

# Temporary contracts' transitions: the role of training and institutions

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The analyses, opinions and findings of these papers represent the views of the authors, they are not necessarily those of the Banco de Portugal or the Eurosystem

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# Temporary contracts' transitions: the role of training and institutions

Sara Serra  
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## Abstract

Despite recent reforms, labour market segmentation is still a marked feature of several European countries. This work empirically analyses transitions out of temporary contracts, by means of a discrete duration model, with a particular focus on human capital features, labour market protection and their interaction. Transitions to open-ended contracts with the same or with a new employer are considered separately, as well as transitions to joblessness, based on data for ten European countries taken from the European Community Household Panel. Conclusions suggest that firm training policies are more relevant for intra-firm transitions, while worker characteristics are more determinant for inter-firm transitions. Labour market regulation plays a significant role in what concerns transitions to open-ended contracts, but not to joblessness, particularly in strongly segmented labour markets. In countries characterized by this type of labour market institutions, human capital features assume an increased relevance, and firm provided training may reduce the influence of the strictness of labour market regulations on the conversion of temporary contracts into open-ended.

JEL: E24, J24, J41

Keywords: Labour market institutions; work-related training; fixed-term contracts.

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## 1. Introduction

This study analyses the determinants of labour market transitions for temporary contracts, with a particular emphasis on the role of human capital features and its potential interaction with labour market institutions. The analysis in the current work is disaggregated into transitions within the same firm (intra-firm transitions) and with another firm (inter-firm transitions), a feature not yet present in the literature. Furthermore, results are disaggregated into two country groups, with different degrees of labour market segmentation. In a complementary analysis, the career dynamics of temporary workers is also investigated.

There is a large literature on transitions from temporary to permanent jobs, which has in general focused on the ability of the former to serve as career stepping stones, particularly in segmented labour markets, characterized by large differences in employment protection for these two types of contracts. These studies include, among others, Portugal and Varejão (2009), Alba-Ramirez (1998), Amuedo-Dorantes (2000), D'Addio and Rosholm (2005) and Booth *et al.* (2002), which focus in general on firm and worker characteristics that favour the conversion of a temporary contract into permanent. Results on the role of temporary contracts are mixed, given that Portugal and Varejão (2009) and Booth *et al.* (2002) find, based on data for the Portuguese and British economy, respectively, some evidence that temporary jobs are to a large extent used for screening workers into permanent positions, while other studies, which focus on the Spanish economy, conclude that temporary contracts exhibit some characteristics of a trap.

Another focus of the literature on employment transitions is the impact of labour market institutions. In particular, the impact of EPL on job and worker turnover and, to a smaller extent, labour reallocation has been the object of interest. In countries with dual labour markets, worker turnover (much higher than job turnover) tends to be concentrated in fixed-term contracts, generating excessive churning among temporary workers (Centeno and Novo (2012)) and on the other hand reduced job-to-job mobility among permanent workers, limiting job reallocation (Gielen and Tatsiramos (2012) and Orsini and Vila Nuñez (2014) among others). As concerns specifically transitions from temporary to permanent contracts, Kahn (2010), for example, finds some evidence that these were increased with the liberalizations of permanent contracts that took place in some European countries, while employment protection legislation (EPL) reforms on temporary contracts gave rise to more mixed results.

This paper explores these institutional aspects as well as the connection between training decisions and transitions. Contrarily to the influence of education on transitions from temporary to permanent jobs, which is found to be positive in several studies, the impact of training on transitions is not much explored in the literature. Some references include Portugal and Varejão

(2009), who find that promotion of temporary contracts to open-ended tends to happen more often in firms which invest more in training, although these firms are less likely than other to hire temporary workers. However, these workers do not necessarily receive training, at least while they have temporary status (Albert *et al.* (2004) and Bassanini *et al.* (2005)). The interaction between training decisions and labour market institutions, namely EPL, is even less explored in the literature. A dual labour market implies high turnover among temporary workers, which discourages training, not only because it increases the potential for a "poaching" externality, but because firms can simply look for workers which have the skills required.<sup>1</sup> Bassanini *et al.* (2005) concluded that an increase in the strictness of labour market regulation, evaluated on the basis of the Organisation for Economic Co-operation and Development (OECD) EPL indicators, is found to have a negative impact on training incidence. Therefore, for workers for which training actually takes place in a highly regulated labour market, it provides a much stronger signalling impact about the ability of that worker, given that higher ability workers are likely to self-select into training firms (Autor (2001)).

The current paper considers the disaggregation of transitions according to the firm where they occur: within the same firm (intra-firm transitions) and with another firm (inter-firm transitions). This distinction is not present in the literature, where the majority of studies do not distinguish employer type (Alba-Ramirez (1998) and Amuedo-Dorantes (2000)), or when they do this distinction is not directly related to nature of the contractual relationships involved (Melero (2004) and Sicherman and Galor (1990)). It is however potentially important given that the role of training may be different given the type of transition obtained. If training is more productive to high ability workers (Autor (2001)), it may be very relevant for obtaining a job by providing a signaling role to new employers. However, if firms believe that workers are unlikely to remain in the firm they will be more reluctant to invest in training. Reinforcing this effect, workers may show less commitment to employers who invest less in skills (OECD (1993)). This will be particularly so if the training provided is of general nature, which may lead the training firm to suffer from a "poaching" externality. Inter-firm transitions can also be related to the literature on job-to-job transitions. For example, Gielen and Tatsiramos (2012) analyse the behaviour of job-to-job transitions due to quits in both temporary and permanent contracts and its interaction with EPL levels. They find that job satisfaction has a relevant role in the decision to quit a job, but not in countries with strict EPL, a fact which is associated with higher mobility costs

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<sup>1</sup>Because all training is to some extent general and to some extent specific and so partially transferable to other firms, potential benefits from training accrue not only to the firm providing it and to the worker acquiring it, but also to other firms that can potentially hire the worker latter on. This constitutes the "poaching" externality (European Commission (2008)).

in this context. However, the reasons to quit a job may be substantially different for permanent and temporary workers, given that for the latter this movement may result from the expectation of contract non-renewal or non-conversion.

The results presented in this paper show that training and EPL, as well as their interaction, influence transitions to permanent contracts, both with the same and with a different employer, albeit in slightly different ways. In fact, the nature of the human resources policy of the firm and the human capital level of the worker appear to affect results in a distinct way depending on the type of transition. For transitions to a permanent job with the same employer, the nature of the firm appears to be the most relevant feature, while for inter-firm transitions, the characteristics of the worker seem to be more relevant. Moreover, being in a training firm insulates to some extent temporary workers from the impact of changes to labour market protection. In addition, the breakdown of results for two country groups shows that EPL affects transitions mainly for segmented labour markets.

Results also show that a sequence of temporary jobs reduces the hazard of transitions from temporary employment to all the destination states considered. This conclusion is similar to the one obtained by Gagliarducci (2005) for the Italian economy, particularly for cases in which there are interruptions between temporary jobs. Furthermore, the higher the number of cumulative previous temporary jobs, the stronger is this effect, which suggests that the personal professional history of each worker may influence the likelihood of transition.

The career of temporary workers prior to transition, namely the number and duration of temporary contracts held, is also investigated, in order to offer a complementary analysis to the previous results. The empirical results obtained show that there is negative occurrence dependence and that longer temporary durations disfavour further job changes, ie. experience is valued, but only for maintaining a given temporary contract.

Finally, an analysis of the determinants of the number of temporary contracts held by a worker is performed through a count model. This allows the cross checking of some of the results stemming from transition analysis.

The remainder of the paper is set out as follows: Section 2 presents the database, sample construction and evidence from descriptive statistics. Section 3 presents the modelling approach followed and Section 4 describes estimation results, both for transitions from and within temporary employment, as well as for the analysis on the number of temporary contracts held by workers. Finally, Section 5 concludes.

## 2. Data and exploratory analysis

### 2.1. Data

The European Community Household Survey (ECHP) is an harmonized longitudinal survey covering fifteen EU member states (Belgium, Denmark, Germany, Greece, Spain, France, Italy, Ireland, Luxembourg, The Netherlands, Portugal, United Kingdom, Austria, Finland and Sweden) and comprising 8 waves (from 1994 to 2001) for the majority of countries. The survey is carried out by national data collection units and coordinated by the Statistical Office of the European Union (Eurostat).

The main advantages of this database are its longitudinal nature and standardized methodology and questionnaire, which allows to analyse individual transitions and cross-country comparisons. However, for three countries (Germany, Luxembourg and UK) the results available for the majority of the survey are based on national questionnaires, whose coverage (both in terms of time and questions asked) and answer structure differs in some cases from the ECHP. Due to these limitations, these countries were not considered in the estimation. Sweden was also excluded from the estimation due to the limited time coverage of the information and unavailability of data on the starting month of a job. Another advantage of this database is the wide span of topics covered in the questionnaire. In particular, for the current study, the availability of questions regarding training incidence, duration, and nature, as well as firm training choices is of interest. However, for estimation only part of this information could be used due to sample size limitations. In fact, item non-response is found to be a much more relevant problem for this database than panel attrition (Bassanini and Brunello (2006)). Due to absence of information on firm provision of education or training, France was also excluded from the estimation sample. Therefore, the analysis is restricted to the remaining ten countries.

Estimation required the sample selection to be further restricted. Only dependent employees working more than 15 hours per week and followed in the survey for at least two consecutive years are considered. Employment status is consistent with the International Labour Organization standards. Data from the first wave of the survey could not be used, given that information on the type of contract held by the worker is only available from wave 2 onwards.<sup>2</sup> Furthermore, only observations in which workers state being in a permanent contract or in a fixed or short-term contract are considered. The treatment of duration prior to the beginning of the survey restricts the sample to those

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<sup>2</sup>The exact wording of this question is "What type of employment contract do you have in your main job? Please indicate which of the following best describes your situation." The options available are: permanent employment, fixed-term or short-term contract, casual work with no contract and some other working arrangement.

observations for which information on year and month of start of the current job is available, which implies that only agents that started their job at the earliest two years before they joined the survey are considered. Moreover, for agents which recorded multiple transitions from a temporary contract to one of the risk states, only the first transition is considered. Individuals which have reported having permanent jobs prior to a temporary contract have also been excluded from estimation.

Finally, the sample is restricted by the availability of information on the regressors considered. These comprise firm characteristics, including sector of activity (public or private and agriculture, industry or services), provision of training to employees and number of employees in the production unit in which the worker is employed. In addition, worker characteristics are also considered, namely gender, age, highest level of general or higher education completed (ISCED<sup>3</sup> level), job satisfaction<sup>4</sup> and attendance of education or training in the recent past. Finally, job or career information like duration of current job and a dummy for the number of temporary contracts held prior to the current one is also considered. The available sample comprises 8947 observations and 5910 individuals after these conditions are satisfied.

