10. MAIN DETERMINANTS OF LABOR FORCE PARTICIPATION IN THE CASE OF METROPOLITAN ROMA PEOPLE

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Abstract

People generally labeled as Roma have unique social, cultural and demographic characteristics across even within the borders of a small geographical area. As a consequence, this study aims to establish main determinants of labor force participation in the case of metropolitan Roma people. The approach is innovative from mainly two points of view: first, methodologically, it uses census, not survey, data; second, it covers the Roma population in Bucharest, which is, to our knowledge the first study of its kind. The paper focuses on education as main determinant of labor force participation as this variable is o particular interest for developing countries. The final section of the paper, presents the main conclusions driven from the logit and probit analysis performed within the study; it also emphasizes the main policy recommendations in the studied area.

Keywords: Roma, employment, education, logit, probit
JEL Classification: J15

I. Introduction

Labor force participation is driven by both economic as well as sociological factors to various extents (Cullison, 1979). Understanding what factors, such as age, gender or ethnicity influence labor force participation is crucial for evaluating current and future economic conditions (Krantz, 2013), as one should note that labor force participation is

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highly interrelated to the business cycle conditions (Aaronson et al., 2014). Also, the maximum or sustainable rate of economic expansion is highly determined by the increase in the labor force (Federal Reserve Bank of San Francisco, 2007). Moreover, understanding the determinants of labor force participation is important for public policies addressing the need to reduce informal economy (Magidu, 2010)

Cultural particularities are critical in understanding the behavior with regard to labor market participation of vulnerable population groups (Contreras, 2011). Such factors can determine not only labor force participation of people belonging to these groups but also other aspects of life such as family size or fertility rates (Smith, 1981). Furthermore, such analyzes are important in order to target and design policies to further enhance labor force participation of vulnerable groups, such as women; such policies may include incentives for increasing educational attainment or campaigns resulting in a shift of attitudes (Chamlou, 2011).

II. Challenges faced by Roma

Roma are Europe's largest and poorest minority group, as well as one of its fastest growing populations, with approximately 70% Roma living in Central and Eastern Europe. A unique minority in Europe, they have no historical homeland and are found in nearly all European countries (Gresham, 2001). Current estimates suggest that seven to nine million Roma live throughout Europe. While some Roma groups are nomadic, most Roma populations in South East Europe have settled, some during the Austrian-Hungarian and Ottoman empires, and others more recently under socialism (Revenga, 2002).

The collapse of the socialist regimes in Romania created new opportunities for all citizens, including Roma minorities. For the first time in decades, minorities were able to express their ethnic identity, participate in civil society, and engage in previously forbidden economic activities. But for many Roma these gains have been offset by a dramatic reduction in other opportunities (Milcher and Fischer, 2011), including a decline of security in jobs, housing and other services, and the absence of viable economic opportunities to increasing poverty (Cekota, 2011). Roma education, essential for climbing out of poverty, has remained inferior to that of non-Roma (Andrei, 2011).

Historically, Roma communities in central and southeastern Europe have been excluded from the labor market and still face serious barriers to employment (Brožovičová, 2013). In addition to being marginalized socially, Roma were typically the first to lose their jobs at the outset of the post-communist transition. Their children grew up in unemployed households, with low educational attainments and inadequate jobs kills. The labor market exclusion of Roma persisted even through the years of economic growth and increasing employment levels prior to the economic slowdown brought by the global financial crisis in 2008 (Kahanec, 2011).

Apart from barriers such as labor market discrimination, a large majority of working age Roma lacks the human capital necessary to participate effectively in the labor market (Aguado, 2010; Luchtenberg, 2010). Only 1 in 8 Roma of working age in Romania are equipped with the necessary education and skill levels. Working age members of the

majority population are 4 to 6 times more likely to have these educational qualifications. Unsurprisingly, these low educational attainments are reflected in low employment rates; only 1 in 2 Roma of working age actually are working in Romania compared to 60% among Romanians (de Laat, 2010).

The challenges for the Roma minority are well known: overcoming poverty, increasing access to education, and diminishing labor market discrimination. But despite a general awareness of labor market discrimination of Roma in Eastern Europe, information on participation in the labor market needed for policy actions is limited, fragmented and often anecdotal. In particular, the impact of Roma educational attainment on labor market outcomes in Eastern Europe has received relatively scant attention (O'Higgins, 2014; Brüggemann, 2012; Kosko, 2012). In contrast, the relationship between education and labor market participation of ethnic minorities has been a major focus of research in developed countries (Kahanec, 2014).

Many Roma who make it to high school tend to enroll in vocational training programs, which appeal to Roma seeking a job directly out of high school. Roma appear less attracted to regular high schools, partly because they are poor and need to prepare themselves for employment quicker than their non-Roma peers (Greenberg, 2010).

In the context of a strong need for empowerment and increased participation in policy and decision-making processes and structures at European level, and the realities of discrimination, particularly Anti-gypsyism, a new action plan for Roma youth has been launched at European level, The Roma Youth Action Plan which aims to promote real equal opportunities for Roma young people in all aspects of life, including education, employment, health and housing (Council of Europe, 2013).

