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Labour force attachment patterns of older unemployed workers:

Analysis of the transition to retirement pathways

Abstract

I examine the labour force attachment patterns late in career; exactly in a period of up to five years preceding the transition from unemployment to retirement. I identify the periods of (un)employment, ALMP and non-participation. I use the registered data from public employment offices on entire population of workers born between 1940 and 1965 who retired from unemployment in the time period 1996-2017 in Poland. I apply sequence analysis and estimate a k-progressive competing risk multi-state model (non-parametrically and semi-parametrically). The findings indicate that these least successful workers who did not manage to encounter a job prior to retirement have not fully contributed to the effective labour supply a few years before actual retirement. They spent most of the time in non-employment; unemployment spells were prolonged, especially the ones that preceded retirement. Employment was more likely further from retirement. ALMP did not lead to sustained employment. Unemployment benefits were collected for long periods. To summarize, workers (probably) restricted their participation to acquire (early) pension benefit rights; and the policy recommendation emerges that minimum retirement age should be increased and early retirement schemes abolished, so that the effective retirement age increases.

JEL Classification: C14, C41, H55, J14, J22, J26, J64

Keywords: older workers unemployment, retirement, transition pathways, multi-state models, recurrent event data, sequence analysis

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1. Introduction

I investigate the labour force attachment patterns of older workers in late stage of career. In particular, I look at the entire population of workers in Poland who retired directly from unemployment, and I examine the transition to retirement pathways in the period of up to 5-years prior to retirement. I argue that workers, who are close to the point at which they are eligible to receive pension benefits, actually 'wait' to fulfil these eligibility criteria. As a consequence, they do not fully contribute to the effective labour supply and their labour force participation is restricted to the minimum requirements necessary to acquire pension rights. Workers either 'wait' to turn standard retirement age, or they 'wait' to meet early pension schemes requirements. Such schemes were exceptionally popular in 1990s and early 2000s, and they were based on a combination of an age level (lower than standard retirement age) and some minimum level of total length of contributory spells). In result, workers who experienced more intense previous labour market attachment could have retired long before standard retirement age. If the hypothesis is true, we should observe prolonged unemployment spells prior to final transition from unemployment to retirement, and probability of transitioning from unemployment to employment should diminish the closer to acquiring pension rights an individual is. I choose to observe workers for up to five years prior to retirement, and this length of time period is to reflect relatively short time horizon in terms of approaching retirement, so workers can formulate expectations. But, at the same time this time span is long enough for individuals to still actively participate in the labour market.

I examine the underexplored country of Poland which severely experiences the problem of population aging. The overall population is expected to decrease by 10% in the next 35 years, whereas the number of 60+ individuals is expected to increase by more than a half what will results in an increase in their share in total population from 23% to 40% in the same time period. In 2016 almost 70% of those aged 50-74 who were inactive, indicated retirement

as a reason for non-participation; and less than 2.5 workers fell on one pensioner (this ratio is constantly decreasing). At the same time, in 2016 the mean retirement age for new pensioners was 61.9 years (63.3 for males and 61.0 for females); while the life expectancy for a 60-year-old men in 2015 was estimated at 19 years, and for female counterpart 24.1 years.

Poland underwent a lot of reforms directed at older workers in the labour market during the analysed period. A brief description of the changes in the social security system can be found in Kula and Ruzik-Sierdzińska (2001), and an outline of the changes in the labour market can be found in a set of reports in *Employment in Poland* (various issues). In the period covered by the analysis, the standard minimum retirement age to become eligible to receive pension benefits was 60 for females and 65 for males. But, until the beginning of 2009, workers had access to a range of early retirement schemes that made them actually deactivate long before the above specified age. For example, in 2004 the effective retirement age was 56.8 years, in 2009 59.3, whereas in 2016 – 61.9 years. In sex breakdown data are available since 2009, and in 2009 females retired on average at 57.8 while seven years later in 2016 at 61, whereas males at 61 in 2009 and 63.3 in 2016. Since the government has recently reversed the reform which increased the retirement age, we can expect these values to decrease in the future.

I use administrative longitudinal data from public employment offices; I observe all workers born between 1940 and 1965 who retired between 1996 and 2017 directly from unemployment. I identify unemployment spells, employment spells, ALMP spells, and complement the labour force attachment patterns with non-participation spells. I apply sequence analysis to find regularities in these patterns and k-progressive competitive risk flexible multi-state model to examine recurrence in certain states, and in unemployment in particular.

I contribute to the literature from a few perspectives. I examine a route to retirement as a multi-year process, and I study retirement from unemployment which is the route less pronounced in the literature. I also build on unemployment experience late in career and its

relationship to further transitions out of unemployment to employment or to non-participation. My considerations overlap to some extent the phenomenon of the discouraged worker effect, meant in a broad manner. Workers who wait to fulfil pension benefits eligibility criteria are in fact discouraged form active labour force participation. Last but not least, I apply quantitative methods rarely used in this subject area and I use dataset which refers to entire population of treated individuals.

Literature review indicates the scope of the previous research from the analysed perspective, although similar studies have been scarce. Non-traditional pathways to retirement have received relatively little attention in the literature, especially compared to traditional routes to non-participation, that is from employment to retirement (compare Gruber and Wise 1999 and 2004). But, the exit route from unemployment to retirement gains importance in the ongoing research discourse (Garcia-Perez et al. 2013). Garcia-Perez et al. (2013) analysed the impact of public regulations on the labour market decisions of workers close to retirement; in particular they focused on transition from unemployment to retirement. They found that unemployment regulations significantly affected the retirement behaviour. Moreover, they found that unemployment benefits constituted an attractive income source[1] for those who were eligible to receive such benefits prior to retirement. Marmora and Ritter (2015) studied the process of retiring directly from unemployment and the impact of unemployment experience late in career on retirement timing. They found that unemployed workers at significantly higher rate than employed workers were leaving the workforce permanently. This effect was weaker for workers eligible to unemployment benefits. Chan and Stevens (2002) also proved that unemployment experience significantly increase the probability of retirement, although not many workers respond to these altered retirement incentives. Merkurieva (2016) quantified that job displacement in late career accelerated retirement by 15 months. Hairault et al. (2010)

[1] In a few countries, significant shares of workers collect unemployment benefits prior to retirement. The shares vary from 7% in Sweden to 40% in Japan (Coile and Levine 2006).

examined distance to retirement to explain employment rates of older workers; and they found that this distance in interaction with the generosity of unemployment benefits and the low demand for older workers justified the low employment rate prior to reaching the eligibility age. Their finding was in line with Hutchens (1988), who displayed that job opportunities decline with age, and that the lack of opportunities could increase the risk of entering retirement. Rutledge (2014), in turn analysed the duration of the job search efforts of older workers; these efforts declined quickly among unemployed older workers, and the availability of financial resources shortened this period further; whereas the labour market conditions had little impact.

Literature has indicated that discouraged worker effect often regards older workers (Benati 2001). Maestas and Li (2006) analysed search behaviour of the older non-employed workers, and found that only a half of the older job seekers found job. Among the rest, some experienced health or income shocks, exerted little job search effort, had relatively high reservation wage; while the remainder – 13% were classified as discouraged workers[2]. O'Brien (2011) analysed the discouraged worker rate of older workers. He found labour force participation rates dependant on business cycle, and the discouraged worker effect asymmetric in magnitude. The influence from cyclical downturn in decreasing older participation rates dominated the increase in participation rate induced by economic recovery. Gałecka-Burdziak and Góra (2016) extended the definition of the discouraged worker effect and investigated whether the availability of pension benefits discouraged older workers from looking for a job. They argued that if pension benefits were perceived as the only potential income, having access to such benefits should have increased considerably the probability that individuals would transition from unemployment to inactivity. Gałecka-Burdziak and Góra (2016) found that if an old-age benefit became the worker's main source of income, she was eight to 20 times more likely to exit the market after one year than recipients of unemployment or social welfare

[2] Maestas and Li (2006) meant by discouraged workers those job seekers who were willing to work at the prevailing wage but were unable to find job.

benefits. Gałecka-Burdziak and Góra's (2016) findings confirmed those of Appold (2004), who proved that early availability of pensions significantly brings forward professional deactivation, and job loss late in career strengthens this effect.

I have not found any study that would have looked at unemployment to retirement routes by examining multi-state (unemployment, employment, and non-participation) multiple spells. To study this phenomenon, I employ recurrent event data (multiple spells) models tailored to such research, although these methods are rarely used in labour economics (they originate in biomedicine). Multiple spells arise when two or more events happen to the same object, for example we observe two consecutive unemployment spells "interrupted" by the employment spell. Multiple failure-time data violate the assumption that the failure times are independent (required in traditional survival analysis). Akerlof and Main (1980) examined the impact of multiple unemployment spells on mean unemployment duration, and found a negative correlation between the average length of a spell and the number of unemployment spells experienced in a calendar year. Heckman and Borjas (1980) followed 122 men (who fulfilled additional criteria) over a 30-month period after they completed high school; they tested for the presence of duration dependence, occurrence dependence, and lagged duration dependence in multiple unemployment spells. Trivedi and Alexander (1989) employed an extended version of the mixed-proportional-hazards model, and estimated the Prentice et al. (1981) model. They directly accounted for repeated unemployment spells, and examined the determinants of the conditional probability of reemployment among long-term unemployed young people. In conclusions they argued that fitting a common duration model to data from different spells involved a major misspecification[3]. Gałecka-Burdziak and Góra (2017a) examined the

[3] Hamerle (1988) also studied theoretical models for multiple-spell duration data. He examined the duration of unemployment (7660 spells, 5848 of which were first spells and 1812 of which were second spells) in Bavaria, and also found that reducing the analysis of multiple-spell data to the analysis of single-spell models led to false interpretations and conclusions. Moreover, the types of multiple-duration models that apply to unemployment in particular were surveyed and described in Van den Berg (2001).

behaviour of unemployed older workers up to five years prior to retiring directly from unemployment over the period 1996-2015 and used the registered longitudinal data of the sample of individuals born between 1940 and 1965. The identified unemployment spells and direction of the outflow from unemployment. They assumed no intermediate transitions among non-unemployment spells before returning to unemployment. Gałecka-Burdziak and Góra (2017a) estimated a conditional risk set model (Prentice et al. 1981), and argued that close proximity to becoming eligible to receive pension benefits leads individuals 'wait' to fulfil these eligibility criteria.

