UNEMPLOYMENT OF HIGHLY EDUCATED DISABLED INDIVIDUALS IN ROMANIA

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Abstract

The main objective of this research is to investigate whether the type of disability has a significant impact on the unemployment spells, exit destinations and (re)employment hazard of highly educated disabled individuals in Romania. The effect of other explanatory variables relevant to the study, such as the gender of disabled individuals, their age, education, academic specialization, region etc., on the unemployment spells, exit destinations and (re)employment hazard is analyzed too. Disabled individuals form a special social category, vulnerable and subject to the risk of social exclusion. The results offer the possibility to identify the most vulnerable among the vulnerable, i.e. the groups affected by the disabilities that raise the biggest problems regarding the insertion or reintegration on the labor market. The study highlights the discrimination against highly educated individuals affected by mental disabilities and is a mirror for the stigma they are affected by entering the labor market. The study emphasize the existence of a double or even multiple vulnerability too, determined by the presence of several elements that disadvantage the individual, such as the triad of mental disability - female - age over 40 years.

Keywords: *disability, unemployed, exlusion, hazard, discrimination*

Clasificare JEL: *J64, J71, J83*

1. Introduction

Disabled individuals are a special group, subject to social risk, being often affected by exclusion from community life. In an attempt to integrate into society, disabled individuals have to deal with physical, organizational, economic and social barriers. Creating equal opportunities for disabled individuals, combating discrimination and improving the life quality of individuals belonging to vulnerable social groups is a major concern of national and international organizations. Despite all these efforts, the labor market integration of disabled individuals' remains a challenge, both for developed and especially for developing economies, such as Romania. According to Ruhm (1991), Dănăcică and Cîrnu (2014), Birău et al. (2019), despite the strategies specially created to provide an adequate qualification for disabled individuals, we are still far from their effective professional training for the current requirements of the labor market. As Kardorff, Ohlbrecht and Schmidt (2013) point out, the access to the labor market for disabled individuals is still extremely difficult. Disabled individuals may encounter serious difficulties in performing specific tasks through traditional, conventional methods (Vygotsky, 1998). However, this does not mean that they cannot adapt and develop. As Sassaki (2005) underlined, the notion of deficiency should not be confused with that of disability.

The goal of social policy makers is precisely to help disabled individuals to find and keep a suitable job, which is the most effective way to improve their life quality (Humer et al., 2007; Lalive et al., 2009). As Warren (2005) points out, the integration into the labor market of disabled individuals involves not only their employment, but also their integration in the social life of community to which they belong.

Although a number of measures have been taken internationally to improve the access of disabled individuals to the labor market, their integration does not rise yet to the levels desired by governments and international organizations. Even in the positive situation of integration into the

labor market, disabled individuals are employed in low-paid jobs, receive substantially lower wages compared to individuals without a disability and perform tasks considered to be inferior, with low opportunities for development and promotion.

Next, we will present a summary of the main results on employment and unemployment of disabled individuals. One of the first studies addressing this topic is that of Bartel and Taubman (1979). The study emphasized that the presence of a debilitating disease reduces the earnings of affected individuals and the number of weekly hours worked, as well as increasing the likelihood of being removed among the workforce and the likelihood of remaining unemployed. The authors examine the prevalence of four categories of diseases for individuals in the US workforce and demonstrate that health has a major effect on labor supply and the integration of individuals into the labor market, highlighting a more pronounced effect on health problems caused by asthma, bronchitis, psychosis and neurosis than those caused by heart disease and arthritis.

Burkhauser and Daly (1998) analyze the life quality of disabled men in the US and Germany and show that, although the incidence of disability is similar for the two states, the way of action and approach to disability, labor market integration and welfare is different. According to the results, in Germany, the income of households in which a disabled man lives is similar to the income of households in which their members have a normal state of health (on average). However, in the US the situation is different, there is a significant discrepancy between the households in which a disabled man lives and those without members with a poor state of health. The authors emphasize that the income earned by disabled individuals is a major determinant of their well-being and quality of life.

The existence of a significant disparity between UK men with normal health and those affected by disabilities is demonstrated by Kidd et al. (2000). Similarly, the existence of significant differences between wages and employability rates of disabled individuals, compared to individuals without disabilities, both men and women, is also highlighted by Baldwin and Johnson (1994, 1995 and 2000). Lechner and Vasques-Alvarez (2003) show that individuals with normal health have higher employment rates in the German labor market and higher earnings compared to those with disabilities, and this difference is significant for all aspects of labor market analyzed by the authors. The group of people in normal health has a 9.6% higher probability of working than the group of disabled individuals, and 16% higher (each year) wages than them. The authors emphasize that, if specific labor market policies for disabled individuals are effective, then there should be no significant differences in labor market integration, job retention, pay and dismissal between disabled individuals and those without disabilities. However, the results of the study show that these social differences and discriminations exist, and could be a strong deterrent for disabled individuals, who, under normal social conditions, would choose to actively participate in the labor market.

Parodi and Sciulli (2008) show that, in Italy, households with one or more disabled members have a considerably lower income than households in which individuals with a normal health live. Also, the income of households with disabled members is severely affected if the aid for these individuals were stopped. As the author underline, in order to increase the income of households with disabled members, policies must be built and implemented to ensure the provision of care services, improved incomes, employment opportunities and educational opportunities for the disabled individuals. Eliason and Storrie (2009), Sullivan and von Wachter (2009) and Bratsberg et al. (2010) sound the alarm on the causality between job loss and the onset of disability that did not previously exist. They are showing that unemployment can worsen pre-existing health problems and can even lead to new ones. The loss of employment causes an increase in the mortality rate of male by 34% over the next 6 years too. The same conclusion is emphasized by Bratberg (1999), Rege et al. (2009) and Thorlacius and Olafsson (2012).

