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Long-term Outcomes of Vocational Rehabilitation Programs:

Labor Market Transitions and Job Durations for Immigrants

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15 June 2007

Long-term Outcomes of Vocational Rehabilitation Programs: Labor Market Transitions and Job Durations for Immigrants*

By Tyra Ekhaugen

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Abstract

This paper employs a flexible dependent hazard rate model to examine the transition to work, job durations and subsequent transitions into and out of the welfare system for all the individuals who participated on a vocational rehabilitation program in Norway during 1995-2002. The effect of being a non-western immigrant on the probability of finding, keeping, and re-finding a job is shown to differ substantially across genders, being particularly favorable for women relatively recently arrived from Africa, Asia or Eastern Europe. I find substantial non-western immigrant business cycle sensitivity regarding the transition(s) to employment but not to unemployment.

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1. Introduction

The number of persons participating in a vocational rehabilitation (VR) program[1] has increased significantly over the last decades in Norway: from 78,000 in 1994 to 114,000 in 2003. This trend may be seen as a governmental response to the worrying rise in the number on disability pensions, from 230,000 to 300,000 in the same period. The government's faith in the ability of VR programs to restore and improve vocationally disabled persons' opportunities in the open labor market is not, however, based on a broad knowledge of the outcomes of such programs. Such knowledge would ideally include evidence not only of how many participants find work after program participation and who they are, but also for how long they manage to keep the job they find, and, if they lose it, whether or not they are able to find a new one.

This has not been attempted in the existing literature on VR program outcomes. The Norwegian literature analyzes short-term outcomes only (with the exception of Ekhaugen, 2006), and the typical outcome is ordinary work observed at one point in time, a maximum of two years after the end of the program (ECON, 2005; Børing, 2002; Pedersen, 2002; 2001), or a maximum of four years after the beginning (Aakvik and Dahl, 2006; Aakvik et al., 2005; Aakvik, 2003; 2001). Also internationally, the papers analyzing comparable programs focus on short-term outcomes, a maximum of three and a half years after the beginning of the sickness spell (Gerfin et al. 2005; Frölich et al. 2004; Gerfin and Lechner 2002).[2]

This paper concentrates in particular on the labor market success of non-western immigrants. Non-western immigrants are a declared target group for

[1] Norwegian VR programs are classified into the following categories: Wage subsidies and contributions to operating costs received by ordinary employers; work experience in ordinary and sheltered work environments respectively; educational measures in courses or (ordinary) schools; temporary employment programs; supported employment; temporary jobs in labor market enterprises; and permanent sheltered employment in labor market enterprises or work cooperatives.

[2] The literature on labor market programs aimed at persons who are not vocationally disabled, is reviewed in Kluve (2006), Kluve and Schmidt (2002) and Heckman et al. (1999).

Norwegian VR programs, but little is known about their outcomes. More generally, their observed welfare- and labor market participation rates are on the political agenda,[3] and some recent research on their long-term adaptation to the Norwegian labor market finds that a very large share ends up receiving disability pension (Bratsberg et al., 2006), and that time of residence has a positive effect on their welfare dependence probability (Ekhaugen, 2007). This paper adds constructively to the literature on immigrant labor market outcomes by analyzing in more detail *who*, in terms of country background and time of residence, faces the problems, and *at what point* in their labor market history do the problems arise. For instance, I would like to see whether the prospects of a given immigrant group, compared to e.g. natives, of finding a job differ from those of keeping the job they find, thereby shedding light on the notion that *obtaining* a job is the crucial step. More generally, it seems there is no internationally published literature on *immigrant job durations* (in general, as well as after VR), something this paper can hopefully help to rectify.

In addition, I use the opportunity readily offered by the model framework to analyze *immigrant business cycle sensitivity* with regard to a variety of labor market transitions, including some hitherto unexplored in the literature.

While the abovementioned existing literature on VR outcomes are either effect evaluations (Aakvik et al., 2005; Aakvik, 2003; 2001; Gerfin et al. 2005; Frölich et al. 2004; Gerfin and Lechner 2002), purely descriptive (Ekhaugen, 2006; Pedersen, 2002; 2001), or simple statistical analyses of the initial transition after VR (Aakvik and Dahl, 2006; ECON, 2005; Børing, 2002), this paper examines how a wide range of VR outcomes vary with the participant's gender and immigrant category. By observing the monthly labor market outcomes of all the individuals who participated

[3] E.g. in Reports to the Storting No. 49 (2003-2004) pp. 156-165, and No. 9 (2006-2007) pp. 60-65.

in a VR program during 1995-2002, up to nine years after their participation ended, I can explore the participants' program-to-job transition, job duration, job-to-welfare transition (where sickness and unemployment are treated separately), as well as their transition from welfare back to work, or to disability or a new VR spell. I estimate these transitions simultaneously in a dependent hazard rate framework which allows for a very flexible modeling of both duration effects and unobserved heterogeneity.

This paper proceeds as follows: Section 2 provides a brief overview of the VR system in Norway. Section 3 presents the data. Section 4 outlines the event histories and shows some observed outcomes. Section 5 explains the econometric approach. Section 6 discusses and illustrates the estimation results. Section 7 concludes.

2. The vocational rehabilitation system in Norway

Vocational rehabilitation (VR) programs offer training and income maintenance for individuals with reduced productivity in the labor market, in order to increase their opportunities in the open labor market. While some participate in VR due to socially related problems, e.g. drugs, prison time or simply 'problems of adapting' in the ordinary labor market, the most common path to VR participation is from employment, via sickness benefits and medical rehabilitation (MR). The sickness benefits period may last up to one year, and the benefits pays 100 per cent of previous income, normally subject to a maximum benefit restriction of around NOK 335,800 (€ 41,000) in 2003. Individuals who are unable to return to work after one year are entitled to MR benefits, usually two thirds of the gross income in the previous year subject to maximum and minimum restrictions. The MR period is also meant to last a maximum of one year, but exceptions to this rule are frequent. While receiving MR benefits, some individuals apply for a disability pension, whereas some return to their

old job. If they are not granted a disability pension, and are unable to return to the old job or find a new one on their own, the individuals are referred to the local unemployment office for VR consideration.

At the unemployment office, the individual is assigned a caseworker, and together they decide upon a rehabilitation plan which normally includes participation in one or more training programs. In most cases, the ultimate goal is for the client to end up in a new job in the open labor market, but the success criterion may also, particularly with young clients, be regular education. While on VR, one is entitled to a VR benefit which is normally the same amount as the MR benefit. The VR spell starts with a period of clarification and waiting, which may last from a couple of days to several months. Some spells end there, if the person is granted disability pension, goes back to MR, or finds work, but most involve VR program participation. Depending on the individual's needs and motivation, such programs may be general labor market programs or programs designed specifically for VR clients. This paper follows the governmental classification of VR programs into the categories described in footnote 1. All programs except regular education and permanent sheltered employment have a maximum length of three years, but the duration of a VR spell is often longer due to waiting periods and attendance in several programs.

3. Data and some definitions

The empirical analyses are based on a database assembled from administrative register data provided by Statistics Norway. It covers the entire Norwegian population and contains detailed monthly information on VR and all other welfare programs, as well as on jobs, for the years 1994-2003. There is also data on individuals' income, family status, education, country background, and other personal characteristics.

The data used comprise all VR spells recorded in Norway that ended during 1995-2002. Each VR spell contains at least one month in a VR program, meaning that all spells with registrations only on waiting, clarification etc., are excluded. A VR spell is said to end in a given month if that month contains a registration in a VR program and the following 12 months do not. There were 162,372 such VR spells, distributed among 147,827 persons. Descriptive statistics on participants and spells

Table 1: Observed person and spell characteristics for the 162,372 VR spells that ended 1995-2002.

	Men	**Women**
Number of VR spells	90,476	71,896
Person characteristics[a]		
Mean years of education	11.6	12.0
Mean age	36.7	37.9
Share married	.35	.45
Mean number of children aged 0-18	.81	.90
Share living in Oslo	.10	.11
Number of immigrants	7,935	4,505
from OECD countries[b]	1,495	1,178
from Eastern Europe	1,283	813
from Asia	3,470	1,878
from Africa	1,309	345
from Latin America	378	291
VR spell characteristics		
Spell duration		
Mean duration (months), all VR spells	20.9	22.1
Share of the VR spells that ended 1997-2002 with duration		
1-6 months	.19	.15
7-12 months	.20	.20
13-18 months	.14	.15
19-24 months	.10	.11
more than 24 months	.37	.39
Share participating in each VR program[c]		
Wage subsidies	.17	.10
Educational measures in courses or (ordinary) schools	.32	.38
Temporary employment programs	.05	.06
Work experience in ordinary work environments	.17	.26
Work experience in sheltered work environments	.15	.10
Supported employment	.02	.02
Temporary stay in labor market enterprises	.07	.04
Permanent sheltered employment	.03	.02
Share with registrations on one program only during our observation period[d]	.65	.64

[a] Observed at the end of the VR spell.
[b] OECD-countries as of 1973 (excluding Turkey): Western Europe, USA, Canada, Australia, New Zealand, and Japan.
[c] Observed at the end of the VR spell. The shares do not quite add up to one, as 1.9% of the women and 1.7% of the men were registered either on trial programs or had invalid registration codes.
[d] Some spells begin before our observation period (1994). We observe 120,458 complete spells.

are presented by gender in Table 1, and by gender and immigrant background in Tables A1 and A2 in the Appendix.

Table 1 shows substantial gender differences for both person and VR spell characteristics. On average, men have lower education, and they are younger, less likely to be married, and more likely to be immigrants. Their VR spells are on average shorter, and there are substantial differences regarding which programs men and women participate in. As we also know that women are more likely than men to have medical, as opposed to social, reasons for VR program participation[4], the empirical analysis will be performed separately for men and women.

Tables A1 and A2 show that both person characteristics (including time of residence) and which type of VR program one is assigned to, vary substantially with country background. OECD-immigrants are fairly similar to natives regarding personal characteristics as well as VR program types, and they are the immigrants with the longest average time of residence. Non-OECD immigrants participate to a much larger extent in VR programs intended for persons with relatively poor labor market prospects. They are also on average less educated, have more children and are more likely to live in Oslo than the natives, although there is substantial within-group variation: Africans are on average younger, less likely to be married, more likely to live in Oslo and have a substantially shorter time of residence than the Asians – and Eastern Europeans differ in almost all respects from both these groups.

Even though VR spell duration, the state prior to the VR spell (medical vs. social) and which VR program the person participated on, all may seem as potentially interesting explanatory variables, I will only use the latter. This is because the other two would have missing values for so many spells (i.e. the ones beginning prior to

[4] Nordberg and Røed (2002), Table 15.

1994) that including them could be downright misleading. That notwithstanding, the VR spell duration would in many cases be endogenous, and the state prior to the VR spell would, due to the common phenomenon of substitution between socially and medically motivated benefits, be a question of definition.

Estimating business cycle sensitivity, I must choose the business cycle indicator with care. While the unemployment rate may appear the obvious choice, it is argued that the state of the labor market is better approximated by the *rate of outflow* from unemployment (see e.g. Blanchard and Katz, 1997, and Carlsen et al., 2006). This holds an intuitive appeal in that we do model transition probabilities into and out of (un-)employment. It is also supported by the findings in Gaure and Røed (2003) that the rate of outflow from unemployment correlates better with an *ex-post*-calculated GDP-based business cycle indicator than does the unemployment rate itself. Acknowledging that the geographic area relevant for the unemployed is neither the municipality nor the county he or she lives in, but the area in which he or she can work, I calculate monthly rates of outflow from unemployment for 90 travel-to work areas[5]. The rate of outflow from unemployment is defined as the number of unemployed who left unemployment for work, divided by the number of people who in that month were at risk for performing such a transition.[6] The average monthly rate of outflow from unemployment during 1995-2003 was 0.09.

4. Transitions and durations: The framework and observed outcomes

I) *Definitions of the concepts used*

[5] These are defined by Statistics Norway.

[6] Being unemployed is here defined as being full-time unemployed or participating on an ordinary labor market program. As registrations are updated at the end of the month, one is at risk for leaving unemployment up to and including the month after the last month of registered unemployment. Leaving unemployment for work in month *t* is defined as being unemployed in month *t*-1, and being neither unemployed nor on VR the four subsequent months (part time unemployment is allowed in month *t*).

The unit of this analysis is *event histories*, of which each individual may have more than one. The event histories may comprise up to three sets of *transitions* (competing risks), and two *spells*. The possible *states* in the event histories modeled are: work[7]; (long-term) sickness benefits or medical rehabilitation; unemployment[8]; and disability pension or a new VR spell. Sickness benefits and medical rehabilitation are treated as one state, as they are both purely health-related benefits. Also the (final) outcomes of disability pension or a new participation in VR are modeled as one, as they are both 'failure outcomes' in the sense that the individual, after a (new) non-employment spell due to illness or unemployment, (once again) ends up in a more permanent state of non-employment.[9] As each person may be registered in more than one state in a given month, the states are organized in a hierarchy where disability pension ranks highest, followed by unemployment, vocational and medical rehabilitation[10], sickness benefits, education and work.[11]

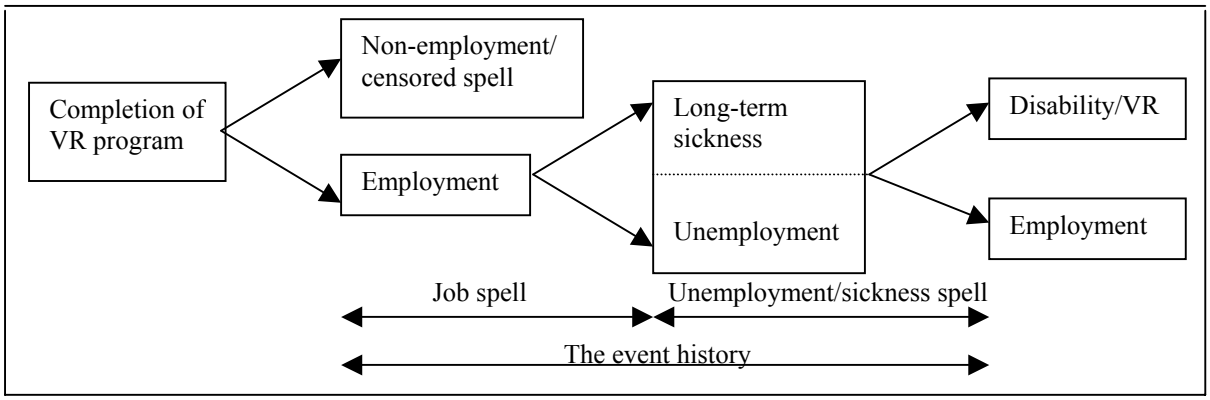
The *event histories* modeled start the month following the end of the VR program participation. During the first period, which may last up to six months, the individuals may or may not find work. Finding work is defined as working (according to the definition above) at least one month during the first six months after the end of the VR spell, and not being registered on disability pension at all during this period. Six months gives the individuals time to search for and land a job, while incorporating

[7] A person is defined as working a given month, either, if he or she is registered in the merged employee-wage register that month as in a job that began the month the VR spell ended or later (as an earlier starting date may imply that the job ended before the VR spell, but that employer forgot to notify the authorities), or if he or she had work-related income that month (wages or income from self-employment) exceeding 2/12 times the social security system 'basic amount' (2003: NOK 55,964).
[8] I.e. registration at the unemployment office as full-time unemployed, participant on an ordinary labor market program, or part-time unemployed with benefits.
[9] Note also that there is a certain randomness in whether a vocationally disabled individual who applies for disability pension actually receives this benefit or is (first) assigned for a VR program.
[10] From September 2000, we only have access to yearly data on medical rehabilitation, and so this state is from then on ranked between education and work.
[11] This means, e.g., that an individual is counted as 'working' a given month only if he or she during that month is not also registered in any of the other states.

only individuals who find work relatively fast. The subsequent transitions can occur from the month after the person has found work, which means that the second period may be any month between month number two and seven after VR. Every period from the second period onwards lasts one month.