I find that workers most of the time spent in non-employment spells. The unemployment spells are prolonged, especially the ones that precede retirement, and quite rarely result in a transition to employment. Employment is more likely the further from retirement an individual is. Few ALMP spells proceed by employment spells. Older workers are less likely to experience subsequent transitions on their pathway to retirement, and females are less likely to participate in ALMP. Unemployment benefits are collected for long periods and decrease the probability of transitioning to either ALMP or non-participation. The overall picture emerges that workers actually deactivate and do not fully contribute to the effective labour supply a few years before actual transition from unemployment to retirement. The policy recommendation is that minimum retirement age should be increased and early retirement schemes abolished, so that the effective retirement age increases. However, the open question remains to what extent workers voluntarily ‘wait’ for old-age benefits. Hence, some measures should be directed at companies to encourage them to increase employment of older workers, as the improvement in job finding opportunities may also encourage older workers to participate in the market.

2. The data

I used administrative longitudinal data from public employment offices that included information on unemployment and contributory spells. The sequence of collecting the data is that when a person registers with a public employment office she provides information on previous contributory spells. She encounters incentives to provide information on previous contributory spells as eligibility to some sorts of benefits depends on the total length of previous contributory spells. The information on consecutive contributory spells is complemented with each subsequent registration. Registration with public employment is not and has never been compulsory to unemployed people, apart from those who were eligible to the unemployment benefits. Hence, the administrative data are not representative for all unemployed individuals, but provide valuable information on labour force attachment patterns of large portion of Poles. Figure 1 compiles information on population coverage, and it turns out from 35 to 55% of all individuals (depending on the birth cohort) came across public employment office database at some point between[4] 1990-2017.

Figure 1. Number of individuals born in a given year (demographic data), workers ever registered with public employment office (public employment office data) and population coverage (in %)

Source: own elaboration.

[4] Public employment offices were set up at the beginning of 1990.

In the study I focused on workers who retired, that is they were deregistered from public employment office because acquired pension rights and applied for the old-age benefit while being registered with public employment office[5]. In the entire dataset there were 136644 workers who retired while being registered anytime between 1990 and 2017. These individuals constituted around 2.7% of all ever registered workers born between 1940 and 1965. For the comparison purposes I identified individuals from the same birth cohorts who deregistered due to having started collecting pre-retirement benefits (10.5% of all workers), disability allowance (9.7% of all workers), reached standard retirement age (3% of all workers). The rest of the workers[6] (74.6%) appeared sometime in the administrative data but did not appear in any of the above specified samples.

Having in mind potential peculiarities of the administrative data, as they are not primarily collected for research purposes (compare Connelly et al. 2016), I adjusted the dataset to the research purposes. The initial sample I examined counted 136644 individuals, and I narrowed this sample in a few manners. I excluded those workers who retired in the time span 1990-1995 (2.1% of the sample), and focused on those who retired anytime between 1996-2017. This cut is justified by occurrence of heavy transformation processes taking place at the beginning of the 1990s in Poland. Next, as I wanted to identify the labour force attachment patterns in the period of up to five years prior to retirement. Knowing the daily date of retirement transition for each individual, I set up a five-year point prior to her daily date of retirement. Then I looked for the first complete spell (of any type) following the five-year point prior to retirement date and subsequent ones up to retirement. So, if a person was in the middle of any spell five years prior to retirement I looked for the first following full spell. Due to the properties of the data, in this manner I cut those individuals who 'waited' in the registered

[5] The dataset included also a few exception of individuals who retired not by means of public employment office and registered thereafter as a job seeker, but I exclude them from the analysis.
[6] The shares sum up to 100.2%, as 0.5% of all 4.9 million individuals appeared in more than one category, but such overlaps were scarce.

unemployment for retirement for a period longer than 5 years, and by this exercise I cut 30% of the sample. In the rest of the sample, there were individuals who experienced up to 20 unemployment periods, and even 60 contributory periods. I narrowed the sample to those who experienced up to 5 unemployment periods (98.8% of the sample) and up to 5 contributory spells (97.5% of the sample). Contributory spells include various kinds of non-unemployment experience, which I grouped into employment (almost 65% of cases), some sorts of benefits other than unemployment benefits (23%), active labour market policy spells (9%), and others including e.g. military service, welfare programmes, imprisonment. Having a dataset of unemployment and contributory spells I filled out the rest of the calendar time to have full longitudinal data with non-participation spells and assigned them the category of others of contributory spells. After this exercise, individuals experienced up to 19 spells of all kinds, I narrowed the sample to those who had up to 11 spells (the last four-digit frequency), what made around 98.3% the sample. The final sample consisted of 91,468 individuals and it made 66.9% of the initial full sample.

Females constituted 53% of the prepared sample of 91,468 individuals. Observed workers were in general poorly educated: 43% of workers had at most primary education, subsequent 44% had vocational or secondary vocational education, 7% of the workers legitimated with post-secondary or tertiary education. Females were better educated than males, but mainly in terms of secondary education instead of vocational education. I observed individuals born between 1940 and 1965, but many of them were born between 1946 and 1956 – 82.5% (the frequency of each birth cohort was higher than 4,000 individuals). The average age at the beginning of a first spell was 57.5 years for males and 52.7 years for females. Males on average retired at the age of 59.9; although 57% of all males retired at the age of 60, and 13% retired at the age of 65. Females on average retired at the age of 55.2, but almost 60% retired at 55, and 17% at the age of 60. Temporal distribution of the retirement transitions was

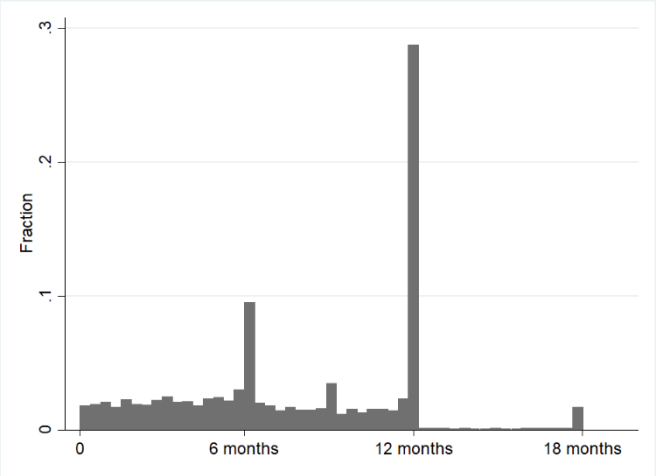
rather uniform, although some peaks were visible in 2008 and prior to 2008, as in 2009 there was implemented a reform restricting early retirement schemes.

The unemployment benefit was collected in 64% of unemployment spells, but in 70% of unemployment spells that ended with a transition from unemployment to retirement. Around 23% of observed individuals did not collect the benefit even once, whereas 15% of the sample more than once. Up to the end of 1996 the benefits claimant could have collected the unemployment compensation till becoming eligible to pension benefit. The 1997 reform introduced pre-retirement benefits and since then the maximum length of collecting the benefit was 18 months[7]. On Figure 2 I present the histogram of duration of collecting the unemployment benefit, with fractions presented on vertical axis[8]. The benefit under regular conditions can be collected for six months, and it occurred in slightly less than 10% of cases. But the peaks are also visible around twelve and eighteen months, and such lengths of collecting the benefit were possible if an individual met eligibility criteria concerning age, total length of contributory spells and resided in a county of high unemployment. The sum of fractions for collecting the benefit for six, twelve and eighteen months indicates that in around 35% of cases the benefit was collected for maximum eligibility period. Moreover, in around 50% of unemployment spells when the benefits was collected, the unemployment spell equalled the length of collecting the benefit, and retirement transition occurred in 78% of cases thereafter.

[7] It was shortened to 12 months in 2010.

[8] For the graphical purposes, I assume that 18 months was the maximum length of collecting the benefit – what covered 99.2% cases of collecting the benefit.

