] Marginalisation means high individual rates of inactivity among persons of working age, who are not in education.

[2] 'Flexicurity' model consists of three elements: 1) flexible hiring and firing rules (flex-element), 2) fairly generous unemployment insurance system (security-element), and 3) Active Labour Market Policies (ALMPs), which are a fairly strict set of rules and regulations regarding availability for work, job search and participation in different programs.

[3] The unemployment rate is defined as the proportion of the labour force (i.e. employed plus unemployed persons), which is unemployed, and this definition does not cover the individuals outside the labour force.

[4] By saying "disadvantaged in the labour market" I mean that the individuals, previously long term unemployed and/or inactive, may have shorter job spells and higher risks of repeated unemployment and inactivity compared to the other workers.

inactivity - in the US labour market, Meghir & Whitehouse (1997) model the transitions in and out of work for men over the age of 40 in the UK, Nilsen et al. (2000) examine transitions from employment among young Norwegians, while Djurdjevic (2003) tackles the question of re-entry to unemployment by studying the exits from different employment states and inactivity in Switzerland.

Rosholm (2001(2)) applies a three-state competing risks model to analyse marginalisation in the Danish labour market in 1981-1990, when the unemployment rate was mostly high. He covers the flows from unemployment, employment and inactivity of three age groups of Danish youth, and finds the high youth unemployment rate to be mainly caused by high transition rates into unemployment and inactivity, rather than low transition rates into employment.

The present study contributes to the research above by tackling the issue of marginalisation in the Danish labour market further, i.e. by taking into analysis 20-59 years old persons and employing a richer set of explanatory variables representing personal and geographical characteristics of the individuals, and their labour market history. Moreover, I choose the observation period from January 1, 1994 to December 31, 2003 - the time when different (i.e. much strickter) labour market policies applies in Denmark (see Section 3).

I use a longitudinal register-based data set and estimate a discrete time hazard model for the exit from the different labour market states: unemployment, employment and out of the labour force. The model was introduced by Jenkins (1995) and further developed by Lauer (2003) when she analysed the link between education and risk of becoming unemployed in a French-German comparison. The idea to use this modelling framework in the analysis of re-unemployment was implemented by Djurdjevic (2003) when she analysed the effect of unemployment on the subsequent employment history in Switzerland. Modelling the exit rate from unemployment, employment and inactivity leads to analyse how the transitions out of the states depend on duration. It also leads to analyse, which individuals are more likely to withdraw from the labour market after unemployment.

An important issue of the analysis is the experience of women, since they are considered to be a higher risk group. Lauzadyte & Rosholm (2008) found that the unemployment duration is 1.5 - 2 times longer for women than for men. Another question of interest is the impact on labour market experience of the individuals age. On the one hand, there is a demand side

related danger for elderly workers to be disadvantaged in the labour market, on the other hand there can be a supply side related lack of motivation for those who are close to early retirement. Young individuals, however, also face a higher risk to drop out of the labour force (to complete education or because of personal reasons). It is also important that another - much stricter - labour market policy is applicable to the youth (see Jensen et al. (2003)), while for those over 59 some special rules (in this case - much milder) are valid. Therefore, I exclude from the analysis persons younger than 20 and older than 59, and focus on the transitions from unemployment, employment and OLF based on gender and age.

Estimation results show that women and elderly individuals face a higher risk to get outside the labour market and experience higher survival in both unemployment and inactivity. I also find non-skilled and low-educated persons, and residents of the biggest Danish cities (except the individuals over fifty), to be disadvantaged in the labour market. Being previously employed reduces the risk of OLF and increases the re-entry to employment probability, while long-term unemployment or inactivity make workers more likely to get back into these labour market states in the future.

Another important finding is a break in the transition rates from employment and inactivity after 12 months spent there: those who survived in a job one year tend to remain employed, while persons, longer than year inactive, face a much higher risk of marginalisation from the labour market.

The structure of the paper is the following. Section 2 gives a brief literature review. Section 3 presents the institutional settings while Section 4 describes and presents the data set used in the study. The modelling framework is explained in Section 5. Section 6 presents and discusses estimation results, and graphs the transitions from the labour market states, based on gender and age, while Section 7 provides the concluding remarks.

2. A Brief Literature Review

While most of the existing research is focused on unemployment, a number of studies examine the other labour market states - employment and inactivity - as well. As a pioneering contribution here I mention Marston (1976), who covers the three labour market states - employment,

unemployment and inactivity - in the US labour market.

A number of studies on British data have also been carried out. For example, Meghir & Whitehouse (1997) model the transitions in and out of work for men over the age of 40 since 1968, and find an increase in earnings to delay job exit, while an increase in social security benefits is found to delay return to work.

Bradley et al. (2003) run a competing risks model on British Household Panel Survey data of 1992–1997. They identify five states - high skilled employment, intermediate skilled employment, low skilled employment, unemployment and OLF - and discover the low skilled workers to be disadvantaged in the British labour market.

Cappellari & Jenkins (2004) examine the flows between unemployment, low-paid employment and high-paid employment for British men in 1991–2000, and find the low-paid men to be more likely to become unemployed than the high-paid ones (transitions from unemployment to low pay found to be associated with low qualifications).

The goal of the study by Jones et al. (2005) is to evaluate the performance of the National Minimum Wage (MNW) introduced in Britain in 1999, i.e. to find out weather this policy measure serves as a stepping stone to higher wages or traps workers in a low wage – no wage cycle. The paper models transitions between different labour market states – payment at or below the NMW, above the NMW, unemployment and inactivity in 1999-2003 - using the multinomial logit approach and find is that for many workers payment at or below the NMW is of relatively short duration, and a substantial number of them move into higher paid jobs.

Djurdjevic (2003) estimates a competing risks model to analyse the exits from the different labour market states - unemployment, employment, characterized by either earning losses, gains or relatively stable earnings, and OLF - in Switzerland (and finds female, foreign and less skilled workers to experience employment instability), while Nilsen et al. (2000) - examine the transitions from employment among young Norwegians (the individuals with high education, experience, and income are found to have significantly lower probabilities of job exits).

Bicakova (2005) focuses on the differences in earnings and labour force status of low-skilled men in France, the UK and the US at the end of the 20th century. She discovers a sizable and significant effect of the wage on the risk of unemployment and inactivity in the UK and the US, but none in France. The low-skilled in France are found to face a relatively similar

risk of unemployment, irrespective of their earning capacity, while in the UK and the US, unemployment is found to be concentrated among the low-skilled at the very bottom of the wage distribution.

There are several notable Danish contributions within this topic as well. Rosholm (2001(2)) applies a three-state dependent competing risks model to analyse marginalisation in the Danish labour market in 1981-1990, when the unemployment rate was mostly high. He covers the flows from unemployment, employment and inactivity of the three age groups of Danish youth, and finds the high youth unemployment rate of that period to be caused mainly by high transition rates into unemployment and inactivity, rather than low transition rates into employment.

Blume et al. (2007) perform a competing risks analysis of the immigrant-native difference in transition patterns across labour market states based on the Danish register data. They distinguish between three labour market states - wage-employment, self-employment and non-employment (incl. unemployment and OLF) - and find that a high proportion of immigrants from non-western countries tend to be marginalised from the labour market relative to natives, and tend to use self-employment to escape marginalisation.

The majority of the papers, however, cover the exits from unemployment, and here among others I want to mention van den Berg & van Ours (1999) and van den Berg et al. (2003) for France, Böheim & Taylor (2000) for Britain, Addison & Portugal (2003) for Portugal. A notable Danish contribution is Rosholm (2001(1)), who studies the variance of individual unemployment durations over the business cycle in Denmark.

Most of the studies, focused on the labour market transitions, adopt a competing risks model formulation with different possible destination states (since the factors, that influence the flows to different destination states, may differ) and use a multinomial logit approach (see among others Nilsen et al. (2000), Lauer (2003), Djurdjevic (2003), Jones et al. (2005)).

3. Institutional Settings

The 'Flexicurity' model – a combination of flexible hiring and firing rules (flexibility for employers), generous benefits for the unemployed (security for employees) and an active labour market policies, which are a fairly strict set of rules and regulations regarding availability for

work – is the core of Danish Labour Market Policy. This section gives a short introduction to the policies applicable to unemployed individuals in Denmark. Additionally, I briefly introduce the system of retirement and child-related policies, since these may impact the behaviour of older individuals and persons having small children, respectively.

3.1. Unemployment Benefits

The unemployment insurance system in Denmark is based on voluntary unemployment insurance (UI) funds membership, which is open to persons with relevant qualifications for the specific UI-fund, or via regular work within its area. To be entitled to the UI benefit, an individual must have been employed for at least 52 weeks during the last 3 years and must be a member of UI fund. The UI benefit cannot exceed 90 % of the last year wage or a given maximum (currently about 22.300 euros annually, taxable income), which is indexed based on the general wage developments. Thus, the replacement rate is highly dependent on previous income, and the 90% compensation in practice is only applicable to the individuals with low wages.

When unemployment insurance benefits expire, a person is eligible for the social assistance, which is also applicable to the unemployed individuals, who are not members of any UI fund. The social assistance scheme depends on age and marital status of a person, and there are also various means tested supplements. An individual who received the maximum UI benefit would typically have an income reduction of about 20 – 40%.

The maximum duration of the UI benefits currently (since January 1, 2001) is 4 years, and the entitlement to the benefits can only be regained by regular work for at least 6 months within the last 36 months. In contrast to unemployment insurance benefits, the social assistance can be received for an unlimited period. The municipalities are responsible for the administration of social assistance and for the organisation of the different measures helping the social assistance recipients to become self-supporting.

3.2. Labour Market Policies since 1994

A reform on Danish labour Market Policies was carried out in 1994, changing the system from essentially passive income support to a more active approach intended on bringing the unem-

ployed individuals back to job. Shortening of UI benefit period, abolishing the possibility to regain eligibility to UI benefits by participation in an ALMP[5] and implementation of activation requirements for both UI and social assistance benefits recipients were the main elements of the reform.

The current active labour market policy is based on the so-called 'right and duty' principle, which is applicable to both UI and social assistance benefits recipients[6]. The principle is associated with the right of unemployed person to receive the compensation for the loss of income and assistance in the form of an ALMP-offer, but also with the duty to participate in ALMPs and other activities when offered to retain eligibility to the UI or social assistance benefits.

The length of the period of the UI benefits receipt has been reduced significantly since 1994. In 1994, the maximum UI benefit duration was 7 years, including a 4 year 'passive' period and subsequently a 3 year 'active' period. This duration has gradually been reduced such that currently the maximum UI benefit period since 2001 is 4 years. After 4 years of UI benefit receipt, an individual must have at least 26 weeks of full time employment in order to renew benefit eligibility.

Under current rules the passive period lasts 9 months and every unemployed individual, older than 30, who is unemployed for more than 9 months, is required to participate in active labour market programmes. If a person is still unemployed after 26 weeks since programme completion, he is required to participate in another ALMP. Programmes can be offered during the passive period and the unemployed individual has the obligations to accept the offers and to be available for both non-subsidized and subsidized work. However, only a fairly low fraction of the unemployed participate in programmes during the 'passive' period.

3.3. Youth Unemployment Programme

In 1996 another reform was implemented, i.e. the Youth Unemployment Programme was introduced, which was directed to unemployed low educated youth. The goal of the Programme

[5] The system before the reforms actually implied an infinite UI benefit period since despite a formal duration of 7 years, a new benefit period could be gained by participating in job-training.

[6] Initially the 'right and duty' principle was applicable only to UI benefits recipients, but in 1998 it was extended to cover the social assistance recipients as well.

was twofold, firstly, to shorten unemployment duration, and secondly, to foster the economic incentives to undertake education. Mandatory activation of uneducated[7] people below 25 after 6 months spent unemployed was introduced by the Programme. The activation could be an education programme of at least 18 months duration, while the social assistance was lowered to the level of study grant[8].

The Programme was gradually extended to include all young individuals below 30[9]. Currently the social assistance benefit recipients younger than 30 years have to receive an ALMP-offer not later than 3 months after the first day on benefits. If they do not find a job after the end of an ALMP, they have to participate in a new ALMP after 3 months since the end of the previous programme, i.e. they are subject to a more or less continuous treatment in programmes while on benefits.

3.4. Policies for Elderly Workers and Retirement

In Denmark, the official normal retirement age has been reduced from 67 to 65 years, and currently 65 year old individuals are entitled to a full rate old-age pension. However, the average actual age of retirement is around 61-62 years and the reason of this is partly the voluntary early retirement benefit programme introduced in 1979, which enables a large part of the labour force to leave the labour market with an income corresponding roughly to unemployment benefit. The scheme was intended to be an alternative to early retirement for individuals worn down by hard and repetitive physical labour, but instead relatively soon became an important part of the pension system.

The age for the early retirement is 60 years, i.e. the residents of Denmark older than 60 are able to retire from a working life before they reach the age of 65. To be able to apply for early retirement benefit they must have an UI fund membership of at least 25 years. Additionally, individuals over 57 years of age are the group subject to the 'passive' labour market policies.

