

Roma Employment in Hungary

After the Post-Communist Transition

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Abstract

We analyze the extent and some causes of the low formal employment rate of the Roma in Hungary, using the most reliable survey data. Roma employment dropped dramatically in the first years of the post-communist transition, widened further a little afterwards, and it stayed largely unaffected by macroeconomic conditions after the transition. The absolute employment gap is roughly the same for men and women, more than third of the gap is explained by lower education of the Roma, and geographic location, while different from non-Romanies, explains little once education is controlled for. We also show indirect evidence for labor market discrimination.

Key words: Roma minority, employment, Hungary, discrimination

JEL codes: J15, J21, J70

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1. Introduction

The Roma (also known as the Romani people or Gypsies) constitute one of the largest and poorest of the ethnic minorities in Europe.² Nearly 80 per cent of them live in former communist countries of Central and Eastern Europe. The size of the Roma population is notoriously hard to assess because ethnic data are not collected in systematic ways (more on this in the Data section). One of the more reliable estimates for the size of the Roma population in Central and Eastern Europe in the early 1990's is slightly over 4 million (Barany, 2002). According to those figures, the share of Romanies in the total population is close to 10 per cent in Bulgaria and Slovakia, it is between 4 and 7 percent in Hungary, Macedonia, Romania and Serbia, and it is at around 2 per cent in Albania and the Czech Republic. Little representative evidence exists on the well-being of the Roma, but all available data indicate wide-spread poverty, low formal employment, low education, poor health, and social exclusion in all countries (Ringold et al, 2005).

The purpose of this paper is to shed light on the extent and some causes of the low formal employment of the Roma in Hungary. Our contribution is threefold. First, we estimate the ethnic employment gap using the most reliable surveys spanning fifteen years of post-communist history. Given the lack of reliable data on Romanies in general, this contribution is significant in itself. Second, we decompose the employment gap into differences in age, education and geographic distribution on the one hand, and a residual component on the other hand. We also decompose the change in the employment gap using two comparable surveys ten years apart. Third, we provide indirect evidence for the existence and increasing importance of labor market discrimination.

The paper focuses on Hungary, because of data availability. For most of the past twenty years, Hungary has been one of the more successful transition economies with a significant Roma minority. It is also one of the few countries with reliable survey data on the Roma both from the early transition and from afterwards. The Hungarian economy went through the post-communist transition relatively quickly, and the transition was accompanied by large net job destruction

² There is some controversy about the name of the Romani ethnic group. In Central and Eastern Europe the name Roma is used, as a noun (Roma plural) and also as an adjective. It is also used by some international organizations and initiatives, such as the Roma Education Fund or the Decade of Roma Inclusion. The United Nations, the U.S. Library of Congress and other international associations use the Romani name for an adjective and a noun as well (Romanies plural). The name Gypsy is used by many non-Roma but not by the Roma: It is a name created by outsiders and is derived from the misconception of Egyptian origin. Similarly to the alternative local names such as Tsigane, Cigany, Gitane or Gitano, the name Gypsy brings negative associations about lifestyle or project images that

(Svejnar, 2002). By the late 1990's, Hungary became one of the more successful transition economies in terms of privatization, institution building and economic growth. In the past decade, the relative position of Hungary deteriorated by most measures, and the recession of 2008-9 hit it more than most post-communist economies. By analyzing Roma employment in Hungary, therefore, we can look at not only the effect of post-communist transition but also large swings in macroeconomic conditions afterwards.

The results imply that the employment of Romanies in Hungary dropped dramatically in the first years of the post-communist transition and stayed largely unaffected by macroeconomic conditions later. By 1994, the ethnic gap in employment rates reached 37 percentage points (0.29 for Romani men versus the 0.66 national average; 0.17 for Romani women versus the 0.53 national average). Since then, the employment gap has widened further because non-Roma employment increased somewhat more than Roma employment. While estimated levels are different from the different surveys, all surveys indicate that the absolute employment gap is roughly the same for men and women, more than third of the gap is explained by lower education of the Roma, and geographic location, while different from non-Romanies, explains little once education is controlled for. The larger part of the employment gap is residual, i.e. it remains unexplained by the (admittedly low-dimensional) vector of observables. The increase in the employment gap is due to the increased role of education in employment prospects, which hurt the Roma because of their low levels education. We also show that the residual employment gap is wider in micro-regions characterized by higher overall unemployment rate, especially in the 2000s. We interpret that as indirect evidence for labor market discrimination.

The remainder of the paper is organized as follows. The next section gives a short historical background for the Romani minority in Central and Eastern Europe. Section 3 introduces the datasets, and section 4 shows descriptive evidence on the employment of the Roma of Hungary. Section 5 presents the methods and the results of the decomposition exercise, and section 6 shows some evidence on the trends in the education of Romanies. Section 7 presents the indirect evidence for the role of labor market discrimination, and the last section concludes.

are inaccurate for many Roma (e.g. the romantic image of travelers). In this paper we use Roma and Romani

2. Some background on Romani history

The Roma have no historical homeland in Europe. They originated in India and migrated to Eastern Europe seven hundred years ago.³ The Roma are a heterogeneous people spread across many countries. Some speak dialects of the Romani language, while others adopted the language of their host country, often in the form of a special dialect. The vast majority of the Roma of Central and Eastern Europe had settled a long time ago, and their sometimes romantic image of being travelers is based on exceptions (mostly from outside Central and Eastern Europe) or pure fiction. The Roma were enslaved in some parts of Central and Eastern Europe for centuries, and they were often prosecuted. Historical evidence on the structure of Roma communities and their relationship to mainstream societies is relatively scarce. The following paragraphs describe a widely accepted but not uncontested view on their premodern and modern history (see, for example, Barany, 2002, Hancock, 2002, and Kemény, 2005).

For centuries, the integration and assimilation of the Roma remained limited. In many respects they lived outside the mainstream society both before and well into the industrial revolution. The Roma had no land or any other formal property, and when not slaves, they worked as independent laborers or sold their own products and services. The industrial revolution and the emergence of centralized nation states started to bring the Roma minority closer to the mainstream society but also undermined their traditional communities. The communist regimes speeded up the dissolution of those communities and instigated a paternalistic assimilation process. Among other things, many Roma faced relocation into neighborhoods within villages and towns inhabited by the majority, obligatory employment in the state sector, and compulsory schooling for their children. As a result, many (in some countries most) Roma families have had stable wage earners in the communist regimes and saw their children achieving more schooling than themselves. At the same time, many of the ties within the Roma communities were destroyed.

The fall of the communist system led to a deep recession and a thorough transformation of labor demand in most transition countries. Demand for unskilled labor collapsed. The more successful post-communist economies started to grow fast from the mid-1990's but not even they have experienced an increase in demand for unskilled labor. Many unskilled people who lost their employment during the transition period were left without a regular formal job ever since.

interchangeably.

Anecdotal evidence suggests that all that affected the Roma especially severely. Hard evidence, on the other hand, is hard to find (UNDP, 2002).

3. Data

The most important contribution of our paper is in showing evidence on Romani employment from multiple surveys that are quite reliable. In this paper we use data from four such surveys: the ethnic sample of the 1993 Hungarian Labor Force Survey, the Representative Roma Surveys of 1994 and 2003, and the Hungarian Life Course Survey of 2007.

Nationally representative data for the Roma in Central and Eastern European countries is rarely available.⁴ Administrative data and standard nationally representative surveys (such as labor force surveys) contain no ethnic markers. National censuses and some representative surveys in general, and in Hungary in particular, ask for the respondents' nationality. By answering the nationality question, the Roma identity can be chosen only as an alternative to other nationalities. To the extent that the Roma have multiple or multi-level identities, answers to this question are bad measures of ethnicity. In Hungary, most Romanies consider themselves Romungros, or Romani-Hungarians. In the Census of Hungary, Romungros have to choose, and many seem to choose Hungarian. A potential reason for such a choice is fear from enumeration as Romanies. The Roma have the reputation to be preferred to left alone, a preference not surprising given their troubled history. Census data on the Roma are non-representative and very unstable. The Census of Hungary enumerated 160 thousand Roma by nationality in 2001, 143 thousand in 1990, and a mere six thousand in 1980. More reliable estimates of the Hungarian Roma population are 485 thousand in 1993 and 600 thousand in 2003. The latter numbers come from targeted Roma surveys that are used in this paper as well and are described later.