For Romania, we have a small number of studies on unemployment and labor market integration of disabled individuals. We mention Stănescu's study (2013), which proposes the

creation and use of social enterprises for disabled individuals. Szekely (2012) and Tudorache et al. (2013) analyzes the socio-professional discrimination of disabled individuals in Romania and emphasizes that Romanian employers prefer to pay contributions to the state, to the detriment of employing individuals with disabilities. They are discriminated against in the labor market and socio-professional development opportunities are well below those for an individual with a normal state of health. Dănăcică and Cîrnu (2014) analyze the duration of unemployment and exit destinations of disabled individuals registered as unemployed in Romania. The obtained results show that the age of the individuals, their education and the economic situation have a significant influence on the probability of (re)employment in the analyzed period.

The main objective of this study is to investigate whether the type of disability has a significant effect on unemployment spells, exit destinations and (re)employment hazard for Romanian highly educated disabled individuals. In addition to this variable, the effect of other personal characteristics of individuals, such as their age, education, academic specialization, urban/rural area of living, the region where the individual is domiciled etc. is analysed too.

2. Estimating the impact of the type of disability on the unemployment spells and exit destinations of highly educated disabled individuals in Romania

2.1. Data and variables

National Agency of Employment (NAE) provided us upon reques a set of data containing 131 unemployment spells belonging to highly educated disabled individuals registered as unemployed and which exit from records between January 1st, 2017 - June 30th, 2019. From this initial dataset, we removed the duplicate cases, those with negative duration of unemployment and those with spells started and completed on the same day. After this processing, the dataset contains 125 unemployment spells of highly educated disabled individuals.

Also, we received from NAE information regarding 123 unemployment spells belonging to highly educated disabled individuals registered as unemployed during January 1st, 2014 and October 31st, 2019. Because the selection criteria are different and the information we received for each spell are different too, we could not form a single database with all the unemployment spells. Therefore, we analyze the impact of disability, as well as the other explanatory variables, on the unemployment spells and exit destinations, for each of these two datasets.

For both samples, the endogenous variable is the unemployment duration, estimated as the difference between the final date of registered unemployment and the date of registration in the NAE record, and expressed in days. We underline that, in this study, the notion of *"unemployment duration"* refers to the time elapsed from the registration as unemployed in the NAE records, until the time of leaving from the record system.

In Table 1 and Table 2 from the Appendix we present the variables and their coding (or calculation method), for both datasets (dataset 1, January 1, 2014 - October 31, 2017 and dataset 2, January 1, 2017 - June 30, 2019).

2.2. Results of the econometric analysis

For the dataset 1, out of all 123 unemployment spells registered at NAE between January 1st, 2014 - October 31st, 2017, the shortest duration is 1 day and belongs to a man affected by somatic disabilities, aged 28, with the occupation of counselor/expert/inspector/referent/economist in trade and marketing. At the opposite pole, the longest spell is 432 days and belongs to a woman with physical/locomotor disabilities, aged 29, with the occupation of counselor/expert/inspector/referent/economist in trade and marketing. 36 spells (29.27%) do not have specified the exit date and 42 spells (34.15%) have the exit date from unemployment, but do

not have the specified reason for leaving the unemployment. For this dataset, the mean duration of unemployment is 213.46 days, with a median value of 183 days, a mode value of 184 days, asymmetry 0.850 and kurtosis 1.016. 15.4% of the unemployment spells ends on day 184, and 13.8% ends on day 181, these being the highest frequencies of completed unemployment spells. 56.3% of the spells end in a period between 1 and 183 days.

In Table 3 we present the distribution of the 123 unemployment spells by the type of disability of individuals. We notice that 39.8% of the analyzed individuals are affected by physical/locomotor disabilities, disabilities that require, in addition to specific jobs, an infrastructure and logistical support for the integration of these individuals into the labor market. In the econometric analysis, we will group the types of disabilities to balance the categories and to improve homogeneity, as presented in Table 1 from the Appendix, looking at whether there is a potential association between the type of disability, unemployment spells and (re)employment hazard of analyzed individuals.

Table no. 3. Distribution of unemployment spells by the type of disability of highly educated individuals

Type of disability	Frecvency	Percent
Other	20	16.3
Associate	1	0.8
Hearing impairments	11	8.9
Physical/Locomotor	49	39.8
Mental	12	9.8
Somatic	16	13.0
Deafblind	4	3.3
Visual	10	8.1
Total	123	100.0

Source: Author processing using SPSS 17.0, based on data provided by NAE

The variable reason for leaving unemployment is of major importance for this study. There are 10 different reasons for leaving unemployment in the dataset 1. Of the 87 spells that have both the date of entry into unemployment and the date of exit from unemployment, it is observed that 26 spells (29.9%) end due to (re)employment and 1 spell ends due to the fact that the individual achieves a monthly income higher than the value of social reference indicator (SRI), being involved in a form of self-employment. A number of 4 spells end due to the expiration of the legal period for receiving the unemployment indemnity and it is not known exactly what is the status of the individual when leaving the NAE record. There is also a fairly high number of spells, respectively 42 (48.3%), which have the date of retirement, but did not specify the reason for retirement. To these are added the 36 spells that do not have the date of unemployment. This will be one of the limitations of this study, namely the large number of spells for which the reason for leaving unemployment is not known.

