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By

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Unemployment Insurance and Entrepreneurship

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Abstract. Based on administrative registers from Norway, we examine how unemployment insurance (UI) and active labor market programs (ALMP) affect the transition rates from unemployment to regular employment and entrepreneurship as well as subsequent earnings levels. We find that both the employment and entrepreneurship hazards rise sharply in response to UI sanctions and UI exhaustion. On average, transitions to entrepreneurship are more profitable than transitions to regular employment. While employment-transitions are highly pro-cyclical, entrepreneurship-transitions are weakly counter-cyclical. ALMPs targeted at entrepreneurship are rare in Norway, but the few start-up subsidies that are provided are successful in terms of generating paid work.

JEL Classification: L26, J65, M13
Keywords: Entrepreneurship, Self-employment, Unemployment

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1. Introduction

As the financial crisis has turned into a persistent jobs crisis, policy makers in many countries have sought to reorient their labor market policies from helping unemployed individuals to search for (non-existing) vacant jobs to help them create new jobs instead (Caliendo at Kritikos 2010; Román *et al*. 2013). A number of empirical studies have established that unemployed individuals have a much higher probability of starting a new business than employed workers have; see, e.g., Evans and Leighton (1989; 1990), Meager (1992), Blanchflower and Meyer (1994), Kuhn and Schuetze (2001), Andersson and Wadensjö (2007), Von Greiff (2009), Berglann *et al.* (2011), and Røed and Skogstrøm (2014). Provided that viable business ideas exist even in times of recession, this suggests that policies aimed at encouraging job creation among the unemployed not only have the potential of reducing unemployment, but also of fostering entrepreneurship and economic growth. A key question arising in this context is whether today's labor market policy institutions – as reflected in the design of unemployment insurance (UI) systems, the associated monitoring and sanction practices, and the design and scale of active labor market programs – are conducive toward the aim of encouraging entrepreneurship among the unemployed. While there exists a huge theoretical as well as empirical literature on the way these institutional characteristics affect individual job *search* strategies (see, e.g., Card, Chetty, and Weber (2007) or Tatsiramos and van Ours (2014), for recent reviews), the literature is, with some important exceptions referred to below, almost silent on their impacts on entrepreneurship behavior.

The aim of the present paper is to contribute to the empirical evaluation of how UI design and activation policies affect entrepreneurship endeavors and economic outcomes among UI claimants. We take advantage of complete administrative registers from Norway, and examine the pattern of transitions from unemployment to both regular employment and to entrepreneurship. In addition, we assess the individual economic consequences of these transitions in terms on subsequent labor market earnings, and estimate the size of the "entrepreneurship premium"; i.e., the difference in expected earnings derived from an entrepreneurship transition as opposed to an employment transition. Since our focus is on UI claimants' propensity to create their own jobs, our definition of entrepreneurship is somewhat wider that what has become standard practice in the empirical entrepreneurship literature; i.e., it encompasses all cases were persons obtain work by starting a new business, whether it occurs through self-employment or through the establishment of a joint venture or a small limited liability company. We focus on the impacts of three institutional characteristics; i.e., i) time-limited unemployment benefits, ii) UI sanctions, and iii) participation in active labor market programs (ALMPs). As pointed out by Gaure *et al.* (2012), there is in Norway a close interrelationship between UI design and the use of active labor market policies. Activation is frequently used to test claimants' willingness to work, and income from ALMP participation often substitutes for exhausted (or soon to become exhausted) UI benefits. The data we use cover a time period with an important reform in the UI system, whereby the maximum duration was reduced from three to two years, facilitating robust identification of the causal effects of UI exhaustion. The effects of sanctions and program participation are identified within the framework of a simultaneous equation model, whereby the relevant explanatory variables are treated as endogenous.

There is a small existing empirical literature that examines the impacts of UI and activation policies on the transition rate from unemployment to entrepreneurship. Carrasco (1999) shows that UI claimants in Spain have much lower transition rates to self-employment than unemployed job seekers without UI have. Based on data from the European Community Household Panel, Román *et al.* (2013) present evidence indicating a significant negative association between the level of unemployment benefits and the transition rate to entrepreneurship. None of these papers seek to isolate the *causal* impacts, however, and since neither eligibility nor benefit levels are randomly assigned, the identified statistical associations may represent sorting as well as causality. The paper that comes closest to our own is Portugal and Addison (2008), who use Portuguese data to examine the transitions from unemployment to six different labor market states, including self-employment. They identify a tendency for self-employment transitions to be particularly sensitive toward economic incentives, with a conspicuous pattern of "timing" towards the end of UI entitlement periods.

There is also a small literature examining the impacts of ALMPs particularly targeted at entrepreneurship, most of it based on data from Germany where various start-up subsidies account for significant part of overall ALMP spending. Baumgartner and Caliendo (2008), Caliendo and Kritikos (2009), and Caliendo and Künn (2011) all report large positive effects of two German start-up programs, in terms of high subsequent earnings as well as long-lasting labor market participation. In addition, Pfeiffer and Reize (2000) report only small differences in survival probabilities and employment growth between startups generated by unemployed persons and others. Building on European cross-country data, Román *et al*. (2013) find that public expenditures on start-up incentives have a positive effect on transitions from unemployment to self-employment, but that this effect is much stronger when unemployment is low than

when unemployment is high. The latter finding emphasizes the potentially critical role played by business cycle conditions, and also questions the appropriateness of using self-employment as part of a strategy to fight unemployment during a recession.

Finally, there is an existing literature comparing the economic outcomes of unemployed job seekers who find regular employment with those starting their own business. This literature indicates that persons starting their own business tend to experience a larger earnings drop than the unemployed who return to wage work, i.e., that there is a negative entrepreneurship premium; see e.g., Evans and Leighton (1989; 1990) and Rissman (2003).