The 1993 ethnic sample of the Hungarian Labor Force Survey (HLFS) is a regular quarterly sample of the labor force survey, which, for the first and last time in the history of the HLFS contains ethnic markers as well. The ethnicity of the respondents was assigned by the

³ For more details, see Barany (2002), Guy (2001), and Hancock (2002).

⁴ Many sociologists and anthropologists oppose the definition of a Roma ethnic group, arguing that ethnic groups are „social constructions,” the boundary of ethnic groups is „fuzzy,” and the results of any classification depend on who does the classification and under what circumstances (see, for example, Ladanyi and Szelenyi, 2001). Of course, there is potentially a lot of truth in these assertions. On the other hand, empirical investigations have to use operational definitions of ethnicity even if they are subject to uncertainty or measurement error. We use different datasets with different measures of ethnicity. An important contribution of our paper is in showing that however we measure

interviewers, without consulting the respondents themselves. In principle, this survey should be ideal for comparing Roma and non-Roma employment because it allows for within-survey comparisons in a nationally representative sample. Unfortunately, the representative nature of the Roma subsample is questionable in this survey, for two reasons with opposing effects. Firstly, the marker assigned by the interviewer may result in a Roma subsample that is biased towards Roma of lower status. There is some evidence collected by sociologists that suggest that these one-time labels by outsiders tend to be unstable and tend to result in omitting middle-class Roma (Ladányi and Szelényi, 2001). Secondly, non-response patterns to the survey are highly selective: the poorest Roma were less likely to be included in the final sample than average households. Kertesi (2005b) showed that the second problem dominates the first one. As a result, the Roma subsample of the 1993 HLFS is not only smaller than what it should be, but it is also significantly less disadvantaged than what it should be.

Two targeted, nationally representative Roma surveys are available for Hungary, which are free from the bias of the 1993 HLFS. One was collected in the first quarter of 1994, while the other was collected in 2003 (see Kemény, Havas and Kertesi, 1995, and Kemény and Janky, 2006). These two surveys are very similar in their focus and sampling design. Both were organized by the Institute of Sociology of the Hungarian Academy of Sciences. The sampling procedure and interviewer instructions made sure that the samples are representative of the Hungarian Roma minority (ethnicity defined by non-Romanies and Romanies as well).⁵ Results from these two surveys are therefore comparable. The Romani figures from these surveys we compare to national data, as opposed to non-Roma figures. In particular, we use the 1994.Q1 and 2003.Q1 samples of the Hungarian Labor Force Survey (HLFS) for comparisons. The labor force surveys contain no ethnic markers and thus non-Romanies are impossible to identify. The national data that we use for comparison certainly include Romanies as well. As a result, the differences we show are lower bounds of the true ethnic differences.

The fourth dataset we analyze consists of the parents of the students in the 2007 wave of the Hungarian Life Course Survey (HLCS). The survey is organized by TARKI (a survey agency and

ethnicity, the qualitative conclusions (and even some of the quantitative results) of our empirical investigation are the same.

⁵ In the first step, neighborhoods were sampled (stratified by expected number of Roma households). In the second step all Romani households were enumerated in the selected neighborhoods, based on information from kindergartens, primary schools, district pediatricians, social workers, etc. The household sample was taken from those lists. Interviewers told the respondents that the survey was meant to represent the Romani population of Hungary. Only households who agreed to participate in such a survey, and who thus declared themselves to be

research institute) and Educatio Kht (an administrative agency of the Hungarian Ministry of Education), and it follows the model of the National Longitudinal Surveys of Youth in the United States. The HLCS is a yearly panel from one student cohort: the target population was in their 8th grade in May 2006. The initial sample consists of 10 thousand students with standardized test scores in reading and mathematics. The first wave of interviews was conducted in the 2006/7 school year, and the second wave in the 2007/8 school year. The potential selective nature of survey non-response was handled successfully by financial incentives for answering and by stratified replacement of nonrespondents from the same geographic area and test score quantile.

In this paper we use the sample of the parents of these students, and restrict the sample to those that responded to both of the two survey waves (attrition was 10 per cent and largely random). Naturally, the sample is not representative of the Hungarian population. Instead, it is representative of the parents of 8th graders in Hungary and is thus more concentrated in terms of age, labor market activity (because of the age range) and household size (at least one child by design). The survey asked the parents of their national and ethnic identity in its two waves. Most importantly, there were two questions in each survey (identity as a first and second choice) allowing for respondents to state multiple identity. In this paper we consider Roma all those who chose Roma as their identity as a first or second choice in either of the two waves.⁶ The parents of the HLCS sample offers several advantages. It offers direct comparisons between Roma and non-Roma using comparable measures from the same survey. It also contains a complete retrospective employment history (asked in a relatively simple way in order to minimize measurement error at the expense of details), and it contains very detailed welfare receipt and employment history between survey waves. The survey is also largely free of the selective non-response bias that plagues the 1993 ethnic sample of the HLFS.

4. Roma Employment in Hungary

Overall employment in Hungary fell significantly in the first years of the post-communist transition. According to the Hungarian Census, the employment rate of the 15-64 year-old

Roma, were interviewed. The representative nature of the resulting sample was checked and approved by Kertesi and Kézdi (1998) using various measures of internal consistency and external comparisons.

⁶ Using this definition, 8.4 per cent of the students in the sample have one or two of their parents identified as Roma (very few of which have one parent identified as Roma and the other as non-Roma). This 8.4 per cent should be compared to an estimated 11 per cent of Roma students in the cohort. The latter estimate is based on the weighted average of the fraction of Romani students in the class of the respondents in their 8th grade. It is also in line with the 10-12 per cent estimate in the relevant birth cohort using the 2003 representative Roma survey described above.

population was 72 per cent in 1980, 66 per cent in 1990, and 53 per cent in 2001. By the mid-1990's Hungarian employment rates reached levels that were low in international comparison, even among post-communist countries (Svejnar, 2002). While the employment rate of men was 78 per cent in 1994 in the OECD countries, it was only 66 per cent in Hungary (Table 1). By 2003, Hungarian male employment increased to 72 per cent, and approached OECD average, at 75 per cent then. Female employment in Hungary decreased together with male employment but never went below the OECD average, and by 2003, it increased slightly above that, at 58 per cent. Employment rates among Roma Hungarians were significantly below the national rates both in 1994 and 2003. Table 1 shows the differences.

Table 1.

By 1994, Roma employment was below 30 per cent among men and to 17 per cent among women, and it did not improve much afterwards. By 2003, employment of Romani men was at a mere 32 per cent, and that of Romani women stayed at 17 per cent. The Roma versus national employment rate differential was at 36-37 percentage points in 1994. It increased to 40 percentage points by 2003 because of rising employment of the non-Roma but not for the Roma. Both the level and the change of the employment gap are very similar for men and women. The employment gap has been stable not only through time but also across age groups.

Those dramatic differences were brought about by the post-communist transition. In communist Hungary, the ethnic employment gap was virtually nonexistent for men, and it was a lot smaller for women. Figure 1 shows the employment rate of people born between 1945 and 1964, from 1984 (when they were 20-39 years old) to 2003 (when they were 39-58 years old). The figures show that virtually all working-age men were employed in the communist economy, both Roma and non-Roma. The difference among women in the 1980's is likely due to more children born in Romani families. Roma employment started a gradual decline earlier than the national rate, a result of selective job destruction that began in Hungary a few years before 1989 (Köllö, 1998). The Roma – non-Roma employment gap emerged in full within five years between 1989 and 1994, and later years induced no significant changes to it.

Figure 1.

Similarly to other communist countries, registered employment was compulsory for all working-age citizens of Hungary except for special groups (e.g. for mothers raising many children). As a result, almost all Roma men, and the majority of women, worked in stable and registered jobs. The representative Roma survey of 1994 contains retrospective employment history that enables us to take a closer look at what working age Romanies did. In 1985, for example, 87 per cent of Roma men and 58 of Roma women worked in registered jobs. Employment was not concentrated on a few sectors, although agriculture, construction (for men), and textiles (for women) employed many Romanies. Employment was not only regular and registered, but it was also stable: the average duration of the employment spell that contained the year of 1985 was over ten years for both Romani men and women. Most non-employed Romani men were disabled or inactive for unknown reason, while most non-employed Romani women were at home with children. Of course, the vast majority of the jobs Roma filled were unskilled jobs that turned out to be not productive in a market economy and were destroyed in the first years of the transition. They were therefore stable jobs only under the socialist economy.