In addition, a country level measure of the strictness of labour market regulation is considered, namely the indicator related to labour legislation included in the International Institute for Management Development (IMD) World Competitiveness Yearbook. This is an yearly assessment of country competitiveness, which includes the results of an executive opinion survey on several issues, including whether labour regulations (hiring/firing practices, minimum wages, etc.) hinder business activities. An increase in the indicator of labour market regulation implies an increase in flexibility at this level. The use of this soft data indicator is preferred to the most commonly used OECD EPL indicator given that the latter relates only to legislative changes, with no measure of their enforceability, and does not allow for a time series interpretation (Antunes and Centeno (2007)). In addition, the scope of the question implied in the indicator is broader than just EPL. The main drawback of the IMD indicator is that labour regulations affecting temporary and permanent contracts are not treated separately.

The analysis carried out for the overall sample and for two country subgroups. Group M (more segmented labour markets) is composed of Spain,

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<sup>3</sup>ISCED is the acronym for the International Standard Classification of Education, provided by the United Nations Educational, Scientific and Cultural Organization (UNESCO).

<sup>4</sup>The indicator on job satisfaction consists of an average of the evaluation of workers regarding several aspects of their job. The exact wording of the question is "How satisfied are you with your present job or business in terms of earnings, hours of work, working conditions etc." and the topics considered are earnings, job security, type of work, number of working hours, working time, working conditions/environment and distance to job/commuting. A higher value implies higher satisfaction, from 1 (not satisfied) to 6 (fully satisfied).

Portugal and Italy, while group L (less segmented labour markets) contains the remaining countries. This partition was adopted because countries in group M provide the largest part of the sample for transitions and are among those with highest share of temporary contracts in employment at the time of the ECHP survey, maintaining that status in recent years (Table (A.1)). In addition, these countries implemented two-tier labour market reforms over the 80's and 90's (Boeri (2011)), maintaining however strict levels of labour market protection (OECD (2013)) and are among those in the European Union with lowest training incidence (Bassanini *et al.* (2005)). This situation distinguishes them from Finland, which also has a high share of temporary contracts in employment. The distinction of southern European countries from the remaining was also adopted by Boeri *et al.* (2000) due to their combination of strict regulation on both the labour and product markets. These country subsamples allow to control to what extent results are driven by group M countries, where temporary contracts share a relatively similar institutional framework.

## 2.2. Exploratory Analysis

Table (A.1) shows the composition of employment across the countries considered for estimation. Countries of Group M (Spain, Portugal and Italy) are among those with higher share of temporary contracts. An update of this information for more recent years, based on data from the OECD, shows that the ranking of countries has not changed significantly, with Portugal and Italy increasing the weight of temporary contracts and Spain reducing it marginally.<sup>5</sup> Table (A.2) shows descriptive statistics concerning some human capital characteristics by type of contract. The average education level of fixed-term and permanent workers is very similar, despite a more unfavourable distribution between secondary and primary education for the former, given that the weight of third-level education is actually higher for temporary employees. Although these workers are not unskilled, they feel in much larger proportion than permanent workers that their skills are not adequately used and that they could fulfill more demanding tasks. Fixed-term workers are also more likely to be enrolled in education or training than permanent workers, particularly in general training, which suggests that in some cases a temporary job may serve as a complement to undergoing general education.

The main reason for leaving a job pointed by temporary workers is the fact that their contract ended, while the second most common reason is quitting

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<sup>5</sup>The temporary employment concept in the OECD data is more encompassing than the fixed-term aggregate in the ECHP. However, based on data from the two databases for 2000-2001, the employment share defined by fixed-term plus other contracts in the ECHP is very comparable to the OECD aggregate, with differences of less than five percentage points.

to a better job. This is in sharp contrast with the situation of permanent employers, which mention obtaining a better job as their main reason to change employment. This finding suggests that the literature on overall job-to-job movements may not be adequate to the specificities of transitions from temporary to permanent contracts.

Table (A.3) shows how this employment structure translates into temporary worker flows for the sample considered. About half of workers change state after one year, and a large share of workers obtain a permanent contract each period, the majority of which by promotion with the same employer. One distinctive feature is that while the share of temporary workers that is promoted to a permanent job with the same employer is relatively stable cross country (ranging from about 17% to 33%), the share of workers that transition to an open-ended contract with a new employer is more heterogeneous. In fact, the share of inter-firm transitions is lower for countries with a higher share of temporary workers, which also show a higher percentage of transitions into joblessness (unemployment plus inactivity). This evidence suggests that there is a margin for use of temporary contracts that is similar across countries (possibly related to temporary labour needs from firms), but there is another share that corresponds to the fulfilment of permanent labour necessities that is done at least initially with temporary contracts. This option may be related to institutional reasons or other.

Table (A.4) shows the values of the IMD indicator on labour regulations for the countries analysed, both for the sample period and more recent years. Results show that, as mentioned, in group M countries labour regulations are perceived as being stricter, with no major change in ranking towards recent years. In addition, there is some overlapping of countries with a low share of inter-firm transitions and with strict labour regulations.

Tables (A.5), (A.6) and (A.7) show the descriptive statistics for the sample used (overall and for the M and L country groups), which illustrate the main differences between workers that experience intra and inter-firm transitions and also transitions into joblessness. These statistics correspond to the sample averages of all the individual level variables used in estimation. For time-varying variables (except age), the lagged values were considered, not only to reduce potential regressor endogeneity issues, but also because that would be the only way to make models comparable by considering the characteristics of the departure state for all competing risks. For example, the time frame of the question regarding training spans over the year prior to the one of the survey, so a worker that has changed job in survey year  $t$  can report in that survey training received either with his previous or current employer.<sup>6</sup>

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<sup>6</sup>The exact question on training for survey year  $t$  is: Have you at any time since January of year  $t-1$  been in vocational education or training, including any part-time or short courses?

Agents that obtain a permanent job with a new employer tend to be younger than the average temporary worker in both country groups. In country group M, their education level is also higher. Workers involved in inter-firm transitions also received training in the period prior to transition in higher proportion than those that experienced intra-firm transitions, a feature which is visible for both country groups, although more notorious for group M. Firm policy as regards training appears to be relevant, as the probability of being in a training firm is slightly higher than average for workers which latter transition into permanent employment. This feature arises mostly from country group M, given that for group L this is only true for workers which are promoted to permanent with the same employer. This is somewhat surprising given the fact that for group L firm-provided training has much higher incidence than in country group M. Moreover, in group L inter-firm transitions originate with higher probability from companies that do not provide training, which stems from a higher incidence of workers which have received training notwithstanding being in a non training firm. This training obtained by agents employed in non-training firms is assumed to be to a large extent self-financed, and referred as such henceforth.<sup>7</sup> For country group M, the probability of obtaining a permanent job with a new employer depends favourably on training, independently of its financing. Workers experiencing the first temporary contract recorded in the survey are much more likely to make a transition than those which had at least one previous temporary contract, and this reflects in particular transitions to joblessness. This feature is particularly notorious for country group L. Transitions to joblessness are made by workers with a higher average age and a lower education level than those going to other states, which are mostly female and that work in production units that are on average smaller and less likely to provide training. These characteristics are common to both country groups.

### 3. Modelling approach

The main variable of analysis is the time elapsed since the admission into a fixed-term contract with a given employer. Given the annual frequency of the survey, a discrete duration model was adopted. The competing risk approach adopted takes into account three modes of exit from temporary employment: being promoted to permanent with the same employer, obtain an open-ended contract with a new employer or joblessness (unemployment or inactivity). Two possible specifications are considered: initially unobserved heterogeneity is not considered but latter this hypothesis is accounted for.

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<sup>7</sup>Additionally, although data is only available for a smaller sample, details on firm training provision suggest that companies that provide training to their workers are in their majority, but not exclusively, responsible for the payment of that training.

Each period, the length of a spell, in this case of a temporary contract, is expressed as a random variable  $T$ , with an associated cumulative distribution function  $F(t)$ . The elapsed time since the beginning of the spell is given by the survivor function  $S(t) = 1 - F(t)$ .

In a discrete duration setup in which data is grouped, time is aggregated into intervals of the time  $]a_i, a_j]$  where  $a_i = \{0, 1, \dots, a_{j-1}\}$  and  $a_j = \{1, 2, \dots, \infty\}$ . In that case, the hazard rate corresponds to the probability that a spell ends in interval  $a_j$ , given that it lasted up until interval  $a_{j-1}$ :

$$h(a_j) = Pr(a_{j-1} < T \leq a_j | T > a_{j-1}) \Leftrightarrow$$

$$h(a_j) = 1 - \frac{S(a_j)}{S(a_{j-1})} \quad (1)$$

And therefore, the survival function is given by:

$$S(a_j) = \prod_{k=1}^j (1 - h(a_k)) \quad (2)$$

The duration is modeled by assuming a proportional hazard model, where  $h_0(t)$  represents the baseline hazard function and  $\lambda_t$  the proportional changes implied by different values of the covariates  $X_t$ :

$$h(t, X_t) = h_0(t) \lambda_t \quad (3)$$

The modeling approach followed was a complementary log-log (cloglog) specification, which corresponds to the discrete time representation of a proportional hazards model with grouped data (see Jenkins (2005) for a proof). In fact, if the hazard rate of the continuous process can be specified as:

$$h(t, X_t) = h_0(t) \exp(\beta' X_t) \quad (4)$$

where  $h_0(t)$  is the baseline hazard and  $X$  is the vector of (possibly) time varying covariates, the discrete time hazard can be expressed as :

$$\ln(-\ln[1 - h(a_j, X_t)]) = \beta' X_t + \gamma_j \Leftrightarrow$$

$$h(a_j, X_t) = 1 - \exp[-\exp(\beta' X_t + \gamma_j)] \quad (5)$$

where  $\gamma_j$  is log of the difference in the integrated continuous time baseline hazard evaluated at the extremes of the interval  $]a_{j-1}, a_j]$ .

This parametric approach, followed for example by Portugal and Varejão (2009), was preferred to the multinomial logit model used by other authors (D'Addio and Rosholm (2005)) because the process governing transitions is continuous, although survival times are grouped into intervals. Given that the

cloglog model is directly derived from that assumption, as shown above, it is more suited for the problem under analysis, while the multinomial logit is more appropriate for situations in which durations are intrinsically discrete (Jenkins (2005)).

The approach followed is semi-parametric in the sense that the baseline hazard is assumed to be constant over a given interval, but no model is imposed to fit the whole duration. For simplicity, competing risks are assumed to be independent. In a continuous duration model, this would imply that the model would simplify to three single cause hazard models. In a discrete duration model, that simplification is only possible if transitions are assumed to occur at the limits of intervals, i.e., at the moments the survey takes place (Portugal and Varejão (2009)).

