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Determinants of unemployment spells and exit destinations in Romania in a competing-risks approach

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ABSTRACT

The purpose of this article is to analyse determinants of unemployment spells and exit destinations in Romania using a competing-risks framework. The empirical analysis is based on a nationally representative data-set of 2,376,253 unemployment spells gathered from the National Agency of Employment Romania. The effect of different covariates on the duration of unemployment spells and exit destinations is estimated.

1. Introduction

A high level of unemployment and its long duration raise many concerns regarding the economic, social and individual consequences of this phenomenon. Among the most important economic consequences that unemployment induces in both developed and developing countries are the non-use and waste of a part of labour resources for which a society has incurred significant costs arising from its education and training, costs that remain unrecovered. Unemployment led to an increase in social tensions; it is a strong factor in the lowering of living standard and worsening quality of life. Moreover, unemployment contributes to the increase of social costs that an economy has to bear in the form of unemployment allowance. Klugman and Kolev (2001) proved in their study a negative association between unemployment duration and household welfare. Arulampalam (2001) emphasised a negative association between unemployment duration and post-unemployment wages in the United Kingdom (U.K.) labour market. The same negative association was observed by Knight and Li (2006) for urban China and Fitzenberger-Wilke (2007) for Germany. As for the social costs of unemployment, beside the well-known aspects presented in the literature, recent studies show a positive association between unemployment and criminality (Andrienko, 2001; Burdett, Lagos, & Wright, 2004; Fajnzylber, Lederman, & Loayza, 1998; Fougère, Kramaz, & Pouget, 2009). Fedorov and Sahn (2005) proved that unemployment is one of the major factors that influence children's health. Unemployment leads to

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individuals' loss of confidence in their own potential, deterioration of their self-esteem and of the ability to integrate into society as active persons. Stankunas, Kalediene, Starkuviene, and Kapustinskiene (2006) reveal the existence of a high frequency of major depressive episodes in the long-term unemployed compared to the short-term unemployed or who have left unemployment by being employed. These are just some examples that demonstrate the importance of a quantified analysis of the main factors of unemployment duration effect and of the exit destinations of unemployment as a way for adopting sustainable policies specifically addressed to identifing vulnerable groups.

Over time there have been published several studies that address issues related to the factors influencing unemployment duration. A very interesting gender gap regarding unemployment duration was proved by Grogan and van den Berg (1999) for Russia. Unmarried women have shorter unemployment spells compared with unmarried men; however, the ratio changes for married people: married women have significantly longer unemployment durations than married men. For Belgium, Greece, France, Spain, Denmark and Portugal the results regarding the effect of gender on unemployment duration showed that women are less likely to leave unemployment (D'Agostino & Mealli, 2000). Similar results were obtained by Tansel and Tasci (2005) for Turkey, Stetsenko (2003) for Kiev, Ukraine, and Kavkler et al. (2009) for Slovenia, Austria, Croatia and Macedonia.

The relationship between age and unemployment duration is complex (Katz, 1974). Older workers are usually protected against unemployment by the senior citizens' rights and by the experience gained in the labour market until that date. However, the probability of their finding a job is significantly decreased by the advanced age. Frequently this age group has a lower incidence of unemployment, but when it occurs the unemployment duration is the longest. Kupets (2006), in a study conducted of the labour market in Ukraine, reveals a negative association between age and re-employment probability of the analysed individuals. The obtained results indicate that subjects older than 40 years that are registered as unemployed leave unemployment not by employment but due to inactivity. A negative association between age and unemployment duration was also revealed by the studies conducted by Stetsenko (2003) for Kiev, Ukraine, and by Kavkler et al. (2009) for Slovenia.

The literature describes education as a major factor influencing the probabilities of individuals' duration of unemployment and re-employment (Blomeyer, Coneus, & Pfeiffer, 2009; Bowles, Gintis, & Osborne, 2001; Heckman, Stixrud, & Urzua, 2006; Mincer, 1991). Grogan and van den Berg (2000) proved that highly skilled workers who lost a job in Russia during 1994–1996 had a lower incidence of unemployment and a shorter duration of it than their less-educated compatriots. McKenna (1996) suggests that education gives two great advantages to workers: a high probability of finding a job; and getting an income that generates high life satisfaction. Ollikainen (2006) emphasised that education is a variable with a strongly positive impact on the unemployment duration in Finland, especially for unemployed women. According to the studies conducted by Tansel and Tasci (2005), Kupets (2006), Nivorozhkin (2006) and Kavkler et al. (2009), the higher a person's educational level, the better his/her probability of finding a job in Turkey, Ukraine, Sweden, Slovenia, Croatia and Austria. Löfmark (2008) analyses the unemployment duration in Taganrog, Russia, and proves that an average level of education improve the access of individuals in the labour market, while having a higher education does not significantly affect the probability of finding a job in this region. The same results are obtained by Cheidvasser and Benitez-Silva (2007) for Russia.

The impact of the unemployment allowance on its duration is a controversial issue and heavily debated in recent economic literature. The job search theory reveals that individuals tend to remain unemployed for a longer period if they receive compensations (Mortensen, 1977). Atkinson and Micklewright (1991) examined the impact of unemployment allowance on the exit rate for Organisation for Economic Cooperation and Development (O.E.C.D.) countries and proved that it temporarily affects the individuals' exit rate from unemployment. A positive direct association between the unemployment allowance and its duration is also revealed by the empirical studies of Moffitt (1985) and Ham and Rea (1987) for the United States (U.S.) labour market. The link between unemployment allowance and duration of unemployment was also the topic of some research undertaken in other European countries by Roed and Zhang (2003), Cockx and Dejemeppe (2005) and Lalive, van Ours, and Zweimüller (2002).

Papers focused on factors influencing unemployment spells are rare for the Romanian labour market. Earle and Pauna (1996) analysed for the first time the effect of gender, education, age and other determinants for the unemployment duration in Romania. The results showed a higher probability of employment for male subjects compared with female. As a person's educational level increases, the unemployment leaving rate increases too. With the age increase, we have a significant increase in the unemployment duration and a decrease in the probability of re-employment. Dănăcică and Babucea (2007) analysed the impact of gender, age and educational level on the unemployment duration for one county in Romania: Gorj county. In a more recent study, Ciuca and Matei (2010) examine the effect of the same variables, gender, age and educational level on the unemployment duration for eight Romanian counties. Their results showed that the differences found between women and men hazard rates are not statistically significant for the year 2009. Another controversial result is that university graduates are not favoured in the labour market; moreover, they have unemployment durations even higher than the subjects with a lower educational level.

In the present study we focus on the factors influencing unemployment spells and exit destinations in post-communist Romania, using a competing-risks modelling approach. Our aim was to estimate the effect of different explanations which cause some individuals registered as unemployed to experience longer unemployment spells and different exit destinations than others. Another goal of this study was to examine the registered unemployment spells and exit destinations in a period when Romania was affected by economic crisis.