The statistical analysis provided in this paper indicates that UI eligibility to some extent discourages risky entrepreneurship endeavors among unemployed job seekers. Our data show that only around two percent of Norwegian UI claimants make a direct transition from unemployment to entrepreneurship, while around 65 percent make a transition to regular employment. A key finding is that the hazard rate from registered unemployment to entrepreneurship rises sharply as the moment of UI exhaustion approaches. In relative terms, the spike associated with UI termination is larger for transitions to entrepreneurship than for transitions to regular employment. We also find that a UI sanction – i.e., a premature temporary loss of benefit entitlement due to inappropriate job search or unwillingness to accept a vacant job or participation in ALMP – significantly raises the transition rates to both employment and entrepreneurship. And whereas actual participation in regular ALMPs raises the transition rate to employment slightly, participation in programs targeted at entrepreneurship raises the transition rate to entrepreneurship *a lot*. For the few UI claimants who do embark on entrepreneurship, it appears to be a profitable endeavor. We estimate a *positive* entrepreneurship premium in the form of around 15 percent higher next-year earnings when

the transition is to entrepreneurship rather than to employment, ceteris paribus. Finally, there is an interesting difference in the cyclicality of the two transition rates; while the employment hazard correlates strongly and positively with real GDP fluctuations, the entrepreneurship hazard is weakly counter-cyclical.

The remainder of this paper is structured as follows. The next section provides a brief discussion of relevant economic theory. Section 3 gives a description of our data and relevant institutions, and outlines our empirical approach, whereas Section 4 presents the statistical model, and Section 5 discusses the foundation for identification of the causal effects of interest. Section 6 presents the main estimation results and section 7 concludes.

2. Theoretical Considerations

Starting from the seminal papers of McCall (1970) and Mortensen (1970), a well-developed job search theory has evolved that forms much of the basis for empirical analyses of the duration and outcome of unemployment spells. The theory highlights the critical role of individual reservations wages and job search intensity, and the way these determinants are affected by the design of unemployment insurance. A standard result is that more generous unemployment insurance causes benefit claimants to reduce their search efforts and raise their reservation wages. Hence, there is a moral hazard problem involved, inducing a tradeoff between the aim of providing appropriate social insurance and consumption smoothing, on the one hand, and the aim of ensuring efficient job search, on the other. An important result from the theory of optimal unemployment insurance, initiated by Shavell and Weiss (1979), is that the conflict between insurance and efficiency can be reduced by designing benefit schedules such that coverage declines with duration. The argument is simple: By reshuffling the bene-

fit schedule to provide higher payments today and lower payments tomorrow, such that expected utility remains constant, agents are given stronger incentives to search for jobs.

Rissman (2007) extends the basic search model to include entrepreneurship as an additional option for unemployed job seekers. In her model, the job seeker basically has three alternative strategies: i) to incur a search cost in order to obtain job offers (with some positive probability), and then accept the offer if the wage exceeds a reservation threshold, ii) to incur a start-up cost in order to become an entrepreneur, or iii) to pull out of the labor force and become inactive. The entrepreneurship alternative is assumed feasible only upon the arrival of a business idea, which occurs according to some exogenous statistical process. Alternatively, one can think of the probability of obtaining viable business ideas as determined by costly investments. The agent will in any case choose the strategy that maximizes expected discounted utility. The existence of unemployment insurance may imply that the private value of continued job search exceeds the social value, and, hence, that agents exert too little effort in finding or creating employment, and let too many job offers and business ideas pass. Time-limited benefits reduce this distortion. As the point of benefit exhaustion approaches, the private value of continued unemployment declines, and it becomes optimal to exert more search or investment efforts and to accept less attractive job offers and business ideas. We would thus expect the transition rates to both employment and entrepreneurship to rise gradually as the moment of benefit exhaustion comes closer.

An additional strategy for containing moral hazard problems is to make benefit eligibility conditional on a minimum effort and on a willingness to accept jobs deemed (by the social security administration) to be appropriate. For this to be a meaningful strategy, some monitoring mechanism is required. At this point there is an obvious

asymmetry between job search and the pursuit of own business ideas. Claimants may be required to document that they have actually applied for vacant jobs, and they can be coerced to accept job offers known by the caseworker to exist. But business ideas are intrinsically private information, and their revelation and realization can thus be timed according to a private optimum. Hence, even though realistic business ideas exist at early stages of an unemployment spell, it may be optimal to postpone pursuing them until UI entitlements have been exhausted. This can of course also be the case for job offers, but job offers may be revoked if they are not accepted quickly, and by rejecting (observable) job offers the claimant also runs the risk of losing UI eligibility. For these reasons, we would expect transitions to entrepreneurship to be more concentrated toward the end of the UI period, and be more sensitive with respect to UI sanctions, than transitions to regular employment. Would-be-entrepreneurs may nevertheless be forced to reveal their true entrepreneurial intentions at earlier stages of the UI spell to avoid monitored job search costs and pressure to accept jobs considered inferior to their own business idea.

Many UI claimants are required to participate in active labor market programs, typically taking the forms of temporary relief work, class-room training, or job-search workshops. These programs serve two purposes; to provide skills needed to find work, and to counteract moral hazard problems; see Røed (2012) for a recent overview. Their effects on transitions to employment and entrepreneurship depend both on the effects they have on human capital and job opportunities (i.e., by raising the job offer arrival rate or the probability of obtaining viable business ideas), and on the way they change the claimants' valuation of alternative strategies. To continue as a benefit claimant may either become *more* attractive, as the claimant appreciates the training provided through the labor market program, or *less* attractive, as the claimant dislikes the associ-

ated loss of leisure. While the valuation-effects are likely to dominate during the period of program participation, the human-capital-effects dominate afterwards. The way in which *completed* program participation affects the transitions to employment and entrepreneurship, respectively, obviously depend on the *contents* of the programs; i.e., on the extent to which they focus on job *search* skills as opposed to job *creation* skills.

Economic theory is normally taken to imply that the transition rate from unemployment to regular employment displays a pro-cyclical pattern. As economic growth picks up, so does the number of vacant jobs and thus the job offer arrival rate. Although the improved job prospects also potentially trigger increases in reservation wages (pickiness), it has been shown – both theoretically (under reasonable assumptions) and empirically – that higher economic growth does increase the rate of transitions from unemployment to regular employment; see, e.g., Burdett and Ondrich (1985) and Gaure and Røed (2007). For transitions to entrepreneurship, the cyclical pattern is less obvious. While the prosperity-pull hypothesis implies pro-cyclical transition rates, due to the improved business opportunities in good times, the recession-push hypothesis implies a counter-cyclical pattern, due to the lack of alternative employment opportunities in bad times; see, e.g., Thurik et al. (2008) or Koellinger and Thurik (2012) for recent discussions.

