

6. THE EFFECT OF ACADEMIC SPECIALIZATION ON UNEMPLOYMENT SPELLS AND (RE) EMPLOYMENT HAZARD OF HIGHLY EDUCATED INDIVIDUALS IN ROMANIA

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Abstract

The aim of this empirical study is to estimate the effect of academic specialization on unemployment spells and (re)employment hazard of highly educated individuals from Romania. A new insight into the problem of unemployment duration and exit destinations of Romanian highly educated individuals is depicted in this paper. A large and complex dataset is analyzed using specific econometric techniques. The obtained results can be useful for labor policy-makers.

Keywords: unemployment; spells; econometric modelling; events; survival; hazard

JEL Classification: J64

1. Introduction

Unemployment is a complex phenomenon which influences all the economic, social and political structures of a society. There are numerous studies in the literature that underline the *economic* (Arulampalam, 2001; Browning și Crossley, 2001; Knight and Lee, 2006; Fitzenberger and Wilke, 2007; Geewax, 2011; Dănăcică, 2013; Nichols *et al.*, 2013; Constantinescu, 2015, p. 136), *social* (White, 1991, p.19; Andrienko, 2001; Burdett *et al.*, 2004; Huang *et al.*, 2004; Edmark, 2005; Krug *et al.*, 2019) and *individual* (Stankunas *et al.*, 2006; Oreopoulos *et al.*, 2008; Sullivan and von Wachter, 2009; Kassenboehmer and Haisken-DeNew, 2009; Lindo, 2011; Browning and Heinesen, 2012; Wightman, 2012; Gregg *et al.*, 2012; Dănăcică, 2013, p. 45; Nordt *et al.*, 2015; Pinger, 2016; Latsou and Geitona, 2018) consequences that unemployment induces in both developing and developed countries. Unemployment has a negative impact on all individuals from all education categories. However, the impact of job loss has a higher magnitude for the group of highly educated individuals, due to the unique features of this labor force, their high expectations

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and aspirations, as well as the financial resources already invested in the formation and development of these individuals.

In recent years, against the backdrop of the higher education expansion in modern societies, the seemingly significant increase in the unemployment rate of highly educated individuals, underemployment and the magnitude of mismatches between the acquired aptitudes of the graduates and the skills required by the employers are topics that have attracted the researchers attention (Koen, 2006; Pauw *et al.*, 2008; Branson *et al.*, 2009; Olowe, 2010; Farooq, 2011; Broecke, 2012; Van Broekhuizen, 2016; Dănăcică, 2022).

A negative experience or a failure at the first contact with the labor market, manifested either by the individual's direct transition from student to unemployed status, or by the transition from student status to emigrant or inactive on the labor market, determines the deterioration of the labor force in whose professional training important financial resources and time have been invested (Mroz and Savage, 2006; Bartlett *et al.*, 2016; Dănăcică, 2022). Even after the end of the negative experience of unemployment, affected individuals have difficulties integrating into the labor market. Recent studies demonstrate a trans-generational negative effect induced by unemployment (Oreopoulos *et al.*, 2008; Gregg *et al.*, 2012; Pinger, 2016), proving that these difficulties do not stop only with the individual in question. Relatively recent research shows that underemployment and unemployment are phenomena with devastating negative effects on the lives of highly educated individuals (Bai, 2006; Li *et al.*, 2014). A positive experience at the first entry to the labor market of young highly educated graduates is therefore of major importance for their further development. The rigorous analysis of the unemployment of highly educated individuals is very important, because, in the period between 20 and 24 years, the foundations of the trajectory of individuals on the labor market and their career are laid (Levinsohn *et al.*, 2014; Oluwajodu *et al.*, 2015). Inevitable, a first negative experience on the labor market will generate long-term negative effects (Bartlett *et al.*, 2016).

Given the numerous studies that demonstrate a better (re)employment probability for highly educated individuals, we naturally wonder why, however, highly educated individuals struggle to find a job? As we know, full employment is not possible, but what are the factors that make the difference between an employed person and one without a job? Starting from this question, the aim of this research is to present a first attempt of analyzing the effect of academic specialization on the unemployment spells exit destinations and exit to a job hazard of highly educated individuals in Romania. We investigate what is hidden behind the unemployment spells of highly educated individuals and why some individuals experience longer unemployment duration and different exit states than others. To our knowledge, until now, there is no study for Romania that investigates the effect of academic specialization on the unemployment spells, thus the paper fills a gap in the specialized literature too. New insights regarding unemployment spells and exit destinations of Romanian highly educated individuals, using recent data, are presented as follows.