Using the data on the parents in the Hungarian Life Course Survey (HLCS) in 2007, we can take a closer look on the characteristics of current labor market activity and inactivity of Roma and non-Roma in a directly comparable way. Table 2 shows the distribution of different types of labor market activities as well as the attachment to the formal labor market (fraction of months worked in previous 12 months). Recall that the data is non-representative for the population both because of its age range (restricted to the 30 to 59 old for Table 2) and because of the over-representation of adults living with children.

Table 2.

The first row of Table 2 repeats the last column of Table 1. The second row shows that irregular employment is more wide-spread among Romanies. The majority of non-employed Roma report to be searching for a job and thus can be classified as unemployed. The unemployment rate, defined here as the ratio of job searchers over job searchers plus employed (either regular or irregular), is at 41 per cent for Romani men (to be compared to the 6 per cent non-Romani rate), and it is 50 per cent for Romani women (0.11 for non-Romanies). The majority of the non-employed and non-searcher male population is on disability pension in both ethnic groups, but more among the Romanies. Similarly, the majority of the non-employed and non-searcher female population is at home with children in both ethnic groups, but more so among the Romanies.

The second panel of Table 2 shows the fraction of months worked in regular job(s) from among the previous 12 months, a measure of stability of employment for the employed, and also a measure of attachment to the labor market for the others. Within each category, time spent in regular jobs is less for the Roma than the non-Roma. The difference is especially sharp among the unemployed, indicating that unemployment durations are significantly longer for the Roma. Kertesi (2005a) argues that the lower employment stability among the Roma may be caused by their concentration in more seasonal sectors, such as construction and agriculture. He also shows that public employment projects, combined with incentives built into the welfare system, are likely to contribute to the short employment spells as well, and thus they are likely to reinforce welfare-dependency.

After having discussed some details of the employment and non-employment patterns, we turn our attention back to the gap in formal employment. We focus on three non-exclusive explanations for the dramatic and permanent drop of Roma employment. First, the majority of Roma may lack the skills needed for formal employment. Second, they may live in parts of the country where jobs are more scarce. Third, direct labor market discrimination may also play a role: when jobs are scarce, the Roma may be dispreferred by non-Roma employers.

5. Decomposing the employment gap

In order to get a hold on the various factors behind the employment gap, we decompose the employment rate differentials into differences in education, and geographical location (and also age), using the standard Oaxaca-Blinder methodology (Oaxaca, 1973, and Blinder, 1973). We analyze the difference of the Romani and the national employment rate (non-Romani data are not available, see above), and estimate linear probability models. The right-hand side variables are all discrete: age groups, educational attainment categories, region, type of town, and whether the individual lived in an agglomeration or a remote village. We carry out the exercise separately for men and women.

The decomposition is based on regressions of the following form:

$$(1) \quad y_{sti} = \beta_{st}' x_{sti} + u_{sti}$$

y is employment (1 if employed and 0 otherwise), index s denotes the sample (Romani, non-Romani or national), index t denotes time, and i is the individual. β is the vector of OLS coefficients and x_i is the vector of right-hand side variables. Right-hand side variables are a constant and a series of dummies for age, education attainment, region, capital/city/town/village, whether the family lives in an agglomeration region or in a remote village (to be explained later). The left-out categories are the age group of 36 to 45, 8 grades of education, the south-eastern region, and villages. Each regression is run separately for men and women, and for each survey. In 1993 and 2007, Roma employment is compared to non-Roma employment, while in 1994 and 2003, Roma employment is compared to national averages.

(1) specifies a linear probability model. The advantage of the linear model in our case is that it allows for a simple linear decomposition. Non-linear models of probability render more complicated decomposition methods (Fairlie, 1999 and 2006). Linear probability models cannot be correctly specified if there are unbounded right-hand side variables. On the other hand, when right-hand side variables are dummies that cover mutually exclusive categories, the model is saturated, and linear probability models are correctly specified and are in fact equivalent to probit and logit models. Our case falls in-between those extremes. All of our right-hand side variables are dummies (and are thus bounded), but they do not comprise all possible interactions, and our model is therefore not saturated. In any case, the focus is on the decomposition exercise. Recall that the unconditional probabilities are in the middle range (never below 0.17 and never above 0.82). As Fairlie (2006) shows, the decompositions based on linear versus non-linear models of probability yield very similar results in such cases.

Table 3 shows differences in the age, education and geographic composition of the Roma population and national averages estimated from the 1994 survey. The Roma minority is significantly younger, less educated, and it is more concentrated in rural areas of the least developed regions of Hungary. Part of the age difference among the non-school population is due to the fact that Romanies leave school earlier. Another part, however, is due to demographics: the Roma are considerably behind the majority ethnic group in terms of the demographic transition (Habicsek, 2002). The educational difference is most pronounced in terms of the fraction of virtually uneducated population (32 and 47 per cent for Roma men and women, compared to the corresponding national averages of 5 and 9 per cent). The other side of the distribution is similarly unequal: Two per cent of Roma men and women have secondary or

higher education compared to the 33 to 39 per cent national average. The Roma are overrepresented in the South-West, North and East of Hungary. Unemployment and non-participation rates are well above national average in these regions (see, for example, Horváth and Hudomiet, 2005). More than 60 per cent of Roma Hungarians live in villages, compared to the national 35 per cent, and the villages where Romanies live are more likely to be “remote,” i.e. having little connection to economically important towns and cities.⁷ Kertesi (2005c) and Köllő (2002, 2006) show that villages in general, and remote villages in particular, are characterized by significantly lower employment prospects than towns and cities, in part due to prohibitive commuting costs.

Table 3.

The different composition of the Roma and non-Roma population is likely to be a significant reason for the employment gap. Based on the linear models specified in (1), the decomposition of the difference average employment rates at time t is in the familiar Oaxaca-Blinder form:

$$(2) \quad \bar{y}_r - \bar{y}_n = \beta'_r \bar{x}_r - \beta'_n \bar{x}_n = \beta'_n (\bar{x}_r - \bar{x}_n) + (\beta'_r - \beta'_n) \bar{x}_r$$

or

$$(3) \quad \Delta \bar{y}_t = \beta'_n \Delta \bar{x}_t + \Delta \beta'_t \bar{x}_r$$

Upper bars mean averages, y is employment so that \bar{y} is the employment rate, and \bar{x} is the vector of mean right-hand side variables. Δ denotes ethnic differences (as opposed to changes through time); r denotes the Romani sample; and index n denotes the non-Romani (in 1993 and 2007) or the national sample (in 1994 and 2003). Average left-hand side variables are equal to the sum of the average right-hand side variables each multiplied by the corresponding regression coefficient, plus the constant, by the properties of OLS.

The first term in the decomposition, $\beta'_n \Delta \bar{x}_t$ measures the difference due to different composition of the two samples. It is often called the *endowment component*. It measures the difference that is due to the different composition of the Romani and the non-Romani (or, in 1994 and 2003 the

⁷ A village is considered “remote” if there is no town or city (within a circle of 40 kilometer in radius) that can be reached by public transportation (bus or train) on weekdays between 5:30 and 7:30 AM in 1995. The data was compiled by János Köllő, and we thank him for letting us use his data. Although the transportation data refer to 1995, the remoteness of the village defined this way keeps a high predictive power for various measures of non-employment years later (Köllő, 2002).

national) sample. If the regression coefficients in the Romani sample were the same as the non-Romani (national) coefficients, the employment rate differential would be equal to this term. The non-Romani (national) coefficients can be thought of as the “normal” reduced-form relationships between covariates and employment. Therefore, this term shows what the “normal” employment rate differential would be, solely as a result of different composition of Romanies (e.g. younger, less educated, living in more remote areas, etc.).

The second term in the decomposition, $\Delta\beta'_m\bar{x}_n$, represents the part of the employment gap that is not due to endowments. Technically, it is due to the fact that regression coefficients, including the constant, are different. When regressions are taken as demand functions, difference in the slope coefficients term are usually interpreted the price effects. Since employment differentials may be due to differences in supply as well as demand, we do not follow that interpretation. Instead, we use the less intuitive but more agnostic “*coefficient term*” label. Differences in the constant reflect Romani versus national employment differences among people in the reference group, while differences in the slope coefficients reflect differences in differences: the extent to which the difference of Roma versus non-Roma (or national) employment rate is different relative to their difference in the reference category. Since the choice of the reference group is arbitrary, we do not present the results separately by coefficient only the entire coefficient term.