Despite the fact that all countries in the European Union have banned discrimination, many Roma across Europe are victims of prejudice and social exclusion (European Commission, 2016). In Romania, educational attainment is the second most important barrier in entering labor force for Roma people, especially in the context of deindustrialization of large cities (Zimmerman, 2008). This issue is particularly important as there is a 10 pp. difference in the increase of probability of finding a job of Roma compared to non-Roma in Romania due to the increase in the educational level (Varly *et al.*, 2014). As a consequence, the current paper focuses o this ethnic group, particularly from the point of view of educational attainment with regard to the labor force entrance. This study uses census data for Bucharest, the capital and largest city in Romania, to analyze the relationship between educational attainment, measured by years of school completed, and the labor force participation rate, defined as the percentage of a given population group who, during the census week, were either "employed" or "unemployed" according to the official definitions.

Besides the fact that the study is conducted for Bucharest (which to our knowledge is the first of its kind), here are several novelty points that our paper points out. First, it finds out how a person's probability of being in the labor force is affected by the amount of formal schooling he or she has received. Several other studies at national level with regard to the employment rate and educational attainment have been conducted but none of them takes into account ethnicity or particular establishments (see for example O'Higgins, 2006 and Earle and Păuna, 1996). We compare that probability across ethnic groups, by gender and by age within each ethnic group. Next, the analysis by

gender within each ethnic group is critical, as Roma education gaps also have an important gender dimension (United Nations Children's Fund, 2011). The results of the paper are particularly important in the context of the continuous decrease of the stable population of Romania between 1990 and 2013 (Andrei *et al*., 2015). From a methodological point of view, using data from the Population and Housing Census provides more precise information about the Roma compared to surveys given the difficulty to identify Roma persons based upon their distinctive characteristics such as appearance, language or family name (Revenga *et al*., 2002), thus designing appropriate surveys being very difficult.

III. Data

Probability models (probit and logit) are most suitable when analyzing dichotomous dependent variables (Aldrich, 1984). Moreover, as the probit and logit models' outputs are frequently almost identical, therefore the choice between them being arbitrary (Schmidheiny, 2015), the results of both models are presented. Thus, using probability models (probit and logit), our goal was to determine the effect of age, sex and level of education on one's probability of being employed. Additionally, the linear probability model has been estimated, as it may be less biased than index model alternatives and is much easier to estimate (Friedman, 2012). To estimate these models we used census data for the Bucharest metropolitan area from the 2011 Romanian Population and Household Census – RPL 2011. The linear probability, the probit and logit models estimated using these data produced similar results, thus our paper demonstrating that the correlation between education and employment probability reflects a valid not a spurious correlation. The total population for Bucharest in 2011 was 1,883,4215 of which 85% were in the 15-65 age group (Romanian National Institute of Statistics, 2013).

The data series used in this study rely on answers to the questionnaire addressed to persons who were either present or temporarily absent from the household during the census (Questionnaire P - Persons). The current activity status (CAS) has 10 answer options: 1 - Employed, 2 - Unemployed, looking for a job, 3 - Unemployed, looking for first job, 4 - Student, 5 - Retired, 6 - Housewife, 7 - Supported by other person, 8 - Supported by the State or private organizations, 9 - Supported from other sources, and 10 - Other economic situations.

For the purpose of this analysis, we defined the population of this study as the population with age between 15 and 65 years who reported one the following categories of current status: Employed (OP), Unemployed, looking for a job (S2), Unemployed, looking for first job (S1) and Housewife (CS). The variable *sex* was measured using the answers to Question 2 and included the options 1 for males and 2 for females. To derive the variable *age* we used Date of Birth (Question 4) from the questionnaire.

Level of education was measured based on the answers to question 26 - highest level of education attained (ILE variable): 1 - Completed higher education, 2 - Completed post-high school studies, 3 - Completed secondary education, 4 - Completed primary education, 5 - Completed other studies (*i.e*., literacy courses).

For all the other variables defined in this study we calculate indicators for Bucharest's entire population, as well as for the main ethnic groups: Romanians, Roma, Magyar, and Turks (only those ethnic groups larger than 1,200 were included in the analysis).

In the following section we introduce the variables that will be used in the analysis. Using the current status variable, we created a dummy variable (VD) which takes the value of 1 for "employed", and 2 when occupational status was S1, S2 or CS. To estimate a person's level of education, we create the variable *LE*, which is defined based on the relationship LE=4/ILE and takes values between 0.8 and 4. The goal of this recoding was to reverse the scores associated with the 4 levels of education, so as the score reflects the highest level of qualification: each level of main compulsory education (primary, secondary, high school, higher education) are given scores from 1 to 4 as they provide a specific set of competencies at national level; other studies such as literacy courses are given a 0.8 score as although they provide students useful competencies, they are not unitary at national level.

