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PARTIAL UNEMPLOYMENT INSURANCE BENEFITS AND THE TRANSITION RATE TO REGULAR WORK

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Abstract: In Finland, unemployed workers who are looking for a full-time job but take up a part-time or very short full-time job may qualify for partial unemployment benefits. In exchange for partial benefits, these applicants must continue their search of regular full-time work. We analyze the implications of the experiences of partial unemployment for subsequent transitions to regular employment. We apply the "timing of events" approach to distinguish between causal and selectivity effects associated with the receipt of partial benefits. Our findings suggest that partial unemployment associated with short full-time jobs facilitates transitions to regular employment. Also part-time working on partial benefits may help in finding a regular job afterwards.

Key words: Partial unemployment benefits, temporary work, duration analysis, treatment effect

Tiivistelmä: Suomessa kokoaikatyötä etsivät työttömät, jotka ottavat vastaan osa-aikatyön tai lyhyen kokoaikatyön, voivat saada soviteltua työttömyyspäivärahaa. Vastineeksi osittaisesta työttömyyskorvauksesta näiden henkilöiden edellytetään jatkavan pidempiaikaisen kokoaikatyön etsimistä. Tutkimuksessa analysoidaan, miten sovitellut työttömyysjaksot vaikuttavat tulevaan työllistymiseen. Valikoituminen sovitellulle päivärahalle huomioidaan ns. ”timing of events” -mallissa, jossa mallinnetaan sekä työllistymistä että siirtymiä kokoaikaisesta työttömyydestä sovitellulle päivärahalle. Tulosten mukaan lyhyet keikkatyöt sovitellulla päivärahalla edesauttavat työllistymistä. Myös soviteltu osa-aikatyö voi helpottaa työllistymistä myöhemmässä vaiheessa, joskaan tämä tulos ei ole kovin robusti.

Asiasanat: Soviteltu työttömyyspäiväraha, osa-aikatyö, työttömyyden kesto

Contents

1 Introduction

During the past few decades the use of temporary and part-time work has increased in many countries. Temporary and part-time jobs – *atypical* jobs hereafter – are generally less desirable compared to permanent full-time employment (Booth *et al.*, 2002). Since many workers take up such jobs involuntarily owing to a lack of better jobs, a large share of part-timers and temporary workers can be viewed as underemployed. In Finland 29% of part-timers would have liked to work full-time, and 68% of temporary workers would have preferred a permanent job in 2004 (Haataja, 2007). Job losers, especially, are disproportionately employed in involuntary part-time and temporary jobs (Farber, 1999).

When no regular jobs are available, job seekers can benefit from atypical jobs. Temporary and part-time jobs can help to maintain and upgrade professional skills, provide contacts with potential employers, and weaken stigmatization associated with prolonged unemployment. Employers can use short-term contracts to uncover otherwise unobserved characteristics, and subsequently offer regular jobs to those applicants who have proved to be good enough. Several recent studies have found that temporary jobs serve as a stepping stone to regular work (Booth *et al.*, 2002, Lane *et al.*, 2003, Zilj *et al.*, 2004, Larsson *et al.* 2004, Heinrich *et al.*, 2005, and Addison and Surfield, 2006).

Wage income from short-term and part-time jobs can often be relatively low compared to unemployment benefits, making them difficult to accept for some unemployed workers. For this reason, several countries, including all the Nordic countries, many other European countries, and the United States, have made *partial* (or supplementary/adjusted) unemployment benefits available for job seekers who take up part-time or short-term jobs when no regular full-time work is available. If short-term and part-time jobs facilitate subsequent transitions to regular work, subsidizing working in such jobs via the unemployment compensation system can enhance labor market efficiency. The opponents of this, however, argue that partial benefits discourage workers from finding regular work through high replacement rates and extended benefit durations. The question of obvious interest is whether subsidized part-time/temporary work induces or hinders the unemployed from finding a regular full-time job. Given the large literature on the effects of the level and maximum duration of unemployment benefits on the behavior of fully unemployed workers, surprisingly little effort has gone into studying the role of partial benefits and their implications for subsequent labor market outcomes.[1] We address this issue in the context of the Finnish labor market.

In Finland, only job seekers who are looking for full-time work can qualify for unemployment benefits. When no full-time regular work is available, benefit recipients who take up a part-time job or a full-time job with the duration of less than one

[1] Munts (1970), McCall (1996), and Gerfin and Lechner (2002) are exceptions.

month (two weeks since 2003) may receive partial benefits on top of wage income. Workers on partial benefits are partially unemployed, and they are expected to continue their search for regular work. The objective of partial benefits is to encourage the unemployed to also take up jobs that are less than suitable, through financial incentives. Although the partial benefits have been available since 1985, very little is known about the recipients and how their behavior and subsequent labor market outcomes are affected.[2]

This paper addresses two main questions: Who among unemployment insurance recipients go to part-time and short full-time jobs that qualify for partial benefits, and what are the implications of partial unemployment for the transitions out of unemployment into regular work? We address these questions by using register-based data on individuals who lost their jobs and entered full-time unemployment in 1999 or 2000. The main concern in modelling the implications of partial unemployment is the potential endogeneity of the receipt of partial benefits. For example, it is possible that workers who find regular work more easily also have less trouble finding part-time and short full-time work. As a consequence, they may be overrepresented among partial benefit recipients, which can bias the estimates unless the selection process is appropriately accounted for. To deal with the selection into partial benefits, we apply a bivariate mixed proportional hazard model. The model specifies a transition rate from compensated (partial/full-time) unemployment to regular work, which depends on the past and current experiences of partial unemployment along with other determinants. The timing of the receipt of partial benefits is modelled by specifying a transition rate from full-time unemployment to partial benefits. These transition rates are interrelated by the way of observed and unobserved characteristics. The causal effects of partial unemployment on the transition rate to regular work is distinguished from the selectivity effects by exploiting variation in the timing of the receipt of partial benefits. This is known as the "timing of events" approach (Abbring and Van den Berg, 2003).

We divide the effect of partial unemployment into two parts: the change in the transition rate to regular work while receiving partial benefits (*instant* effect) and the change following the return to full-time unemployment (*delayed* effect). We allow these effects to vary with the type of partial unemployment (subsidized part-time or short full-time work), and the timing and duration of the partial benefit period. We find a higher transition rate from full-time unemployment to partial benefits for women than for men. The transition rate to partial benefits also varies with occupation, education, and living region. We find that partial unemployment associated with short full-time jobs facilitates transitions to regular work during and after a spell of partial benefits. The strong instant effect suggests a possibility that short full-time jobs are used as a probation device by employers, providing a stepping

[2] As part of the same research project, Haataja and Korkeamäki (2007) and Haataja (2007) consider the incidence of partial unemployment and the livelihood of partial benefit recipients.

stone to longer employment contracts for some applicants. We find no evidence that subsidized part-time jobs are used for the same purpose. Nevertheless, taking a part-time job that qualifies for partial benefits may still reduce the expected duration until regular work, owing to a positive delayed effect, although this evidence is not conclusive.

The rest of the paper is organized as follows. The next section discusses some related studies. Section 3 introduces the Finnish unemployment compensation system, with an emphasis on potential incentives associated with partial benefits. Section 4 describes the underlying data sources and sample restrictions. Descriptive evidence is presented in Section 5, which is followed by an econometric analysis in Section 6, where we tackle the selectivity issues. The final section concludes.

2 Related literature

The question as to whether atypical jobs, such as part-time and temporary jobs, are "dead ends" or "stepping stones" to regular employment has been the topic of many recent studies. Heinrich *et al.* (2005) find that welfare recipients who take up temporary help jobs have better prospects than those without any job in the US labor market. Addison and Surfield (2006) and Lane *et al.* (2003) report similar findings, but Autor and Houseman (2005) draw the opposite conclusion from their analysis of quasi-experimental data from the Michigan Work First job placement program. Autor and Houseman find that having been placed in a temporary help job does not improve (and possibly lowers) employment and earnings over the subsequent one to two years' period compared to not having received any job placement. But workers in temporary help jobs seem to perform significantly worse than those who were assigned to direct-hire jobs. This makes them conclude that in some cases workers may be better off if they do not take up temporary jobs but continue searching for a permanent job.

Booth *et al.* (2002) show that temporary workers in Britain typically move readily into permanent jobs and either fully (women) or partially (men) catch up with the wage level of those who started in permanent jobs. Zilj *et al.* (2004) analyze transitions from unemployment to temporary work, from unemployment to regular work, and from temporary work to regular work in the Dutch labor market.[3] They find a much higher transition rate from temporary work to regular work than from unemployment to regular work. This suggests that the unemployed can reduce their expected duration until regular work by taking up temporary jobs. Using Finnish survey data, Kauhanen (2005) finds that the unemployed applicant who takes a temporary job has a higher probability of being employed in a permanent job one year later than otherwise similar applicants who remain unemployed.

Larsson *et al.* (2005) examine the implications of temporary work generated by a Swedish "career-break" program. This program allows the employee to take sabbatical leave for 3 to 12 months provided that his or her position is filled by an unemployed worker for that period. Their findings suggest that a temporary replacement job reduces the risk of being unemployed in the future, and that the duration of such a job raises the probability of having a permanent job in the same firm at a later day. Nätti *et al.* (2005) analyze a similar Finnish program using both survey and register data. Their descriptive analysis suggests that temporary replacement jobs improve the chances of unemployed applicants in the labor market (according to the register data) and those who obtain such positions also expect

[3] The unemployed, as defined by Zilj *et al.* (2004), need not be the recipients of unemployment benefits but all jobless people who are searching for a job are included. Moreover, their period of temporary work also includes unemployment and nonparticipation following the first true spell of a temporary job.

they do so (according to the survey).