We present results of the decomposition separately for men and women, and for each survey (years 1993, 1994, 2003, and 2007). The endowment effect we show by variables (groups of dummy variables) of age, education, and geographical location. The regression coefficients and the sample means are in the Appendix tables A1 through A4.

Table 4.

The results are qualitatively very similar for men and women and in surveys that are close in terms of the year of observation. This is remarkable given differences in the estimated level of the employment rate and the qualitative differences among the surveys.

According to our estimates, endowment differences explain 36 to 38 percent of the overall gap in 1993 and 1994 for both men and women. In 2003 and 2007, endowment differences explain 45 per cent for men and 50 to 68 per cent for women. Age differences work slightly in favor of Roma employment, because the Roma population is younger and thus skewed towards younger

cohorts within the 16 to 64 age range as well. The overwhelming part of the endowment differences is due to differences in education. The increasing role of the endowment component (both in absolute and relative terms) is also due to the increasing role of educational differences.

Geographic differences explain a small part of the employment gap for both gender and in each year. This is a somewhat surprising result given the large differences in residential patterns. The Roma in Hungary live in higher proportions in certain regions, they are significantly more concentrated in rural areas and remote villages, and less concentrated in agglomeration areas. However, these differences do not seem to play an important role in the Roma – non-Roma employment gap, at least not when education is also controlled for.

In order to look into the change in employment rate differentials, we also carried out dynamic versions of the Oaxaca-Blinder decomposition exercise. One can decompose the change in ethnic differentials as defined in (3) the following way.

$$(4) \Delta\bar{y}_t - \Delta\bar{y}_{t-1} = \beta'_{nt-1} (\Delta\bar{x}_t - \Delta\bar{x}_{t-1}) + (\Delta\beta_t - \Delta\beta_{t-1})' \bar{x}_{rt-1} + (\beta_{nt} - \beta_{nt-1})' \Delta\bar{x}_{rt} + \Delta\beta'_{nt} (\bar{x}_{rt} - \bar{x}_{rt-1})$$

For this exercise, one needs comparable datasets. The only pair of surveys that allows for such a comparison is the 2003 versus 1994 pair. Within this pair, both the Roma and the comparison surveys are comparable (the two nationally representative Roma surveys and the two HLFS samples).

In the dynamic decomposition described in (4), the first term reflects the effect of the changing endowment differences. The second term is the change in the coefficient differentials, i.e. the change in the residual effects. The third term shows the effect of the national changes in the coefficients keeping the Roma endowment vector constant. The fourth term shows the effect of changes in the composition of the Romani population (“change in Roma endowments”). Estimates are in Table 5.

Table 5.

Recall that the employment gap changed little between 1994 and 2003. As a result, Table 5 contains very small numbers. Changes in endowment differentials had virtually no effect on the employment gap. The same is true for changes in Roma endowments (the fourth term). The

effects cancel out in the second term, which implies that changes in pure residual effects are also zero on the balance. Only the third term, the changes in the national coefficients, contributed significantly to the increased employment rate gap, for both men and women. In fact its contribution was double of the overall change. All of this comes from education. Education-related employment differences (“returns to education” in terms of employment prospects) increased significantly between 1994 and 2003 in Hungary. Since the Romanies are significantly less educated, this left them behind and thus increased the ethnic employment gap.

To summarize the results, slightly less than half of the employment gap can be explained by ethnic differences in age, education and geographic location. In fact, it is the educational differences that explain almost all of this part. While the Roma live in more rural and remote areas of Hungary, that in itself contributes little to their low employment once education is controlled for. The explained component is employment rate differences increased slightly between 1994 and 2003, due improvements in national employment rates. Romanies saw their employment rates increasing less because the improvement affected more educated groups, in which they are severely underrepresented.

6. Trends in educational differences

The bulk of the explained part of the employment gap is due to low levels of education of the Roma. In this section we look at whether there are improvements in the ethnic educational gap in Hungary. The historical trends are illustrated in Figure 2. The graphs show degrees completed for the adult population, by year of birth, separately for Romanies and the entire population.

Figure 2.

Nationwide primary school completion rate has been above 97 per cent for all cohorts born after 1950. The Romani approached that rate slowly, with males born after 1960 reaching 80 per cent. Females got up to the same rate 20 years later. In order to meet the increasing demand for skilled blue-collar workers, vocational training expanded dramatically in Hungary, especially among men. The ratio of vocational training degrees among men reached a 40 per cent national average for the 1950 cohort. Romani men took part in the expansion as well, albeit with a delay and at a smaller scale: the relevant ratio for them peaked at 20 per cent 20 years later. Cohorts born after the mid-1970's experienced a downward trend in the national average of vocational training as

demand for blue-collar workers dropped sharply from the late 1980's. The mirror image of that decrease shows in the more valuable secondary education rates. Starting from around 1990, when cohorts born in the mid 1970 have finished primary school, national average secondary school rates started to increase. Romani education rates did not follow this pattern, neither the decrease in vocational training nor the increase in secondary education.

Since the fall of communism primary school completion rates continued to converge but the gap in further education has widened. Ironically, by the time the Roma achieved virtually full primary school completion it lost its market value. Table 6 shows education and enrollment rates in 1993 and 2003. The estimates show a significant, 18 percentage point increase in completed primary school rates for Romanians (part of which is due to earlier completion). At the same time, their overall vocational and secondary education decreased by 4 percentage points (18 percentage points if we condition on completed primary school). This slight decrease is in contrast to the national average rates that increased by 5 percentage points, so that 92 per cent – i.e. virtually all non-Romanians – continued in some school.

Table 6.

The widening educational gap is even more striking if we look at secondary education with the perspective of a maturity exam. Much of vocational education became obsolete with the fall of the communist economy and the labor-intensive technology it tended to use. As a result, national vocational education rates dropped by 27 percentage points. Increased enrollment into secondary schools with maturity more than compensated for this drop, producing a 32 percentage point increase at the national level. Romani vocational education dropped as well, although to a smaller extent. Romani secondary school enrollment, however, did not increase enough to compensate for that. As a result, by 2003, still a mere 14 per cent of young Romanians continued education towards a maturity degree, compared to an 80 per cent national average (16 versus 83 per cent conditional on primary school completion). Thus between 1993 and 2003 the gap between vocational and more valued secondary schooling widened by an additional 27 percentage points.

We can sum up these trends the following way. Romani education caught up slowly but steadily after World War II. As a result, their primary school completion reached more than 80 per cent of the national average (at virtually 100 per cent). Romanians also started to enroll into vocational training schools and reached 50 per cent of national vocational schooling rates. However, their

integration did not extend to secondary and tertiary education. By the second half of the 1980's, even the previously increasing trends stopped. After the fall of communism, secondary (and also tertiary) education experienced a dramatic expansion. But that seems to have left the Romanies behind. As a result, we can expect that the education level of Romanies will lag behind non-Roma levels in the future as much as in the present, although at higher levels. As a result, we can expect little improvement of the relative employment of the prospects of the Romanies in Hungary.

7. Indirect evidence for labor market discrimination

At best than half of the employment gap is explained by differences in crude measures of demographics, educational attainment and geographic location. The rest is unexplained. It may reflect unobserved differences in skills (productivity) or labor market discrimination. In this section we look at the latter and try to see whether some part of the unexplained differences may be due to direct labor market discrimination.

We look at whether unexplained employment differences vary with the local unemployment rate. We use unemployment rates in micro-regions, of which there are 150 in Hungary. The distribution of local unemployment rates is shown in Figure 3. The thought experiment is the following. Take two people of the same gender, age and education one Romani, the other non-Romani, who live in very similar towns/villages and in the same micro-region. Suppose that unemployment in this micro-region is low. Then relocate both to a different micro-region (within the same large region), to the same kind of town/village they lived before. Suppose that unemployment in the new micro-region is high. The question is whether the difference in the employment probability of the Romani and non-Romani person is the same in the two micro-regions.

Figure 3.

In this thought experiment labor market discrimination may be the reason for the ethnic gap to be larger in the high-unemployment region. The mechanism is the following. If unemployment is low, employer discrimination is more costly, because there are less people to choose from. When unemployment is high, it is easier for employers to hire in discriminative way. Therefore discrimination is likely to be more prevalent when the local unemployment rate is higher.