3. Data, institutions, and empirical approach

It is common in the literature to equate entrepreneurship to self-employment; see, e.g., Parker (2004) for a recent overview. However, many individuals who start new businesses do so by establishing or taking over small limited liability companies, either alone or together with friends/colleagues.[1] They then become employed in their own company – or, in some cases, in another company which is again owned by their own

company. These individuals will typically be classified as *employed* in register-based analyses of entrepreneurship, even though they may have played a pivotal role in setting up their own workplace and are exposed to the risks associated with being a residual claimant to the firm's earnings. From an economics perspective, we will argue that the essential features of entrepreneurship are that a person engages both labor and capital into an economic activity and operates as a residual claimant to the resultant earnings, while the mode of ownership is of secondary importance. We therefore employ an entrepreneurship concept incorporating self-employed as well as employees who own their own workplace, either directly or indirectly through other companies.[2] According to this definition, around 9 % of the labor force participants in Norway are classified as entrepreneurs. The entrepreneur rate is much higher for men (13 %) than for women (4 %); see Berglann *et al.* (2011). The annual transition rate from registered unemployment to entrepreneurship is typically around 2 percent (3 percent for men and 1 percent for women).[3]

The starting point of our analysis is the flow of new unemployment insurance (UI) claimants in Norway from October 1999 through September 2007. The basic requirements for UI eligibility in Norway are that the person in question has been in paid employment just prior to the unemployment spell, that he/she has lost this job involuntarily, that labor earnings exceeded approx. 120,000 NOK (15,000 €) the last calendar year (or, alternatively added up to more than 240,000 NOK over the last three calendar years), and that the claimant search actively for a new job and is willing to accept any relevant job offer.[4] If these requirements are satisfied, the replacement rate is 62.4 percent of past earnings (up to an annual earnings ceiling around 480,000 NOK). Little more than half of the unemployed job seekers in Norway satisfy the UI eligibility requirements at entry into unemployment (Gaure *et al.*, 2012). Until the end of 2002, the

maximum duration of UI benefits was three years. In January 2003, maximum duration was cut to two years for new claimants.

In our analysis, we define a "new" claimant in a month *t* as a person who registered as unemployed job seeker and claimed UI benefits by the end of this month, but did not register in any of the months *t-1*, *t-2*,…,*t-6*; hence, to enter our dataset, a person must have been outside unemployment for at least half a year.[5] We then follow each of these spells – month by month – until it ends by a transition to employment or to entrepreneurship, or is right-censored for other reasons. To record a transition, we require at least three months of absence from the unemployment register. The nature of the transition – in terms of employment, entrepreneurship, or other (right-censored) exit – is identified on the basis of employment registers, tax registers (with information on individual labor and business earnings), and business owner registers (covering all limited liability companies).[6] For each transition to either employment or entrepreneurship, we also record total registered earnings in the first whole calendar year after the transition.

During the unemployment spell, the claimant may make a transition to two alternative active labor market program (ALMP) types, distinguished by whether or not they are specifically targeted toward entrepreneurship or not. In addition, they may be subject to a UI benefit sanction. We model these three events in the spirit of the Timing-of-Events-approach (Abbring and Van den Berg 2003), and estimate their impacts on the two final-destination hazards and the post-unemployment earnings level separately during their occurrence (on-treatment effects) and afterwards (post-treatment effects). Spells are right-censored in cases of transitions to regular education, to other social insurance programs (rehabilitation, disability, early retirement), to inactivity without income support, migration, or death. Still ongoing spells are also right-censored at the end of our observation window in September 2007.

Table 1. Descriptive overview of the data

	Employment	Entrepreneur-ship	Other or no tran-sition
# Spells	102,423	3,402	51,299
Mean spell duration (months)	4.61	5.23	5.17
Participant in ALMP (%)			
Targeted at entrepreneurship	0.5	8.9	1.0
Not targeted at entrepreneurship	14.8	9.0	17.8
Exposed to a sanction (%)	26.5	29.2	29.9
Sex and family situation (%)			
Married woman with children	12.5	8.2	11.8
Unmarried woman with children	11.9	5.6	12.0
Married woman without children	5.4	2.9	6.7
Unmarried woman without children	14.5	5.6	13.5
Married man with children	8.0	21.5	6.1
Unmarried man with children	9.0	17.8	7.5
Married man without children	5.3	11.8	5.6
Unmarried man without children	33.5	26.5	36.8
Age (%)			
< 30	42.2	19.2	43.2
30-39	30.5	36.5	27.5
40-49	16.3	26.5	14.5
50-59	9.3	15.6	9.9
>59	1.7	2.1	4.9
Education (%)			
Compulsory only	4.3	5.1	5.5
Lower secondary	33.9	31.5	35.3
Higher secondary	48.7	49.2	44.0
College/University	9.1	10.9	6.7
	4.0	3.3	8.6
Country background			
Native	83.9	84.3	77.6
Immigrant	16.1	15.7	22.4
Immigrant from non-OECD country	9.0	7.0	12.3

The vast majority of the Norwegian ALMPs either have a general "skills-enhancing" scope, or they are targeted at job search or temporary employment. Only 4 % of the programs recorded in our data were specifically targeted at entrepreneurship, comprising around 0.7 % of all UI claimants. The programs that are targeted at entrepreneurship give the claimant the opportunity to continue receiving UI benefits for up to six months during planning/development of a business idea, and for up to 3 months

upon implementation of the project, provided that the idea is considered (by appropriate local authorities) to have some merit. In the statistical analysis, we evaluate "regular" ALMPs and entrepreneurship ALMPs separately. For entrepreneurship ALMPs, it is important to bear in mind that entrants to the program have already been through some sort of screening process, in the sense that their business ideas have been considered worth trying out.

A UI sanction implies that benefit entitlements are lost prematurely, typically for a period of 8 weeks. Sanctions are imposed if the claimants violate the active-search-requirements, fail to show up when summoned to the Employment Office, reject suitable job offers, or refuse to participate in ALMPs; see Røed and Westlie (2012) for details.[7]

Table 1 provides a descriptive overview of the population used in our analysis. In total, there are 157,124 UI spells included in the statistical analysis.[8] A little more than two thirds end in a direct transition to regular employment. Only around two percent end in a transition to entrepreneurship. Hence, entrepreneurship does not appear to be a quantitatively important exit route from insured unemployment. It is also notable that transitions to entrepreneurship tend to occur later in the unemployment spells than transitions to employment.