Although these findings suggest that working in atypical jobs facilitate subsequent transitions to permanent employment, they do not directly imply that working on partial benefits is equally useful for labor market prospects. When partial benefits are available, workers can be less choosy about part-time and temporary jobs, and hence jobs held by workers on partial benefits may be less attractive and less productive than part-time and temporary jobs in general. Moreover, working on partial benefits may be associated with relatively high replacement rates and postpone the day when the unemployment benefits are exhausted. So there may be disincentive effects that attenuate or even reverse the positive effects associated with atypical jobs. But if such disincentive effects do not exist or are relatively weak, and if also jobs that qualify for partial benefits serve as a stepping stone to regular jobs, the partial benefits can provide a means of bringing more unemployed persons back to regular work. To date, however, very little is known about the role of partial benefits and their implications for subsequent labor market outcomes. Munts (1970), McCall (1996), and Gerfin and Lechner (2002) are exceptions.

In the US labor market, unemployment insurance recipients who take up a part-time job can earn up to a given amount ("the disregard") with no reduction in benefits, after which benefits are reduced on a dollar-for-dollar basis. By exploiting variation in the amount of earnings disregarded across states and over time, McCall (1996) shows that an increase in the disregard increases the transition rate from full-time unemployment to subsidized part-time work during the first three months of unemployment, and thereby lowers the expected duration of non-employment (i.e. the duration until either part-time or full-time work). But his analysis remains silent about the possible effect of subsidized part-time work on the chances of finding a full-time job, which is a more interesting question from the policy point of view. Munts (1970) gives early descriptive evidence that workers in Wisconsin did adjust their part-time working to benefit from a partial benefit scheme, which was slightly different.

Gerfin and Lechner's (2002) analysis of Swiss active labor market measures is perhaps most closely related to this study. In Switzerland, a wage subsidy is paid to those unemployed who accept a job in the regular labor market that pays less than their unemployment benefits. The participants of this scheme remain registered as job seekers and receive subsidy payments from unemployment insurance that over-compensate the difference between the wage and full unemployment compensation. Gerfin and Lechner conclude that the temporary wage subsidy is a successful program in terms of increasing their chances in the labor market, and is superior to more traditional labor market policy measures in Switzerland. Carling and Richardson (2004) come to a similar conclusion when comparing various labor market programs in Sweden. They find that the programs in which applicants obtain work experience and training provided by firms are more effective than classroom vocational train-

ing. Since they model the unemployment duration of program participants from the start of various programs, their analysis does not tell us how participation in any given program compares to non-participation. Nor do they consider the recipients of partial benefits.

3 Unemployment insurance in Finland

Unemployment benefit claimants must register as seekers of *full-time* work at the employment office. In particular, those who are looking for part-time work only are not entitled to unemployment benefits. Earnings-related unemployment insurance (UI) benefit can be received by workers who have been working and contributing to an unemployment fund for at least 10 months during the two years prior to unemployment.[4] The replacement rate for the UI benefit declines with the level of former earnings, the gross and net replacement rates for a worker with median earnings being 55% and 64% respectively (Koskela and Uusitalo, 2003). The UI benefit can be received for a maximum of 500 working days, which approximately amounts to two calendar years of full-time unemployment. Workers whose UI benefits are exhausted can claim labor market support. UI recipients are by far the largest group of job losers entering unemployment, and we will focus on this group in our empirical analysis.

UI recipients who take up a full-time job with a duration of less than one month (two weeks since 2003) or a part-time job with working time no greater than 75% of the regular working time in the occupation can claim partial unemployment benefits.[5] These workers are regarded as underemployed (or partially unemployed), and they should continue their search for regular full-time work in exchange for partial benefits. In 2005 one-fourth of UI recipients had received partial benefits and the partial benefits amounted to 9% of the total UI expenditure (Haataja and Korkeamäki, 2007).

While partially unemployed, each euro from work reduces the UI benefit by 50 cents. This adjustment is done in four-week or one-month periods, depending on the wage payment period. More specifically, the gross partial benefit per day, p, is obtained as

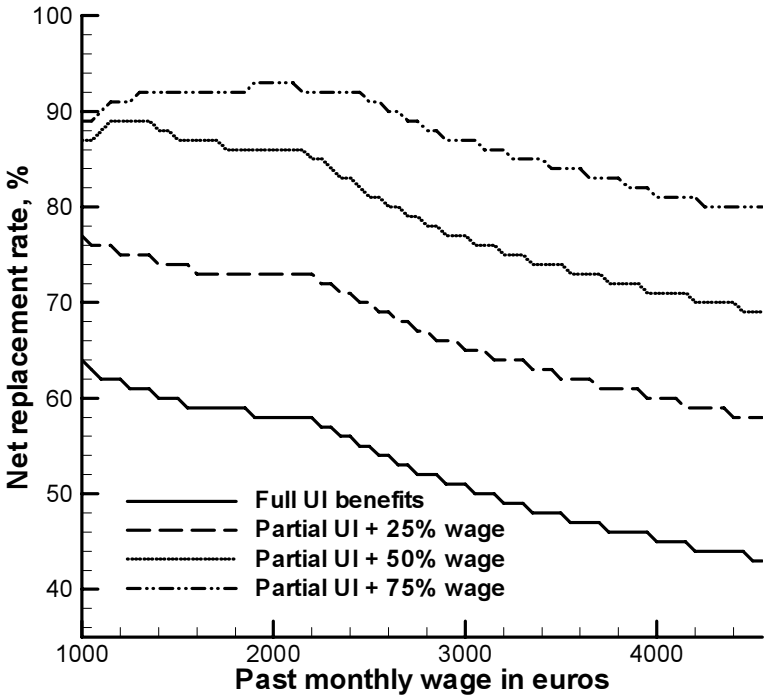
$$p = b - (0.5 \times w)/21.5,$$

where b is the gross full benefit per day, w is the gross wage income in the adjustment period, and 21.5 corresponds to the average working days in month. The partial benefit is paid for each working day in the adjustment period irrespective of whether the worker actually worked on that day or not. As a rule, the sum of partial benefits and wage income cannot exceed 90% of the gross wage on which the level of full UI

[4] Workers who fulfill the employment criterion of having worked at least 10 months but do not belong to any unemployment fund are eligible for the basic allowance (which amounts to 115 euros per week for a single person in 2003). Those who do not qualify for the UI benefit nor for the basic allowance can claim labor market support. There is no time limit for receipt of labor market support but it is means-tested against the spouse's income, with the maximum benefit level equal to the basic allowance.

[5] These rules for partial benefits were mainly introduced in 1997 as part of a larger reform of the unemployment compensation system. Haataja (2007) gives a description of the Finnish unemployment compensation system over a longer period.

Figure 1: Net replacement rates compared to full-time employment with the past wage rate, % (Source: Haataja, 2007)



benefit is based (that is, the wage level prior to unemployment).

Figure 1 depicts net replacement rates on UI benefits when full-time unemployed or partially unemployed at different wage levels.[6] The horizontal axis refers to the previous gross monthly wage, which determines the full level of UI benefits. The solid curve shows the net replacement rate as a function of the past wage rate when full-time unemployed. This is downward sloping due to the declining gross replacement rate of UI benefits and progressive income taxation.[7] Three other curves depict the ratios of net income associated with the combinations of various wage levels (expressed as fractions of the previous gross monthly wage) and partial benefits to net income in the past full-time job.

Consider a worker who earned 2000 euros a month before unemployment. When full-time unemployed on UI benefits, her net replacement rate is 58%. If she takes a part-time job with the monthly wage income of 500 euros (i.e. 25% of the previous monthly wage), her net replacement rate will rise to 73%. If the part-time job amounts to 1000 euros a month, the net placement rate will be as high as 86%.

[6] The net replacement rates take into account UI benefits, wages, and income taxation.

[7] Wage income is typically taxed at a lower rate than unemployment benefits due to particular deductions.

Assuming the same hourly wage for both jobs, this suggests that a half-day job combined with partial benefits results in only 14% lower net income than the full-time job. Although the gross replacement rate is limited to 90%, the net replacement rate can be higher due to taxation, as seen in the graph. It is evident that, compared to either full-time working or full-time unemployment, the combination of partial UI benefits and wage income can result in rather high net income levels. And this is true for a wide range of wage levels.

Furthermore, when a worker is collecting partial benefits, his entitlement period elapses at a reduced rate proportional to the ratio of partial benefits to the full compensation level. Namely, each day on partial benefits reduces the entitlement period by p/b days. It follows that a worker who has been on partial benefits has a longer time before the UI benefits become exhausted than an otherwise similar worker who has been full-time unemployed for the whole time.