[7] I.e. without any formal education beyond secondary school.
[8] This should create an incentive to undertake ordinary education on public study grants or to find a job.
[9] Those over 24, however, do not face a lower benefit.

3.5. Maternity Leave and Child Allowance

Women with permanent residence in Denmark are entitled to 4 weeks of maternity leave before child birth with a benefit corresponding to the full salary. After the birth the mother has 14 weeks of maternity leave, while the father is entitled to 2 weeks of paternal leave with the full benefit during the same period.

When the child is 14 weeks old, the parents are entitled to 32 weeks leave with full benefit to be divided freely between them, which they may choose to spend the leave together or in continuation of each other. The father may begin 32 weeks of leave alongside (or instead of) the mother's 14 weeks.

The parents are allowed to prolong their parental leave for up to maximum of 46 weeks from the time when the child is 14 weeks old. But they are still entitled to 32 weeks of leave with the full benefit, i.e. during the 46 weeks they are paid an amount corresponding to 32 weeks of full benefit. The benefit is paid by the municipality or by the employer, who is then reimbursed by the municipality.

Additionally, all families liable to pay tax in Denmark receive an allowance for each child below 18. The allowances are independent of the income of the parents and are not taxable. Since 2008 the annual allowance amounts to 16 156 DKK for 0-2 years old children, 12 792 DKK for those between 3-6 and 10 064 DKK for those 7-17 years old.

3.6. Childcare Facilities

There are several childcare alternatives for 0-6-year-old children in Denmark, collectively known as childcare facilities. Most childcare facilities are institutions, but the facilities for childcare in private homes, especially for children under 3 years are also available. The local authorities decide which types of childcare they wish to offer the 0-6-year-olds. They are also responsible for establishing, running and supervising the childcare facilities, and may establish them of their own or let private contractors handle it.

Municipal childminder arrangements (i.e. the children are cared for in the childminder's home together with up to 4 other children) and nurseries[10] are used for children aged from

[10] An institution, where the children are grouped in rooms to which a number of adults are connected, with on average 3 children per childcare employee.

6 months to 2-3 years, while the kindergarten is the most common type of childcare for 3-6-year-olds. The kindergartens vary in size, but on average there are 6 children per kindergarten teacher.

The parents are also allowed to choose a private childcare instead of using a municipal childcare facility. A private childcare arrangement may have certain advantages, e.g. if the parents work outside the opening hours of the childcare facilities. Rules and subsidy schemes concerning private childcare, however, differ among the local authorities.

4. Description of the Data Set

I use the longitudinal register-based data set consisting of event histories for persons belonging to a representative 1 per cent sample of the 16-70 year aged Danish population. The sample is rotating, i.e. it is updated such a way that it is representative in each of the years. The event histories are based on monthly individual unemployment information and on the mandatory pension contributions, made by the employers, and cover the period from January 1, 1985 to December 31, 2003. In the present study I cover the period from January 1, 1994 to December 31, 2003 because better quality data are available after the reform of Danish Active Labour Market Policies introduced in 1994.

The data is presented in a person-month format and we can distinguish four states occupied by the individual - employment (E), unemployment (U), recall (or temporary) unemployment (T) and inactivity (or out of the labour force (OLF)). According to UN's International Labour Office (ILO) definition a person is categorised as unemployed if he is out of work, available to work and actively searching for a job[11]. The unemployment is defined as recall unemployment when the unemployed worker returns to the former employer during the first three months after becoming unemployed. In this paper I only analyse the unemployment spells that do not end with recall. Recall unemployment and unemployment, shorter than 1 month, is merged with the employment spells. Employed persons are either employees, self-employed or assisting spouses[12],

[11] All UI benefits recipients are classified as unemployed. A fraction of the social assistance recipients (those who are available to work or "employable") are classified as unemployed, while another fraction (whose "unemployable") belong to OLF category.

[12] According to Denmark's Statistics classification a person is classified as "assisting spouse" if his/her income from assisting spouse is higher than salary.

while OLF is the remaining category and includes retirement, maternity leave, education, being a housewife and other non-specified states out of the labour force.

Thus, there are three mutually excluding states: Employment (E), Unemployment (U) and Out of the labour force (OLF), and the following transitions are examined: U-E, U-OLF, E-U, E-OLF, OLF-E and OLF-U.

I exclude from the analysis individuals younger than 20 and older than 59 and create three age groups - for the persons older than 19 and younger than 30, for the 30-49 years old and for those older than 50 - and allocate them to the groups based on their age at the beginning of the unemployment, employment or inactivity spell.

In the analysis I use a flow sample. For each spell I observe the starting and ending dates, the state occupied and the destination state. To handle the issue of left-censored spells (see e.g. Lancaster (1990) and Steiner (2001)) there is an alternative, namely to use the stock sample, however in this case the model would become very complex, and a number of parameters to be estimated should be reduced. Moreover, this would require a fairly strong stationarity assumption (i.e. the process should be assumed to be constant).

Using the flow sample implies conditioning on persons flowing into the state. I exclude from the analysis the spells, which were in progress at the beginning of the analysis period, i.e. the individuals who had their unemployment, employment or OLF spell in progress on January 1, 1994 and who never moved out of their labour market state during the period of observation are excluded. Thus, the sample used in this analysis is not a random sample of the population.

The older workers could be expected to be affected mostly by selectivity. On the one hand they may enjoy from suitable job and better employment protection, so it could be the case that the older workers included into the sample are a selective group of those with troubles in the labour market. On the other hand, however, the older workers maybe disadvantaged in some situations (like in the case where new working technologies are implemented, requiring new knowledge and/or skills obtained by younger individuals).

Table 1: Comparison of individuals included and excluded from the sample, by age

Age, %	**Unemployment**		**Employment**		**OLF**	
	Included*	Excluded**	Included*	Excluded**	Included*	Excluded**
20-29	35.6	20.4	43.6	25.3	48.1	40.7
30-49	49.8	56.4	45.7	60.8	40.0	44.4
50-59	14.6	23.2	10.7	13.9	11.9	14.9

* Category "included" covers the individuals having U, E or OLF as their first spell.

** Category "excluded" covers the individuals who had their U, E or OLF spell in progress on January 1, 1994 and who never moved out of their labour market state during the period of observation.

The comparison of the workers, included and excluded from the sample[13], by age (see Table 1) shows that 23.2 % of the individuals excluded from the sample as unemployed throughout the observation period belong to 50-59 age group in contrast to 14.6 % of those included into the sample, i.e. the older workers maybe disadvantaged in the labour market once unemployed. In the cases of employment and OLF, the fractions of elderly persons among those included and excluded from the sample, however, are rather similar.

Table 1 also discovers that 60.8 % of the persons excluded as being constantly employed througout the period of observation belong to the middle age group (compared to 45.7 % of the included ones), and this gives some evidence that the middle-aged persons included into the sample may to some kind be a selective group of those with troubles in the labour market. However, even if this is the case, using the flow sample is still meaningful, since the persons disadvantaged in the labour market is of particular interest.

Concerning the 20-29 age group, I find that the fraction of its representatives is lower among the individuals excluded from the sample (either as being employed, unemployed or OLF) compared with the included ones. And this is not surprising since young persons are the most flexible age group in the labour market.

[13] 93 persons excluded as unemployed throughout the observation period, 10890 individuals - as employed, while 916 persons - as staying inactive. Thus, the majority of the excluded individuals are employed. Concerning persons included into the sample, I refer to sub-section 3.1.

4.1. Sample Composition

As Table 2 indicates, the non-censored unemployment spells in the sample last on average 6.5 months, while the average lenghts of the employment and OLF spells are 8.5 and 7 months.

Table 2: Sample composition

	U	**E**	**OLF**
Number of observations	**240985**	**636133**	**249172**
Number of individuals*	**5340**	**7581**	**4954**
Men	2517	3789	2155
Women	2823	3792	2799
Number of spells	**33942**	**44318**	**26271**
Right-censored spells, %	23.7	44.6	29.7
Non right-censored spells ending in			
Unemployment, %	-	56.3	33.8
Employment, %	79.9	-	66.2
OLF, %	20.1	43.7	-
Average lenght of spell (in months)**	**6.5**	**8.5**	**7.0**

* Number of people having unemployment, employment or OLF as their first spell

** Average lenght of non-censored spell

A large share (80%) of the non-right censored unemployment spells end in employment while the rest end in OLF. Once employed, nearly half (45%) of the individuals tend to remain employed, but on the other hand many individuals move back into unemployment (56% of non-right censored and 31% of all employment spells) or drop out of the labour force. The majority of those, who entered into OLF, tend to get back into employment (66% of non-right censored spells). However almost 30% of the spells correspond to the individuals remaining out of the labour market.

Tables A.2. - A 3. in the Appendix cover the sample split up on gender (Table A.2) and age groups (Table A.3.). Looking at gender differences, I find unemployed women to have a higher risk of staying in that position or dropping out of the labour market. One fifth of unemployed men and more than one fourth of unemployed women remain in this state, and only 15% of the non-right censored spells of men, but 25% of women end in the OLF. Once employed, the survival rate here is about 44% for both men and women, but from the transitions out of

employment we discover that men are more likely to become unemployed, while women are more likely to leave the labour force. 70% of men, but only 63% of women transit from OLF back into employment. The average duration of non-censored unemployment and OLF spells for men are 1.3 and 0.7 months shorter than for women, while the duration of the employment spell is half a month longer.

Differences in the transitions among the age groups are bigger. After becoming employed the youngest age group (20-29 years old people) have lower survival probabilities, and face a higher risk to drop out of the labour market (58% of the non-right censored employment spells). But on the other hand survival in unemployment and in OLF is also lowest for this age group. I discover that only 16% of 20-29 years old unemployed persons stay in that state, while for the elderly (50-59 old) this figure comes up to 31%. However, the greatest differences exist in the case of OLF. Less than one fourth of the youths, one third of those in the middle age group and more than half of the elderly tend to remain out of the labour market. And 73% of the non-right censored OLF spells in 20-29 age group end in employment, while for 50-59 age group this number comes up to only 53%.

Duration of employment spell doesn't vary between the 20-29 and 30-49 age groups, but is 2 months longer for the 50-59 years old. The unemployment spells, however, are longer for those older than 50 (by 4 months, compared to the middle aged group and by 3 months, compared to the youngest). The non-censored OLF spells are longest for the youths and shortest for those over fifty. This and the fact of the highest survival rates lead to the finding that once in inactivity, the 50-59 old individuals tend to exit from this state faster than their younger counterparts, but when time spent in OLF increases, they get disadvantaged in the labour market.

4.2. Explanatory Variables

In the analysis I use a number of observable explanatory variables representing personal and geographical characteristics, and labour market history. The three age groups - *AGE20-29*, *AGE30-49* and *AGE50-59* - are dummies, which represent the age of the persons in the data set. *Female*, *Married* and *Immigrant* are the dummies for being women, married and immigrants (incl. both 1^{st} and 2^{nd} generation). *Mch0_2*, *Mch3_6*, *Mch7_17* and *Wch0_2*, *Wch3_6*,

Wch7_17 are the indicators for the age of the youngest child for men and women; the reference category is having no children.

M_Edu11, *M_Edu12*, *M_Edu14*, *M_Edu16*, *M_Edu18* and *W_Edu11*, *W_Edu12*, *W_Edu14*, *W_Edu16*, *W_Edu18* represent the lenght of education completed (for men and women) - 10-11 years, 12 years, 13-14 years, 15-16 years and more than 16 years respectively. The reference here is 9 years or less (primary school education). *Experience* means work experience of an individual until the start of the spell, while *Previous state* is a proxy for labour market attachment, taking the value 1 if the state in the previous spell was employment. To cover the impact of long-term unemployment and inactivity on the future labour market outcomes, I introduce the dummies for being unemployed, employed or inactive longer than six months in the previous spell - *PREM_U6*, *PREM_E6*, *PREM_OLF6* and *PREW_U6*, *PREW_E6*, *PREW_OLF6*, and *PRE5059_U6*, *PRE5059_E6*, *PRE5059_OLF6* - for men, women and 50-59 years old persons respectively.

Indicators *Copenhagen*, *Aarhus*, *Odense* and *Aalborg* indicate place of residence, the reference category being "other place of residence". I also look separately to the effect of place of residence to 50-59 years old individuals: *Copenhagen5059*, *Aarhus5059*, *Odense5059* and *Aalborg5059*.

I include a set of variables showing the UI fund membership: *UI FUND CONSTRUCTION, UI FUND MANUFACTURING, UI FUND TECHNICIANS, UI FUND TRADE, UI FUND CLERICAL, UI FUND ACADEMICS, OTHER UI FUND, and UI FUND SELF-EMPLOYED*. Some of UI funds are based on the industry of occupation, while others are based on the educational achvievements of the members. For example, *UI FUND MANUFACTURING* mainly insures unskilled workers of the manufacturing industry, and *UI FUND ACADEMICS* covers UI funds, which insure academically educated workers.