The structure of article is organised as follows: a short overview of unemployment dynamics in Romania is presented in Section 2. Section 3 presents data and variables of the study. Econometric framework and empirical results are given in Section 4. Conclusions are presented in the last section of the article.

2. A short overview of unemployment in Romania

Unemployment in the communist period was non-existent or negligible due to the nature of the Romanian economic system. Official acknowledgement of unemployment was made in 1991, when Law No. 1/1991 entered into force (Dănăcică, 2013). The first study where unemployment is evaluated by International Labour Office (I.L.O.) standards was made in 1994 (Bădulescu, 2006; Kavkler et al., 2009). Similar to other transition countries, massive dismissals and output contraction from the industrial sector led to a substantial increase in the unemployment rate, especially in the early years of transition to a market economy. The

Table 1. Dynamics of the unemployment rate in Romania, Hungary, Bulgaria and UE27, 2000–2011.

	2000	2001	2001	2003	2004	2005	2006	2007	2008	2009	2010	2011
UE27	8.8	8.6	8.9	9.1	9.2	9.0	8.3	7.2	7.1	9.0	9.7	9.6
Romania	6.8	6.6	7.5	6.8	8.0	7.2	7.3	6.4	5.8	6.9	7.3	7.3
Hungary	6.4	5.7	5.8	5.9	6.1	7.2	7.5	7.4	7.8	10.0	11.2	10.9
Bulgaria	16.4	19.5	18.2	13.7	12.1	10.1	9.0	6.9	5.6	6.8	10.2	11.1

*Source: Eurostat Database.

highest I.L.O. unemployment rate after the downfall of communism, 8.4%, was reached in 2002 (National Institute of Statistics [I.N.S.S.E.] Tempo-Online Database). However, compared with other former communist economies, Romania registered a relatively low unemployment rate. Table 1 presents the dynamics of I.L.O. unemployment rate in Romania, Hungary, Bulgaria and UE27 between 2000 and 2011. As we can see, the I.L.O. unemployment rate places Romania below the average of EU 27 and below the rates of Hungary and Bulgaria.

Behind the low unemployment rate registered for Romania is a high rate of external migration (especially for the high-qualified labour force – brain-drain phenomenon being very pronounced for Romania) and the high number of discouraged workers (Dănăcică, 2013). As Löfmark (2008) pointed out, discouraged workers are not included in the I.L.O. unemployment definition, which may lead to an estimate of the unemployment rate much lower than is actually the case.

3. Data and variables of the study

The current research is based on 2,376,253 unemployment spells, registered at the National Agency of Employment Romania during between 1 January 2008 and 31 December 2010 and all ongoing spells until 30 April 2011, when we received the data from National Agency of Employment. The initial data-set had 2,653,183 spells. From the initial data-set we had to remove all the spells of individuals aged less than 15 years and older than 65 years and individuals with negative duration of unemployment. Individuals whose unemployment spells begun and ended on the same day were removed from the database too, due to the non-existent duration of unemployment. Out of all the 2,376,253 spells, 296,371, representing 12.5%, are ongoing spells.

Due to the confidentiality law regarding registered unemployed in Romania, we didn't receive the names of individuals registered as unemployed during the analysed period (or an identification number for every of them). As a consequence, we couldn't identify multiple spells for the same individual and unite them. However, after we analysed the coding used by the National Agency of Employment for the unemployed, we noticed that a particular category of individuals, having an unclear deactivation reason (e.g., '4 – request for registration without unemployment allowance') is a potential source of multiple spells existence. A proportion of these individuals (especially young graduates) changed their status from being registered as unemployed without allowance to being unemployed with allowance in a few days, and thus an implicit a new spell for the same individual appears. Due to the unclear exit destination, in the econometrical analysis all these spells with '4' at their end are censored. Thus, the problems generated by the intra-person correlation are avoided. The ongoing spells were censored, too. However, we would like to underline that we used as our unit of the analysis unemployment spells rather than individuals.

For each registered spell we received information concerning the start date and end date of the spell (12.5% of the total spells don't have an end date), the gender of the unemployed, age, education, region of residence, urban/rural area of residence, marital status, whether or not the subject received unemployment allowance (U.I.) during his/her current spell, the reason of exit from unemployment, labour market history and health status of the registered unemployed.

The endogenous variable of the study, *duration of an unemployment spell*, was calculated as the difference between the last and the first day of unemployment and is measured in days (Dănăcică, 2013). The explanatory variables of our study (e.g., personal characteristics like gender, age, education, region of residence, area of residence, marital status, history on the labour market, health status, whether or not the individual registered as unemployed receives unemployment allowance during his/her current spell (U.I.), year of registration at the National Agency of Employment Romania) are described in Table A1 from the Appendix.

When the individual is deactivated from the register of unemployed, his/her unemployment spell ends. As we mentioned before, we got information about the deactivation reason for each spell. We had 26 different deactivation reasons in our data-set (e.g., employment, retirement, retirement due to invalidity, inability to work, imprisonment, maternity leave, going abroad, accident occurred during training courses, expiry of the legal period for receiving unemployment allowance, etc.). With this information in hand we could discriminate between different types of exit destinations from registered unemployment. We divided the exit destinations in three main categories: 1 – (re)employment; 2 – expiry of the legal period for receiving unemployment allowance; and 3 – non-participation (inactivity) on the Romanian labour market. All the spells with unclear exit destinations and all the ongoing spells are right censored.

4. Econometric framework

We will begin this section by presenting some basic methodological issues. Although at the beginning the survival analysis was used to study death as an event specific to medical studies (Armitage, 1971; Peto & Lee, 1973; Pike, 1966) and demographical studies (Berkson & Gage, 1950; Cutler & Ederer, 1958; Gehan, 1969), as from the 1970s these statistical techniques have been increasingly used in economics and social sciences. Survival data are not normally distributed and usually contain incomplete information; due to their particularities like censoring and abnormality distribution, survival data require a different statistical analysis compared with the quantitative data due to their particularities. A detailed presentation of survival analysis and duration models is presented by Therneau and Grambsch (2001), Collett (2003), Lee and Wang (2003) and Tableman and Kim (2004).

We consider T a random variable with non-negative value for the *survival time* of individuals until a pre-established event $(T \geq 0)$. The *survival function*, denoted as $S(t)$, is defined to be the probability that an individual survival time is equal to or greater than t:

$$S(t) = P(T \geq t) \tag{1}$$

The graph of survival function versus t is named survival curve (Le, 1997). Median survival time and mean survival time until the event can be estimated using survival function.