For those who make a transition to either employment or entrepreneurship, Table 2 presents some key statistics describing the observed economic outcomes in the first calendar year after the transitions occurred. These statistics indicate that transitions to entrepreneurship on average are considerably more economically successful than transitions to employment. This is partly because many of the new businesses survive (and apparently thrive) the first year, and partly because the entrepreneurship become a stepping-stone for subsequent regular employment. One year after exit from

unemployment, almost 90 percent of those who made a transition to entrepreneurship are still economically active – in the sense that they are either in entrepreneurship or in employment. In comparison, only 75 percent of those who made a direct transition to employment are still active. Entrepreneurs are also more successful in terms of earnings in the first calendar year after the transition; the mean income is 36 percent higher and the median income is 23 percent higher in the group of entrepreneurs than in the group of employees. In the statistical analysis, we are going to use this first-year earnings measure as the indicator for economic performance after transitions to employment or entrepreneurship. This performance measure will thus not only reflect the immediate rewards associated with the jobs and businesses to which the UI claimants made a transition in the first place, but also the opportunities – or lack of opportunities – that these transitions subsequently entailed.

Table 2. Outcomes in the year after transition to employment or entrepreneurship

	Transitions to employment	Transitions to entrepreneurship
Main economic activity one year after (%)		
Employment	73.6	24.5
Entrepreneurship	1.0	64.0
Other	25.4	11.5
Total income first whole year after transition		
Mean	251,311	342,474
P10	69,762	120,053
P25	161,512	213,307
P50 (median)	252,765	309,644
P75	327,603	429,708
P90	409,033	584,304
Number of observations	102,423	3,402

Note: Total income comprises all personal income sources, including earnings, business income, and capital income.

4. Statistical Model

We observe labor market status by the end of each calendar month only; hence we set up the statistical model in terms of grouped hazard rates. We write the integrated month-specific hazard rate associated with destination state *k* for unemployment spell *i* in month *t*, φ_{kit}, as functions of ongoing duration of the UI claim $(\mathbf{d})$, of ongoing or completed sanctions or ALMPs $(\mathbf{z})$, of the current GDP growth rate (g), of a vector of observed individual characteristics and other controls $(\mathbf{x})$, and of a vector of (time-invariant) unobserved spell-specific individual characteristics $(\mathbf{v})$; i.e.,

$$\varphi_{kit} = \int_{t-1}^{t} \theta_{kis} ds = \exp\left(\mathbf{d}_{it}^{'}\lambda_k + \mathbf{z}_{it}^{'}\gamma_k + \delta_k g_t + \mathbf{x}_{it}^{'}\beta_k + v_{ki}\right), \quad k = 1,2,3,4,5, \qquad (1)$$

where *k=1* is employment, *k=2* is entrepreneurship, *k=3* is participation in a regular ALMP, *k=4* is participation in an entrepreneurship ALMP, and *k=5* is a UI sanction (premature temporary loss of UI benefits). While transitions to employment and entrepreneurship terminate the unemployment spell, the events of ALMP and a UI sanction imply that the spell continues. Upon a transition to employment or entrepreneurship, the total labor market earnings in the subsequent calendar year are specified as:

$$w_i = \exp\left(\mathbf{d}_{ic}^{'}\lambda_6 + \mathbf{z}_{ic}^{'}\gamma_6 + \delta_c g_t + \mathbf{x}_{ic}^{'}\beta_c + \theta Ent + v_{6i} + \varepsilon_i\right), \qquad (2)$$

where the *c*-subscript denotes the covariates' values at the time of spell completion, *Ent* is an entrepreneurship indicator (equal to 1 if the transition was to entrepreneurship and zero if it was to regular employment), v_{6i} is a covariate reflecting unobserved individual earnings capacity (potentially correlated with unobserved heterogeneity affecting the five hazard rates $(v_{1i},...,v_{5i})$), and ε_i is a normally distributed error term reflecting genuine randomness in earnings opportunities at the individual level. Note that Equation (2) is only estimated for persons who actually make a transition to employ-

ment or entrepreneurship. Note also that we assume here that the individual expected entrepreneurship-employee earnings differential can be represented by a common shift-parameter $\left(\exp(\theta)\right)$. This is obviously a restrictive specification. It has the advantage, though, that we obtain a unique estimate of the "entrepreneurship premium". Alternatively, we could have modeled the earnings equations for employees and entrepreneurs separately. However, given the relatively few entrepreneurship transitions observed in our data, such a strategy is not feasible in practice. Recall that our "earnings-outcome" does not reflect the payoff associated with the state obtained immediately after exit from unemployment, but rather the earnings accumulated over the next calendar year – regardless of what happens with the labor market status in this period. This outcome has the advantage that it reflects the broader consequences of a given transition, including its influence on earnings stability and the risk of new unemployment. A disadvantage is that it may be influenced by subsequent events that have nothing to do with the transition under consideration and hence be subject to more "noise". A more mundane reason for using calendar year earnings as the outcome measure in our analysis is that it is the only one available for those who make a transition to entrepreneurship (since earnings for this group must be calculated on the basis of reported taxable business income and dividends).

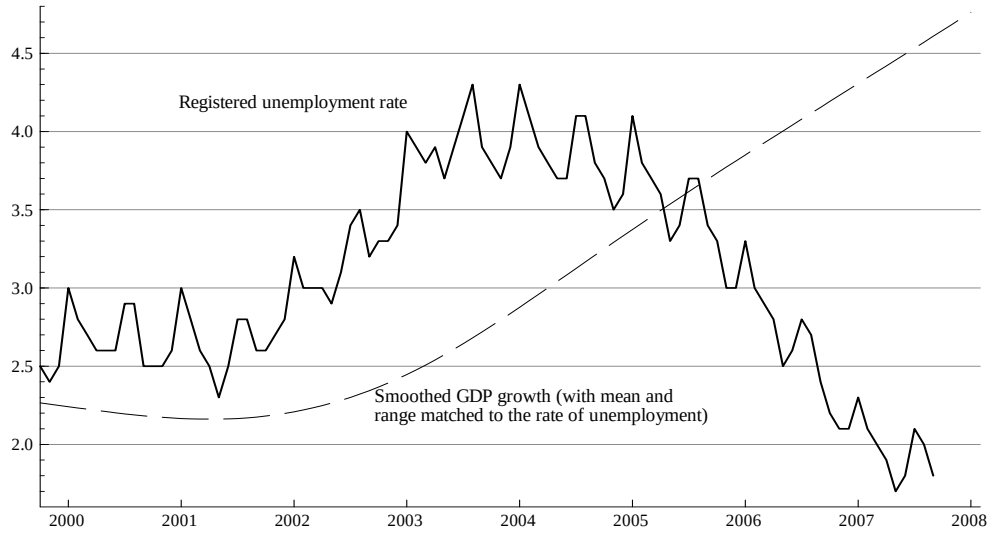
The impacts of UI duration (**d**) are modeled non-parametrically with one dummy variable for each duration month, and separately before and after the reduction of the maximum UI duration from three to two years. Note that it is the consumption of UI entitlements that defines the duration baseline in our model. The "duration clock" is stopped in months where benefits are not paid out, due to exhausted entitlements, a temporary sanction, or the substitution of ALMP earnings for UI benefits. In total, we