The objective of partial benefits is to encourage the unemployed to take up jobs that would not be acceptable otherwise. The implications of the experiences of partial unemployment for subsequent labor market outcomes are ambiguous *a priori*. On the one hand, atypical jobs may facilitate transitions to regular employment via human capital accumulation, additional contacts with employers, and weakened stigma, but, on the other, partial benefits may have negative incentive effects due to the high replacement rates and extended benefit durations. Also, it is possible that such jobs do not provide a means of escaping unemployment but just crowd out productive job searching, as suggested by the findings of Autor and Houseman (2005) for the US. This is a matter of concern, especially for atypical jobs that are subsidized via partial benefits. If the unemployed are forced to take up atypical jobs and if such jobs have no positive implications for future labor market outcomes, workers on partial benefits may be no better off, and possibly worse off, than the full-time unemployed. To address these questions, we take a careful look at the data.

4 Data sources and sample

Our main source of data is the Employment Statistics (ES) database of Statistics Finland. This database merges information from over 20 administrative registers for all people with permanent residence in Finland. In addition to a rich set of variables for background characteristics, the ES database includes information on unemployments spells, periods in labor market training and job placement programmes (from the employment offices), and some limited information on job spells (from the pension institutions). However, there is no information on the spells of partial unemployment, since, in the database, workers on partial benefits are recorded as employed. To overcome this difficulty we have merged complementary information from the registers of the Social Insurance Institution (KELA) and the Insurance Supervisory Authority (ISA). ISA's records contain detailed information on unemployment spells for UI recipients, whereas KELA's records include the corresponding information for the recipients of the basic unemployment allowance and labor market support. These registers contain the starting and ending dates of all part- and full-time unemployment spells, along with information on daily benefit and the type of partial unemployment (due to involuntary part-time work or a full-time job shorter than one month). Thus, KELA's and ISA's registers cover all compensated periods of unemployment. At the time of collecting our data, KELA's and ISA's records were available until 2005 but the last year in the ES database was 2003.

We drew a 90% random sample of workers in the ES database who entered unemployment in 1999 or 2000, provided that they were employed over the whole of the past year.[8] We restrict our analysis to workers between the ages of 25 and 50 who became full-time unemployed and who were entitled to UI benefits at the beginning of their unemployment period. The older workers are excluded because their behavior is affected by withdrawal possibilities via early retirement schemes and because some of them are entitled to extended unemployment benefits (see Kyyrä and Wilke, 2007).

By including only workers who started as full-time unemployed, we effectively exclude individuals who switched from a full-time position to working part-time within the same firm. In these cases the underlying decision process is not clear. It should be the case that the worker had to move to a part-time position involuntarily because of the deterioration in business conditions. However, one can always speculate on a possibility that the worker reduced his working time freely in agreement with the employer, and partial benefits were just used as a wage subsidy. If so, the worker on partial benefits has no incentive to search for a full-time job.[9] While

[8] According to the rules of Statistics Finland, it is not allowed to collect data on the whole population of interest for research purposes, but a sample must be used. Therefore, we had to exclude 10% of the workers in the underlying population.

[9] A technical reason to exclude workers who started as partially unemployed is that in our duration model it is not possible to identify the selectivity effect associated with entry into partial

such practice is not legal, there are obvious financial incentives to misuse the partial benefits in this way.

Our sample covers 13,454 individuals, of whom 56% are female. For this sample we have collected background information on the family status, age, living region, education level, and occupation from the records of the ES database. Then we follow these workers until they leave compensated unemployment, including periods of full and partial benefits of any type. The overall duration of unemployment is defined as the length of time the worker receives (partial or full) unemployment benefits, and hence is presumably looking for a full-time job. More precisely, the overall period of unemployment is obtained by combining all sequential spells of unemployment in the KELA and ISA registers whose distance was less than two weeks. The resulting unemployment period may consist of several sequential unemployment spells of different types. For example, a worker who first received full UI benefits may have accepted a part-time job with partial UI benefits for a few weeks, then returned to full-time unemployment, and finally started to collect labor market support due to the exhaustion of UI benefits. For those who received partial benefits we have recorded the timing and duration of the receipt of partial benefits within the overall unemployment spell.[10]

The overall unemployment period may end with a transition to regular work, to a training course, to a job placement programme, or to nonparticipation. By "regular work" we refer to all jobs that do not qualify for partial benefits. In addition to full-time jobs with a duration of longer than one month, regular jobs may also include part-time jobs and shorter full-time jobs with monthly wage income high enough to reduce the partial benefit to zero. Workers in such jobs are officially fully employed, and thereby not eligible for any sort of unemployment compensation. At least from the viewpoint of the employment administration, these applicants completed their compensated job search successfully. Our definition of regular work is dictated by data limitations since we do not observe the working time, nor the length or type of employment contract.

KELA's and ISA's registers do not contain reasons why a given spell of compensated unemployment ended. To determine the exit destinations we have had to rely on information in the ES database. When the last piece of the overall unemployment period matches the full-time unemployment spell observed in the ES database, the reason for termination is typically recorded in the data. This information comes directly from the employment authorities. When this was not the case or this information was missing, we tried to determine the exit destination by comparing the

benefits at the beginning of the unemployment spell (Van den Berg *et al.*, 2004).

[10] When determining the duration of partial unemployment we have combined the subsequent spells of partial benefits if their distance was less than one week and if they were of the same type (associated either with a part-time job or short full-time job). This was done for 17 women and 5 men.

ending day of the overall unemployment spell with the starting days of job spells, labor market programs, and job placement programs available in the ES database. These procedures revealed the exit destination for the vast majority of workers in the data.

5 Descriptive evidence

Table 1 reports some sample statistics by sex and partial unemployment status, indicating whether the worker received partial benefits at some point during his or her unemployment period or not. Experiences of partial unemployment are more common among women. While 17% of women received partial benefits during their unemployment period, only 10% of men did so. From Panel A we see that the average age and UI benefits are almost identical between the recipients of partial benefits and those who were full-time unemployed over the whole unemployment period.[11] A higher share of women are married compared to men. Family background does not vary notably with the partial unemployment status.

We have allocated workers into five broad living regions to account for some regional differences in labor market conditions. Uusimaa, which includes the capital region, is distinguished from the other part of Southern Finland. Women with no educational certificates beyond comprehensive school and those living in Uusimaa are less likely to have received partial benefits. There are no notable differences between the male recipients and non-recipients of partial benefits according to the educational level or region of residence. Although sex differences in educational levels are rather moderate, women and men are concentrated in different occupation groups, reflecting a high degree of sex segregation in the Finnish labor market. Engineering, machinery, industrial work, and construction are the most common occupations among men, whereas the majority of women are looking for jobs in health care and social, clerical, or service sectors. It appears that the incidence of partial unemployment varies strongly with occupation. Partial benefits are most frequently received by applicants who are looking for health care and social work, which is a very female-dominated sector. This explains at least partly why the experiences of partial unemployment are more common among women. By contrast, industrial workers are much less likely to have received partial benefits.

As seen in Panel C in Table 1, roughly one-half of workers eventually escaped unemployment to regular work. Among both women and men this share is slightly higher for those who received partial benefits at some point. The share of exits to labor market training is clearly higher among workers without the experiences of partial unemployment. The same observation applies, albeit to a lesser degree, to exits to job placement programs. These findings may imply that subsidized atypical work and labor market programs serve as substitutes in some cases. It is possible that differences in the availability of atypical jobs, for example by occupation or region, are reflected in the supply of various labor market programs. Moreover, the

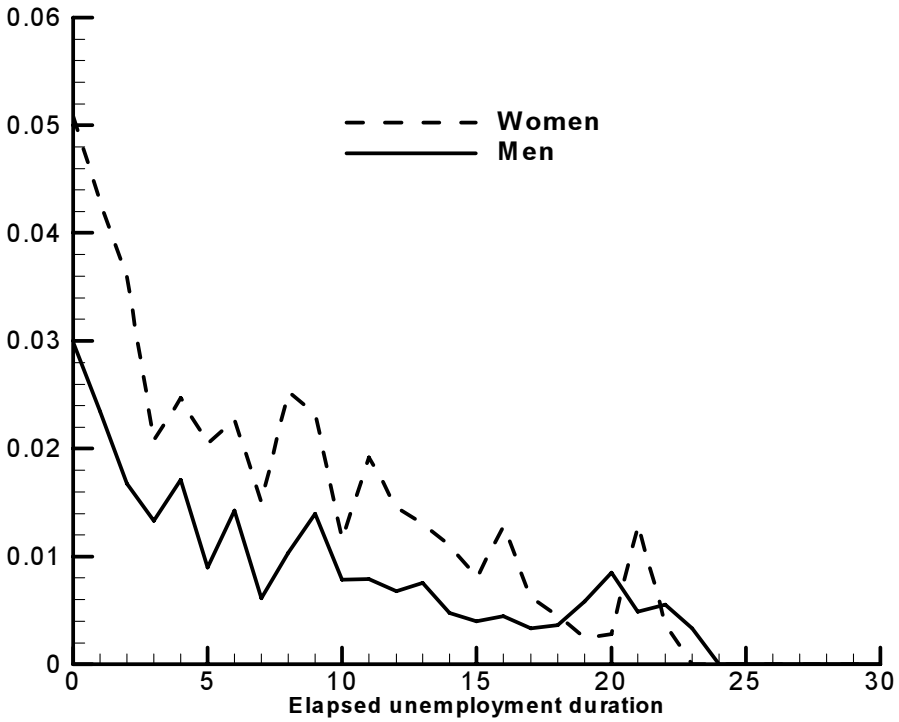
[11] UI benefits are measured at the time when the worker entered unemployment. Because of our sample restriction, all workers were entitled to full benefits at that time. Full compensation is (temporarily) replaced by partial benefits for those who take up part-time jobs or short full-time jobs.