5. Methodological Framework

In this paper I estimate a discrete time hazard model for the exit from the different labour market states: unemployment, employment and out of the labour force. The idea of the hazard rate models (see, for example, Allison (1982), Lancaster (1990)) is to divide the duration spent

in a state into a number of time intervals and then to look to each interval whether an individual survived or exited the state. Since the data for this study is available in discrete time intervals - months, I choose a discrete time modelling framework.

I distinguish between different possible destination states and adopt a competing risks formulation, since the factors, that influence transitions to different destination states (for example, transitions from unemployment to employment and from unemployment to OLF), may differ, and following the tradition in the latest studies (see among others Nilsen et al. (2000), Lauer (2003), Djurdjevic (2003), Jones et al. (2005)) run a multinomial logit estimation.

To examine whether the modelling specification is appropriate I run a couple of specification tests. Firstly I apply the Wald tests for combining the states to test the hypothesis that some of the labour market states could be combined to make the modelling specification to be binomial rather than multinomial. Due to the extremely long computation time of the estimation with the mass points, specification tests are based on estimations with no modelling of unobserved heterogeneity.

Further, the MNL requires independence of irrelevant alternatives (IIA): the odds ratio for any pair of choices is assumed independent of any third alternative. Elimination of one of the choices should not change the ratios of probabilities for the remaining choices. Choices that are close, in the sense that their utilities are stochastically correlated, violate the IIA assumption. Therefore I run the Small Hsiao test (Small and Hsiao, 1985) to test the validity of IIA assumption The hypotheses again are tested on the specification without unobserved heterogeneit, i.e. I assume that if the alternatives are independent in this specification, then they are also independent in the less restrictive specification, which allows unobserved heterogeneity.

Endogeneity of the past labour market history is another question of interest, that is, the dummy variables for persons being in a particular labour market state for more than 6 months during the previous spell are likely to be endogenous. For example, an individual with a high transition rate from unemployment to job may also experience low transition rate from job to unemployment and OLF due to unobserved reasons, thus he could have a relatively high probability of being employed for a long time during the previous job spell.

Estimating the Multivariate Mixed Proportional Hazard (MMPH) model, i.e. the model,

which allows both for a causal effect and for related unobserved heterogeneity[14] could be the way to deal with the issue of endogeneity (see, e.g. Coleman (1990), Rosholm (2001(2)) and van den Berg (2001)). Taking this issue explicitly into account, however, would make modelling fairly complicated and computationally demanding, thus in this study the past labour market outcomes are assumed to be exogenous.

5.1. Model Description

I use the modelling specification introduced by Jenkins (1995) and further developed by Lauer (2003), when she analysed the link between education and risk to become unemployed in a French-German comparison. The idea to use this model in the analysis of re-unemployment was implemented by Djurdjevic (2003), when she analysed the effect of unemployment on the subsequent employment history in Switzerland.

Let us assume that T_{ij}^s expresses the time spent by individual $i, i \in \{1...N\}$ spent in the $s^{th}, s \in \{1...S_i\}$ spell of state $j, j \in \{1...\Omega\}$ before transition to another state or censoring. T_{ij}^s can be partitioned into a discrete number of intervals, $I_t, t \in \left\{1...T_{ij}^s\right\}$. In case transition or censoring occurs in interval I_t, we have $t = T_{ij}^s$. If a person survives in the state until the end of interval I_t, then $T_{ij}^s > t$. The set of the observed variables is covered by x_{ij}. (since the time variation in x may be endogenous, the variables are assumed to be time invariant), while ε_{ijk} represents the unobserved characteristics. The probability that person i moves from the state j to state $k, (\neq j) \in \{1...\Omega\}$ in the time interval I_t (given survival until beginning of I_t) is expressed by a destination-specific hazard rate and is defined as:

$$\begin{aligned} h_{ijk}^s(t|x_{ij}, \varepsilon_{ijk}) &= Pr(T_{ij}^s = t, \delta_{ijk}^s = 1 | T_{ij}^s \geqslant t, x_{ij}, \varepsilon_{ijk}); \\ i &= 1, ..., N; t = 1, ..., T_{ij}^s; j, k = 1, ..., K. \end{aligned} \tag{1}$$

Here δ_{ijk}^s means the transition indicator, which equals 1 if the s^{th} spell of individual i in state j ends in state k and 0 otherwise. Since the exit states are mutually exclusive, the probability

[14] **Generally, the unobserved determinants of the durations spent in different states are allowed to be related, and the unobserved determinants of different durations spent by an individual in the same state are assumed to be identical.**

of ending the s^{th} spell of state type j for any other state in interval I_t, can be expressed as:

$$\begin{aligned} H_{ij}^{s}(t|x_{ij},\varepsilon_{ijk}) &= Pr(T_{ij}^{s}=t|T_{ij}^{s}\geqslant t,x_{ij},\varepsilon_{ijk}) \\ &= \sum_{k\neq j}^{\Omega} h_{ijk}^{s}(t|x_{ij},\varepsilon_{ijk}). \end{aligned} \tag{2}$$

The survivor function shows the unconditional probability that the person stays in the state j until the end of interval I_t and is defined as:

$$\begin{aligned} S_{ij}^{s}(t|x_{ij},\varepsilon_{ijk}) &= Pr(T_{ij}^{s}>t|x_{ij},\varepsilon_{ijk}) \\ &= \prod_{z=1}^{t}(1-H_{ij}^{s}(z|x_{ij},\varepsilon_{ijk})). \end{aligned} \tag{3}$$

And finally, the unconditional probability that individual i moves from his original state j to state k in interval I_t can be expressed by the product of probabilities that he survives time interval I_{t-1} and that he leaves state j in interval I_t (given that he had survived until I_{t-1}):

$$\begin{aligned} p_{ijk}^{s}(t|x_{ij},\varepsilon_{ijk}) &= Pr(T_{ij}^{s}=t,k|x_{ij},\varepsilon_{ijk}) \\ &= h_{ijk}^{s}(t|x_{ij},\varepsilon_{ijk})S_{ij}^{s}(t-1|x_{ij},\varepsilon_{ijk}). \end{aligned} \tag{4}$$

Assuming that all spell observations, conditional on $x_{ij}(t)$ and ε_{ijk}, are independent, the likelihood function for the state j can be written as:

$$\mathcal{L}_j = \prod_{i=1}^{N}\prod_{s=1}^{S_i}\left[\prod_{k\neq j}^{\Omega} p_{ijk}^{s}(T_{ij}^{s})\right]^{\delta_{ijk}^{s}} S_{ij}^{s}(T_{ij}^{s}))^{\gamma_{ij}^{s}}. \tag{5}$$

Here δ_{ijk}^{s} is the transition indicator defined above and γ_{ij}^{s} means the censoring indicator, which is equal to 1 if the sth spell of individual i in state j is censored and 0 otherwise (note that $\gamma_{ij}^{s}+\prod_{k\neq j}\delta_{ijk}^{s}=1$).

Now we can introduce indicator y_{ijk}^{s}, which is equal to 1 when $\delta_{ijk}^{s}=1$ and $t=T_{ij}^{s}$ (see

Lauer, 2003) and express the likelihood function in the following way:

$$\mathcal{L}_j = \prod_{i=1}^{N} \prod_{s=1}^{S_i} \prod_{k \neq j}^{\Omega} \prod_{t=1}^{T_{ij}^s} h_{ijk}^s(t)^{y_{ijk}^s} \left(1 - \sum_{k \neq j}^{\Omega} h_{ijk}^s(t)\right)^{1 - \sum_{k \neq j}^{\Omega} y_{ijk}^s}. \tag{6}$$

If we assume the hazard rate to have a multinomial logit form,

$$h_{ijk}^s(t|x_{ij}, \varepsilon_{ijk}) = \frac{\exp\left[\alpha_{jk}(t) + \beta_{jk}' x_{ij} + \varepsilon_{ijk}\right]}{1 + \sum_{l \neq j} \exp\left[\alpha_{jl}(t) + \beta_{jl}' x_{ij} + \varepsilon_{ijl}\right]}, \tag{7}$$

equation (6) is a standard multinomial likelihood function, where y represent the transition indicators, and the censored observations enter the likelihood function as an additional state.

The term $\alpha_{jk}(t)$ represents the baseline hazard function, which shows the way the hazard rate depends on time. I choose the semi-parametric approach by assuming the baseline hazard function to be piecewise constant (that is $\alpha_{jk}(t) = \alpha_{jkm}$, $m = 1; ...; M_j$, where M_j is the number of intervals for baseline hazard). The following cut-off points for the intervals are used for all hazard rates (the unemployment, employment and OLF spells durations are all measured in months): 3, 6, 9, 12, 15, 18, 21, 24, 36, 60 and 84.

The x_{ij} represent the observed variables, which are assumed not to be determined by the future outcomes of the employment, unemployment and inactivity processes.

5.2. Unobserved Heterogeneity

Unobserved heterogeneity ε_{ijk} is specified non-parametrically, using the mass point approach (see Heckman&Singer (1984)). There is assumed a discrete probability distribution for ε_{ijk}, i.e. that ε_{ijk} can be partitioned into a limited number R of mass points or location parameters ε_{rjk}, $r \in \{1...R\}$, with a given probability $Pr(\varepsilon_{rjk})$. The following conditions are imposed on the mass points and their probabilities:

$$\begin{aligned} &\sum_{r=1}^{R} Pr(\varepsilon_{rjk}) = 1 \\ &\sum_{r=1}^{R} Pr(\varepsilon_{rjk}) \varepsilon_{rjk} = 0 \\ &E(\varepsilon_{rjk} x_{ij}(t)) = 0 \end{aligned}$$

Hence, the likelihood function (6) may be rewritten as:

$$\mathcal{L}_j = \sum_{r=1}^{R} Pr(\varepsilon_{rjk}) \left[\prod_{i=1}^{N} \prod_{s=1}^{S_i} \prod_{k \neq j}^{\Omega} \prod_{t=1}^{T_{ij}^s} h_{ijk}^s \left(t|x_{ij}, \varepsilon_{rjk}\right)^{y_{ijk}^s} \left(1 - \sum_{k \neq j}^{\Omega} h_{ijk}^s(t|x_{ij}, \varepsilon_{rjk})\right)^{1 - \sum_{k \neq j}^{\Omega} y_{ijk}^s} \right].$$

Note that the transition rates out of the different labour market states are estimated separately, and I impose a restriction of no correlation between unobservables in the exits out of different states, i.e. $Corr(v_u, v_e, v_{olf}) = 0$.

When modelling transitions out of a given state, I use a "factor loading specification", imposing perfect correlation between the two unobserved heterogeneity terms. Such parameterization has been chosen for computational reasons, i.e. to restrict the number of unknown parameters and to limit the computational burden of the estimation of the model.

6. Estimation Results

This section covers the estimation results. The first sub-section presents the results of specification tests, related to the functional form of the hazard rate, while sub-sections 6.2. - 6.4. tackle transitions from unemployment, employment and OLF respectivelly.

Due to the choice of the multinomial logit specification a note on the interpretation of the parameters estimated is needed, i.e. the results presented in Tables 5, 6 and 7 are the parameters, which inform us about the probability of leaving a state for a certain destination state relative to the probability of staying. In other words, I report the probability of leaving for a certain destination state relative to staying in a current state, i.e. the odds ratio: P_k/P_j.

Alternatively, the marginal effect of a covariate on the probability of entering state k, i.e. the change in the hazard rate that would result from changing a value of one covariate while keeping other covariates fixed, could be computed, which is not necessarily of the same sign as the parameter involved.

6.1. Specification tests

Firstly, I run a series of Wald tests on the (joint) significance of the (sets of) variables and their interactions with the gender and age dummies (see Table 3)[15].

Table 3: Wald tests on independent variables

	Exits from U		Exits from Job		Exits from OLF	
	$\chi 2$	p > $\chi 2$	$\chi 2$	p > $\chi 2$	$\chi 2$	p > $\chi 2$
Tests on coefficients						
Woman	**82.70**	**0.00**	**14.86**	**0.00**	**16.04**	**0.00**
Immigrant	**303.00**	**0.00**	*8.27*	*0.02*	**70.47**	**0.00**
Age	**719.45**	**0.00**	**130.11**	**0.00**	**404.83**	**0.00**
Place of residence	**167.33**	**0.00**	**193.51**	**0.00**	**41.93**	**0.00**
Experience	**149.31**	**0.00**	**308.30**	**0.00**	*7.86*	*0.02*
Prev. state - employment	*4.79*	*0.04*	-	-	*5.91*	*0.05*
UI fund membership	**1396.90**	**0.00**	**1412.83**	**0.00**	**1661.15**	**0.00**
Tests on interactions						
Man * Education	**131.30**	**0.00**	**172.48**	**0.00**	**154.16**	**0.00**
Woman * Education	**141.75**	**0.00**	**24.45**	**0.01**	*16.78*	*0.08*
Man * Married	**39.56**	**0.00**	*6.24*	*0.04*	**13.04**	**0.00**
Woman * Married	**14.95**	**0.00**	*5.61*	*0.06*	2.46	0.29
Man * Children	**42.60**	**0.00**	**25.57**	**0.00**	6.06	0.42
Woman * Children	**478.02**	**0.00**	**16.37**	**0.01**	**313.41**	**0.00**
Man * Prev. U >6 months	-	-	**129.10**	**0.00**	**292.80**	**0.00**
Man * Prev. Job >6 months	**37.63**	**0.00**	-	-	**151.48**	**0.00**
Man * Prev. OLF >6 months	**65.75**	**0.00**	**167.60**	**0.00**	-	-
Woman*Prev. U >6 months	-	-	2.09	0.35	0.90	0.64
Woman*Prev. Job >6 months	*6.72*	*0.04*	-	-	*6.16*	*0.05*
Woman*Prev. OLF >6 months	**11.74**	**0.00**	0.87	0.65	-	-
Age 50-59*Prev. U >6 months	-	-	**12.41**	**0.00**	**11.91**	**0.00**
Age 50-59*Prev. Job >6 months	2.69	0.16	-	-	**304.55**	**0.00**
Age 50-59*Prev. OLF >6 months	1.00	0.61	1.12	0.14	-	-
Age 50-59*Place of residence	**22.69**	**0.00**	9.37	0.31	**31.64**	**0.00**
Tests on overall significance (finally retained specification)						
Overall Wald test	**6583.77**	**0.00**	**6238.22**	**0.00**	**6481.91**	**0.00**

Bold: significant at 1% level; *italic*: significant at 10% level

[15] In these tests, the null hypothesis that all coefficients associated with given variable(s) or interaction(s) are zeros is tested.

