THE ROLE OF EDUCATION FOR RE-EMPLOYMENT HAZARD OF ROMANIAN WOMEN

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Abstract

The purpose of this study was to analyze the effect of education on re-employment hazard of Romanian unemployed women, during January 1st 2008- December 31st 2010. Empirical analysis is based on 1047172 registered women unemployment spells gathered from NAE Romania. As a methodology, I used non-parametric technique and semi-parametric competing risks-model. Obtained results prove that education has a significant effect on re-employment hazard of unemployed women and in reducing the median survival time until employment occurs. The impact of other exogenous variables is analyzed too.

Key words: re-employment hazard, model, risks, spell

JEL Classification: J64, J21

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1. Introduction

The aim of this paper is to analyze the effect of education for re-employment hazard of unemployed women registered at National Agency of Employment (NAE) Romania during 1 January 2008-31 December 2010. In recent papers, I proved the existence of a gender gap regarding women and men unemployed in Romania. Women have a 14% lower instantaneous hazard rate of exit to employment compared with men, and the result is statistically significant. I also proved that the presence of a higher education is lowering the differences between men and women unemployment hazard rate to exit to a job, and also is lowering the median survival time until employment occurs. In this paper, I am trying to investigate what is the impact of education for re-employment hazard of Romanian unemployed women. Two groups, low educated unemployed women and higher educated unemployed women are separately analyzed and compared.

The econometrical analysis of my paper is based on 1047172 registered women unemployment spells gathered from NAE Romania. The period of my study is January 1st 2008-December 31st 2010.

The dependent variable of my study, *duration of an unemployment spell*, was calculated as the difference between the first and last day of unemployment and is measured in days.

Beside education at the start of unemployment spell, the following exogenous variable are included in my study: age of women at the start of unemployment spell, urban/rural area of residence, marital status at the registration date, unemployment allowance during current spell and disability.

Age of women at the start of unemployment spell variable has values in between 15 and 65 years and was divided in the econometrical analysis into five intervals, as follows: 15-24 years, 25-34 years, 35-44 years, 45-54 years and 55-64 years.

The *education at the start of unemployment spell* variable includes the following categories: unknown education, primary education or none, gymnasium, apprenticeship complementary education, professional school, theoretical high-school, vocational high-school, special education (for women with disability, compatible with theoretical high-school in numbers of study years), foremen school, post-high-school, college and university.

The variable area of residence was coded as 0 for rural area and 1 for urban area.

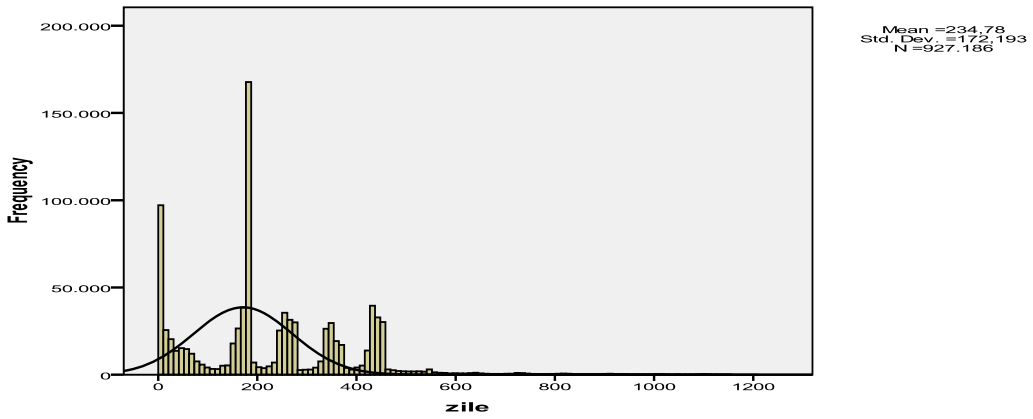
For *unemployment allowance* we had just information about if a subject has received allowance during his/her unemployment spell or not (0- if not, 1-if he/she received allowance). When I am analyzing the impact of receiving or not benefits for the exit destination, it is actually analyzed the impact of UI for the current spell and its exit destination. I do not know if an individual did not received at all UI during his/her registered unemployment duration, or received UI during one spell and lost the right for the other spell or spells. Therefore the impact of UI variable is kind of problematic and unclear. I would say that it is the impact of UI received during the current spell of an unemployed for the current exit destination. However, I would like to underline that we used as unit of our analysis unemployment spells rather than individuals.