The distribution function of T, denoted by $F(t)$, is given by the formula:

$$F(t) = P(T < t) = \int_0^i f(u)du = 1 - S(t) \tag{2}$$

The random variable T is also characterised by the probability density function $f(t)$, defined by:

$$f(t) = \lim_{\delta t \to 0} \frac{P(t \leq T < t + \delta t)}{\delta t} \tag{3}$$

The hazard function represents the instantaneous failure (*death* in biostatistics) rate, assuming that the individual has survived until time t, and has the following expression:

$$\lambda(t) = \lim_{\delta t \to 0} \frac{P(t \leq T < t + \delta t | T \geq t}{\delta t} \tag{4}$$

High values of the hazard function can be interpreted as a high risk event to occur for that individual. From the Equation (4) we see that $\lambda(t)\delta t$ is the probability for a subject to '*die*' (the event is happening) in the interval $(t, t + \delta t)$ conditional on survival until the time t. In our study, $\lambda(t)$ gives the probability that an individual who is still unemployed on the day t to exit in the next day to one of the three exit destinations described above (Dănăcică, 2013).

If the hazard rate is constantly decreasing or increasing in time, we have duration dependence. If $\lambda(t) / \delta t > 0$ the hazard increases in time; this situation may appear if an individual need for a job increases also in time. If $\lambda(t) / \delta t > 0$ we have negative duration dependence, thus the probability of exit from unemployment decreases with time. This is a consequence of employers' decisions to discriminate against the long-term unemployed individuals or the decrease of the individual's job search activity, when the spell is prolonged (Dănăcică, 2013).

Figures 1 and 2 present the histogram for duration of unemployment spells and the corresponding histogram for spells deactivated due to (re-)employment. We can observe peaks around the first day, around the 180th day, around 270th day and 1 year. Of the spells that ended in (re)employment, 11.4% have the end occurring in the first day, 0.4% in the 181st day, 0.5% in the 184th day, 0.6% in the 273rd day, 0.7% in the 365th day and 0.5% in the 457th day.

As an individual approaches the end of unemployment allowance eligibility, his/her reservations wage declines, leading to an increase in the exit rate (Mortensen, 1970). Analysing Figures 1 and 2, we can see that both exit rate from unemployment and (re)employment rate increase as the exhaustion time of benefits gets closer. The same conclusion was underlined by Carling, Edin, Harkman, and Holmlund (1996) and Hui (1991). Ollikainen (2006) pointed out that unemployment compensation system can induce observed duration dependence. This is the case with Romania, too (Figures 3 and 4). In the literature we can find evidence that exit probabilities from unemployment may vary over time due to the effects of business cycle (van den Berg & van der Klaauw, 2000).

Figures 3 and 4 present histograms of unemployment duration (days) for all the spells deactivated due to (re-)employment; the first histogram is for individuals that received unemployment allowance during their current spell, and the second for subjects that did not received unemployment allowance during their spell.

The semiparametric Cox proportional hazard model with an unrestricted baseline is the standard estimation method used in empirical analysis of unemployment duration. With the
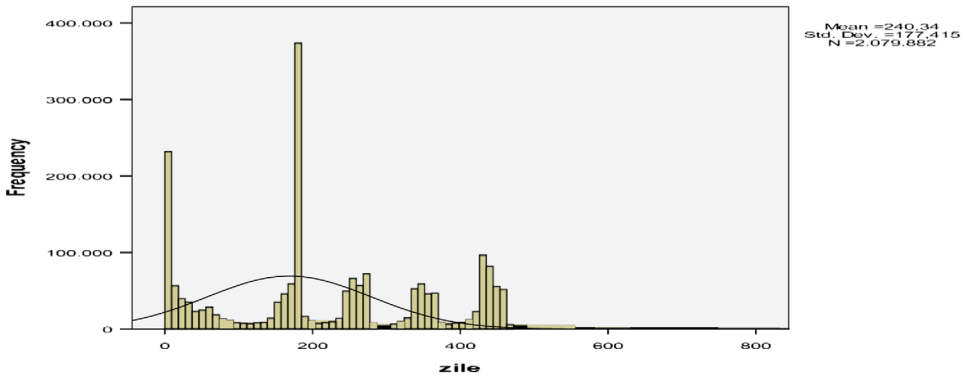
Figure 1. Histogram of the duration of unemployment spells (days). Source: Dănăcică, D. (2013), *Cercetări privind Durata Șomajului și Probabilitatea (Re)Angajării [Researches regarding Unemployment Duration and (Re)Employment Probability]*, Postdoctoral thesis, Bucharest: Romanian Academy Publishing House, p. 61.
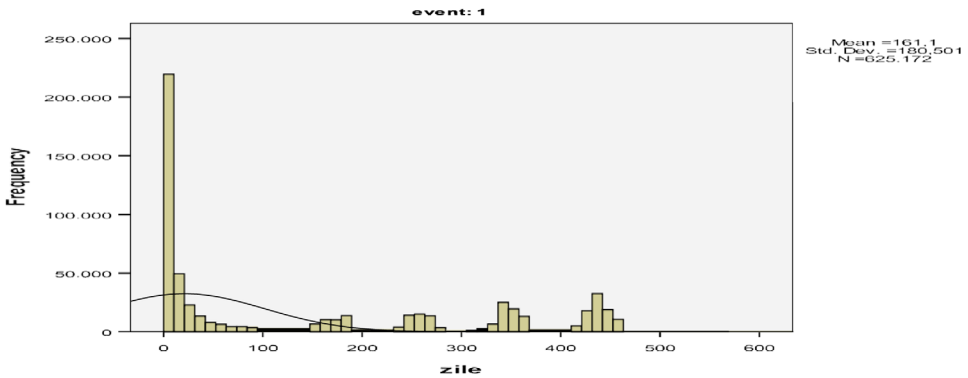
Figure 2. Histogram of the duration of unemployment spells (days) deactivated due to (re-)employment. Source: Dănăcică, D. (2013), *Cercetări privind Durata Șomajului și Probabilitatea (Re)Angajării [Researches regarding Unemployment Duration and (Re)Employment Probability]*, Postdoctoral thesis, Bucharest: Romanian Academy Publishing House, p. 61.
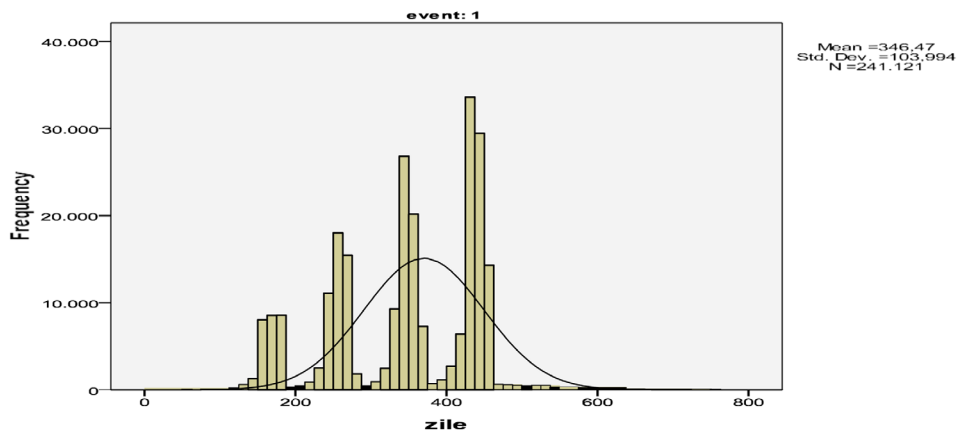
Figure 3. Histogram of unemployment duration (days) for spells deactivated due to (re-)employment (with unemployment allowance during the analysed spell). Source: SPSS 17.0 computation.