The variables and interactions, which proved not to be significant at 10 percent level at least, were dropped from the model. Afterwords, the overall Wald test is used to test (on the basis of the final specification with respect to the variables included) the hypothesis that all the slope coefficients of both equations are jointly insignificant, which is strongly rejected.

Table 4: Other specification tests

Exit from Unemployment	χ^2	$p > \chi^2$
Wald test for combining states		
Combining E and OLF	4653.91	0.00
Combining E and U	7647.81	0.00
Combining OLF and U	2634.82	0.00
Small and Hsiao test for IIA		
Omitted: E	60.80	0.38
Omitted: OLF	60.90	0.37
Exit from Employment	χ^2	$p > \chi^2$
Wald test for combining states		
Combining U and OLF	4527.16	0.00
Combining U and E	9136.23	0.00
Combining OLF and E	7992.39	0.00
Small and Hsiao test for IIA		
Omitted: U	52.66	0.45
Omitted: OLF	49.31	0.58
Exit from OLF	χ^2	$p > \chi^2$
Wald test for combining states		
Combining U and E	4080.94	0.00
Combining U and OLF	6066.27	0.00
Combining E and OLF	6544.96	0.00
Small and Hsiao test for IIA		
Omitted: U	59.11	0.29
Omitted: E	86.04	0.17

To examine whether the modelling specification is appropriate I use a couple of specification tests (see Table 4). Firstly, I run the Wald tests for combining the states to make the modelling specification to be binomial. That is, I test the null hypothesis that the coefficients of two categories are not significantly different from each other, and thus that the categories can be

collapsed. A series of tests is applied for exits from unemployment, employment and OLF, and the hypothesis is rejected in all the cases (that is, the labour market states can't be combined).

Furthermore, the Small and Hsiao tests examine the hypothesis of Independence of Irrelevant Alternatives (IIA). If there exists any degree of substitutability among the labour market states, the IIA assumption is violated, and the multinomial logit specification is rejected. The results of the test lead to the finding that the IIA assumption is supported by the data for all the transitions tested.

Thus, the results of both specification tests indicate that the multinomial logit specification is appropriate.

6.2. Transitions from Unemployment

In this sub-section I present and discuss the estimation results of the factors having an impact on the transitions from unemployment to employment and to outside the labour force (the U-E and U-OLF flows). Covering the issue of personal characteristics, it appears that being a woman decreases the chance of leaving unemployment for a job (coefficient of -0.293), but doesn't influence the probability of getting outside the labour force. Married men are more likely to re-enter employment, once unemployed, and the likelihood of becoming inactive is reduced, while married women face a higher risk of remaining unemployed.

Having children affect transitions from unemployment differently for men and women. Women with a baby of two years or younger are less likely to get employed (coeff. -0.445) and face a higher risk to exit from the labour market (coeff. 0.481). Children, older than two, but younger than seven also reduce their employment probability (coefficient of -0.175), but have only a slight impact on getting them into inactivity, while those, older than six, lower the chance of exiting unemployment for OLF (coeff. -0.268).

The effect of having a child however is opposite for men - children of all age groups increase their fathers' employment probabilities, and those, older than two, lower the risk of getting outside the labour force. This difference is not surprising, since women have less time to search for a job and are likely to drop out temporarily from the labour market because of childbearing reasons, while having a family to support may increase the motivation of men to get a job.

Concerning the age differences, I find the youngest individuals to be the most flexible, while

those over fifty - to be disadvantaged in the labour market. Compared to the middle-aged (30-49 age group) individuals, the youth are more likely to exit unemployment for both job and OLF (positive coefficients of 0.362 and 0.305 respectively) and these transitions can be affected by the Youth Unemployment Programme (see subsection 3.3.), which creates an incentive either to find a job or to start a regular education, i.e. to drop temporary from the labour market. The elderly workers, however, have much lower chances to get employed (coeff. -0.574) and face comparatively high risk to get into inactivity (coeff. 0.506), that again can be partially resulted by mild labour market policies for the elderly workers and their behaviour before early retirement (see subsection 3.4.).

Another important characteristic is immigration status. The immigrants are found to be a group facing a higher risk to be trapped in this situation - on the one hand they experience a lower chance of leaving unemployment for a job (coeff. -0.626), but on the other hand they also face a lower risk of getting outside the labour force (coeff. -0.124).

The positive effect of education on employment and the negative effect on OLF suggest that the less educated persons tend to remain unemployed or to withdraw from the labour market, compared to the more educated. Women with 13 -16 years of education, however, are more likely to withdraw from labour market, but the risk is compensated by better job prospects.

The unemployment insurance fund membership also plays an important role in explaining the transitions from unemployment. The members of all UI funds face a much lower risk of leaving unemployment for inactivity than the reference category - *SID+KAD* - which are the two main insurance funds for unskilled men and women. Being previously self-employed or in the trade sector reduces the re-employment probability[16].

Persons, employed in the previous spell, have a higher likelihood of re-entry to employment (coefficient of 0.365) and a lower risk of inactivity (coeff. -0.214), while being previously employed more than six months increases the chance of getting a job (coeff. 0.100) and reduces the risk of inactivity (compared with the refference group - persons, employed less than six months; coeff. -0.258) for men but is not significant for women.

[16] The findings above can be partially explained by disadvantage in the labour market of the less educated and unskilled persons. The economic incentives of unemployed individuals may differ as well since the replacement rate is highly dependent on previous income, and the UI benefit of 90% of the previous wage in practice is only applies to the persons with low wages, i.e. less educated and unskilled workers.

Table 5: Transitions from Unemployment

Variables	**To Job**		**To OLF**	
	Coeff.	Std. err.	Coeff.	Std. err.
Female worker	**-0.293**	**0.032**	0.016	0.051
Age (ref: 30-49)				
20-29 years	**0.362**	**0.019**	**0.305**	**0.030**
50-59 years	**-0.574**	**0.039**	**0.506**	**0.065**
Married man	**0.145**	**0.024**	*-0.091*	*0.052*
Married woman	**-0.122**	**0.032**	0.044	0.059
Immigrant	**-0.626**	**0.036**	**-0.124**	**0.046**
Age of youngest child (for women)				
0-2 years	**-0.445**	**0.030**	**0.481**	**0.036**
3-6 years	**-0.175**	**0.035**	*0.085*	*0.050*
7-17 years	0.063	0.042	**-0.268**	**0.076**
Age of youngest child (for men)				
0-2 years	**0,152**	**0,031**	-0,070	0,069
3-6 years	**0,112**	**0,039**	**-0,311**	**0,102**
7-17 years	**0,096**	**0,042**	*-0,187*	*0,105*
Education, for men (ref:<10 years)				
10-11 years	0.005	0.032	0.082	0.058
12 years	0.056	0.036	**0.204**	**0.057**
13-14 years	**0.117**	**0.040**	**-0.111**	**0.045**
15-16 years	**0.150**	**0.022**	*-0.149*	*0.084*
17-18 years	**0.320**	**0.067**	-0.087	0.129
Education, for women (ref:<10 years)				
10-11 years	*0.095*	*0.046*	*-0.126*	*0.072*
12 years	**0.321**	**0.049**	*-0.124*	*0.071*
13-14 years	**0.165**	**0.035**	**0.128**	**0.058**
15-16 years	**0.347**	**0.053**	**0.184**	**0.049**
17-18 years	**0.533**	**0.082**	0.195	0.156
Experience	**0.014**	**0.001**	**-0.017**	**0.002**
Previous state - employment	**0.365**	**0.017**	**-0.214**	**0.024**
Man prev. employed >6 months	**0.100**	**0.025**	**-0.258**	**0.057**
Man prev. OLF >6 months	**-0.334**	**0.057**	**0.374**	**0.070**
Woman prev. employed >6 months	-0.047	0.038	0.029	0.069
Woman prev. OLF >6 months	*0.150*	*0.078*	**-0.252**	**0.091**

Bold: significant at 1% level; *italic:* significant at 10% level

Table 5: Transitions from Unemployment (continued)

Variables	**To Job**		**To OLF**	
	Coeff.	Std. err.	Coeff.	Std. err.
UI fund membership (ref: SID+KAD)				
Metal	**0.085**	**0.034**	**-0.694**	**0.075**
Manufact	**0.053**	**0.022**	**-0.770**	**0.037**
Construct	**0.454**	**0.031**	**-0.727**	**0.077**
Tech	**-0.271**	**0.038**	**-0.582**	**0.062**
Trade	**-0.384**	**0.028**	**-0.537**	**0.039**
Clerical	**0.097**	**0.030**	**-0.520**	**0.049**
Acad	**-0.162**	**0.043**	**-0.614**	**0.074**
Uiother	-0.031	0.029	**-0.558**	**0.047**
Selfs	**-0.453**	**0.052**	**-0.407**	**0.062**
Place of residence (ref: other)				
Copenhagen	**-0.220**	**0.019**	0.024	0.031
Aarhus	**-0.156**	**0.032**	**0.207**	**0.048**
Odense	**-0.121**	**0.037**	-0.072	0.062
Aalborg	**-0.128**	**0.038**	0.062	0.063
Place of resid. 50-59 years (ref: other)				
Copenhagen	-0.078	0.063	*-0.164*	*0.076*
Aarhus	-0.145	0.116	**-0.382**	**0.142**
Odense	-0.176	0.146	0.175	0.159
Aalborg	*0.215*	*0.126*	*-0.367*	*0.181*
Baseline hazard (ref: 1-3)				
4-6 months	**0.334**	**0.018**	**0.145**	**0.033**
7-9 months	**0.103**	**0.022**	*-0.082*	*0.040*
10-12 months	**-0.123**	**0.027**	**-0.111**	**0.045**
13-15 months	**-0.312**	**0.032**	*-0.082*	*0.050*
16-18 months	**-0.321**	**0.037**	0.075	0.053
19-21 months	**-0.551**	**0.046**	**0.040**	**0.059**
22-24 months	**-0.567**	**0.052**	**0.305**	**0.059**
25-36 months	**-0.685**	**0.038**	**0.488**	**0.041**
37-60 months	**-1.383**	**0.064**	**0.255**	**0.064**
61-84 months	**-1.373**	**0.078**	**1.624**	**0.169**
>84 months	**-2.700**	**0.166**	**1.346**	**0.135**
Constant	**-2.655**	**0.032**	**-3.447**	**0.052**
Mass points				
$\varepsilon 1$ (Pr ($\varepsilon 1$) = 0.28)	*0.561*	*0.174*	-0.039	0.115
$\varepsilon 2$ (Pr ($\varepsilon 2$) = 0.72)	**-0.218**	**0.086**	0.015	0.191

Bold: significant at 1% level; *italic:* significant at 10% level

The effect of long term inactivity in the previous spell is gender-specific: it has a negative effect on the future job prospects (coeff. -0.334) and highers transitions into OLF (coeff.0.374) for men. There is an opposite situation for women (the coefficients are 0.150 and -0.252 respectively), and this could possibly be explained by the fact that the long-term inactivity of women is often related to child-bearing.

The geographical characteristics of unemployed individuals also seem to have an impact on their future labour market prospects. The residents of the counties with the four biggest Danish cities are found to be disadvantaged, compared with the reference category (other place of residence). Living in Copenhagen prolongs a persons' survival in unemployment the most (coefficient to exit for job: -0.220), while the inhabitants of Aarhus county face the highest risk to become inactive (coeff. to flow into OLF: 0.207). Interesting, however, is the finding that living in Copenhagen, Aarhus and Aalborg is favourable to the individuals older than fifty - they face a lower risk of getting out of the labour market, once unemployed, while the inhabitants of Aalborg also face better employment prospects (coeff. 0.215).