2. Literature Review

Over time, a number of studies focused on unemployment of highly educated individuals, as well as the effect of factors influencing the unemployment spells, the exit states and the exit to a (new) job have been published. The results are mixed. Foley (1997) proved that there were no significant differences between the unemployment duration of highly educated individuals and individuals with a secondary or even primary education level on the Russian labor market, during 1992-1994. Perhaps counter to expectations, the highly educated individuals do not seem to find jobs faster than the less educated, and university graduates

remain unemployed for a longer period of time before exiting the labor force. A different result is obtained by Grogan and van den Berg (2001) for the same Russian labor market, but for the period 1994-1996. Highly skilled workers who lost their jobs after October 1994 had a shorter unemployment duration than those with a lower educational level. The two authors pointed out that, although the variables describing the unemployment duration and the econometric approach used in Foley's (1997) study are different from their approach, the obtained results emphasize that the employment situation in Russia has changed over time, in favor of better educated individuals. The effect of education on the unemployment duration in Finland was investigated by Kettunen (1997), proving that education has a positive effect on the exit to a job hazard up to about 13-14 years of schooling. The reemployment hazard decreases as the level of schooling exceeds this point. Masters and PhD graduates have difficulties finding a job that match their training and aspirations. The results of the study underlined that the risk of job loss for highly educated individuals was quite low, but when it occurred, unemployment for this educational group could be a long-term problem. Later, Ollikainen (2006) demonstrated that education had a significant positive effect on reducing the unemployment duration in Finland, especially for unemployed women, and higher education contributed to the reduction in gender differences in this labor market, having an equalizing effect. Once again, we may see how the employment of highly educated individuals changes for better over time.

In countries such as Slovakia, UK, Belgium, Ireland, Slovenia, Poland, Romania, Germany, France and US, a higher level of education lowers the risk of unemployment, shortens unemployment duration and determines higher re-employment chances than other educational groups (Lubyova and van Ours, 1997; D'Agostino and Mealli, 2000; Domadenik and Pastore, 2004; Farber, 2004; Lauer, 2000; Dănăciță, 2013). In the case of Spain and Greece, university education does not have a significant effect on reducing the unemployment duration (D'Agostino and Mealli, 2000). In contrast, for the Netherlands, the results obtained by Wolbers (2000) proved that highly educated individuals were more likely to lose their job during their active life as compared to vocational education graduates and that there were minor differences between the exit to a job probability of individuals with secondary education and those with tertiary education. Naong (2011), underlined that the reason why some highly educated graduates found it difficult to find a job was that either they chose the wrong field in which they specialized, or the country's educational system did not provide them with the necessary skills to be employed. Salas-Velasco (2007) analyzed the determinants of transition from student enrolled in a higher education institution to employment for nine European countries and proved the existence of disparities between Northern Europe and the South in the probability to find a job for the first time of highly educated graduates. His results confirmed the hypothesis that the educational field and academic specialization play an important and significant role in the probability of finding a first job. Walker (2015) showed that there was a link between the unemployment of highly educated graduates and the universities they graduated from. A significant percentage of employers prefer to hire graduates of universities with tradition, which guarantee a quality education. A similar conclusion is also highlighted by Bradley and Nguyen (2004) and Jun and Fan (2011), the reputation enjoyed by some higher education institutions positively and significantly influences the probability of graduates to find a job. According to Bartlett *et al.* (2016, p. 8), having a higher education diploma generates advantages on the labor market in the Western Balkans region. 16.2% is the average unemployment rate of highly educated individuals, as compared to 23.9% for the entire workforce. However, the authors pointed out that the unemployment rate of recent graduates entering the labor market is 37.1%, which suggests the existence of a difficult transition from the recent graduate status to employment. In all

educational fields, and especially in the field of business administration and law, there is a surplus of highly educated individuals in the Western Balkans region. According to authors, the sectors with the fastest growth of jobs for highly educated individuals are the information sector, construction, finance and insurance, communications, etc. Therefore, labor market integration of young university graduates and their subsequent career is also influenced by their academic specialization.