use 61 dummy variables in $\mathbf{d}$. The first duration month is selected as a reference, which is assumed to be common for the two UI regimes. We then have 36 dummy variables representing UI duration in the pre-reform regime (with maximum UI duration of 36 months), and 24 dummy variables representing UI duration in the post-reform regime. The last variable in each of these dummy variable sets indicate that UI entitlements are exhausted, and hence that the job seeker no longer claims UI benefits.

The effects of the endogenous events of ALMP participation and sanctions ($\mathbf{z}$) are represented in the appropriate hazards in the form of 6 dummy variables indicating ongoing or completed ALMP (of the two different types) or sanction. These dummy variables then represent the "on-treatment" and "post-treatment" effects, respectively.

Business cycle fluctuations are represented in the model through the monthly GDP growth indicator *g*. This is based on the quarterly national real growth rates reported by Statistics Norway (excluding offshore industries), and we have used a HP filter (Hodrick and Prescott 1997) to produce a smooth monthly series. The fluctuations in the GDP indicator during our observation window are illustrated in Figure 1, together with the monthly rate of registered unemployment. Unsurprisingly, the two series correlate negatively, but the correlation is far from perfect. In particular, it may be noted that the cyclical turning point (the trough) is identified to have occurred much earlier according to the GDP-measure than what can be read off from unemployment figures. This is in line with findings reported by Gaure and Røed (2007) that the rate of unemployment tends to reach its cyclical turning point relatively long after the underlying business cycle conditions have changed.

Figure 1. Registered unemployment rate and smoothed GDP growth 1999.10-2007.9



Source: Statistics Norway.

The vector of control variables $(\mathbf{x})$ contains a number of individual characteristics, and also 12 seasonal dummy variables. Individual characteristics are represented by 5 age dummy variables (<30, 30-39, 40-49, 50-59, >59), 5 education level dummy variables (compulsory only, lower secondary, upper secondary, college/university, unknown), 7 gender and family situation variables (man, women, married, women and married, # children 0-3, # children 0-3 and women, # children 4-17, # children 4-17 and women), 3 immigrant dummy variables (native, immigrant, immigrant from outside OECD), and 19 geographical dummy variables (one for each county in Norway).

To derive the likelihood function and estimate the model, we use the approach outlined in Gaure *et al.* (2012). This approach is designed to account for the left-truncation problem embedded in interval-censored duration data, and uses a completely nonparametric strategy to represent the joint distribution of the six unobserved covariates affecting the five transition rates and the post-unemployment earnings level, respectively.[9] The latter implies that unobserved heterogeneity is approximated by a (six-

dimensional) discrete distribution (Lindsay, 1983) with the number of mass-points chosen by adding points until it is no longer possible to increase the likelihood function (Heckman and Singer 1984), and then determine the preferred number of location points on the basis of the Akaike Information Criterion (AIC). The scope for adding additional points is at all stages of the process evaluated by means of simulated annealing (Goffe *et al*. 1994) as well as by full estimation based on randomly selected starting-values for heterogeneity parameters. The optimization algorithm we use is described and assessed in Gaure, *et al.* (2007). Note that unobserved heterogeneity is interpreted as spell-specific; hence for individuals who during our observation period have multiple spells, each spell is treated as if experienced by different persons. The reason why we do this is that we otherwise would have to take into account that previous spells – and their outcomes – may have causal impacts on the outcomes of current spells (Røed and Westlie, 2012), which is not feasible based on the data available for the present analysis without a considerable loss of observations.

5. Identification

The conditions for nonparametric identification of the multivariate mixed proportional hazard (MMPH) rate model are laid out in Abbring and Van den Berg (2003). In addition to the requirement of proportionality – in the sense that the proportional shift in a hazard rate caused by the manipulation of an observed covariate is the same regardless of the hazard's initial level – identification relies on a "no anticipation assumption", requiring that claimants do not anticipate the realization of the stochastic process determining future events and adjust their ex ante behavior in response to that private information. With respect to the impacts of UI exhaustion, this assumption is satisfied, since the timing of UI exhaustion is common knowledge and fully captured by the sys-

tematic part of the model. With respect to the impacts of ALMP participation and UI sanctions, however, the no anticipation assumption is more questionable. It is probable that claimants are notified about upcoming events some time prior to their actual implementation, and that they respond to this private information by changing behavior. Since ALMP's as well as sanctions are typically implemented quickly once the relevant decision is made, we nevertheless view the potential violations of no-anticipation to be of minor importance in the present context.

Even though we apply a proportional hazard rate model, we emphasize that identification in our case does *not* rely solely on the proportionality assumption. An important additional source of identification comes from the abundance of exogenous time-varying covariates; see, e.g., McCall (1994), Brinch (2007) and Gaure *et al.* (2007). Of particular value for identification purposes in our case is the substantial cyclical and seasonal variation in both labor demand and in the scale of labor market programs; see Røed and Westlie (2012) for a more thorough discussion of this argument as well as a historical description of the magnitude of these variations in the Norwegian labor market.[10] Time-varying variables give a sort of instrumental-variable type foundation for identifying the role of unobserved heterogeneity. The "exclusion restriction" is then that *past values* of these variables do not have a direct effect on the hazard rates, conditional on their present values, implying that they influence the contemporary hazards only through the already realized selection process; see also Eberwein *et al.* (1997, p. 663).

A particular feature of our analysis is that we model the impacts of UI duration separately before and after a reform that was implemented at a particular point in time (January 1, 2003). One may question how it is possible to identify separately the effects of the reform from the impacts of cyclical fluctuations. The answer to this ques-

tion lies in the fact that the new and stricter regime was implemented for new spells only; hence for a long period of time the two regimes coexisted, in the sense that there were persons belonging to both regimes represented in the dataset at the same time. The focus of our analysis is in any case *not* to identify the effect of the reform as such, but to investigate how the reform affected the patterns of duration dependence.