Same situation I had for *disability* (0- no disability, 1- subject with disability). For *marital status* I have the following categories: 0-unknown marital status, 1- unmarried, 2- married, 3-widowed and 4- divorced.

2. Preliminary description of the dataset

The minimum duration of women unemployment spells is 1 day, the maximum duration is of 1205 days, with a mean of 234.78 days, and a median of 184 days; the skewness is 1.026 and the kurtosis is 2.418. In the figure 1 is presented the histogram for women unemployment spells.

Figure 1: *Histogram of women unemployment spells (days)*



Out of all 1047172 women registered spells, 24.9% are aged in between 15-24 years, 23.9% are aged in between 25 and 34 years, 27.2% are aged in between 35-44 years, 20.4% are aged in between 45-54 years, 3.5% are aged in between 55-65 years. The youngest women registered in unemployment have 15 years and the maximum 65 years. Mean duration until employment occurs is of 91.37 days for the youngest age grup, 15-24 years, 136.61 days for the 25-34 years, 196.44 days for the 35-44 years, 213.90 days for 45-54 years and 167.83 for 55-65 years.

In table 1 is presented the distribution of women unemployment spells by education. We can see that most of the spells belong to low educated women and to high-school graduated women. Women higher educated spells represents 12.5%, a higher percent than men with a higher education registered as unemployed.

Table 1: *Distribution of women spells by education*

Education	Frequency	Percent
Without education	36671	3,5
Incomplete gymnasium	63544	6,1
Gymnasium	242698	23,2
Apprenticeship complementary education	41242	3,9
Vocational school	106989	10,2
Special education	1631	,2
Theoretic high-school	58088	5,5
Vocational high-school	229168	21,9
Post-high-school	21630	2,1
Foremen school	2831	,3
College	1559	0.1
Long-term university	129969	12,4
Unknown education	111132	10,6
Total	1047172	100,0

Most of the women employed at the end of study period are vocational school graduated, post-high-school graduated, college and university graduated.

46.2% of the women spells are from rural area and 53.8% are from urban area. The percent of low educated women registered as unemployed more than four times higher than the percent of urban low educated women. 5.3% from rural spells belongs to higher educated women, compared with 18.5% spells from urban area. Mean duration of unemployment until reemployment occurs is 130.65 days for rural women and 177.39 for urban women. At the end of my study 32.5% of urban women were reemployed, compared with 22.3% for rural women.

Out of all 1047172 women registered spells, 29.8% are unmarried, 54.3% are married, 3.4% are widowed, 1.4% are divorced and 11.1% did not specified their marital status. 30% of married women are reemployed at the end of my period, compared with 23.1% for unmarried women and 22.7% for divorced women.

48.7% of analyzed spells belong to women that received unemployment allowance (UI) during it, and 51.3% are non-UI spells. Mean duration of unemployment until reemployment occurs is 332.99 days for UI spells, and 47.34 days for non-UI spells. At the end of my study 23.2% from UI women were reemployed, compared with 32.2% non-UI women.

Out of all 1047172 women registered spells, 99.9% belong to women with a normal health condition and only 1% are spells of women with a disability. 24.7% from unemployed women with a

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disability were reemployed at the end of my study, compared with 27.9% women reemployed with a normal health condition.