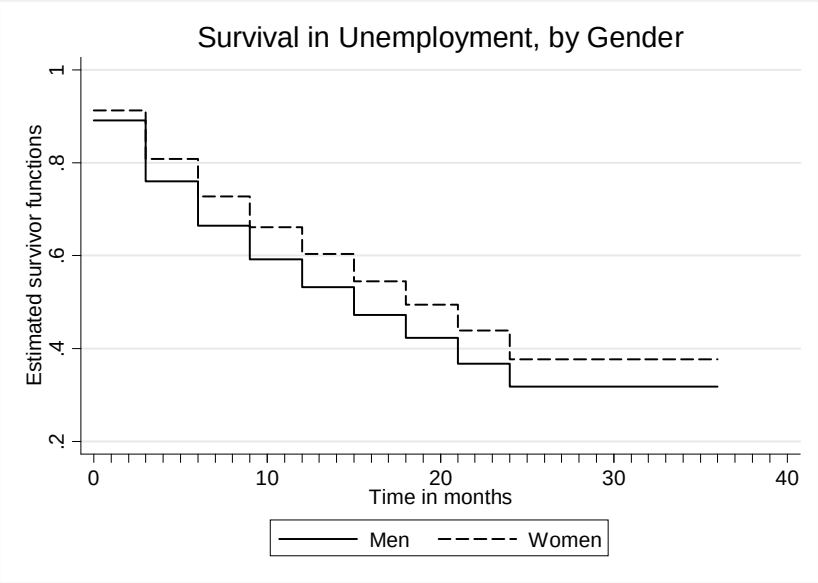
Turning to the issue of duration depence, I find a negative duration dependence in the U-E flows and a positive duration dependence while moving from unemployment into inactivity - the long-term unemployment reduces persons' re-employment probability and increases the risk of getting outside the labour market.

Finaly, I cover the estimations of the individual unobserved heterogeneity. I account for unobserved heterogeneity by employing two mass points of support to improve the model. The presence of these points means that the persons can be divided into two heterogeneous groups. Table 5 indicates that the first group of individuals has an above average probability of exiting unemployment for a job (the coefficient is: 0.561). The probabilities for the mass points are: $Pr(\varepsilon 1) = 0.28$ and $Pr(\varepsilon 2) = 0.72$. This means that for some unobserved reason 28% of unemployed persons are in a better situation of getting back into employment.

To summarise the previous results and to illustrate the duration dependence pattern, I have computed the survivor and hazard functions, based on the gender and the age of individuals. The functions have been calculated for the sub-groups of persons from the estimated coefficients, based on gender and age specific characteristics means.

Figure 1: Survival in Unemployment

1.A.:



1.B.:

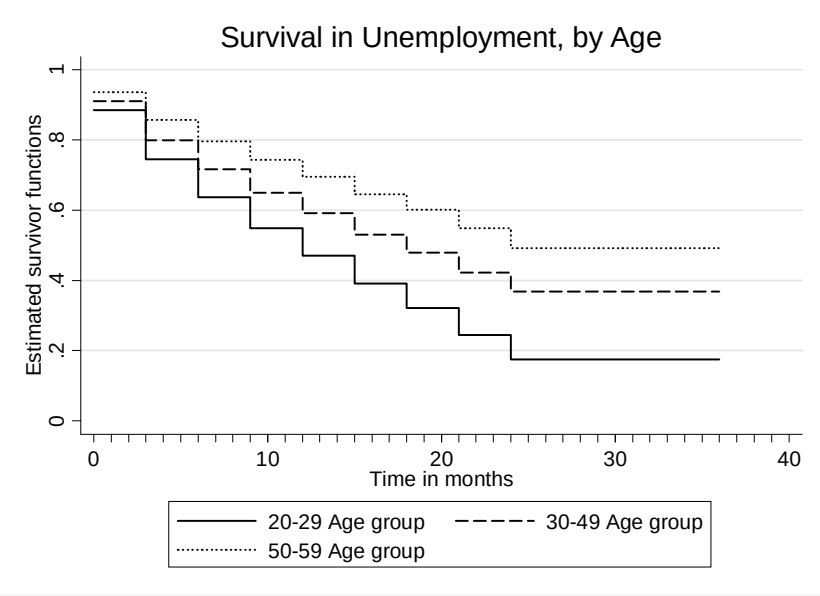
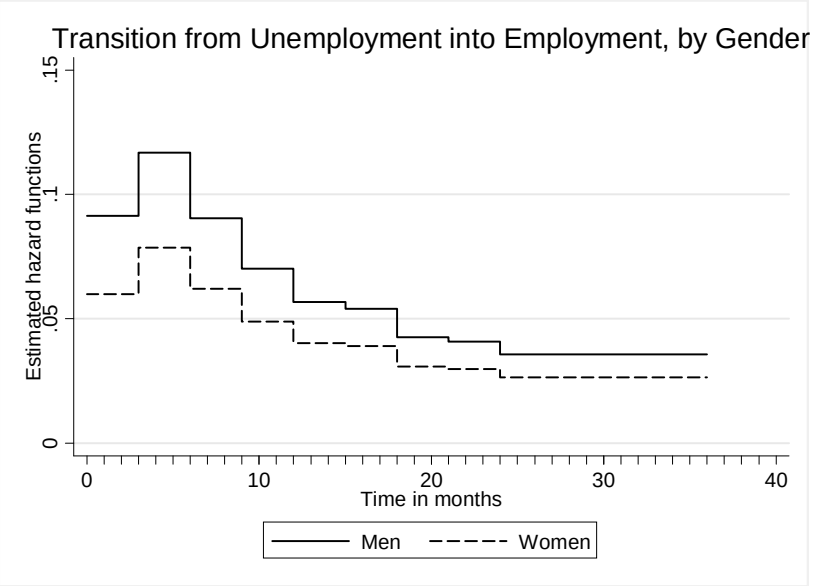


Figure 2: Transitions from Unemployment to Employment

2.A.:



2.B.:

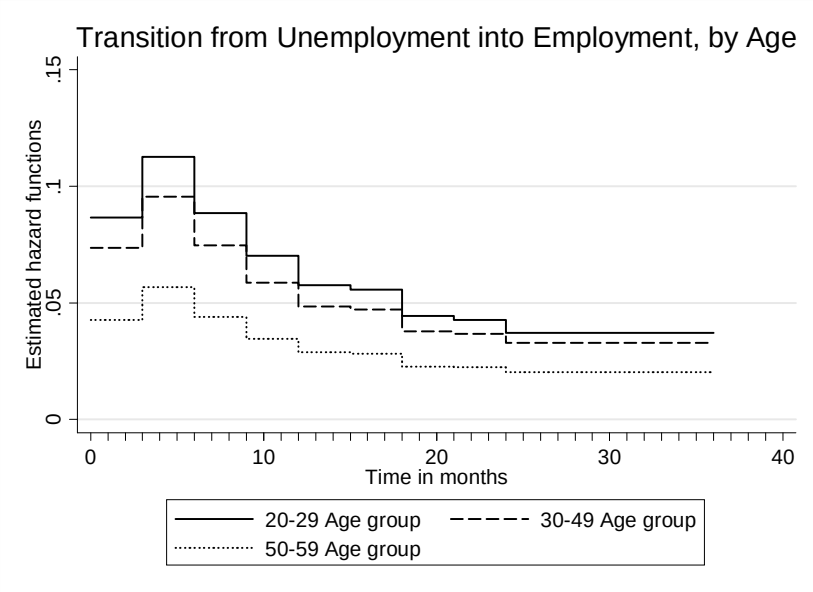
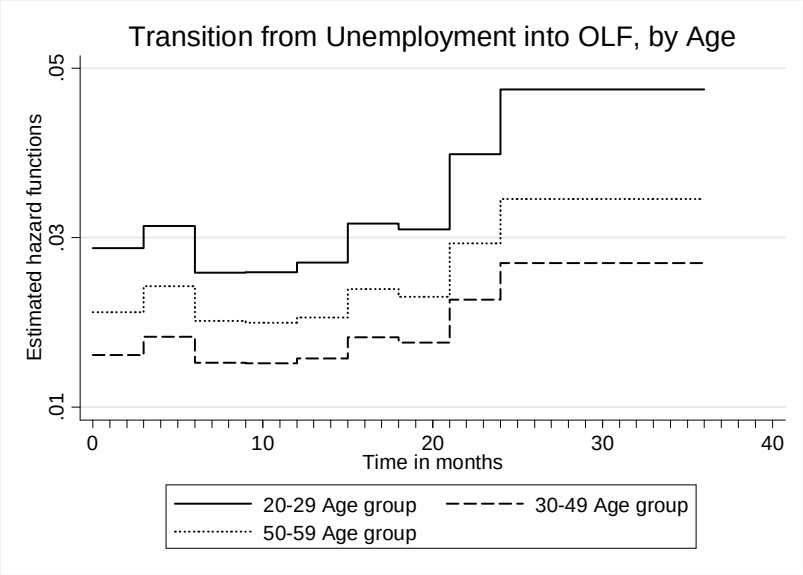


Figure 3: Transitions from Unemployment to OLF

3.A.:

3.B.:



The graphs show a steady decline over time in the survivor functions for both genders and all age groups. It turns out that women remain in unemployment longer than men. Differences in the survival among the age groups, however, are sharper. The elderly individuals experience higher survival rates, while the youngest group has the best chances to leave unemployment (after two years of unemployment 18% of the youth, but 49% of the elderly remain in such a situation).

Transitions to employment have a spike in 4-6 months of unemployment spell and then decline gradually, but remain rather stable after the first year on benefits. The flows into OLF, on the contrary, become stable after 6 months of unemployment, but increase sharply after 21 months. Concerning the gender issue, I find women to experience lower transitions to a job (especially in the first year of unemployment) and higher flows to inactivity, while the age-based analysis discovers the youngest to have highest chances to move to a job, but also to OLF. The elderly persons are less likely to transit to a job, and the middle-aged have the lowest risk of becoming inactive.

6.3. Transitions from Employment

This sub-section tackles transitions from employment into unemployment and inactivity (the E-U and E-OLF flows). Concerning the effect of gender and personal characteristics, I find that being a woman or an immigrant increases the risk of re-entry to unemployment (the coefficients are 0.202 and 0.158 respectivelly), but doesn't influence the flows into inactivity. Being married plays a positive role for the employment situation (the probabilities of getting unemployed (for men) or inactive (for women) are reduced). Children have different impact for men and women. The effect of having a child, younger than seven, is found not to be significant regarding exits from employment of women[17]. Children of seven or older, however, make their mothers more attached to the labour market (the coeff. for exits from employment is: (-0.193) + (-0.231) = (-0.424). For men, though, children of all age groups make them more likely to stay in job. And this could again be explained by the positive effect of having family to support to their motivation of remaining employed.

[17] The well developed childcare facilities (see subsection 3.5.) allows Danish women to keep a full time job, and their labour force participation eventually approached that of the men.

Table 6: Transitions from Employment

Variables	**To U**		**To OLF**	
	Coeff.	Std. err.	Coeff.	Std. err.
Female worker	**0.202**	**0.050**	-0.020	0.069
Age (ref: 30-49)				
20-29 years	**-0.255**	**0.030**	**0.672**	**0.041**
50-59 years	**0.398**	**0.048**	**0.348**	**0.085**
Married man	**-0.107**	**0.039**	-0.005	0.069
Married woman	0.010	0.052	**-0.237**	**0.083**
Immigrant	**0.158**	**0.054**	0.043	0.068
Age of youngest child (for women)				
0-2 years	0.035	0.052	0.029	0.066
3-6 years	0.055	0.053	-0.043	0.075
7-17 years	**-0.193**	**0.069**	*-0.231*	*0.105*
Age of youngest child (for men)				
0-2 years	-0.012	0.050	**-0.360**	**0.089**
3-6 years	*-0.131*	*0.068*	**-0.410**	**0.132**
7-17 years	0.006	0.072	*-0.269*	*0.154*
Education, for men (ref:<10 years)				
10-11 years	-0.039	0.049	*-0.165*	*0.072*
12 years	**-0.306**	**0.055**	**0.152**	**0.059**
13-14 years	**-0.176**	**0.037**	**-0.285**	**0.062**
15-16 years	**-0.245**	**0.069**	*-0.152*	*0.090*
17-18 years	**-0.726**	**0.123**	**-0.541**	**0.143**
Education, for women (ref:<10 years)				
10-11 years	-0.073	0.071	-0.102	0.097
12 years	*-0.129*	*0.076*	0.011	0.079
13-14 years	**-0.160**	**0.057**	-0.043	0.087
15-16 years	**-0.325**	**0.094**	0.169	0.116
17-18 years	0.151	0.148	0.135	0.188
Experience	**-0.025**	**0.002**	**-0.037**	**0.003**
Man prev. U >6 months	**0.472**	**0.053**	**-0.292**	**0.028**
Man prev. OLF >6 months	**-0.398**	**0.032**	**0.762**	**0.051**
50-59 years - prev. U >6 months	-0.066	0.076	**0.510**	**0.153**