Given the competing risk approach, a latent duration variable is associated with each exit mode from a temporary job, given that it may end when the worker transitions to permanent employment with the same employer ( $T_{SE}$ ), with a different employer ( $T_{DE}$ ) or due to joblessness ( $T_J$ ), and only the minimum of the latent failure times, if any, is observed:  $t = \min(T_{SE}, T_{DE}, T_{JB}, T_C)$ , where  $T_C$  corresponds to the duration of censored spells.

Consider the destination specific censoring indicators for spell  $i$ :

$$\delta^{SE} = \begin{cases} 1 & \text{if spell ends with transition with the same employer} \\ 0 & \text{otherwise} \end{cases} \quad (6)$$

$$\delta^{DE} = \begin{cases} 1 & \text{if spell ends with transition with a different employer} \\ 0 & \text{otherwise} \end{cases} \quad (7)$$

$$\delta^{JB} = \begin{cases} 1 & \text{if spell ends with joblessness} \\ 0 & \text{otherwise} \end{cases} \quad (8)$$

Then the contribution to the likelihood of the problem generated by an individual with a spell length of  $J$  intervals ( $J$  if the number of the last interval in which the agent is observed) is given by (the subscript  $C$  denotes censored spells):

$$\mathcal{L} = (\mathcal{L}_{SE})^{\delta^{SE}} (\mathcal{L}_{DE})^{\delta^{DE}} (\mathcal{L}_{JB})^{\delta^{JB}} (\mathcal{L}_C)^{(1-\delta^{SE}-\delta^{DE}-\delta^{JB})} \quad (9)$$

$$\text{where } \mathcal{L}_{SE} = \left[ \frac{h_{SE}(a_J)}{1-h_{SE}(a_J)} \right] S_{SE}(a_J) S_{DE}(a_J) S_{JB}(a_J)$$

The expressions for the other exit routes follow identically. Replacing them in equation (9), the likelihood contribution is given by (see Jenkins (2005) for details on the derivation):

$$\mathcal{L} = \left[ \frac{h_{SE}(a_J)}{1 - h_{SE}(a_J)} \right]^{\delta^{SE}} \left[ \frac{h_{DE}(a_J)}{1 - h_{DE}(a_J)} \right]^{\delta^{DE}} \left[ \frac{h_{JB}(a_J)}{1 - h_{JB}(a_J)} \right]^{\delta^{JB}} S_{SE}(a_J) S_{DE}(a_J) S_{JB}(a_J) \quad (10)$$

given that for the censored spells,  $\mathcal{L}_C = (S_{SE}(a_J) S_{DE}(a_J) S_{JB}(a_J))$ .

And therefore, the overall likelihood of the problem (where  $i$  designates an individual and  $J_i$  the last interval in which agent  $i$  is observed, which corresponds to the moment of transition or censoring) is given by:

$$\mathcal{L} = \prod_{i=1}^n \left[ \frac{h_{SE}(a_{J_i})}{1 - h_{SE}(a_{J_i})} \right]^{\delta^{SE}} \left[ \frac{h_{DE}(a_{J_i})}{1 - h_{DE}(a_{J_i})} \right]^{\delta^{DE}} \left[ \frac{h_{JB}(a_{J_i})}{1 - h_{JB}(a_{J_i})} \right]^{\delta^{JB}} \times \\ \times S_{SE}(a_{J_i}) S_{DE}(a_{J_i}) S_{JB}(a_{J_i}) \quad (11)$$

Additionally, the presence of unobserved heterogeneity is considered. In that case, if the continuous frequency hazard function is given by:

$$h(t, X_t|v) = h_0(t) \exp(\beta' X_t) v \quad (12)$$

where  $v$  is an unobservable individual effect, assumed to be a random variable with unit mean, finite variance and independently distributed from  $t$  and  $X$ , that only assumes positive values. In that case the hazard can be modeled as:

$$\ln(-\ln[1 - h(a_j, X_t)]) = \beta' X_t + \gamma_j + u \quad (13)$$

where  $u = \ln(v)$ .

This model will be estimated assuming both a Normal distribution for  $u$  with mean zero and a *Gamma* distribution for  $v$ .<sup>8</sup>

In Section (4.2), a discrete duration model is also used to model transitions between temporary contracts. However, in this case the model involves multiple spells, but for simplicity, the competing competing risk framework is not considered.

With multiple spells (but without considering competing risks), the contribution to the likelihood of the problem of a given individual that only experienced one spell is given by (see Willett and Singer (1995) for a detailed derivation):

$$\mathcal{L}_1 = \left[ \frac{h_1(a_{M1})}{1 - h_1(a_{M1})} \right]^{1 - c_{M1}} S_1(a_{M1}) \quad (14)$$

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<sup>8</sup>The case with *Gamma* distribution was estimated using the user-written Stata program `pgmhaz8`, developed by Stephen P.Jenkins, whereas the case with the Normal distribution was estimated directly with Stata routines.

where  $c_{M1} = 1$  if the spell is censored in interval  $M$ , the last one in which the individual is observed for the first spell.

More generally, for an individual experiencing  $k$  spells, the contribution for the likelihood is given by:

$$\mathcal{L} = \prod_{k=1}^{Mk} \left[ \frac{h_k(a_{Mk})}{1 - h_k(a_{Mk})} \right]^{1-c_{Mk}} S_k(a_{Mk}) \quad (15)$$

## 4. Estimation Results

### 4.1. Transitions out of temporary employment

*4.1.1. Overall Sample.* Table (A.8) presents the results of the estimation of the competing risks duration model for transitions out of temporary employment. In this case the hypothesis of unobserved heterogeneity was not considered. Robust standard errors (in order to correct for potential error heteroskedasticity) are presented in parenthesis.<sup>9</sup>

One note on coefficient interpretation: in a continuous proportional hazard model, the exponential of the coefficients can be interpreted as hazard ratios, the proportional change in the hazard rate when a covariate changes one unit relatively to the reference category. Given that the cloglog model corresponds to the discrete version of a continuous proportional hazard model, the exponential of coefficients in Table (A.8) can be interpreted as the hazard ratio of the corresponding continuous model. Therefore, a positive (negative) coefficient associated to a given covariate will imply that an increase in that covariate corresponds to a higher (lower) hazard than for the reference category.<sup>10</sup>

For the estimated models presented in Tables (A.8) to (A.13), a non-parametric approach was followed as regards the estimation of the hazard rate, with dummies representing regular intervals of duration of the temporary job. These durations are measured at the beginning of intervals, therefore corresponding to the minimum duration of the temporary job. The last dummy

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<sup>9</sup>The option for robust standard errors instead of country and year clustered errors was made for practical reasons – the inability of controlling for two clustering variables in Stata for this model – as well as for theoretical reasons. In particular, Cameron and Miller (2015) argue that cluster-specific fixed effects, like country and year control variables, may absorb systematic within-cluster correlation if it is believed that within-cluster correlation of errors is solely driven by a common shock process.

<sup>10</sup>Like in the multinomial logit model, the coefficients report to the risk of transition due to a specific exit route  $j$ , and do not allow for direct inference about the overall probability of exit from temporary employment, which is dependent on the coefficients estimated for all competing risks. That interpretation is only valid if the coefficient on the model for exit route  $j$  is the highest (or the lowest) of all the competing risks estimates for that covariate (see Thomas (1996)).

included covers minimum durations above 2.5 years. Due to legal limitations on the maximum duration of a temporary contract, closed intervals above that duration would lead to the exclusion of some countries from that parameter estimation sample.

As above mentioned, time-varying regressors enter the model in lagged terms. In addition, the variable related to labour market flexibility (IMD indicator) is standardized across countries to facilitate the interpretation of interaction effects.

A large part of spells is left-censored, given that the temporary job has already started when the individual enters the survey. To account for this feature, duration is measured using a combination of stock sampling and flow sampling. When an individual declares for the first time in the survey to be in a temporary job, elapsed duration in months is measured as the date of the survey interview minus the date of start of the current job. Afterwards a year is added to duration for each period of the survey in which the state of holding a temporary contract is maintained.<sup>11</sup> Durations in the sample are subject to some degree of measuring error resulting from possible recording errors in the survey.<sup>12</sup>

The second column of Table (A.8) shows estimation results for temporary workers who were promoted to permanent with the same employer. These exhibit positive duration dependence, which implies that the probability of promotion to a permanent contract increases with the duration of the job. This result is similar to the one obtained by other authors (Portugal and Varejão (2009) and Alba-Ramirez (1998), for example) and consistent with a situation in which worker and firm share investments in firm-specific skills, which progress with time on-the-job (Booth *et al.* (1997)). There is a peak of conversions for contracts that lasted more than two years and a half (this corresponds to the legal duration limit of temporary contracts for some countries at that time, including Belgium, Denmark and Portugal (OECD (2004))). Guell and Petrongolo (2007) find evidence for Spain of similar spikes in transitions at one and three years of contract duration. The fact that firms appear to explore to some extent the legal limits of the contracts suggests that firms take advantage

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<sup>11</sup>This strategy was pursued due to intra-firm transitions, for which the precise date of transition cannot be ascertained, and to limit problems of loss of observations and inconsistencies for other transitions. In the case of inter-firm transitions, information on small periods of joblessness between jobs could be retrieved from the database, but this route is not explored because the focus of this work is on more persistent states, corresponding to career changes. In addition, that approach would lead to further loss of observations. However, this implies that many short-duration transitions through joblessness are not captured, as well as many short duration contracts.

<sup>12</sup>In fact, some inconsistencies arise when measuring elapsed duration while entering the sample, given that, possibly due to recording errors, the date of start of the current job recorded for some individuals is posterior to the date of interview, resulting in a negative duration. An elapsed duration of some days was attributed to these cases, to avoid further loss of observations.

of the lower (actual and potential) firing costs associated with temporary contracts while it is possible to retain the option value of converting the worker to a permanent position.

Workers that have higher formal education show a higher hazard of promotion to a permanent contract than their counterparts. The same is true for temporary jobs in training-providing firms (the reference category are non-training workers in non-training firms), independently of whether the worker has actively taken advantage of training in the recent past. These findings are in line with the theory that both education and training are correlated with ability (European Commission (2008) and Autor (2001)), and therefore not only high ability workers could self-select into training firms, but also, as they reveal that ability over the duration of the temporary job, firms are more likely to promote them into permanent positions. On the contrary, there is a significant negative impact on the hazard for those workers which received training prior to transition while employed in a non-training firm. This suggests that this training was self-financed and had a more general nature than the one that could have been obtained inside the firm. Because general training provides skills which are transferable, it increases the workers ability to obtain other potential employers, and this could be seen by the firm offering the temporary contract as a signal that the worker could be searching for another job, or could simply become over-qualified for the current job. But on alternative, this could also be the result of low promotion prospects for the worker within his current firm.