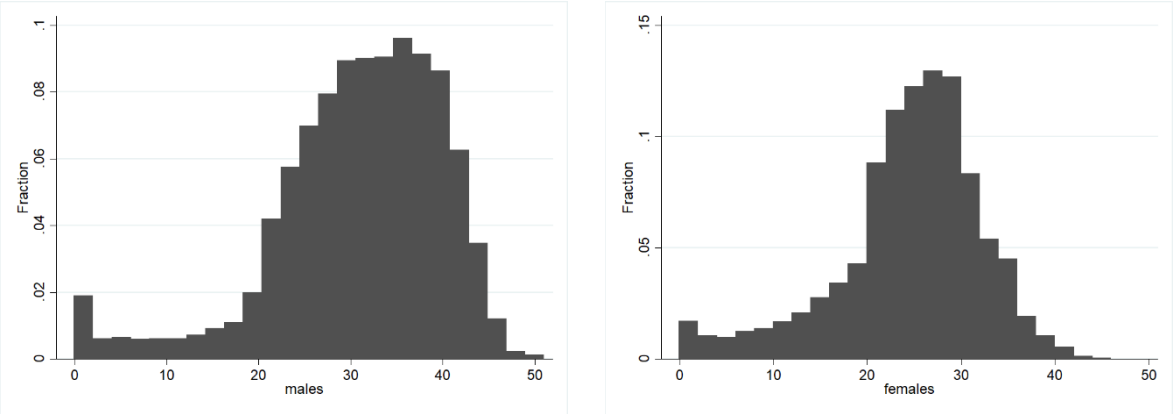
Figure 2. Duration of collecting the unemployment benefit (in months)



Source: own elaboration.

The dataset provided information on work experience for 94% of the individuals. The total work experience is defined as the total length of contributory spells that count for unemployment benefit eligibility collected prior to the last unemployment spell experienced. Mean work experience differed between sexes and it depended on the fact whether an individual retired at standard retirement age or before that. Mean work experience equalled 24 years for females, and 30.8 years for males, but females who retired at the age of at least 60 had mean work experience smaller by three years than those who retired before turning 60 (21.2 years compared to 24.6 years on average). For males the analogous difference was smaller, as those who retired being at least 65 had mean work experience of 29.4 years, whereas those who retired before turning 65 had work experience equal on average to 31 years. Figure 3 compiles the distribution of total work experience for males (left side) and males (right side).

Figure 3. The distribution of work experience at the beginning of unemployment spell that terminated with a transition to retirement, for females and males (in years)



Source: own elaboration.

3. Labour force participation patterns – status and transitions analysis

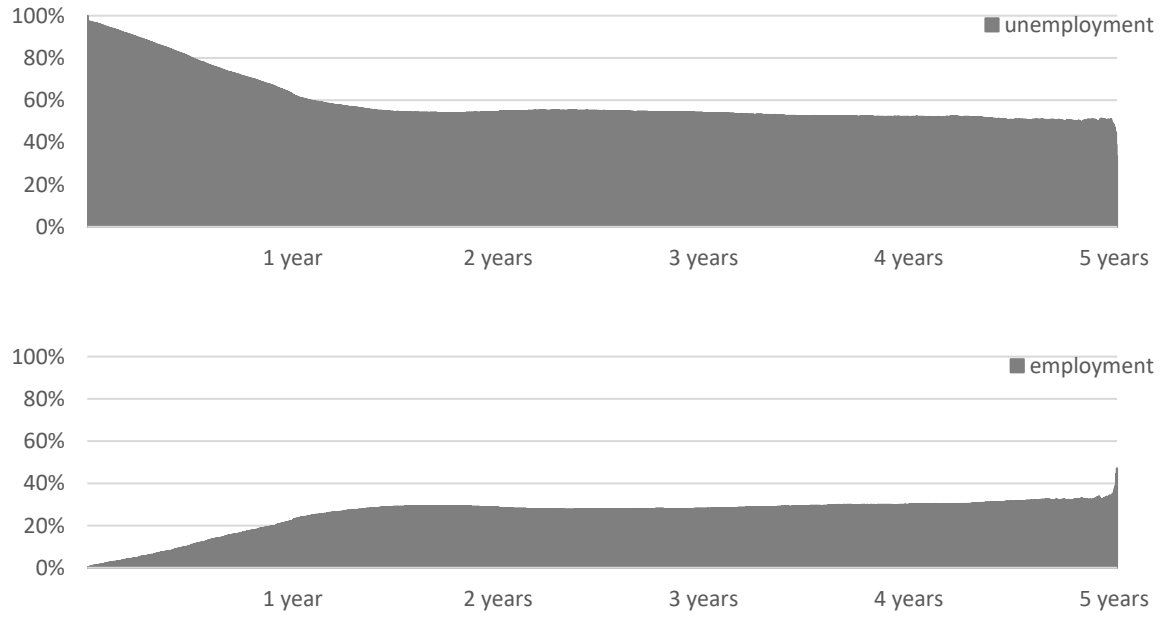
I observed individuals for up to five years, since the beginning of the first full spell of any kind, that is unemployment, employment, ALMP, benefits or others (including non-participation), following the five-year point preceding the retirement transition up to the retirement. I observed individuals on average for 2.5 years and the observation time did not differ between sexes. Half of the workers was observed for 2.6 years, and the fourth quartile for at least 4.1 years. As previously stated, in the final sample there were workers who experienced up to eleven spells of all types, including up to five spells of unemployment, and up to five contributory spells. The rest of the calendar year was filled up with non-participation state. Tables 2 and 3 in the Appendix display the distribution in the number of particular types of observations.

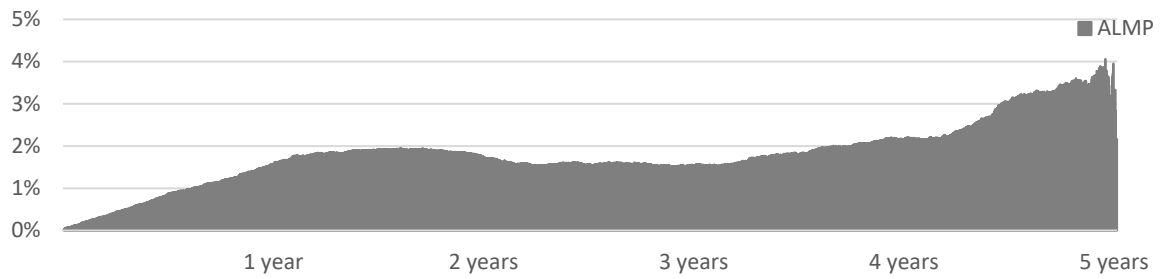
Particular spells duration differed substantially depending on the type of spell and on the ordinal number of the spell experienced. The mean duration of unemployment spell was 12.9 months, but the spell that preceded the transition to retirement lasted 14.5 months on average. The employment spell lasted on average 12.3 months, ALMP spell – 6 months, benefit (other than unemployment benefit) spell – 11.2 months, and non-participation 2.3 months.

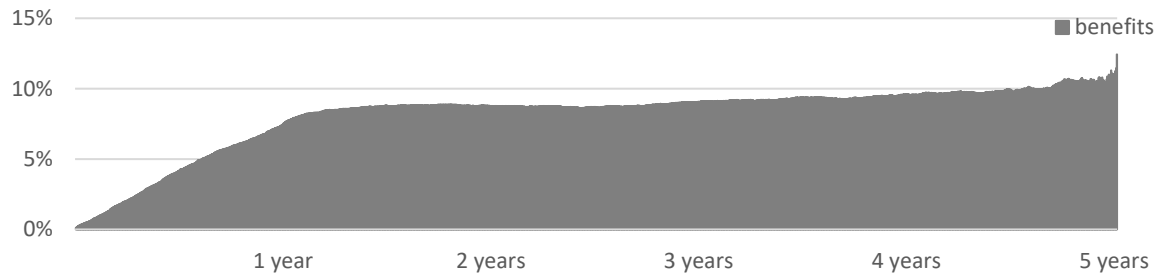
I identified daily status of each worker during the whole observation period to present shares of workers with particular status at tempograms (Figure 4). A few striking conclusions

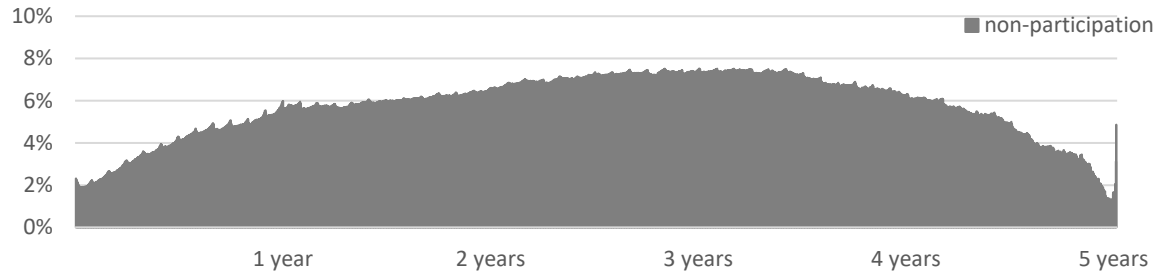
arise: up to one year prior to retirement transition around 50% of the workers were registered as unemployed, this share was constant the further we moved from the retirement. The closer it was to retirement the more workers were registered with public employment office, for example six months prior to retirement around 80% of the soon pensioners were registered as unemployed. The further it was to retirement the more workers were employed or in ALMP programmes, although the shares never surpassed 35% in case of employment and 5% in case of ALMP programmes. The periods of collecting the benefits were also quite popular throughout the analysed period. The decrease in share in one year period prior to retirement resulted from an increase in unemployment share as these types could not overlap in the constructed dataset (although could overlap in reality). Last but not least, small percentages of non-participation spells prove that most workers remained in some system throughout the observations period (employment, unemployment or welfare) and only few remained outside any system.