Bold: significant at 1% level; *italic:* significant at 10% level

Table 6: Transitions from Employment (continued)

Variables	To U		To OLF	
	Coeff.	Std. err.	Coeff.	Std. err.
UI fund membership (ref: SID+KAD)				
Metal	**0.482**	**0.057**	**-1.231**	**0.114**
Manufact	**0.677**	**0.034**	**-1.152**	**0.061**
Construct	**0.698**	**0.052**	**-1.246**	**0.115**
Tech	**0.211**	**0.063**	**-1.017**	**0.101**
Trade	**0.261**	**0.045**	**-1.164**	**0.073**
Clerical	**0.162**	**0.052**	**-1.088**	**0.075**
Acad	*0.185*	*0.078*	**-0.939**	**0.096**
Uiother	**0.476**	**0.046**	**-0.835**	**0.075**
Selfs	**-0.366**	**0.092**	**-0.989**	**0.124**
Place of residence (ref: other)				
Copenhagen	**-0.179**	**0.030**	**0.215**	**0.032**
Aarhus	**-0.152**	**0.050**	**0.457**	**0.045**
Odense	0.081	0.054	*0.135*	*0.062*
Aalborg	**0.232**	**0.055**	**0.245**	**0.068**
Baseline hazard (ref: 1-3)				
4-6 months	**-0.282**	**0.028**	-0.042	0.035
7-9 months	**-0.566**	**0.036**	**-0.436**	**0.046**
10-12 months	**-1.138**	**0.051**	**-0.892**	**0.061**
13-15 months	**-1.983**	**0.081**	**-1.579**	**0.089**
16-18 months	**-1.982**	**0.084**	**-1.637**	**0.096**
19-21 months	**-2.027**	**0.090**	**-1.797**	**0.108**
22-24 months	**-2.111**	**0.097**	**-1.276**	**0.088**
25-36 months	**-2.401**	**0.063**	**-1.883**	**0.069**
37-60 months	**-3.041**	**0.072**	**-2.166**	**0.069**
61-84 months	**-3.473**	**0.104**	**-2.363**	**0.091**
>84 months	**-3.490**	**0.111**	**-2.218**	**0.092**
Constant	**-2.395**	**0.050**	**-2.663**	**0.067**
Mass points				
$\varepsilon 1$ (Pr ($\varepsilon 1$) = 0.24)	-0.405	0.262	-0.314	0.243
$\varepsilon 2$ (Pr ($\varepsilon 2$) = 0.76)	**0.128**	**0.043**	**0.099**	**0.026**

Bold: significant at 1% level; *italic:* significant at 10% level

Concerning the age, belonging to 20-29 age group reduces the risk of unemployment (coeff.: -0.255), but the probability of dropping outside the labour market increases[18]. Thus, the overall risk of exiting employment is higher (the coeff. is: (-0.255) + 0.672 = 0.417. The elderly persons, however, face the highest risk of exiting job for both unemployment and inactivity (coeff.: 0.398 + 0.348 = 0.746).

The education level is an important factor, helping to remain in a job once employed. Men in all educational groups are found to be in a favourable employment situation, compared to the reference group (those with nine or less years of education), and the most educated individuals face the lowest risk of leaving a job (the coefficients for the hazards to unemployment and OLF for the group with 17-18 years of education are -0.726 and -0.541 respectively). For women, the years of education have no impact to the transitions from job to inactivity, but lower the risk of unemployment (coeff. for the group with 15-16 years of education is -0.325)[19].

The effect of previous job experience on the transitions from employment is found not to be strong, though significant, while previous unemployment or inactivity, longer than 6 months, makes men more likely to get trapped back into these stages (the coefficients for the exits to unemployment and OLF are 0.472 and 0.762). Long-term unemployment in the previous spell gives a significant coefficient of 0.510 for the flow into inactivity of 50-59 years old individuals.

Unemployment insurance fund membership has a complementary role in explaining the flows from employment. The self-employed individuals are most likely to remain employed and face the lowest transitions into both unemployment and OLF (the coeff.: -0.366 and -0.989). It is surprising, that members of all other UI funds experience higher risk of re-entry to unemployment than the refference category - members of *SID+KAD* funds. But on the other hand, they also experience a much lower risk of moving outside the labour market, and thus are in a better employment situation than the unskilled workers.

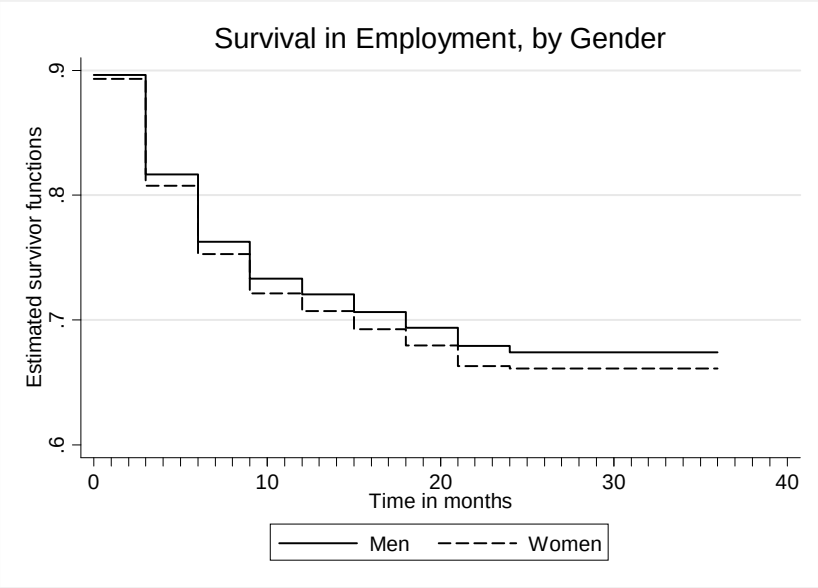
Concerning the place of residence factor, I find the residents of Copenhagen, Aarhus, Odense and Aalborg to be more likely to exit employment than the reference category - residents of other places.

[18] And this can be explained by the fact that many young workers leave their jobs for regular education, which is covered by OLF category.

[19] These, again, can be explained by the better job prospectives for educated individuals and by the economic incentives to stay employed, since in the case of job loss income replacement rate is comparatively lower for the higher wage earners.

Figure 4: Survival in Employment

4.A.:



4.B.:

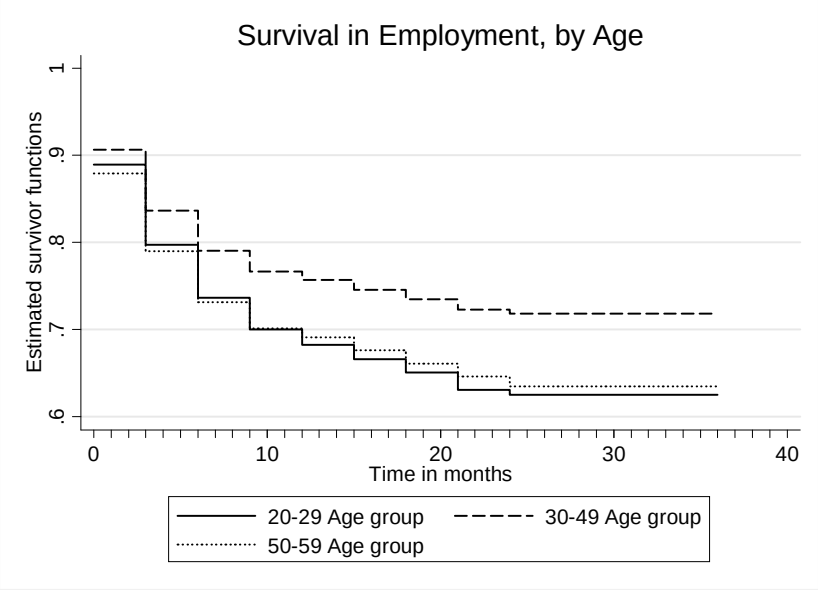
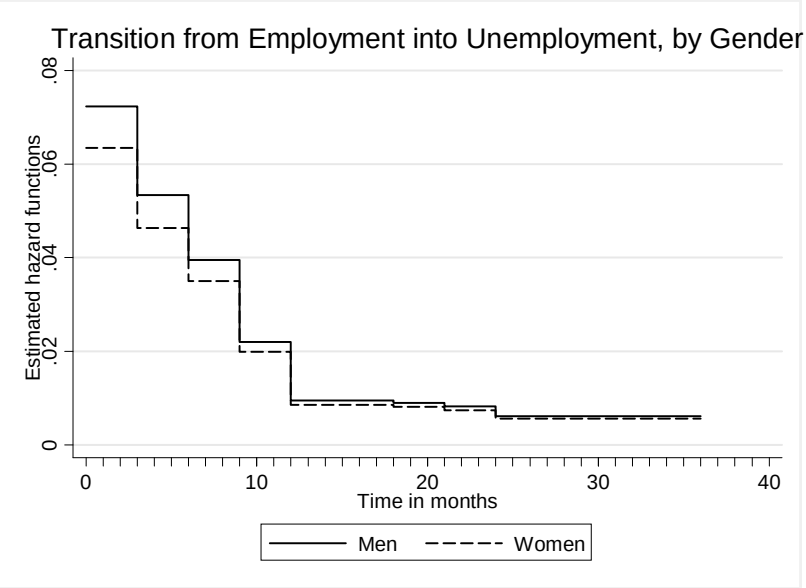


Figure 5: Transitions from Employment to Unemployment

5.A.:



5.B.:

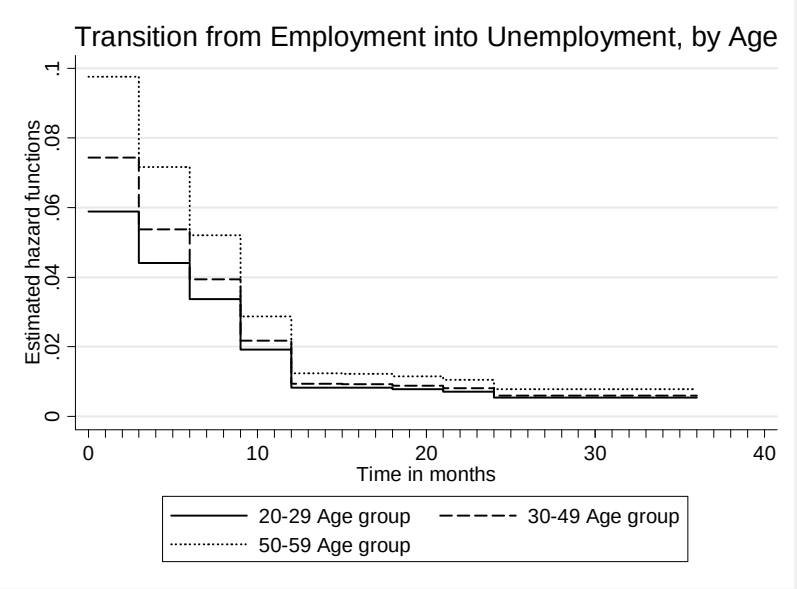
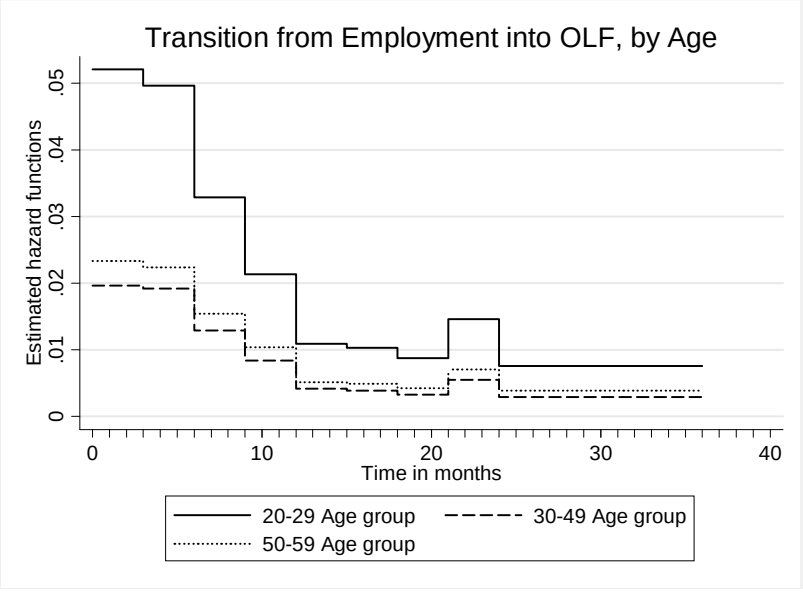


Figure 6: Transitions from Employment to OLF

6.A.:

6.B.:



Living in Odense or Aalborg increases the flows from employment to unemployment and OLF. The inhabitants of Copenhagen and Aarhus experience lower transitions to unemployment, but are at a higher risk of moving into inactivity. Thus, the effect of place of residence to the exit from employment is slightly positive (coeff.: (-0.179) + 0.215 = 0.036) for Copenhagen and positive (coeff.: (-0.152) + 0.457 = 0.305) for Aarhus.