The *transitions* and *spells* within the event histories are illustrated in Figure 1. From work, the individuals may go to long-term sickness benefits or unemployment.[12] From each of these benefits, the possible transitions are to (a second spell of) work, where I do not distinguish between returning to the old job and finding a new one, and a new VR spell/disability.[13] The event histories end here. The transitions from sickness benefits or unemployment are modeled as one, with a dummy indicating which benefit the individual received, and the possibility of different duration effects.

Figure 1: An overview of the transitions and spells.



The *job durations* analyzed are the number of months from the beginning of the job spell to either the beginning of a long-term sickness spell, the beginning of an unemployment spell, or censoring. As such, a 'job duration' does not necessarily mean time spent at one workplace.

[12] While I require at least three consecutive months of sickness benefits and/or MR for such a transition to be recorded, one month suffices for unemployment.
[13] A transition to a new VR spell requires one month of VR or disability. A transition to work requires, from unemployment, at least two months of work, as one month only may simply mean that the individual forgot to hand in the declaration card. Such 'gaps' are not included in the unemployment spell duration. From sickness benefits, one month of work is enough to record a transition.

The event history is censored if the individual is not registered as either working, unemployed, on sickness benefits, or on VR or disability pension for a continuous period of at least two months. If the individual lacks such registrations for one month only, the event history continues, but the gaps are not counted in the durations. I also censor event histories involving a transition directly from work to VR or disability pension, as the model is intended to mirror the benefit system as described in Section 2.

II) *Observed transition rates and job durations by gender and immigrant background*

The observed VR program outcomes deserve attention both as a backdrop to the econometric analyses below, and because they are potentially interesting in their own right. Table 2 shows that men more often than women find work after VR (39 vs. 33 per cent) and less often go to disability. For those who do find work, job durations are on average longer for men than for women despite their share of very short job spells being larger. From work, men are less prone to long-term sickness than women are, but among those men who do fall ill, a substantially larger share leaves the labor force afterwards. Unemployment is more common among men, while the transitions out of unemployment are equally distributed across gender.

Table 3 shows the observed outcomes for men by country background (due to the size of the tables, I do not distinguish by time of residence). Immigrants from OECD-countries are shown to have very similar outcomes to natives both regarding the transition to work, job durations and subsequent transitions. The fact that they, as well as all the other immigrant groups, less often than natives become disabled is probably at least partly due to the fact that disability pension entitlement, as well as the amount paid to those entitled, is based on the duration of residence and previous

Table 2: Observed transition rates and job durations by gender.

	Men	Women
From VR		
Number of event histories	90,476	71,896
Share making a transition to work	.39	.33
Share making a transition to education	.07	.07
Share making a transition to disability	.10	.13
Share doing none of the above	.45	.47
Job durations and transitions from work		
Number of event histories at risk	35,430	23,383
Job durations, months		
Average over all job spells [a]	23.4	21.3
Share of the job spells that began before 2001 that lasted		
1-3 months	.18	.16
4-6 months	.14	.12
7-12 months	.14	.17
13-24 months	.14	.18
25-36 months	.10	.11
more than 36 months	.30	.26
Transitions from work		
Share making a transition to long-term sickness benefits	.28	.36
Share making a transition to unemployment	.31	.22
Share working to the end of the observation period	.22	.20
Subsequent transitions		
Transitions from long-term sickness benefits		
Number of event histories at risk	9,773	8,471
Share making a second transition to work	.69	.75
Share making a transition to disability/new VR spell	.18	.12
Share receiving benefits to the end of the observation period	.09	.08
Transitions from unemployment		
Number of event histories at risk	10,913	5,070
Share making a second transition to work	.77	.77
Share making a transition to disability/new VR spell	.08	.08
Share receiving benefits to the end of the observation period	.07	.08

[a] Some job spells are censored, so that the true average job duration is longer.

work experience in such a way that participation is likely to be non-existent the first 5-10 years after arrival.[14] The transition rate to work from VR is at least as high among immigrants from Eastern Europe and Latin America as among natives, but lower among immigrants from Africa and Asia. All immigrant categories display shorter average job durations than the natives. For Africans and Latin Americans, a third of the job spells lasts three months or less. Unemployment is the by far dominating cause of job spell closure for all non-western immigrant categories, while long-term sickness, except for Latin Americans, is relatively rare. Re-employment is

[14] The rules can be found at http://www.lovdata.no/all/nl-19970228-019.html.

Table 3: Observed transition rates and job durations for men by country background.

	OECD	Eastern Europe	Africa	Asia	Latin America	Norway
From VR						
Number of event histories	1,495	1,283	1,309	3,470	378	82,541
Share making a transition to work	.40	.41	.33	.33	.39	.39
Share making a transition to education	.04	.06	.09	.06	.08	.07
Share making a transition to disability	.08	.05	.04	.07	.05	.10
Share doing none of the above	.47	.48	.54	.54	.48	.44
Job durations and transitions from work						
Number of event histories at risk	597	526	434	1,159	146	32,568
Job durations, months						
Average over all job spells	22.5	18.8	15.2	17.9	15.0	23.9
Share of the job spells that began before 2001 that lasted						
1-3 months	.17	.21	.32	.24	.27	.18
4-6 months	.15	.16	.14	.16	.15	.13
7-12 months	.14	.12	.17	.14	.11	.14
13-24 months	.15	.16	.13	.13	.17	.15
more than 24 months	.39	.35	.25	.32	.29	.40
Transitions from work						
Share making a transition to long-term sickness benefits	.25	.19	.15	.21	.28	.28
Share making a transition to unemployment	.29	.44	.45	.37	.42	.30
Share working to the end of the observation period	.23	.21	.16	.19	.08	.22
Subsequent transitions						
Transitions from sickness benefits						
Number of event histories at risk	150	98	67	241	41	9,176
Share making a second transition to work	.71	.66	.64	.73	.63	.69
Share making a transition to disability/new VR spell	.18	.12	.18	.12	.15	.18
Share receiving benefits to the end of the observation period	.07	.16	.12	.09	.17	.09
Transitions from unemployment						
Number of event histories at risk	176	233	197	429	62	9,816
Share making a second transition to work	.75	.73	.72	.73	.76	.77
Share making a transition to disability/new VR spell	.06	.09	.04	.06	.05	.08
Share receiving benefits to the end of the observation period	.13	.10	.11	.10	.11	.07

[a] This may be somewhat misleading due to the differences in time of residence among the various immigrants groups. See also note a) in Table 2 regarding censoring.

in fact almost as common for non-western immigrants as for natives, but there are signs that their unemployment- and sickness benefit periods are also longer.

A comparison with the results for women in Table A3 in the Appendix reveals gender differences similar to those for the natives: women are less likely to find work,

their average job duration is shorter, they are more likely to fall ill and less likely to become unemployed. However, female non-western immigrants are more likely than their male counterparts to become re-employed from unemployment as well as from illness, and African women also stand out favorably regarding the probability of finding and keeping a job.

5. The econometric approach

This paper employs a multivariate mixed proportional hazard rate model where the initial transition, i.e. the probability of finding work during the first period and thus of being observed in the following periods as well, is described by a binomial logit equation. The subsequent transitions constitute a competing risks model, where the individual may face competing risks twice: first, from work to unemployment, *u*, or sickness benefits, *s*; then, from either of these (back) to work, *w*, or a new VR spell/disability, *r*. The hazard rates are allowed to be correlated with the probability of finding work through the correlation of unobserved variables, and exclusionary restrictions ensure identification of the sample selection process, so that the results on job durations and transitions in the ordinary labor market are valid not only for those who actually find work, but for all VR program participants.

As the data are not updated continuously, but once each calendar month, the hazard rates modeled are integrated over these observation intervals. The underlying continuous time hazard rates (i.e. the calendar time and spell duration effects) are assumed to be constant within each month, and to depend multiplicatively on the elapsed spell duration, calendar time, observed regressors and unobserved heterogeneity. Let φ_{jit} denote the integrated period-specific hazard rate governing the transition to state *j* for an event history *i* in period *t*. Let y_{w1i} be an outcome indicator

which is equal to one if the individual finds work after VR and zero otherwise, and let $l(\cdot)$ denote a binomial logit expression, i.e. $l(\cdot) = \frac{\exp(\cdot)}{1+\exp(\cdot)}$. Let d denote spell duration. The model can then be specified as follows:

(1) $P(y_{w1i}=1)= l(\alpha_1 b_{reg}+\alpha_2 c+\alpha_3 f_i+\beta x_{1i}+v_{w1i})$

(2) $\varphi_{kit} = exp(\beta_k x_{it}+\delta_k b_{reg,t}+\eta_k c_t+\gamma_k w_d+ v_{ki})$, $k= u, s$

(3) $\varphi_{mit} = exp(\beta_m x_{it}+\delta_m b_{reg,t}+\eta_m c_t+\gamma_m D_d+\varepsilon_m su_{i,t-1}+ v_{mi})$, $m=w, r$

Eq. (1) models the probability that the VR spell results in a transition to a job, and hence is subject to the statistical analysis of job duration (initial condition). In eq. (1), all variables are observed at the end of the rehabilitation spell. b_{reg} is the regional business cycle indicator, c is the calendar month (twelve dummies), while f_i is a vector of family characteristics intended to capture the amount of disability pension the individual would be entitled to. These variables are meant to ensure identification of the sample selection (see the section 'Identification'). The vector x_{1i} contains sets of variables that measure age (a third-degree polynomial), immigrant category (eleven dummies for different combinations of country background and time of residence), years of education (one dummy for each year), county of residence (19 dummies), and which type of VR program the individual participated in (ten dummies). Note that the VR program parameters have no causal interpretation.

In eqs. (2) and (3), which models the hazard rates from work and (unemployment and sickness) benefits respectively, the vector x_{it} contains the person-specific characteristics age, immigrant category, years of education, county of residence and VR program type (all specified as above; age is now time-varying), as well as the individual's marital status and number of children under 18. $b_{reg,t}$ captures the regional business cycle; c_t is the calendar month (twelve dummies); and w_d is the

elapsed job duration. In eq. (3), su_{t-1} indicates whether the individual received sickness benefits or was unemployed the period prior to the (potential) transition, while the vector of duration variables D_d contains not only the by now completed and time-constant $w_{\underline{d}}$, but also the elapsed duration of sickness benefits and unemployment, respectively.

The individual scalar variables (v_{w1},v_u, v_s, v_w, v_r) capture the unobserved heterogeneity. For a given individual, unobserved characteristics which affect one of the transition intensities could also affect another, and so we allow *interdependence* between the components of (v_{w1},v_u, v_s, v_w, v_r). The distribution of unobserved heterogeneity in the population is assumed to be approximated by a discrete distribution (this is discussed in more detail under 'Estimation').[15]

Identification

This paper aims to estimate various kinds of duration effects: the effect of job duration on the transition rate to unemployment and sickness benefits respectively, and the effects of unemployment and sickness duration both on the transition (back) to work, and to a new VR spell. Not wanting to impose any distributional assumptions on these effects, they are modeled non-parametrically, with one dummy for each duration period.[16] As shown in Heckman and Honoré (1989) and Abbring and Van den Berg (2003), identification of duration dependence is guaranteed by the mixed proportional hazard (MPH) structure. However, we do not have to rely solely on the assumption of a MPH structure, as identification in our case is also facilitated by a substantial exogenous variation in time-varying covariates (see McCall, 1994, and

[15] Røed and Raaum (2006) and Røed and Zhang (2003) estimate similar models (although with a differently specified initial condition), while e.g. Abbring et al. (2005) also estimate non-parametric multivariate MPH models, but with an exogenously determined number of mass points.
[16] Month by month (up to 36 months) for job durations, while the benefit durations are grouped (Tables A4 and A5 shows how) according to what was observed in a previous, more flexible, estimation round.

Brinch, 2007, for a formal discussion of the use of time-varying covariates to identify hazard rate models with unobserved heterogeneity). Business and seasonal cycles produce exogenous variations over time in the hazard rates, and by comparing the actual, 'current' hazard rate with the expected rate as deduced from the current cycles and the same individuals 'lagged' hazard rates (i.e. hazard rates experienced earlier in the relevant spell), the effects of the individual's unobserved characteristics on the hazard rate can be identified.

Identification of the 'true' parameters for the entire VR participating population, as opposed to only those who found work after VR, is ensured by exclusionary restrictions, showing up as three variables in the sample selection equation (1): First, the regional business cycles at the time the individual is at risk of entering the labor market (i.e. the last month of the VR spell). This is expected to affect the probability of finding work during that period, but not the subsequent labor market transitions, which are already allowed to depend on the business cycles at the time they occur. Second, I include the calendar month at the time the individual is at risk of entering the labor market as a measure of the seasonal variations in the probability of finding work. Again, this is not likely to affect the subsequent transitions. Finally, I specify a 48 dummy-family variable which interacts the individual's number of children in different age groups with the existence of a spouse and the spouse's income in such a way that it captures the individual's expected disability pension according to the complex entitlement rules, and thus his or her 'alternative cost' of choosing employment (the substantial empirical correlation between a person's family characteristics and his or her probability of becoming

disabled is documented by Bratsberg et al., 2006).[17] The individual's subsequent labor market transitions are unlikely to depend on these very specific interacted family characteristics, given that they are already allowed to depend on marital status and number of children.

Estimation

The unit of this analysis is event histories rather than individuals.[18] Each event history contributes to the analysis with a number of observations equal to the number of periods at risk of making a transition of some sort, i.e. only one for those 103,559 VR spells that did not end in a transition to work, and more than one for those 58,813 that did. Each observation is described in terms of calendar time (business and seasonal cycles), spell duration, the value of explanatory variables and an outcome.

Let y be an outcome indicator variable. y_{w1i} is, as above, equal to one if the individual finds work after VR, and zero otherwise, while y_{beni} is equal to one if the job spell ended with a transition to (unemployment or long-term sickness) benefits, and zero otherwise. The period-specific y_{jit} is equal to one if the corresponding observation period ended in a transition to state j, and zero otherwise. Let Y_{wi} and Y_{beni} be the number of periods observed for event history i in the job spell and the (unemployment and/or sickness) benefit spell, respectively. The likelihood function is constructed so as to correspond to the three-step setup of the model outlined in Section 4 I, implying that the first part captures the transition from VR to work; the second part captures the transitions from work to either unemployment or long-term

[17] An individual is entitled to an additional pension if the spouse's income is below a certain amount. An extra amount is also paid per child under the age of 18, and this amount is non-decreasing in the number of children (the total future payments decrease of course with the children's age). This amount is higher if the individual has no spouse, or if the spouse's income is low; hence the interaction. (See 'Folketrygdloven', http://www.lovdata.no/all/nl-19970228-019.html.)