Identification of the earnings equation (Equation 2) is discussed in Gaure *et al.* (2012). Given that the distribution of unobserved characteristics directly affecting the transitions out of unemployment are nonparametrically identified through the event history part of the model, it is argued that their influence on earnings can be traced out through the observed distribution of realized earnings conditional on the observed event history.

6. Estimation results

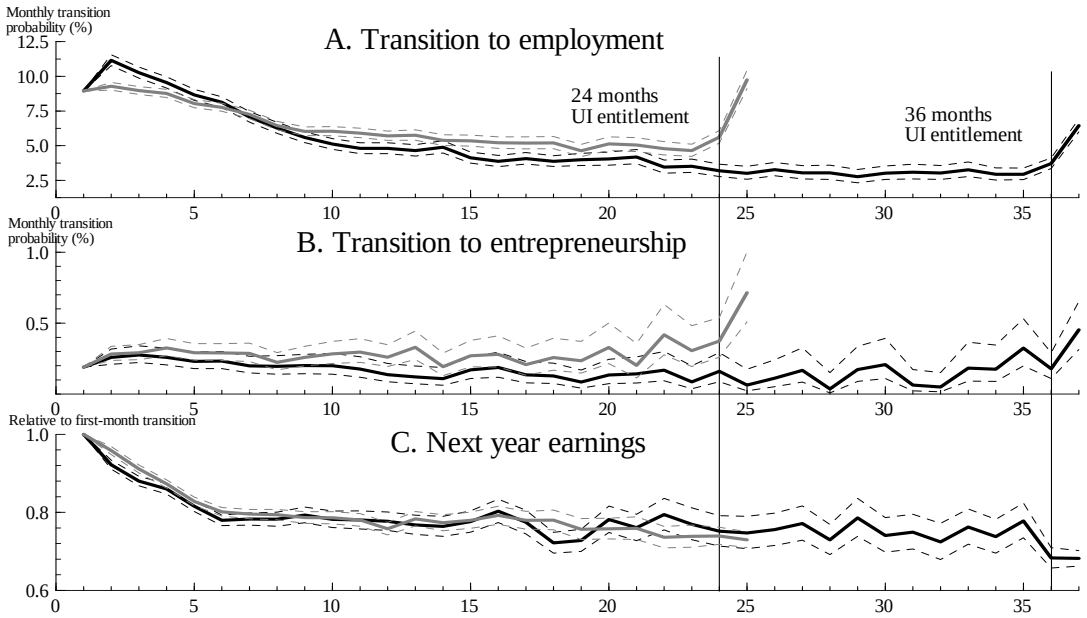
The preferred model ended up having 13 support points in the distribution of unobserved heterogeneity. Given the large number of estimated parameters (745 in total), we cannot present the results in any detail. We focus on how various key predetermined characteristics, spell duration, and endogenous events affect the three final outcomes; i.e., the transitions to employment and entrepreneurship and the rewards associated with these transitions.

We first present the estimated UI duration effects – before and after the reform. Figure 2 displays the regime-specific UI duration baselines with 95 percent confidence intervals. The two transition rate profiles are normalized such that first-month hazard rates are equal to the observed first-month event frequencies in the data; whereas the earnings outcome are measured relative to earnings expectations for exits in the first duration month.

The transition rate profiles in panels A and B can be interpreted as the estimated hazard profiles for a representative entrant to UI. For example, focusing on the entrepreneurship hazard (panel B), we note that the representative agent's monthly transition probability increases from around 0.2 percent in the first month to around 0.5-1.0 percent after exhaustion (marked by the vertical lines in the graphs). The transition rate to employment starts at around 8 percent and then declines almost monotonously to 3-4 percent toward the end of the UI period, before it again rises to 8-10 percent after UI exhaustion. The relative impact of UI exhaustion appears to be larger for the entrepreneurship hazard than for the employment hazard, and the probability of establishing a new business is considerably higher after UI exhaustion than at any point in time earlier in the unemployment spell. Moreover, while there is a general pattern of strong negative duration dependence in the employment hazard, the entrepreneurship hazard remains almost constant until the rise during the last months of the entitlement period. This may reflect that while employability declines with unemployment duration (e.g., due to the use of statistical discrimination in the hiring process), the possibilities of starting up one's own business remain more or less constant.

It is evident from Figure 2 that the spikes in the hazard rates were shifted exactly 12 months ahead in response to the 12 month reduction in maximum UI duration in 2003. This pattern should convincingly remove any doubts that it is indeed the loss of UI benefits that causes the hazard rates to rise around the time of exhaustion.

Figure 2. Estimated UI duration baseline hazard rates, with 95 % confidence intervals.



Note: The two hazard rates (panels A and B) are normalized to the observed average transition rate in the first duration month. Annual earnings (panel C) are measured relative to the level expected for transitions occurring after only one month of unemployment. Vertical lines indicate the timing of UI exhaustion before (36) and after (24) the 2003 reform.

The profiles of earnings obtained after exit from unemployment indicate that expected next-year earnings decline as a function of completed unemployment duration during the first six months of the spell and then stabilize at a level approximately 20 percent below initial earnings expectations. This is somewhat at odds with the finding reported by Gaure *et al.* (2012) that earnings expectations actually increase during the initial stages of the job search period. Note, however, that while Gaure *et al.* (2012) used the earnings obtained in the very first month after a transition to regular employment as the outcome variable, we use the overall earnings obtained in the first whole calendar year after transitions to both employment and entrepreneurship, conf. Section 4. Hence, in contrast to Gaure *et al.* (2012), our earnings outcome is not uniquely linked to the labor market status prevailing immediately after exit from unemployment, but encompasses instead the medium term economic consequences of the transition.

Table 3 presents other estimation results of interest. These results confirm the importance of economic incentives for transitions to both regular employment and entrepreneurship; see Columns I and II. A UI sanction (temporary loss of UI benefits) is estimated to raise the employment hazard by 174 % $\left((Exp(1.011)-1)\times 100 = 174\right)$ and the entrepreneurship hazard by as much as 285 %, ceteris paribus.[11] Both effects persist after the sanction is completed, although at lower levels, suggesting that a sanction does have some lasting "disciplinary" effects. The large immediate increase in the entrepreneurship hazard resulting from a UI sanction indicates that although a sanction normally is imposed due to inappropriate job *search* behavior (or failure to report regularly to the employment office), it does in some cases trigger the realization of already existing, but apparently "sleeping", business ideas.