There is a negative duration dependence in both E-U and E-OLF flows. The probability of exiting a job declines with the time spent employed, and there is a sharp decline in the baseline hazards after the first year of employment. And lastly, concerning the unobserved heterogeneity issue, I find that for some unobserved reasons 76% of individuals face a higher risk to exit a job once employed (coeff. is: 0.128 + 0.099 = 0.227).

The age and gender specific survivor and hazard functions illustrate the findings above. It turns out that men stay employed longer than women, but the gender specific survival differences are slight. However, looking to the E-U and E-OLF flows (especially during the first year of employment), there is evidence that men are more likely to leave a job for unemployment, while women more tend to move into inactivity.

There is a minor difference in job survival of the youth and the elderly individuals, and both age groups survive as employed shorter than their middle-aged counterparts. But here, again, there is a difference in the transitions - the youngest persons are much more likely to drop out of the labour market, while those older than 50 face the risk of re-entry to unemployment.

Another interesting and important finding is a sharp decline in the transition rates into unemployment and inactivity after the first year of employment: the individuals, who survived employed one year, tend to remain in that state.

6.4. Transitions from OLF

The analysis of the transitions from OLF (the OLF-E and OLF-U flows) leads to the result that being a woman reduces the chance of exiting OLF for employment (coefficient of -0.209). Being married has negative impact on the flows from inactivity for men, but the influence of mariage to the exit for employment is not significant. Having small children makes women less likely to leave OLF for job (coeff.: -0.674 and -0.148).

Immigrants face a higher overall probability of leaving OLF. But this increase is due to the

exit from OLF to unemployment (the coefficient for the OLF-E flow is -0.182), thus they are at the risk of being trapped in a long-term unemployment.

The age factor tends to play an extremely important role in explaining the transitions from inactivity. The youngest are found to be in the most favourable situation (coefficient for the OLF-E flow is 0.424), but here I want to pay attention to the elderly workers, who are found to be strongly disadvantaged on the labour market, compared to their younger counterparts. Being older than 50 sharply lowers the chances of exiting for both employment and unemployment, and the coefficient for overall OLF exit probability is (- 1.574).

The number of years of education have a positive influence on the exit from OLF for employment. Men with 17-18 years and women with 15-16 years of education face the most favourable re-employment prospectives (coeff. 0.351 and 0.158).

The members of all UI funds survive shorter in inactivity than the reference category. Thus, the unskilled workers are found to be another problematic group, facing the risk of marginalisation from the labour market[20].

Those, who were previously employed, experience higher transitions to re-employment (coefficient of 0.552) and have lower chance to leave inactivity for unemployment (coeff. -0.715). This is in line with previous findings that inactive persons, who were previously employed, tend to return to employment, while those previously unemployed face a risk of re-entry to unemployment (see Appendix table A.1.3.) Being previously employed longer than six months gives better job prospectives for both men and women (the coefficients for the OLF - E flow are 0.246 and 0.189 respectively), while being previously long-term unemployed incresases the risk of the OLF-UI flow for men.

The past employment history plays an extremely important role for the 50-59 years old persons - those with the previous job spell longer than 6 months are more likely to leave inactivity for both new job or UI. Individuals having more than six months of past unemployment history, however, face a much higher risk of staying trapped out of the labour market, compared to the reference group - persons, unemployed less than six months (the coefficient for the exit from OLF is -1.524 + (-1.443) = (-2.967)).

[20] Like in the case of unemployment, these findings can be explained by disadvantage in the labour market of the less educated and unskilled persons and by the economic incentives of the individuals.

Table 7: Transitions from OLF

Variables	To Job		To U	
	Coeff.	Std. err.	Coeff.	Std. err.
Female worker	**-0.209**	**0.048**	-0.021	0.050
Age (ref: 30-49)				
20-29 years	**0.424**	**0.029**	0.042	0.030
50-59 years	**-1.116**	**0.085**	**-0.458**	**0.078**
Married man	0.002	0.027	**-0.143**	**0.028**
Immigrant	**-0.182**	**0.050**	**0.326**	**0.045**
Age of youngest child (for women)				
0-2 years	**-0.674**	**0.039**	-0.025	0.036
3-6 years	**-0.148**	**0.048**	0.075	0.049
7-17 years	0.098	0.065	0.039	0.073
Education, for men (ref:<10 years)				
10-11 years	0.061	0.049	0.001	0.059
12 years	*0.068*	*0.041*	**-0.562**	**0.059**
13-14 years	**0.129**	**0.042**	**-0.154**	**0.047**
15-16 years	0.083	0.058	**-0.443**	**0.079**
17-18 years	**0.351**	**0.094**	**-0.623**	**0.131**
Education, for women (ref:<10 years)				
10-11 years	*0.119*	*0.066*	-0.049	0.073
12 years	*0.128*	*0.055*	0.076	0.073
13-14 years	-0.027	0.058	0.053	0.061
15-16 years	*0.158*	*0.075*	0.005	0.095
17-18 years	0.041	0.123	0.160	0.158
Experience	*0.005*	*0.002*	*-0.005*	*0.003*
Previous state - employment	**0.552**	**0.024**	**-0.715**	**0.026**
Man prev. empl. >6 months	**0.246**	**0.030**	**-0.684**	**0.053**
Man prev. OLF >6 months	**-0.593**	**0.040**	**0.306**	**0.030**
Woman prev. employed >6 months	**0.189**	**0.068**	0.032	0.041
50-59 years - prev. empl. >6 months	*0.194*	*0.088*	**0.274**	**0.102**
50-59 years - prev. U >6 months	**-1.524**	**0.183**	**-1.443**	**0.094**

Bold: significant at 1% level; *italic:* significant at 10% level

Table 7: Transitions from OLF (continued)

Variables	To Employment		To UI	
	Coeff.	Std. err.	Coeff.	Std. err.
UI fund membership (ref: SID+KAD)				
Metal	**0.371**	**0.066**	**1.085**	**0.073**
Manufact	**0.301**	**0.038**	**1.032**	**0.036**
Construct	**0.431**	**0.068**	**0.760**	**0.081**
Tech	**0.192**	**0.064**	**1.040**	**0.059**
Trade	0.063	0.044	**0.919**	**0.040**
Clerical	**0.511**	**0.043**	**0.811**	**0.051**
Acad	**0.219**	**0.066**	**1.334**	**0.070**
Uiother	**0.267**	**0.050**	**0.906**	**0.048**
Selfs	**0.169**	**0.074**	**0.239**	**0.090**
Place of residence (ref: other)				
Copenhagen	*0.027*	*0.014*	**-0.087**	**0.030**
Aarhus	*-0.078*	*0.033*	**-0.192**	**0.047**
Odense	-0.040	0.044	*-0.125*	*0.059*
Aalborg	**-0.136**	**0.049**	0.016	0.057
Place of resid. 50-59 years (ref: other)				
Copenhagen	**0.300**	**0.100**	**0.298**	**0.096**
Aarhus	**0.545**	**0.213**	**0.588**	**0.181**
Odense	0.051	0.236	0.225	0.197
Aalborg	0.059	0.270	0.238	0.209
Baseline hazard (ref: 1-3)				
4-6 months	**0.414**	**0.024**	**0.076**	**0.027**
7-9 months	**0.125**	**0.030**	**-0.361**	**0.038**
10-12 months	**0.518**	**0.031**	**-0.117**	**0.043**
13-15 months	**-0.701**	**0.059**	**-1.223**	**0.082**
16-18 months	**-0.526**	**0.060**	**-0.971**	**0.081**
19-21 months	**-0.774**	**0.073**	**-1.243**	**0.101**
22-24 months	**-0.480**	**0.070**	**-1.032**	**0.102**
25-36 months	**-0.994**	**0.055**	**-1.548**	**0.079**
37-60 months	**-1.767**	**0.075**	**-2.226**	**0.098**
61-84 months	**-2.459**	**0.123**	**-3.590**	**0.220**
>84 months	**-3.508**	**0.206**	**-6.442**	**1.000**
Constant	**-3.066**	**0.047**	**-2.943**	**0.050**
Mass points				
$\varepsilon 1$ (Pr ($\varepsilon 1$) = 0.86)	0.131	0.114	-0.093	0.309
$\varepsilon 2$ (Pr ($\varepsilon 2$) = 0.14)	*-0.805*	*0.175*	0.571	0.068

Bold: significant at 1% level; *italic:* significant at 10% level

Concerning the geographical pattern, again I find the residents of counties with the four biggest Danish cities to be disadvantaged in the labour market. Living in Copenhagen, however, slighly increases the chance of getting back into employment (coeff.: 0.027), but on the other hand slightly decreases the transitions into unemployment (coeff.: -0.087). The negative effect of residing in Aarhus is not very strong as well (coeff.: -0.078), but here I want to mention that the inhabitants of Aarhus and Odense are less likely to leave OLF for unemployment, i.e. there is a danger for these individuals to be discouraged to search for a job and thus, to be marginalised and remain out of the labour market. The residents of Aalborg face the lowest transitions from OLF to employment.

The inhabitants of Copenhagen and Aarhus, older than fifty, are found to be in a favourable labour market situation, compared to the reference group - the coefficients for their exits from inactivity are $0.300 + 0.298 = 0.598$ and $0.545 + 0.588 = 1.133$ respectively.

As in the case of the U-E flow, I here discover the presence of negative duration dependence. In the transitions from OLF into employment, however, I find individuals more likely to move for a job during the first year (especially in 10-12 months) in OLF.

But the situation changes drastically after the first year of inactivity. For the OLF-U transitions, I observe a negative duration dependence during the whole period of inactivity, that is the time, spent outside the labour market, discourage people to search for a job.

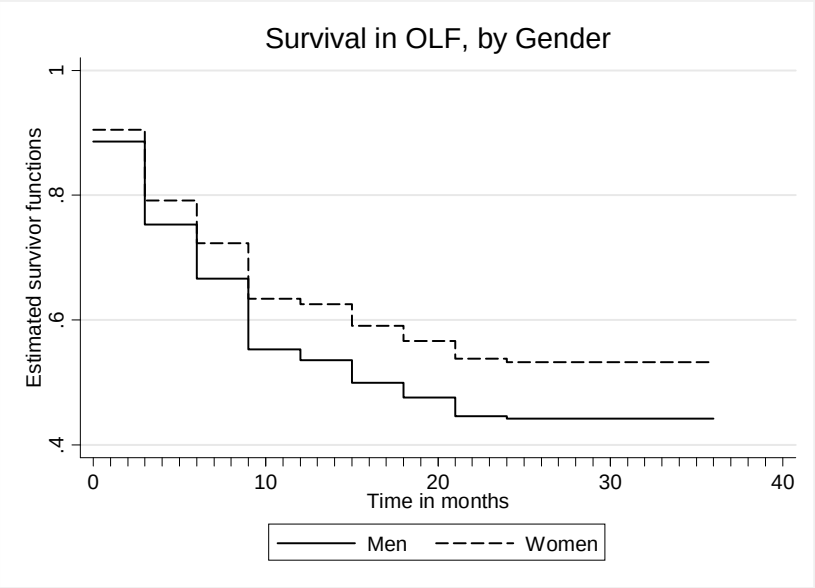
And finally, concerning the individual unobserved heterogeneity, I discover 14% of inactive persons to have a lower chance of leaving OLF for a job.

Now, again, I illustrate the findings above by graphing gender and age based survivors and hazards. I observe women to survive in OLF longer than men. Concerning the age of the persons, the youngest are least likely to remain inactive, while the elderly are found to be the risk group. After two years in OLF 30% of 20-29 old individuals, but 75% of those, older than 50, remain in this state.

There are no gender differences in the transitions from OLF into unemployment, but women experience lower chances of leaving inactivity for a job, especially during the first year outside the labour market. Youth are more likely to move into job than their older counterparts, while looking to the OLF-U flow, I find the middle-aged to be in the best situation. In both transitions again I find the age based differences to be mostly expressed in the first year of inactivity.