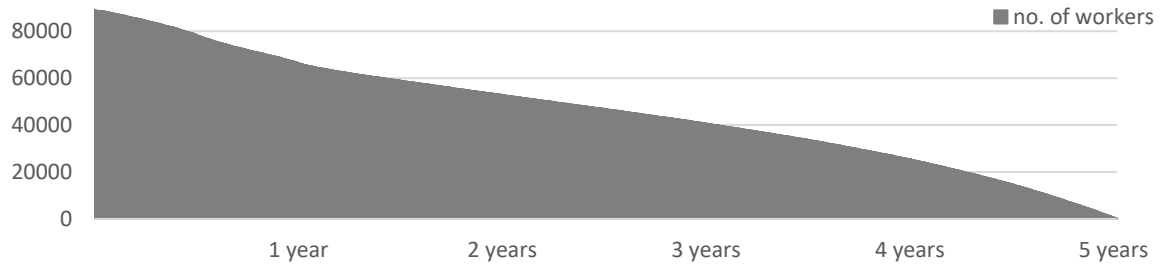
Figure 4. Tempograms of the shares of workers in a particular state in the labour market in the period of up to five years prior to retirement transition (reverse counting – time to retirement), and the number of workers observed at each particular date











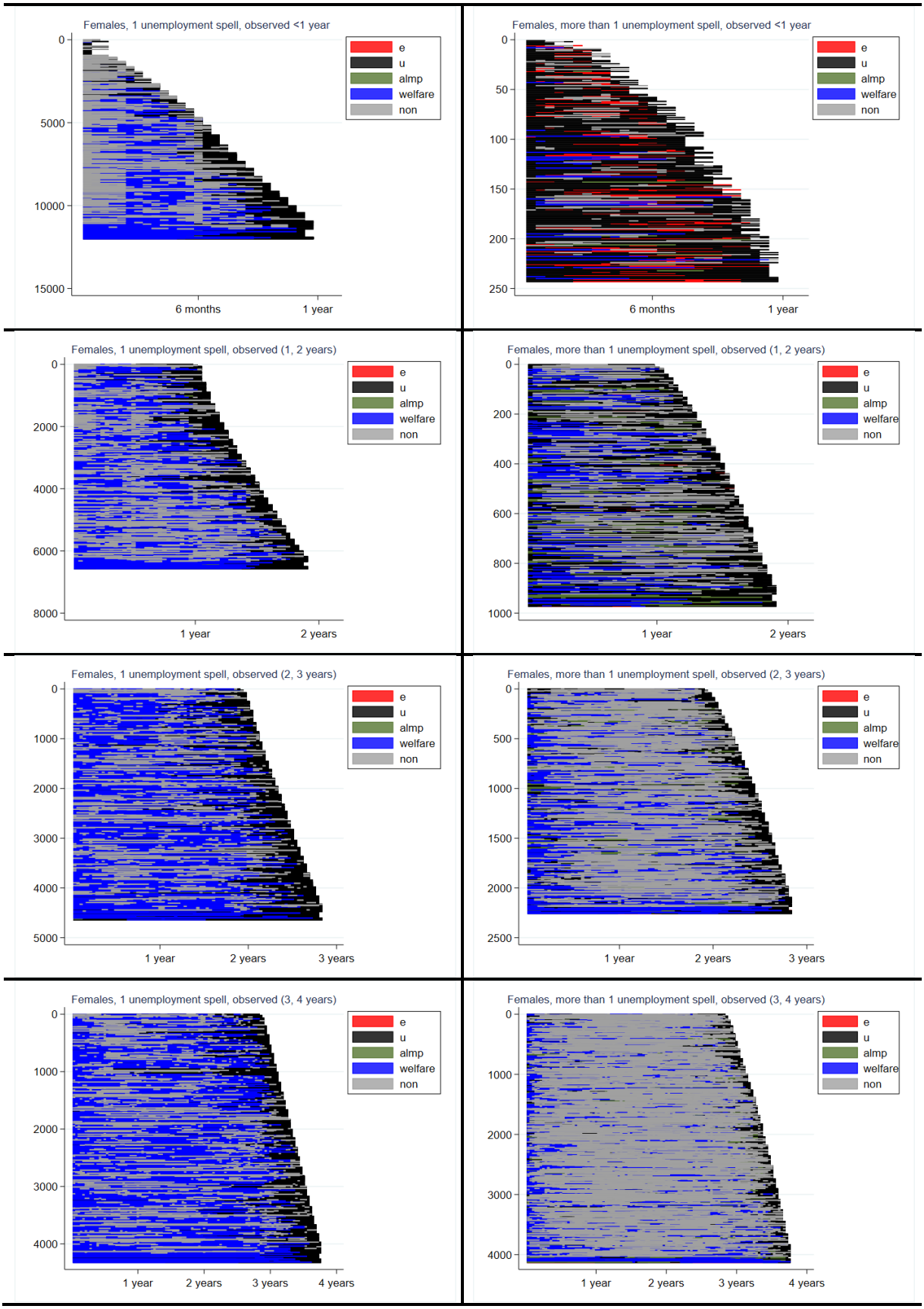
Source: own elaboration.

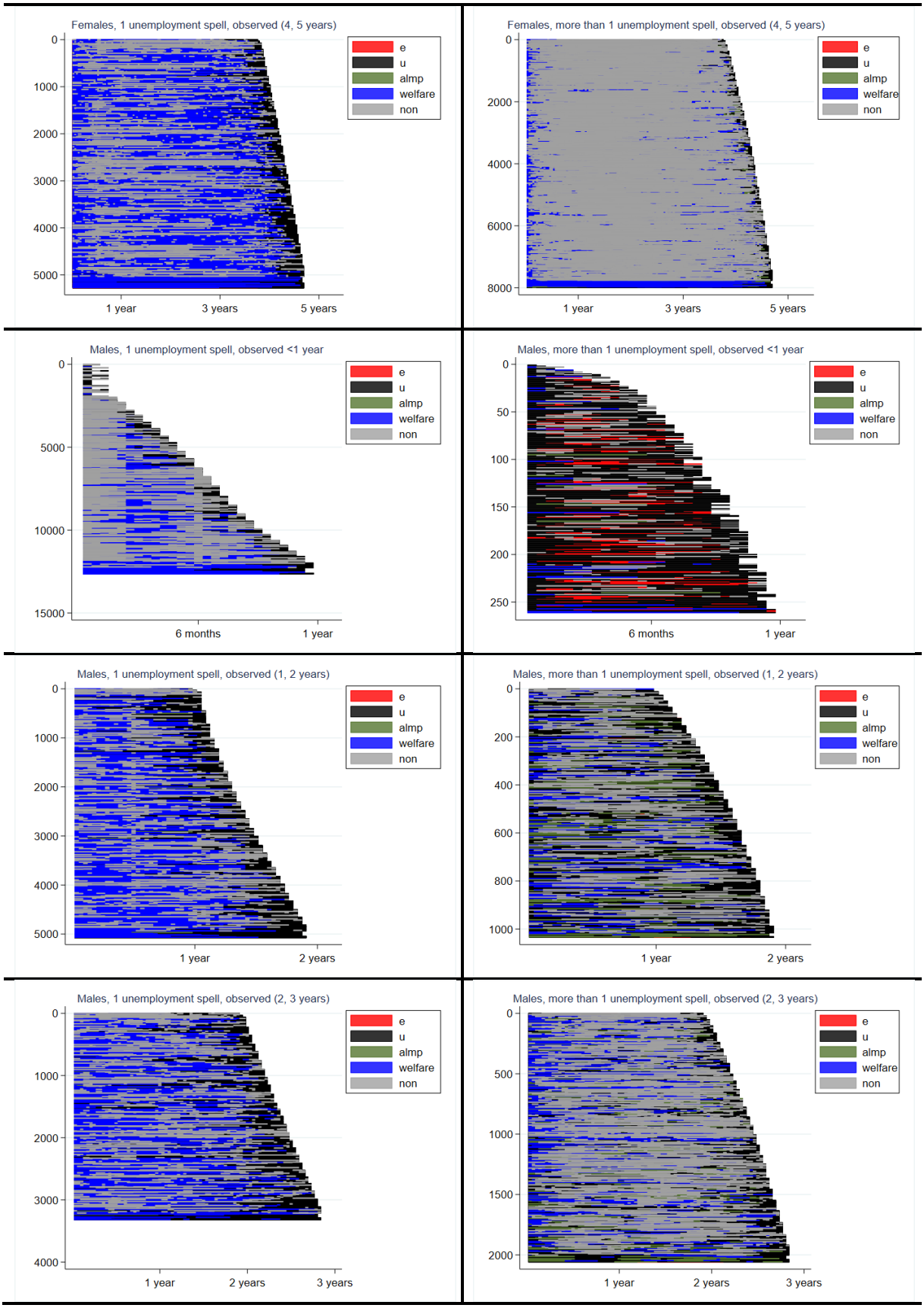
In the sequence analysis I examined both the transitions between states and the length of staying in particular state. This allowed me to identify some peculiarities and patterns in labour market attachment history. If the unemployment spell was not the last one experienced, it was followed by employment in 50% of cases, although the mean duration of such employment spell was only 10.6 months. In one out of ten cases the unemployment spell ended

in a transition to ALMP programmes, but these in turn in only 10% were followed by employment periods. The perception of small effectiveness of ALMP in leading to sustainable employment is strengthened by the fact that ALMP spells were in 40% cases followed by subsequent unemployment spell. The unemployment spell that ended in a retirement transition was preceded by non-participation spells in 75% of cases, but their median length was just 12 days. On the other hand, this unemployment spell in 15% cases was preceded by employment spells and their median length was 1 year.