Participation in regular ALMPs is estimated to have a weak positive effect on the transition rate to employment (around 5 percent during participation and 2 percent afterwards), and a very strong negative effect on transitions to entrepreneurship. Participation in entrepreneurship-oriented ALMPs, on the other hand, have huge positive effects on the transition rate to entrepreneurship (around 500 percent both during participation and afterwards), and a strong negative impact on transitions to regular employment (around 60 percent during participation and 30 percent afterwards). Hence, measured this way, it appears that entrepreneurship-oriented ALMPs are highly successful in generating entrepreneurship. Recall, however, that a screening process of business ideas has already taken place in the selection of participants to these programs.

Table 3. Selected parameter estimates (standard errors in parentheses)

	I Transition to Em-ployment	II Transition to Entre-preneurship	III Log first-year earnings
Transition was to entrepreneurship (the entrepreneurship premium)	-	-	0.150*** (0.010)
ALMP regular			
Ongoing	0.049*** (0.017)	-0.867*** (0.136)	-0.004 (0.007)
Completed	0.023 (0.015)	-0.711*** (0.091)	-0.038*** (0.006)
ALMP entrepreneurship			
Ongoing	-0.956*** (0.094)	1.864*** (0.142)	-0.084*** (0.031)
Completed	-0.354*** (0.074)	1.769*** (0.123)	0.041 (0.029)
UI sanction			
Ongoing	1.011*** (0.014)	1.348*** (0.074)	-0.018*** (0.006)
Completed	0.242*** (0.015)	0.113 (0.086)	0.046*** (0.006)
Business cycle			
GDP growth (smoothed)	0.341*** (0.018)	-0.177* (0.097)	0.218*** (0.006)
Age			
< 30	0.332*** (0.011)	-0.642*** (0.064)	-0.239*** (0.004)
30-39	0.140*** (0.011)	-0.065 (0.050)	-0.055*** (0.004)
40-49	Ref.	Ref.	Ref.
50-59	-0.235*** (0.014)	-0.049 (0.061)	-0.027*** (0.006)
>59	-0.876*** (0.024)	-1.019*** (0.118)	-0.146*** (0.009)
Education			
Compulsory only	0.144*** (0.018)	0.115 (0.089)	0.045*** (0.006)
Lower secondary	Ref.	Ref.	Ref.
Higher secondary	0.231*** (0.008)	0.343*** (0.043)	0.096*** (0.003)
College/University	0.381*** (0.013)	0.384*** (0.067)	0.230*** (0.005)
Gender and family situation			
Unmarried man without children	Ref.	Ref.	Ref.
Women	-0.052*** (0.009)	-1.118*** (0.067)	-0.136*** (0.003)
Married	0.178*** (0.012)	0.537*** (0.048)	0.110*** (0.004)
Women×married	-0.120*** (0.015)	-0.340*** (0.090)	-0.186*** (0.005)
# Children 0-3	-0.140*** (0.011)	0.094* (0.048)	0.003 (0.004)
Women× # Children 0-3	-0.200*** (0.017)	-0.276** (0.110)	-0.076*** (0.006)
# Children 4-17	-0.008** (0.004)	0.142*** (0.020)	0.007*** (0.002)
Women× # Children 4-17	-0.014 (0.013)	-0.199** (0.083)	-0.010** (0.005)
Country background			
Native	Ref.	Ref.	Ref.
Immigrant	-0.074*** (0.014)	0.039 (0.067)	0.000 (0.004)
Immigrant from non-OECD country	-0.324*** (0.018)	-0.881*** (0.094)	-0.040*** (0.006)
Av. monthly event freq. (%)	6.34	0.21	-

Additional controls: Seasonal dummies (12), county dummies (19) and UI duration dummies (61). *(**)(***) Significant at the 10(5)(1) percent level.

The hazard rate from unemployment to employment is strongly pro-cyclical. We have scaled the GDP growth index such that it has a unit range, implying that the change from the worst to the best cyclical conditions during our data window caused a rise in the employment hazard of 41 % ($(Exp(0.341)-1)\times 100 = 41$), ceteris paribus. By contrast, the transition rate to entrepreneurship displays a weakly counter-cyclical pat-

tern, indicating that the recession-push mechanism tends to dominate the prosperity-pull mechanism for the potential entrepreneurs studied here. Taken together, these findings imply that entrepreneurship becomes a relatively much more important escape route from unemployment in bad times. This may suggest that labor market policies should also have a stronger focus on encouraging entrepreneurship in bad times. Due to data limitations we have, however, not been able to assess whether there are cyclical variations in the *effects* of labor market programs also, as indicated by Román *et al*. (2013).

The most notable estimate representing the influences of individual characteristics is the huge gender-divide in entrepreneurship propensity. Among unmarried without children, men's entrepreneurship hazard is three times as high as that of women. For married job seekers and for job seekers with small children, the gender gap in entrepreneurship entry is even larger. It is notable that the male-female entrepreneurship ratios identified in our analysis are very similar to those recorded for so-called "early stage entrepreneurial activity" in Norway in the Global Entrepreneurship Monitor (GEM); see Kelley *et al.* (2011). Another point to note is the different age profiles in transitions to employment and entrepreneurship; while the employment hazard declines monotonously with age, the entrepreneurship hazard rises until the forties, and then declines. The estimated entrepreneurship hazard is around 60 percent lower for non-OECD immigrants than it is for both natives and for immigrants from OECD countries. In comparison, the corresponding differential in the employment hazard is "only" around 30-35 percent. These findings stand in some contrast to the popular view that immigrants turn to entrepreneurship as an alternative to paid employment, owing to hard-to-document educational skills or discrimination in the labor market; see, e.g., Parker (2004, pp 129-132). However, they fit well into previous Norwegian evidence

indicating that non-OECD immigrants have large difficulties establishing themselves in the Norwegian labor market, and that they face a very high risk of leaving the labor market completely upon job loss; see Bratsberg *et al.* (2010).