The second dataset contains 125 unemployment spells of highly educated disabled individuals which came out of the NAE records during January 1st, 2017 - June 30th, 2019. The minimum duration of unemployment is 1 day. There are 3 individuals with this duration, as follows: 1 woman, aged 27, university studies - 2nd master cycle, domiciled in Olt county, urban area, affected by hearing disabilities, without unemployment indemnity, with the occupation of economist engineer, the reason for leaving unemployment is (re)employment; 1 man, aged 29, university studies - cycle 1, domiciled in Neamț county, rural area, affected by physical/locomotor disabilities, without unemployment indemnity, counselor/expert/inspector/referent/economist in economic management, reason for leaving unemployment is (re) employment; 1 man, aged 35, university studies - cycle 1, domiciled in Giurgiu county, urban area, affected by hearing

disabilities, without unemployment indemnity, with the occupation of goods handler, the reason for leaving unemployment is (re)employment. The longest spell is 396 days, belongs to a woman, aged 47, graduate of higher education - cycle 1, from Bihor county, domiciled in urban areas, with physical/locomotor disabilities, with the occupation of trainer, and the spell ends because the legal period for receiving the unemployment indemnity has expired. 28 unemployment spells, representing 22.4% of the total dataset, do not have a specified reason for their end, and 2 of them do not have the mentioned date of exit from unemployment. For this second dataset, 94.4% of the spells ended due to (re)employment are completed in a period between 1 day and 180 days and only 5.6% of the spells are completed in a period between 181 days and 360 of days. No individual who leaves unemployment through (re)employment stays unemployed for more than 297 days. For this second dataset, the mean unemployment duration is 108.92 days, the median value is 98 days, and the mode is 181 days, asymmetry 0.608 and kurtosis -0.334. 42.25 days is the mean unemployment duration until (re)employment, with a median of 12 days, asymmetry 2.268 and kurtosis 5.340.

In Table 4 we present the distribution of the 125 analyzed spells by the type of disability of individuals registered as unemployed in the NAE records. We can notice again that highly educated individuals with physical/locomotor disabilities have the highest share in the total dataset, respectively 39.2%, followed by those with somatic disabilities and other disabilities (12.8% each), as well as hearing impairments (12%). There is a duration that belongs to an individual affected by HIV/AIDS in this second dataset.

Table no. 4. Distribution of unemployment spells by the type of disability

Tipul dizabilității	Frecvență	Procent
Other	16	12.8
Associate	4	3.2
Hearing impairments	15	12.0
Physical/Locomotor	49	39.2
HIV/AIDS	1	0.8
Mental	10	8.0
Somatic	16	12.8
Deafblind	6	4.8
Visual	8	6.4
Total	125	100.0

Source: Author processing using SPSS 17.0, based on data provided by NAE

We received information about the reason of leaving from registered unemployment for this second dataset too. We have 8 different reasons of leaving unemployment. 71 spells end due to (re)employment, 26 spells have no specified reason for leaving unemployment and 2 spells have no date of exit from unemployment. In this dataset, there are no individuals out of unemployment due to obtaining their own monthly income higher than the SRI value. We also note that for this dataset, only 26 of the spells do not have a specified reason for leaving unemployment, compared to 42 spells for the first dataset.

We grouped all these reasons for unemployment leave into five groups, as follows: 1 - (re) employment; 2 - exit from registered unemployment due to the expiration of the legal duration for receiving unemployment indemnity; 3 – exit from registered unemployment due to negligence or self-determination; 4 – exit from registered unemployment due to the transition in inactivity (non-participation) on the Romanian labor market; and 5 - which includes all spells with an unclear reason for leaving unemployment (such as spells ended with the term "closed by transfer") and spells that did not have a reason for unemployment leave.

Next we analyze the effect of the type of disability on the unemployment spells and (re)employment or obtaining monthly income higher than the value of SRI hazard for highly educated disabled individuals. Along with this variable, the effect of other variables, such as gender, age, education, environment, urban rural etc., on the unemployment spells and (re) employment hazard is estimated too. As a methodology, we use the Kaplan-Meier estimator and the Cox proportional hazard model in a competing-risks framework. For the Kaplan-Meier analysis, event 1, (re)employment or obtaining monthly income higher than the SRI is the one of major importance.

In Table 5 from the Appendix we present the results of Kaplan-Meier analysis and the results of the Log-Rank, Breslow and Tarone-Ware statistical tests, for the first dataset. Due to the lack of space, survival curves and survival tables for each explanatory variable will be provided upon request. The results of the Kaplan-Meier estimator show that, although there are differences between the number of individuals who manage to find a (new) job function of their type of disability, these differences are not statistically significant. We have a 36.4% employability rate for individuals with physical/locomotor disabilities, 25% for those affected by somatic disabilities, 50% for those affected by visual disabilities, 10% for those affected by mental disabilities, 36.4% for those affected of hearing disabilities and deafblindness and 73.3% for those affected by other disabilities (associated and other types).

The effect of the gender variable on the unemployment spells is not significant. We have the same situation for age, education, academic specialization, region, urban/rural area, type of locality and participation in courses offered by NAE. Because in the case of the participation in courses offered by NAE variable, neither the mean nor the meadian survival time in unemployment until the (re)employment could be estimated, because there is no individual who participated in specific courses offered by NAE who achieved the expected event, this variable was no longer included in Table 5 from the Appendix. For the first dataset, there is statistical significance only for the indemnity variables, the type of indemnity (less than 1% for all 3 statistical tests) and previous work experience (at a significance threshold of 10%, only for the Log-Rank test). Highly educated disabled individuals who did not receive unemployment indemnity during their current spell have a 257,856 days median survival time in unemployment until (re)employment occurs, compared with 398,553 days for highly educated disabled individuals who did receive unemployment indemnity during their current spell.

The results of the Kaplan-Meier analysis, the results of the Log-Rank, Breslow and Tarone-Ware statistical tests for the second dataset are presented in Table 6 from the Appendix. Survival curves and survival tables for each explanatory variable for this second dataset will be provided upon request too. We mentioned that, there is no spell that ends due to obtaining a monthly income higher than the SRI value in this second dataset. Therefore, we estimate the (re)employment hazard of analyzed individuals. The results presented in Table 6 from the Appendix show that, again, the type of disability does not significantly influence the survival time in unemployment until (re)employment occurs.