Depending on the academic specialization, the duration until finding a job according to their own aspirations is higher for some graduates than for others (Mncayi, 2016). Acquah (2009) and Walker (2015) proved that in the South African labor market, science and engineering graduates had a higher probability of finding a job as compared to humanities graduates. A similar result is also obtained by Lim and Lee (2019), who pointed out differences in the Korean students' preparation for labor market, depending on the chosen academic specialization or the characteristics of the higher education institution for which they have opted. Thus, social sciences, humanities, arts graduates have a poorer preparation for a successful transition from student to employee, as compared to the graduates of engineering sciences, natural sciences, educational sciences, medicine and pharmacy. Also, a number of recent studies have argued that the training offered by higher education institutions has a pronounced theoretical character and neglects practical aspects related to preparing students for their future job. According to these studies, companies have unrealistic expectations about the practical skills that young graduates have, when searching for a first job (Dai *et al.*, 2008; Griesel and Parker, 2009). Another potential contributing factor to graduate unemployment is that individuals have high expectations regarding wages and refuse job offers that are not in line with their own aspirations.

In Romania, the employment and unemployment of highly educated labor force is an insufficiently investigated topic. Angelescu *et al.* (2010) analyzed the graduate-to-employee transition and labor market integration of highly educated individuals. The results of the analysis showed that university graduates succeeded in a good integration on the Romanian labor market (60.9% one year after graduation), but also emphasized that, if we took into account the fact that almost 12.5% of them already had a job after graduation and almost half of them had been working since college, the process of insertion into the labor market of young graduates did not seem to be a linear one. Florea and Oprean (2010) and Naghi (2014) analyzed aspects related to the insertion of highly educated graduates into the labor market, massification of higher education in Romania, inadequate skills in relation to market requirements and under-employment of higher education graduates. Using a Cox proportional hazard model in a competing risks approach, Dănăcică (2013) proved that higher education had a significant and positive effect on the unemployment duration and the exit to a job hazard for the 2008-2010 period, but not as strong as we would have expected.

3. Data and Variables

The empirical analysis is based on a nationally representative dataset provided by the National Agency of Employment Romania (NAE). The dataset had information about 198,021 unemployment spells of highly educated individuals, registered as unemployed between January 1st 2014 and October 31st 2017 at NAE. Unemployment spells can start anytime between January 1st 2014 and October 31st 2017. Regarding the exits from unemployment, November 16, 2017 is considered as the final observation date.

From this initial dataset we removed individuals under the age of 21 and over 65 years old. The negative unemployment durations, spells belonging to individuals who had specified "post-high-school" education and records for which there was a conflict between the age

and the educational level of individual were removed, too. After this initial processing of the dataset, the total number of unemployment spells decreased to 151,034. Out of all 151,034 registered unemployment spells², 23,192 spells, representing 15.36%, are spells without an exit date from unemployment, spells still ongoing at November 16, 2017 or the individuals were lost from observation. For each spells registered at NAE we had information about entry year into unemployment, county where the individual lived, whether the individual received unemployment indemnity (UI) during his/her current spell, the amount of compensation received as financial support, gender, number of the file, registration date, exit date, the reason of unemployment, education, age, whether the individual had previous work experience or not, whether the individual had a normal health status or disabilities, ethnicity of the individual, the type of locality where the unemployed was domiciled, urban or rural area where the individual lived, the Romanian Occupation Code (ROC) for each individual at the time of registration, occupation of individual according to the legislation of ROC, the reason of exit from registration and whether or not the individual attended courses for the unemployed organized by NAE.