Table 1 lists the variables that will be used in the models. The dependent variable in the models is Employment Status while age, highest level of education, and sex constitute the independent variables.

Table 1

Description of variables used in the probability models

Variable	Variable Description
Employment Status (VD)	This dummy variable takes the value 1 if the person declared his/her current activity status as "Employed" and 0 in the person responded "Unemployed", "seeking work", "Housewife", "Supported by other person", "Supported by the State or private organizations", "Supported from other sources" and "Other economic situation".
Person's Age (AGE)	Age in years at the date of the census (11.10.2011)
Highest Level of Education (ILE)	Highest level of education: 1 – college/university, 2 – post high school, 3 – high school, 4 – middle school and 5 - other studies (literacy classes)
LE	4/ILE
Sex	0 – female, 1 – male

Educational attainment is of a particular interest for employment rates and participation in labor force in developing countries (United Nations Scientific and Cultural Organization, 2013). As a consequence, this paper focuses on this issue. Our paper will offer a strong basis for further analysis at even more specific level (school unit level) from the point of view of interaction variables (gender-age, gender-ethnic ethnicity, gender-family background). It is very important to carry out such analysis at lowest disaggregation level as possible, as people collectively labeled as Roma are very heterogeneous (O'Higgins, 2015).

The results shown in Table 2 reveal differences in level of education across ethnic groups, with the Roma group having the lowest average educational level. The Magyars had the highest educational level, approximately 20% higher than the overall average

for the Bucharest population. The differences between ethnic groups are even larger if we consider the percentage with college degree in the 21-65 years old group: 40.6% for the entire population, 41.4% for Romanians, 4.2% for Roma, 53.3% for Magyars and 35.8% for Turks.

The data also show large differences among the groups with respect to average age. Clearly, the Roma population is the youngest among the four ethnic groups and this can be explained by a higher birth rate and shorter life expectancy. On the other hand, the average age for the Magyar population is 34% higher than that for the entire population. The data also show strong gender imbalances for the Magyars and Turks. For the latter ethnic group, men constitute 75.1% of the population used in our study.

Table 2 presents the characteristics of the census population as well as the characteristics of the population of the study (N=1,054,844).

Table 2

Descriptive statistics for the variables used in the probability models

		Total population	Romanians	Roma	Magyars	Turks	Other
2011	N	1883425	1618883	23973	3359	2315	234895
	% ethnic group in total population	100.00	85.95	1.27	0.18	0.12	12.47
	Average Age	40.39	41.33	30.25	54.13	33.35	34.86
	% men in total population	46.3	46.1	49.9	39.8	66.9	47.2
Population	Studied population as % of group popopulation	84.6	83.9	43.5	84.0	76.3	80.0
	Average Age	38.93	39.14	35.30	43.06	37.86	41.43
	% men in total population	49.3	49.3	50.3	48.5	75.1	67.2
	Average level of education (LE)	2.53	2.57	1.34	2.94	2.25	2.91

IV. Model Estimation

In order to evaluate the extent to which a person's age, sex, ethnicity, and education level are related to employment status we used three binary regression models: linear, logit, and probit. These models use employment status (VD) as the dependent variable and Age, ILE, and Sex as independent variables.

The probability model is defined by the following equation:

$$p_i = P_i + \varepsilon_i \tag{1}$$

where: $P_i = P(VD = 1|AGE, SEX, ILE)$ is a function (linear or non-linear) of the independent variables and the error ε_i follows a normal distribution $N(0, \sigma^2)$.

When the probability model is linear, P_i is defined as follows:

$$P_i = a_0 + a_1 AGE_i + a_2 AGE_i^2 + a_3 SEX_i + a_4 ILE_i = \mathbf{x}_i'\mathbf{a} \tag{2}$$

In this case the parameters of the model are estimated with the least squares method and the results are presented in Table 3. The results presented in the table reveal that

the coefficients estimated for each variable (both in the entire population and each ethnicity model) have the same sign, indicating the following:

- Women have a lower probability of being employed than men do. This holds true for the entire population as well as within each ethnic group. For the Romanian ethnic group, women are 8.8% less likely than men to be employed and the gender gap increases to 23% for Roma and 40% for Turks.

- The positive signs for the coefficients corresponding to the variable ILE in the model estimated for the population as well as the models for each ethnic group suggest a positive return for investment in education when the outcome is defined as probability of being employed.

The simple comparison of the coefficients estimated for each of the four ethnic groups indicates significant differences in the importance of educational attainment among the ethnic groups. In order to evaluate the extent to which highest level of education predicts employment status, we calculated the marginal probabilities for each group. For Roma, a unit increase in educational attainment results in a 9% increase in the probability of being employed.