Of the 68 completed unemployment spells belonging to highly educated disabled men, 42 end due to (re)employment (61.8%). Of the 55 completed unemployment spells belonging to women, 29 end due to (re)employment (52.7%). However, the results of the Log-Rank, Breslow and Tarone-Ware tests show a lack of statistical significance for the effect of gender on survival time in unemployment. For this second dataset, the age of the individual has a significant impact on the probability of survival in unemployment until (re)employment occurs. The employability rate is 45.5% for individuals under the age of 25, 65.6% for individuals aged between 25 and 29, and 64.1% for those aged between 30 and 39 , 42.9% for those aged between 40 and 49, 100% for those aged between 50 and 55 and 25% for those over 55 years. The education has a significant effect on the probability of survival in unemployment until (re)employment occurs too. The mean survival time in unemployment until the expected event, (re)employment, occurs, is 146,306 days for

individuals graduating from higher education - cycle 1 and 236,838 days for individuals graduating from higher education - cycle 2 master. Here, in the case of disabled individuals, the time spent in unemployed until (re)employment is longer for master's graduates, compared to those with higher education - bachelor's degree, and the probability of leaving unemployment due to (re)employment is lower than for individuals graduating from higher education - cycle 1.

The differences observed between the 8 regions of Romania and between urban and rural areas are not statistically significant.

In the next step, we use the Cox proportional hazard model in a competing-risks framework to estimate the effect of explanatory variables on the (re)employment hazard and on the transition probability to the other 4 exit destinations. We previously specified that all reasons for leaving unemployment were grouped into five categories. These categories become expected events, statuses to which the unemployed transit, at the moment of leaving the NAE record. Of course, of these 5 categories, the most important event is (re)employment (or unemployment due to obtaining monthly income higher than the SRI, in case of one spell in dataset 1).

The results of Cox regression when the expected event is (re)employment or obtaining monthly income higher than the SRI value, for the first dataset are presented in Table 7 from the Appendix. All the spells which do not have (re)employment or obtaining monthly income higher than the SRI as a reason for leaving unemployment are right-censored. For the ethnicity variable, all spells belong to individuals of Romanian ethnicity. Therefore, this variable is not included in the model. Also, for the variable specific courses offered by NAE, there are no participants in courses that exit unemployment due to (re)employment, thus, this variable is not included in the model either. All other variables are simultaneously specified. Enter method was used.

The results show a similar picture to that provided by the Kaplan-Meier estimator: the type of disability, gender, age, education, academic specialization, region, urban/rural area, previous work experience does not significantly influence the (re)employment probability of highly educated disable individuals registered as unemployed during January 1st 2014 - October 31st, 2017. Only the unemployment indemnity variable has a significant impact (at a threshold of 10%) on the probability of occurrence of event 1. A highly educated disabled individual who receives unemployment indemnity during his current spell has, at any time during the study, a 86% (re)employment hazard lower than an individual without indemnity. Because the Kaplan-Meier analysis showed that the amount of unemployment indemnity also significantly influences the occurrence of event 1, using the Cox regression we estimate the singular effect of this variable on the hazard of event 1 occurence. The results are presented in Table 8. We can notice that there is statistical significance only for the difference between individuals with 75% of the SRI indemnity and those without indemnity. Individuals receiving unemployment indemnity of 75% of the SRI during their current spell have a 95.4% lower (re)employment hazard than individuals without indemnity.

Table no 8. Cox regression, event 1, type of unempoyment indemnity, dataset 1

Type of indemnity	B	SE	Wald	df	Sig.	Exp(B)	95.0% CI for Exp(B)	
							Inf.	Sup.
Without indemnity	Reference category							
50%	0.485	0.631	0.592	1	0.442	1.625	0.472	5.592
75%	-3.071	1.083	8.042	1	0.005	0.046	0.006	0.387

Source: Author processing using SPSS 17.0, based on data provided by NAE

Following the same algorithm, we used Cox proportional hazard regression to estimate the effect of explanatory variables on the occurrence of the other 4 events. Because there are a small number of spells that achieve the event, and for some categories of explanatory variables there is no completed spells due to that event, in some cases survival indicators could not be estimated.

However, the result of the Wald test shows the lack of statistical significance for all explanatory variables introduced in the model, when the event is exit from unemployment due to the expiration of the legal period of receiving unemployment indemnity, exit from unemployment due to negligence or decision of the unemployed, exit in inactivity and exit from unemployment due to to an unclear reason. Due to these results and the lack of significance for the objectives of the analysis, the specific tables are no longer presented in the paper. However, we can provide these tables upon request.

The results of the Cox regression for event 1, (re)employment, for the second dataset, are presented in Table 9 from the Appendix. In this dataset, there is no spell ended due to obtaining a monthly income higher than the SRI value. Therefore, for this dataset we estimate the effect of the explanatory variables on the (re)employment hazard. All the explanatory variable (type of disability, gender, age, education, academic specialization, region, urban/rural area and unemployment indemnity) were simultaneously introduced in the model. For all this explanatory variables, the reference category is the first and the Enter method was the one used.

We notice that at a significance threshold of 5%, highly educated individuals affected by a mental disability have a 90.8% lower (re)employment probability compared with individuals with physical/locomotor disabilities, the reference category. There is no statistical significance for the differences observed for the other type of disabilities. There is also no statistical significance for the differences between men and women. Age is, however, an important factor for the (re)employment probability, for highly educated disabled individuals in dataset 2. Regression coefficients for 25-29, 30-39 and 50-55 years age groups are positive, which shows that these individuals have a higher (re)employment probability than individuals under the age of 25, the reference category. The educational level of disabled individuals has an important and significant effect on the (re)employment probability too. The regression coefficient for unemployed with a master's degree is negative, which shows a 62.6% lower (re)employment probability, compared to those who graduated only from the 1st cycle of university studies. A potential explanation may be the one related to the higher expectations that master's graduates have and, implicitly, to their rigidity regarding the acceptance of a job that is not in accordance with their own education and aspirations.