The main objective of this research is to investigate the impact of academic specialization on unemployment spells and exit to a job hazard of highly educated individuals. We did not receive information about academic specialization of the unemployed registered at NAE as a distinctive variable. However, the variables occupation and ROC gives us information related to the academic specialization of each individual. There are several thousand different variants for the occupation variable in the data set and 61 spells did not mention the occupation of individuals to whom they belong. Because it is not possible to process all these categories, we coded the occupation variable, taking into account the ROC, as follows: 1-individuals who at the entry date in unemployment were registered with ROC and occupation specific to higher economic studies; 2- individuals who at the date of registration in unemployment were registered with ROC and occupation specific to higher engineering studies, architecture and urbanism; 3- individuals who at the date of registration in unemployment were registered with ROC and occupation specific to higher medical studies (this group also includes dentists, nurses with a higher education, veterinarians, dental technicians, physiotherapists, medical researchers, medical research assistants); 4 - individuals who at the date of registration in unemployment were registered with ROC and occupation specific to law studies; 5 - individuals who at the date of registration in unemployment were registered with ROC and occupation specific to higher education in psychology, sociology, social assistance, pedagogy; 6 - individuals who at the date of

² *The Romanian confidentiality law of personal data does not allow access to information related to the names of the unemployed or their personal numerical code, after which they could be identified. It is possible to have in the dataset unemployment spells belonging to the same person. However, we got information about the number of each personal file of the unemployed. Using Statistical Package for the Social Sciences (SPSS), we were able to detect 16,683 duplicated cases, using information regarding the number of each personal file of the unemployed. Because in some of these cases identified by SPSS as a duplicate, between the first and second unemployment spell there is more than one year difference and because, during a first spell, the individual received unemployment indemnity, and during the second spell, the individual did not receive unemployment indemnity, and for some variables we have different variants or values of them, we could not conclude that these spells belonged to the same individual and we could not unite them. Therefore, in the empirical analysis we used all 151,034 unemployment spells and we underline that we used as unit of the analysis unemployment spells, rather than individuals.*

registration in unemployment were registered with ROC and occupation specific to higher education in the field of acting, directing, scenography; 7 - individuals who at the date of registration in unemployment were registered with ROC and occupation specific to higher education in geography, history, archeology; 8 - individuals who at the date of registration in unemployment were registered with ROC and occupation specific to higher education in humanities and journalism, 9 - individuals who at the date of registration in unemployment were registered with ROC and occupation specific to higher studies in mathematics, physics, chemistry and biology; 10 - all other individuals belonging to other specializations and occupations, 11- unspecified occupation. Beside the effect of academic specialization on unemployment spells, exit destinations from unemployment and (re)employment hazard, we estimated the effect of other variables on unemployment spells too, such as gender, age, region, urban/rural area, ethnicity, etc. In Table A1 from the online Appendix, we present in a systematic form the variables of the study.

For each unemployment spell, we received information about the reason why the spell ended (deactivation from NAE record). For the 127,842 completed unemployment spells, with the date of entry and exit from unemployment, there are 30 different reasons for exit from unemployment specified. Out of all 127,842 completed spells, 78,085 spells, representing 61.08% of their total, are spells without an exit reason and 16 spells ended due to the death of the individual. The 16 spells of unemployment ended by the death of the individual are not used in the econometric analysis.

Since it is not possible to estimate the survival and hazard function for each of these 30 exit reasons, we created five categories, as follows: 1- exit from unemployment due to (re)employment or earning a monthly income higher than the social reference indicator (SRI) value; 2- exit from unemployment due to the expiry of the legal period for receiving unemployment indemnity (UI); 3- exit from unemployment due to personal negligence or personal decision; 4- exit from unemployment in inactivity (non-participation) on the Romanian labor market; and 5- spells with an unclear status of the individual or without a specified reason for leaving unemployment. Spells without a specified reason for exit from unemployment and spells ended due to the reason "canceled by the operator" are included in this group too. These five categories are, in fact, expected events in econometric modeling using the Kaplan-Meier estimator and the Cox proportional hazard model, in a multi-risks approach.