The results regarding the earnings equation are presented in Table 3, Column C. Our main interest here lies in the size of the "entrepreneurship premium" reported in the first row of the table. Recall (from Table 2) that the average difference in first year earnings between those who entered entrepreneurship and those who entered regular employment was 36 percent. The estimate obtained here indicates that the causal effect is around 0.15 log-points (approximately 15 percent), which is much less than the observed difference, but still a sizeable impact. Hence, our finding at this point is clearly at odds with previous evidence indicating a negative entrepreneurship premium for the unemployed (Evans and Leighton 1989; 1990; Rissman; 2003). It is in line with previous Norwegian evidence reported by Berglann *et al.* (2011), though. Entrepreneurship appears to pay off in comparison to transitions to regular employment, but a significant part of the entrepreneurship premium appears to be driven by a process whereby entrepreneurship becomes a stepping stone for new regular employment. As shown by the descriptive statistics in Table 2, as much as 24.5 percent of those who made a transition to entrepreneurship in our data have regular employment recorded as their main economic activity in the subsequent year.

Conditional on the outcome of the unemployment spell – in terms of a transition to either employment or entrepreneurship – the results indicate a tendency for program participation to yield slightly lower earnings (with a possible exception for completed entrepreneurship programs). A plausible interpretation of this finding is that the program participation contributes to a reduction in reservation wages and "pickiness".

7. Concluding remarks

Unemployment is the driving force behind many entrepreneurship endeavors. Yet, the transition rate from insured unemployment to entrepreneurship is extremely low, and labor market policies targeted at unemployed workers typically focus on search for existing vacancies rather than on encouraging new startups. Based on Norwegian register data, we have shown in this paper that the transition from unemployment to entrepreneurship is highly sensitive toward financial incentives, even more so than the transition from unemployment to regular employment. There are significant spikes in the entrepreneurship hazards around the time of unemployment insurance (UI) exhaustion, although from a very low level. This indicates that some business ideas remain dormant until alternative income options no longer are available. There is also a large rise in entrepreneurship propensity in response to UI sanctions. Taken together, these observations suggest that there exists an underexploited potential for entrepreneurial job creation among UI claimants.

Existing labor market policies targeted at UI claimants typically has a strong focus on encouraging and supporting the search for existing job vacancies. To some extent this can be justified by informational asymmetries with respect to the claimant's effort and pickiness in relation to the two different ways of finding work. For example, while it is possible to monitor job search efforts (e.g., by requiring copies of job search applications), it is more difficult to monitor a claimant's willingness to pursue own business ideas. But we have also presented evidence indicating that active labor market programs (ALMPs) tend to favor regular employment. Only around 4 percent of ALMP slots are targeted particularly at entrepreneurship. These, on the other hand, appear to be highly effective in the sense that they raise the hazard rate to entrepreneur-

ship both during the participation period (on-program effect) and afterwards (post-program effect. Given the finding that "sleeping" business ideas exist among UI claimants, there should be a potential for ALMPs to raise the entrepreneurship hazard even further.

Our results also indicate that transitions from unemployment to entrepreneurship are weakly counter-cyclical, implying that the relative importance of entrepreneurship rises sharply in bad times. Thus, in times of economic crisis, it may be of particular importance to design labor market institutions such that they foster entrepreneurship among the unemployed. This conclusion is corroborated by our finding that transitions to entrepreneurship are rather generously rewarded, and sometimes also become a springboard for the return to regular employment. It is important to bear in mind though, that the evidence presented in this paper is based on a situation with moderate cyclical fluctuations, with unemployment rates varying between 2.5 and 4.5 percent; i.e., far below those now observed in many industrialized countries.

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Notes

[1] Note that while starting as a self-employed is essentially free of charge, there may be significant start-up costs for limited liability companies. In the period covered by our empirical analysis, registering a limited liability company was subject to a small fee (approx. 6,000 NOK in 2012-prices), but required an initial share capital of at least 100,000 NOK. Limited liability companies were also required to audit their accounts, which potentially made this type of company more expensive to run.

[2] Following Berglann *et al.* (2011), we define an employee as entrepreneur if he/she owns at least 30 percent of the firm (directly or indirectly) or owns at least 10 percent *and* is a board member or CEO. Note that our definition of entrepreneurship does not require that the firm is "new"; nor does it require that the entrepreneur is necessarily the founder of the firm. The central feature of our definition is the combined employment of capital and labor into a business activity. Whether this occurs through the establishment of a new firm or through takeover – and potentially revitalization – of an existing firm is of secondary importance.

[3] In comparison, Rissman (2007) reports annual transition rates from unemployment to self-employment for U.S. males around 6 %, i.e., roughly twice the Norwegian level.

[4] Monetary amounts reported in this paper are inflated to 2012-value.

[5] We condition on at least six months without prior unemployment to ensure that all the job seekers included in our analysis have full UI entitlements at the start of their spells. In Norway, it is not uncommon to have brief gaps in ongoing unemployment spells due to, e.g., short temporary jobs, in which case the return to UI will be counted as a continuation of the previous entitlement period.

[6] To ascertain consistency, we also exploit information from administrative social insurance registers and education registers.

[7] Premature loss of UI benefits may also result from claimants' failure to register. UI claimants are obliged to confirm regularly (every fortnight) that they are still unemployed and still actively searching for work. If they fail to do so, UI payments will be halted until the confirmation arrives.

[8] These spells were experienced by 141,884 different persons, out of which 9.43 % had more than one spell during our data window.

[9] The distribution of unobserved heterogeneity is assumed to be independent of observed characteristics at the time of entry into unemployment. We exploit Bayes' rule to derive the distribution of unobserved heterogeneity conditional on survival to the first "observation post" (the borders between the monthly intervals). For the sake of brevity, we do not present the (relatively complicated) likelihood function in this paper. A full description of the likelihood function for a similar model (and similar data) is given in Gaure et al. (2012, Appendix). Note that we treat each spell as a separate entity in terms of its attributed unobserved covariates; i.e., we do not exploit information on repeated spells for the same individuals.

[10] Based on our results, we estimate that a move from the worst to the best business cycle conditions (ceteris paribus) in our estimation period (see Figure 1) causes a 41 percent increase in the employment hazard, a 16 percent decline in the entrepreneurship hazard, a 27 percent increase in the hazard to regular ALMPs, a 45 percent increase in the hazard to entrepreneurship ALMPs, and a 77 percent increase in the sanction hazard. In addition, there are significant seasonal variations in all hazard rates, with, for example, the employment hazard being twice as high in August than in December. We return to some of these results in the next section.

[11] Note that the proportional shifts in the hazard rates implied by the parameter estimates are equal to Exp(estimate). Since $Exp(a)-1 \approx a$ for small a, small parameter estimates may be interpreted approximately as the relative change in the hazard rate resulting from a unit change in the corresponding explanatory variable.