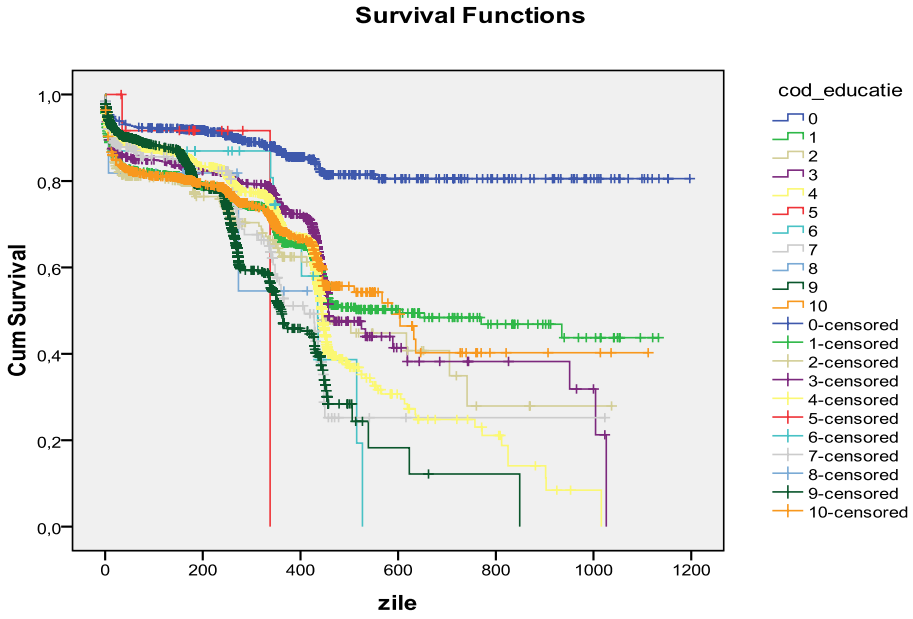
At the end of my study, 25.7% of registered unemployed women spells ended in reemployment, 26.7% ended due to expiry of the legal period for receiving UI, 2.6% ended in inactivity and 45% are right censored due to lack of an end date or due to unclear exit destination. Following I will estimate the impact of education on reemployment hazard of Romanian women, and I will estimate also the impact of the other exogenous variable on the reemployment hazard.

3. The effect of education on women re-employment hazard

The effect of education on women reemployment hazard was estimated using non-parametric and semi-parametric methods.

In figure 2 I presented the survival curves for educational level, when the event is employment. We can see from the figure that higher educated women have the highest chances to exit from unemployment and to be re-employed and uneducated women or just with primary level of education have the lowest chances to be reemployed.

Figure 2: *Survival curves for educational level, event employment, for Romanian unemployed women*



Median survival time until employment occurs have the lowest value, 409 days for higher educated women, followed by post-high-school graduated women, with 430 days, and the highest value for primary education or none (table 2). As we can notice, the differences observed between survival curves are statistically significant. Thus the conclusion is that education has a significant effect on Romanian women reemployment.

Table 2: *Survival time until employment occurs (days) for education variable*

Education	Days
Primary education or none	1006
Gymnasium	566
Apprenticeship complementary education	449

Vocational school	448
High-school	445
Special education	438
Foremen school	447
Post-high-school	430
College	428
University (Long-term)	409
Log Rank (Mantel-Cox)	0.000
Breslow (Generalized Wilcoxon)	0.000
Tarone-Ware	0.000

In table 3 are presented values of median survival time until employment occurs for age variable, for urban and rural area, marital status, unemployment allowance and disability. As we can see, all these exogenous variables have an effect on survival time until employment occurs. Romanian unemployed women aged in between 15 and 24 years and 45-65 years are the most disadvantaged regarding reemployment. Unemployed women from rural area have a medium survival time until reemployment almost double than women from urban area. Same situation is for women that received unemployment allowance during their current spell. A disability has a negative impact on women median survival time until employment occurs. As we can see from table 3, all the observed differences are statistically significant.

Table 3: *Survival time until employment occurs (days)*

Exogenous Variable	
Age	
15-24 years	532
25-34 years	429
35-44 years	452
45-54 years	611
55-65 years	870
Log Rank (Mantel-Cox)	0.000
Breslow (Generalized Wilcoxon)	0.000
Tarone-Ware	0.000
Urban/Rural Area	
Rural	778
Urban	444
Log Rank (Mantel-Cox)	0.000
Breslow (Generalized Wilcoxon)	0.000
Tarone-Ware	0.000
Marital status	
Unknown	998
Unmarried	457
Married	455
Widowed	455
Divorced	935
Log Rank (Mantel-Cox)	0.000
Breslow (Generalized Wilcoxon)	0.000
Tarone-Ware	0.000
Unemployment allowance	
Without indemnity	455
With indemnity	953