In Figure A1 from the online Appendix we present the histogram of analyzed spells, and in Figure A2 from the online Appendix we present the histogram of spells ended by employment/re-employment or due to obtaining a monthly income higher than the SRI value. From the analysis of these histograms, we may notice an obvious association between the unemployment duration and the legal period of receiving unemployment benefits. Table A2 from the online Appendix presents the central tendency statistics for the analyzed unemployment spells. Unemployment spells have a positive asymmetric and leptokurtic distribution. The distribution of the completed analyzed spells, without deceased individuals, by the exit from unemployment reasons is the following: 19.5% spells ended due to (re)employment or earning a monthly income higher than the SRI value, 9.2% spells were deactivated due to expiry of the legal period for receiving UI, 8.9% spells were deactivated due to personal negligence or individual decision, 1.1% spells ended due to non-participation on the Romanian labor market and 61.3% spells have an unclear reason for exit from unemployment. Due to the lack of space, a detailed description of the database will be provided upon request.

In the next section, we use the Kaplan-Meier estimator and the Cox proportional hazard model in a competing-risks approach to estimate the effect of the above presented variables on the unemployment spells and exit destinations of Romanian highly educated individuals.

4. Results of the Econometric Analysis

Using the Cox proportional hazard model with five possible events and the Kaplan-Meier estimator, we analyzed the effect of academic specialization and of the other above presented explanatory variable on the unemployment spells, exit destinations and (re)employment hazard of highly educated individuals registered as unemployed in Romania. In our competing-risks approach, the probability of exit from unemployment due to one of the five possible events is estimated by reducing the model to a single-risk one and right-censoring all the spells deactivated due to other event than the one considered. We have the following regression equation:

$$\lambda_i(t) = \lambda_0(t) \cdot e^{\beta_1(\text{gender}) + \beta_2(\text{age}) + \beta_3(\text{education}) + \beta_4(\text{academic_specialization}) + \beta_5(\text{region}) + \beta_6(\text{area}) + \beta_7(\text{work_experience}) + \beta_8(\text{indemnity}) + \beta_9(\text{UI_type}) + \beta_{10}(\text{abs}) + \beta_{11}(\text{ethnicity}) + \beta_{12}(\text{locality_type}) + \beta_{13}(\text{training})}$$

where: $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}, \beta_{12}, \beta_{13}$ are the regression coefficients, $\lambda_0(t)$ is the baseline hazard and $\lambda_i(t)$ is the hazard rate. The hazard rate measures the probability of an individual who is still unemployed at the “ t ” time (day) to exit to a job, exit due to expiry of legal period for UI, exit due to unemployed own fault or exit in inactivity in the very next day.

We estimated the effect of academic specialization and of the other explanatory variables on unemployment spells and exit destinations for all the five described events. Of course, the most important event, to which we will give due attention, is the 1st event, exit to a job or due to earning a monthly income higher than the value of SRI hazard of unemployed. Cox regression results in a multiple risk approach are shown in Tables A3-A7 from the online Appendix. Data processing was performed using the SPSS software version 25. All the explanatory variables are entered simultaneously in the model, and the Enter method was used. To test the differences observed between subpopulations, we used the Wald test. The reference category is the first for all explanatory variables. We can notice that when the expected event is exit from unemployment due to (re)employment or due to earning monthly income higher than the SRI value, except for gender and ethnicity variables, all the other explanatory variables have a significant effect on the unemployment duration and exit from unemployment due to event 1 hazard.

The regression analysis emphasized that the academic specialization had a significant effect, causing differences between highly educated individuals, in terms of unemployment duration and exit destinations. Highly educated unemployed with medical studies have a 13.9% higher probability of exit to a job or exit due to earning a monthly income higher than SRI value than unemployed who graduated economics, the reference category. The result is statistically significant (Table A3 from the online Appendix.). This group also records the lowest median survival time in unemployment until exit due to the event 1 (Table A8 from the the online Appendix). Individuals with a higher education in engineering, architecture and

urbanism have a 4 % higher probability of exit to a job or exit due to earning a monthly income higher than SRI value than unemployed with a higher education in economics. However, the unemployed with a higher education in Law, psychology, sociology, anthropology, social work, acting, scenography, geography, history, archeology or philology and journalism have a lower probability of exit to a job or exit from unemployment due to earning a monthly income higher than the SRI value compared to unemployed with a higher education in economics, the reference category. We must underline that, in the category of those with other academic specializations and occupations, there are individuals that could belong to the group of those with higher education in economics or engineering (or other groups); but because it is not possible to know exactly the academic specialization, these individuals are found in the category of other specializations and occupations. We underline that the exit from unemployment due to event 1 probability for the group of individuals with higher education in economics, engineering or Law can be, therefore, underestimated.