Table 1: Descriptive statistics

	Women		Men	
Recipient of partial benefits:	No	Yes	No	Yes
A. Background characteristics				
Age	37.9	37.8	37.8	37.6
UI benefit per day	41.9	41.7	47.5	46.3
Married (%)	50.0	50.8	43.0	44.3
Child under 7 (%)	26.1	25.8	22.7	27.3
Region of residence (%):				
Uusimaa	25.5	16.1	23.2	21.2
Southern Finland	38.2	41.8	37.3	34.7
Eastern Finland	13.0	13.3	14.6	17.7
Northern Finland	10.9	11.9	12.6	15.4
Central Finland	12.4	16.9	12.2	11.1
Educational level (%):				
Comprehensive	21.3	15.9	25.7	23.1
Secondary	40.3	43.9	47.7	47.4
Lower university	29.4	31.4	19.5	19.7
Master's degree or higher	9.0	8.8	7.1	9.8
Occupation (%):				
Commercial work	13.6	10.1	10.0	6.1
Engineering	4.5	3.5	12.0	10.4
Machinery	0.7	0.1	11.8	8.4
Industrial work	11.1	6.3	20.8	13.9
Construction	0.2	0.2	11.8	10.7
Educational work	4.8	7.4	1.6	3.6
Health care and social work	19.7	31.4	2.7	6.3
Clerical work	23.7	16.3	7.6	6.6
Service work	13.1	17.0	5.5	8.8
Other	8.6	7.7	16.2	25.1
B. Duration variables (days)				
Unemployment duration	185	274	217	297
Completed duration	123	217	144	243
Time until partial benefits		107		119
Short full-time work		96		112
Part-time work		126		141
Duration on partial benefits		72		63
Short full-time work		48		45
Part-time work		111		112
C. Exit destinations (%)				
Regular work	41.4	48.1	52.2	56.4
Job placement	11.0	9.8	7.6	5.8
Training course	22.8	9.3	19.1	9.9
Nonparticipation	13.7	5.6	6.8	3.3
Unknown	11.1	27.2	14.3	24.6
Number of observations	6,239	1,291	5,319	605

Notes: Figures in the table are averages unless otherwise indicated. Background characteristics in Panel A are measured at the beginning of the unemployment period. Completed spells in Panel B include those followed by regular employment.

Figure 2: Monthly hazard for transitions into partial benefits by sex

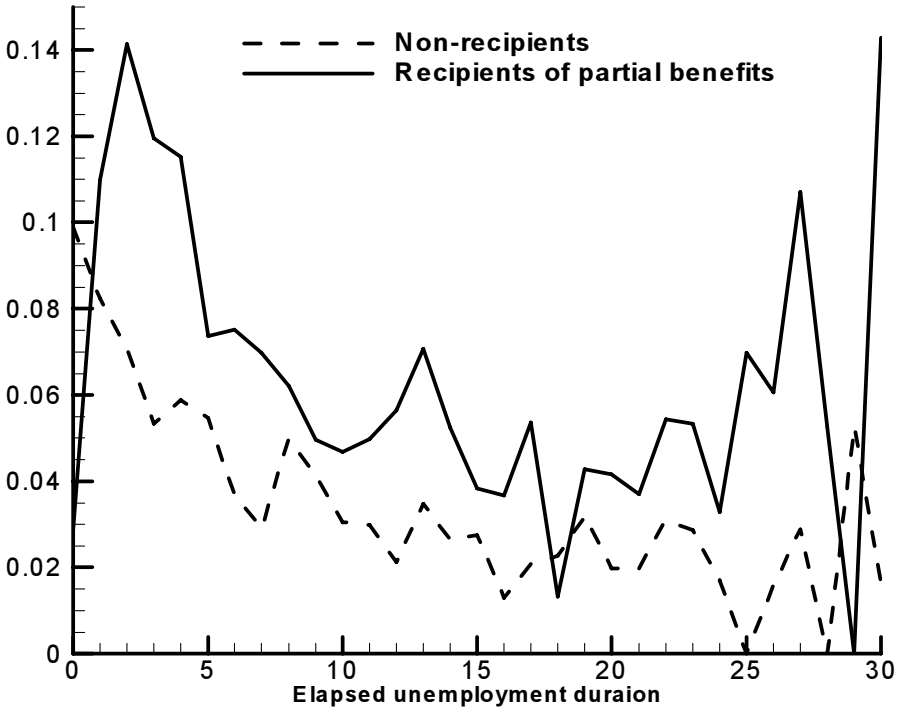


employment authorities do not offer places on training courses and job placement programs for workers on partial benefits because they are classified as employed job seekers. Finally, receipt of partial benefits may indicate that the applicant is really focused on looking for any kind of job, and does not consider the labor market programs as a reasonable alternative. This could also explain why partial benefit recipients are less likely to leave the labor force.

In some cases we were unable to determine the exit destination. In general, many unknown cases are likely to be associated with transitions out of the labor force because activities outside the labor force are poorly documented in the ES database. The shares of unknown cases are clearly higher for partial benefit recipients. We do not have direct information on the reason of termination from the employment authorities (but have indirect information) for applicants who left unemployment while receiving partial benefits. There are 201 women and 64 men who were on partial benefits at the time of exit and whose exit destination is not known. These groups account for 16 and 11 percent of male and female partial benefit recipients respectively, which explains the differences between the groups in the table.

In Figure 2 we depict empirical hazard functions for the receipt of partial UI benefits, i.e. monthly transition rates from full unemployment compensation to partial benefits. The hazard function is highest during the first months of unemployment,

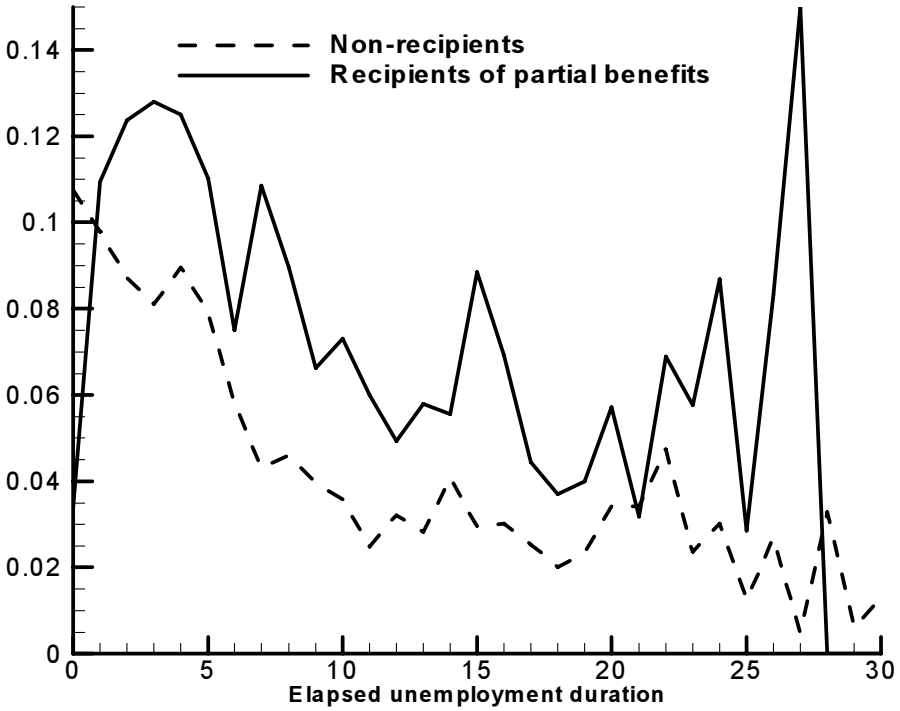
Figure 3: Women's monthly hazard for transitions to regular work conditional on receipt of partial benefits



when the monthly rate is between 2% to 5% for women, and somewhat lower for men. For both sexes it decreases gradually, being around zero after two years of unemployment. The hazard function of women is uniformly higher over the first 18 months of unemployment. The average duration until the receipt of partial benefits is 107 days for women and 119 days for men (see Panel B in Table 1). Workers have collected partial benefits around 70 days on average. Not surprisingly, the spells of partial benefits associated with short full-time work are typically shorter, with the average duration of about 45 days for both sexes. Due to part-time work, partial benefits have been received for 110 days on average.

Among the recipients of partial benefits, the average duration of overall unemployment is close to 300 days. This exceeds the average duration of non-recipients by as much as 80 to 90 days. The differences between the groups are even larger in the average duration of completed unemployment spells, i.e. the spells followed by a transition to regular work. At a glance, these findings may seem to imply that partial benefits discourage workers from leaving unemployment. This is too hasty a conclusion, however, as we should recognize that selection into partial benefits takes place over time. Workers who are lucky and find a regular job quickly after job loss are less likely to receive partial benefits. By contrast, those with difficulties

Figure 4: Men's monthly hazard for transitions to regular work conditional on receipt of partial benefits



in finding regular employment are over-represented among the recipients of partial benefits. Therefore, rather than comparing the average durations, it is more illustrative to consider empirical hazards for exits to regular work, i.e. monthly transition rates from (fully or partially compensated) unemployment to regular work.