[18] Some individuals do contribute with more than one event history, but using this information would imply assuming that the unobserved heterogeneity is constant across event histories, and thus that there are no causal effect from the first VR spell on the outcomes of the subsequent VR spell(s).

sickness benefits, where φ_{kit} is the hazard rate in eq. (2); while the third part captures the transitions from either of these benefits to a new work- or VR spell, where φ_{mit} is the hazard rate in eq. (3). The contribution to the likelihood function formed by a particular event history, conditional on the vector of unobserved variables (v_{w1},v_u, v_s, v_w, v_r), can then be formulated as

$$
\begin{aligned}
L_i(v_i) = & \left[P(y_{w1i}=1)\right]^{y_{w1i}} \left[P(y_{w1i}=0)\right]^{(1-y_{w1i})} \\
& \times \prod_{y_{kit}\in Y_{wi}} \left[\prod_{k\in(u,s)} \left[\left[\left(1-\exp\left(-\sum_{k\in(u,s)} \varphi_{kit}\right)\right) \frac{\varphi_{kit}}{\sum_{k\in(u,s)} \varphi_{kit}} \right]^{y_{kit}} \right. \right. \\
& \left. \left. \times \left[\exp\left(-\sum_{k\in(u,s)} \varphi_{kit}\right) \right]^{\left(1-\sum_{k\in(u,s)} y_{kit}\right)} \right] \right]^{y_{w1i}} \\
& \times \prod_{y_{mit}\in Y_{beni}} \left[\prod_{m\in(w,r)} \left[\left[\left(1-\exp\left(-\sum_{m\in(w,r)} \varphi_{mit}\right)\right) \frac{\varphi_{mit}}{\sum_{m\in(w,r)} \varphi_{mit}} \right]^{y_{mit}} \right. \right. \\
& \left. \left. \times \left[\exp\left(-\sum_{m\in(w,r)} \varphi_{mit}\right) \right]^{\left(1-\sum_{m\in(w,r)} y_{mit}\right)} \right] \right]^{y_{beni}}
\end{aligned} \tag{5}
$$

As this depends on unobserved heterogeneity, it cannot be used directly in the data likelihood. Instead, we use the expectation of L with respect to the unobserved variables, i.e. we integrate them out of the likelihood. The distribution of the unobserved heterogeneity is unknown, and it is thus approximated in a nonparametric fashion with the aid of a discrete distribution (Lindsay, 1983; Heckman and Singer, 1984). Gaure et al. (2007) shows that, in order for the parameters to be estimated without bias, it is essential to allow the number of support points in the heterogeneity distribution to be determined endogenously in the estimation process according to an appropriate information criterion (as opposed to pre-specifying a (low) number of support points). This is therefore the strategy used in this paper. Let Q be the (a priori

unknown) number of support points in the heterogeneity distribution, and let $\{v_q, p_q\}$, q=1, 2, ..., Q, be the associated heterogeneity vectors and probabilities. All individuals are appointed with the same set of p_q's (i.e. probabilities p_q of having v_q, where v_q refers to the q'eth mass point for *all* transitions). That is, the estimation process does *not* imply drawing one v_q for each individual. Also note that the unobserved heterogeneity is assumed to be uncorrelated with the observed characteristics of the individual. Let N be the number of event histories. In terms of observed variables, the likelihood function is then given as

$$(6)\ L = \prod_{i=1}^{N} \sum_{q=1}^{Q} p_q L_i(v_q)$$

The model is estimated by maximizing (6) with respect to all the model and heterogeneity parameters (including v_q and p_q) repeatedly for alternative values of Q. I begin with Q= 1, i.e. no unobserved heterogeneity, and then add new support points until the model is saturated. As recommended by Gaure et al. (2007), I use the likelihood itself as model selection criterion.[19]

The basically non-parametric estimation strategy involves an extensive use of dummies and thus – with five transitions – a vast number of estimated parameters. Also, wishing to allow the number of support points in the unobserved heterogeneity distribution to be determined endogenously in the estimation process, we understand that maximizing (6) is a huge computational task. This is solved by using an optimization program tailored for the type of data we use.[20] The estimation was performed using a supercomputer at the University of Oslo.

[19] More precisely, the estimation stops when the log-likelihood increases by less than 0.01.
[20] The program is developed by Simen Gaure at the Centre for Information Technology Services, University of Oslo and the Ragnar Frisch Centre for Economic Research, and may be studied at http://www.frisch.uio.no/NPMLE.html.

6. Results

For expositional reasons, this section is divided into several parts. Subsection I, part A to D presents the estimation results for the outcomes of VR programs, while part E suggests how the results are to be interpreted. Subsection II shows the business cycle sensitivity results.

I) *Outcomes of VR programs: Estimation results*

There is a substantial variation across immigrant groups for all observed outcomes (Section 4), but also regarding person and VR spell characteristics such as age, time of residence, education, region and type of VR program (Section 3). It remains to be seen to what extent the observed differences are in fact due to immigrant background per se, i.e. to language proficiency, skin color, translatability of human capital acquired in the country of origin, and other unobserved immigrant-specific traits that may have consequences for the labor market outcomes in Norway.

The model presented in Section 5 is estimated separately for men and women. For men, the model selected contains ten support points in the joint heterogeneity distribution. Through the process of introducing unobserved heterogeneity into the model, the likelihood increased by 414.21 units, from –214,224.75 (Q=1) to –213,810.54 (Q=10). For women, the model selected contains nine support points, and the likelihood increased by 303.30 from –144,969.59 (Q=1) to –144,666.29 (Q=9). A total number of 1,324 parameters were estimated. The estimation results are presented in Tables A4 and A5 in the Appendix.

In order to check model performance, I use the estimated parameters and the individuals' actual observed personal characteristics to *simulate* the event histories. The individuals' unobserved characteristics are determined by using the estimated

probability, p_q, and location vector, v_q, belonging to each mass point, q=1, ..., Q, where Q^{est} equals 10 for men and 9 for women. Each person is randomly assigned to each of the "types" (mass points), and deposited with the relevant constant, v_q. All transitions (eq. 1-3 above) are decided by random drawings based on the probabilities and hazard rates calculated from the model. From the simulated event histories I am able to calculate the various transition rates and durations as they are estimated by the model, and compare these to their empirical counterparts. As shown in Table A6 and Figure A1 in the Appendix, the model is indeed capable of reproducing the observed outcomes in a reassuring manner, for both genders.

A) *Finding work after VR*

Tables A4 and A5 show that immigrant background matters for the probability of finding work even when we control for other observed characteristics, as well as unobserved heterogeneity. The magnitude of the parameter estimates is illustrated through simulation. (While there are admittedly easier ways, the results regarding job durations and subsequent transitions require simulation due to the competing risks setting, so I use it here as well for consistency.) The event histories are simulated as described above, but the individuals' immigrant category is set from outside: By first allowing *all* individuals to be native, and then e.g. 'African with less than ten years of residence', we find the isolated effect of being 'African etc.' compared to being native, on the probability of finding work. The results are shown in Table 4.

This exercise reveals intriguing gender differences regarding how the probability of finding work is affected by immigrant background. For males, being a non-western immigrant affects the employment probability negatively for several immigrant categories. For females, on the other hand, being an immigrant from

Table 4: *Finding a job.* The isolated effect of immigrant background on the probability of finding work after VR: The predicted probabilities, and the percentage difference from natives.

	Men		**Women**	
Natives	.404		.335	
	Level	*Difference*	*Level*	*Difference*
OECD				
0-9 years of residence	.449	+11.1%	.362	+8.1%
≥10 years of residence	.419	+3.7%	.310	-7.5%
Eastern Europe				
0-9 years of residence	.434	+7.4%	*.434*	*+29.6%*
≥10 years of residence	*.324*	*-19.8%*	.310	-7.5%
Africa				
0-9 years of residence	.392	-3.0%	*.433*	*+29.3%*
≥10 years of residence	*.332*	*-17.8%*	.333	-0.6%
Asia				
0-9 years of residence	.385	-4.7%	*.424*	*+26.6%*
≥10 years of residence	*.350*	*-13.4%*	*.308*	-8.1%
Latin America				
0-9 years of residence	.399	-1.2%	.348	+3.9%
≥10 years of residence	.437	+8.2%	.344	+2.7%

Note: Numbers in italic denote that the probability of finding work for the relevant immigrant group is significantly different from that of the natives on a 5% level.

Africa, Asia or Eastern Europe with less then ten years of residence at the end of the VR spell *increases* the probability of finding work by some 30 percent as compared to otherwise similar native women, resulting in simulated employment probabilities which are equal to or larger than those of their male counterparts. Also puzzling is the finding that irrespective of gender, African, Asian and Eastern European immigrants with a *longer* time of residence generally seems to perform worse than those with shorter, and significantly so for the Asian women. Interestingly, immigrants from Latin America show neither the gender- nor the time of residence-patterns as seen in the other non-western immigrant groups.

As for the other observed characteristic, Tables A4 and A5 show that the probability of finding work decreases with age, and increases with the level of prior education. It also varies significantly with which VR program the individual participated in. Regardless of gender, it is, all else being equal, highest for wage subsidies and lowest for supported employment. The results for the 48-dummy family

variable intended to help identifying the sample selection process (see Section 5, 'Identification') show the expected signs.[21]

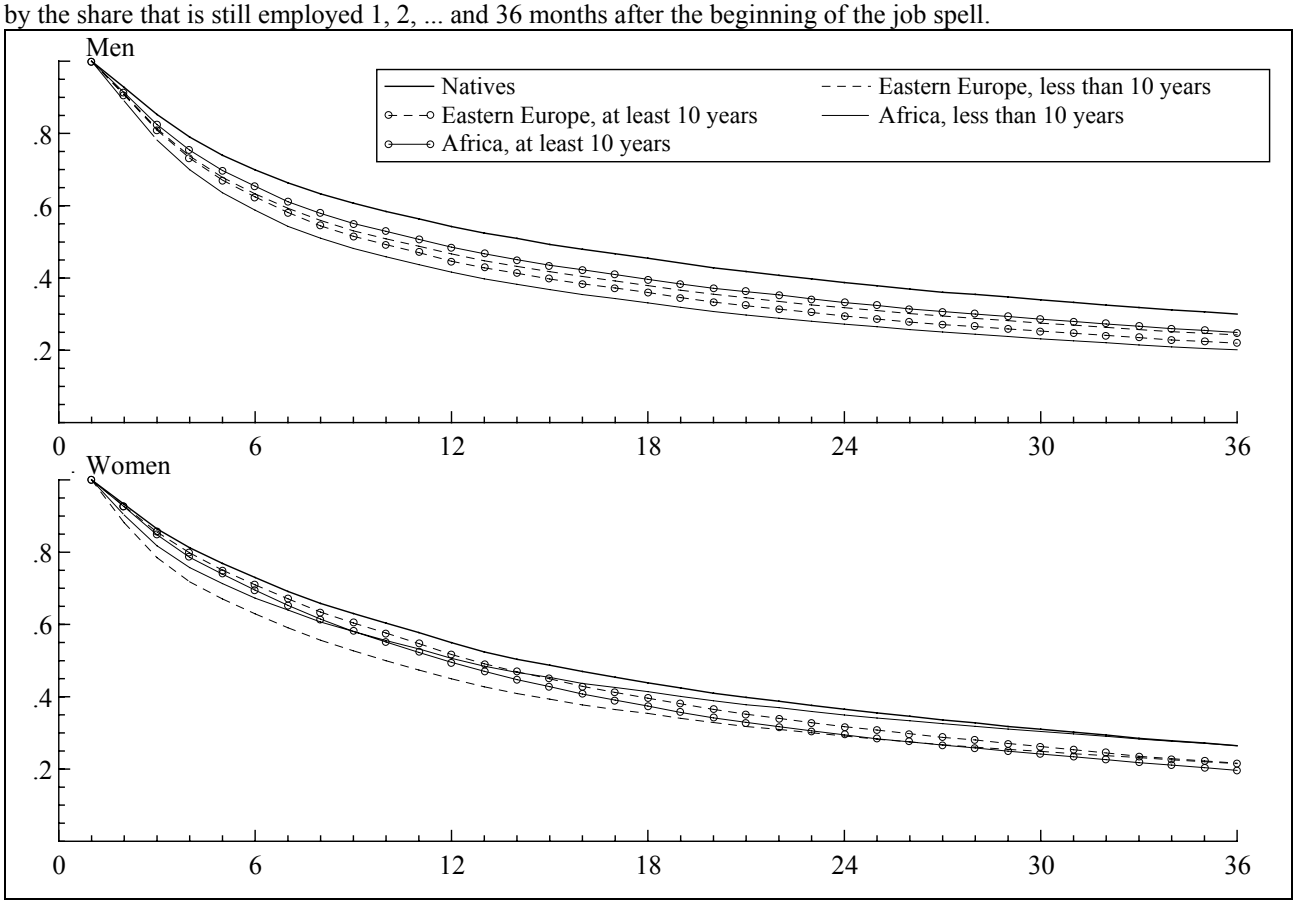
B) *Staying employed*

The unit of analysis in this case is job durations, as defined in Section 4. The event histories are simulated as described above, for each immigrant category. While age is permitted to be time-varying, there is no business cycle variation. I then simply calculate the share with still ongoing job spells for each relevant job duration, and plot these in Figure 2. Note that the shares are conditional on actually having found work during the six month period following VR participation. Also note that a person who is no longer employed after e.g. six months, can become re-employed a couple of months later, i.e. the figure does not show the share that is employed at each point in time, but the share that is still on the same job spell.

We see that being native imply the longest average job spells for both genders, ceteris paribus, illustrated by a 30% probability of still being employed after 36 months for males, and a 26% probability for females. For male non-western immigrants, the percentage lies between 20 and 25, with immigrants from Africa with less than ten years of residence at the bottom. Surprisingly, being a *female* immigrant from Africa with less than ten years of residence implies as high a probability of still being employed after 36 months as that of the native females – but it also implies a high probability of having a very short job spell.

[21] Consider an individual with one child aged 0-10. The family variable interacts the child information with four spouse categories. For both genders, the estimates show that the probability of finding work is lower if the individual is entitled to a full child-related additional benefit (i.e. if he or she either has no spouse, or a spouse whose income lies below a certain level – in which case he or she is also entitled to a spouse-related additional benefit) than if he or she is not (due to a high income spouse). The results for the individuals with missing information on spouse's income are, as expected, ambiguous.

Figure 2: *Job durations.* The isolated effect of immigrant background on the job duration, illustrated by the share that is still employed 1, 2, ... and 36 months after the beginning of the job spell.