Table 3

Regression Coefficients in the Linear Probability Model

	Group					
	Total Population	Romanians	Roma	Magyars	Turks	Other
C	0.120866* (0.004536)	0.059304* (0.004140)	-0.709661* (0.034994)	0.050677* (0.090828)	-0.422332* (0.111957)	0.045437 (0.044286)
Age	0.027066* (0.000232)	0.028553* (0.000200)	0.048436* (0.001907)	0.027060* (0.003893)	0.037073* (0.005735)	0.024411* (0.002064)
age^2	-0.000302* (0.00000287)	-0.000316* (0.0000024)	-0.000573* (0.0000246)	-0.000323* (0.0000412)	-0.000431* (0.000071)	-0.000276* (0.000023)
sex	0.080563* (0.000685)	0.088388* (0.000752)	0.232775* (0.008136)	0.113662* (0.017841)	0.399520* (0.021743)	0.216963* (0.008797)
Ile	0.051213* (0.000262)	0.055893* (0.000288)	0.086259* (0.007029)	0.075085* (0.007051)	0.065088* (0.007126)	0.037072* (0.003114)
N	1054844	897178	13339	1424	1588	8662
R-Squared	0.06	0.07	0.11	0.16	0.25	0.10
Log likelihood	-376939.2	-341405.4	-8845.488	-459.5210	-627.3144	-3854.919

Note: * significant at the 0.1.

For the linear probability model, the marginal rate for the probability of being employed in relation to the increase in level of education equals the value of the coefficient that corresponds to variable ILE:

$$\frac{\partial P_i}{\partial ILE_i} = \frac{\partial P(VD=1|\overline{AGE}, \overline{SEX}, \overline{ILE})}{\partial ILE} \quad (3)$$

Marginal probabilities are more easily interpreted than the probit regression coefficients and are presented in Table 4. They are defined as the partial derivatives of the probability of an ethnic group being in the labor market with respect to individual control

variables. The marginal probabilities in each case are defined at the sample means of the variables over the pooled sample from the total population. The marginal probabilities are distributed asymptotically according to the normal distribution.

Table 4 further presents the probability of being employed for each ethnic group and level of education. The table indicates that the low average educational level for the Roma group is associated with the highest increase in the probability of being employed if the person improves his or her level of education.

Table 4

Marginal rates for the probability of being employed in relation to educational level

	Total Population	Romanian	Roma	Magyar	Turk	Other
Other	0.03	0.04	0.06	0.05	0.04	0.02
Primary	0.05	0.06	0.09	0.08	0.07	0.04
Secondary	0.07	0.07	0.12	0.10	0.09	0.05
Post-High School	0.10	0.11	0.17	0.15	0.13	0.07
University	0.20	0.22	0.35	0.30	0.26	0.15

For the logit model, P_i is determined based of the logit distribution (Balakrishnan 1992):

$$\mathrm{P_i} = \mathrm{F}(\boldsymbol{x_i'a}) = \frac{\exp(\boldsymbol{x_i'a})}{1+\exp(\boldsymbol{x_i'a})} \quad (4)$$

The model parameters are estimated through the method of maximum likelihood and the results are presented in Table 5.

Table 5

Results for the Logit Model

	Group					
	Total population	Romanian	Roma	Magyar	Turk	Other
C	-3.3865* (0.026778)	-3.5525* (0.029511)	-5.8742* (0.204183)	-3.5843* (0.805885)	-6.1614* (0.845300)	-3.0787* (0.294322)
Age	0.1806* (0.001306)	0.1823* (0.001424)	0.2432* (0.010707)	0.1681 (0.034613)	0.2410* (0.043585)	0.1465* (0.013804)
age^2	-0.0020* (0.000016)	-0.0020* (0.000017)	-0.0029* (0.000139)	-0.0020 (0.000369)	-0.0028* (0.000551)	-0.0016* (0.000157)
sex	0.6944* (0.005769)	0.7135* (0.006166)	1.0271* (0.037263)	1.0114 (0.169126)	2.2502* (0.149056)	1.3245* (0.057720)
Ile	0.4529* (0.002397)	0.4617* (0.002538)	0.3943* (0.034482)	0.6212 (0.064897)	0.5475* (0.064259)	0.2510* (0.021520)
N	1054844	897178	13339	1424	1588	8662
McFadden R-squared	0.077	0.079	0.085	0.173	0.231606	0.099
LR statistic	70230.63	62113.07	1558.923	215.0747	384.7961	858.2437
Log likelihood	-417568.2	-363997.9	-8400.113	-515.4925	-638.3165	-3882.671

Note: * significant at the .01 level

For the probit model, P_i is determined using the probability function of a normal distribution of average 0 and standard deviation 1 (Greene 2012):

$$P_i = F(\mathbf{x}_i'\mathbf{a}) = \frac{1}{2} + \int_0^z e^{-\frac{1}{2}t^2} dt, \text{ where } z_i = \mathbf{x}_i'\mathbf{a}. \quad (5)$$

The parameters of the model are estimated using the method of maximum likelihood and the results are presented in Table 6.