We run probability models with the same right-hand side variables as in (1), but on pooled ethnic samples, and add the regional unemployment rate as an additional control variable. We focus our attention to the 1994 and the 2003 surveys. The two ethnic subsamples and the two genders are pooled together here, and coefficients on right-hand side variables (except regional unemployment) are forced to be the same for both. We allow for ethnic differences in the constant and the coefficient on micro-regional unemployment rate. For each year, we estimate probit models of the following form:

$$(5) \quad y_i = \Phi(\beta' x_i + \gamma u_i + \delta r_i + \lambda u_i \times r_i)$$

where the x variables are identical to those in (1): a constant, a constant and a series of dummies for age, education attainment, region, capital/city/town/village, agglomeration, and remote village dummies. r is 1 if person i belongs to the Romani sample and 0 otherwise; and u_i is unemployment rate of the micro-region the person lives in.

The parameters of interest are δ and λ . δ measures the Romani versus national employment rate differential in hypothetical regions with zero unemployment rates. λ measures the extent to which the difference changes with the local unemployment rate. Since all other characteristics are controlled for, the differences captured by δ and λ are the differences left unexplained in the Oaxaca-Blinder decomposition exercise. Table 7 shows the average partial effects of major interest; Appendix table A5 contains the complete set of the estimates. Figure 4 shows the partial effect of local unemployment rates on the employment probabilities for Romanies and the total population, in the form of predicted employment probabilities as a function of local unemployment, holding everything else fixed at sample means.

Table 7.

Figure 4.

If the relationship between local unemployment and the (residual) employment gap is interpreted as evidence on labor market discrimination, the results indicate that discrimination was present for men in 1994 but less so for women. By 2003, discrimination became significantly stronger. In 2003, for men, the employment gap is estimated to be 22 percentage points where local unemployment is zero. The estimated gap doubles to 45 percentage points where unemployment is at 30 per cent. In 2003, the relationship is similar for women. The estimated residual

employment gap is 21 percentage points where local unemployment is zero, and 41 percentage points where unemployment is at 30 per cent.

An obvious alternative to our interpretation is that ethnic differences in skills may be larger in micro-regions with higher unemployment rate. We look into whether unobserved skill differentials are related to the local unemployment rates the following way. Using primary school data from 1985, we look at whether ethnic differences in some outcomes are larger in the regions where unemployment rate became stronger in 1994 and 2003. We consider three outcomes: the fraction of schoolchildren who attended preschool earlier; the fraction of schoolchildren who are not overage, i.e. who started school in time and repeated no grade; and the fraction of students who failed no subjects. Figure 5 contains the results.

Figure 5.

The results show that ethnic differences are not larger in regions where unemployment became large either in 1994 or 2003. This is inconsistent with the alternative interpretation, and thus it provides support for the labor market discrimination argument.

8. Conclusions

This paper analyzed the extent and some causes of the low formal employment rate of the Roma in Hungary, using the most reliable survey data. Roma employment dropped dramatically in the first years of the post-communist transition, widened further a little afterwards, and it stayed largely unaffected by macroeconomic conditions after the transition.

Our results imply that the employment of Romanies in Hungary dropped dramatically in the first years of the post-communist transition and stayed largely unaffected by macroeconomic conditions later. The employment gap has widened a little because non-Roma employment increased somewhat more than Roma employment. While estimated levels are different from the different surveys, all surveys indicate that the absolute employment gap is roughly the same for men and women, more than third of the gap is explained by lower education of the Roma, and geographic location, while different from non-Romanies, explains little once education is controlled for. The larger part of the employment gap is residual, i.e. it remains unexplained by the (admittedly low-dimensional) vector of observables. The increase in the employment gap is

due to the increased role of education in employment prospects, which hurt the Roma because of their low levels education. We also show that the residual employment gap is wider in micro-regions characterized by higher overall unemployment rate, especially in the 2000s. We interpret that as indirect evidence for labor market discrimination.

The results have strong policy implications. The dramatically wide employment gap points to severe break in the Hungarian society. Besides obvious effects on current poverty, health, potential effects on illegal activities, and political instability, the very low employment rate in itself may result in poorer development of children with long-lasting effects (see, for example, Kertesi and Kézdi, 2007). Social policy should respond to these challenges. In the short run, if the employment prospects cannot be increased significantly, the effects of non-employment should be addressed. In the long run, the goal is preventing the re-emergence of the employment gap for the future generations. Policies aiming at closing the education gap for Romanies should play an important role.

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Tables

Table 1. Employment rates, age 16 to 64.

	1993*	1994**	2003**	2007***
Men				
Roma	0.41	0.29	0.32	0.35
Non-Roma	0.68			0.82
National average		0.66	0.72	
Male employment gap	-0.28	-0.37	-0.40	-0.47
Women				
Roma	0.26	0.17	0.18	0.24
Non-Roma	0.54			0.71
National average		0.53	0.58	
Female employment gap	-0.29	-0.36	-0.40	-0.47

*Source: the ethnic sample of the 1993 Hungarian Labor Force Survey (HLFS). The sample is likely to underrepresent the most disadvantaged Roma households.

**Source of the Roma figures: the 1994 and 2003 Representative Roma Surveys. Source of the national employment data: the 1994 and 2003 samples of the HLFS. The HLFS data contain no ethnic markers. As a result, the employment gap refers to the Roma employment rate minus national employment rate.

***Source: parents of the Hungarian Life Course Survey (HLCS), wave 2007. The HLCS sample is representative of the parents of 8th graders. As a result, it is biased towards age groups characterized by higher labor market participation.

Table 2. Labor market activity and fraction of months in formal employment in previous year. Parents in the HLCS in November, 2007, age 30 to 59.

	Men		Women	
	Roma	Non-Roma	Roma	Non-Roma
Distribution by employment				
Employed in regular job	35	82	24	71
Employed in irregular jobs	11	3	3	2
Unemployed*	32	5	27	9
At home with children	1	0	27	9
Disabled	14	6	11	6
Other inactive	7	4	8	4
All	100	100	100	100
Implied unemployment rate**	0.41	0.06	0.50	0.11
Average fraction of months in regular employment in previous 12 months by labor market activity in November 2007				
Employed in regular jobs	0.90	0.97	0.85	0.96
Employed in irregular jobs	0.04	0.09	0.08	0.12
Unemployed*	0.07	0.27	0.07	0.22
All inactive	0.02	0.10	0.03	0.05
All	0.35	0.83	0.25	0.72

Source: parents of the Hungarian Life Course Survey (HLCS), wave 2007. The HLCS sample is representative of the parents of 8th graders.

*Reported to be searching for job.

** The ratio of unemployed over unemployed plus employed (both regular and irregular).

Table 3. Composition of the Roma minority versus national composition in 1994. Age, education, and geography. 16 to 64 years old and not enrolled in school.

	Men		Women	
	Roma	National	Roma	National
Age group				
16 to 25	0.31	0.14	0.31	0.13
26 to 35	0.28	0.21	0.27	0.20
36 to 45	0.23	0.28	0.24	0.27
46 to 55	0.12	0.21	0.11	0.22
56 to 65	0.06	0.16	0.07	0.18
Education				
0 to 7 grades	0.32	0.05	0.47	0.09
8 grades	0.47	0.25	0.42	0.37
vocational	0.19	0.37	0.09	0.15
secondary	0.02	0.22	0.02	0.29
higher	0.00	0.11	0.00	0.10
Region				
Central	0.13	0.28	0.14	0.29
Mid-West	0.06	0.11	0.06	0.11
West	0.05	0.10	0.05	0.10
South-West	0.20	0.10	0.19	0.10
North	0.24	0.13	0.24	0.13
East	0.25	0.15	0.24	0.15
South	0.07	0.13	0.08	0.12
City-town-village				
Budapest	0.07	0.19	0.08	0.20
Big city	0.09	0.20	0.10	0.20
Small town	0.23	0.26	0.23	0.26
Village	0.61	0.35	0.59	0.34
Agglomeration	0.27	0.54	0.29	0.56
Remote village	0.22	0.08	0.21	0.08

Source of the Roma figures: the 1994 Representative Roma Survey.
Source of the national data: the 1994 Q1 sample of the HLFS.

Table 4. Decomposition of the ethnic employment gap into endowment and coefficient components. Results from static Oaxaca-Blinder decompositions.