An increase in labour market flexibility, measured as an increase in the IMD indicator, has a positive effect on the hazard to a permanent contract with the same employer. However, the equations include regressors that control for the interaction between IMD and the firm-worker pairs training status, and these show that the impact of the IMD indicator is only relevant for workers of non-training firms. That is, workers in training firms are somewhat insulated of the negative impact that a strict labour market legislation will have on transition to a permanent contract. This suggests that possibly training firms invest more in selection to find skilled workers whose expected productivity will cover the costs of training and hire with the ultimate objective of converting that temporary job into permanent.

Other significant coefficients signal that workers enrolled in the agricultural sector have a lower hazard than their counterparts of being promoted to permanent with the same employer, which possibly reflects the seasonal nature of many of the jobs in agriculture. In addition, being in the private sector and higher job satisfaction implies and increased hazard of transition.

As regards inter-firm transitions (Table A.8, column 3), duration dependence is negative but not significant, and therefore there is no large difference in the probability of leaving to obtain an open-ended with a new firm after only a few months of tenure or after two years. However, these transitions may occur due to different reasons over time, given that initially they may be

due to the realization of the poor quality of the match, and at a later stage motivated by the perception that promotion to an open-ended contract with the same employer will not be possible. In fact, Kahn (2012) finds that search intensity in a temporary job increases as the contract approaches its end.<sup>13</sup>

Job satisfaction does not have a significant impact on the hazard, while on the other hand a higher level of labour regulation flexibility has a positive effect on transitions with a new employer. This effect is in fact determined by group M countries. This result is in line with Gielen and Tatsiramos (2012), which show, using also ECHP data, although only for workers in permanent employment, that quits to better jobs are related to job satisfaction in the initial job, but that connection is weaker in countries with higher level of job protection. This results from higher mobility costs in more regulated labour markets, which prevent individuals with low job satisfaction from quitting, due to the low probability of finding a better suiting job. As concerns human capital effects, both formal education and worker training favour transitions to a permanent job with a new employer, independently of whether that training was obtained in a training firm (and thus has more likely a vocational nature) or not. However, the interaction coefficients between the IMD indicator and firm-worker training show that a change in labour market flexibility has no significant impact on the hazard of workers that received training within training firms, in the same vein as the result for intra-firm transitions. All other situations where there is some type of training involved imply an increase in the hazard associated to inter-firm transitions when there is less strict labour market regulation. Additionally, men have a higher probability of experiencing inter-firm transitions, in line with the findings by Booth *et al.* (1997) that job quitting behaviour is more pronounced for this group. Older workers, on the other hand, have lower hazards than their younger counterparts, possibly because mobility costs increase with age (Winkelmann and Zimmermann (1998)), while benefits to hiring firms decrease, given that they have less time to benefit from the new worker skills.

The view that a temporary job is an experience good (Melero (2004) and references herein) is supported by the negative duration dependence found for transitions to joblessness (Table (A.8), column 4). As both the firm and the worker assess the quality of the match and the job progresses the probability that the match is found to be poor decreases. Human capital determinants have an impact on transitions to joblessness that is to a large extent of symmetrical sign to those in the model for intra-firm transitions, given that education and presence in a training firm reduce the hazard to non-employment, while having received training while in a non-training firm increases it. However, the degree of EPL strictness does not have a significant effect on these transitions, independently of training status, in tandem with the unclear sign found in the

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<sup>13</sup>The coefficient closest to significance relates to a tenure of a minimum of 15 to 18 months, which is probably in most cases longer than the first renewal of the temporary contract but still before the end of its legal limit, which supports this view.

literature for the impact of EPL on unemployment levels (see Boeri and van Ours (2013) and Blanchard and Portugal (2001), among others). Smaller firms are more likely to originate transitions into joblessness, possibly because in these cases the end of the job is more directly connected with the survival of the firm itself. The lower hazard of men into joblessness is possibly associated with higher incidence of transitions of women into inactivity due to family reasons.

A feature which is common to the three competing destinations is the strong and negative impact on the hazard of having had at least one previous temporary contract. This regressor tries to control for initial conditions, limiting the problem of the sample of unavailability of the whole career history of workers. Having at least one previous temporary contract has a large negative impact on the hazard of leaving temporary employment, particularly through joblessness. Moreover, this effect is increasing in the number of previous temporary jobs held (results available upon request). This feature suggests that some workers may be trapped in a succession of temporary employment cycles. Section (4.2) analyses the career trajectories of these workers in more detail.<sup>14</sup>

Results in Table (A.9) show the same model specifications, but considering the possibility of unobserved heterogeneity, assuming that the error terms follow a Normal distribution. The possibility of errors following a *Gamma* distribution was also tested, but given that it was not possible to obtain convergence for the model of intra-firm transitions and that remaining results were very similar to those obtained with the normal distribution, they are not presented here. The value for  $\rho$  defines the percentage of the variance determined by intra-class variance (in this case individuals) and therefore the relevance of the estimated unobserved heterogeneity effects. The estimates presented suggest that unobserved heterogeneity is not relevant for workers which transition to permanent with the same employer but has some influence for other modes of exit. Likelihood ratio tests for the significance of  $\rho$  can not be computed for these estimates given the assumption of clustering in the data.<sup>15</sup> However, test

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<sup>14</sup>Other potential explanatory variables that were included in the models but revealed not significant included country level measures of product market regulation, given that Autor (2001) concludes that firms provide more general training as market competition increases. In addition, whether the worker lives in a couple, job status (supervisory, intermediate and non-supervisory) and part-time status were also considered as regressors and found not significant.

<sup>15</sup>According to information from Stata support, available on <http://www.stata.com/support/faqs/statistics/likelihood-ratio-test/>, the likelihood associated with maximum likelihood estimates for clustered data is not a true likelihood; i.e., it is not the distribution of the sample, because when there is clustering, individual observations are no longer independent, and the likelihood does not reflect this. Therefore, it should not be used for variance estimation using standard formulas.

results computed disregarding this issue suggest that  $\rho$  is not significant for intra-firm transitions but is for other destination states.

The consequences for the results of not considering unobserved heterogeneity are those usually found in the literature, namely an underestimation of duration dependence for most horizons and of the absolute value of coefficient estimates. The impacts on estimated coefficients and their significance are however very limited, possibly due to the use of a flexible baseline hazard specification (Jenkins (2005)). Despite this, given that unobserved heterogeneity appears to be relevant, it is taken into account in the remainder of results.

*4.1.2. Results by country group.* Tables (A.10) to (A.12) show the results of the estimation of the competing risk models for country groups M and L, respectively. Although in many cases results are qualitatively similar for both groups, the significance or even the sign of some coefficients differs across them. This section focuses on the most relevant of these differences.

For workers that obtain an open-ended contract with the same employer (Table (A.10)), the impact of higher formal education is only significant for group M countries, possibly because in some of these countries it is still attained by a relatively low share of the population. The positive interaction effects of receiving training and being in a training firm found for the overall sample stem from country group L, while for country M groups, these effects are not statistically significant, which can be related to the low incidence of vocational training in these countries (CEDEFOP (2010)). However, for country group M training status impacts on the effect that the degree of labour market regulation has on transitions. As mentioned earlier for the overall sample, workers that are enrolled in temporary contracts in training firms do not benefit so much in terms of increased hazard from higher labour market flexibility. On the other hand, labour market regulation does not have any significant effect on duration in country group L.

Concerning workers which transition to a permanent job with a new employer (Table (A.11)), as mentioned in the previous subsection, results seem to confirm those in Gielen and Tatsiramos (2012) given that job satisfaction has a negative significant impact on transitions to a new employer in country group L and labour market regulation measures do not have in general a significant effect, while the opposite happens for group M countries. This result suggests that an open-ended contract obtained with a new employer may ensue a voluntary quit for group L, while for group M countries it may reflect the end of the temporary contract, and therefore be more affected by institutional than individual effects. Possibly due to this, the negative impact on the hazard of age and positive impact for male workers stems from group L countries only. The impact of receiving training prior to transition is not significant for any country group individually (although it has a higher p-value for group L countries), contrarily to what was found for the overall sample.

In the case of transitions to joblessness (Table (A.12)), there do not appear to be major differences between the two country groups, with the exception of the indicator of labour market regulation, which has a positive and significant sign in the case of group M. Given the finding that labour reallocation is larger in countries (or labour market segments) with less strict regulation, job-to-job transitions will be more frequent, implying more periods of joblessness.

As for the overall sample, for all country groups and transition types there is a negative impact in the hazard associated with having at least one temporary job prior to the current one. Given the consistency of this result, the career paths of temporary workers up to the moment of transition are analysed in the next section.

#### ***4.2. Transitions within temporary employment***

In order to access what determines a job history composed of several temporary jobs, a duration model with repeated spells is estimated for transitions from temporary to temporary job for the sample of the previous section. This may also help shed some light on the impact of policies that extend the maximum legal duration of temporary contracts, given that this will affect the career history of workers.

For simplicity, the model estimated is a discrete duration model identical to the one in the previous section but with repeated spells, in which the dependent variable corresponds to a transition from a temporary contract to another. Only one possible destination is considered, due to computational simplicity. However, the possibility that a temporary worker was laid off from his previous job, and therefore endured at least a small period of unemployment between jobs is controlled for in estimation indirectly, by including as a regressor the reason why the worker left the previous job. Given that the indeterminateness regarding the moment of transition that affect the data used in the previous section is not an issue in this case, the minimum duration for each temporary job is obtained in the same way as described for initial elapsed duration in the previous section, i.e., by using information on the date of survey interview and date of start of current job.

The set of regressors considered is identical to the one in the previous section, but many revealed not significant, notably the impact of labour market regulation and human capital variables. Moreover, additional regressors were considered, namely the reason for leaving the previous job, given the evidence in Booth *et al.* (1997) that the recent history of job mobility impacts tenure at the current job. The job status held in each job (supervisory, intermediate or non-supervisory) was also included, given that it was found to be significant in Gagliarducci (2005), but was not in this case.

Results in Table (A.13) show that with the duration of a temporary contract, the probability of moving to another one decreases, although this difference is only significant for durations above one year, and in country group

L, for durations above 18 months. This result is in line with the findings of Booth *et al.* (1997) (for all types of job changes), that job tenure increases as job accumulate.

There is also negative occurrence dependence, given that being in the second temporary job episode of the survey decreases the hazard of moving to the next one.<sup>16</sup> Therefore, experience both in the current temporary job or in the previous one appears to be valuable to employers, leading temporary contracts to be longer, and possibly renewed.