Table 6

Results of the Probit Model

	Group					
	Total Population	Romanian	Roma	Magyar	Turk	Other
C	-1.85565* (0.015396)	-1.96047* (0.016953)	-3.58095* (0.120496)	-1.91343* (0.445401)	-3.45241* (0.475656)	-1.74116* (0.170571)
Age	0.103048* (0.000748)	0.104348* (0.000816)	0.147963* (0.006369)	0.094869* (0.019264)	0.138245* (0.024508)	0.08504* (0.007997)
age^2	-0.00113* (0.000009)	-0.00114* (0.0000096)	-0.00177* (0.000083)	-0.00112* (0.000206)	-0.00163* (0.000307)	-0.00096* (0.000091)
sex1	0.377726* (0.003142)	0.389494* (0.003376)	0.630906* (0.022669)	0.533366* (0.090062)	1.297426* (1.297426)	0.758516* (0.032993)
Ile	0.243549* (0.001256)	0.250369* (0.001344)	0.240797* (0.020694)	0.329644 (0.034073)	0.284613* (0.284613)	0.13912* (0.012203)
n	1054844	897178	13339	1424	1588	8662
McFadden R-squared	0.077	0.078	0.085	0.169	0.230	0.100
LR statistic	69756.10	61763.87	1560.314	210.2166	377.4928	852.9483
Log likelihood	-417805.4	-364172.5	-8399.417	-517.9216	-641.9682	-3885.319

Note: * significant at the .01 level

V. Analysis of results

The first objective of our analysis was to identify the effects of education on one's probability of being employed. We evaluate these effects for the entire popultaion as well as for each ethnic group.

For the three models we calculate the marginal rates for the probability of being employed for each educational level and ethnic group for the situation where the variables have averages calculated at the level of each group (these values are presented in Table 1, columns 5-8). In calculating the marginal rates for the three models, we use the the following definitions:

a) The marginal rate for the linear model is a constant that equals the value of the paratmeter estimate that corresponds to the educational level variable:

$$\frac{\partial \mathrm{P_i}}{\partial \mathrm{ILE_i}} = \frac{\partial \mathrm{P(VD=1|\overline{a})}}{\partial \mathrm{ILE_i}} = \mathrm{a_4} \quad (6)$$

b) For the logit model, the marginal rate is not constant; instead it depends on the data point for which it is calculated and this is determined based on the following relationship:

$$\frac{\partial P_i}{\partial ILE_i} = a_4 f(\mathrm{x_i'a}) \quad (7)$$

c) For the probit model, the marginal rate is calculated according to the following formula:

$$\frac{\partial P_i}{\partial ILE_i} = a_4 f(x_i'a) \quad (8)$$

where: $f(\cdot)$ is the density of the distribution $N(0,1)$.

Next we calculate the marginal rates for the data point where the value of each variable is the average of that variable. The results obtained for the total population and for the four ethnic groups are presented in Table 7.

Table 7

Marginal rate for the probablity of being employed based on the average level of education for the linear, logit, and probit models (%)

Model	Group					
	Total Population	Romanian	Roma	Magyar	Turk	Other
Linear	5.13	5.59	8.63	7.51	6.51	3.71
Logit	4.28	4.54	9.82	5.03	6.46	3.09
Probit	4.48	4.76	9.58	5.47	6.51	3.20

These results reveal significant differences in the marginal probablity of being employed across ethnic groups. For instance, the low level of education for the Roma population yields a relatively high marginal rate for this group. From an economically point of view, this should be interpreted as follows: the lower the educational level of a person, the lower it is the probability of being employed; this trend is more powerful for people belonging to the Roma group than to the other studied ethnic groups. Moreover, as the investment in education is carried out in the care of persons with lower educational level, it will generate higher employability chances.

Next, we evaluate the effects of increasing the average level of education on the probability of being employed for the entire population and for each ethnic group.

The evaluation of these effects is carried out using three binary models. The marginal rates are calculated for the scenario where the values for AGE and SEX are equal to the averages of these variables for each group. Also for education we calculate for each case a value that is obtained through the product of the average of ILE and a weight coeffcient that captures the rate of improvement in level of education.

In Table 8 and Figures 1 and 2 we present the marginal effects for the logit and probit models for the scenarios where the average level of education is improved in increments of 10%, from 10% to 100%.

For each ethnic group we conducted simuations only for the ILE values that are lower than 3.8. Under these conditions we obtain the following results: (1) as expected, the marginal probablity rates for the entire population and for each ethnic group decrease as the group's average level of education increases; (2) for the Roma group a 90% increase in the average educational level will bring the group to the current average educational level of the entire population; (3) even a doubling of the average level of education for the Roma would maintain a relatively low marginal rate of 9% for this group.

Figure 3 presents the marginal effects for the probit and logit models for the Roma. The marginal rates calculated for the two linear models for different values of the variable converge to 8.85%.