I also applied sequence analysis methods and generated sequence index plots to present the labour force attachment patterns of the studied workers. I identified the status every 14th day since the first day of observation till the retirement transition. The workers were grouped using classical optimal matching technique (the most frequent path constituted the reference in each case) and Figure 5 compiles sequence index plots in various breakdowns. For the readability of the plots I produced them in sex breakdown and while accounting for the fact whether an individual experienced one unemployment spell (66.6% of the sample) or multiple unemployment spells. The vertical axis displays number of observed individuals, while horizontal axis the observation period. The frequencies in particular plots differ what hinders direct comparison, but a few conclusions arise. Workers who experienced only one unemployment spell prior to retirement transition, in many cases received some sort of income from welfare or were simply inactive. Any kinds of (subsidised) employment were scarce. At the end of the labour market attachment history they registered, probably to use eligibility to unemployment benefit and then retired. Workers who experienced multiple unemployment spells, displayed more various labour market attachment pathways. The employment spells were more visible especially among those observed less than a one year, and particular spells interrupted either ones.

Figure 5. Sequence index plots for particular number of transitions (from two to 15) for males and females, order based on classical optimal matching technique




Females, 1 unemployment spell, observed (4, 5 years)
0
1000
2000
3000
4000
5000
1 year
3 years
5 years
e
u
almp
welfare
non
Females, more than 1 unemployment spell, observed (4, 5 years)
0
2000
4000
6000
8000
1 year
3 years
5 years
e
u
almp
welfare
non
Males, 1 unemployment spell, observed <1 year
0
5000
10000
15000
6 months
1 year
e
u
almp
welfare
non
Males, more than 1 unemployment spell, observed <1 year
0
50
100
150
200
250
6 months
1 year
e
u
almp
welfare
non
Males, 1 unemployment spell, observed (1, 2 years)
0
1000
2000
3000
4000
5000
1 year
2 years
e
u
almp
welfare
non
Males, more than 1 unemployment spell, observed (1, 2 years)
0
200
400
600
800
1000
1 year
2 years
e
u
almp
welfare
non
Males, 1 unemployment spell, observed (2, 3 years)
0
1000
2000
3000
4000
1 year
2 years
3 years
e
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almp
welfare
non
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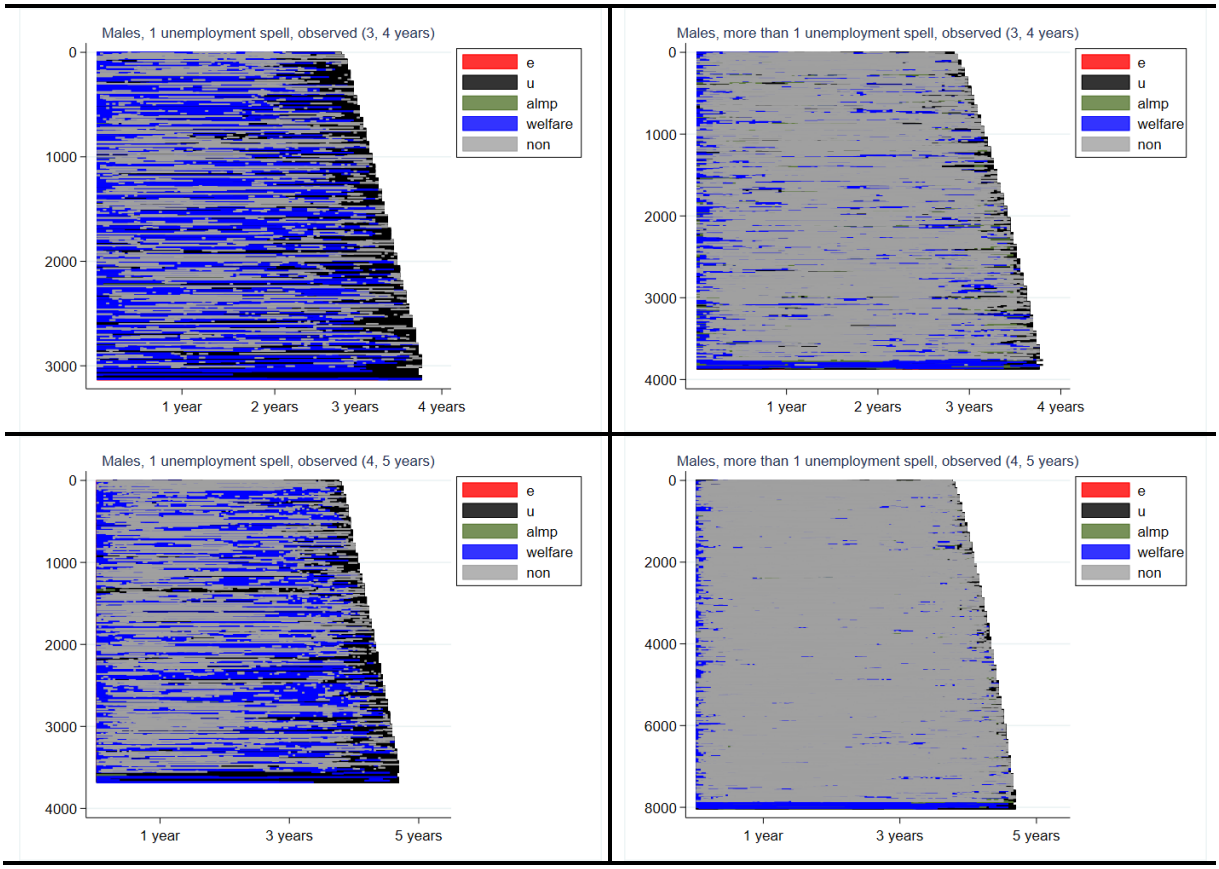


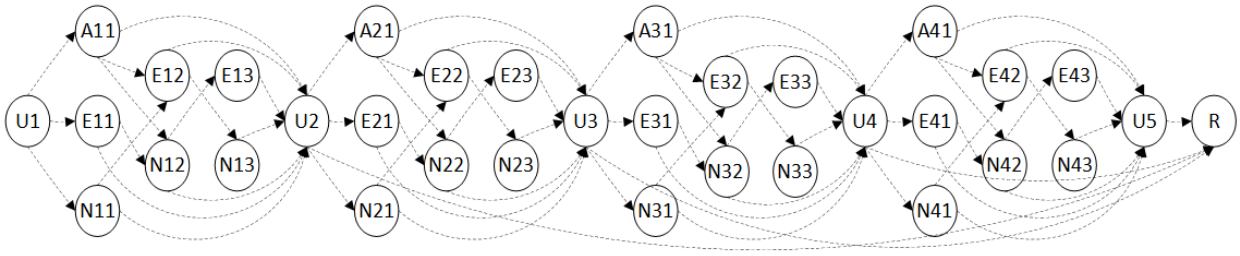
Notes: e – employment, u – unemployment, almp – ALMP, welfare – benefits, non – others
Source: own elaboration.

4. K-progressive competing risk multi-state model

I employed a multi-state model (MSM), which is a model for a continuous time stochastic process that allows individuals to move among a finite number of states. If a state is transient – further transitions are possible, if it absorbing – no further transition is possible from the given state (Meira-Machado et al. 2009). I built a k-progressive model with competing risks at each stage of a transition pathway to retirement. Figure 6 outlines the general idea of a full model. The starting state for all individuals is unemployment, so I neglected everything that happened before the first unemployment spell. I did so to examine especially the direction of exits from unemployment and intermediate transitions between unemployment spells. Moreover, I focused on individuals who experienced at least two unemployment spells, which means that they had intermediate states of ALMP or employment, or non-participation between

unemployment spells. I assumed that workers could have experienced up to three intermediate states between unemployment spells and this covered 29147 individuals out of 30547 individuals experiencing at least two unemployment spells, so the 95.4% of the sample. The model accounted for retirement transitions after second, third, fourth and fifth unemployment spell as the total sample included individuals experiencing different number of unemployment spells.

Figure 6. K-progressive competing risk full model, in which up to three intermediate states were possible between unemployment spells

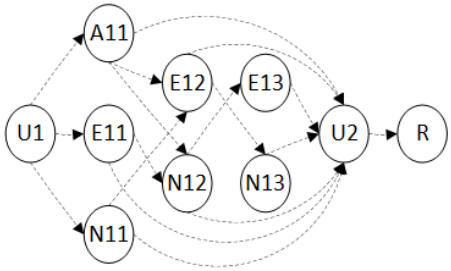


Notes: U1 – first unemployment spell, A11 – ALMP after the first unemployment spell, E11 – first employment after first unemployment spell, N11 – first non-participation after first unemployment spell, E12 – second employment after first unemployment spell, N12 – second non-participation after first unemployment spell, E13 – third employment after first unemployment spell, N13 – third non-participation after first unemployment spell, and so on; R – retirement; arrows display possible transitions.

Source: own elaboration.

For the robustness check of the results I built models for individuals experiencing a given number of unemployment spells. I treated these groups of workers as strata; in each model workers retired after the last unemployment spell. For example, Figure 7 displays the model for individuals experiencing two unemployment spells; for individuals experiencing three, four or five unemployment spells, the models contained respective parts of the model in Figure 6, having in mind that retirement was possible only after the last unemployment spell experienced.