Log Rank (Mantel-Cox)	0.000
Breslow (Generalized Wilcoxon)	0.000
Tarone-Ware	0.000
Disability	
Normal health condition	456
With disability	678
Log Rank (Mantel-Cox)	0.000
Breslow (Generalized Wilcoxon)	0.000
Tarone-Ware	0.000

For the next step of my analysis, I used a semi-parametric competing-risks model to estimate the impact of education and of the other exogenous variables for women re-employment hazard. The group of low educated women is compared with the group of higher educated women. There are three events in my model, 1- re-employment, 2- exit from unemployment due to expiry of the legal period for receiving UI, and 3 – inactivity.

Out of all 1047172 women registered spells, 25.7% ended in reemployment, 26.7% ended due to expiry of legal period for receiving UI, 2.6% ended in inactivity and 45% are right censored, due to lack of an end date of spell or due to unclear exit destination.

In table 4 are presented the results of competing-risks estimation for re-employment hazard of Romanian unemployed women. As we can notice from the table, education has an important role in improving reemployment chances of Romanian unemployment women and in reducing duration of unemployment. All regression coefficients are positive, meaning an increase of re-employment hazard for all educational levels, compared with women with primary education or none, the reference category. Highest re-employment hazard is estimated for women that graduated college (short-term university level), vocational school and high-school. Age at the start of unemployment spell is another factor that has a significant influence on re-employment hazard of women. Unemployed women aged in between 25 and 34 years have the highest re-employment hazard; and the lowest re-employment chances are for women aged in between 55 and 65 years old. Unemployed women from rural area have a 39.6% lower re-employment hazard compared with women from urban area, the reference category. The presence of indemnity during a spell is important factors that significantly reduces the re-employment hazard and prolong the unemployment duration. Re-employment hazard of women with non-UI spells are more than three times higher than unemployed women with UI. Also, having a good health condition is improving the reemployment chances of Romanian unemployed women (1.320 higher re-employment hazard than women with a disability).

Table 4: *Results of the Cox proportional hazard model in a competing-risks framework, event employment*

Variables	B	SE	Wald	df	Sig.	Exp(B)	95,0% CI for Exp(B)	
							Lower	Upper
Age at the start of unemployment spell								
15-24 years	,691	,016	1954,580	1	,000	1,995	1,935	2,057
25-34 years	,944	,015	3975,040	1	,000	2,570	2,496	2,647
35-44 years	,680	,015	2088,772	1	,000	1,974	1,917	2,032
45-54 years	,448	,015	886,297	1	,000	1,566	1,520	1,613
55-65 years	Reference category							
	Education at the start of unemployment spell							
Primary education or none	Reference category							
Gymnasium	1,334	,011	14546,705	1	,000	3,798	3,716	3,881
Apprenticeship complementary education	1,538	,014	11712,389	1	,000	4,654	4,526	4,785
Vocational school	1,633	,012	18625,578	1	,000	5,121	5,002	5,242

High-school	1,561	,011	19012,706	1	,000	4,766	4,661	4,872
Special education	1,451	,054	718,489	1	,000	4,268	3,839	4,746
Foremen school	1,627	,036	2021,215	1	,000	5,091	4,742	5,465
Post-high-school	1,620	,017	9120,293	1	,000	5,053	4,888	5,224
College	1,675	,049	1182,029	1	,000	5,341	4,855	5,876
University education	1,579	,012	16603,793	1	,000	4,851	4,736	4,969
Unknown education	1,340	,012	12783,835	1	,000	3,818	3,730	3,907
Urban/Rural area								
Rural area	-,504	,004	12711,587	1	,000	,604	,599	,610
Urban area	Reference category							
	Unemployment allowance							
Without indemnity	1,307	,005	77413,612	1	,000	3,697	3,663	3,731
With indemnity	Reference category							
Marital status at the start of unemployment spell								
Unknown	,308	,020	226,706	1	,000	1,361	1,307	1,416
Unmarried	,038	,020	3,532	1	,060	1,039	,998	1,081
Married	,261	,020	175,077	1	,000	1,298	1,249	1,349
Widowed	,192	,022	76,318	1	,000	1,212	1,161	1,265
Divorced	Reference category							
	Health condition							
Without disability	,278	,053	27,708	1	,000	1,320	1,190	1,464
With disability	Reference category							

In table 5 are presented the reemployment hazards for primary education or none group and for higher educated group, estimated function of the specified exogenous variables. We can notice that education doesn't have an impact on age differences between primary education or non group and higher educated group. But for urban and rural variable, the presence of higher education significantly decreases the gap between rural and urban women. There are no significant differences between these two educational groups for marital status variable. Another significant difference is noticed for indemnity variable; higher educated women without UI have a higher reemployment hazard than primary or non educated women.