Unemployed with higher education in Law, those with university studies in geography, history, archeology, those with university studies in philology and journalism and those with other academic specializations and occupations are more prone to end their unemployment due to the expiry of the legal period stipulated for receiving unemployment benefits. Unemployed with higher medical education have a 90.2% higher probability of exit to non-participation in the Romanian labor market compared to the reference category, and the difference is highly significant. Unemployed with higher medical education have the highest probability of exit unemployment due to leaving abroad for a period less or greater than 3 months. The result is an image of the exodus of medical staff from Romania.

Because the academic specialization variable is of major importance for the research, in Figure A3 from the online Appendix the hazard function for the different categories of academic specializations, when the event is (re)employment or obtaining a monthly income higher than the SRI value is presented. During the whole period, the instantaneous hazard of exit to a job for the individuals with medical studies is higher, compared to the other categories. Therefore, the result of the empirical analysis highlights the fact that, on the Romanian labor market, medical academic specializations offer the best chance of exit to a job. A low median survival time in unemployment until event 1 occurs is registered for individuals with a higher education in engineering, architecture and urbanism, economics, Law studies, mathematics, physics, chemistry and biology too.

Regarding the effect of the other variables, the results show that the regression coefficient for gender is positive, which means a 0.3% higher probability of event 1 occurrence for highly educated women than men, the reference category. But, according to the result of the Wald test, this gender gap is not significant. Same lack of statistical significance for the gender gap is registered for spells ended due to event 2, expiry of the legal period for receiving unemployment allowance (Table A4 from the online Appendix). We may also notice that highly educated women have 12.3% lower probability of exit from unemployment due to negligence or personal decision and a 74.6% higher hazard rate of exit to inactivity than men, the reference category (Table A5 and A6 from the online Appendix). Because the Kaplan-Meier analysis showed the existence of statistical significance for the effect of gender on the unemployment spells, we investigated the singular effect of gender on the hazard of event 1. The results are presented in Table A9 from the online Appendix. Analyzed individually, the gender variable had a significant effect on the unemployment spells and (re)employment hazard. Highly educated women are 3.5% less likely to exit to event 1 than highly educated men, a similar result to that offered by the Kaplan-Meier analysis. This result shows that there is a gender disparity on the Romanian labor market even in the case of highly educated individuals, but much lower than that found by Dănciă (2013), for all

educational groups. Women are still discriminated against by employers, mainly because of motherhood. However, higher education reduces the disparities between men and women and offers more opportunities for employment or (re)employment for women.

Age has a significant and strong effect on unemployment spells and exit destinations of highly educated unemployed. As the values of the age variable increase, the hazard of producing the expected event 1, exiting unemployment due to (re)employment or due to obtaining monthly incomes higher than the SRI value decreases, the most vulnerable being the unemployed graduates of higher education of age over 50 (Table A3 from the online Appendix). They also record the longest unemployment duration until event 1 occurs. At-risk individuals, of age over 50, are protected by seniority laws on the labor market, but when unemployment does occur, they have the longest duration of unemployment and the lowest likelihood of reemployment, with many exiting from unemployment through retirement. The group of individuals over 50 (and especially women over 50) must be supported by the competent authorities through effective, active and passive measures to combat unemployment, social exclusion, discrimination and improve their (re)employment chances. When the expected event is 2, leaving unemployment due to the expiry of the legal period to receive unemployment indemnity, all the age groups have negative coefficients as compared to the reference category, the unemployed with higher education and age below 25 years. Young individuals below the age of 25 have the highest instantaneous hazard of leaving the NAE record due to the expiry of the legal period to receive unemployment indemnity (some of them are recent graduates, entitled to receive unemployment indemnity for a maximum period of 6 months), the highest hazard of leaving unemployment due to negligence or one's own decision and the highest hazard of leaving unemployment due to the transition to a form of non-participation on the Romanian labor market (Table A4 from the online Appendix).