Asian and Latin American categories are excluded from the figure for readability reasons. These backgrounds affects job durations almost similarly as being from Eastern Europe, for a given time of residence (see also Table 5).

Gender-wise, Figure 2 shows that men are more likely to have very long *and* very short job spells. We also detect a generally male-specific pattern to how a non-western background affects job duration, non-western immigrant backgrounds appearing to imply a high probability of leaving employment early in the job spell, but given that the job spell lasts some nine months, the probability of staying employed even to the 36th month is just as large as for the natives. Finally, we note that the ranking of which immigrant category 'performs better' is constant over the job duration for men, but not for women.

As for how elapsed job duration affects the hazard rates out of employment, Tables A4 and A5 show no striking gender differences. The hazard rate to long-term sickness benefits is not significantly affected at all, while there is a significant

negative duration effect on the unemployment hazard. A comparison of the reported estimation results to the ones found in the first estimation round, i.e. with no unobserved heterogeneity, shows, as expected, that introducing unobserved heterogeneity leads to a substantially reduced effect of elapsed job duration on the unemployment hazard.

C) *How the job spells end*

The estimates pertaining to the sickness benefits and unemployment hazards in Tables A4 and A5 indicate that the variation in job durations across immigrant background is mainly due to different *unemployment* hazards. In order to demonstrate how immigrant background affects the ending of a job spell, I use the simulated event histories from earlier to show the status 6, 12 and 24 months after the beginning of the job spell to see how many who by then have become unemployed or long-term ill.

The simulated cumulative transition shares as presented in Table 5, are to be interpreted as follows: When six months had passed after the beginning of the job spell, immigrant background from Eastern Europe and a 'short' time of residence

Table 5: *How the job spells end*. Share that have gone to unemployment and long-term sickness benefits (cumulative transition shares) 6, 12 and 24 months after the beginning of the job spell.

	Men						**Women**					
	Unemployment			**Sickness benefits**			**Unemployment**			**Sickness benefits**		
Immigrant category	6m	12m	24m	6m	12m	24m	6m	12m	24m	6m	12m	24m
Natives	.174	.231	.282	.071	.123	.191	.134	.185	.225	.093	.165	.251
Eastern Europe												
0-9 years of residence	*.279*	*.365*	*.439*	*.044*	*.075*	*.118*	*.268*	*.347*	*.401*	.066	.114	.171
≥10 years of residence	*.252*	*.326*	*.386*	.082	.134	.197	.138	.190	.228	.110	.198	.304
Africa												
0-9 years of residence	*.329*	*.419*	*.493*	.049	.080	.119	*.230*	*.308*	*.363*	.050	.090	.140
≥10 years of residence	*.236*	*.306*	*.367*	.071	.119	.177	.140	.187	.224	.128	.223	.334
Asia												
0-9 years of residence	*.240*	*.314*	*.378*	.063	.105	.159	*.249*	*.323*	*.375*	.082	.144	.216
≥10 years of residence	*.226*	*.293*	*.353*	.076	.126	.188	*.234*	*.304*	*.351*	.100	.169	.249
Latin America												
0-9 years of residence	*.288*	*.370*	*.439*	.072	.117	.170	.251	.330	.383	.076	.130	.212
≥10 years of residence	*.272*	*.345*	*.404*	*.116*	*.179*	*.247*	.159	.211	.255	.088	.160	.257

Note: Numbers in italic denote that this hazard rate is significantly affected by the relevant immigrant category as compared to natives, on a 5% level.

implied a 26.8% probability for the average woman of having become unemployed by then, which is seen to be significantly higher than the 13.4% probability for an otherwise identical native woman, and a 6.6% probability of having become long-term ill, which is seen not to be significantly different from the 9.3% for an otherwise identical native woman.

In general, we see that the unemployment hazard is significantly positively affected by immigrant background for all male non-western immigrant groups and some of the female, and more so for the shortest time of residence-category. Interestingly, while there are almost no gender differences regarding the cumulative transition probabilities to unemployment for the Asian immigrants, the differences are substantial – in favor of the women – for the African immigrants, as well as for the Eastern European and Latin American immigrants with the longest time of residence. There is generally no significant effect of immigrant background on the hazard rate to long-term sickness benefits, but it seems this transition is more common among those with the longest time of residence.

D) *Finding a new job after unemployment*

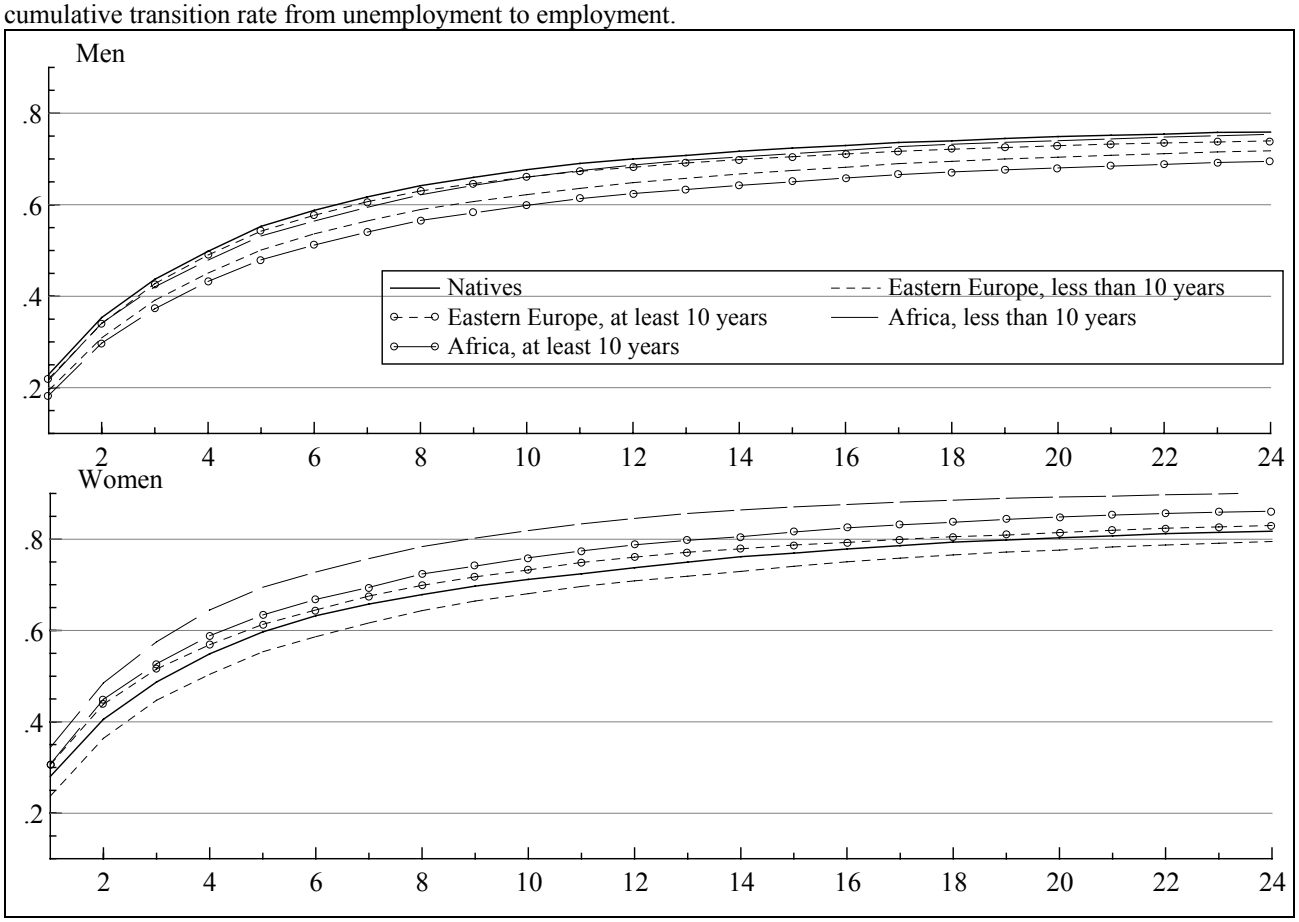
The higher unemployment propensity among non-western immigrants would not be so worrying if it went hand-in-hand with an ability to find new work relatively fast. However, among men, all but one non-western immigrant background imply a *lower* probability of finding a new job, and two of them significantly so. On the brighter side, several estimates are (non-significantly) positive for the women, and once again the female immigrants from Africa stand out favorably.

Figure 3 depicts the cumulative transition rate from unemployment to work for those who became unemployed during the first year of employment (see the columns

marked ’12m’ under ‘unemployment’ in Table 5), for each month of unemployment. Note that, due to the competing risks framework, it is not so that those who have not yet found work are necessarily still unemployed.

Women are more likely than men to become re-employed: After two months of unemployment, the women had a 36-49% probability of having found work, compared to a 30-35% probability among the men. After twelve months, the corresponding numbers were 71-85% and 62-70%.[22] Being native implies the largest re-employment hazard at any time in the unemployment spell for men, whereas for

Figure 3: *Finding a new job after unemployment.* The isolated effect of immigrant category on the cumulative transition rate from unemployment to employment.



Being an immigrant from Asia or Latin America is found to imply re-employment hazards within the extremes depicted here.

[22] At least after several months of unemployment, the re-employment probabilities presented here will be artificially large if the (in the simulation) imposed assumption of stochastic censoring is wrong. In the actual data set, censoring often occurs when leaving unemployment for social assistance, e.g. because of exhausted benefit rights, and so censored unemployment spells are probably less likely to end in employment than the average unemployment spell.

women being a non-western immigrant outperforms being native for several immigrant categories.

Regarding the estimated duration effects, we see from Tables A4 and A5 that the hazard to work depends negatively on the unemployment duration, and somewhat more so for men than for women. (Note that the estimated unemployment duration dependency incorporates discouragement, statistical discrimination etc. which implies a negative duration effect, as well as depletion of benefit rights, which should imply a positive duration effect.) The duration effect of sickness benefits seems to be fairly constant during the first ten months of the benefit spell, before peaking at 12 months, and then sinking again. The 12 months peak (also found in e.g. Nordberg and Røed, 2003) is probably due to the entitlement rules as described in Section 2, i.e. that one must apply for (the smaller amount of) medical rehabilitation benefits after 12 months of sickness benefits. The notion of the sickness benefits duration effect being more system- than individual specific is mirrored in how the estimates change when we introduce unobserved heterogeneity: while the effect of unemployment duration is substantially reduced, the effect of sickness benefits duration hardly changes at all.

E) *Possible interpretations*

There are several reasons why labor market success should vary with country background (see e.g. Bauer et al., 2000): The existence and translatability of foreign education and work experience, language differences, culture differences regarding the value attached to the ability to provide for oneself, the migration motive (labor vs. family reunification or refuge) and skin color (racist employers).[23] Adding to this, I could not control for work experience gained before the VR participation, and

[23] Some studies even show that the significant effect of country of origin on earnings disappears as soon as home country characteristics are controlled for (Jasso and Rosenzweig, 1995; Borjas, 1987).

systematic differences across immigrant groups in this respect would be incorporated in the immigrant dummies.

Most of these matters should mainly affect *the probability of finding work*, through the factual and perceived skills of the immigrant. As such, one would think that the probability of finding work would increase with the similarity of the country of origin to Norway, i.e. that it should be the lowest for immigrants from Africa, followed by Asia and Latin America, Eastern Europe and the OECD-countries. In addition, time of residence should smooth out some of the initial differences, implying that those with more than ten years since arrival should outperform those with less.

When we look at the transition from VR to work, as well as at the subsequent re-employment transition, the above predictions correspond only partially to my findings. Each of the non-western immigrant categories have at least one time of residence category where they perform at least as well as the natives, and the continent differences are contrary to expectations in that being an immigrant from Africa, Asia or Latin America is, for a given time of residence category, found to yield statistically similar (or better) outcomes as being from Eastern Europe or (for the women) OECD-countries. In particular, we note the astonishing labor market outcomes of African, Asian and Eastern European women.

These findings may be interpreted through the following mechanisms: First of all, case workers may put more effort into VR program participants who are perceived as having poorer labor market prospects. Second, assuming that it is known beforehand by the potential employer that e.g. Africans face a more difficult labor market than Eastern Europeans, he or she may be more suspicious of the fact that the latter have participated in a VR program, as the Africans may be assumed to be victims of racism and thus need some help even though they are 'good workers'.

Third, the non-OECD VR program participants may respond to the perceived unfriendly labor market by applying for work with extra fervor. Fourth, individuals with worse labor market prospects to begin with may have larger gains from VR program participation, in line with the findings in e.g. Aakvik et al. (2005). Finally, there is the possibility of selective sampling (or, more precisely, that the unobserved characteristics are not independent of immigrant background in the inflow), in that it is the most resourceful immigrants in each category who participate in VR programs. Given the target group of VR programs, this seems a rather unlikely general theory, but it may be relevant for e.g. the small group of female African VR participants.

Supporting the hypothesis of compensating caseworkers, we note that the labor market successes are short-lived for most immigrant groups, due to very high unemployment hazards. These may stem from language- and cultural differences, which entail lower productivity and difficulties in adapting to the workplace. Non-western immigrants may also to a larger extent than natives have to settle for temporary jobs. The finding of almost no effect of immigrant background on the long-term sickness hazard, in contrast to the substantial effect on the unemployment hazard, may reflect that non-western immigrants to a larger extent than natives and OECD-immigrants participate in VR programs due to work-related rather than illness-related problems (Ekhaugen, 2006, p. 14), but also that long-term illness is something 'objective', which does not depend on whether one is born in Norway or not.

Also in contrast to the predictions outlined above, time of residence seems to affect the employment- and re-employment hazard *negatively* for non-western immigrants. This may be interpreted through two of the findings in Ekhaugen (200/): Certain immigrant groups do in fact 'assimilate into welfare', and there is selective re-migration in the sense that immigrants leaving Norway are more likely to be able to

provide for themselves than those who stay. But it may also reflect differences in arrival cohorts, and even country backgrounds, as the country composition within the larger areas that we do control for, may change over time.

II) *Business cycle sensitivity*

In the modeling, business cycles are allowed to affect the hazard rates differently for natives, OECD-immigrants and non-OECD immigrants.[24] As expected, the estimates in Tables A4 and A5 show that gender is of no importance regarding the significance of the business cycle sensitivity for the different transitions, nor for the (main) differences between immigrant categories.

Non-OECD immigrants are substantially more sensitive to business cycles than natives when it comes to the probability of finding a job after VR, and we see a corresponding, albeit smaller, difference regarding the hazard rate back to employment after a period on benefits. As for the transition to unemployment, however, non-OECD immigrants appear to be *less* sensitive to business cycles than natives are. In fact, the unemployment hazard of non-OECD immigrants is not significantly affected by business cycles at all, whereas that of natives is substantially so. The sickness hazard is not significantly affected by business cycles for any immigrant category or gender. This seems reasonable, as we are dealing with *long-term* sickness and a discipline argument is therefore probably less relevant. More surprising is the finding that the native disability-/new VR spell-hazard for both genders is significantly positively affected by business cycles. OECD-immigrants are generally not significantly affected by business cycles regarding any transition.