	Men				Women			
	1993	1994	2003	2007	1993	1994	2003	2007
Endowment								
Age	+0.02	+0.03	+0.04	+0.01	+0.02	+0.02	+0.03	+0.00
Education	-0.09	-0.13	-0.19	-0.18	-0.09	-0.13	-0.22	-0.28
Geography	-0.03	-0.04	-0.03	-0.05	-0.02	-0.03	-0.01	-0.04
Sum of endowment components	-0.10	-0.14	-0.18	-0.21	-0.11	-0.13	-0.20	-0.32
Coefficients								
Sum of coefficient components	-0.18	-0.23	-0.21	-0.26	-0.18	-0.23	-0.20	-0.15
Overall employment gap	-0.28	-0.37	-0.40	-0.47	-0.29	-0.36	-0.40	-0.47
Fraction explained								
by endowment differences	0.36	0.38	0.45	0.45	0.38	0.36	0.50	0.68

Source: see the notes to Table 1.

Table 5. Dynamic Oaxaca-Blinder decomposition results.

	Change in endowment differential	Change in coeff. differential	Change in national coefficients	Change in Roma endowments	SUM
Men					
Age	0.00	0.03	0.00	0.00	0.03
Education	0.00	0.01	-0.06	-0.02	-0.07
Region	0.02	0.02	0.00	0.02	0.05
Constant	-	-0.05	-	-	-0.05
Overall	0.02	0.01	-0.06	0.00	-0.03
Women					
Age	0.01	0.00	-0.01	0.00	0.00
Education	-0.02	0.03	-0.07	-0.01	-0.07
Region	0.02	0.08	0.00	0.01	0.11
Constant	-	-0.08	-	-	-0.08
Overall	0.01	0.03	-0.08	0.00	-0.04

Table 6. Changes in educational attainment after the post-communist transition of Hungary. Schooling rates of the 16-17 year old (Romanies: 17-18 years old) population in 1994 and 2003 (per cent)

	Completes primary school	Continues studies in Vocational school	Secondary school	Total
Romani average				
1993	68	33	9	42
2003	86	24	14	38
Change	+18	-9	+5	-4
National average				
1993	96	39	48	87
2003	96	12	80	92
Change	0	-27	+32	+5
Romani – National difference in changes				
	+18	+18	-27	-9

Note: The category of continuing studies covers those who studied in vocational or secondary schools or completed any of those. Continuing rates are underestimated by dropout rates.

Sources: Hungarian Romani Surveys of 1994 and 2003, and Hungarian Labor Force Surveys of 1994/1 and 2003/1.

Table 7. Effect of local unemployment rate on average employment and additional effect on Romani employment. Average partial effects from probit models. Standard errors in parentheses

	1994		2003	
	Men	Women	Men	Women
Effect on average employment	-0.62 (0.12)**	-0.39 (0.11)**	-0.47 (0.13)**	-0.24 (0.12)*
Additional effect on Romani employment	-0.38 (0.16)*	-0.04 (0.17)	-0.77 (0.16)**	-0.96 (0.19)**

* significant at 5%; ** significant at 1%

Control variables: Age (dummies), education (dummies), large region (dummies), Budapest/city/town (village is reference), agglomeration dummy, remote village dummy

Figures

Figure 1. Roma and National employment rates in Hungary, by gender. Cohort 20 to 39 years old in 1984

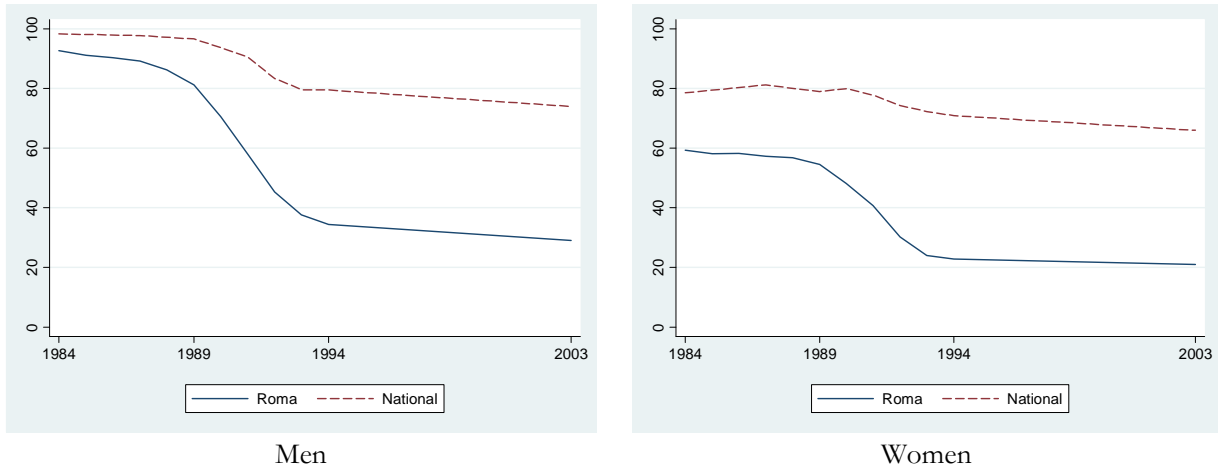
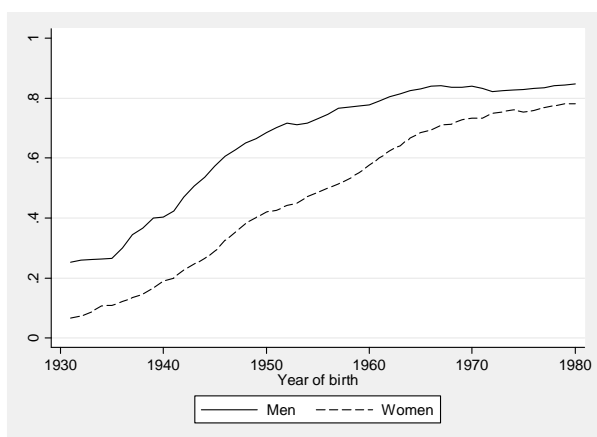
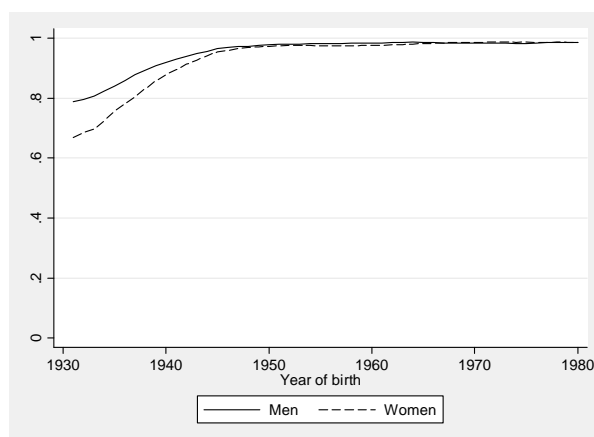


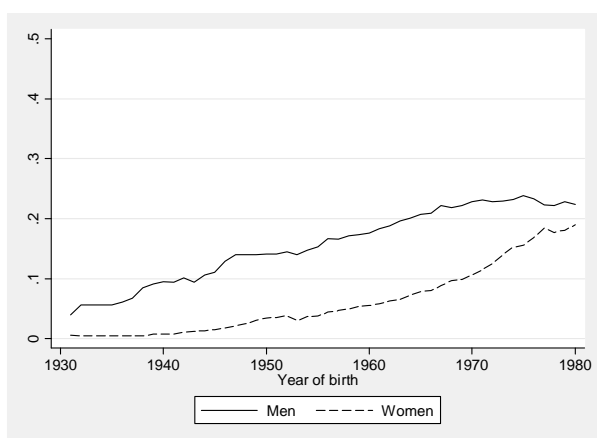
Figure 2. Trends in Romani educational attainment compared to national trends.



Romanies: primary school



National: primary school



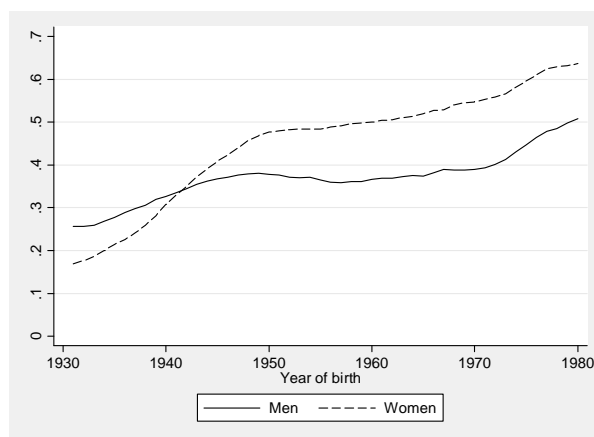
Romanies: vocational school



National: vocational school



Romanies: secondary school maturity exam



National: secondary school maturity exam

Sources. Romanies: Hungarian Romani Surveys of 1994 and 2003, and Hungarian Labor Force Surveys of 1994/1 and 2003/1. Educational attainment rates of the 1930-1940 cohorts are computed from the 1994 surveys; those of the 1941-70 cohorts were computed as an average of the 1994 and 2003 surveys; those of the 1971-80 cohorts were computed from the 2003 surveys. The figures show smoothed series by taking ± 5 -year moving averages (appropriately adjusted at the endpoints).