Regarding the education variable, we may notice that a highly educated unemployed with a bachelor's degree has 15.5% higher exit event 1 hazard than the reference category (Table A3 from the online Appendix). The result is statistically significant. An unexpected result is obtained for the group of individuals with higher education - cycle 2 master, who have a negative regression coefficient, which means that highly educated individuals graduating from cycle 2 master have at any time a 21.5% lower probability of leaving unemployment due to (re)employment or due to earning a monthly income higher than the SRI than the reference category (Table A3 from the online Appendix). The result is highly significant. Although they have a high educational level, these individuals have the highest median survival time in unemployment until finding a (new) job (Table A8 from the online Appendix). This shows, on the one hand, that the labor market cannot accommodate such a large number of graduates with a master's degree and, on the other hand, a rigidity of this segment of the labor force.

As for the region variable, for event 1 we observe that all the regression coefficients are negative, therefore all regions have a lower exit to event 1 hazard as compared to the North-East region, the reference category. A highly educated unemployed living in the North-East region has the shortest median survival time until (re)employment (360 days), followed by the unemployed living in the West region (378 days) (Table A3 from the online Appendix). The observed differences are statistically significant. An explanation for the advantage of the North-East region, in addition to the specific economic profile, is found in the composition of the sample of this region. The North-East region has a low percentage of unemployed people over the age of 55, a high percentage as compared to other regions of graduates of medical higher education and the highest percentage, 64%, of non-UI unemployed, who have an active job search behavior clearly superior to the UI unemployed.

Surprisingly, highly educated unemployed with previous work experience have a 13.5% lower exit to event 1 hazard than highly educated unemployed without previous work experience. The median survival time in unemployment until exit to event 1 is 365 days for individuals without previous work experience, as compared to 588 days for those with previous work experience. This result is opposite to that obtained by Dăncă (2013), for all educational categories. A possible explanation for this particular result is related, in the case of the analyzed data set, to the composition of the two subpopulations, with or without previous work experience. The number of individuals below the age of 40 is significantly higher in the group of those with no previous work experience. Also, in this group there are more graduates with a bachelor's degree and significantly more graduates with medical academic specializations, these groups having better exit to event 1 probabilities than others.

Analyzing the results presented in Table A3 from the online Appendix, we notice that highly educated unemployed who receive unemployment indemnity in the amount of 75% of the SRI have a 77.3% lower exit to event 1 probability than those who receive unemployment indemnity in the amount of 50% of the SRI (plus the quotas specific to their contribution period). We also notice that SPSS does not return the estimated values for non-UI individuals and for individuals domiciled in the Bucharest region and signals the presence of collinearity between the UI type variable and locality type. We estimated the Cox regression for event 1 giving up the explanatory variables affected by collinearity. There are slight changes in the regression coefficients and hazard rates, naturally, because the analysis is very sensitive, and the number of explanatory variables has changed. However, the overall picture is the same, except for the variables affected by collinearity: for the area variable there is a positive regression coefficient for the urban area, and for the UI variable, a negative regression coefficient for the category of those with UI.

Regarding the ethnicity variable, there is a positive regression coefficient for ethnic Hungarians as compared to the reference category, and the difference is statistically significant. We emphasize, however, that when we use the Kaplan-Meier estimator and analyze the effect only of the ethnic variable on survival until event 1 occurs, no statistical significance is obtained for the obtained differences, and the ethnic variable does not significantly influence unemployment survival until event 1 (Table A8 from the online Appendix). Therefore, it is possible that the observed differences are not determined by the effect of the ethnicity, but rather by the sample composition of ethnic Hungarians (proportion of men and women, age of individuals, academic specialization, etc.). For the other ethnic groups there are no statistically significant differences as compared to the reference category.

The econometric analysis has as a starting point the proportional hazard assumption. To test it, we used one of the recommended graphical methods, namely the log-minus-log curve. If the lines corresponding to the different categories specific to each explanatory variable do not intersect and are parallel, then the assumption is verified. All the explanatory variables have similar log-minus-log curves. The specific log-minus-log curves for the analyzed variables do not intersect, thus the assumption of hazard proportionality is verified and the Cox proportional hazard model is fitted.