[24] It would be interesting to determine whether e.g. immigrants from Eastern Europe are less affected by business cycles than other non-OECD immigrants – an experiment did indicate this – but splitting the non-OECD immigrants into smaller groups would give such a low number of observations in each as to render all the estimated parameters statistically insignificant.

The business cycle sensitivity regarding the probability of finding work after VR can be illustrated through the following simple exercise: I set the probability of finding work (eq. 1) for each gender equal to the mean probability as shown in Table 2 (.39 for men and .33 for women), and calculate the corresponding right-hand side value in eq. (1). The rate of outflow from unemployment, which captures the business cycles, is then reduced by one standard deviation, i.e. .0187, from the average .09, with everything else held constant.[25]

Table 6: *Business cycle sensitivity.* The effect on the probability of finding work after VR of reducing the rate of outflow from unemployment by one standard deviation, i.e. .0187, from the mean, i.e. .09, from the observed average probabilities of .39 for the men and .33 for the women.

	Men		**Women**	
Immigrant category	New level	Change (%)	New level	Change (%)
Natives	.357	8.5	.299	9.4
OECD-immigrants	.369	5.4	.295	10.6
Non-OECD immigrants	.334	14.3	.260	21.2

The point estimates indicate that a reduction in the outflow rate from unemployment by one standard deviation affects the probability of finding work roughly twice as much for non-OECD immigrants than for natives, while OECD-immigrants are quite similar to natives. Women seem on the whole to be more sensitive to business cycles than men, but mostly so among non-OECD immigrants.

The existing literature supports the finding that the job-market success of non-western immigrants is more sensitive to business cycles than that of the natives. Different outcomes are employed: the transition rates from non-employment to employment and vice versa (Bratsberg et al., 2006); welfare dependency (Ekhaugen, 2007); and yearly labor earnings (Barth et al., 2004). In contrast to my findings, Bratsberg et al. (2006) conclude that the transition rate from employment to non-employment is also more sensitive to business cycles for non-western immigrants

[25] Unfortunately, because the business cycles are specified as a polynomial and I failed to retrieve the covariance matrix in the estimation, the *precision* of the estimates cannot be discussed accurately. As a second-best strategy, however, we can note that the estimated second- and third-order coefficients are statistically non-significant for either transition, and therefore compare only the estimated first-order coefficients – which *are* significantly different across immigrant categories for the transition to work.

than for natives. This may be because the immigrants in their sample (labor immigrants) are more resourceful than those in mine (which includes refugees and immigrants arriving for family reunification; all of whom have participated in a VR program), and the latter are prone to unemployment irrespective of business cycles.

7. Conclusion

This paper analyzes outcomes of vocational rehabilitation (VR) programs, as well as business cycle sensitivity for a multitude of labor market transitions on a nine-year data panel comprising all the VR spells that ended during 1995-2002. Not only does the paper bring a new methodological approach to the literature on VR program outcomes, but it also contributes simply by concentrating first of all on *long*-term outcomes far beyond the traditional focus on the transition to work, and second on *immigrants*, whose long-term labor market outcomes such as job durations and the ability to become re-employed after a period on benefits, we know very little about.

While the sheer number of outcomes and demographic groups suggests that the detailed results are better left in the tables, there are some patterns that deserve attention. First of all, the results show that the prospects of a given non-western immigrant group, compared to e.g. natives, of finding a job *are* different than those of keeping the job they find – but perhaps not as expected. For most immigrant categories, the prospects of finding a job after VR are shown *not* to be significantly affected by immigrant background per se. The exceptions are men from Eastern Europe, Asia, and Africa with at least ten years of residence at the end of the VR program, who are less likely, by some 13-20 per cent, to find work than otherwise similar native men; and women from Eastern Europe, Asia, and Africa with less than ten years of residence at the end of the VR program, who are in fact substantially

more likely, by some 27-30 per cent, to find work than otherwise similar native women. But their apparent labor market success is short-lived. Due to a significantly higher unemployment hazard (but to a far lesser extent long-term sickness hazard), *all* non-western immigrant groups face shorter job durations than the natives. This is most pronounced among the men, but also among the women, and in particular among those groups who excelled at finding work. Interestingly, while all the male non-western groups are also less likely than the native males to become re-employed, some female non-western groups seem to outperform the native women, as well as their male counterparts.

The quite general finding of very impressive labor market outcomes among non-western immigrant women, and in particular among those from Asia and Africa, *could* imply that VR participation is particularly beneficent for these groups, and so that VR participation should be offered to more non-western immigrant women than what is done today. Such a conclusion would however require more to-the-point research, first of all because the rather few non-western immigrant women in my sample probably are not random representatives of their respective immigrant groups.

This paper allows business cycles to affect all the transitions differently for different (broad) immigrant categories and genders. Non-western immigrants – and in particular women – are found to be substantially more sensitive to business cycles regarding the transition from VR to employment than natives and OECD-immigrants, and to some extent also regarding the re-employment transition after a period on benefits. But while the native unemployment hazard is significantly and substantially affected by business cycles, no such effect is found for the non-western immigrants, regardless of gender.

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Appendix

Table A1: Observed person and spell characteristics for men by country background.[a]

	OECD	Eastern Europe	Africa	Asia	Latin America	Norway
Number of VR spells	1,495	1,283	1,309	3,470	378	82,541
Person characteristics						
Mean years of education	11.2	10.5	10.3	10.4	11.3	11.7
Mean age	42.9	38.9	35.3	37.2	38.2	36.5
Share married	.46	.62	.38	.57	.39	.34
Mean number of children aged 0-18	0.86	1.28	1.40	1.47	1.07	0.76
Share living in Oslo	.15	.17	.57	.39	.25	.08
Time of residence, 1st gen. immigrants						
share < 10 years	.25	.70	.47	.37	.26	-
share ≥ 10 years	.75	.30	.53	.63	.74	-
Mean number of years of residence	17.2	9.1	10.9	12.4	13.6	-
Number of 2nd generation immigrants	77	33	18	77	5	-
Share participating in each VR program[b]						
Wage subsidies	.18	.18	.07	.09	.09	.17
Educational measures in courses or (ordinary) schools	.33	.16	.22	.22	.25	.33
Temporary employment programs	.05	.07	.09	.06	.07	.05
Work experience in ordinary work environments	.19	.10	.08	.13	.18	.17
Work experience in sheltered work environments	.12	.24	.34	.27	.22	.14
Supported employment	.01	.02	.01	.01	.01	.02
Temporary stay in labour market enterprises	.06	.19	.15	.16	.14	.06
Permanent sheltered employment	.03	.03	.03	.04	.03	.03

[a] All variables, both person characteristics and the shares participating in each VR program, are observed at the end of the VR spell.

[b] The shares do not quite sum to one, as some were registered either on trial programs or had invalid registration codes.

Table A2: Observed person and spell characteristics for women by country background.[a]

	OECD	Eastern Europe	Africa	Asia	Latin America	Norway
Number of VR spells	1,178	813	345	1,878	291	67,391
Person characteristics						
Mean years of education	12.0	11.5	9.0	10.0	11.1	12.0
Mean age at the end of the VR spell	42.6	39.2	35.2	37.8	39.1	37.8
Share married	.51	.63	.48	.68	.49	.44
Mean number of children aged 0-18	0.78	1.05	1.61	1.48	1.21	0.87
Share living in Oslo	.20	.20	.58	.39	.28	.10
Time of residence, 1st gen. immigrants						
share < 10 years	.21	.63	.41	.33	.22	-
share ≥ 10 years	.79	.37	.59	.67	.78	-
Mean number of years of residence	19.3	10.0	11.3	12.7	13.5	-
Number of 2nd generation immigrants	59	24	2	42	5	-
Share participating in each VR program[b]						
Wage subsidies	.11	.13	.06	.06	.08	.10
Educational measures in courses or (ordinary) schools	.39	.23	.24	.23	.37	.39
Temporary employment programs	.07	.11	.09	.06	.07	.06
Work experience in ordinary work environments	.25	.14	.15	.16	.19	.27
Work experience in sheltered work environments	.09	.23	.34	.32	.18	.10
Supported employment	.01	.02	.01	.01	.00	.02
Temporary stay in labour market enterprises	.03	.10	.06	.10	.04	.04
Permanent sheltered employment	.02	.02	.02	.03	.03	.02

[a] All variables, both person characteristics and the shares participating in each VR program, are observed at the end of the VR spell.

[b] The shares do not quite sum to one, as some were registered either on trial programs or had invalid registration codes.

Table A3: Observed transition rates and job durations for women by country background.

	OECD	Eastern Europe	Africa	Asia	Latin America	Norway
From VR						
Number of spells	1,178	813	345	1,878	291	67,391
Share making a transition to work	.33	.39	.33	.31	.33	.32
Share making a transition to education	.07	.06	.05	.05	.07	.07
Share making a transition to disability	.12	.07	.05	.08	.08	.14
Share doing none of the above	.49	.49	.58	.57	.53	.47
Job durations and transitions from work						
Number of spells at risk	384	316	113	583	95	21,892
Job durations						
Average over all job spells (# months)[a]	20.4	17.9	15.3	15.5	20.6	21.5
Share of the job spells that began before 2001 that lasted						
1-3 months	.17	.15	.21	.21	.10	.16
4-6 months	.15	.12	.17	.18	.09	.12
7-12 months	.20	.21	.22	.20	.28	.16
13-24 months	.13	.18	.12	.15	.13	.18
more than 24 months	.36	.33	.29	.26	.39	.38
Transitions from work						
Share making a transition to long-term sickness benefits	.33	.25	.24	.25	.33	.37
Share making a transition to unemployment	.20	.35	.29	.37	.31	.21
Share working to the end of the observation period	.21	.19	.18	.15	.19	.20
Subsequent transitions						
Transitions from sickness benefits						
Number of spells at risk	128	80	27	148	31	8,057
Share making a second transition to work	.70	.80	.89	.72	.71	.75
Share making a transition to disability/new VR spell	.20	.05	.04	.07	.16	.12
Share receiving benefits to the end of the observation period	.05	.13	.07	.11	.13	.08
Transitions from unemployment						
Number of spells at risk	76	110	33	214	29	4,608
Share making a second transition to work	.74	.75	.76	.77	.83	.77
Share making a transition to disability/new VR spell	.08	.05	.06	.04	.07	.08
Share receiving benefits to the end of the observation period	.13	.11	.12	.12	.10	.07

[a] This may be somewhat misleading due to the differences in time of residence among the various immigrants groups. In addition, and more generally, some job spells are censored, so that the true average job duration spell is probably longer.

Table A4: Estimation results, men.

	From VR, eq. (1)		From work, eq. (2)				From sickness/unemployment, eq. (3)			
	Transition to work		Transition to sickness		Transition to unemployment		Transition (back) to work		Transition (back) to VR	
	Est.	**Std.e.**	**Est.**	**Std.e.**	**Est.**	**Std.e.**	**Est.**	**Std.e.**	**Est.**	**Std.e.**
Country background and years of residence (native is reference)										
OECD, <10 years	0.262	0.141	-0.438	0.239	0.303	0.155	-0.230	0.188	0.119	0.431
OECD, ≥10 years	0.085	0.089	-0.260	0.138	0.162	0.116	-0.082	0.124	-0.086	0.284
Eastern Europe, <10	0.171	0.093	*-0.378*	0.164	*0.621*	0.088	*-0.225*	0.112	0.058	0.287
Eastern Europe, ≥10	*-0.477*	0.137	0.265	0.233	*0.528*	0.194	-0.060	0.225	0.189	0.423
Africa, <10	-0.068	0.105	-0.259	0.263	*0.854*	0.098	-0.087	0.140	-0.537	0.401
Africa, ≥10	*-0.412*	0.105	0.087	0.196	*0.378*	0.137	-0.270	0.153	-0.080	0.370
Asia, <10	-0.118	0.077	-0.089	0.156	*0.403*	0.086	*-0.301*	0.108	-0.060	0.250
Asia, ≥10	*-0.312*	0.063	0.154	0.115	*0.358*	0.081	-0.115	0.092	*-0.682*	0.242
Latin America, <10	-0.025	0.260	0.179	0.516	*0.699*	0.269	0.354	0.456	-0.822	1.237
Latin America, ≥10	0.181	0.153	*0.726*	0.239	*0.644*	0.159	-0.007	0.207	0.072	0.442
Age[a]										
1st order value	*-0.043*	0.002	*0.022*	0.003	*-0.018*	0.002	*-0.012*	0.002	*-0.022*	0.004
2nd order value	*-0.017*	0.003	*-0.029*	0.008	*0.022*	0.004	0.006	0.005	0.011	0.011
3rd order value	*0.077*	0.007	*0.037*	0.013	-0.002	0.010	*-0.027*	0.011	*0.054*	0.021
Business cycles[b]										
Natives										
1st order value	*6.954*	0.464	-0.422	0.537	*-2.741*	0.500	*4.060*	0.463	*4.882*	1.094
2nd order value	*-2.952*	0.651	-0.076	0.902	0.793	0.704	-0.849	0.434	-0.886	2.241
3rd order value	*0.409*	0.187	-0.023	0.310	-0.050	0.162	*0.101*	0.052	-0.892	1.136
OECD immigrants										
1st order value	4.841	3.167	-1.302	3.284	-7.683	4.269	*7.534*	3.443	-2.782	10.184
2nd order value	-0.409	7.266	11.062	6.275	8.012	6.940	-3.193	7.393	-33.12	33.834
3rd order value	-1.106	5.291	-2.840	2.445	-3.636	10.279	1.201	3.819	6.642	6.131
Non-OECD imm.										
1st order value	*11.942*	1.674	0.238	2.619	-0.195	1.789	*6.643*	1.741	6.642	6.131
2nd order value	-5.262	4.235	-2.508	6.588	2.834	5.037	-3.382	3.448	-9.537	20.379
3rd order value	-1.017	3.304	0.261	4.465	-3.993	4.245	0.967	1.138	0.110	24.308
Education, years (Six years is reference)										
Zero	0.421	0.279	-0.384	0.622	-0.132	0.438	-0.399	0.563	-0.818	1.183
Seven	0.638	0.530	-0.520	1.231	-0.191	0.777	0.032	0.720	0.039	6.188
Eight	*0.663*	0.279	-0.396	0.619	-0.318	0.441	-0.346	0.564	-0.586	1.175
Nine	0.537	0.278	-0.375	0.618	-0.228	0.439	-0.248	0.563	-0.459	1.175
Ten	*0.542*	0.275	-0.185	0.614	-0.096	0.434	-0.317	0.559	-0.721	1.170
Eleven	0.509	0.274	-0.363	0.614	-0.085	0.433	-0.358	0.558	-0.590	1.168
Twelve	*0.704*	0.275	-0.537	0.615	-0.290	0.434	-0.258	0.559	-0.800	1.170
Thirteen	*1.006*	0.275	-0.760	0.614	-0.535	0.433	-0.237	0.558	-0.737	1.169
Fourteen	*0.742*	0.278	-0.942	0.619	-0.659	0.438	-0.147	0.562	-0.799	1.178
Fifteen	*0.736*	0.280	-0.947	0.622	-0.724	0.441	-0.411	0.565	-0.789	1.186
Sixteen	*1.859*	0.285	*-1.392*	0.621	*-1.310*	0.441	-0.088	0.563	-1.226	1.187
Seventeen	*1.088*	0.281	-1.157	0.621	*-1.026*	0.444	-0.267	0.566	-0.478	1.182
Eighteen	*0.945*	0.310	-1.057	0.655	-0.898	0.482	-0.127	0.598	-2.092	1.500
Nineteen – twenty-one	*0.878*	0.307	-0.795	0.661	-0.576	0.486	-0.357	0.608	-0.877	1.279
Missing value	*0.647*	0.282	-0.429	0.626	-0.373	0.441	-0.329	0.567	-0.744	1.182

[a] Measured as deviations from the mean age. 1st order value=Age – mean age; 2nd order value=(Age – mean age)^2/mean age; 3rd order value=(Age – mean age)^3/(mean age)^2.