As concerns previous work history, the reasons to leave the previous job displayed in Table (A.2) that are not directly job related, i.e., all aside firm quit to a better job, layoff ("obliged to stop by employer") or end of contract were aggregated in a categorical variable labelled "other". Although results are not statistically significant, they show a positive impact on the hazard of moving to another temporary job for workers which left their previous job due to contract end.<sup>17</sup> Assuming that unobserved heterogeneity is controlled for, the impact of previous job history should not reflect individual characteristics, and possibly suggests some signalling role that job history may have for employers.

Results are not sharply different across country groups. However, negative occurrence dependence is only relevant for group M countries, and duration dependence effects are much stronger, suggesting a stronger importance of career history for this group. The effect of gender (men have a higher hazard of transition to another temporary job) and of sector of activity (being in the services sector reduces the probability of changing temporary job) are only significant for country group M. On the other hand, there is a positive effect on the duration of a given temporary job for older workers, higher formal education and of working in the private sector only from country group L.

#### ***4.3. Number of temporary jobs held by a worker***

As a further complementary analysis, the overall number of temporary contracts held by workers over the period of the sample is analysed. Given that some worker and firm characteristics favour transitions to permanent employment and/or longer durations of temporary contracts, these should consequently imply a lower count of temporary contracts. To this purpose, a truncated negative binomial model where the dependent variable is the number of temporary contracts was estimated on the basis of the sample of Section (4.2). Given the characteristics of the sample used, each worker has at least one

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<sup>16</sup>The fact that there is available information regarding the previous job of individuals experiencing their first temporary job episode in the sample shows that the beginning of the survey does not coincide in many cases with the start of the workers career.

<sup>17</sup>The non-significance of this result is possibly due to the limited number of observations, given that including observations for France and the UK, which was possible but not pursued for consistency with the previous section, would render this coefficient significant.

temporary contract, and therefore the model is truncated at zero. The negative binomial model is adopted given its capacity to accommodate overdispersion of the data. This model can be interpreted as a mixture distribution where the count variable has a Poisson distribution but there is unobserved heterogeneity in the data, which can be modelled using a *Gamma* distribution (Cameron and Trivedi (2005)). The assumption of overdispersion appears reasonable given the observation of the count variable histogram, which shows an apparent excessive count of ones, and was confirmed through a test on estimation output.

Therefore, if the random count variable  $y$  has a Poisson distribution with parameter  $\lambda = \mu\nu$ , where  $\mu$  is a deterministic component and  $\nu$  is a random variable characterized by a *Gamma* distribution with variance  $\alpha$ , the marginal density of  $y$  is given by the following negative binomial distribution:

$$h(y|\mu, \alpha) = \frac{\Gamma(\alpha + y)}{\Gamma(\alpha)\Gamma(y + 1)} \left( \frac{\alpha}{\alpha + \mu} \right)^\alpha \left( \frac{\mu}{\mu + \alpha} \right)^y \quad (16)$$

Estimation results for this model, both for the overall sample and for the country group breakdown are presented in Table (A.14). Standard deviations of the coefficients are presented in normal brackets and marginal effects in square brackets.<sup>18</sup> The additional output  $\ln(\alpha)$  refers to the estimate of the logarithm of  $\alpha$ , the parameter that accounts for overdispersion of the data in the negative binomial distribution. Therefore, a test of  $\alpha = 0$  can be seen as a test of validation of the overdispersion assumption and consequently of the choice for the negative binomial model.<sup>19</sup> Stata provides a likelihood ratio test for the significance of  $\alpha$  that takes into account the truncated distribution of  $\alpha$ . The probability of occurrence of a value more extreme than the test statistic is described as "p-value of LR test for  $\alpha = 0$ " in Table (A.14). Results do not lead to the rejection of the overdispersion hypothesis, although for group L countries only at the 10 per cent significance level.

The set of regressors considered encompasses that of previous sections whenever possible. In this case, interaction effects between training received by the worker and supplied by the firm were not included, given that they were found to be not significant. In the case of variables whose values change across jobs, like sector of activity or size of the firm, the values attributed to the first temporary job were considered. This was not only the approach followed in Winkelmann and Zimmermann (1998) but also the most reasonable possibility given the large number of observations corresponding to only one job.

Results in the second column of Table (A.14) confirm some of the results of the previous sections, in the sense that some worker and firm characteristics that were found in Section (4.1) to determine an increase in the probability

<sup>18</sup>Marginal effects are evaluated at the average of continuous regressors and at the reference categories of categorical variables.

<sup>19</sup>However, because  $\alpha$  must be greater than or equal to zero, the standard normal will not be the correct asymptotic distribution of  $\alpha$  (Long and Freese (2001)).

of transition to permanent employment and to decrease the probability of transition to unemployment are also found to reduce the expected number of temporary jobs held by a worker. Additionally, some factors found in Section (4.2) to increase the duration of a temporary job are also found to reduce the count of temporary jobs. Therefore, a lower number of temporary jobs results from the joint effects of higher probability of transition to permanent positions and from longer durations of the temporary contracts actually held.

In particular, higher education levels increase the probability of transitions to permanent employment and decreases the hazard of transition to joblessness. Correspondingly, higher education has an (almost significant) negative impact on the number of temporary contracts held. When divided by country groups (columns 3 and 4 of Table (A.14)), this result appears to stem from countries with more segmented labour markets, where education levels above basic imply a decline of 0.1 in the average expected number of temporary jobs held. For country group L, a higher education level favours a higher number of temporary contracts. This may be related to fundamental differences in the use and purposes of temporary contracts in both groups of countries: as a screening device or a buffer for shocks in segmented markets and as part of a vocational training system for other countries.

As regards training variables, receiving training is not significant in explaining the number of temporary jobs held. However, being in a training firm in the first temporary job has a negative impact on the number of jobs held: workers in these firms have an expected 0.07 lower count of temporary jobs. A similar result is found across country groups, although it is only significant at the 10 per cent level for less segmented economies.

According to results in Section (4.1), being in the private sector also favours transitions to permanent employment and discourages transitions to joblessness. In fact, being in this sector is also significant as regards an expected reduction in the number of temporary jobs held. Looking at country group results, this result appears to stem from non-segmented economies, while it is non-significant for segmented economies. Again, this may be related to public training and education policies that differ across country groups. Working in the services sector in the first temporary job recorded in the sample implies a reduction in the expected count of 0.16 when compared to working agriculture, in line with what the transitions analysis suggested. This results apparently stems from country group M, where this effect is even stronger. However, for the industrial sector this result is only close to significant. Job satisfaction in the first temporary job held also reduces the expected number of temporary jobs for the overall sample, in line with its expected impact on transitions obtained in Section (4.1). However, this regressor is not significant for country groups. Finally, working in an intermediate sized firm ((20-99) employees) in the first job captured by the survey tends to lead to a higher number of temporary jobs, which is in line with the previous conclusion that larger firms reduce the hazard of transition to joblessness. These results suggest that, with the

exception of education, firm or firm-related characteristics (like job satisfaction) appear to be more determinant than individual characteristics to the number of temporary contracts held by workers.

## 5. Conclusion

This work analysed transitions from temporary to permanent contracts in European countries, with a special focus on human capital aspects and their interaction with labour market institutions. A new perspective was adopted given that the possibility of obtaining an open-ended contract through a promotion with the current employer or having to change job to obtain it were analysed separately. Results support the view that these two channels of transition are similar in some aspects, namely that they both benefit from the education of workers and from increases in labour market flexibility, as measured by the IMD. However, they also present differences, namely regarding duration dependence, and interactions between labour market flexibility and different aspects of training. Intra-firm transitions from a temporary to an open-ended contract are facilitated for workers enrolled in training firms, and these transitions appear to be somewhat protected from the effects of changes in labour market protection. On the other hand, the training characteristics of the worker and not of the firm appear to be relevant in the case of inter-firm transitions. The breakdown of results across country groups indicate that in segmented labour markets institutional aspects play a large role in transitions, rendering individual aspects in some cases a more secondary role.

In addition, results show that workers which experience a sequence of temporary contracts tend to be trapped to some extent in that segment of the labour market, although their probability of transition into joblessness is also smaller.

An analysis of the number of temporary contracts held by workers on the basis of a count model allows to cross-check some of these results, reinforcing the importance of firm characteristics in the careers of temporary workers.

There some margins for improvement in the current work. In particular, competing risks in duration analysis were assumed to be independent, which constitutes a limitation, despite being a feature common in literature, not only for tractability reasons, but also because a dependent risk model is not identified with single-spell data without additional structure (van den Berg (2005)). In addition, further research would benefit from a disaggregated analysis of labour market regulations into those affecting temporary and permanent employment, which was not possible with the available data. This would allow to ascertain whether differences observed between country groups stem from overall higher levels of employment protection in southern European countries or from the differences in protection between the two segments, ie., what is the importance of absolute and relative strictness of EPL.

**Appendix: Tables**

Country	1995-2001				2008-2012
	permanent	fixed-term	none	other	temporary employment <sup>a</sup>
Spain	64.1	29.7	3.8	2.4	25.7
Finland	84.2	13.5	1.7	0.5	15.3
Portugal	80.0	10.6	3.3	6.1	22.1
Belgium	89.1	8.8	0.4	1.6	8.3
Greece	76.8	8.6	14.0	0.6	11.5
Italy	86.9	7.9	3.2	2.0	13.1
Ireland	82.1	6.1	8.7	3.1	9.4
Denmark	88.3	5.6	5.5	0.6	8.6
Austria	91.7	4.9	0.4	3.0	9.2
Netherlands	89.4	3.3	0.7	6.6	18.6

TABLE A.1. Composition of employment by contract type

Notes:<sup>a</sup> Share in dependent employment, OECD data. Data sorted in descending order by share of fixed-term contracts in 1995-2001.

Sources: ECHP and OECD.