Figure 3. Distribution of local unemployment rates

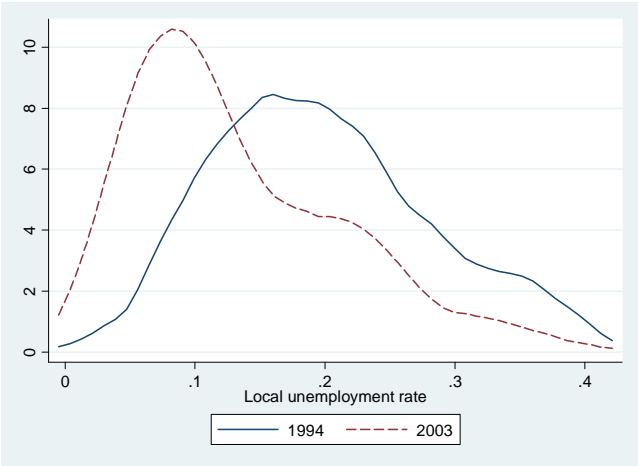


Figure 4. Local unemployment rates and composition-adjusted employment rates of Romanies versus overall rates. By gender, in 1994 and 2003. Vertical axes: employment rates; horizontal axes: unemployment rate of the small region.

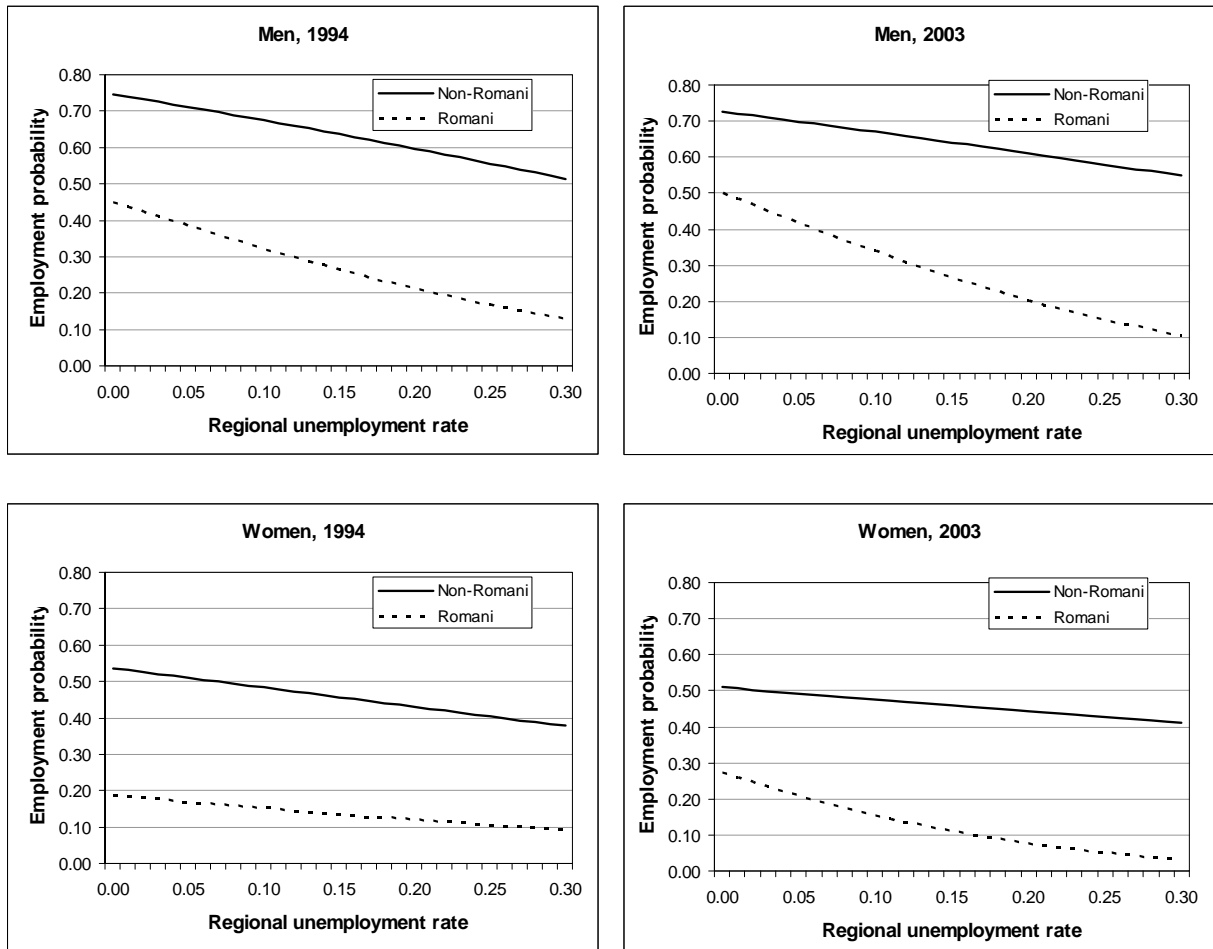
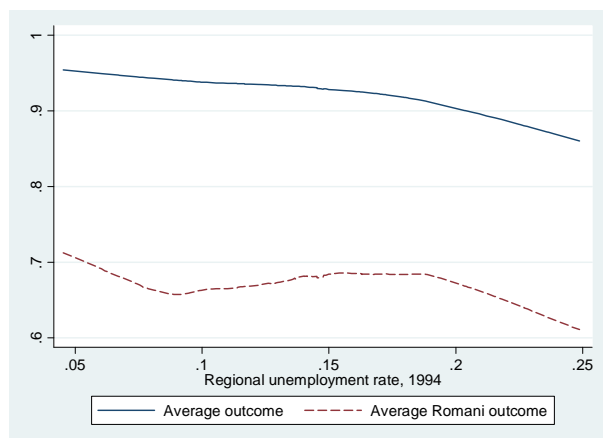
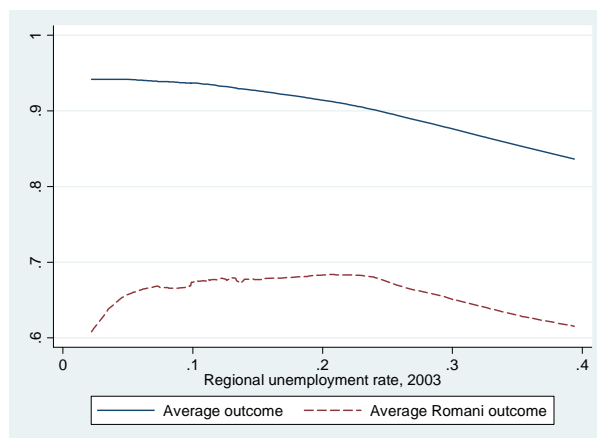


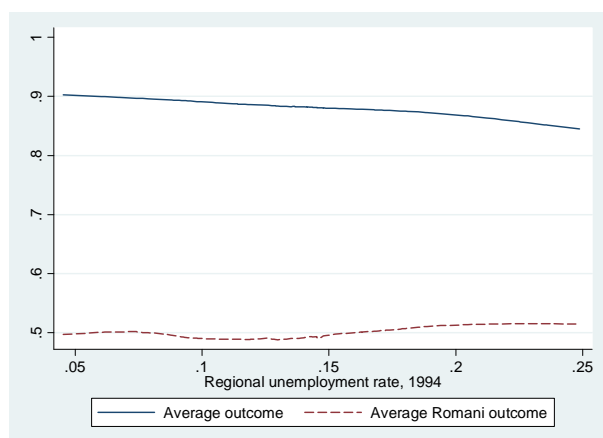
Figure 5. Local unemployment rates and kindergarten and primary school outcomes of Romanies versus overall outcomes. Vertical axes: outcomes (measured in 1985); horizontal axes: unemployment rate of the small region (measured in 1994 and 2003).