[b] Measured as deviations from the mean outflow rate from unemployment. Similarly as age: 1st order value=The outflow rate – mean outflow rate; 2nd order value=(The outflow rate – mean outflow rate)^2/ mean outflow rate; 3rd order value=(The outflow rate – mean outflow rate)^3/(mean outflow rate)^2.

Table A4: Estimation results, men (continued).

	From VR, eq. (1)		From work, eq. (2)				From sickness/unemployment, eq. (3)			
	Transition to work		Transition to sickness		Transition to unemployment		Transition (back) to work		Transition (back) to VR	
	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.
Calendar month										
(January is reference)										
February	*0.131*	0.042	*-0.281*	0.049	*-0.449*	0.045	*-0.352*	0.043	*-0.258*	0.102
March	*0.130*	0.041	*-0.323*	0.049	*-0.601*	0.046	*-0.328*	0.043	*-0.236*	0.101
April	*0.117*	0.040	*-0.342*	0.050	*-0.490*	0.046	*-0.207*	0.042	*-0.358*	0.102
May	*0.190*	0.042	*-0.312*	0.050	*-0.863*	0.052	*-0.101*	0.041	*-0.346*	0.102
June	*0.220*	0.036	*-0.459*	0.051	*-0.770*	0.049	-0.054	0.042	*-0.325*	0.103
July	0.005	0.034	*-0.667*	0.053	*-0.794*	0.049	-0.025	0.042	*-0.266*	0.100
August	*0.271*	0.042	*-0.140*	0.046	*-0.582*	0.045	*-0.191*	0.044	*-0.272*	0.099
September	*0.107*	0.040	*-0.137*	0.047	*-0.410*	0.043	*-0.105*	0.042	*-0.372*	0.102
October	*0.147*	0.039	*-0.145*	0.046	*-0.509*	0.043	*-0.177*	0.043	*-0.214*	0.099
November	*0.119*	0.042	*-0.252*	0.047	*-0.457*	0.042	*-0.162*	0.042	*-0.327*	0.103
December	0.021	0.045	*-0.542*	0.053	*-0.754*	0.047	*-0.598*	0.047	*-0.390*	0.109
Married	-	-	*-0.151*	0.033	*-0.433*	0.027	*0.149*	0.028	0.081	0.054
Missing value	-	-	-0.505	0.734	-0.748	0.560	*1.771*	0.767	-	-
Number of children										
0-18 years of age	-	-	*0.080*	0.014	*0.024*	0.012	*0.033*	0.012	*-0.064*	0.025
County of residence										
(Østfold is reference)										
Akershus	0.088	0.048	-0.103	0.073	*-0.168*	0.061	*-0.137*	0.064	0.172	0.137
Oslo	-0.013	0.045	*-0.143*	0.071	-0.101	0.058	*-0.141*	0.061	*0.307*	0.135
Hedmark	0.027	0.053	-0.024	0.080	*0.137*	0.065	-0.069	0.070	0.261	0.147
Oppland	0.024	0.054	*0.206*	0.077	0.089	0.066	-0.060	0.068	0.106	0.145
Buskerud	-0.021	0.050	-0.036	0.075	0.025	0.065	-0.080	0.067	0.259	0.142
Vestfold	*0.132*	0.052	-0.103	0.078	*0.128*	0.065	-0.123	0.069	*0.427*	0.137
Telemark	0.033	0.051	0.076	0.075	*0.283*	0.061	*-0.219*	0.066	*0.468*	0.135
Aust-Agder	*-0.137*	0.059	0.080	0.088	*0.270*	0.072	-0.146	0.076	0.270	0.161
Vest-Agder	*-0.184*	0.053	*0.202*	0.079	*0.267*	0.066	*-0.155*	0.072	*0.383*	0.138
Rogaland	-0.084	0.048	*-0.268*	0.077	*0.309*	0.058	*-0.318*	0.064	*0.470*	0.134
Hordaland	*-0.163*	0.048	-0.122	0.075	*0.264*	0.059	*-0.181*	0.065	*0.278*	0.135
Sogn og Fjordane	*0.347*	0.071	-0.168	0.098	0.142	0.078	-0.078	0.088	*0.598*	0.167
Møre og Romsdal	-0.044	0.054	*-0.192*	0.083	*0.249*	0.066	-0.091	0.070	*0.428*	0.147
S. Trøndelag	*-0.229*	0.050	-0.043	0.079	*0.296*	0.061	*-0.159*	0.066	0.104	0.146
N. Trøndelag	*-0.334*	0.061	0.083	0.098	*0.633*	0.072	*-0.247*	0.079	*0.491*	0.163
Nordland	*-0.149*	0.047	-0.029	0.072	*0.384*	0.058	-0.072	0.063	*0.519*	0.131
Troms	*-0.200*	0.053	-0.070	0.083	*0.340*	0.064	-0.127	0.070	*0.341*	0.142
Finnmark	*-0.201*	0.059	-0.079	0.107	*0.853*	0.063	*-0.148*	0.076	*0.458*	0.161
VR program										
(Wage subsidies is ref.)										
Work experience, ordinary work environ.	*-1.760*	0.062	*0.157*	0.059	*-0.197*	0.043	*0.115*	0.049	*0.213*	0.071
Work experience in sheltered work environ.	*-1.869*	0.065	-0.086	0.087	*0.653*	0.041	0.035	0.053	0.062	0.094
Educational measures in courses or schools	*-1.562*	0.058	0.002	0.050	0.020	0.032	*0.246*	0.037	-0.005	0.064
Temporary employment programs	*-0.450*	0.049	*-0.446*	0.061	*0.243*	0.041	*-0.133*	0.047	-0.023	0.099
Supported employment	*-2.326*	0.094	0.186	0.158	0.088	0.108	-0.082	0.139	*0.575*	0.212
Temporary stay in labor market enterprises	*-0.870*	0.052	*-0.261*	0.064	*0.459*	0.038	*-0.219*	0.047	*0.264*	0.084
Permanent sheltered employment	*-2.007*	0.078	*-0.665*	0.129	*-0.274*	0.107	0.128	0.121	-0.068	0.200
Trial programs	*-1.336*	0.105	*0.304*	0.145	0.073	0.123	0.157	0.131	-0.210	0.250
Invalid codes	*-1.640*	0.103	*0.635*	0.181	0.093	0.153	-0.253	0.212	-	-

Table A4: Estimation results, men (continued).

	From VR, eq. (1)		From work, eq. (2)				From sickness/unemployment, eq. (3)			
	Transition to work		Transition to sickness		Transition to unemployment		Transition (back) to work		Transition (back) to VR	
	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.
Job durations, months										
(1 is reference)	-	-								
2 months	-	-	*0.248*	0.099	*0.269*	0.067	-0.112	0.070	0.298	0.170
3 months	-	-	0.164	0.102	*0.188*	0.078	-0.023	0.084	*0.436*	0.179
4 months	-	-	*0.350*	0.102	0.066	0.081	0.040	0.087	*0.543*	0.180
5 months	-	-	*0.401*	0.104	*-0.168*	0.085	0.072	0.089	0.254	0.190
6 months	-	-	*0.485*	0.105	-0.154	0.086	-0.028	0.090	0.306	0.189
7 months	-	-	*0.505*	0.106	*-0.334*	0.090	0.015	0.094	*0.426*	0.189
8 months	-	-	*0.395*	0.110	*-0.432*	0.093	0.027	0.096	0.303	0.192
9 months	-	-	*0.381*	0.113	*-0.657*	0.099	0.147	0.104	*0.495*	0.203
10 months	-	-	*0.540*	0.113	*-0.688*	0.101	-0.023	0.103	0.405	0.208
11 months	-	-	*0.556*	0.116	*-0.533*	0.101	-0.038	0.105	0.362	0.208
12 months	-	-	*0.578*	0.118	*-0.722*	0.105	-0.068	0.107	*0.490*	0.208
13 months	-	-	*0.550*	0.120	*-0.819*	0.110	0.093	0.108	0.184	0.228
14 months	-	-	*0.642*	0.121	*-0.813*	0.111	-0.136	0.113	0.358	0.218
15 months	-	-	*0.451*	0.127	*-0.812*	0.113	-0.011	0.115	0.125	0.238
16 months	-	-	*0.578*	0.128	*-0.978*	0.119	-0.004	0.124	0.205	0.248
17 months	-	-	*0.575*	0.130	*-0.801*	0.116	0.041	0.127	0.299	0.242
18 months	-	-	*0.663*	0.130	*-0.823*	0.117	0.036	0.117	-0.044	0.265
19 months	-	-	*0.663*	0.132	*-0.958*	0.123	-0.098	0.127	-0.021	0.262
20 months	-	-	*0.533*	0.137	*-1.025*	0.128	-0.034	0.128	-0.019	0.272
21 months	-	-	*0.722*	0.135	*-1.121*	0.133	-0.081	0.134	-0.005	0.274
22 months	-	-	*0.590*	0.141	*-1.000*	0.131	0.183	0.143	-0.025	0.304
23 months	-	-	*0.740*	0.139	*-1.126*	0.138	0.054	0.131	-0.013	0.291
24 months	-	-	*0.622*	0.144	*-1.265*	0.144	-0.020	0.145	0.345	0.283
25 months	-	-	*0.811*	0.141	*-1.229*	0.146	-0.117	0.144	-0.070	0.287
26 months	-	-	*0.697*	0.145	*-1.314*	0.151	0.176	0.142	-0.265	0.359
27 months	-	-	*0.508*	0.152	*-1.224*	0.147	-0.089	0.150	-0.139	0.335
28 months	-	-	*0.673*	0.150	*-1.371*	0.158	0.160	0.151	0.256	0.312
29 months	-	-	*0.719*	0.152	*-1.280*	0.156	-0.035	0.157	0.373	0.302
30 months	-	-	*0.693*	0.153	*-1.458*	0.164	0.118	0.152	-0.428	0.405
31 months	-	-	*0.825*	0.150	*-1.360*	0.163	-0.028	0.155	0.026	0.336
32 months	-	-	*0.706*	0.156	*-1.329*	0.166	0.027	0.155	0.107	0.351
33 months	-	-	*0.922*	0.152	*-1.574*	0.181	0.057	0.163	0.173	0.329
34 months	-	-	*0.495*	0.168	*-1.541*	0.183	0.062	0.171	-0.200	0.401
35 months	-	-	*0.644*	0.164	*-1.477*	0.181	0.278	0.188	-0.634	0.450
36 or more months	-	-	*0.855*	0.130	*-1.620*	0.104	*0.267*	0.106	-0.236	0.244
Sickness benefits dur.[c]										
(Unemployment is ref.)										
3-6 months	-	-	-	-	-	-	*-0.479*	0.089	*0.542*	0.161
7-10 months	-	-	-	-	-	-	*-0.598*	0.093	*0.822*	0.165
11 months	-	-	-	-	-	-	*-0.253*	0.106	*1.562*	0.172
12 months	-	-	-	-	-	-	*1.096*	0.101	*2.496*	0.171
13 months	-	-	-	-	-	-	*0.285*	0.123	*1.578*	0.200
14-17 months	-	-	-	-	-	-	*-0.231*	0.115	*0.986*	0.190
18-23 months	-	-	-	-	-	-	0.089	0.121	*1.398*	0.192
24 months or more	-	-	-	-	-	-	*-0.704*	0.205	*1.703*	0.216
Unemployment dur.										
(Sickness ben. is ref.)										
1-2 months	-	-	-	-	-	-	*0.886*	0.080	0.234	0.145
3-5 months	-	-	-	-	-	-	*0.882*	0.088	-0.022	0.147
6-8 months	-	-	-	-	-	-	*0.696*	0.099	0.238	0.155
9-11 months	-	-	-	-	-	-	*0.515*	0.106	0.098	0.175
12-17 months	-	-	-	-	-	-	*0.332*	0.110	-0.022	0.176

Table A4: Estimation results, men (continued).

	From VR, eq. (1)		From work, eq. (2)				From sickness/unemployment, eq. (3)			
	Transition to work		Transition to sickness		Transition to unemployment		Transition (back) to work		Transition (back) to VR	
	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.
18-23 months	-	-	-	-	-	-	0.122	0.128	0.279	0.195
24 months or more	-	-	-	-	-	-	-0.124	0.148	0.279	0.205
Sickness benefits at the beginning of the month (Unemployment is reference)	-	-	-	-	-	-	*0.349*	0.103	*0.432*	0.170
Family situation (No additional pension is reference)										
Marital addition, and full addition for										
0 children	-0.116	0.092	-	-	-	-	-	-	-	-
1 child 11-18	-0.226	0.163	-	-	-	-	-	-	-	-
1 child 0-10	0.117	0.097	-	-	-	-	-	-	-	-
1 0-10, 1 11-18	0.222	0.175	-	-	-	-	-	-	-	-
0 0-10, 2 11-18	0.371	0.224	-	-	-	-	-	-	-	-
2 0-10, 0 11-18	0.016	0.089	-	-	-	-	-	-	-	-
1 0-10, 2 11-18	-0.249	0.206	-	-	-	-	-	-	-	-
2 0-10, 1 11-18	0.229	0.175	-	-	-	-	-	-	-	-
0 0-10, ≥3 11-18	-0.068	0.304	-	-	-	-	-	-	-	-
≥3 0-10, 0 11-18	-0.036	0.108	-	-	-	-	-	-	-	-
2 0-10, 2 11-18	0.064	0.256	-	-	-	-	-	-	-	-
1 0-10, ≥3 11-18	-0.216	0.299	-	-	-	-	-	-	-	-
≥3 0-10, 1 11-18	-0.174	0.216	-	-	-	-	-	-	-	-
≥2 0-10, ≥3 11-18	-0.691	0.394	-	-	-	-	-	-	-	-
≥3 0-10, ≥2 11-18	*-0.712*	0.267	-	-	-	-	-	-	-	-
Married, but no marital addition, and reduced addition for										
1 child 11-18	*0.249*	0.055	-	-	-	-	-	-	-	-
1 child 0-10	*0.246*	0.056	-	-	-	-	-	-	-	-
1 0-10, 1 11-18	*0.333*	0.069	-	-	-	-	-	-	-	-
0 0-10, 2 11-18	*0.361*	0.070	-	-	-	-	-	-	-	-
2 0-10, 0 11-18	*0.300*	0.057	-	-	-	-	-	-	-	-
1 0-10, 2 11-18	*0.394*	0.094	-	-	-	-	-	-	-	-
2 0-10, 1 11-18	0.099	0.087	-	-	-	-	-	-	-	-
0 0-10, ≥3 11-18	0.047	0.147	-	-	-	-	-	-	-	-
≥3 0-10, 0 11-18	*0.335*	0.089	-	-	-	-	-	-	-	-
2 0-10, 2 11-18	0.002	0.170	-	-	-	-	-	-	-	-
1 0-10, ≥3 11-18	0.002	0.210	-	-	-	-	-	-	-	-
≥3 0-10, 1 11-18	-0.123	0.171	-	-	-	-	-	-	-	-
≥2 0-10, ≥3 11-18	*0.835*	0.373	-	-	-	-	-	-	-	-
≥3 0-10, ≥2 11-18	*-0.664*	0.302	-	-	-	-	-	-	-	-
Married, but missing info on addition(s)										
0 children	*-0.638*	0.119	-	-	-	-	-	-	-	-
1 child 11-18	-1.900	1.100	-	-	-	-	-	-	-	-
1 child 0-10	-0.700	0.424	-	-	-	-	-	-	-	-
1 0-10, 1 11-18	-	-	-	-	-	-	-	-	-	-
0 0-10, ≥2 11-18	-1.134	0.971	-	-	-	-	-	-	-	-
≥2 0-10, 0 11-18	-0.721	0.750	-	-	-	-	-	-	-	-
1 0-10, ≥2 11-18	-	-	-	-	-	-	-	-	-	-
≥2 0-10, 1 11-18	-	-	-	-	-	-	-	-	-	-

Table A4: Estimation results, men (continued).