4. Conclusions

The aim of this research was to analyze the academic specializations that offer the best chances of employment at the first interaction with the labor market or the best chances of re-employment, in the situation where the initial job was lost. We also wanted to know what hides behind the unemployment spells of Romanian highly educated individuals, why some

individuals have shorter unemployment spells than others, different exit destinations from unemployment and different outcomes on the labor market. To carry out this analysis, we requested and received from NAE a complex and nationally representative dataset consisting of 198,021 unemployment spells, registered during January 1st, 2014 and October 31st 2017.

Our results highlight that education is a major importance factor for the unemployment spells and the integration (or reintegration) into the labor market of highly educated individuals. Not only the higher education is important, but especially the chosen academic specialization. The academic specialization has an important impact on the individual's active life and the chance to integrate or reintegrate into the labor market depends on this choice. Unemployed with a medical higher education have the shortest unemployment duration among all educational categories and the highest (re)employment hazard. Engineering studies, architecture and urbanism, economics, law, mathematics, physics, chemistry or biology studies offer a good (re)employment hazard or self-employment hazard for those who have opted for these academic specialization too. The results of the econometric analysis highlighted the existence of disparities between individuals with a higher education in humanities and those who graduated technical sciences or economics to the disadvantage of the first group. This result is similar to those obtained by Salas-Velasco (2007), Acquah (2009), Walker (2015) and Lim and Lee (2019). However, we underline that we have in the data set individuals with occupations that do not provide clear indications related to their academic specialization (they can be graduates of economics, graduates of law or graduates of engineering). These occupations have been categorized as "other specializations and occupations". Thus, the exit from unemployment hazard for the graduates of economics, engineering or law may be underestimated. This is one of the limitations of the research carried out in this paper. The second one is related to the large number of spells with no mention of the reason why these individuals left unemployment.

Another important conclusion, which emerges from the econometric analysis, is related to the large number of individuals with a master degree, registered as unemployed during the analyzed period, an unfortunate image of the massification of these programs. In the analyzed data set there is a consistent number of unemployment spells belonging to highly educated individuals but who, at the time of job loss, were employed in jobs specific to secondary education, below their level of training and not in line with their academic specialization. Unfortunately, there is no information provided on the type of job found by highly educated individuals who exit from unemployment through (re)employment. It would have been very interesting to analyze whether there is a correlation between their academic specialization and the job profile found. Future research directions will focus on this topic.

The results also proved a gender gap regarding unemployment duration and (re)employment probabilities. The median survival time until the occurrence of event 1 is 488 days for men and 547 days for women. If we analyze the singular effect of the gender in the Cox model we notice that highly educated women are 3.5% less likely to exit to a job or exit due to earning a monthly income higher than SRI, compared to highly educated men. However, the gender disparity is mitigated by the presence of higher education. Age has a significant effect on the unemployment spells and exit to a job hazard of highly educated individuals. The empirical analysis shows a direct association between age and unemployment duration. Highly educated unemployed over the age of 50 are the most vulnerable group. If they are also female, the vulnerability increases. Each region of Romania has specific demographic and socio-economic peculiarities, which exert a significant influence on the unemployment duration and (re)employment probability of

individuals affected by unemployment, in general, and those highly educated, in particular. The existence of disparities shows a lack of convergence regarding Romania's regional development. It is desirable to have a uniform regional development and avoid gaps that can, in the long term, lead to inter-regional migration, demographic and social problems. Attracting investments and creating new jobs for the South-West, South-East and North-East regions, considered the poorest regions in the European Union, can contribute to achieving economic and social cohesion. The regional differences regarding the unemployment duration and the (re)employment probability are useful to be investigated in future research, in correlation with the economic profile of each region and its degree of development.

The obtained results reinforce the previous conclusions (Dănăciță, 2012 and 2013), the unemployment benefits system must be rethought, because the granting of unemployment benefits obviously has a negative role on the searching for a job behavior of individuals. From the analysis of statistical data, it is easy to see an obvious dependence between the duration spent in unemployment and the maximum legal period for which an individual can receive unemployment allowance. Not only receiving unemployment allowance had negative effects on the searching for a job behavior, but also its amount. Unemployment of highly educated individuals seems to have at least for a specific time, a voluntary component too.

As future research directions, we want to analyze the association between the unemployment duration of highly educated individuals and their post-unemployment wages and aspects related to the over-specialization of individuals and its effect on the labor market.

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