	Type of contract				Total	Observations
	Perma- nent	Fixed- term	None	Other		
<b>Higher level of education completed</b>						
Third level	23.5	24.4	8.2	12.4	22.7	51818
Secondary level second stage	37.6	30.6	31.6	25.9	36.3	83009
Secondary level less than second stage	38.9	45.1	60.2	61.8	41.0	93818
<b>Skills for a more demanding job?</b>						
Yes	52.7	58.8	54.5	48.1	53.3	117676
No	47.3	41.2	45.5	51.9	46.7	103196
<b>Enrolment in Education or training</b>						
Yes	24.9	30.9	19.3	19.7	25.2	58293
No	75.1	69.1	80.7	80.3	74.8	173370
<b>Type of course attended</b>						
General+Vocational+Language	0.9	2.0	0.8	0.5	1.1	615
General+Vocational	4.7	5.9	6.4	11.0	5.1	2946
General+Language	1.8	5.7	4.9	2.6	2.4	1416
Vocational+Language	11.9	7.9	3.0	4.2	10.9	6363
General	10.1	29.4	48.0	33.3	14.3	8307
Vocational	58.3	38.4	26.9	38.8	54.3	31681
Language	12.3	10.6	10.0	9.6	11.9	6965
<b>Reason for end of previous job</b>						
Obtained better Job	43.1	23.0	18.8	27.8	38.6	49403
Obliged to stop by employer	15.1	12.9	21.0	13.4	15.0	19235
End of contract	13.4	44.0	27.0	22.4	18.7	23891
Sale/closure of family business	2.0	1.7	3.8	1.8	2.1	2626
Marriage	10.1	2.4	5.9	5.6	8.6	11064
Children related	2.9	2.5	4.1	4.4	2.9	3770
Looking after other persons	0.1	0.1	0.3	0.2	0.1	168
Partner' job required moving	0.6	0.4	0.3	0.5	0.5	654
Study, national service	3.4	4.8	7.2	4.1	3.8	4878
Illness	1.0	1.3	2.4	2.9	1.2	1551
Retirement	0.8	0.6	1.2	0.7	0.8	969
Other	7.5	6.3	8.1	16.3	7.7	9863
Observations	47662	7569	1693	1369	58293	

TABLE A.2. Employer characteristics by contract type

Note: the statistics presented are the average proportion of the sample corresponding to each category, with the exception of job satisfaction, for which the average sample value is reported.

Source: ECHP.

Country	Remain Temporary	Intra-firm transition	Inter-firm transition	Joblessness	Observations
Spain	56.2	17.5	4.3	22.1	3917
Portugal	54.2	24.8	6.6	14.5	1361
Finland	45.6	16.7	8.5	29.2	945
Greece	53.9	18.0	8.8	19.4	434
Italy	44.1	20.2	10.3	25.4	891
Belgium	51.0	26.8	12.1	10.1	298
Austria	36.7	33.3	14.4	15.5	264
Ireland	39.2	26.5	18.0	16.3	245
Denmark	34.8	23.3	21.5	20.4	270
Netherlands	39.8	17.7	25.8	16.8	322
Total	51.0	20.0	8.1	20.9	8947
Observations	4562	1791	726	1868	8947

TABLE A.3. Transitions from temporary jobs

Note: Data sorted in ascending order by share of transitions to tenure with a new employer.  
Source: ECHP.

	1995-2001	2008-2012
Italy	2.4	3.7
Belgium	3.1	3.3
Spain	3.4	3.4
Portugal	3.9	3.9
Austria	4.1	5.4
Greece	4.2	3.6
Netherlands	4.5	4.4
Finland	4.6	5.0
Ireland	5.9	5.2
Denmark	7.6	8.1

TABLE A.4. IMD- Labour regulations indicator

Notes: Data sorted in ascending order by 1995-2001 values.  
A higher value of the indicator implies higher perceived flexibility in the economy.  
Source: IMD World Competitiveness Online.

Variable	Overall	Remain temporary	Intra-firm transition	Inter-firm transition	Joblessness
Duration in months:					
]0, 3[	0.20	0.18	0.13	0.25	0.28
[3, 6[	0.15	0.14	0.10	0.15	0.20
[6, 9[	0.10	0.10	0.09	0.12	0.11
[9, 12[	0.08	0.07	0.08	0.09	0.08
[12, 15[	0.11	0.11	0.13	0.11	0.10
[15, 18[	0.08	0.08	0.09	0.06	0.06
[18, 21[	0.05	0.05	0.06	0.04	0.04
[21, 24[	0.04	0.04	0.05	0.03	0.02
[24, 30[	0.08	0.09	0.10	0.06	0.05
$\geq 30$	0.12	0.14	0.17	0.08	0.05
First job	0.58	0.39	0.75	0.77	0.80
Not first job	0.42	0.61	0.25	0.23	0.20
Age [16,30[	0.54	0.53	0.54	0.60	0.53
Age [30,45[	0.33	0.35	0.35	0.32	0.29
Age [45,65]	0.13	0.13	0.12	0.08	0.18
Firm size <20 workers	0.48	0.46	0.48	0.44	0.54
Firm size 20-99 workers	0.28	0.30	0.27	0.26	0.27
Firm size >99 workers	0.24	0.24	0.25	0.29	0.19
Secondary education or more	0.53	0.52	0.58	0.64	0.47
Less than secondary education	0.47	0.48	0.42	0.36	0.53
Training worker	0.34	0.32	0.33	0.44	0.34
No training worker	0.66	0.68	0.67	0.56	0.66
Training firm	0.24	0.24	0.30	0.31	0.18
No training firm	0.76	0.76	0.70	0.69	0.82
Training worker+firm	0.15	0.14	0.18	0.21	0.11
Training worker+no training firm	0.18	0.17	0.15	0.22	0.24
No training worker+training firm	0.09	0.09	0.12	0.10	0.07
No training worker+no training firm	0.57	0.59	0.55	0.47	0.59
Men	0.52	0.54	0.52	0.54	0.47
Women	0.48	0.46	0.48	0.46	0.53
Agriculture	0.04	0.05	0.02	0.03	0.06
Industry	0.33	0.34	0.35	0.30	0.29
Services	0.63	0.62	0.63	0.67	0.65
Private sector	0.73	0.72	0.77	0.73	0.71
Public sector	0.27	0.28	0.23	0.27	0.29
Job satisfaction	3.88	3.85	4.00	4.01	3.77
Observations	8947	4562	1791	726	1868

TABLE A.5. Descriptive statistics - Overall Sample

Note: the statistics presented are the average proportion of the sample corresponding to each category, with the exception of job satisfaction, for which the average sample value is reported.

Source: ECHP.

Variable	Overall	Remain temporary	Intra-firm transition	Inter-firm transition	Joblessness
Duration in months:					
]0, 3[	0.19	0.18	0.11	0.20	0.27
[3, 6[	0.14	0.14	0.08	0.13	0.18
[6, 9[	0.09	0.09	0.08	0.13	0.10
[9, 12[	0.07	0.07	0.08	0.09	0.09
[12, 15[	0.11	0.11	0.13	0.13	0.11
[15, 18[	0.08	0.08	0.09	0.06	0.06
[18, 21[	0.05	0.06	0.06	0.05	0.04
[21, 24[	0.04	0.04	0.05	0.03	0.03
[24, 30[	0.09	0.09	0.11	0.07	0.06
$\geq 30$	0.13	0.14	0.20	0.11	0.06
First job	0.54	0.36	0.73	0.74	0.77
Not first job	0.46	0.64	0.27	0.26	0.23
Age [16,30[	0.57	0.56	0.58	0.65	0.55
Age [30,45[	0.31	0.32	0.32	0.27	0.29
Age [45,65]	0.12	0.12	0.10	0.07	0.16
Firm size <20 workers	0.51	0.49	0.52	0.52	0.56
Firm size 20-99 workers	0.29	0.30	0.28	0.27	0.27
Firm size >99 workers	0.20	0.22	0.20	0.21	0.17
Secondary education or more	0.43	0.42	0.49	0.57	0.37
Less than secondary education	0.57	0.58	0.51	0.43	0.63
Training worker	0.27	0.26	0.26	0.36	0.27
No training worker	0.73	0.74	0.74	0.64	0.73
Training firm	0.14	0.14	0.18	0.17	0.11
No training firm	0.86	0.86	0.82	0.83	0.89
Training worker+firm	0.07	0.07	0.09	0.12	0.05
Training worker+no training firm	0.19	0.19	0.17	0.25	0.22
No training worker+training firm	0.07	0.07	0.09	0.05	0.06
No training worker+no training firm	0.66	0.67	0.65	0.59	0.67
Men	0.57	0.59	0.56	0.56	0.51
Women	0.43	0.41	0.44	0.44	0.49
Agriculture	0.05	0.06	0.03	0.04	0.07
Industry	0.38	0.40	0.39	0.34	0.33
Services	0.57	0.54	0.58	0.63	0.60
Private sector	0.82	0.82	0.85	0.82	0.80
Public sector	0.18	0.18	0.15	0.18	0.20
Job satisfaction	3.73	3.73	3.85	3.79	3.59
Observations	6169	3330	1202	349	1288

TABLE A.6. Descriptive statistics - Group M Countries

Note: the statistics presented are the average proportion of the sample corresponding to each category, with the exception of job satisfaction, for which the average sample value is reported.

Source: ECHP.

Variable	Overall	Remain temporary	Intra-firm transition	Inter-firm transition	Joblessness
Duration in months:					
]0, 3[	0.21	0.16	0.16	0.29	0.31
[3, 6[	0.16	0.14	0.14	0.18	0.23
[6, 9[	0.12	0.12	0.12	0.11	0.14
[9, 12[	0.08	0.09	0.08	0.08	0.07
[12, 15[	0.11	0.11	0.13	0.10	0.09
[15, 18[	0.07	0.08	0.09	0.06	0.04
[18, 21[	0.04	0.04	0.06	0.03	0.03
[21, 24[	0.03	0.03	0.06	0.03	0.02
[24, 30[	0.07	0.09	0.07	0.05	0.03
≥ 30	0.10	0.14	0.09	0.06	0.03
First job	0.67	0.48	0.80	0.79	0.88
Not first job	0.33	0.52	0.20	0.21	0.12
Age [16, 30[	0.46	0.42	0.44	0.56	0.49
Age [30, 45[	0.38	0.42	0.41	0.36	0.28
Age [45, 65]	0.16	0.16	0.15	0.08	0.22
Firm size <20 workers	0.41	0.40	0.39	0.37	0.49
Firm size 20-99 workers	0.28	0.31	0.25	0.26	0.26
Firm size >99 workers	0.31	0.29	0.36	0.37	0.24
Secondary education or more	0.76	0.80	0.77	0.71	0.68
Less than secondary education	0.24	0.20	0.23	0.29	0.32
Training worker	0.49	0.48	0.47	0.50	0.50
No training worker	0.51	0.52	0.53	0.50	0.50
Training firm	0.46	0.49	0.55	0.44	0.33
No training firm	0.54	0.51	0.45	0.56	0.67
Training worker+firm	0.32	0.34	0.37	0.31	0.23
Training worker+no training firm	0.17	0.14	0.10	0.20	0.27
No training worker+training firm	0.14	0.15	0.18	0.14	0.10
No training worker+no training firm	0.37	0.37	0.35	0.36	0.40
Men	0.42	0.39	0.44	0.52	0.38
Women	0.58	0.61	0.56	0.48	0.62
Agriculture	0.02	0.02	0.02	0.02	0.03
Industry	0.21	0.17	0.26	0.26	0.21
Services	0.77	0.81	0.72	0.72	0.76
Private sector	0.53	0.45	0.62	0.64	0.52
Public sector	0.47	0.55	0.38	0.36	0.48
Job satisfaction	4.22	4.19	4.32	4.23	4.18
Observations	2778	1232	589	377	580

TABLE A.7. Descriptive statistics - Group L Countries

Note: the statistics presented are the average proportion of the sample corresponding to each category, with the exception of job satisfaction, for which the average sample value is reported.