Table 8

Marginal Effects for the logit and probit models

	Initial Rate	The slope for the logit model as the average level of education increases by:									
		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Total	4.3	3.9	3.6	3.2	2.9						
Romanian	4.5	4.1	3.8	3.4	3.1						
Roma	9.8	9.8	9.7	9.7	9.6	9.5	9.4	9.3	9.2	9.0	8.9
Magyar	5.0	4.3	3.7	3.1							
Turk	6.5	5.9	5.4	4.9	4.4	4.0	3.6				
Other	3.1	2.9	2.8	2.6							
	Initial Rate	The slope for the probit model as the average level of education increases by:									
		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Total	4.48	4.14	3.81	3.50	3.20						
Romanian	4.76	4.39	4.03	3.69	3.40						
Roma	9.58	9.55	9.52	9.47	9.41	9.35	9.27	9.19	9.10	8.99	8.88
Magyar	5.47	4.79	4.15	3.57							
Turk	6.51	6.07	5.64	5.22	4.81	4.41	4.03				
Other	3.20	3.06	2.93	2.79							
	Average of ILE (%)	Educational level after an increase of the average educational level by (%):									
		10	20	30	40	50	60	70	80	90	100
Total	2.5	2.8	3.0	3.3	3.5						
Romanian	2.6	2.8	3.1	3.3	3.6						
Roma	1.3	1.5	1.6	1.7	1.9	2.0	2.1	2.3	2.4	2.5	2.7
Magyar	2.9	3.2	3.5	3.8							
Turk	2.3	2.5	2.7	2.9	3.2	3.4	3.6				
Other	2.9	3.2	3.5	3.8							

Figure 1

Marginal effects for logit models for the total population and ethnic groups for different levels of increase in level of education (%)

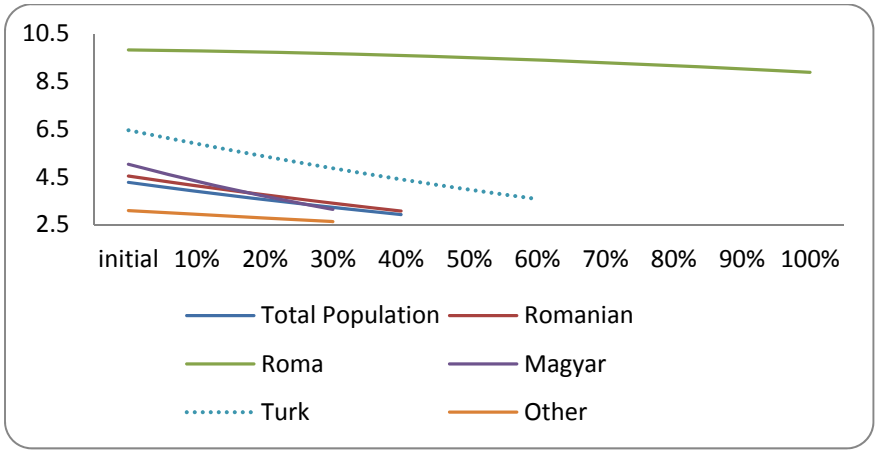


Figure 2

Marginal effects for probit models for the total population and ethnic groups for different levels of increase in Level of Education (%)

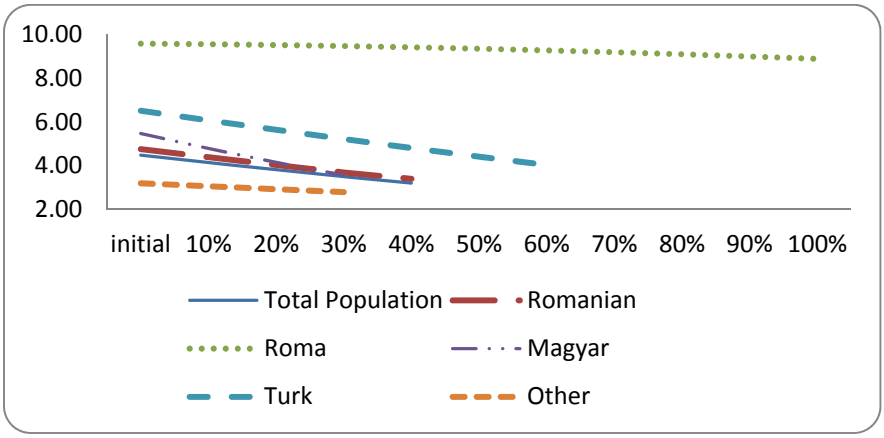
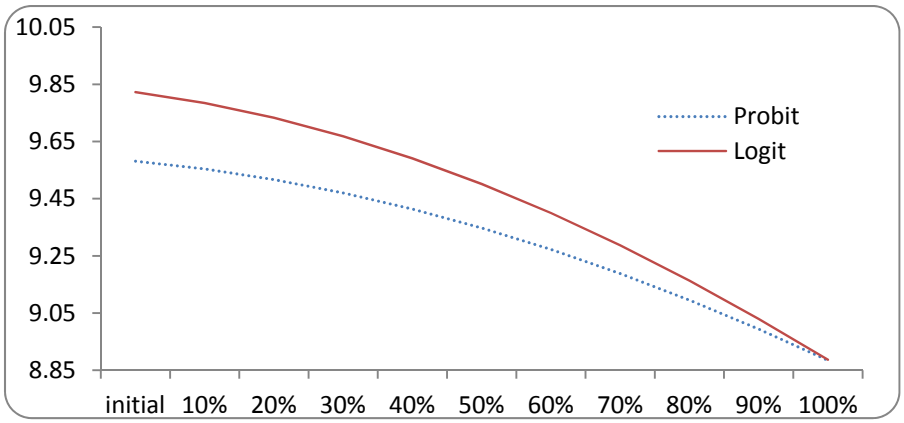