In Figures 3 and 4 the dashed curve shows the transition rate to regular work at a given month for workers who had not received partial benefits by that month (but may receive at a later point). The solid curve is the hazard function of the recipients of partial benefits, including workers who are currently receiving partial benefits and those who have received partial benefits before the month in question. Thus, the groups of recipients and non-recipients change with the elapsed duration of unemployment, and hence they differ from the groups in Table 1. Here we do not make a distinction between workers who received partial benefits due to short full-time work and those who worked part-time, because the group sizes would become rather small.

The transition rates to regular employment exhibit negative duration dependence. One should not pay too much attention to the spikes in the hazard rates at long durations, as these are driven by a few observations. The hazard function of partial benefit recipients generally lies above the hazard of non-recipients. This

suggests that having been on partial benefits increases the transition rate to regular work. The effect is substantial: over the first 24 months of unemployment, the hazard function of recipients is some 75% higher on average for both sexes (80% if the first month is omitted).

It is worth emphasizing that the differences in the hazard rates may be driven by differences in the characteristics of recipients and non-recipients of partial benefits at different points in time, and thereby cannot be interpreted as evidence of *causal* effects. By construction, no one has experienced partial unemployment at the beginning of the unemployment spell. As time passes, some individuals take up atypical jobs, and thereby switch from full compensation to partial benefits. In other words, the composition of two groups changes with the elapsed unemployment duration as an increasing fraction of non-recipients moves to the group of recipients. This dynamic selection process is hardly random, but is driven by observed and unobserved individual characteristics. We shall tackle this issue in the next section.

6 Econometric analysis

6.1 Hazard functions

We denote the latent duration of unemployment until regular work with T_u, which is a continuous random variable. The realization of this variable is observed for workers who leave unemployment for regular work, whereas data on T_u are censored for those who leave unemployment for other causes or remain unemployed until the end of 2003. The overall unemployment spell may or may not include periods spent on partial benefits.

The hazard rate out of unemployment to regular work – or the employment hazard, for short – at unemployment duration t is specified as

$$\theta_u\left(t\,|\mathbf{x}, \upsilon_u, t_p, \Delta\right) = \lambda_u(t) e^{\mathbf{x}'\boldsymbol{\beta}_u + \left(\mathbf{z}_1'\boldsymbol{\gamma}\right) 1\{t_p < t \leq t_p + \Delta\} + \left(\mathbf{z}_2'\boldsymbol{\delta}\right) 1\{t > t_p + \Delta\} + \upsilon_u}, \tag{1}$$

where λ_u is the baseline hazard; $\mathbf{x}$ is a vector of observed characteristics; $\mathbf{z}_1$ and $\mathbf{z}_2$ are subsets of $\mathbf{x}$; t_p is the moment at which the worker starts to collect partial benefits and Δ is the length of the partial benefit period; $1\{A\}$ denotes the indicator variable, taking the value of one if A is true, and the value of zero otherwise; and υ_u is an unobserved individual-specific effect that is independent of $\mathbf{x}$. The model outlined above is the mixed proportional hazard (MPH) specification with time-varying variables indicating whether the worker is currently on partial benefits or whether he or she has already completed a period of partial benefits. The hazard function (1) characterizes the conditional distribution of T_u given $\mathbf{x}$, υ_u, t_p, and Δ.

The multiplicative effect of partial unemployment on the transition rate to regular work while receiving partial benefits, the *instant* effect, is captured by $\mathbf{z}_1'\boldsymbol{\gamma}$. The multiplicative effect from the end of the partial unemployment spell, the *delayed* effect, is $\mathbf{z}_2'\boldsymbol{\delta}$. There are obvious reasons to allow for the different effects during and after the period of partial unemployment. Compared to full-time unemployment, the applicant on partial benefits has a different income level, has less time to search for other employment opportunities, and receives fewer job offers from the employment office. On the other hand, the successful recipient of partial benefits may have a good chance of being offered a regular job.

In our benchmark model, $\mathbf{z}_1$ and $\mathbf{z}_2$ include only two dummy variables indicating whether partial benefits are associated with a part-time job or a short full-time job. This specification allows distinct effects for two types of partial unemployment. For example, the coefficients of the part-time job dummy in $\boldsymbol{\gamma}$ and $\boldsymbol{\delta}$ capture proportional changes in the employment hazard during a period of partial benefits associated with subsidized part-time working and after such a period, respectively.

We abstract from the effects of multiple spells of partial unemployment. In the data, 315 women and 131 men have more than one spell of partial benefits. Their unemployment spells are artificially censored at the beginning of the second spell

of partial benefits. Furthermore, the length of the partial unemployment period, Δ, is assumed to be exogenous. This is a trivial assumption for full-time jobs that qualify for partial benefits but it is less obvious for part-time jobs. According to the unemployment compensation rules, working part-time on partial benefits should be only a temporary solution, as the worker is assumed to continue his or her search for full-time employment. Also, the vast majority of partial benefit periods associated with part-time work in the data are very short. Therefore, the assumption that individuals know the length of the partial benefit period at the beginning of a part-time job is not too restrictive.[12]

A transition from full-time unemployment to partial benefits is a result of a job search process similar to the one that precedes a transition to regular work. This suggests that the time until the receipt of partial benefits is also a random variable, which we denote with T_p. To model the conditional distribution of T_p we specify the following hazard function for transitions from full-time to partial unemployment at unemployment duration t:

$$\theta_p\left(t\,|\mathbf{x},\upsilon_p\right)=\lambda_p(t)e^{\mathbf{x}'\boldsymbol{\beta}_p+\upsilon_p}, \tag{2}$$

where λ_p is the baseline hazard, and υ_p is an unobserved individual-specific random effect. This hazard rate depends on the same set of observed characteristics, $\mathbf{x}$, as the employment hazard, θ_u, does. This is a natural assumption since both T_p and T_u describe the time until finding a job.

It is worth emphasizing that we specify only one process for the timing of the receipt of partial benefits and treat working time (part-time or short full-time) as a characteristic of partial unemployment experience. A more general model would involve distinct hazard functions for transitions to subsidized part-time work and short full-time work, with a large number of additional parameters to be estimated. Such a modelling approach would open up the possibility of over-parameterization, since these additional parameters must be estimated using a small number of observations on transitions to a given type of subsidized work. Therefore, we have adopted the more parsimonious specification, with the single transition rate to partial benefits but the effect of partial unemployment allowed to depend on the type of subsidized work.

If υ_u and υ_p were independent, the likelihood function of the model would be separable in the parameters of two hazard functions. As a consequence, the determinants of θ_u and θ_p could be estimated in two steps from the two distinct MPH models. However, when the unobserved components are not independent, the statistical inference about the determinants of the employment hazard must be based on the joint distribution of T_u and T_p due to a selectivity problem. That is, the determinants of θ_u and θ_p must be estimated simultaneously. In doing so, one can

[12] Alternatively, we can think of the duration of a part-time job as a random variable as long as it is not driven by unobserved determinants correlated with υ_u.

distinguish the causal effects from the selectivity effects associated with partial unemployment. This is known as the "timing of events" approach, which has been discussed in depth by Abbring and Van den Berg (2003, 2004). They show that the causal effects $\boldsymbol{\gamma}$ and $\boldsymbol{\delta}$ are identified, provided that the hazard functions are of the MPH type and workers do not anticipate their entry into partial benefits. The no-anticipation assumption allows the unemployed to know the probability distribution of T_p (that is, the determinants of hazard function θ_p) but not to be aware of the realizations of T_p in advance. This is a plausible assumption, since finding an offer of part-time or short full-time work via the standard job search process necessarily precedes the receipt of partial benefits. As long as the unemployed do not know the arrival times of such offers in advance, they cannot anticipate the exact timing of their entry into partial benefits either.

6.2 Parametrization and maximum likelihood estimation

We model the duration dependence using piecewise constant hazard specifications. The time axis is divided into M intervals $(c_{m-1}, c_m]$, $m = 1, 2, ..., M$. The baseline hazard $k \in \{u, p\}$ in the m-th interval is modelled as

$$\lambda_k(t) = e^{\alpha_j^m}, \qquad t \in (c_{m-1}, c_m].$$

We transfer our duration variables in months by dividing original variables measured in days by 30.5. We distinguish nine intervals for the overall unemployment duration: eight 3-month periods, and an open-ended interval of 24 or more months. For the duration until partial benefits we apply the same intervals with an exception that the open-ended interval begins 3 months earlier at 21 months. Moreover, we artificially censor spells at 27 months of unemployment: all workers with the spell longer than 27 months are treated as still unemployed after 27 months. This affects 212 men and 117 women.

We assume a bivariate discrete distribution for the joint distribution of unobserved heterogeneity. In the context of duration models, the use of discrete distributions to capture unobserved heterogeneity has been advocated by Heckman and Singer (1984). When the number of the points of support increases, the discrete distribution can approximate any true distribution well, including continuous ones. It is also computationally convenient, as the log-likelihood function can be expressed in a closed form.