Regarding the academic specialization of the analyzed individuals, the Wald test shows that the only statistically significant difference is that between graduates of psychology, social work, sociology and graduates of economics, which is the reference category. Individuals graduating in psychology, social work or sociology have a 73.7% lower (re)employment hazard compared to individuals graduating in economics. For the other observed differences we have no statistical significance. Also, the region and urban/rural area where the individual resides does not have a significant effect on the (re)employment probability.

Analogous to dataset 1, following the same algorithm, Cox regression was used to estimate the effect of explanatory variables on the occurrence of the other 4 events. In this case too, the tables are not presented in the paper due to same reason as for dataset 1. Howevere, we can provide the tables upon request.

The use of the Cox proportional hazard model is based on the proportionality hazard assumption. We used the log-minus-log curve for all the explanatory variables of dataset 1 and dataset 2. All log-minus-log curves for the explanatory variables show that the assumption of the hazard proportionality is fulfilled.

3. Conclusions

The aim of this research was to analyze the effect of the type of disability on unemployment spells, exit destinations and (re)employment hazard of highly educated disabled individuals, as well as the effect of other variables. This study is first of its kind conducted for Romania. So far, data about the type of disability of individuals affected by unemployment were inaccessible. For the

empirical analysis, we used two datasets, provided by NAE upon request. Dataset 1 includes the unemployment spells of highly educated disabled individuals, registered in the records of NAE during January 1st, 2014 - October 31st, 2017. Dataset 2 includes the unemployment spells of highly educated disabled individuals, who left unemployment during January 1st, 2017 - June 30th, 2019.

Due to different selection criteria for the two samples, we could not merge them into a single dataset. The first dataset contains 123 spells, 87 of which are completed, with the date of exit from unemployment mentioned. 36 spells are without an exit date. Also, although 42 spells are completed, do not have the specified reason for leaving unemployment. These are the limitations of the study for dataset 1, the rather large number of spells without a specified reason for leaving unemployment and without a date for leaving unemployment. In the first dataset, 26 spells are completed due to the (re)employment, one spells is completed because the individual obtains monthly income higher than the SRI value, 4 spells are completed because the legal period for receiving the unemployment indemnity has expired, 10 spells end through fault or at the request of the unemployed, 3 spells are endued by switching to a form of inactivity, 42 spells have no specified reason for completion, and one ends because it is canceled by the operator.

The results of the econometric analysis showed that, for dataset 1, only the unemployment indemnity and its type have a significant impact on the unemployment spells and (re)employment proabability. Highly educated disabled individuals, who receive unemployment indemnity during their current spell have a 86% lower (re)employment hazard than those who do not receive unemployment indemnity. Also, the unemployed who receive allowance, in the amount of 75% of the SRI value have a 95.4% lower (re)employment probability than those who do not receive unemployment indemnity. The second dataset contains 125 unemployment spells, belonging to highly educated disabled individuals who came out of the NAE records during January 1st, 2017 - June 30th, 2019. A number of 28 spells, representing 22.4% of the total, does not have a specified reason for their end, and 2 spells, representing 1.6% of the total dataset, do not have an exit from unemployment. A number of 71 spells end due to the (re)employment of the respective individuals, 15 spells end because the legal period of receiving the unemployment indemnity has expired, 7 spells end due to the fault of the unemployed or at his request, 3 spells end due to exit in inactivity of the individuals and 27 spells end, but they did not have specified the exit reason.

For dataset 2, the results show that highly educated individuals affected by mental disabilities have a 89.8% lower (re)employment hazard than highly educated unemployed affected by physical/locomotor disabilities (the reference category). The other differences between the different types of disabilities are not significant. Similar to dataset 1, gender, region and urban/rural area of living do not have a significant effect on the unemployment spells and (re)employment probability of analyzed individuals. Age, however, is an important factor for the unemployment duration and (re)employment hazard. The academic specialization of unemployed influence the (re)employment hazard too. As in the case of first dataset, the unemployment indemnity has a significant effect on the labor market behavior of the highly educated disabled unemployed.

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Appendix

Table 1. Variables description, dataset 1 (2014-2017)

Variables	Description
Unemployment duration	Quantitative variable, calculated as the difference between the end date of registered unemployment and its start date and expressed in days
Gender	Qualitative variable, transformed into dummy variable, coded as follows: 1- Male, 2-Female
Age	Quantitative variable with values between 21 and 60 years, grouped in the following intervals: [<25 years], [25-29 years], [30-39 years], [40-49 years], [50-55 years], [over 55 years old]
Education	Qualitative variable, with the follwing categories: Long-term undergraduate studies and Master, coded with 1 first category, 2 second category. We do not have in this data set individuals with a PhD.
County	Qualitative variable, with categories that describe all the 41 counties of Romania and the Municipality of Bucharest. These categories were grouped by development regions, according to the Nomenclature of Territorial Units of Statistics (NUTS) of Romania. We have for the new variable, region, the following codifications 1-North-East region, which includes six counties (Iaşi, Neamţ, Botoşani, Vaslui, Suceava and Bacău); 2-Western region with four counties (Caraş-Severin, Arad, Timiş and Hunedoara) 3-North-West region, with six counties (Bistriţa-Năsăud, Cluj, Satu-Mare, Bihor, Maramureş and Sălaj); 4- Center region, which includes six counties (Sibiu, Harghita, Alba, Mureş, Covasna and Braşov); 5-South-East region, which includes six counties (Galaţi, Vrancea, Tulcea, Brăila, Buzău and Constanţa); 6- South-Muntenia region, which includes seven counties (Dâmboviţa, Prahova, Ialomiţa, Argeş, Călăraşi, Teleorman and Giurgiu); 7- Bucharest-Ilfov region and 8- South-West Oltenia region which includes five counties (Gorj, Dolj, Mehedinţi, Olt and Vâlcea)
Tip_dosar _card2	Qualitative variable that provides information about the status of the individual at the time of entering the NAE record as unemployed, with the categories: became unemployed, without a job after graduation, looking for a job, unemployed without the allowance right, wants to change jobs
Tip_dosar	Qualitative variable, transformed into dummy variable with the values 0 for non-indemnified individuals and 1 for indemnified individuals
UI type	Variable that provides information about the amount of unemployment benefit, with the variants: 50%, 75% and the rest of the non-UI unemployed, coded with 1-50%, 2-75% and 3 - others
ABS	Qualitative variable that provides information about individuals who are graduates who have not found a job according to their professional training within 60 days of graduation. We coded this variable as follows: 1- graduate and 0- others.
Urban/Rural area	Qualitative variable, transformed into a dummy variable with the values 0 - Rural, 1- Urban
Previous work experience	Qualitative variable, transformed into dummy variable, with values 0- No, 1- Yes
Disability Type	Qualitative variable, which describes the type of disability, coded as follows: 1 - physical/locomotor disabilities, 2- somatic disabilities, 3- visual disabilities, 4- mental disabilities (we have no person registered with cognitive disabilities), 5- hearing disabilities and deafblindness , 6- other disabilities (associated with other types, we do not have in dataset 1 any individual affected by HIV/AIDS)
Ethnicity	Qualitative variable with 2 variants, Romanian and Roma, coded as follows 1- Romanian, 2-