Figure 4. Histogram of unemployment duration (days) for spells deactivated due to (re-)employment (without unemployment allowance). Source: SPSS 17.0 computation.
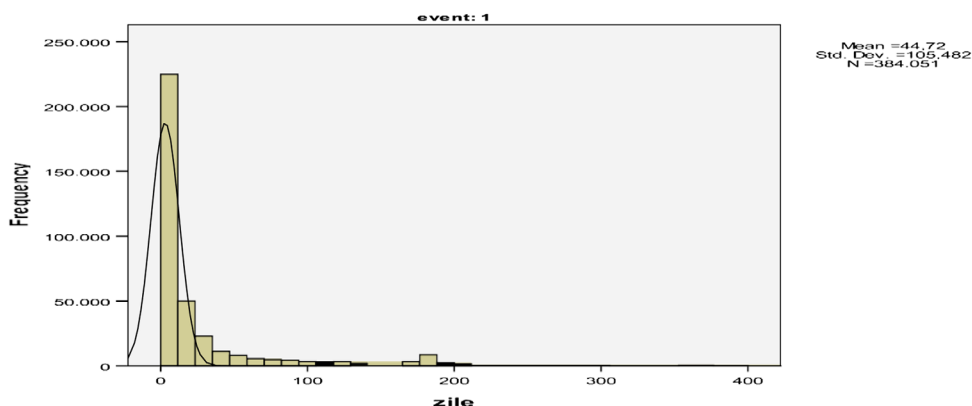
data in hand, we could distinguish between three potential exit destinations from registered unemployment. A part of the empirical studies focused on the unemployment duration, and its impact factors do not make a distinction between different destination states of exit from unemployment, this omission leading to unrealistic employment probability of individuals (Eriksson, 1985; Gonzalo & Saarela, 2000 and Dănăcică, 2013). The standard single-risk model extended to two or more exit destinations is known in the literature as a competing-risks model (Lancaster, 1990). Jensen and Westergaard-Nielsen (1990) emphasised that using a competing-risks model led to an increase of the amount of information compared to the single-risk model; therefore, a competing-risks model is a better option. Using a competing-risks framework with flexible baseline hazard rates give more robust results than those obtained from parametric approaches. With parametric models for unemployment duration the estimated effects of covariates can be biased due to a restrictive shape of the hazard rate of unemployed. The parametric Weibull model allows only for hazard rates that monotonically increase or decrease with unemployment duration (Dănăcică, 2013).

As we can see from Figure 3 and 4, there is a strong link between unemployment allowance and behaviour of unemployed individuals. As Mortensen (1977) pointed out, hazard rate from unemployment increases when unemployment allowance exhaustion approaches. Empirically we can see the existence of non-stationarity in unemployment allowance element of the job search environment. Therefore, the use of a flexible specification of the baseline hazard rate allowing for non-monotonic variation with unemployment duration is needed. Our estimation does not allow for unobserved individual heterogeneity. However, as Han and Hausman (1990), Meyer (1990), Narendranathan and Stewart (1993) and Boheim and Taylor (2000) underline, not allowing for unobserved heterogeneity does not significantly bias the results when a fully flexible baseline hazard specification is used.

In the case of a competing-risks model, the probability of leaving unemployment is given by the sum of two or more transition probabilities. A transition probability is defined in our study as the probability of going to one of the three potential end destinations: (re-)employment; exit from unemployment due to expiry of the legal period for receiving unemployment allowance; or non-participation (inactivity). Gonzalo and Saarela (2000), Addison and Portugal (2003), Jensen and Svarer (2003) and Olikainen (2006) underlined that the

transition probabilities are assumed to be independent, conditional on the explanatory variables. According to Narendranathan and Stewart (1993) the transition probabilities are estimated as a single risk by treating spells that are finishing into other destinations as right-censored spells.

The effect of the explanatory variables on unemployment spells and exit destinations is presented in Tables A2, A3 and A4 in the Appendix. In our analysis, the reference category is the last category for gender, age, region of residence, urban/rural area of residence, marital status, receiving or not receiving unemployment allowance during the current spell, history on the labour market, health status, and first category for education and entry year in registered unemployment; the Enter method was selected.

Out of all 2,376,253 analysed spells, only 26.3% ended in (re-)employment; 25.2% of the registered spells were deactivated due to expiry of the legal period for receiving unemployment allowance, 2.3% ended in non-participation on the Romanian labour market and 46.1% are right-censored spells. Out of all 625,172 registered spells deactivated due to (re-)employment, 41.3% are U.I. spells and 58.7% are non-U.I. spells. All the 599,391 registered spells deactivated due to expiry of the legal period for receiving unemployment allowance are U.I. spells. Therefore, in this case, the unemployment allowance variable was not specified in the competing-risks model. Of all the spells deactivated due to inactivity, 99.9% are U.I. spells, and only 0.1% are non-U.I. spells. Out of all 1,067,031 censored spells, 19.6% are U.I. spells and 80.4% are non-U.I. spells. The non-U.I. spells belong to individuals previously registered as unemployed with the right to receive unemployment allowance (before the start of analysis).

Gender

Mean duration of spells for women is 234.78 days, and mean duration for men is 244.81 days. However, this is due to a higher transition rate in destination 2 and 3 for women than men. Non-parametric estimation using Kaplan–Meier product limit shows that median survival time until employment occurs is 456 days for women and 451 days for men, and the result is highly significant. As we can notice from Table A2 in the Appendix , the regression coefficient for women is negative, meaning a decrease of the exit to a job hazard. Women have a 14% lower exit to a job hazard rate than men, and the result is highly significant. However, in our data-set the number of spells that belong to higher-educated women is higher than the number of spells of higher-educated men; since education tends to increase the probability of exit to a job for an individual, the gender gap is not very pronounced, like in other Eastern European countries. Women are most prone to exit from unemployment due to expiry of the legal period for receiving unemployment allowance or ending in inactivity than men (Tables A3 and Table A4 in the Appendix). Kavkler et al. (2009) found out a 20.8% higher hazard rate for men unemployed spells to end in Slovenia. Boheim and Taylor's (2000) results show that median duration of unemployment spells is higher for men than for women, due to exits into part-time employment or inactivity. Exit rates from unemployment into full time employment for women are similar to those for men, but with a lower proportion of transition. As Löfmark (2008) pointed out, women's lower probabilities of exit to a job may be a consequence of gender discrimination, maternity and gender disparities in degrees of risks aversion. In a recent study, Dănăcică and Mazilescu (2012) proved that the gender gap is more pronounced in the case of long-term unemployment (one year or more). Using a

multinomial logistic regression Dănăcică (2012) emphasised that women are most prone to exit from unemployment to a short-term job (less than 12 months) than men.