Figure 3

Marginal effects for probit and logit models for the Roma population



A second goal of our analysis was to determine if signficant differences exist across the groups that might indicate possbile gender or age discrimination in hiring decisions.

Therefeore, using the logit and probit models we calculated the probability of being employed for the entire population and for the four ethnic groups and age groups (between 15 and 65) and separateley for men and women.

The gender effects by age on the probability of being employed as estimated by logit and probit model is calculated by :

$$GE_i = P(VD = 1|AGE_i, ILE_i, \text{sex} = 1) - P(VB = 1|AGE_i, ILE_i, \text{sex} = 0) \quad (9)$$

where: AGE_i is age expressed in years, ILE_i is the average level of education for each group and SEX is 1 when the probability is calculated for men and 0 for women.

The results of this analysis are presented in Figures 4 and 5. As one can observe, both models show similar results. For Romanian, Magyar and other ethnic groups taken into account, the gender effects by age on the probability of being employed show similar results. More specifically, the gender gap reduces its influences gradually up until the age of 40-42 when it starts to increase but significantly. For the Roma population and the Turks, this pattern is completey different. For the Roma, the gender gap influence on the probability of being employed is constant between 24-56 years. With regard to the Turks, the influence is higher for the youngsters and lower for mid 40 population but overall, it condsiderably higher than in the case of other ethnic groups.

Figure 4

Gender effects by age on the probability to find a job estimated by logit model

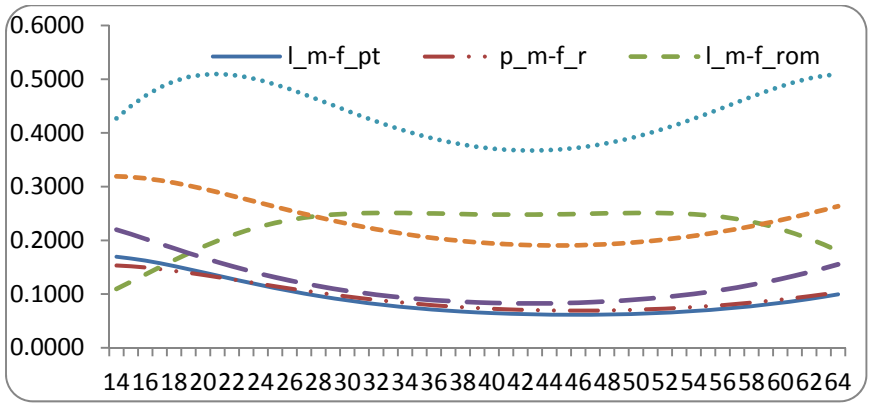


Figure 5

Gender effects by age on the probability to find a job estimated by logit model

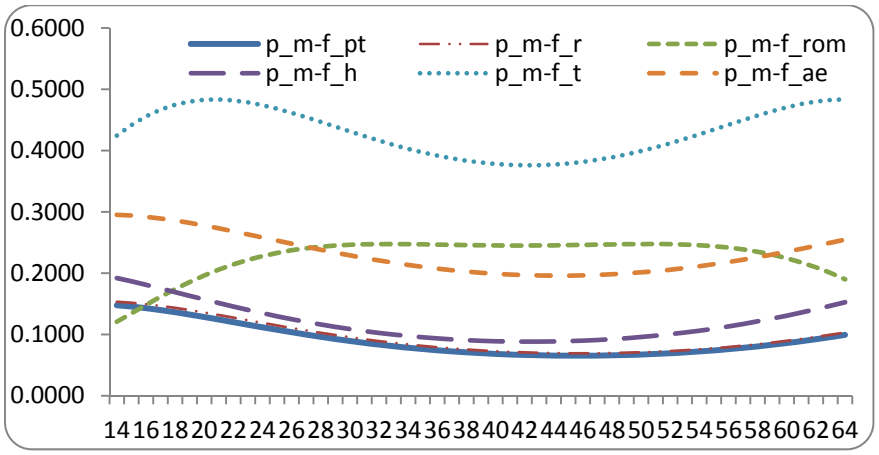


Table 9 presents the values of the linear coefficient of correlation calculated for the data series *l_m-f* (under the principal diagonal) and *p_m-f* (above the principal diagonal) for the four ethnic groups. The numbers included in the first parenthesis are the t-Student statistics calculated under the Null Hypothesis that the linear correlation coefficient is zero while the numbers in the second parenthesis represent the F statistic calculated under the null hypothesis that there is no significant difference between two ethnic groups regarding the gender differences by age.