	Roma. In this data set we have only these two ethnic groups
Locality type	Qualitative variable with the following categories: commune, commune component municipality, commune component city, municipality, municipality residence, city, residence of municipality, residence of city, village component commune, village component city, village municipality, village residence of commune, Bucharest sector. The transformation of this variable and its coding was done as follows: 1-commune, 2-municipality, 3-city, 4-village, 5-sector Bucharest
ROC code	Numerical variable that provides us with information about the ROC code specific to the occupation of each individual registered as unemployed. It was not coded because it is not included in the econometric analysis
Occupation	Qualitative variable, with 62 categories that describe different occupations of highly educated individuals, affected by disability, and who lost their jobs. In the econometric analysis we coded this variable as follows: 1- individuals who at the date of registration in unemployment were registered with ROC codes and occupations specific to economic higher education, 2- individuals registered with ROC codes and specific occupations specific to engineering higher education, 3 - individuals with ROC codes and occupations specific to higher medical education (this group also includes pharmacists, physiotherapists and dental technicians), 4- individuals registered with ROC codes and occupations specific to higher legal studies, 5- individuals registered with ROC codes and occupations specific to higher education in the field of psychology, sociology and social assistance and group 6 - all other individuals belonging to other occupational categories
The reason for leaving unemployment	Qualitative variable, with 10 different reasons for ending the duration of unemployment, coded as follows: 1- (re)employment, or when the individual earns a monthly income higher than the SRI value, 2- expiry of the legal period for unemployment indemnity, 3- spells ended through the fault of the unemployed or at his request (when he does not request the maintenance of the job application, when he unjustifiably refuses to participate in incentive services and at the request of the beneficiary) 4-non-participation (when the unemployed is admitted in a form of education, when retirement for disability is greater than 12 months, during the period of temporary incapacity for work) and 5- spells without a reason for leaving unemployment and spells ended with the specification "canceled by the operator"
Trainning courses	Qualitative variable, transformed into dummy variable with values 0 - No, 1- Yes
Entry year in unemployment	the entry in the NAE record of the unemployed

Source: Author processing using SPSS 17.0, based on data provided by NAE

Table 2. Variables description, dataset 2 (2017-2019)

Variables	Description
Unemployment duration	Quantitative variable, calculated as the difference between the end date of registered unemployment and its start date and expressed in days
Gender	Qualitative variable, transformed into dummy variable, coded as follows: 1- Male, 2-Female
Age	Quantitative variable with values between 21 and 60 years, grouped in the following intervals: [<25 years], [25-29 years], [30-39 years], [40-49 years], [50-55 years], [over 55 years old]
Education	Qualitative variable, with the follwing categories: Long-term undergraduate studies and Master, coded with 1 first category, 2 second category. We do not have in this data set individuals with a PhD.
County	Qualitative variable, with categories that describe all the 41 counties of Romania and the Municipality of Bucharest. These categories were grouped by development regions, according to the Nomenclature of Territorial Units of Statistics (NUTS) of Romania. We have for the new variable, region, the following codifications 1-North-East region, which includes six counties (Iaşi, Neamţ, Botoşani, Vaslui, Suceava and Bacău); 2-Western region with four counties (Caraş-Severin, Arad, Timiş and Hunedoara) 3-North-West region, with six counties (Bistriţa-Năsăud, Cluj, Satu-Mare, Bihor, Maramureş and Sălaj); 4- Center region, which includes six counties (Sibiu, Harghita, Alba, Mureş, Covasna and Braşov); 5-South-East region, which includes six counties (Galaţi, Vrancea, Tulcea, Brăila, Buzău and Constanţa); 6- South-Muntenia region, which includes seven counties (Dâmboviţa, Prahova, Ialomiţa, Argeş, Călăraşi, Teleorman and Giurgiu); 7- Bucharest-Ilfov region and 8- South-West Oltenia region which includes five counties (Gorj, Dolj, Mehedinţi, Olt and Vâlcea)
Urban/Rural area	Qualitative variable, transformed into a dummy variable with the values 0 - Rural, 1- Urban
Tip_dosar	Qualitative variable, transformed into dummy variable with the values 0 for non-indemnified