Age

As we notice from Tables A2, A3 and A4 in the Appendix , age has a significant effect on exit destinations of Romanian unemployed. All four age groups have positive regression coefficients, meaning an increase of the exit to a job hazard rate compared with the reference category, 55–65 group. Individuals aged in between 25 and 34 years are in the better position on the labour market compared with the other age groups. The instantaneous hazard rate of exit to a job is more than double compared with the reference category, the 55–65 age group. Individuals aged between 25 and 34 years have higher chances of exiting to a job compared with those aged between 15 and 24 years. This is not just the age effect, but also the effect of education and existence of a previous work experience. The 15–24 age group is most prone to exit in inactivity or due to expiry of the legal period for unemployment allowance. Median survival time until (re-)employment occurs is 633 days for individuals aged between 15 and 24 years, 428 days for individuals aged between 25 and 34 years, 449 days for the 35–44 group, 465 days for the 45–54 group, and 936 days for the 55–65 group. For (re-)employment event, age was computed also as a continuous variable. The regression coefficient is negative; however, due to the high number of youth spells, the age effect is lower than in other Eastern European countries. The inverse relationship between age and the probability of exit to a job is a common finding in the literature (Kavkler et al. (2009); Boheim & Taylor, 2000, Kupets, 2006; Tansel & Tasci, 2005; Nivorozhkin, 2006). Age has a slightly higher impact on the probability of women exiting to a job than men (Dănăcică & Cîrnu, 2014). The observed differences between age groups are statistically significant.

Education

Most of the registered unemployment spells during the analysed period came from uneducated or low-educated individuals and individuals that graduated theoretical high school (10.3% primary education or none, 23.5% gymnasium, 17.3% vocational school and 22.8% high schools). Individuals with a higher education represent 9.1% from the total database. Thus, education has a clearly impact on unemployment incidence. Of spells from our dataset, 10.8% have an unknown level of education. An individual with a university education has the lowest value of median survival time until (re-)employment occurs, 427 days (with 80 days less than an uneducated or primary education individual). Therefore, higher education has a positive effect on unemployment spells (inverse association), although is not as strong as we expected. The differences between the other groups are small, except individuals that graduated special education and have a median survival time of 454 days, third longest duration after the very low-educated group and gymnasium group. In Table A2 in the Appendix we can see that all the groups have an instantaneous hazard rate of exit to a job higher than 1, compared with very low-educated group that means an increase of exit to a job chances. Individuals with a short-term university education have the highest hazard rate of exit to a job, followed by the vocational school group and post-high school group. However, from a statistical point of view, after we examine the confidence intervals we can

draw the conclusion that both the short-term university group and the vocational group have the same chances of exiting to a job. We have the same situation for the individuals with long-term university education and individuals with a post-high school education. The results suggest that, for the analysed period, an education focused more on developing practical skills, like vocational schools, foremen schools, post-high schools (nursing, social assistance, accounting, etc.) or an university education gave better chances for (re-) employment in Romania.

Marital status

The composition of the data-set by marital status at the time of registration is as follows: 32.5% are spells of unmarried subjects; 52.9% are spells of married subjects; 2.4% are spells of widowed subjects; 0.8% for divorced subjects; and 11.4% spells have an unknown marital status. Married subjects have a 36% higher exit to a job rate compared with divorced subjects, and a 23% higher exit to a job rate compared with unmarried subjects. The median survival time until (re-)employment occurs is 457 days for unmarried subjects, 452 days for married subjects, 457 days for widowed subjects and 927 days for divorced subjects. Divorced subjects have the longest median survival time until (re-)employment occurs, the lowest hazard of (re-)employment rate and the lowest employability rate. Divorce appears to have a negative impact on the exit to a job rate; however, we have to take into account the size of divorced subjects sample. The exit to a job hazard of married men is slightly higher than for women (Dănăcică & Cîrnu, 2014). Both married men and women are more motivated to exit to a job than people without family responsibilities. An interesting subject for a further research can be the impact of a child in the household for unemployment duration and (re-)employment probability. Marital status doesn't significantly influence the exit in inactivity or due to expiry of the legal period for receiving unemployment allowance, in the analysed period.

Region of residence

The distribution of unemployment spells by region is as follows: 18.7% spells from North-East Region; 9.5% from West Region; 11.9% spells from North-West Region; 13.6% spells from Central Region; 11.3% for South-East Region; 17.5% for South-Muntenia Region; only 4.6% spells are from Bucharest-Ilfov Region; and 12.9% from South-Oltenia Region. West Region has the shortest median survival time until (re-)employment occurs, 437 days, and South-Oltenia Region the longest median survival time until (re-)employment, 825 days. The competing risks specification shows that all seven regions have the exit to a job hazard rate higher than 1, compared with the reference category, South-Oltenia Region. Individuals from the West Region have the highest exit to a job hazard rate, compared with the reference category, followed by individuals from South-Muntenia Region. As we can see from Tables A3 and A4 in the Appendix, individuals from South-Oltenia Region are most prone to exit from unemployment in inactivity or due to expiry of the legal period of receiving unemployment allowance. According to the Eurostat Report from November 2011, in 2010 Bucharest-Ilfov Region had the lowest level of shares of long-term unemployed of the EU27, 5.0%. Every region of Romania has his own survival function, with a different behaviour. A

future study will focus on the regional disparities regarding unemployment duration and (re-)employment probabilities in Romania.

Urban–rural area

Of the total registered unemployment spells, 51.5% belong to individuals living in a rural area of Romania and 48.5% are urban spells. Competing-risks specification shows that people from the rural area have a 37.8% lower exit to a job rate compared with those from the urban area, the reference category. Median survival time until (re-)employment for rural spells is 754 days, compared with 443 days, median survival time for urban spells. The Log Rank test, Breslow test and Tarone–Ware test were used to test the differences between survival times, and the results allow us to reject the null hypothesis. As we can see from Table A3 in the Appendix, individuals from rural area are most prone to exit from registered unemployment due to the expiry of the legal period for receiving unemployment allowance. We can conclude that the residential area of a person has an impact on incidence, duration of unemployment and (re-)employment probabilities in Romania. This situation can be one of the consequences of the decline of agriculture during the analysed period in Romania. Between 2000 and 2010, the volume of the labour force working in agriculture constantly decreased. Unfortunately, rural areas in Romania have experienced a continuous depreciation of economic development, leading to low chances of employment for the subjects that live in rural areas.