	From VR, eq. (1)		From work, eq. (2)				From sickness/unemployment, eq. (3)			
	Transition to work		Transition to sickness		Transition to unemployment		Transition (back) to work		Transition (back) to VR	
	Est.	**Std.e.**	**Est.**	**Std.e.**	**Est.**	**Std.e.**	**Est.**	**Std.e.**	**Est.**	**Std.e.**
≥2 0-10, ≥2 11-18	28.108	inf.	-	-	-	-	-	-	-	-
Single: full addition for										
0 children	*-0.407*	0.037	-	-	-	-	-	-	-	-
1 child 11-18	*-0.263*	0.053	-	-	-	-	-	-	-	-
1 child 0-10	*-0.210*	0.047	-	-	-	-	-	-	-	-
1 0-10, 1 11-18	*-0.241*	0.071	-	-	-	-	-	-	-	-
0 0-10, ≥2 11-18	*-0.148*	0.073	-	-	-	-	-	-	-	-
≥2 0-10, 0 11-18	-0.063	0.059	-	-	-	-	-	-	-	-
1 0-10, ≥2 11-18	0.079	0.106	-	-	-	-	-	-	-	-
≥2 0-10, 1 11-18	-0.032	0.096	-	-	-	-	-	-	-	-
≥2 0-10, ≥2 11-18	-0.145	0.161	-	-	-	-	-	-	-	-

[c] Note that one must add the parameter for "receiving sickness benefits at the beginning of month *t*" in order to interpret the effect of having received sickness benefits a given number of months on the relevant hazards in month *t*. Correspondingly, one must deduct this parameter when interpreting the effect of having been unemployed a given number of months.
Numbers in italic denote that the estimated parameter is significant on a 5% level.

Table A5: Estimation results, women.

	From VR, eq. (1)		From work, eq. (2)				From sickness/unemployment, eq. (3)			
	Transition to work		Transition to sickness		Transition to unemployment		Transition (back) to work		Transition (back) to VR	
	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.
Country background and years of residence (native is reference)										
OECD, <10 years	0.192	0.211	0.038	0.230	0.422	0.268	-0.139	0.300	0.319	0.668
OECD, ≥10 years	-0.187	0.117	-0.121	0.121	0.097	0.177	-0.109	0.149	0.468	0.270
Eastern Europe, <10	*0.718*	0.156	-0.218	0.179	*0.955*	0.144	-0.043	0.146	-0.569	0.624
Eastern Europe, ≥10	-0.179	0.187	0.258	0.202	0.028	0.289	0.095	0.220	-0.170	0.624
Africa, <10	*0.704*	0.273	-0.557	0.460	*0.724*	0.274	0.524	0.310	-0.952	0.970
Africa, ≥10	-0.023	0.212	0.366	0.243	0.057	0.359	0.183	0.320	-1.393	1.502
Asia, <10	*0.645*	0.136	0.021	0.175	*0.846*	0.143	0.128	0.132	-0.076	0.558
Asia, ≥10	*-0.202*	0.101	0.161	0.121	*0.683*	0.134	-0.110	0.147	-0.489	0.434
Latin America, <10	0.085	0.400	-0.105	0.557	0.822	0.424	-0.307	0.568	0.985	0.911
Latin America, ≥10	0.055	0.212	0.023	0.236	0.195	0.263	0.133	0.278	0.016	0.697
Age[a]										
1st order value	*-0.020*	0.002	*-0.011*	0.002	*-0.022*	0.003	-0.004	0.003	-0.002	0.006
2nd order value	*-0.016*	0.005	-0.004	0.007	0.007	0.007	0.000	0.007	0.028	0.018
3rd order value	*0.056*	0.011	*0.057*	0.014	-0.026	0.018	-0.026	0.016	0.011	0.035
Business cycles[b]										
Natives										
1st order value	*6.980*	0.616	0.833	0.576	*-1.893*	0.768	*2.350*	0.575	*5.046*	1.626
2nd order value	*-3.430*	0.741	-0.687	1.006	-0.251	1.755	-1.175	0.640	-3.137	2.838
3rd order value	*0.392*	0.166	0.003	0.388	-0.039	1.117	0.154	0.080	0.306	1.220
OECD immigrants										
1st order value	*8.515*	4.289	2.219	4.642	-4.282	6.471	2.652	4.704	-0.879	9.706
2nd order value	-0.836	9.037	3.168	8.159	0.697	15.245	-4.799	8.024	2.738	16.977
3rd order value	0.023	8.347	-0.531	2.893	-0.054	10.330	0.505	4.522	-0.369	9.321
Non-OECD imm.										
1st order value	*15.400*	2.779	1.238	3.167	2.765	3.729	*6.472*	3.250	9.224	10.399
2nd order value	-11.45	6.763	-0.660	6.264	6.352	7.556	-1.514	7.612	-21.12	35.890
3rd order value	3.430	3.878	-1.707	4.390	-16.33	13.807	-6.872	11.503	-	-
Education, years (Six years of ed. is ref.)										
Zero	0.010	0.323	0.304	0.536	0.186	0.487	0.508	0.557	0.088	1.280
Seven	-0.335	0.736	1.012	1.690	1.023	1.444	1.657	2.251	-	-
Eight	-0.002	0.320	0.262	0.529	0.003	0.491	-0.128	0.562	0.740	1.219
Nine	0.094	0.314	0.289	0.522	-0.030	0.477	0.410	0.546	0.405	1.211
Ten	0.144	0.310	0.298	0.519	0.178	0.468	0.395	0.542	0.108	1.203
Eleven	0.271	0.308	0.218	0.517	0.182	0.465	0.411	0.540	0.290	1.198
Twelve	*0.620*	0.310	0.303	0.518	0.080	0.467	0.494	0.541	0.216	1.201
Thirteen	*0.871*	0.310	0.170	0.518	0.074	0.466	0.548	0.540	0.053	1.200
Fourteen	*0.725*	0.314	0.171	0.520	-0.176	0.473	0.480	0.544	0.231	1.212
Fifteen	*0.640*	0.317	0.067	0.523	-0.146	0.478	0.550	0.547	0.345	1.220
Sixteen	*2.262*	0.329	0.193	0.519	-0.890	0.472	0.714	0.543	-0.172	1.210
Seventeen	*1.312*	0.316	0.157	0.519	-0.771	0.473	0.637	0.544	-0.070	1.207
Eighteen	0.712	0.390	-0.200	0.610	0.050	0.571	0.275	0.619	-0.020	1.475
Nineteen – twenty-one	*1.075*	0.356	-0.146	0.539	-0.334	0.525	0.408	0.580	0.397	1.277
Missing value	0.583	0.326	0.205	0.533	0.104	0.484	0.628	0.559	0.318	1.282

[a] Measured as deviations from the mean age. 1st order value=Age – mean age; 2nd order value=(Age – mean age)^2/mean age; 3rd order value=(Age – mean age)^3/(mean age)^2.

[b] Measured as deviations from the mean outflow rate from unemployment. Similarly as age: 1st order value=The outflow rate – mean outflow rate; 2nd order value=(The outflow rate – mean outflow rate)^2/ mean outflow rate; 3rd order value=(The outflow rate – mean outflow rate)^3/(mean outflow rate)^2.

Table A5: Estimation results, women (continued).

	From VR, eq. (1)		From work, eq. (2)				From sickness/unemployment, eq. (3)			
	Transition to work		Transition to sickness		Transition to unemployment		Transition (back) to work		Transition (back) to VR	
	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.
Calendar month (January is reference)										
February	0.057	0.056	*-0.345*	0.052	*-0.328*	0.066	*-0.363*	0.051	-0.272	0.145
March	0.067	0.056	*-0.326*	0.052	*-0.491*	0.068	*-0.365*	0.052	*-0.385*	0.151
April	-0.019	0.055	*-0.434*	0.054	*-0.538*	0.072	*-0.240*	0.050	*-0.426*	0.149
May	0.090	0.058	*-0.468*	0.054	*-0.695*	0.075	*-0.270*	0.051	*-0.490*	0.152
June	*0.431*	0.048	*-0.635*	0.056	*-0.491*	0.070	*-0.176*	0.051	*-0.297*	0.146
July	*0.141*	0.044	*-0.876*	0.061	*-0.251*	0.065	-0.040	0.049	-0.226	0.145
August	*0.632*	0.059	*-0.217*	0.050	-0.083	0.062	*-0.188*	0.051	*-0.512*	0.150
September	*0.165*	0.054	*-0.113*	0.049	*-0.188*	0.064	-0.062	0.050	*-0.542*	0.151
October	*0.235*	0.054	-0.059	0.047	*-0.388*	0.065	*-0.244*	0.052	-0.196	0.139
November	0.024	0.057	*-0.273*	0.050	*-0.585*	0.068	*-0.152*	0.050	-0.101	0.139
December	*0.158*	0.060	*-0.702*	0.059	*-0.759*	0.073	*-0.409*	0.054	*-0.329*	0.156
Married	-	-	*-0.189*	0.026	*-0.298*	0.037	0.046	0.031	*-0.145*	0.071
Missing value	-	-	-	-	-	-	-	-	-	-
Number of children										
0-18 years of age	-	-	*0.046*	0.014	-0.011	0.019	-0.012	0.016	0.004	0.040
County of residence (Østfold is reference)										
Akershus	*0.138*	0.061	-0.057	0.063	*-0.450*	0.089	*-0.153*	0.070	0.322	0.189
Oslo	0.040	0.058	*-0.136*	0.062	*-0.552*	0.086	0.005	0.069	*0.539*	0.187
Hedmark	*-0.151*	0.071	0.004	0.075	-0.087	0.100	0.035	0.083	0.334	0.213
Oppland	-0.025	0.072	0.100	0.074	-0.052	0.099	0.016	0.083	0.073	0.225
Buskerud	0.124	0.065	-0.025	0.066	*-0.448*	0.095	-0.133	0.074	0.355	0.196
Vestfold	0.127	0.067	-0.102	0.073	*-0.204*	0.097	*-0.170*	0.082	0.219	0.210
Telemark	0.113	0.067	-0.026	0.069	*-0.281*	0.096	0.045	0.080	*0.623*	0.196
Aust-Agder	*-0.188*	0.078	*-0.198*	0.084	-0.032	0.111	-0.178	0.100	*0.620*	0.223
Vest-Agder	*-0.279*	0.072	-0.133	0.080	-0.075	0.106	-0.093	0.090	0.402	0.222
Rogaland	*-0.266*	0.065	*-0.274*	0.073	-0.001	0.092	-0.017	0.074	0.334	0.218
Hordaland	*-0.236*	0.065	*-0.170*	0.072	-0.047	0.093	0.002	0.076	0.383	0.222
Sogn og Fjordane	*0.195*	0.099	-0.164	0.097	0.136	0.128	0.094	0.109	*0.670*	0.271
Møre og Romsdal	*-0.235*	0.073	-0.128	0.082	0.167	0.099	0.091	0.082	*0.538*	0.234
Sør-Trøndelag	*-0.322*	0.064	-0.087	0.072	0.067	0.090	-0.100	0.075	0.240	0.209
Nord-Trøndelag	*-0.495*	0.083	-0.083	0.092	*0.303*	0.112	-0.165	0.098	*0.683*	0.233
Nordland	*-0.169*	0.064	-0.095	0.070	*0.245*	0.086	-0.003	0.070	0.363	0.198
Troms	*-0.198*	0.074	0.041	0.075	-0.054	0.102	0.027	0.083	0.284	0.219
Finnmark	*-0.306*	0.091	0.061	0.097	*0.371*	0.117	-0.005	0.102	*0.742*	0.233
VR program (Wage subsidies is ref.)										
Work experience, ordinary work environ.	*-2.238*	0.109	-0.044	0.046	*-0.178*	0.065	*0.226*	0.056	-0.047	0.098
Work experience in sheltered work environ.	*-2.490*	0.118	*-0.288*	0.077	*0.462*	0.081	0.077	0.077	-0.092	0.175
Educational measures in courses or schools	*-2.101*	0.107	*-0.101*	0.043	0.093	0.058	*0.237*	0.050	-0.145	0.094
Temporary employment programs	*-0.670*	0.085	*-0.223*	0.053	*0.557*	0.063	-0.038	0.059	-0.060	0.120
Supported employment	*-3.329*	0.162	-0.219	0.182	-0.080	0.209	-0.040	0.214	0.532	0.293
Temporary stay in labor market enterprises	*-1.569*	0.107	*-0.260*	0.081	*0.858*	0.077	*-0.240*	0.078	-0.063	0.153
Permanent sheltered employment	*-2.807*	0.142	*-0.470*	0.168	0.145	0.189	0.047	0.162	-0.976	0.607
Trial programs	*-2.329*	0.169	-0.078	0.170	0.320	0.210	0.048	0.181	0.212	0.338
Invalid codes	*-1.665*	0.137	0.070	0.139	*0.643*	0.140	0.117	0.160	-2.928	1.515

Table A5: Estimation results, women (continued).