Figure 7. K-progressive competing risk model for workers experiencing two unemployment spell (up to three intermediate states were possible between unemployment spells)

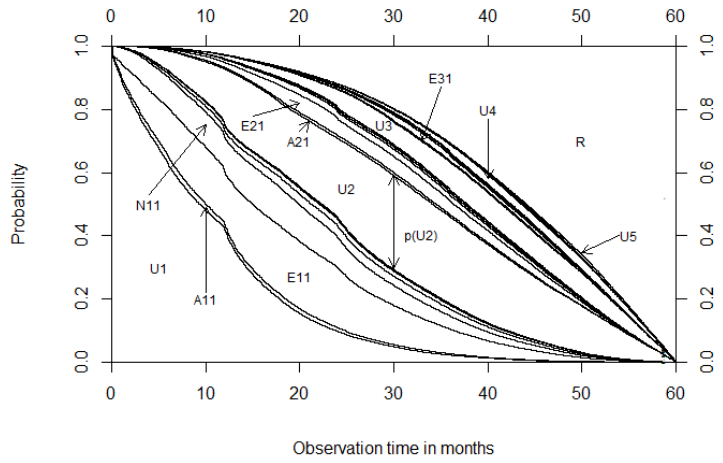


Notes: U1 – first unemployment spell, A11 – ALMP after the first unemployment spell, E11 – first employment after first unemployment spell, N11 – first non-participation after first unemployment spell, E12 – second employment after first unemployment spell, N12 – second non-participation after first unemployment spell, E13 – third employment after first unemployment spell, N13 – third non-participation after first unemployment spell, and so on; R – retirement; arrows display possible transitions.

Source: own elaboration.

I applied non-parametric and semi-parametric methods to this Markov type model, and used *mstate* package in R for the computations (compare de Wreede et al. 2011). In non-parametric estimates I computed transition intensities and transition hazards, assuming a separate baseline hazard for each of the transitions. Next, I identified a transition probability matrix. Figure 8 displays the results by means of stacked transition probabilities, and Figures 9-12 in the Appendix present temporal distribution of stacked probabilities for models for respective groups of workers experiencing two, three, four or five unemployment spells. The vertical distance between two adjacent curves represents the probability of being in the corresponding state in a given moment (de Wreede et al. 2011).

Figure 8. Non-parametric estimates of stacked transition probabilities, full model



Notes: U1 – first unemployment spell, A11 – ALMP after the first unemployment spell, E11 – first employment after first unemployment spell, N11 – first non-participation after first unemployment spell, E12 – second employment after first unemployment spell, N12 – second non-participation after first unemployment spell, E13 – third employment after first unemployment spell, N13 – third non-participation after first unemployment spell, and so on; R – retirement; arrows display possible transitions. p(·) – probability of being in a given spell in a given moment, equal to the distance between two adjacent curves; e.g., p(U2) – probability of being in second unemployment spell in 30th month of observation time.
Source: own elaboration.

In the next step, I employed a semi-parametric approach to the models describing transition pathways of workers experiencing a given number of unemployment spells (two, three, four and five). I did it to determine the impact of particular covariates on respective transitions and verify if it differed among workers experiencing different number of unemployment spells. I examined following covariates: sex, educational level, quadratic age at the retirement transition, and dummy variable which indicated if an individual collected unemployment benefit in a particular unemployment spell. Moreover, I expanded two factor variables: (i) sex and (ii) dummy on collecting unemployment benefit, to check if the impact of these determinants depended on the direction of the outflow from unemployment. As in the case of non-parametric estimates, I assumed a separate baseline hazard for each transition. The estimated coefficients and their standard errors are shown in Table 1.

Table 1. Semi-parametric estimates of the k-progressive competing risk model

Variable / estimate	Parameter estimate (standard errors)			
	two unemployment spells	three unemployment spells	four unemployment spells	five unemployment spells
age	0.0465***	0.0309**	-0.0026	-0.008
	(0.011)	(0.014)	(0.020)	(0.004)
age^2	-0.0005***	-0.0003**	0.0000	0.0000
	(0.000)	(0.000)	(0.000)	(0.000)
education level				
primary	-	-	-	-
vocational	0.0081	-0.0033	-0.0339*	-0.0078
	(0.009)	(0.012)	(0.017)	(0.003)
secondary general	0.0429***	-0.0445**	-0.0525	-0.0703
	(0.016)	(0.023)	(0.033)	(0.007)
secondary vocational	0.0815***	0.0333**	-0.0178	-0.0464
	(0.011)	(0.015)	(0.022)	(0.004)
post-secondary or tertiary	0.1403***	-0.0040	-0.0028	0.0161
	(0.017)	(0.025)	(0.038)	(0.074)
sex				
males	-	-	-	-
females	-0.0239*	-0.0299*	-0.0184	-0.0083
	(0.013)	(0.016)	(0.023)	(0.045)
females (U1→A11)	-0.3604***	-0.3590***	-0.4105***	-0.8175**
	(0.064)	(0.070)	(0.104)	(0.261)
females (U1→E11)	-0.0439*	-0.0569	-0.0672	-0.0666
	(0.023)	(0.038)	(0.063)	(0.131)
females (U1→N11)	-0.0627**	-0.0059	0.0773	0.0315
	(0.026)	(0.042)	(0.076)	(0.134)
females (U2→A21)	-	-0.1174*	-0.3513***	-0.5028**
		(0.070)	(0.098)	(0.225)
females (U2→E21)	-	0.0295	-0.0985	0.0400
		(0.036)	(0.064)	(0.131)
females (U2→N21)	-	-0.0882*	0.1591**	0.0753
		(0.045)	(0.0.078)	(0.147)
females (U2→R)	-0.1112***	-	-	-
	(0.019)			
females (U3→A31)	-	-	-0.3531***	-0.4544**
			(0.102)	(0.218)
females (U3→E31)	-	-	0.1524**	-0.0658
			(0.062)	(0.129)
females (U3→N31)	-	-	0.1308	0.0036
			(0.080)	(0.153)
females (U3→R)	-	-0.0734***	-	-
		(0.028)		
females (U4→A31)	-	-	-	-0.2408
				(0.239)
females (U4→E31)	-	-	-	0.1771
				(0.125)
females (U4→N31)	-	-	-	0.0810
				(0.152)
females (U4→R)	-	-	-0.0373	-
			(0.047)	
females (U5→R)	-	-	-	-0.0316
				(0.095)
UI (U1→A11)	-1.0373***	-0.9582***	-1.2295***	-0.8844***
	(0.064)	(0.069)	(0.107)	(0.238)
UI (U1→E11)	0.0850***	0.0023	0.1114*	0.4877***
	(0.022)	(0.037)	(0.061)	(0.136)
UI (U1→N11)	-0.9360***	-0.9000***	-0.9445***	-1.4900***
	(0.023)	(0.041)	(0.077)	(0.155)
UI (U2→A21)	-	-1.1738***	-0.7626***	-0.8245***
		(0.079)	(0.099)	(0.241)
UI (U2→E21)	-	0.0213	0.3174***	0.8593***
		(0.033)	(0.062)	(0.143)
UI (U2→N21)	-	-1.0736***	-1.2402***	-1.8350***
		(0.048)	(0.088)	(0.204)
UI (U2→R)	0.1290***	-	-	-
	(0.009)			
UI (U3→A31)	-	-	-1.0885***	-0.6536***
			(0.112)	(0.225)
UI (U3→E31)	-	-	0.1787***	0.7338***
			(0.059)	(0.139)
UI (U3→N31)	-	-	-1.2601***	-2.0810***
			(0.096)	(0.224)
UI (U3→R)	-	0.1218***	-	-
		(0.011)		
UI (U4→A31)	-	-	-	-1.0310***
				(0.269)
UI (U4→E31)	-	-	-	0.6760***
				(0.127)
UI (U4→N31)	-	-	-	-1.3610***
				(0.201)
UI (U4→R)	-	-	0.1579***	-
			(0.029)	
UI (U5→R)	-	-	-	0.2366***
				(0.033)
Concordance	0.58 (se=0.004)	0.574 (se=0.006)	0.565 (se=0.011)	0.601 (se=0.024)
Likelihood ratio test	2222 (df=15)	1635 (df=21)	1080 (df=27)	639.6 (df=33)
Wald test	2228 (df=15)	1524 (df=21)	965.7 (df=27)	53239 (df=33)
Number of events	67441	41405	19774	5619

Notes: A – ALMP programmes, E – employment, N – non-participation, R – retirement, U – unemployment.

Source: own elaboration.

Older workers experienced lower hazard, but at an increasing rate, of the transition to subsequent states. There was no difference in hazard of subsequent transitions between sexes in general, but specific coefficients indicated that females were less likely to participate in the ALMP programmes (the hazard was around 30% lower compared to males). Estimated coefficients on the educational level attained were statistically significant only in samples referring to workers experiencing less unemployment spells, and their values implied that those better educated individuals were more likely to transition out of unemployment, although the hazard rates' values were only a few percentage points higher compared to those with primary education. The fact of collecting the unemployment benefit differentiated almost all possible transitions, and in general collecting the benefit decreased changes of transitioning to ALMP or non-participation, but increased likelihood of moving from unemployment to employment. The decreases in hazard were even by 60-70%, whereas increases were by up to 20% (apart from the 5-unemployment-spell sample where values were exceptionally high).