Unemployment allowance

Out of all 2,376,253 registered unemployment spells during the analysed period, 52.3% are non-U.I. spells (without unemployment allowance) and 47.7% are U.I. spells (with unemployment allowance). As we can see from Table A3 in the Appendix, the unemployment allowance is a negative factor for exit to a job rate of the analysed spells. The lack of U.I. during a spell increases the exit to a job hazard rate more than fourfold compared with having the U.I. during the current spell. The frequency of the non-U.I. spells ended in (re-)employment is much higher than the U.I. spells, and the probability of exit in (re-)employment is also much higher. All the spells that were deactivated due to expiry of U.I. eligibility are U.I. spells. Of all the spells that ended in inactivity, 99.9% are U.I. spells and only 0.1% are non-U.I. spells. As we underlined above, there are peaks in the duration of unemployment histogram that suggest a strong association between the deactivation moment and unemployment compensation system (Figures 1, 2, 3 and 4). Of the subjects that did not received unemployment allowance during their spell, 92.4% exit to (re-)employment within six months, compared with 9.7% for subjects receiving unemployment allowance. Due to the particularities of Romanian unemployment legislation in the analysed period, a high number of unemployed chose to stay in unemployment until the legal period of receiving U.I. expired. Also, individuals near to retirement age chose to stay in unemployment as long as the law allows, exiting from unemployment into retirement. As we stated above, we estimated the effect of unemployment allowance for duration of unemployment and exit destinations for the current spell of an individual.

History on the labour market

As we can see from Table A2 in the Appendix, the exit to a job rate is 22.9% lower for individuals without previous work experience at the time of registered unemployment compared with individuals who had previous work experience before entering unemployment. Median survival time until (re-)employment occurs is 943 days for individuals without previous work experience compared with 453 days for individuals with previous work experience. The results are statistically significant. Unfortunately, we did not have the information about the type of work experience – whether or not there is experience in the same field as the individual's current job.

As the macroeconomic indicators suggests, having a previous work experience plays an important role in finding a job in the Romanian labour market, especially for graduates of vocational schools, foremen schools, post-high schools and universities. From 16 August 1994, the Romanian government implemented programmes to facilitate the introduction of new graduates into the labour market. Employers that offer jobs to young graduates receive 12 months' subvention (or 18 months if the person has a disability) for every young employed, as follows: 500 RON/month (approximately 119 euro/month) for primary and gymnasium level of education; 600 RON/month for high-school and post-high-school level of education and 750 RON/month for university level. The employer has the obligation to maintain the young graduated in activity another two more years after subvention is offered.

Also, the employer receives 250 RON/month and the monthly reimbursement of the theoretical training if it hires a young apprentice, or 250 RON/month for every university student or high-school student if the employer hires them during vacations for more than 60 days. The results of our study strength the conclusion that measures of stimulating the introduction of new graduates into the labour market implemented until now by Romanian Government are not enough.

Health status

A normal health condition improves the chances of an individual exiting from unemployment to (re-)employment during the analysed period in Romania. Individuals with a normal health condition have a 36.7% higher hazard rate of exit to a job compared with individuals with a disability. Median survival time until employment occurs is 453 days for an individual with a normal health condition, compared with 541 days median survival time until employment of a subject with a disability. A young age is worsening the gap between individuals with a normal health condition and individuals with disabilities. As we can see from Tables A3 and A4 in the Appendix, individuals with a normal health condition have a negative regression coefficient, meaning a decrease of the exit in inactivity hazard rate or exit due to expiry of U.I. eligibility. Again, we have to take account of the size of the sample for disabled individuals. Unfortunately, we did not have any information about the type of disabilities. Another interesting research topic that could be followed in future research is to analyse the effect of difference type of disabilities (physical, cognitive) on the duration of unemployment and (re-)reemployment probabilities of individuals. From 2005, the Romanian government implemented a series of measures to combat social exclusion and to improve employment chances for individuals with disabilities. The results of our study prove that the measures are not enough. As Miranda (2003) pointed out, the main reason

for a higher incidence of labour market non-participation among people with disability is not just the difficulties of finding a job according to their particularities, but also the existence of barriers that still exists in societies regarding access in institutions, public buildings, workplaces and public transportation.

Entry year in unemployment

Out of 2,376,253 registered spells, 26.7% start in 2008, 37.5% in 2009 and 35.8% have 2010 as the start date. Thus, the economic crises have a clear impact on incidence of unemployment in Romania. For both 2009 and 2010, the instantaneous hazard rate of exit to a job is lower than 1, compared with 2008, the reference year (Table A2 in the Appendix). Moreover, for both 2009 and 2010, the instantaneous hazard rate of exit in inactivity or due to expiry of legal period for U.I. eligibility is higher than 1, compared with the reference year. We can conclude that the exit rate from unemployment is very sensitive to the economic situation in Romania. In 2009 and 2010, the impact of economic crises led to negative consequences in the Romanian labour market. The spells with 2009 and 2010 as the start year are affected by Government Ordinance O.U.G. No.28/2009, that led to an artificial increase of the unemployment duration.

5. Conclusion

The aim of this article was to analyse determinants of unemployment spells and exit destinations in Romania, using a competing-risks modelling approach. The empirical analysis is based on a nationally representative micro-data-set, gathered from the National Employment Office of Romania. The results of the empirical analysis show that women have a 14% lower exit to a job hazard rate than men. Women are most prone to exit from unemployment due to expiry of the legal period for receiving unemployment allowance or to exit in inactivity than men. The gender gap increases for low-educated women and in the case of long-term unemployment. Also, the results of the study suggest that Romanian policies to reduce unemployment duration and to improve (re-)employment should be targeted towards individuals aged over 35 years, especially for women belonging to this age group. The group aged between 15 and 29 years is disadvantaged in the labour market, too. The results of our study strength the conclusion that measures of stimulating the introduction into the labour market of new graduates implemented until now by the Romanian government are not enough. Another target direction for policies-makers is to increase the level of education of the labour force. And a special attention has to be paid to achieving an education focused more for developing practical skills, like the vocational schools, foremen schools or post-high-schools. Individuals with a higher education have a better exit to a job chance compared with the other groups, but most of the time the job they receive is not according to their skills and level of education. A large proportion of them are hired in positions for individuals without a higher education, with a low salary, thus the investment in their education is practically lost. As the data suggest, having a higher education or having a post-high school education give the same exit to a job chances during the analysed period.

The gap between urban and rural living is important in Romania. Thus, in our opinion, Romanian policy-makers have to focus more on agriculture and its impact on development of rural areas. Unemployed men living in rural areas of Romania have a lower exit to a job

probability than women living in the rural areas. Previous work experience plays an important role on the exit to a job chances. Men are much more affected by the lackof previous work experience prior to entering unemployment than women. Disabled individuals are a vulnerable group in the Romanian labour market. Our results underline that the measures implemented by the Romanian government are not enough to combat social exclusion and to improve employment chances of individuals with a disability. The main reason for a higher incidence of labour market non-participation among people with a disability is not just the difficulties of finding a job according to their particularities, but also the existence of barriers that still exist in society regarding disabled access to institutions, public buildings, workplaces and public transportation. Again, men are much more affected than women by the presence of a disability (especially low-educated men, their work profile being more physical).