	From VR, eq. (1)		From work, eq. (2)				From sickness/unemployment, eq. (3)			
	Transition to work		Transition to sickness		Transition to unemployment		Transition (back) to work		Transition (back) to VR	
	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.
Job durations, months (1 is reference)										
2 months	-	-	*0.269*	0.099	-0.130	0.067	*-0.207*	0.080	0.255	0.206
3 months	-	-	*0.362*	0.099	*-0.365*	0.072	-0.069	0.084	0.294	0.210
4 months	-	-	*0.232*	0.103	*-0.556*	0.077	-0.010	0.087	0.323	0.218
5 months	-	-	*0.347*	0.102	*-0.644*	0.081	-0.095	0.090	0.148	0.217
6 months	-	-	*0.377*	0.103	*-0.683*	0.083	-0.048	0.088	-0.135	0.232
7 months	-	-	*0.370*	0.103	*-0.747*	0.087	0.008	0.092	0.068	0.229
8 months	-	-	*0.376*	0.104	*-0.887*	0.095	-0.084	0.097	0.020	0.235
9 months	-	-	*0.290*	0.107	*-0.719*	0.092	-0.126	0.099	-0.025	0.238
10 months	-	-	*0.456*	0.105	*-0.885*	0.099	-0.163	0.106	0.061	0.235
11 months	-	-	*0.361*	0.108	*-0.669*	0.095	-0.129	0.099	0.048	0.243
12 months	-	-	*0.451*	0.106	*-0.847*	0.101	-0.175	0.102	-0.207	0.247
13 months	-	-	*0.410*	0.107	*-1.043*	0.112	0.071	0.102	0.103	0.267
14 months	-	-	*0.381*	0.109	*-1.269*	0.127	-0.016	0.109	-0.073	0.276
15 months	-	-	*0.484*	0.109	*-1.168*	0.126	0.019	0.108	-0.359	0.297
16 months	-	-	*0.372*	0.113	*-1.241*	0.132	0.050	0.116	-0.295	0.294
17 months	-	-	*0.454*	0.112	*-1.346*	0.139	-0.034	0.116	-0.367	0.299
18 months	-	-	*0.354*	0.116	*-1.051*	0.126	-0.121	0.123	-0.293	0.293
19 months	-	-	*0.303*	0.118	*-1.125*	0.134	-0.109	0.119	-0.291	0.342
20 months	-	-	*0.283*	0.120	*-1.102*	0.138	-0.180	0.122	-0.253	0.319
21 months	-	-	*0.335*	0.120	*-1.506*	0.166	0.119	0.126	-0.112	0.329
22 months	-	-	*0.317*	0.123	*-1.340*	0.161	-0.036	0.127	-0.435	0.355
23 months	-	-	0.146	0.130	*-1.340*	0.160	-0.018	0.132	-0.617	0.426
24 months	-	-	*0.350*	0.122	*-1.704*	0.187	-0.054	0.132	-0.478	0.401
25 months	-	-	*0.288*	0.125	*-1.804*	0.205	*-0.365*	0.160	-0.650	0.402
26 months	-	-	*0.317*	0.125	*-1.496*	0.184	-0.023	0.153	-0.831	0.442
27 months	-	-	0.136	0.135	*-1.489*	0.189	-0.084	0.154	-0.676	0.461
28 months	-	-	*0.310*	0.131	*-1.411*	0.187	-0.065	0.163	-0.482	0.432
29 months	-	-	*0.331*	0.132	*-1.740*	0.219	-0.058	0.152	*-1.559*	0.651
30 months	-	-	*0.313*	0.135	*-1.707*	0.224	0.028	0.158	-0.325	0.407
31 months	-	-	*0.308*	0.136	*-1.591*	0.219	-0.040	0.170	-0.416	0.428
32 months	-	-	*0.525*	0.130	*-1.539*	0.223	0.088	0.130	-0.401	0.398
33 months	-	-	*0.325*	0.140	*-1.547*	0.223	0.263	0.175	-0.591	0.513
34 months	-	-	0.169	0.150	*-1.942*	0.271	0.024	0.223	*-2.243*	1.034
35 months	-	-	*0.304*	0.147	*-1.460*	0.219	-0.019	0.206	*-1.659*	0.751
36 or more months	-	-	*0.375*	0.097	*-1.862*	0.103	-0.076	0.089	*-0.542*	0.216
Sickness benefits dur.[c] (Unemployment is ref.)										
3-6 months	-	-	-	-	-	-	*-0.446*	0.106	0.366	0.193
7-10 months	-	-	-	-	-	-	*-0.458*	0.109	*0.974*	0.201
11 months	-	-	-	-	-	-	-0.018	0.120	*1.660*	0.214
12 months	-	-	-	-	-	-	*1.311*	0.119	*2.890*	0.209
13 months	-	-	-	-	-	-	0.821	0.131	*1.819*	0.250
14-17 months	-	-	-	-	-	-	0.116	0.126	*1.375*	0.230
18-23 months	-	-	-	-	-	-	0.255	0.134	*1.445*	0.249
24 months or more	-	-	-	-	-	-	*-0.606*	0.199	*1.995*	0.253
Unemployment dur. (Sickness ben. is ref.)										
1-2 months	-	-	-	-	-	-	*0.501*	0.081	*0.740*	0.173
3-5 months	-	-	-	-	-	-	*0.489*	0.087	*0.408*	0.184
6-8 months	-	-	-	-	-	-	*0.371*	0.102	0.408	0.214
9-11 months	-	-	-	-	-	-	0.225	0.116	0.380	0.252
12-17 months	-	-	-	-	-	-	0.129	0.115	*0.619*	0.208

Table A5: Estimation results, women (continued).

	From VR, eq. (1)		From work, eq. (2)				From sickness/unemployment, eq. (3)			
	Transition to work		Transition to sickness		Transition to unemployment		Transition (back) to work		Transition (back) to VR	
	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.
18-23 months	-	-	-	-	-	-	-0.036	0.138	0.097	0.316
24 months or more	-	-	-	-	-	-	-0.035	0.147	0.469	0.260
Sickness benefits at the beginning of the month (unemployment is reference)	-	-	-	-	-	-	*0.283*	0.114	*0.419*	0.208
Family situation (No additional pension is reference)										
Marital addition, and full addition for										
0 children	0.001	0.150	-	-	-	-	-	-	-	-
1 child 11-18	-0.343	0.308	-	-	-	-	-	-	-	-
1 child 0-10	*-0.845*	0.325	-	-	-	-	-	-	-	-
1 0-10, 1 11-18	-0.105	0.458	-	-	-	-	-	-	-	-
0 0-10, 2 11-18	0.194	0.429	-	-	-	-	-	-	-	-
2 0-10, 0 11-18	*-1.506*	0.380	-	-	-	-	-	-	-	-
1 0-10, 2 11-18	-0.154	0.526	-	-	-	-	-	-	-	-
2 0-10, 1 11-18	-0.629	0.666	-	-	-	-	-	-	-	-
0 0-10, ≥3 11-18	0.220	0.772	-	-	-	-	-	-	-	-
≥3 0-10, 0 11-18	-0.128	0.616	-	-	-	-	-	-	-	-
2 0-10, 2 11-18	-0.114	1.660	-	-	-	-	-	-	-	-
1 0-10, ≥3 11-18	-1.089	1.431	-	-	-	-	-	-	-	-
≥3 0-10, 1 11-18	1.366	2.369	-	-	-	-	-	-	-	-
≥2 0-10, ≥3 11-18	-0.244	1.135	-	-	-	-	-	-	-	-
≥3 0-10, ≥2 11-18	0.001	0.150	-	-	-	-	-	-	-	-
Married, but no marital addition, and reduced addition for										
1 child 11-18	*0.397*	0.060	-	-	-	-	-	-	-	-
1 child 0-10	-0.079	0.075	-	-	-	-	-	-	-	-
1 0-10, 1 11-18	*0.438*	0.077	-	-	-	-	-	-	-	-
0 0-10, 2 11-18	*0.519*	0.076	-	-	-	-	-	-	-	-
2 0-10, 0 11-18	-0.065	0.070	-	-	-	-	-	-	-	-
1 0-10, 2 11-18	*0.288*	0.100	-	-	-	-	-	-	-	-
2 0-10, 1 11-18	*0.238*	0.113	-	-	-	-	-	-	-	-
0 0-10, ≥3 11-18	*0.326*	0.149	-	-	-	-	-	-	-	-
≥3 0-10, 0 11-18	-0.188	0.119	-	-	-	-	-	-	-	-
2 0-10, 2 11-18	-0.126	0.208	-	-	-	-	-	-	-	-
1 0-10, ≥3 11-18	0.041	0.241	-	-	-	-	-	-	-	-
≥3 0-10, 1 11-18	-0.455	0.249	-	-	-	-	-	-	-	-
≥2 0-10, ≥3 11-18	-0.604	0.533	-	-	-	-	-	-	-	-
≥3 0-10, ≥2 11-18	-0.627	0.474	-	-	-	-	-	-	-	-
Married, but missing info on addition(s)										
0 children	*-0.886*	0.225	-	-	-	-	-	-	-	-
1 child 11-18	0.331	0.221	-	-	-	-	-	-	-	-
1 child 0-10	0.002	0.095	-	-	-	-	-	-	-	-
1 0-10, 1 11-18	0.122	0.155	-	-	-	-	-	-	-	-
0 0-10, ≥2 11-18	0.151	0.287	-	-	-	-	-	-	-	-
≥2 0-10, 0 11-18	0.025	0.102	-	-	-	-	-	-	-	-
1 0-10, ≥2 11-18	0.675	0.428	-	-	-	-	-	-	-	-
≥2 0-10, 1 11-18	-0.429	0.273	-	-	-	-	-	-	-	-

Table A5: Estimation results, women (continued).

	From VR, eq. (1)		From work, eq. (2)				From sickness/unemployment, eq. (3)			
	Transition to work		Transition to sickness		Transition to unemployment		Transition (back) to work		Transition (back) to VR	
	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.	Est.	Std.e.
≥2 0-10, ≥2 11-18	-0.278	0.781	-	-	-	-	-	-	-	-
Single: full addition for										
0 children	*-0.178*	0.041	-	-	-	-	-	-	-	-
1 child 11-18	0.005	0.057	-	-	-	-	-	-	-	-
1 child 0-10	*-0.318*	0.061	-	-	-	-	-	-	-	-
1 0-10, 1 11-18	-0.046	0.083	-	-	-	-	-	-	-	-
0 0-10, ≥2 11-18	0.026	0.078	-	-	-	-	-	-	-	-
≥2 0-10, 0 11-18	*-0.493*	0.085	-	-	-	-	-	-	-	-
1 0-10, ≥2 11-18	-0.094	0.124	-	-	-	-	-	-	-	-
≥2 0-10, 1 11-18	*-0.303*	0.139	-	-	-	-	-	-	-	-
≥2 0-10, ≥2 11-18	-0.457	0.258	-	-	-	-	-	-	-	-

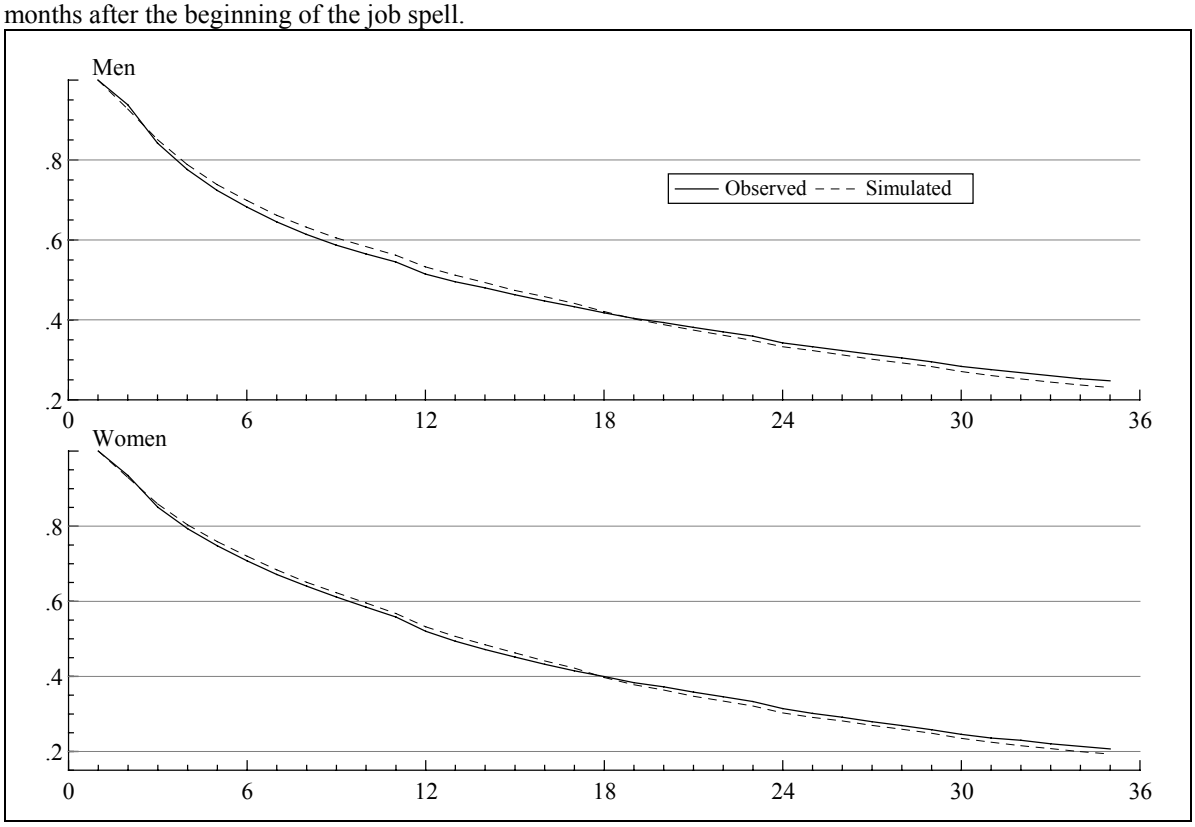
c Note that one must add the parameter for "receiving sickness benefits at the beginning of month *t*" in order to interpret the effect of having received sickness benefits a given number of months on the relevant hazards in month *t*. Correspondingly, one must deduct this parameter when interpreting the effect of having been unemployed a given number of months.
Numbers in italic denote that the estimated parameter is significant on a 5% level.

Table A6: Observed and simulated transition rates.

	Men		Women	
	Observed	Simulated	Observed	Simulated
From VR				
Number of spells	90,476	90,476	71,896	71,896
Share making a transition to work	.392	.402	.325	.337
Transitions from work				
Number of spells at risk	35,430	36,377	23,383	24,221
Share making a transition to long-term sickness benefits	.276	.261	.362	.351
Share making a transition to unemployment	.308	.337	.217	.261
Subsequent transitions				
Number of spells at risk, i.e. those job spells which ended in unemployment or long-term sickness benefits	20,686	21,753	13,541	14,823
Share making a transition (back) to work	.732	.127	.757	.090
Share making a transition to disability/new VR spell	.718	.122	.764	.080

Note: In order to remove the purely simulation-related uncertainty, the simulated rates and numbers are the averages of the results from 10 simulations. (This uncertainty is not substantial, however. As an example, the transitions rates from different simulations are equal including the second decimal.)

Figure A1: *Staying employed*. The observed and simulated share that is still employed 1, 2, ... and 35 months after the beginning of the job spell.



Note: Since the simulation-related uncertainty is so small, the simulated trend is based on one simulation only. The simulation is chosen as the one of the 10 behind Table A6 that is the closest to the simulated average (of the 10).