To derive the log-likelihood function we consider two groups of workers separately: those who receive partial benefits at some point during their unemployment period and those who do not. First, consider a worker who leaves unemployment at spell duration t_u without experiencing partial unemployment by that time. The likelihood contribution of this observation, conditional on observed characteristics

only, is

$$f_0(t_u\,|\mathbf{x}) = \sum_i \sum_j \left[S_p\left(t_u\,\middle|\mathbf{x}, \upsilon_p^j\right) \theta_u\left(t_u\,\middle|\mathbf{x}, \upsilon_u^i, T_p > t_u\right)^{c_u} \times S_u\left(t_u\,\middle|\mathbf{x}, \upsilon_u^i, T_p > t_u\right) p_{ij} \right], \quad (3)$$

where p_{ij} denotes the probability at which the realization of $(\upsilon_u^i, \upsilon_p^j)$ occurs; and $c_u = 1$ if the worker leaves unemployment for regular work, and $c_u = 0$ otherwise. The survivor functions for T_u and T_p are given by

$$\begin{aligned} S_p\left(t_u\,\middle|\mathbf{x}, \upsilon_p^j\right) &= \exp\left[-e^{\mathbf{x}'\boldsymbol{\beta}_p + \upsilon_p^j} \Lambda_p(t_u)\right], \\ S_u\left(t_u\,\middle|\mathbf{x}, \upsilon_u^i, T_p > t_u\right) &= \exp\left[-e^{\mathbf{x}'\boldsymbol{\beta}_u + \upsilon_u^i} \Lambda_u(t_u)\right], \end{aligned}$$

where $\Lambda_k(t) \equiv \int_0^t \lambda_k(z)dz$ for hazard $k \in \{u, p\}$. In other words, $f_0(t_u\,|\mathbf{x})$ equals the probability of $T_p > t_u$ times the probability of $T_u = t_u$ or $T_u > t_u$ conditional on $T_p > t_u$, depending on whether the unemployment spell is followed by a regular job ($c_u = 1$) or not ($c_u = 0$). Since υ_u and υ_p are not observed, $f_0(t_u\,|\mathbf{x})$ is obtained by taking the expected value of $f_0(t_u\,|\mathbf{x},\upsilon_u, \upsilon_p)$ with respect to the joint distribution of unobserved heterogeneity terms, which amounts to taking the sum of $f_0(t_u\,|\mathbf{x},\upsilon_u, \upsilon_p)$ over all possible values of υ_u and υ_p using p_{ij}'s as weights.

The likelihood contribution of a worker who experiences a spell of partial unemployment, which starts at t_p and lasts for Δ periods, and then leaves unemployment at $t_u \geq t_p + \Delta$, is given by

$$f_1(t_p, t_u\,|\mathbf{x},\Delta) = \sum_i \sum_j \left[\theta_p\left(t_p\,\middle|\mathbf{x}, \upsilon_p^j\right) S_p\left(t_p\,\middle|\mathbf{x}, \upsilon_p^j\right) \times \theta_u\left(t_u\,\middle|\mathbf{x}, \upsilon_u^i, t_p, \Delta\right)^{c_u} S_u\left(t_u\,\middle|\mathbf{x}, \upsilon_u^i, t_p, \Delta\right) p_{ij} \right], \quad (4)$$

where

$$\begin{aligned} S_u\left(t_u\,\middle|\mathbf{x}, \upsilon_u^i, t_p, \Delta\right) = \exp\Big[-e^{\mathbf{x}'\boldsymbol{\beta}_u + \upsilon_u^i} \Big(\left[1 - e^{\mathbf{z}_1'\boldsymbol{\gamma}}\right] \Lambda_u(t_p) + e^{\mathbf{z}_2'\boldsymbol{\delta}} \Lambda_u(t_u) \\ + \left(e^{\mathbf{z}_1'\boldsymbol{\gamma}} - e^{\mathbf{z}_2'\boldsymbol{\delta}}\right) \Lambda_u(t_p + \Delta) \Big] . \end{aligned}$$

The likelihood contribution equals the probability of $T_p = t_p$ times the probability of $T_u = t_u$ (if exit to regular work) or $T_u > t_u$ (if censored) conditional on t_p and Δ. For the worker who leaves unemployment while receiving partial benefits it holds that $t_u = t_p + \Delta$.

The log-likelihood function of the model is then obtained as

$$\mathcal{L} = \sum_{h \in \Omega_0} \ln f_0\left(t_u^h\,\middle|\mathbf{x}^h\right) + \sum_{h \in \Omega_1} \ln f_1\left(t_p^h, t_u^h\,\middle|\mathbf{x}^h, \Delta^h\right) \quad (5)$$

where h indexes individuals, and Ω_0 and Ω_1 are index sets for the non-recipients and recipients of partial benefits, respectively. Assuming a given number of the points of

support for the heterogeneity distribution, we maximize the log-likelihood function with respect to $\boldsymbol{\beta}_u$, $\boldsymbol{\beta}_p$, $\boldsymbol{\gamma}$, $\boldsymbol{\delta}$, α_u^m's, α_p^m's, υ_u^i's, υ_p^j's, and p_{ij}'s subject to constraints $\sum_i \sum_j p_{ij} = 1$ and $0 \leq p_{ij} \leq 1$ for all i and j, and normalization $\upsilon_u^1 = \upsilon_p^1 = 0$.

6.3 Estimation results

Tables 2 and 3 show the determinants of hazard functions for women and men, respectively. The results reported are obtained from model specifications with two points of support for the heterogeneity terms υ_u and υ_p, with normalization $\upsilon_u^1 = \upsilon_p^1 = 0$. For women we have also imposed $p_{12} = 0$, as this parameter converged to the boundary of the parameter space in the unrestricted specification. Standard errors reported are conditional on the chosen dimension of the heterogeneity distribution.[13]

In the light of previous descriptive evidence, it comes as no surprise to find that the effects of most of the covariates vary by sex. While married men have a higher hazard to regular work compared to unmarried men, being married has no statistically significant effect for women. The hazard rate to partial benefits does not vary with age, whereas age has a significant effect on the hazard to regular work for both sexes. On closer inspection, it turns out that the employment hazard of men decreases almost linearly with age over the age range of the analyzed sample. Compared to a reference worker aged 38, a 25-year-old man has a 72% higher hazard and a 50-year-old man has a 26% lower hazard to regular work. The effect of age among women is quite different. While differences in the employment hazard are rather small among women between the ages of 25 and 40, the oldest women find regular work at a higher rate. A possible explanation is that employers are cautious about hiring fertile women for regular jobs. In Finland, a combination of maternity, parental, and child-care leave can result in a career break of about 3 years, after which the employee has the right to return to her old job.

A child under the age at which children start comprehensive school reduces both hazard rates for women. This may imply that having a young child in the family increases the value of women's non-market time. Also, it may be difficult to arrange day care for short full-time jobs, which can explain part of the negative effect on the hazard rate to partial benefits. Young children induce men to work part-time and/or take up short full-time jobs but do not affect the transition rate to regular work.

The hazard rates to regular work and to partial benefits increase uniformly with the level of education among both women and men. Compared to an otherwise identical woman with comprehensive education, a woman with a Master's degree has 153% and 94% higher transition rates to regular work and to partial benefits,

[13] We have estimated the model by varying the number of mass points. By adding more mass points, we did not find improvements in the optimal value of the log-likelihood function (as measured by various information criteria), while many probabilities converged to zero and the locations of some mass points converged to a similar value.

Table 2: Hazard estimates for women

	Hazard function for			
	Regular work		Partial benefits	
	Coeff.	Std.Err.	Coeff.	Std.Err.
Married	0.068	0.043	0.032	0.066
Child under 7	−0.388	0.055	−0.286	0.080
log UI Benefits	0.192	0.115	−0.002	0.181
Age	−0.126	0.033	0.016	0.051
$\text{Age}^2/100$	0.119	0.044	−0.035	0.067
Region of residence (vs. Uusimaa):				
Southern Finland	−0.271	0.053	0.410	0.090
Eastern Finland	−0.347	0.072	0.296	0.114
Northern Finland	−0.289	0.075	0.384	0.118
Central Finland	−0.258	0.070	0.679	0.115
Education (vs. comprehensive):				
Secondary education	0.208	0.061	0.404	0.093
Lower university	0.522	0.069	0.534	0.104
Master's degree or higher	0.913	0.095	0.663	0.154
Occupation (vs. commercial):				
Engineering	−0.089	0.117	−0.015	0.185
Industrial work	−0.184	0.092	−0.387	0.148
Educational work	0.572	0.106	1.082	0.170
Health care and social work	0.445	0.077	0.977	0.113
Clerical work	0.169	0.075	−0.035	0.121
Service work	0.189	0.084	0.606	0.123
Other	0.138	0.094	0.368	0.146
Instant effects ($\boldsymbol{\gamma}$):				
Short full-time work	0.404	0.099		
Part-time work	−0.019	0.120		
Delayed effects ($\boldsymbol{\delta}$):				
Short full-time work	0.591	0.108		
Part-time work	0.219	0.198		
Duration dependence (α_u / α_p):				
(0,3] months	−2.030	0.223	−3.702	0.163
(3,6] months	−2.233	0.244	−4.211	0.189
(6,9] months	−2.537	0.255	−4.166	0.211
(9,12] months	−2.553	0.262	−4.098	0.242
(12,15] months	−2.668	0.271	−4.367	0.291
(15,18] months	−2.863	0.288	−4.605	0.362
(18,21] months	−2.805	0.303	−5.567	0.566
(21,24] months	−2.629	0.322	−5.284	0.529
24 and more months	−3.420	0.482	−5.284	0.529
Heterogeneity term (v_u^2 / v_p^2)	−1.173	0.209	−6.027	17.442
p_{11}	0.311	0.121		
p_{12}	0.000	–		
p_{21}	0.401	0.099		
p_{22}	0.288	0.074		
Log-likelihood		−16141.1		

Notes: log UI benefits are measured in deviation from the sample mean. Age variables are measured in deviation from a reference worker aged 38. The number of observations is 7530.