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Appendix

Table A1. Explanatory variables description.

Explanatory variable	Description
Gender	Dummy variable: 0 – women; 1 – men
Age	Values in between 15 and 65 years, analysed as a metric variable and also distinctively, with the following intervals: 15–24; 25–34; 35–44; 45–54; and 55– 65
Education	Dummy variable with the following categories: 0 – for less than 4 years of study; 1 – gymnasium; 2 – apprenticeship complementary education; 3 – vocational school; 4 – high school; 5 – special education (for people with disability); 6 – foremen school; 7 – post-high school; 8 – short-term higher education (college); 9 – long-term higher education (university); and 10 – unknown level of education
Region of residence	Dummy variable with the following categories: 1– North-East Region; 2 – West Region; 3 – North-West Region; 4 – Central Region; 5 – South-East Region; 6 – South-Muntenia; 7 – Bucharest-Ilfov Region; and 8 – South-West Oltenia Region
Area of residence	Dummy variable: 0 – rural area; 1 – urban area
History on the labour market	0 if individuals do not have previous work experience, 1 if he/she has work experience
Marital status	Dummy variable with the following categories: 0 – unknown marital status; 1 – unmarried; 2 – married; 3 – widower; and 4 – divorced
Receiving or not U.I.[1]	Dummy variable: 0 – if the individual does not receive unemployment allowance during his/her current unemployment spell; 1 – if he/she doesreceive unemployment allowance during the current unemployment spell
Health status	0 without disability, 1 with disability
Registration year[2]	2008, 2009, 2010

[1]The only information that we had about unemployment allowance of the registered unemployed was if they got unemployment allowance or not during his/her current spell. We would like to underline that we estimated the effect of receiving unemployment allowance during the current spell on the duration of unemployment and exit destinations. This mention is important since we have in the dataset individuals that received unemployment allowance at one point, found a job, lost their job and came back in the registration as an unemployed person without receiving unemployment allowance and with a new spell, different from the previous one.

[2]This explanatory was introduced in the econometrical analysis in order to capture the impact of financial crisis for unemployment spells and exit destinations.

Source: Authors' own analysis.

Table A2. Results of the Cox proportional hazard model in a competing-risks framework, event (re-)employment.

	B	SE	Wald	df	Sig.	Exp(B)	95.0% CI for Exp(B) Lower	Upper
Variables in the Equation								
Gender								
Women	−0.151	0.003	3174.832	1	0.000	0.860	0.855	0.864
Men								
Age								
Age metric	−0.014	0.000	9568.596	1	0.000	0.986	0.986	0.987
15–24 years	0.468	0.007	4284.279	1	0.000	1.596	1.574	1.619
25–34 years	0.728	0.006	12705.569	1	0.000	2.071	2.045	2.097
35–44 years	0.457	0.006	5241.334	1	0.000	1.579	1.560	1.599
45–54 years	0.300	0.006	2187.039	1	0.000	1.349	1.333	1.366
55–65 years			Reference category					
Education								
<=4 years			Reference category					
Gymnasium	1.206	0.007	32345.659	1	0.000	3.341	3.297	3.385
Apprenticeship education	1.436	0.009	27066.002	1	0.000	4.205	4.134	4.278
Vocational school	1.572	0.007	51482.764	1	0.000	4.816	4.751	4.882
High school	1.443	0.007	42689.119	1	0.000	4.234	4.176	4.292
Special education	1.365	0.037	1370.004	1	0.000	3.916	3.643	4.210
Foremen school	1.503	0.016	8567.737	1	0.000	4.495	4.354	4.640
Post-high school	1.515	0.013	13561.905	1	0.000	4.550	4.436	4.668
College	1.596	0.036	1942.251	1	0.000	4.933	4.595	5.296
University education	1.493	0.008	36938.329	1	0.000	4.451	4.384	4.519
Unknown education	1.269	0.007	30861.308	1	0.000	3.559	3.509	3.610
Marital status								
Unknown	0.344	0.017	392.105	1	0.000	1.411	1.363	1.459
Unmarried	0.125	0.017	52.274	1	0.000	1.133	1.095	1.172
Married	0.307	0.017	327.402	1	0.000	1.360	1.315	1.406
Widowers	0.179	0.019	92.139	1	0.000	1.196	1.153	1.241
Divorced			Reference category					
Region of residence								
North-East	0.341	0.005	4936.263	1	0.000	1.406	1.393	1.420
West	0.535	0.005	9978.498	1	0.000	1.707	1.690	1.725
North-West	0.246	0.006	1960.597	1	0.000	1.279	1.265	1.293
Central	0.223	0.005	1704.096	1	0.000	1.250	1.237	1.263
South- East	0.200	0.006	1282.046	1	0.000	1.222	1.208	1.235
South-Muntenia	0.362	0.005	5350.267	1	0.000	1.436	1.422	1.450
Bucharest- Ilfov	0.120	0.007	313.501	1	0.000	1.127	1.113	1.142
South Oltenia			Reference category					
Rural or Urban area of residence								
Rural Area	−0.470	0.003	26830.030	1	0.000	0.625	0.622	0.629
Urban Area			Reference category					
Unemployment allowance during the current spell								
Without UI	1.418	0.005	87290.096	1	0.000	4.128	4.090	4.167
With allowance			Reference category					
Labor market history								
Without work exp.	−0.260	0.005	3060.477	1	0.000	0.771	0.764	0.778
With work exp.			Reference category					
Health status								
Without disability	0.312	0.035	81.081	1	0.000	1.367	1.277	1.463
With disability			Reference category					
Entry year in unemployment								
2008			Reference category					
2009	−0.379	0.003	15335.069	1	0.000	0.684	0.680	0.688
2010	−0.036	0.003	116.456	1	0.000	0.964	0.958	0.971

Source: Dănăcică, D. (2013), *Cercetări privind Durata Șomajului și Probabilitatea (Re)Angajării* [Researches regarding Unemployment Duration and (Re)Employment Probability], Postdoctoral thesis, Bucharest: Romanian Academy Publishing House, p. 172–173 and authors's estimation using SPSS 17.0.

Table A3. Results of the Cox proportional hazard model in a competing-risks framework, event expiry of legal period for receiving unemployment allowance.