Source: ECHP.

VARIABLES	Same employer	Diferent employer	Joblessness
Duration in months:			
[3, 6[	0.1166 (0.1004)	-0.1477 (0.1212)	-0.1212* (0.0677)
[6, 9[	0.3739*** (0.1042)	0.0416 (0.131)	-0.4275*** (0.0828)
[9, 12[	0.4661*** (0.1101)	-0.0842 (0.1498)	-0.3782*** (0.0935)
[12, 15[	0.8105*** (0.0953)	-0.0746 (0.1353)	-0.4177*** (0.086)
[15, 18[	0.8244*** (0.1058)	-0.2646 (0.1705)	-0.6034*** (0.1081)
[18, 21[	0.8403*** (0.1178)	-0.199 (0.2033)	-0.7248*** (0.1301)
[21, 24[	0.9813*** (0.1253)	-0.1618 (0.226)	-0.8303*** (0.153)
[24, 30[	0.9654*** (0.1045)	-0.2111 (0.1712)	-0.7186*** (0.1127)
≥ 30	1.1300*** (0.0948)	-0.1453 (0.1538)	-1.1605*** (0.114)
Not first job	-0.9981*** (0.0571)	-0.7289*** (0.09)	-1.2463*** (0.0595)
Age [30,45[	0.0744 (0.0551)	-0.1447* (0.0877)	-0.1789*** (0.0567)
Age [45,65]	-0.0508 (0.0815)	-0.6825*** (0.1516)	0.1749** (0.0691)
Firm size 20-99 workers	-0.0684 (0.0587)	-0.0669 (0.0941)	-0.1115** (0.0559)
Firm size >99 workers	-0.0506 (0.0632)	-0.0323 (0.0986)	-0.2130*** (0.0657)
Secondary education or more	0.2581*** (0.0576)	0.1978** (0.091)	-0.4585*** (0.056)
Training worker+firm	0.2361*** (0.0814)	0.2972** (0.13)	-0.5205*** (0.0972)
Training worker+no training firm	-0.1559** (0.0784)	0.2063* (0.1066)	0.1377** (0.0661)
No training worker+training firm	0.2769*** (0.0839)	-0.0932 (0.1492)	-0.2765*** (0.0986)
IMD Labour market Regulations	0.3716*** (0.0931)	0.5281*** (0.1352)	0.0971 (0.0964)
IMD Training worker+firm	-0.3274*** (0.0823)	-0.3641*** (0.1058)	0.0845 (0.0989)
IMD Training worker+no training firm	-0.157 (0.0997)	-0.13 (0.1134)	0.0554 (0.088)
IMD No training worker+training firm	-0.2424** (0.0981)	-0.1172 (0.1258)	-0.0831 (0.116)
Men	0.0543 (0.0522)	0.3002*** (0.0803)	-0.2295*** (0.0512)
Industry	0.5451*** (0.161)	0.2307 (0.2335)	-0.2235** (0.1069)
Services	0.4417*** (0.1607)	0.2818 (0.2283)	-0.1213 (0.1052)
Job satisfaction	0.1652*** (0.0301)	-0.0199 (0.0435)	-0.1763*** (0.0276)
Private sector	0.5139*** (0.0676)	0.3104*** (0.0971)	-0.2452*** (0.0608)
Constant	-3.6851*** (0.3574)	-2.5842*** (0.4979)	0.7402** (0.3406)
Observations	8,947	8,947	8,947
Country dummies	yes	yes	yes
Time dummies	yes	yes	yes
Log-pseudolikelihood	-4078	-2280	-3973

TABLE A.8. Transitions - Results without unobserved heterogeneity

Robust standard errors in parentheses.

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1.

VARIABLES	Same employer	Diferent employer	Joblessness
Duration in months:			
[3, 6[	0.1166 (0.1003)	-0.1494 (0.136)	-0.1259* (0.0716)
[6, 9[	0.3739*** (0.1041)	0.0641 (0.1485)	-0.4443*** (0.0867)
[9, 12[	0.4661*** (0.11)	-0.0594 (0.1682)	-0.3885*** (0.0981)
[12, 15[	0.8105*** (0.0972)	0.023 (0.1554)	-0.3803*** (0.0934)
[15, 18[	0.8245*** (0.1082)	-0.1668 (0.1953)	-0.5726*** (0.1136)
[18, 21[	0.8404*** (0.1207)	-0.0802 (0.2311)	-0.6988*** (0.1352)
[21, 24[	0.9814*** (0.1273)	-0.0497 (0.2557)	-0.8167*** (0.1578)
[24, 30[	0.9655*** (0.1135)	-0.0187 (0.2071)	-0.6619*** (0.1214)
$\geq 30$	1.1303*** (0.1188)	0.0702 (0.1972)	-1.0957*** (0.1262)
Not first job	-0.9981*** (0.0623)	-0.8352*** (0.1164)	-1.3165*** (0.0726)
Age [30,45[	0.0744 (0.0565)	-0.1477 (0.1002)	-0.1858*** (0.0599)
Age [45,65]	-0.0508 (0.0813)	-0.7493*** (0.1716)	0.1871** (0.0734)
Firm size 20-99 workers	-0.0684 (0.0583)	-0.075 (0.1057)	-0.1170* (0.0597)
Firm size >99 workers	-0.0506 (0.0628)	-0.036 (0.1135)	-0.2213*** (0.0708)
Secondary education or more	0.2581*** (0.0579)	0.2398** (0.1045)	-0.4864*** (0.0611)
Training worker+firm	0.2361*** (0.0838)	0.3316** (0.1457)	-0.5437*** (0.1023)
Training worker+no training firm	-0.1559** (0.0775)	0.2314* (0.1211)	0.1420** (0.0695)
No training worker+training firm	0.2769*** (0.0829)	-0.0995 (0.1666)	-0.2906*** (0.1046)
IMD Labour market Regulations	0.3716*** (0.0933)	0.5968*** (0.1542)	0.1056 (0.1017)
IMD Training worker+firm	-0.3274*** (0.0853)	-0.4309*** (0.1326)	0.0804 (0.1024)
IMD Training worker+no training firm	-0.157 (0.0999)	-0.1361 (0.1357)	0.0584 (0.0925)
IMD No training worker+training firm	-0.2424** (0.0969)	-0.1548 (0.1488)	-0.0877 (0.122)
Men	0.0543 (0.052)	0.3433*** (0.0946)	-0.2522*** (0.0561)
Industry	0.5451*** (0.1588)	0.2778 (0.2641)	-0.2379** (0.1163)
Services	0.4418*** (0.159)	0.3137 (0.2577)	-0.1316 (0.1141)
Job satisfaction	0.1652*** (0.0301)	-0.0132 (0.0492)	-0.1845*** (0.0297)
Private sector	0.5140*** (0.0704)	0.3343*** (0.1111)	-0.2627*** (0.0659)
Constant	-3.6854*** (0.3635)	-3.1474*** (0.6032)	0.7546** (0.3581)
Observations	8,947	8,947	8,947
Country dummies	yes	yes	yes
Time dummies	yes	yes	yes
$\rho$	0.000145	0.433	0.127
Log-pseudolikelihood	-4078	-2277	-3972

TABLE A.9. Transitions - Results with unobserved heterogeneity

Robust standard errors in parentheses.

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1.

VARIABLES	Group M	Group L
Duration in months:		
[3, 6[	-0.0249 (0.1345)	0.3203** (0.1592)
[6, 9[	0.3264** (0.136)	0.4397** (0.175)
[9, 12[	0.5595*** (0.1359)	0.3238 (0.2007)
[12, 15[	0.8899*** (0.1405)	0.6921*** (0.175)
[15, 18[	0.8345*** (0.151)	0.8430*** (0.2022)
[18, 21[	0.8306*** (0.1712)	1.0660*** (0.2351)
[21, 24[	0.9767*** (0.1734)	1.2425*** (0.2447)
[24, 30[	1.1344*** (0.1896)	0.6910*** (0.2254)
≥ 30	1.3625*** (0.2624)	0.7686*** (0.2351)
Not first job	-1.1371*** (0.1231)	-0.8137*** (0.1205)
Age [30,45[	0.0875 (0.0703)	0.1215 (0.1077)
Age [45,65]	-0.0867 (0.1052)	0.0906 (0.1396)
Firm size 20-99 workers	-0.0787 (0.069)	-0.0793 (0.1171)
Firm size >99 workers	-0.1854** (0.0816)	0.1014 (0.1161)
Secondary education or more	0.2924*** (0.0745)	0.1154 (0.1207)
Training worker+firm	0.0823 (0.1512)	0.3545** (0.149)
Training worker+no training firm	-0.0274 (0.1041)	-0.5504*** (0.1877)
No training worker+training firm	0.1378 (0.1463)	0.3105* (0.1618)
IMD Labour market Regulations	0.8715*** (0.1701)	-0.1196 (0.1557)
IMD Training worker+firm	-0.4753** (0.2328)	-0.1829 (0.1299)
IMD Training worker+no training firm	-0.0553 (0.1736)	0.1506 (0.1776)
IMD No training worker+training firm	-0.5308** (0.2398)	-0.0534 (0.144)
Men	0.0725 (0.0665)	-0.0251 (0.0956)
Industry	0.4722*** (0.1832)	0.6873* (0.3548)
Services	0.4103** (0.1845)	0.4982 (0.3476)
Job satisfaction	0.1837*** (0.0371)	0.1429** (0.061)
Private sector	0.4597*** (0.0953)	0.5792*** (0.114)
Constant	-2.5364*** (0.3344)	-2.6162*** (0.606)
Observations	6,169	2,778
Country dummies	yes	yes
Time dummies	yes	yes
$\rho$	0	0.156
Log-pseudolikelihood	-2704	-1309

TABLE A.10. Transitions to an open-ended contract with the same employer- Results with unobserved heterogeneity, by country group

Robust standard errors in parentheses.

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1.