Table 5: *Re-employment hazard for 2 groups of education, in a competing risks approach*

Explanatory variables	Primary education or none group			Higher educated group		
	Re-employment Hazard	Exit due to expiry of legal period UI	Exit in inactivity	Re-employment Hazard	Exit due to expiry of legal period UI	Exit in inactivity
15-24 years	2,352***	1,195***	1,343	2,235***	5,695***	2,311***
25-34 years	1,975***	1,638***	,709***	2,901***	3,440***	,861***
35-44 years	1,468***	1,096	,167***	1,540***	1,830***	,147***
45-54 years	1,309***	,977	,561***	1,304***	1,287***	,479***
55-65 years	Reference category					
Rural	,401***	,506	,274	,884***	,820	,487***
Urban	Reference category					
Unknown	,653***	,375***	,322***	1,628	,829***	,581***
Unmarried	,931	,693***	,441***	1,162	1,234***	,676***
Married	1,219***	1,350***	1,345	1,174	1,344***	1,157***
Widowers	1,411***	1,614***	1,758	1,119	1,223***	1,030
Divorced	Reference category					

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Without benefits	1,062**	-	-	2,895***	-	-
With benefits	Reference category					
Without disability	,568	1,883	-	1,451	,941	,831
With disability	Reference category					

*/**/***/significant at 10%/5%/1% level

4. Conclusion

The aim of this article was to analyze the effect of education on reemployment hazard of Romanian unemployed women. Empirical analysis is based on 1047172 registered women unemployment spells, gathered from NAE Romania. The period of my study is January 1st 2008-December 31st 2010. Beside education, other exogenous variables and their impact on reemployment hazard were estimated. The used methodology is based on non-parametric analysis and semi-parametric competing-risks model.

Analyzing the obtained results we can draw the following conclusion:

- Women have a 14% lower instantaneous hazard rate of exit to employment compared with men, and the result is statistically significant. But the presence of higher education led to a decrease of the gender gap regarding reemployment hazard, and also decrease the median survival time until employment occurs.
- Education plays an important role in improving the reemployment chances of unemployed women. Median survival time until employment occurs is 409 days for Romanian women graduated university education, compared with 1006 days for primary education or none.
- Education has a significant role on improving reemployment hazard of Romanian Unemployed women and reducing duration of unemployment. Highest re-employment hazard was estimated for women that graduated college (short-term university level), vocational school and high-school.
- Beside education, other exogenous variable were found to have a significant effect on reemployment hazard, like age at the start of an unemployment spells, urban or rural area of residence, having or not UI during the current spell and health condition. Age at the start of unemployment spell has a significant influence on re-employment hazard of women. Unemployed women aged in between 25 and 34 years have the highest re-employment hazard; and the lowest re-employment chances are for women aged in between 55 and 65 years old. Unemployed women from rural area have a 39.6% lower re-employment hazard compared with women from urban area, the reference category. The presence of indemnity during a spell is important factors that significantly reduce the re-employment hazard and prolong the unemployment duration. Re-employment hazard of women with non-UI spells are more than three times higher than unemployed women with UI. Also, having a good health condition is improving the reemployment chances of Romanian unemployed women (1.320 higher reemployment hazard than women with a disability).
- The comparative analysis for low educated women (primary education or none) and higher educated women proved that education doesn't significantly influence the reemployment hazard by age, but has a significant impact on urban/rural variable. The presence of higher education significantly decreases the gap between rural and urban women. There are no significant differences between these two educational groups for marital status variable. Another significant difference is noticed for indemnity variable; higher educated women without UI have a higher reemployment hazard than primary or non educated women.

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