			Variables in the Equation				95.0% CI for Exp(B)	
	B	SE	Wald	df	Sig.	Exp(B)	Lower	Upper
Gender								
Women	0.199	0.003	5230.071	1	0.000	1.221	1.214	1.227
Men								
Age								
15–24 years	2.066	0.007	80654.475	1	0.000	7.891	7.780	8.005
25–34 years	1.097	0.007	28101.551	1	0.000	2.994	2.956	3.033
35–44 years	0.265	0.006	1749.078	1	0.000	1.304	1.288	1.320
45–54 years	0.041	0.006	41.395	1	0.000	1.042	1.029	1.056
55–65 years			Reference category					
Education								
<=4 years			Reference category					
Gymnasium	0.839	0.008	11755.432	1	0.000	2.313	2.278	2.348
Apprenticeship education	0.933	0.009	9909.011	1	0.000	2.543	2.497	2.590
Vocational school	0.843	0.008	11405.210	1	0.000	2.323	2.287	2.359
High school	1.039	0.008	17905.934	1	0.000	2.828	2.785	2.871
Special education	1.307	0.030	1873.169	1	0.000	3.695	3.483	3.921
Foremen school	0.745	0.017	1977.682	1	0.000	2.107	2.039	2.177
Post-high school	1.030	0.013	6018.962	1	0.000	2.802	2.730	2.876
College	0.916	0.036	649.784	1	0.000	2.499	2.329	2.681
University education	1.185	0.009	19364.554	1	0.000	3.271	3.217	3.327
Unknown education	0.969	0.008	13148.283	1	0.000	2.635	2.591	2.679
Marital status								
Unknown	0.028	0.017	2.695	1	0.101	1.029	0.995	1.064
Unmarried	0.278	0.017	276.413	1	0.000	1.320	1.278	1.364
Married	0.063	0.016	14.543	1	0.000	1.065	1.031	1.099
Widowers	−0.006	0.018	0.120	1	0.729	0.994	0.959	1.030
Divorced			Reference category					
Region of residence								
North-East	0.008	0.005	2.772	1	0.096	1.008	0.999	1.018
West	−0.118	0.005	472.389	1	0.000	0.889	0.879	0.898
North-West	−0.087	0.005	290.954	1	0.000	0.916	0.907	0.926
Central	−0.191	0.005	1493.392	1	0.000	0.826	0.818	0.834
South- East	−0.091	0.005	299.127	1	0.000	0.913	0.904	0.923
South-Muntenia	−0.060	0.005	160.341	1	0.000	0.941	0.933	0.950
Bucharest- Ilfov	−0.364	0.007	2771.337	1	0.000	0.695	0.686	0.705
South Oltenia			Reference category					
Rural or Urban area of residence								
Rural Area	0.087	0.003	938.645	1	0.000	1.091	1.085	1.097
Urban Area			Reference category					
Labor market history								
Without work experience	−1.54	0.004	131529.795	1	0.000	0.213	0.212	0.215
With work experience experience			Reference category					
Health status								
Without disability	−0.430	0.032	177.652	1	0.000	0.650	0.611	0.693
With disability			Reference category					
Entry year in unemployment								
2008			Reference category					
2009	0.144	0.004	1657.835	1	0.000	1.155	1.147	1.163
2010	1.237	0.004	88255.859	1	0.000	3.445	3.417	3.473

Source: Dănăcică, D. (2013), *Cercetări privind Durata Șomajului și Probabilitatea (Re)Angajării* [Researches regarding Unemployment Duration and (Re)Employment Probability], Postdoctoral thesis, Bucharest: Romanian Academy Publishing House, p. 174–175 and authors's estimation using SPSS 17.0.

Table A4. Results of the Cox proportional hazard model in a competing-risks framework, event inactivity.

							95.0% CI for Exp(B)	
	B	SE	Wald	df	Sig.	Exp(B)	Lower	Upper
Gender								
Women	0.649	0.010	4147.543	1	0.000	1.913	1.876	1.951
Men								
Age								
15–24 years	0.687	0.019	1260.578	1	0.000	1.987	1.913	2.064
25–34 years	−0.693	0.016	1968.432	1	0.000	0.500	0.485	0.516
35–44 years	−2.268	0.017	17867.779	1	0.000	0.104	0.100	0.107
45–54 years	−1.325	0.013	10334.737	1	0.000	0.266	0.259	0.273
55–65 years				Reference category				
Education								
<=4 years				Reference category				
Gymnasium	0.807	0.026	961.710	1	0.000	2.242	2.131	2.359
Apprenticeship complementary education	0.905	0.034	698.061	1	0.000	2.471	2.311	2.643
Vocational school	0.996	0.027	1398.842	1	0.000	2.708	2.570	2.853
High school	1.116	0.026	1791.459	1	0.000	3.053	2.899	3.215
Special education	1.248	0.111	125.480	1	0.000	3.482	2.799	4.332
Foremen school	1.478	0.036	1652.692	1	0.000	4.383	4.081	4.706
Post-high school	1.281	0.041	956.884	1	0.000	3.598	3.318	3.903
College	1.191	0.113	110.643	1	0.000	3.292	2.637	4.110
University education	1.292	0.029	2031.534	1	0.000	3.638	3.440	3.849
Unknown education	0.305	0.032	87.980	1	0.000	1.356	1.273	1.446
Marital status								
Unknown	−0.022	0.044	0.245	1	0.621	0.978	0.897	1.067
Unmarried	−0.146	0.042	11.951	1	0.001	0.864	0.796	0.939
Married	0.059	0.040	2.169	1	0.141	1.061	0.981	1.147
Widowers	−0.103	0.047	4.856	1	0.028	0.902	0.824	0.989
Divorced				Reference category				
Region of residence								
North-East	0.119	0.018	44.411	1	0.000	1.127	1.088	1.167
West	0.045	0.020	5.392	1	0.020	1.046	1.007	1.087
North-West	0.008	0.019	0.168	1	0.682	1.008	0.971	1.046
Central	0.104	0.017	35.297	1	0.000	1.109	1.072	1.148
South- East	−0.036	0.019	3.586	1	0.058	0.964	0.929	1.001
South-Muntenia	0.052	0.018	8.500	1	0.004	1.053	1.017	1.091
Bucharest- Ilfov	−0.062	0.022	7.811	1	0.005	0.940	0.899	0.982
South Oltenia				Reference category				
Rural or Urban area of residence								
Rural Area	−0.215	0.010	429.311	1	0.000	0.807	0.790	0.823
Urban Area				Reference category				
Labor market history								
Without previous work experience	−1.547	0.016	9319.599	1	0.000	0.213	0.206	0.220
With previous work experience				Reference category				
Health status								
Without disability	−0.618	0.110	31.889	1	0.000	0.539	0.435	0.668
With disability				Reference category				
Entry year in unemployment								
2008				Reference category				
2009	0.309	0.012	624.425	1	0.000	1.362	1.329	1.395
2010	1.487	0.015	9419.669	1	0.000	4.425	4.294	4.560

Source: Dănăcică, D. (2013), *Cercetări privind Durata Șomajului și Probabilitatea (Re)Angajării* [Researches regarding Unemployment Duration and (Re)Employment Probability], Postdoctoral thesis, Bucharest: Romanian Academy Publishing House, p. 175–176 and authors's estimation using SPSS 17.0.