VARIABLES	Group M	Group L
Duration in months:		
[3, 6[	-0.1588 (0.2045)	-0.1603 (0.18)
[6, 9[	0.3078 (0.2088)	-0.1513 (0.2049)
[9, 12[	0.005 (0.2351)	-0.1345 (0.2402)
[12, 15[	0.3401* (0.2045)	-0.3048 (0.224)
[15, 18[	-0.1482 (0.27)	-0.1867 (0.2847)
[18, 21[	-0.0188 (0.3065)	-0.0375 (0.3448)
[21, 24[	-0.0946 (0.3602)	0.0601 (0.3771)
[24, 30[	0.1165 (0.2638)	-0.1775 (0.3035)
$\geq 30$	0.2033 (0.2532)	-0.1167 (0.2959)
Not first job	-0.8723*** (0.1568)	-0.7677*** (0.1681)
Age [30, 45[	-0.0986 (0.143)	-0.172 (0.1377)
Age [45, 65]	-0.3211 (0.2371)	-1.0154*** (0.2405)
Firm size 20-99 workers	-0.0788 (0.1404)	-0.1173 (0.1565)
Firm size $>99$ workers	-0.0583 (0.1635)	-0.0597 (0.1564)
Secondary education or more	0.4502*** (0.1351)	-0.1151 (0.1502)
Training worker+firm	0.2955 (0.2656)	0.2864 (0.2132)
Training worker+no training firm	0.1718 (0.1863)	0.3009 (0.2083)
No training worker+training firm	-0.0709 (0.3172)	0.0689 (0.2324)
IMD Labour market Regulations	0.9167*** (0.2551)	0.3207 (0.204)
IMD Training worker+firm	-0.6117* (0.371)	-0.2983* (0.1728)
IMD Training worker+no training firm	-0.1352 (0.2819)	-0.1226 (0.1978)
IMD No training worker+training firm	0.3953 (0.483)	-0.1702 (0.1971)
Men	0.2097 (0.1287)	0.4527*** (0.1368)
Industry	0.2251 (0.33)	0.2347 (0.4336)
Services	0.2849 (0.3276)	0.23 (0.4099)
Job satisfaction	0.067 (0.0661)	-0.1252* (0.0734)
Private sector	0.3312** (0.1683)	0.2933** (0.1462)
Constant	-2.6979*** (0.6101)	-1.6212** (0.7812)
Observations	6,169	2,778
Country dummies	yes	yes
Time dummies	yes	yes
$\rho$	0.406	0.381
Log-pseudolikelihood	-1254	-1003

TABLE A.11. Transitions to an open-ended contract with a new employer - Results with unobserved heterogeneity, by country group

Robust standard errors in parentheses.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

VARIABLES	Group M	Group L
Duration in months:		
[3, 6[	-0.088 (0.0898)	-0.2153* (0.122)
[6, 9[	-0.4299*** (0.1096)	-0.4913*** (0.1452)
[9, 12[	-0.2395** (0.1168)	-0.7290*** (0.1872)
[12, 15[	-0.2813** (0.1148)	-0.5330*** (0.1661)
[15, 18[	-0.4786*** (0.1334)	-0.7809*** (0.2304)
[18, 21[	-0.6686*** (0.1609)	-0.7090*** (0.2583)
[21, 24[	-0.7528*** (0.1869)	-0.8715*** (0.3045)
[24, 30[	-0.4726*** (0.1417)	-1.2146*** (0.263)
≥ 30	-0.9357*** (0.1437)	-1.6515*** (0.2856)
Not first job	-1.3041*** (0.0868)	-1.4091*** (0.14)
Age [30, 45[	-0.0788 (0.0709)	-0.3801*** (0.1121)
Age [45, 65]	0.2007** (0.0924)	0.195 (0.1218)
Firm size 20-99 workers	-0.1404* (0.0722)	-0.1382 (0.1093)
Firm size >99 workers	-0.2795*** (0.0901)	-0.2406** (0.1222)
Secondary education or more	-0.4972*** (0.0749)	-0.4314*** (0.1146)
Training worker+firm	-0.3783* (0.195)	-0.8711*** (0.1639)
Training worker+no training firm	-0.0153 (0.1065)	0.1498 (0.1375)
No training worker+training firm	-0.1909 (0.2021)	-0.6098*** (0.191)
IMD Labour market Regulations	0.3737** (0.151)	-0.2114 (0.1638)
IMD Training worker+firm	-0.1325 (0.3107)	0.4092*** (0.1562)
IMD Training worker+no training firm	-0.2636 (0.161)	0.1938 (0.1605)
IMD No training worker+training firm	-0.1497 (0.3066)	0.2521 (0.1865)
Men	-0.2947*** (0.0683)	-0.1914* (0.0996)
Industry	-0.2862** (0.1281)	-0.1006 (0.2941)
Services	-0.1526 (0.1273)	-0.0982 (0.2788)
Job satisfaction	-0.2258*** (0.0352)	-0.0836 (0.0573)
Private sector	-0.2918*** (0.0869)	-0.3131*** (0.1037)
Constant	1.4113*** (0.2591)	0.8286 (0.5309)
Observations	6,169	2,778
Country dummies	yes	yes
Time dummies	yes	yes
$\rho$	0.146	0.0884
Log-pseudolikelihood	-2765	-1175

TABLE A.12. Transitions to joblessness - Results with unobserved heterogeneity, by country group

Robust standard errors in parentheses.

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1.

VARIABLES	Overall	Group M	Group L
episode 2	-0.4069*** (0.1044)	-0.4040*** (0.1165)	-0.3617 (0.2338)
episode 3	-0.2405 (0.1911)	-0.2959 (0.2154)	0.1676 (0.4055)
Duration in months:			
[6, 12[	-0.0575 (0.1)	-0.0506 (0.1138)	-0.0619 (0.2112)
[12, 18[	-0.2371** (0.1017)	-0.2503** (0.1139)	-0.171 (0.2328)
[18, 24[	-0.6210*** (0.1392)	-0.6283*** (0.16)	-0.5633** (0.2851)
≥ 24	-0.9024*** (0.1372)	-1.0442*** (0.158)	-0.3959 (0.276)
Age [30,45[	0.0585 (0.0798)	0.1253 (0.0908)	-0.2233 (0.1584)
Age [45,65]	-0.1797 (0.112)	-0.0956 (0.1261)	-0.5010** (0.2338)
Men	0.1939** (0.0805)	0.2352** (0.0919)	0.1182 (0.1749)
Secondary education or more	-0.2371*** (0.0831)	-0.2028** (0.0941)	-0.3388* (0.1927)
Industry	-0.0756 (0.1467)	-0.1177 (0.1532)	0.7391 (0.612)
Services	-0.2486* (0.1495)	-0.2777* (0.158)	0.4949 (0.6123)
Private sector	-0.0978 (0.0967)	0.1108 (0.1281)	-0.4644*** (0.1771)
Supervisory	0.2534 (0.2539)	0.3641 (0.3173)	0.1499 (0.3889)
Intermediate	0.1755 (0.1197)	0.1584 (0.1443)	0.1703 (0.2148)
Previous job: quit	-0.1368 (0.1349)	-0.1255 (0.1577)	-0.2999 (0.2725)
Previous job: layoff	-0.2044 (0.1602)	-0.2233 (0.1862)	-0.1505 (0.3236)
Previous job: contract end	0.1638 (0.1166)	0.1065 (0.1385)	0.3149 (0.2119)
Constant	-1.0828*** (0.2936)	-1.1159*** (0.2492)	-1.5461** (0.6821)
Observations	3,948	2,870	1,078
Country dummies	yes	yes	yes
Time dummies	yes	yes	yes
$\rho$	0.0577	0.0516	0
Log-pseudolikelihood	-1933	-1458	-461.6

TABLE A.13. Transitions between temporary jobs - Results with unobserved heterogeneity

Robust standard errors in parentheses.

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1.

VARIABLES	Overall	Group M	Group L
Secondary education or more	-0.0873 (0.0556) [-0.0463]	-0.1686 (0.0646)** [-0.1034]	0.2446 (0.1227)* [0.0886]
Age [30,45]	0.0642 (0.0854) [0.0350]	0.0334 (0.1017) [0.0214]	0.1565 (0.1557) [0.0610]
Age [45,65]	-0.0963 (0.1513) [-0.0484]	-0.1630 (0.1805) [-0.0946]	0.1678 (0.2743) [0.0658]
Men	0.0797 (0.0537) [0.0422]	0.1044 (0.0621) [0.0646]	0.0068 (0.1067) [0.0026]
Not living in a couple	-0.0734 (0.0644) [-0.0392]	-0.0295 (0.0763) [-0.0185]	-0.1074 (0.1202) [-0.0410]
Experience	-0.0033 (0.0046) [-0.0018]	-0.0009 (0.0053) [-0.0005]	-0.0114 (0.0088) [-0.0044]
Private sector	-0.1907 (0.0658)** [-0.1068]	0.0009 (0.0839) [0.0006]	-0.4800 (0.1174)** [-0.1871]
Intermediate	-0.1917 (0.1886) [-0.1167]	-0.2108 (0.2231) [-0.1518]	-0.1935 (0.3441) [-0.0899]
Non-supervisory	-0.2388 (0.1705) [-0.1421]	-0.2525 (0.2005) [-0.1783]	-0.3034 (0.3153) [-0.1337]
Firm size 20-99 workers	0.1346 (0.0568)* [0.0737]	0.1248 (0.0638) [0.0796]	0.1717 (0.1226) [0.0688]
Firm size >99 workers	-0.0083 (0.0683) [-0.0042]	0.0341 (0.0800) [0.0208]	-0.0236 (0.1332) [-0.0086]
Training worker	0.0545 (0.0588) [0.0292]	0.0359 (0.0679) [0.0226]	0.1673 (0.1173) [0.0642]
Training firm	-0.1451 (0.0715)* [-0.0739]	-0.1384 (0.0915) [-0.0822]	-0.2010 (0.1147) [-0.0764]
Job satisfaction	-0.0580 (0.0283)* [-0.0308]	-0.0451 (0.0314) [-0.0282]	-0.0941 (0.0636) [-0.0361]
Part-time job	-0.1244 (0.0853) [-0.0629]	-0.0718 (0.1025) [-0.0436]	-0.2479 (0.1517) [-0.0874]
Industry	-0.1740 (0.1103) [-0.1063]	-0.1937 (0.1148) [-0.1404]	0.0640 (0.3617) [0.0237]
Services	-0.2749 (0.1095)* [-0.1599]	-0.3088 (0.1156)** [-0.2119]	0.0706 (0.3469) [0.0262]
Constant	-0.1070 (0.3034)	-0.0850 (0.2893)	-0.3371 (0.6068)
ln( $\alpha$ )	-1.5342	-1.6708	-1.7593
p-value of LR test for $\alpha = 0$	(0.000)***	(0.001)**	(0.080)*
Observations	5,246	3,441	1,805
Country dummies	yes	yes	yes

TABLE A.14. Number of temporary jobs held by a worker - Count model results

Robust standard errors in parentheses. Marginal effects in square brackets.

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1.

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