Table 9

Gender gaps in the probability to be employed estimated by logit (values under the principal diagonal) and probit (values above the principal diagonal) models

	M-F(r)	M-F (rom)	M-F (h)	M-F (t)
M-F(r)	1.00	-0.88 (t=10.65) (F=527.7)	0.98 (t=37.27) (F=18.9)	0.86 (t=10.10) (F=2659.8)
M-F(rom)	-0.88 (t=13.17) (F=347.0)	1.00	-0.93 (t=15.51) (F=317.6)	-0.53 (t=3.66) (F=852.4)
M-F(h)	0.95 (t=21.90) (F=10.1)	-0.96 (t=24.13) (F=212.7)	1.00	0.79 (t=7.62) (F=2107.4)
M-F(t)	0.69 (t=6.65) (F=1605.0)	-0.55 (t=-4.66) (F=581.7)	0.74 (t=7.62) (F=1299.8)	1.00

The results reveal the following:

a) the F Statistics show significant differences among ethnic groups related to the gaps that exist between men and women when it comes to being employed;

b) the linear coefficients of correlation indicate similarities among Romanians, Magyars and Turks relating to the gender gaps by age. For these three ethnic groups the gender gaps in the probability of being employed follow a U-shaped curve, reaching the lowest point around the age of 40-42. In contrast, the gender gap peaks for Roma around the same age. These results are validated by the logit and probit models.

VI. Conclusions and Implications for public policy

The results of this analysis indicate that each step up the educational attainment ladder is associated with some increase in labor force participation. This pattern is observed across all ethnic groups in Bucharest's labor market. However, the responsiveness of labor participation rates to educational attainment varies significantly among the ethnic groups and is highest for the Roma population.. Thus, public policies for increasing participation at all educational levels for Roma is mandatory. There are many educational policies addressing the need to increase participation among Roma children already implemented in the European countries, many of them resulting in a future increase of participation of the Roma youths on the labor market: from a legislative point of view, any schooling law should ban segregation and support intercultural and inclusive education; moreover, in many countries introduced compulsory kindergarden education; other measures include free after-school, training Roma mediators to support Roma children and youth, enhancing school reception by Roma families (European Commission, 2016a). Tertiary education is found to have a large impact on participation in all ethnic groups, and especially for Roma. With regard to the need of increasing the enrolment of Roma youths beyond compulsory schooling, most effective policies consists not only of scholarships for talented students but also informal and non-formal learning facilities (European Commission, 2014). Also, in order to make sure that Roma youths finish tertiary education, once enrolled, it is mandatory to establish mentoring

and tutoring activities ever since the enrolment (Nagy, 2011). Moreover, in order to raise attendance of Roma youths in Higher education institutions, the public needs to be aware of the beneficies that such measures will bring to the society (European Higher Edcucation Area, 2014).

Several examples from other countries have shown that careful analysis should be performed before implementing any policy with the purpose of increasing participation at all educational levels for Roma in order not to have negative results: in Croatia, many Roma youth, after finishing higher education, do not return to their primary communities, very often due to rejection of their members (Potočnik, 2013); in Hungary, a mandatory school attendance policy for Roma children resulted in segregated schools (Moore, 2014); in Slovakia, social inclusion policies for Roma lead to negative attitudes and perceptions (Kahanec, 2012).

The challenges posed by the large gaps in labor market outcomes are compounded by the country's demographic trends. The trend of declining majority population and increasing elderly population means that young labor market entrants, and increasingly among them Roma men and women, will have to pay the taxes that pay for pensions, health care, infrastructure, etc. Young Roma are entering labor markets at much higher rates than aging majority populations - as many 21% in Romania. And large share of new labor market entrants are Roma, representing nearly one-fifth in Romania (de Laat, 2011). In fact, Roma will be entering the labor market at relative rates that are 2-2.5 times higher than the majority populations.

To transform these economic and fiscal losses into gains that will take Roma families out of poverty and can support the social security system of the aging populations in Romania, investing into quality education is not only the best social choice but also the economically smart choice to make. Improving school readiness is also essential for addressing the employment gap between Roma and non-Roma populations. Early school drop-out rates can be addressed by improving early childhood development outcomes and giving young Roma children an equal starting point as they enter primary school. Other possible actions in order to address the problems of the Roma community in Romania are: vocational and employment-based education with a flexible schedule, preschool provisions, intercultural curriculum, alternative schooling models to mainstream schooling system, income transfer programmes (Nelson, 2013).

In order to reduce gender gaps with regard to employability of Roma, one must notice that special policies must be addressed to Roma women as they are often captured within the tadition of the patriarchal principles of family and communitiy (COSV, 2013). Other measures include continous information of families with regard to the need of qualitification and education but also support for access to services of education including daycare services for little children (Reasearch Institute for Quality of Life, 2010).

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