Figure 7: Survival in OLF

7.A.:



7.B.:

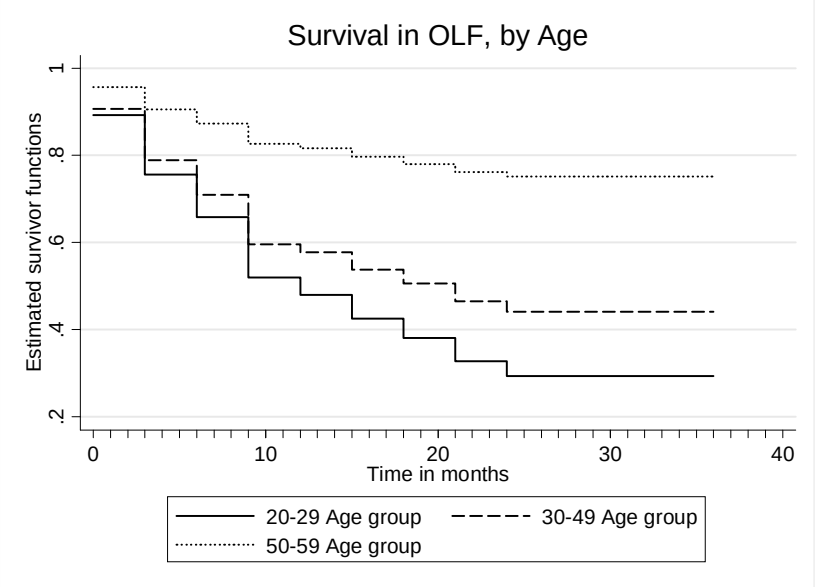
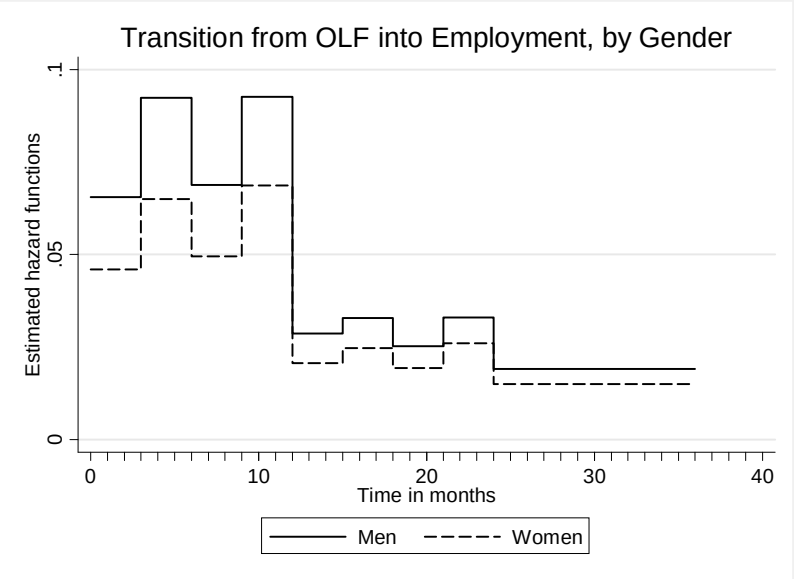


Figure 8: Transitions from OLF to Employment

8.A.:



8.B.:

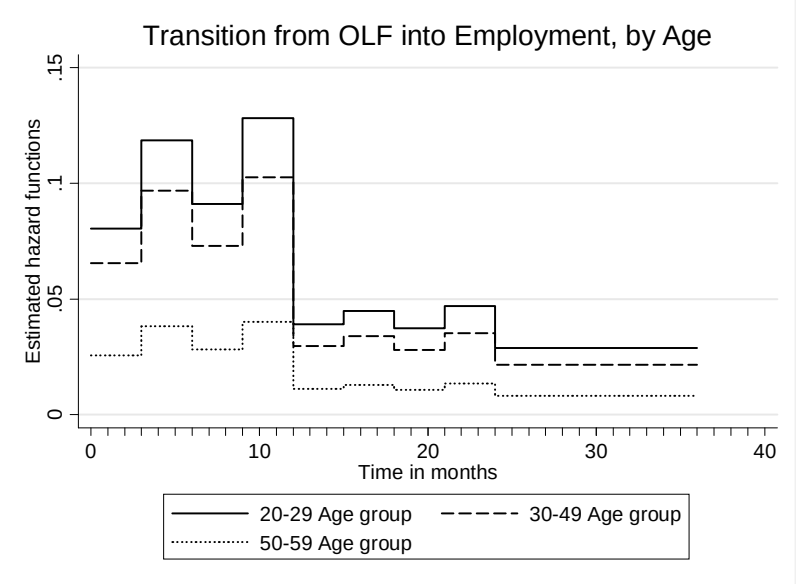
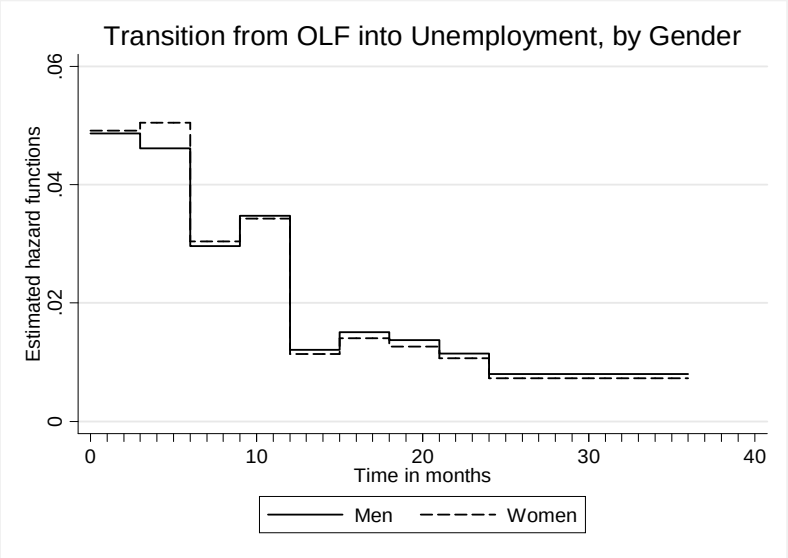
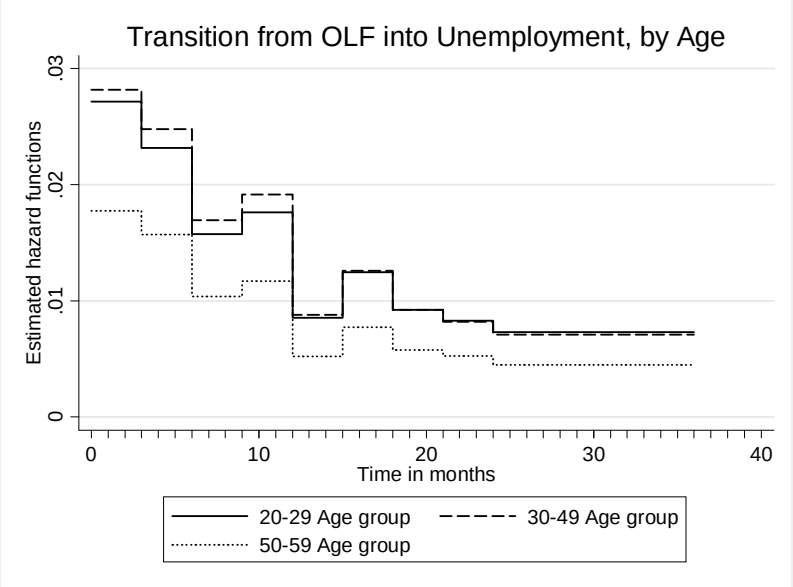


Figure 9: Transitions from OLF to Unemployment

9.A.:



9.B.:



And the last and very important finding is a sharp decline in both transitions after the first year in OLF. In the previous chapter I mentioned such break to be existent in the case of employment, however here it is even more expressed. For example, during the 10-12 months of inactivity the hazards for the 20-29, 30-49 and 50-59 age groups are 13%, 10% and 4%, but after one year, spent in OLF, they drop to 4%, 3% and 1% respectively. Similar behaviour is observed in gender based hazard rates, and in the hazards from OLF into unemployment.

7. Conclusions

In this paper I use the longitudinal register-based data and estimate a discrete time hazard model for the exits from the different labour market states - unemployment, employment and inactivity - in the Danish labour market. I distinguish between the different possible destination states, adopt a competing risks formulation and run a multinomial logit estimation.

The estimations results find women to face a higher risk of getting outside the labour market and to experience higher survivals in both unemployment and inactivity.

The youth is found to be the most flexible age group, most likely to leave employment and unemployment for OLF, but also having the highest transitions back into employment, while those over fifty are found to face the highest risk of long-term unemployment and marginalisation from the labour market.

Years of education make persons less likely to exit for unemployment or inactivity, and help them to find a job once unemployed or outside the labour force, while the unskilled workers are found to be the highest risk group to drop out of the labour force, and to remain in that state.

Being previously employed reduces the risk of OLF, and increases the re-entry to employment probability, while long-term unemployment or inactivity make workers more likely to get back into these labour market states in the future. Living in the biggest Danish cities, where job competition is high, makes individuals disadvantaged, but has a positive effect on labour market performance of persons over fifty.

Finally, I find a break in the transition rates from employment and inactivity after 12 months spent there: those, who survived in a job one year, tend to remain employed, while persons, longer than one year inactive, face much higher risk of marginalisation from the labour market.

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APPENDIX

TABLE A.1.1.: EMPLOYMENT SPELLS IN 1% REPRESENTATIVE SAMPLE (1993-2003)

	If previous spell - unemployment	**If previous spell - OLF**
Spells ending in unemployment, %	42.32	14.21
Spells ending in OLF, %	9.15	47.27
Right-censored spells, %	48.52	38.52
Non right-censored spells ending in:		
Unemployment, %	82.22	23.12
OLF, %	17.78	76.88
Average lenght of spell (in months)	12.70	16.88

* I use the longitudinal register-based data set of event histories for persons belonging to a representative 1% sample of the 16-70 year aged Danish population. Persons younger than 20 and older than 59 have been excluded.

TABLE A.1.2.: UNEMPLOYMENT SPELLS IN 1% REPRESENTATIVE SAMPLE (1993-2003)

	If previous spell - employment	**If previous spell - OLF**
Spells ending in employment, %	66.41	45.27
Spells ending in OLF, %	12.38	26.16
Right-censored spells, %	21.20	28.56
Non right-censored spells ending in:		
Employment, %	84.29	63.38
OLF, %	15.71	36.62
Average lenght of spell (in months)	7.03	7.37

* I use the longitudinal register-based data set of event histories for persons belonging to a representative 1% sample of the 16-70 year aged Danish population. Persons younger than 20 and older than 59 have been excluded.

TABLE A.1.3.: OLF SPELLS IN 1% REPRESENTATIVE SAMPLE (1993-2003)

	If previous spell - employment	**If previous spell - unemployment**
Spells ending in employment, %	57.99	22.95
Spells ending in unemployment, %	13.83	44.11
Right-censored spells, %	28.18	32.95
Non right-censored spells ending in:		
Employment, %	80.74	34.22
Unemployment, %	19.26	65.78
Average lenght of spell (in months)	9.81	8.81

* I use the longitudinal register-based data set of event histories for persons belonging to a representative 1% sample of the 16-70 year aged Danish population. Persons younger than 20 and older than 59 have been excluded.

TABLE A.2.: SAMPLE COMPOSITION (GENDER BASED)*

	Unemployment	**Employment**	**OLF**
Men			
Number of observations	**106749**	**331236**	**104834**
Number of individuals**	**2517**	**3789**	**2155**
Number of spells	**16510**	**22214**	**11321**
Non right-censored spell ending in			
Unemployment, %	-	60.3	29.9
Employment, %	84.9	-	70.1
OLF, %	15.1	39.7	-
Lenght of non-censored spell (in months)	**5.9**	**8.6**	**6.6**
Women			
Number of observations	**134236**	**304897**	**144338**
Number of individuals**	**2823**	**3792**	**2799**
Number of spells	**17432**	**22104**	**14950**
Right-censored spells, %	27.2	44.8	31.1
Non right-censored spell ending in			
Unemployment, %	-	52.2	36.8
Employment, %	74.7	-	63.2
OLF, %	25.3	47.8	-
Lenght of non-censored spell (in months)	**7.2**	**8.3**	**7.3**

* I use the longitudinal register-based data set of event histories for persons belonging to a representative 1% sample of the 16-70 year aged Danish population. Persons younger than 20 and older than 59 have been excluded.

** Number of people having unemployment, employment or OLF as their first spell

TABLE A.3.: SAMPLE COMPOSITION (AGE GROUPS)*

	Unemployment	**Employment**	**OLF**
20-29 group			
Number of observations	**70486**	**257835**	**100399**
Number of spells	**12072**	**19341**	**12637**
Right-censored spells, %	15.9	38.0	22.5
Non right-censored spell ending in			
Unemployment, %	-	41.8	26.9
Employment, %	77.7	-	73.1
OLF, %	22.3	58.2	-
Lenght of non-censored spell (in months)	**5.5**	**8.2**	**7.7**
30-49 group			
Number of observations	**120201**	**306605**	**94326**
Number of spells	**16914**	**20230**	**10510**
Right-censored spells, %	27.0	50.5	31.9
Non right-censored spell ending in			
Unemployment, %	-	68.6	40.4
Employment, %	83.4	-	59.6
OLF, %	16.6	31.4	-
Lenght of non-censored spell (in months)	**6.5**	**8.2**	**6.3**
50-59 group			
Number of observations	**50298**	**71693**	**54447**
Number of spells	**4956**	**4747**	**3124**
Right-censored spells, %	31.3	46.1	51.6
Non right-censored spell ending in			
Unemployment, %	-	75.7	46.8
Employment, %	74.0	-	53.2
OLF, %	26.0	24.3	-
Lenght of non-censored spell (in months)	**9.6**	**10.2**	**5.5**

* I use the longitudinal register-based data set of event histories for persons belonging to a representative 1% sample of the 16-70 year aged Danish population. Persons younger than 20 and older than 59 have been excluded.

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