	individuals and 1 for indemnified individuals
Disability	Qualitative variable, which describes the type of disability, coded as follows: 1 - physical/locomotor disabilities, 2- somatic disabilities, 3- visual disabilities, 4- mental disabilities (we have no person registered with cognitive disabilities), 5- hearing disabilities and deafblindness, 6- other disabilities (associated, other types, HIV/AIDS)
ROC code	Numerical variable that provides us with information about the ROC code specific to the occupation of each individual registered as unemployed
Occupation	Qualitative variable with 65 categories that describe different occupations of highly educated individuals affected by disability and who lost their jobs. In the econometric analysis we coded this variable as follows: 1- individuals who at the date of unemployment were registered with ROC codes and occupations specific to economic higher education, 2- individuals registered with ROC codes and specific occupations specific to engineering higher education, 3 - individuals with ROC codes and occupations specific to higher medical education (this group also includes dentists, physiotherapists and dental technicians), 4- individuals registered with ROC codes and occupations specific to higher legal studies, 5- individuals registered with ROC codes and occupations specific to higher education in the field of psychology, sociology and social work and group 6 - all other individuals belonging to other occupational categories
The reason for leaving unemployment	Qualitative variable, with 8 different reasons for ending the spells, coded as follows: 1- (re)employment, 2- expiry of the legal period for unemployment indemnity, 3- spells ended through the fault of the unemployed, or at his request, 4- non-participation and 5- spells without a reason for leaving unemployment and spells ended with the statement "closed by transfer".

Source: Author processing using SPSS 17.0, based on data provided by NAE

Table 5. Mean and median survival time until event 1, dataset 1

Variable	Mean (days)	Median (days)	Sig.		
			Log-Rank	Breslow	Tarone-Ware
Disability type					
Physical/locomotor disabilities	322.242	-	0.379	0.178	0.259
Somatic disabilities	284.481	-			
Visual disabilities	182.200	181.000			
Mental disabilities	344.000	-			
Hearing impairments and deafblindness	266.303	184.000			
Other disabilities (associated. other types. HIV/AIDS)	294.565	-			
Gender					
Women	297.075	-	0.425	0.433	0.432
Men	317.874	358.000			
Age					
less 25 ani	183.018	-	0.328	0.419	0.386
25-29 ani	275.773	184.000			
30-39 ani	292.191	358.000			
40-49 ani	345.556	-			
50-55 ani	319.750	-			
over 55 ani	319.750	-			
Education					
Long-term undergraduate	271.011	184.000	0.285	0.466	0.365
Master level	351.509	-			
Academic specialization					
Economics	342.124	-	0.989	0.974	0.982
Engineering sciences	271.667	184.000			
Medical sciences	183.250	-			
Law sciences	230.600	-			
Psychology. social work. sociology	183.778	-			
Other academic specialization	289.781	-			
Region					

North-East	-	-	0.569	0.733	0.680
West	-	-			
North-West	-	-			
Center	-	-			
South-East	-	-			
South-Muntenia	-	-			
Bucharest-Ilfov	-	-			
South-Oltenia	-	-			
Urban/Rural area					
Rural	293.571	-	0.388	0.188	0.271
Urban	324.208	-			
Unemployment indemnity					
Without indemnity	257.856	184.000	0.002	0.007	0.003
With indemnity	398.553	-			
Indemnity Type					
50%	182.188	-	0.000	0.001	0.000
75%	425.833	-			
Without indemnity	257.856	184.000			
Local					
Commune	288.545	-	0.928	0.738	0.851
Municipality	320.845	-			
Town	318.750	-			
Village	184.000	-			
Bucharest sector	303.667	-			
Previous work experience					
Without experience	266.659	184.000	0.083	0.182	0.121
With experience	360.463	-			
ABS					
Other	324.058	-	0.761	0.322	0.511
Graduates	182.937	-			

Source: Author processing using SPSS 17.0, based on data provided by NAE

Table 6. Mean and median survival time until (re)employment, dataset 2

Variable	Mean (days)	Median (days)	Sig.		
			Log-Rank	Breslow	Tarone-Ware
Disability type					
Physical/locomotor disabilities	161.350	60.000	0.194	0.299	0.243
Somatic disabilities	188.915	182.000			
Visual disabilities	101.250	34.000			
Mental disabilities	243.000	.			
Hearing impairments and deafblindness	120.381	64.000			
Other disabilities (associated. other types. HIV/AIDS)	101.011	66.000			
Gender					
Women	141.494	67.000	0.259	0.322	0.328
Men	202.423	142.000			
Age					
less 25 ani	122.588	.	0.018	0.030	0.026
25-29 ani	79.250	27.000			
30-39 ani	127.237	66.000			
40-49 ani	239.108	297.000			
50-55 ani	57.400	5.000			
over 55 ani	272.500	.			
Education					

Long-term undergraduate	146.306	60.000	0.008	0.010	0.009
Master level	236.838	.			
Academic specialization					
Economics	161.304	61.000	0.100	0.131	0.114
Engineering sciences	128.000	32.000			
Medical sciences	182.286	297.000			
Law sciences	35.600	10.000			
Psychology, social work. sociology	137.130	.			
Other academic specialization	160.129	86.000			
Region					
North-East	187.313	297.000	0.884	0.752	0.800
West	89.556	53.000			
North-West	160.932	61.000			
Center	109.333	11.000			
South-East	55.500	5.000			
South-Muntenia	135.308	127.000			
Bucharest-Ilfov	190.280	205.000			
South-Oltenia	218.286	.			
Urban/Rural area					
Rural	98.600	84.000	0.890	0.659	0.772
Urban	175.274	123.000			
Unemployment indemnity					
Without indemnity	119.020	32.000	0.001	0.000	0.000
With indemnity	251.936	297.000			