Table 3: Hazard estimates for men

	Hazard function for			
	Regular work		Partial benefits	
	Coeff.	Std.Err.	Coeff.	Std.Err.
Married	0.302	0.047	0.105	0.121
Child under 7	0.002	0.051	0.336	0.138
log UI Benefits	0.484	0.120	−0.831	0.295
Age	−0.084	0.031	0.073	0.085
$\text{Age}^2/100$	0.067	0.041	−0.106	0.112
Region of residence (vs. Uusimaa):				
Southern Finland	0.016	0.054	0.058	0.148
Eastern Finland	0.114	0.067	0.342	0.175
Northern Finland	0.164	0.069	0.409	0.186
Central Finland	0.177	0.071	0.064	0.202
Education (vs. comprehensive):				
Secondary education	0.215	0.052	0.262	0.137
Lower university	0.381	0.074	0.487	0.192
Master's degree or higher	0.590	0.094	0.801	0.235
Occupation (vs. commercial):				
Engineering	−0.032	0.087	0.306	0.276
Machinery	0.093	0.091	0.258	0.287
Industrial work	−0.215	0.084	0.028	0.261
Construction	0.632	0.091	0.858	0.277
Educational work	0.184	0.155	1.579	0.369
Health care and social work	0.226	0.128	1.758	0.319
Clerical work	−0.277	0.101	0.325	0.296
Service work	−0.155	0.110	1.192	0.292
Other	0.098	0.082	1.203	0.251
Instant effects ($\boldsymbol{\gamma}$):				
Short full-time work	0.378	0.171		
Part-time work	0.074	0.198		
Delayed effects ($\boldsymbol{\delta}$):				
Short full-time work	0.657	0.138		
Part-time work	0.745	0.230		
Duration dependence (α_u / α_p):				
(0,3] months	−1.962	0.593	−2.274	0.405
(3,6] months	−1.985	0.609	−2.458	0.425
(6,9] months	−2.441	0.602	−2.581	0.438
(9,12] months	−2.745	0.599	−2.449	0.439
(12,15] months	−2.772	0.595	−2.923	0.476
(15,18] months	−2.793	0.590	−3.312	0.538
(18,21] months	−2.967	0.593	−2.875	0.523
(21,24] months	−2.625	0.589	−3.551	0.601
24 and more months	−2.888	0.605	−3.551	0.601
Heterogeneity term (v_u^2 / v_p^2)	−1.105	0.465	−3.252	0.292
p_{11}	0.001	0.019		
p_{12}	0.157	0.191		
p_{21}	0.068	0.026		
p_{22}	0.774	0.191		
Log-likelihood	−13245.2			

Notes: log UI benefits are measured in deviation from the sample mean. Age variables are measured in deviation from a reference worker aged 38. The number of observations is 5924.

respectively. There are clear sex differences in the effects of living region and occupation. Compared to women with residence in Uusimaa, women living in all other parts of the country have lower hazards to regular work but higher hazards to partial benefits. Men living in Uusimaa do not differ from men outside the capital area in a similar way.

Workers who are looking for health care and social work, service, or educational work move into partial benefits at much higher rates than workers in other occupational groups. Among women these same occupations are also associated with higher hazard rates to regular work, whereas the picture is less clear for men. For example, the hazard rate to partial benefits is three times higher for a woman and almost five times higher for a man who is looking for educational work than for a reference worker with an commercial occupation. These findings reflect occupational differences in the supply of atypical jobs.

The instant and delayed effects of an experience of partial unemployment are the parameters of principal interest. The size of these effects depends on whether partial benefits are associated with short full-time work or part-time work. It turns out that, for both sexes, subsidized short full-time work has a positive effect on the hazard to regular employment during and after the spell of partial benefits. The women's hazard rate to regular employment increases by 81% and the men's rate by 93% after a spell of partial benefits due to short full-time work. The instant effect of short full-time work is somewhat lower but still quite strong, being around 0.4 for both sexes (i.e. about a 50% increase in the employment hazard). The rather strong instant effect is consistent with the hypothesis that employers use short employment contracts for probation purposes, and subsequently offer longer contracts to those applicants who performed sufficiently well during the subsidized period. On the other hand, the delayed effects are even stronger, suggesting that a short full-time job in a given firm also improves the chances of obtaining a regular job in other firms in the longer run. Perhaps even very short full-time jobs can serve as a positive signal of the applicant's motivation or provide useful contacts with other potential employers. At this point it is worth emphasizing that we do not observe employers in the data. Some partial benefit recipients may not have returned to full-time unemployment because they found a regular job in another firm. Likewise, some full-time unemployed have probably returned to firms where they had a subsidized job previously as regular employees.

Partial unemployment associated with part-time working has no statistically significant effects for women. The absolute value of the instant effect is close to zero. The delayed effect of part-time work is not that small, being 0.219 (i.e. a 24% increase in the employment hazard), but it is very inaccurately estimated, as the standard error is almost as large as the point estimate. The corresponding effect for men is 0.745, and it is statistically significant at the conventional risk levels. This suggests an increase of 110% in the men's hazard rate to regular work after a period

of subsidized part-time work, the effect of which is even stronger than the effect of short full-time work. The men's hazard rate to regular work does not change significantly while men are receiving partial benefits due to part-time working. The absence of the instant effects of part-time working may indicate that, contrary to short full-time jobs, part-time jobs are not used by employers to screen potential applicants for regular jobs. It is worth noting that our findings suggest that taking a part-time job does not crowd out the search for regular work, which is a good message for policy-makers. Moreover, men seem to benefit from such jobs in their search for regular work at a later stage.

For both sexes our model is able to identify only a few types of workers who differ in their unobserved characteristics. This is a common finding in the context of duration models with discrete unobserved heterogeneity. The discrete distribution is perhaps best interpreted as an approximation of the true distribution of unobserved heterogeneity. It seems that information available in typical duration data does not suffice to differentiate between more than a few heterogeneity types (Van den Berg, 2001). With a small number of the points of support, the discrete distribution can give a rather crude approximation for the true distribution. Simulation studies have shown that the discrete distribution with only a few mass points can capture most of the effects of unobservables on the hazard function estimates even when the true underlying distribution is continuous (e.g. Heckman and Singer, 1984). Therefore, we expect our model is able to eliminate the selection bias in the hazard function estimates that would otherwise result from the endogeneity of the receipt of partial benefits. On the other hand, the estimates of heterogeneity terms should not be taken too literally, as there may exist more heterogeneity types than are detected in our analysis, but the data simply do not allow us to differentiate between them. Having said this, it is interesting to consider the estimated heterogeneity distributions in more detail.

The estimate of unobserved heterogeneity term v_p^2 for women has a very large standard error, whereas the estimated probabilities of all mass points are accurate. The opposite is true for men, as unobserved heterogeneity terms are accurately estimated but p_{12} is less so. A very small estimate of v_p^2 for women, albeit inaccurately estimated, is an indication of the existence of a group of women who are very unlikely to move into partial benefits. Workers in this group, 29% of all women, also have a relatively low hazard rate to regular work (69% lower compared to the reference group) due to unobserved characteristics. As a result, these women have serious difficulties in finding any type of work. About one-third of the women belong to the reference group that is characterized by relatively high hazard rates both to partial benefits and to regular work after controlling for observed characteristics. On the other hand, 40% of the women have a relatively high hazard rate to partial benefits but a rather low hazard rate to regular work for unobserved reasons. This may imply that many women prefer atypical jobs, perhaps because of their valuation of

non-market time and/or high replacement rates associated with partial unemployment, and hence they actively search for part-time and short full-time work at the expense of regular work.

From Table 3 we see that 77% of the men are estimated to share the same values of v_u and v_p. Compared to this group, 16% of the men have a similar hazard to partial benefits but a higher hazard to regular work for unobserved reasons. There is also a smaller group, including 7% of the men, who find regular jobs at the same rate but move into partial benefits at a higher rate after controlling for observed characteristics.

6.4 Sensitivity analysis

Estimates of the instant and delayed effects of partial unemployment from model specifications without unobserved heterogeneity are reported in the first columns of Tables 4 and 5. For women these effects are generally higher than those in Table 2. Ignoring the selection into partial benefits hence leads to overestimating the causal effects of partial unemployment among women. The estimated delayed effect of subsidized part-time work in Table 4 is 0.348, implying an increase of 42% in the employment hazard after the period of partial benefits due to part-time work. This effect is statistically significant at the 5% level. In Table 2 the same effect is smaller and does not differ significantly from zero at the conventional risk levels. For men the selection into partial benefits affects the results in the opposite direction.[14] The estimated effects of partial unemployment obtained from specification A in Table 5 are uniformly lower than those in Table 3. The differences in the point estimates between the specifications are rather small, and the same effects in both specifications are statistically significant for men. Although the differences between the specifications with and without unobserved heterogeneity are not overwhelmingly large, we conclude that appropriate statistical inference requires that the selection process has been taken into account.