5. Discussion

Obtained results indicate marginal labour force attachment of the workers who experienced unemployment late in job career, and eventually transitioned from unemployment to retirement. It looks that these workers actually deactivated long before actual retirement took place and their participation was restricted to the minimum. What stands out is the fact that around 30% of the workers who retired directly from registered unemployment were registered prior to retirement for periods longer than five years (so they were not directly included in the analysis). Workers in the sample spent on average 84% of the observation time in non-employment states, but one quarter of all workers spent 73% of the observation time as non-employed, and half of the sample did not experience even one day of the observation time as employed. Although unemployment constituted most of this non-employment time, workers did not contribute to the effective labour supply. Employment spells were more likely the

further it was to retirement, and they were on average shorter than unemployment spells. Transitions from unemployment to employment were rather infrequent. The relative abundancy of ALMP spells, and the fact that only a small fraction of ALMP spells were followed by employment spells indicates inefficiency of ALMP in generating sustainable employment. Probably the ALMP programmes were treated as means to collect contributory spells to acquire (early) pension rights and/or get some income especially if an individual was not eligible to unemployment benefit. The last unemployment spell experienced was on average the longest, what also suggests that workers waited to become eligible to collect pension benefits.

Workers often retired either at the age well below the standard retirement age (but on average legitimated with greater professional experience) or exited the pool at standard retirement age (but on average legitimated with lower professional experience). It looks that those who could have taken advantage of various early retirement schemes did so, while others must have waited till they reached standard retirement age.

Quantitative study showed lower hazard of subsequent transitions of older workers, what may reflect their lower mobility between states in the labour market, especially in terms of low employability chances (that generally decrease with age). Gender did not differentiate hazard of transitions, apart from participation in ALMP. Here, usually public works and intervention works dominated what could explain lower treatment rate among females.

Many workers collected unemployment benefit for long periods. This suggests that unemployment benefit was perceived as a valuable source of income for the studied group, especially if we account for the fact that the time period of collecting the benefit contributed to the old-age benefit. This was especially visible in spells directly preceding the retirement transition. On the other hand, eligibility to unemployment benefit depends on previous work attachment (365 of contributory days in the preceding 18 months), so the picture emerges that after losing a job, workers took on the benefit and then retired. In each sub-sample in model's

estimates the fact of collecting the unemployment benefit in the last experienced unemployment spell increased the probability of transitioning from unemployment to retirement. I suppose, that short proximity of the pension benefit encouraged workers to use the benefit as a source of income and then retire, as they had already fulfilled the eligibility criteria for the old-age benefits. Point estimates indicated also that collecting the unemployment benefit discouraged workers from transitioning from unemployment to either ALMP or non-participation (so the opportunity cost of losing the benefit was too high). But in some cases collecting the unemployment compensation increased probability of transitioning from unemployment to employment. I would explain this finding by means of some selection, probably workers who were least likely to find a job could either exit to non-participation (and have no income) or participate in ALMP (and have relatively low income compared to the unemployment benefit). On the other hand, some workers with greater employability chose employment compared to unemployment once a job offer arrived.

The patterns in labour force participation are the outcome of the demand and supply. Older workers, who were close to retirement age, did not contribute to the effective labour supply a few years before actual retirement. The simple direct policy recommendation would be to increase the standard retirement age and abolish early retirement schemes. Then, most probably the effective retirement age would follow the changes in legal conditions. The open question remains whether these workers 'waited' voluntarily. One side of a coin is to create incentives for workers to remain active in the labour force and make them realize that they are the ones to take advantage of their prolonged labour force participation; the other thing is to create incentives for companies to encourage them to retain older workers among their employees or hire new older employees, as these companies will benefit from this employment strategy as well.

My research provides valuable insights in studying less common routes to retirement, than standard employment - retirement transition. Nevertheless, it has been limited to some extent. I observed individuals who retired directly from registry in the public employment office. I did not compare the results to any other groups of pensioners, or workers from the same birth cohorts who appeared in registry as well. In particular, it would be interesting to compare the labour force attachment patterns of the future pensioners with those collecting pre-retirement benefits, disability allowance, or reached standard retirement age. These options are other potential routes leading to professional deactivation by means of public employment office. It would be also advisable to compare the labour force attachment patterns of the studied group with workers from the same birth cohorts who managed to reintegrate with the labour market. I plan to address these issues in future research.

In total I investigated the labour force attachment patterns of around 70% of workers who transitioned to retirement from unemployment. Data from the social security administration indicated that for the time period 2008-2016 I observed on average 3% of the new pensioners, and this share oscillated in the range 1%-5% in particular years. This figure seems small, but it covers the entire population of least successful workers who did not manage to encounter a permanent job prior to retirement, but who still found some incentives to register with public employment office prior to retirement and retired while being registered with it. I observed only legal employment spells, yet some workers could have remained in registry to obtain free health insurance and possibly collect unemployment benefit, and they were working in a shadow economy at the same time. Once a person turns standard retirement age, she is not obliged to retire, but cannot be registered as unemployed anymore (she can be registered as a job seeker though). I assumed that studied workers decided to retire because pension benefits were their only available source of (legal) income, moreover they could more easily unretire thereafter as employment protection legislation is less strict for pensioners than for soon

pensioners. The LFS data for Poland indicated that in 2012, 50% of the individuals who were receiving pension benefits and were continuing working did so primarily to ensure that they had sufficient personal/household income (LFS data for 2012, Eurostat) and according to SHARE data, even 10% of pensioners in Poland worked somehow after retiring. All in all, although the sample was relatively small compared to entire population of pensioners, it reflected the retirement processes of the least successful older workers. Hence, I examined small, yet important and non-routine route to retirement.

6. Conclusions

In this study, I investigated the patterns of labour force attachment of older workers who eventually transitioned from unemployment to retirement. I examined their employment, ALMP, unemployment, welfare and non-participation complete spells in a period of up to five years that preceded deregistration due to transitioning from unemployment to retirement. I looked at the entire population of the above specified workers who were registered with any of the public employment offices in Poland and retired over the time period 1996-2017. I hypothesised that unemployed individuals being close to retirement did not effectively contribute to the labour supply, as they in fact 'waited' to become eligible to pension benefits. The arbitrarily chosen five-year period was to reflect relatively short time horizon in terms of the soon retirement, so workers could have already formulated expectations regarding old-age benefits. But, simultaneously the time span of this length should have induced active participation in the labour market.

I found that workers actually did not fully contribute to the effective labour supply in a period of a few years preceding the retirement. They on average spent 84% of observed time in non-employment, and although most of that time were unemployment spells their participation was restricted to the very minimum. The unemployment spells were prolonged, especially the ones that preceded retirement, and relatively rarely ended in a transition to

employment. Employment spells were scarce and more likely the further it was to retirement. Few ALMP spells were followed by employment spells. Older workers were less likely to transition in the labour market between states, and females were especially worse off in moving from unemployment to ALMP. Unemployment benefit constituted a valuable source of income and it was often collected over the maximum period.

The overall picture that arises from the research indicates that workers actually deactivated from labour force participation a few years before actual retirement. They did not manage to encounter official and sustained employment. This could have arisen due to their preferences, but also due to the labour demand constraints. The policy recommendation would be to increase the minimum retirement age and abolish early retirement schemes. Then the effective retirement age should follow the changes in legal requirements concerning eligibility to pension benefits. Nevertheless, some measures should be directed at creating incentives for companies to retain or hire older workers among their workforce as the improvement in job finding opportunity should also encourage workers to participate in the market.

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Appendix

Table 2. Distribution in the number of spells (part

No.	No. of individuals who experienced exactly a given no. of spells		No. of observations of a given number of spells	
	no.	%	no.	%
1	40097	43.8%	91468	33.0%
2	4996	5.5%	51371	18.5%
3	17925	19.6%	46375	16.7%
4	7578	8.3%	28450	10.3%
5	6273	6.9%	20872	7.5%
6	4567	5.0%	14599	5.3%
7	3440	3.8%	10032	3.6%
8	2296	2.5%	6592	2.4%
9	1973	2.2%	4296	1.5%
10	1311	1.4%	2323	0.8%
11	1012	1.1%	1012	0.4%
Total	91468		277390	

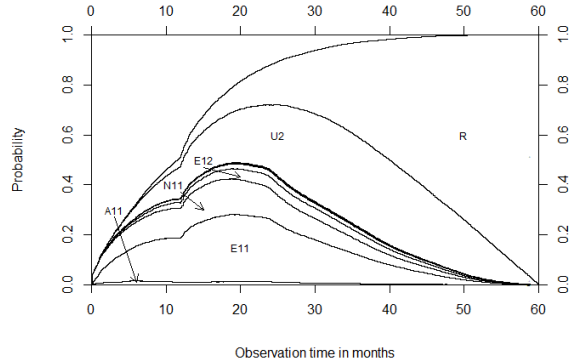
Source: own elaboration.

Table 3. Distribution in the number of particular types of spells

No.	No. of individuals who experienced exactly a given no. of unemployment spells		No. of individuals who experienced exactly a given no. of employment spells	
	no.	%	no.	%
1	60632	66.3%	27421	58.9%
2	20161	22.0%	11127	23.9%
3	7525	8.2%	5027	10.8%
4	2517	2.8%	2283	4.9%
5	633	0.7%	711	1.5%
Total	91468		46569	

Source: own elaboration.