Source: Author processing using SPSS 17.0, based on data provided by NAE

Table 7. Results of the Cox regression, event 1, dataset 1

Explanatory	B	SE	Wald	df	Sig.	Exp(B)	95.0% IC for Exp(B)	
							Inf.	Sup.
Disability type			3.563	5	0.614			
Physical/locomotor disabilities	Reference category							
Somatic disabilities	0.348	0.840	0.171	1	0.679	1.416	0.273	7.339
Visual disabilities	0.375	1.079	0.121	1	0.728	1.455	0.176	12.058
Mental disabilities	-1.867	1.204	2.407	1	0.121	0.155	0.015	1.635
Hearing impairments and deafblindness	0.149	0.915	0.026	1	0.871	1.160	0.193	6.971
Other disabilities (associated. other types. HIV/AIDS)	-0.647	0.983	0.433	1	0.510	0.523	0.076	3.597
Men	Reference category							
Women	0.242	0.737	0.108	1	0.742	1.274	0.300	5.405
Age			3.268	5	0.659			
less 25 ani	Reference category							
25-29 ani	0.761	0.970	0.616	1	0.433	2.141	0.320	14.335
30-39 ani	0.665	1.026	0.421	1	0.517	1.945	0.261	14.517
40-49 ani	-0.466	1.360	0.117	1	0.732	0.628	0.044	9.028
50-55 ani	-1.229	1.825	0.453	1	0.501	0.293	0.008	10.471
over 55 ani	0.954	1.972	0.234	1	0.628	2.597	0.054	123.797
Long-term undergraduate	Reference category							
Master level	-0.314	0.634	0.245	1	0.621	0.731	0.211	2.531
Academic			3.309	5	0.652			

specialization								
Economics	Reference category							
Engineering sciences	0.339	0.941	0.130	1	0.719	1.404	0.222	8.886
Medical sciences	-0.594	1.399	0.180	1	0.671	0.552	0.036	8.564
Law sciences	0.690	1.231	0.314	1	0.575	1.993	0.179	22.255
Psychology. social work. sociology	-1.457	1.024	2.022	1	0.155	0.233	0.031	1.735
Other academic specialization	-0.404	0.784	0.265	1	0.607	0.668	0.144	3.107
Region			1.294	7	0.989			
North-East	Reference category							
West	-0.023	0.903	0.001	1	0.980	0.978	0.167	5.736
North-West	0.319	0.771	0.172	1	0.679	1.376	0.304	6.235
Center	0.129	1.039	0.015	1	0.901	1.138	0.148	8.725
South-East	-0.322	1.081	0.089	1	0.766	0.725	0.087	6.032
South-Muntenia	-0.298	0.801	0.139	1	0.710	0.742	0.154	3.566
Bucharest-Ilfov	-1.021	1.285	0.632	1	0.427	0.360	0.029	4.470
South-Oltenia	-13.997	580.053	0.001	1	0.981	0.000	0.000	.
Rural	Reference category							
Urban	0.340	0.676	0.253	1	0.615	1.405	0.374	5.281
Without experience	Reference category							
With experience	0.140	0.982	0.020	1	0.886	1.150	0.168	7.880
Without indemnity	Reference category							
With indemnity	-1.965	0.947	4.309	1	0.038	0.140	0.022	0.896
Other	Reference category							
Graduate	0.093	1.017	0.008	1	0.928	1.097	0.149	8.055

Source: Author processing using SPSS 17.0, based on data provided by NAE

Table 9. Results of the Cox regression, (re)employment, dataset 2

Explanatory	B	SE	Wald	df	Sig.	Exp(B)	95.0% IC for Exp(B	
							Inf.	Sup.
Disability type			10.187	5	0.070			
Physical/locomotor disabilities	Reference category							
Somatic disabilities	-0.388	0.447	0.754	1	0.385	0.678	0.282	1.629
Visual disabilities	-0.370	0.628	0.346	1	0.556	0.691	0.202	2.368
Mental disabilities	-2.390	1.057	5.111	1	0.024	0.092	0.012	0.728
Hearing impairments and deafblindness	0.456	0.407	1.253	1	0.263	1.577	0.710	3.502
Other disabilities (associated. other types. HIV/AIDS)	-0.436	0.429	1.031	1	0.310	0.647	0.279	1.500
Men	Reference category							
Women	-0.344	0.303	1.296	1	0.255	0.709	0.392	1.282
Age			18.017	5	0.003			
less 25 ani	Reference category							
25-29 ani	1.709	0.461	13.765	1	0.000	5.522	2.239	13.620
30-39 ani	1.281	0.450	8.103	1	0.004	3.601	1.490	8.702
40-49 ani	0.535	0.535	0.999	1	0.317	1.708	0.598	4.875
50-55 ani	1.738	0.699	6.180	1	0.013	5.684	1.444	22.370
over 55 ani	0.095	1.127	0.007	1	0.933	1.100	0.121	10.009
Long-term undergraduate	Reference category							
Master level	-0.984	0.373	6.961	1	0.008	0.374	0.180	0.777

Academic specialization			12.385	5	0.030			
Economics	Reference category							
Engineering sciences	-0.749	0.520	2.077	1	0.150	0.473	0.171	1.310
Medical sciences	-0.342	0.647	0.280	1	0.597	0.710	0.200	2.523
Law sciences	0.961	0.753	1.630	1	0.202	2.615	0.598	11.438
Psychology. social work. sociology	-1.334	0.504	7.009	1	0.008	0.263	0.098	0.707
Other academic specialization	-0.574	0.370	2.411	1	0.120	0.563	0.273	1.163
Region			5.017	7	0.658			
North-East	Reference category							
West	0.380	0.595	0.408	1	0.523	1.462	0.456	4.692
North-West	0.806	0.466	2.988	1	0.084	2.238	0.898	5.580
Center	0.302	0.555	0.296	1	0.587	1.352	0.456	4.011
South-East	0.794	1.247	0.405	1	0.524	2.211	0.192	25.458
South-Muntenia	0.717	0.429	2.799	1	0.094	2.049	0.884	4.749
Bucharest-Ilfov	0.289	0.591	0.239	1	0.625	1.335	0.419	4.254
South-Oltenia	-0.336	0.681	0.243	1	0.622	0.715	0.188	2.716
Rural	Reference category							
Urban	-0.012	0.412	0.001	1	0.978	0.989	0.441	2.217
Without indemnity	Reference category							
With indemnity	-1.562	0.362	18.633	1	0.000	0.210	0.103	0.426

Source: Author processing using SPSS 17.0, based on data provided by NAE