We also report results from extended specifications in which the effects of partial unemployment are allowed to vary with the timing and duration of the receipt of partial benefits (specification B in Tables 4 and 5). We find that the instant effect of short full-time work depends on the timing of entry into partial benefits for both women and men. The instant effect is stronger for jobs taken at the later stage of unemployment. For men who take up a short full-time job very quickly after entering unemployment, the instant effect does not differ significantly from zero. However, a short full-time job taken after 6 months of full-time unemployment has an instant effect of 0.385 ($= -0.287 + 6 \times 0.112$), implying a 47% increase

[14] The unobserved heterogeneity terms v_u and v_p exhibit a small negative correlation for men in Table 3 and a positive correlation for women in Table 2, which explains the difference in the direction of the selection bias.

Table 4: Model variants for women

	No unobserved heterogeneity (A)		Heterogeneous effects (B)	
	Coeff.	Std.Err.	Coeff.	Std.Err.
Instant effects ($\boldsymbol{\gamma}$)*:*				
Short-term work	0.553	0.080	0.520	0.127
Start of short full-time work			0.073	0.029
Part-time work	0.130	0.095	0.172	0.157
Start of part-time work			0.037	0.029
Delayed effects ($\boldsymbol{\delta}$)*:*				
Short-term work	0.665	0.083	0.725	0.207
Start of short full-time work			0.038	0.030
Duration of short full-time work			0.105	0.103
Part-time work	0.348	0.177	0.831	0.348
Start of part-time work			−0.085	0.072
Duration of part-time work			0.019	0.071
Unobserved heterogeneity:	No		Yes	
Log-likelihood	−16150.3		−16135.8	

Notes: The model with heterogeneous effects incorporates a bivariate discrete distribution for unobserved heterogeneity. The start of short full-time/part-time work equals the time until receipt of partial benefits (=days/30.5). The duration of short full-time/part-time work is the length of time on partial benefits (=days/30.5).

in men's hazard rate to regular work. The instant effect of a similar job for women is 0.958 ($= 0.520 + 6 \times 0.073$), i.e. a 160% increase in the employment hazard. Unlike men, women also benefit from short full-time jobs found very quickly after entering unemployment. For example, a short full-time job taken after one month of unemployment entry increases women's employment hazard by 81% during such a job spell.

It is not obvious why the instant effect of short full-time work becomes stronger with the elapsed duration of unemployment. One possibility is that short full-time jobs facilitate transitions to regular work by a way of weakening the social stigma attached to being unemployed for a long time. This would imply a stronger effect for the long-term unemployed. This reasoning should also apply to the delayed effect, but the delayed effects of short full-time work do not depend on the timing of such jobs. Hence, the stigma explanation does not sound very convincing. An alternative explanation is that short full-time jobs taken at a later point in the unemployment period are more carefully chosen by the unemployed, and hence such jobs more often serve as a stepping stone to regular work.

The results in Tables 4 and 5 do not provide evidence of heterogeneity in the

Table 5: Model variants for men

	No unobserved heterogeneity (A)		Heterogeneous effects (B)	
	Coeff.	Std.Err.	Coeff.	Std.Err.
Instant effects ($\boldsymbol{\gamma}$)*:*				
Short-term work	0.289	0.113	−0.287	0.365
Start of short full-time work			0.112	0.033
Part-time work	0.003	0.162	−0.503	0.425
Start of part-time work			0.066	0.037
Delayed effects ($\boldsymbol{\delta}$)*:*				
Short-term work	0.571	0.092	0.160	0.450
Start of short full-time work			0.019	0.040
Duration of short full-time work			0.103	0.076
Part-time work	0.669	0.207	0.337	0.572
Start of part-time work			0.030	0.069
Duration of part-time work			0.069	0.102
Unobserved heterogeneity:	No		Yes	
Log-likelihood	−13252.3		−13238.8	

Notes: The model with heterogeneous effects incorporates a bivariate discrete distribution for unobserved heterogeneity. The start of short full-time/part-time work equals the time until receipt of partial benefits (=days/30.5). The duration of short full-time/part-time work is the length of time on partial benefits (=days/30.5).

delayed effects of short full-time and part-time work according to the timing and duration of such job spells (see specification B). Nevertheless, we find clear discrepancies in the coefficients of short full-time and part-time work dummies in the delayed effects between the specifications in Tables 2 and 4 on the one hand, and between the specifications in Tables 3 and 5 on the other. In Table 3 we have strong delayed effects for both short full-time and part-time work for men. By contrast, none of the components of the heterogenous delayed effects in Table 5 differ significantly from zero. Because only 605 men received partial benefits during their unemployment period, our data may be too sparse for an accurate estimation of heterogeneity in the delayed effects.

The opposite pattern is found for women. The delayed effects in the specification in Table 4 are stronger than those given in Table 2. The coefficient of the dummy for short full-time work in the delayed effect increases from 0.404 to 0.725 despite the fact that the timing and duration of partial benefits have additional positive effects in Table 4. Moreover, the coefficient of the part-time work dummy in Table 4 is fourfold compared to its value in Table 2, where it does not even differ significantly from zero. The results obtained from specification B suggest that working part-time

also has a long-lasting positive effect for women. We do not find such evidence from our parsimonious model in Table 2.

These differences are puzzling. It is possible that the delayed effects are heterogeneous but variation in the timing and duration of partial benefit spells, combined with a relatively small number of observations on partial benefit recipients, does not allow us to estimate these effects accurately.[15] We also tried to estimate model specifications with the effects varying with other characteristics, such as occupation and education. It turned out to be difficult to detect any significant effects, and the estimation procedure occasionally collapsed due to numerical difficulties. These exercises also imply that the data do not suffice to identify additional heterogeneity in the effects of partial unemployment if such heterogeneity does exist. Finally, it is worth emphasizing that the distribution of unobserved heterogeneity, which plays a key role in distinguishing the selectivity effects from the causal effects, is affected by the set of included explanatory variables. This makes the comparison of the results from the different specifications difficult. In any case, our qualitative findings are sufficiently robust to draw clear conclusions about the implications of partial unemployment for subsequent labor market experiences.

[15] The Likelihood Ratio statistic for joint significance of the additional parameters in the heterogeneous effects specification is 10.6 for women and 12.8 for men. We cannot reject the null hypothesis that the instant and delayed effects of partial unemployment are independent of the timing and duration of partial benefits for women at the 5% risk level (the critical value with 6 degrees of freedom equals 12.6). The hypothesis is marginally rejected for men.

7 Concluding remarks

Recent studies have found that temporary jobs can provide a stepping stone to regular employment for unemployed workers. This study supplements the existing literature in providing evidence that short full-time and part-time jobs combined with partial benefits also speed up the process out of unemployment into regular work. We found significant and economically large effects for subsidized short full-time work. When the applicant takes up a short full-time job that qualifies for partial benefits, the hazard rate to regular employment increases almost by one-half. This may indicate that short full-time jobs are used as a probation device by employers, leading to longer employment contracts for some applicants. The effect is stronger for short full-time jobs taken at the later stages of unemployment, so the long-term unemployed benefit most. The delayed effect turned out to be even larger, as the employment hazard almost doubles after a completed spell of partial benefits due to short full-time work. We found no instant effect on the transition rate to regular employment for part-time working on partial benefits. But there is some evidence of positive long-run effects for subsidized part-time work, though our estimates of delayed effects vary with the model specification, being either significantly positive or near to zero. Overall, our findings suggest that by encouraging the unemployed to take up atypical jobs that might not be acceptable without partial benefits, it may be possible to get more unemployed workers back to regular employment by a given time. Therefore, labor market efficiency may be enhanced by making partial benefits available.

Some limitations in our reduced-form duration analysis should be kept in mind. First, our analysis abstracts from any possible general equilibrium effects, which arise if the partial benefit scheme affects the relative supply of different types of jobs. Second, even in the absence of supply side effects, the existence of partial benefits *per se* may lower the transition rate to regular work among all job seekers, including those who will never receive partial benefits.[16] This is because, by making part-time and short full-time jobs more attractive, the partial benefit scheme can induce the unemployed to devote more time to looking for atypical jobs at the expense of a search for regular employment.

As an example, consider a reduction in the generosity of partial benefits. Since the unemployed have an incentive to redirect their effort towards looking for regular work, the policy reform may lead to an increase in the hazard rate to regular work and to a decrease in the hazard rate to partial benefits. Even when the causal proportional effect of partial unemployment on the underlying employment hazard remains intact, the shape of baseline hazards and the distribution of observed heterogeneity, which capture the effects of unobservable search behavior in our model, are expected to change. One cannot identify these changes using the data from the

[16] Zilj *et al.* (2004) emphasize a similar issue in their analysis.

labor market where such a policy change did not actually take place. As a result, it is difficult to make sensible predictions of how a particular change in the partial benefit scheme would affect the transition rates between full-time unemployment, partial unemployment, and regular employment. In other words, our results are conditional on the current availability and generosity of partial benefits. Simulations of changes in the partial benefit scheme, which would be of considerable interest from a policy perspective, call for (quasi-)experimental data or the estimation of structural behavioral models.

The discussion above suggests that our estimates may give too rosy a picture of the role of partial benefits. On the other hand, working on partial benefits may have implications for the unemployed that were not recovered in our analysis. Experiences of partial unemployment may not only speed up the process of moving into regular work but also lead to better matches in terms of higher pay and longer expected job duration. Unfortunately, a lack of detailed information on jobs prevents us from analyzing the quality of jobs taken by the unemployed. Whether working on partial benefits leads to better regular jobs or not is an important topic for future work.

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