Figure 9. Temporal distribution of stacked probabilities for workers experiencing two unemployment spells, starting point is the exit from first unemployment spell



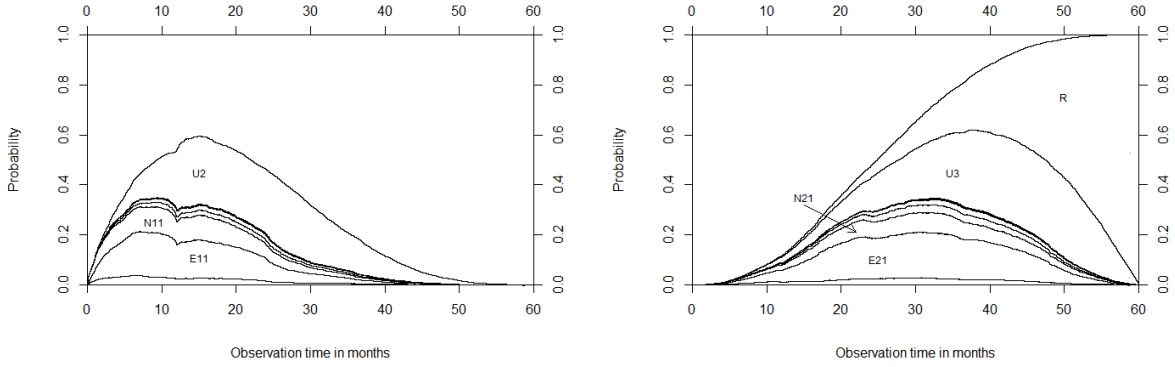
Notes: U1 – first unemployment spell, A11 – ALMP after the first unemployment spell, E11 – first employment after first unemployment spell, N11 – first non-participation after first unemployment spell, E12 – second employment after first unemployment spell, U2 – second unemployment spell, R – retirement. Other intermediate spells were omitted.

Source: own elaboration.

Figure 10. Temporal distribution of stacked probabilities for workers experiencing three unemployment spells

since the exit from 1st unemployment spell up to 2nd unemployment spell

since the exit from 2nd unemployment spell up to retirement

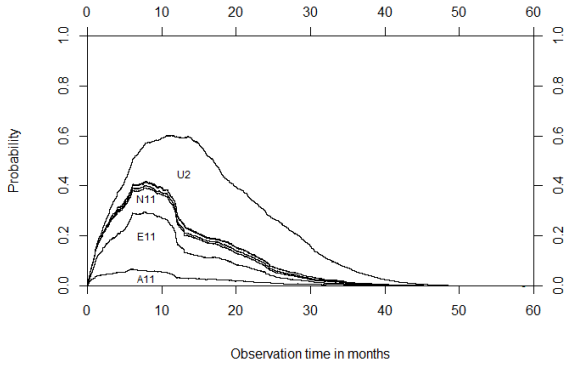


Notes: U1 – first unemployment spell, A11 – ALMP after the first unemployment spell, E11 – first employment after first unemployment spell, N11 – first non-participation after first unemployment spell, U2 – second unemployment spell, A21 – ALMP after the second unemployment spell, E21 – first employment after second unemployment spell, N21 – first non-participation after second unemployment spell, U3 – third unemployment spell, R – retirement. Other intermediate spells were omitted.

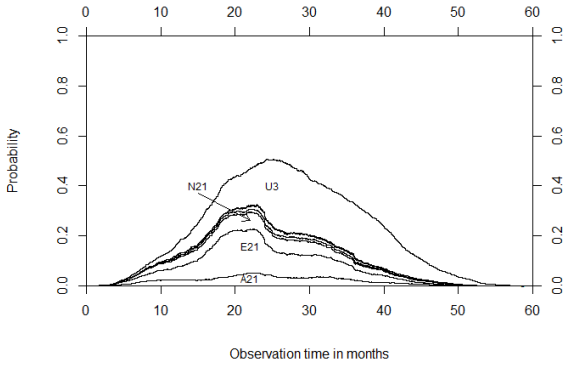
Source: own elaboration.

Figure 11. Temporal distribution of stacked probabilities for workers experiencing four unemployment spells

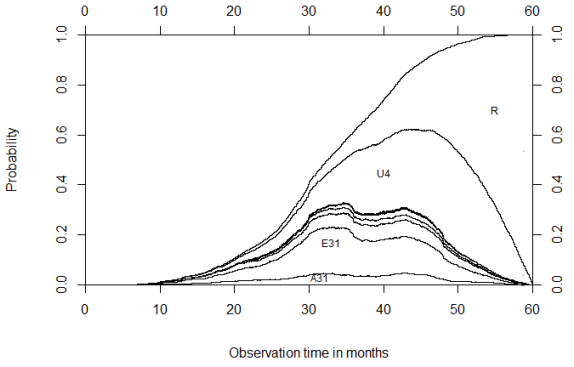
since the exit from 1st unemployment spell up to 2nd unemployment spell



since the exit from 2nd unemployment spell up to 3rd unemployment spell



since the exit from 3rd unemployment spell up to retirement

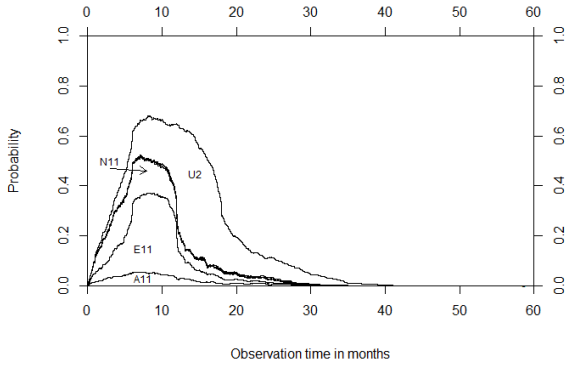


Notes: U1 – first unemployment spell, A11 – ALMP after the first unemployment spell, E11 – first employment after first unemployment spell, N11 – first non-participation after first unemployment spell, U2 – second unemployment spell, A21 – ALMP after the second unemployment spell, E21 – first employment after second unemployment spell, N21 – first non-participation after second unemployment spell, U3 – third unemployment spell, A31 – ALMP after the third unemployment spell, E31 – first employment after third unemployment spell, U4 – fourth unemployment spell, R – retirement. Other intermediate spells were omitted.

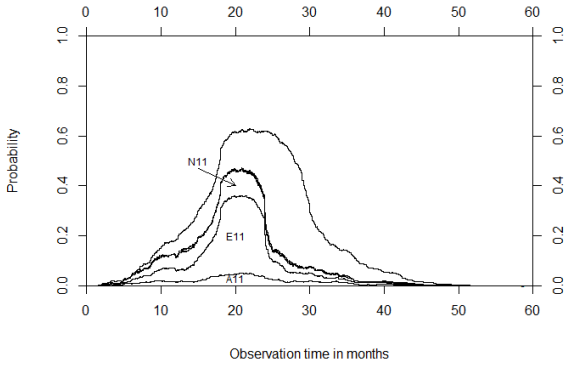
Source: own elaboration.

Figure 12. Temporal distribution of stacked probabilities for workers experiencing five unemployment spells

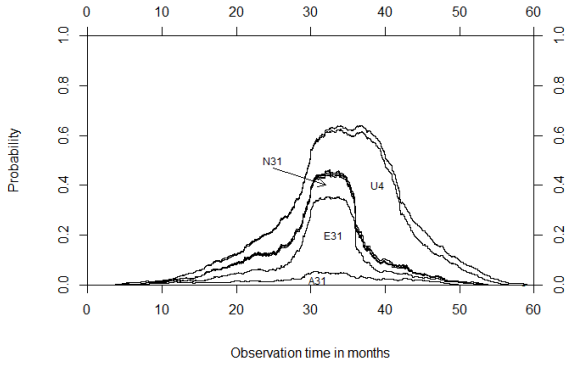
since the exit from 1st unemployment spell up to 2nd unemployment spell



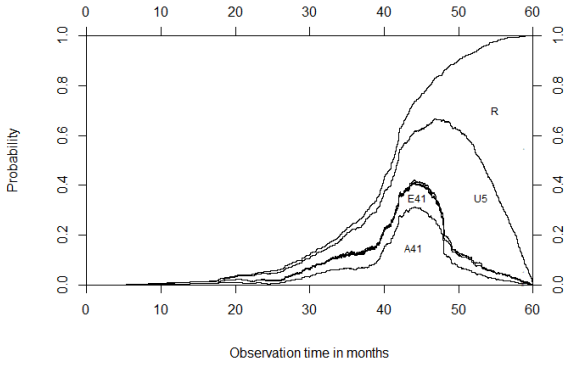
since the exit from 2nd unemployment spell up to 3rd unemployment spell



since the exit from 3rd unemployment spell up to 4th unemployment spell



since the exit from 4th unemployment spell up to retirement



Notes: U1 – first unemployment spell, A11 – ALMP after the first unemployment spell, E11 – first employment after first unemployment spell, N11 – first non-participation after first unemployment spell, U2 – second unemployment spell, A21 – ALMP after the second unemployment spell, E21 – first employment after second unemployment spell, N21 – first non-participation after second unemployment spell, U3 – third unemployment spell, A31 – ALMP after the third unemployment spell, E31 – first employment after third unemployment spell, N31 – first non-participation after third unemployment spell, U4 – fourth unemployment spell, A41 – ALMP after the fourth unemployment spell, E41 – first employment after fourth unemployment spell, N41 – first non-participation after fourth unemployment spell, U5 – firth unemployment spell, R – retirement. Other intermediate spells were omitted.

Source: own elaboration.