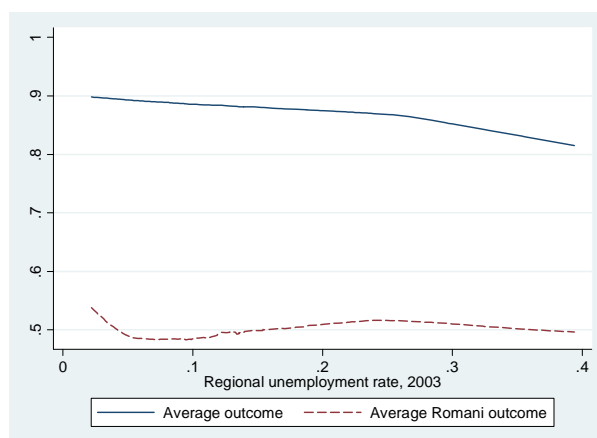
Fraction in kindergarten/preschool



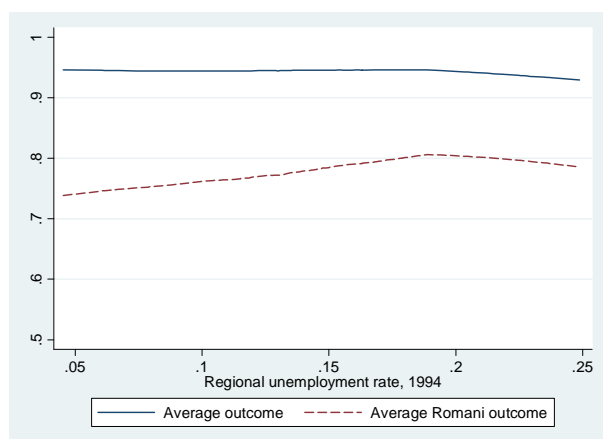
Fraction in kindergarten/preschool



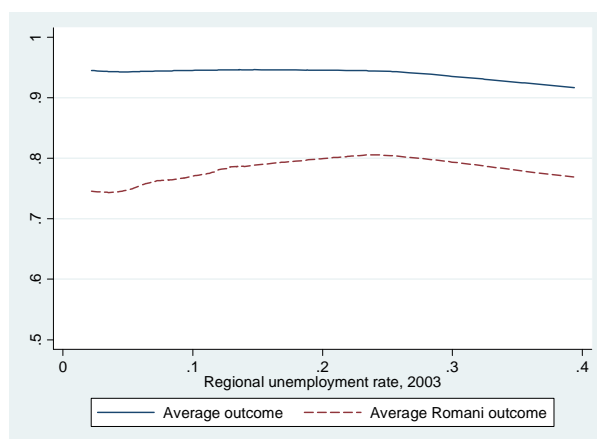
Fraction *not* overage in primary school



Fraction *not* overage in primary school



Fraction *not* failed any subjects in primary school



Fraction *not* failed any subjects in primary school

Appendix Tables

Table A1. Detailed results of the linear probability models, 1993.

	Roma male	Roma female	Non-Roma male	Non-Roma female
Age 16 to 25	-0.088 [1.92]	-0.135 [3.21]**	-0.125 [12.42]**	-0.239 [22.59]**
Age 26 to 35	0.062 [1.39]	-0.073 [1.74]	0.012 [1.29]	-0.192 [19.99]**
Age 46 to 55	0.025 [0.44]	-0.096 [1.94]	-0.083 [8.70]**	-0.126 [13.13]**
Age 56 to 64	-0.33 [5.52]**	-0.243 [4.59]**	-0.485 [43.47]**	-0.587 [53.64]**
Education 0-7 grades	-0.069 [1.62]	-0.161 [4.67]**	-0.157 [9.47]**	-0.074 [5.29]**
Education vocational	0.321 [7.39]**	0.044 [0.80]	0.121 [13.45]**	0.122 [11.67]**
Education secondary	0.46 [6.40]**	0.197 [3.66]**	0.154 [16.21]**	0.166 [19.62]**
Education higher	0.395 [3.66]**	0.561 [5.59]**	0.255 [21.73]**	0.261 [22.21]**
Region Central	0.144 [1.25]	-0.067 [0.69]	0.021 [1.51]	0.034 [2.38]*
Region Mid-West	0.16 [1.60]	-0.056 [0.65]	-0.005 [0.42]	0.017 [1.32]
Region West	0.214 [2.53]*	0.227 [3.02]**	0.056 [4.14]**	0.063 [4.57]**
Region South-West	0.078 [1.00]	-0.048 [0.69]	-0.042 [3.16]**	0.045 [3.35]**
Region North	0.01 [0.13]	-0.089 [1.41]	-0.04 [3.17]**	0.012 [0.93]
Region East	0.052 [0.72]	-0.03 [0.47]	-0.041 [3.34]**	-0.017 [1.34]
Town type Budapest	-0.119 [1.05]	-0.101 [1.09]	0.013 [0.94]	0.015 [1.05]
Town type City	-0.08 [1.19]	0.063 [1.09]	0.025 [2.14]*	0.034 [2.78]**
Town type Town	-0.002 [0.06]	0.014 [0.40]	0.021 [2.50]*	0.022 [2.57]*
Agglomeration	0.093 [1.99]*	-0.01 [0.24]	-0.013 [1.43]	0.013 [1.34]
Remote village	-0.052 [1.18]	-0.106 [2.76]**	-0.054 [4.11]**	-0.061 [4.51]**
Constant	0.286 [3.77]**	0.437 [6.42]**	0.699 [54.83]**	0.619 [49.37]**
Observations	741	768	16247	17806
R-squared	0.26	0.25	0.24	0.26

Absolute value of robust t-statistics in brackets

* significant at 5%; ** significant at 1%

Table A2. Detailed results of the linear probability models, 1994.

	Roma male	Roma female	National, male	National, female
Age 16 to 25	-0.1 [4.29]**	-0.155 [8.06]**	-0.137 [13.02]**	-0.195 [18.13]**
Age 26 to 35	-0.043 [1.82]	-0.105 [5.41]**	0.016 [1.75]	-0.169 [17.98]**
Age 46 to 55	-0.069 [2.27]*	-0.13 [5.24]**	-0.079 [8.46]**	-0.097 [10.48]**
Age 56 to 64	-0.173 [4.48]**	-0.198 [6.80]**	-0.464 [43.83]**	-0.552 [52.91]**
Education 0-7 grades	-0.138 [6.85]**	-0.09 [5.81]**	-0.159 [10.23]**	-0.103 [8.05]**
Education vocational	0.115 [4.98]**	0.163 [6.48]**	0.134 [15.69]**	0.154 [15.39]**
Education secondary	0.147 [2.57]*	0.213 [4.55]**	0.186 [19.12]**	0.18 [21.86]**
Education higher	0.345 [1.98]*	0.349 [2.33]*	0.281 [23.27]**	0.283 [24.20]**
Region Central	0.024 [0.50]	-0.041 [1.05]	0.038 [2.63]**	0.031 [2.17]*
Region Mid-West	0.092 [2.00]*	-0.078 [2.14]*	0.014 [1.10]	0.008 [0.63]
Region West	0.08 [1.63]	-0.034 [0.87]	0.076 [5.53]**	0.054 [3.94]**
Region South-West	0.084 [2.24]*	-0.018 [0.62]	-0.025 [1.88]	0.021 [1.59]
Region North	-0.059 [1.57]	-0.03 [1.02]	-0.059 [4.63]**	-0.018 [1.47]
Region East	-0.089 [2.44]*	-0.124 [4.33]**	-0.049 [4.01]**	-0.027 [2.23]*
Town type Budapest	0.03 [0.59]	0.055 [1.33]	-0.007 [0.49]	0.004 [0.28]
Town type City	-0.08 [1.96]	0.022 [0.67]	0.052 [4.37]**	0.043 [3.63]**
Town type Town	-0.016 [0.73]	0.002 [0.10]	0.035 [4.10]**	0.026 [3.04]**
Agglomeration	0.057 [1.97]*	-0.014 [0.60]	-0.003 [0.28]	0.013 [1.37]
Remote village	-0.048 [2.12]*	-0.027 [1.46]	-0.07 [5.36]**	-0.077 [5.84]**
Constant	0.385 [9.80]**	0.352 [11.14]**	0.645 [50.76]**	0.587 [47.79]**
Observations	2674	2795	16690	18216
R-squared	0.1	0.09	0.24	0.27

Absolute value of robust t-statistics in brackets

* significant at 5%; ** significant at 1%

Table A3. Detailed results of the linear probability models, 2003.

	Roma male	Roma female	National, male	National, female
Age 16 to 25	-0.057 [1.81]	-0.114 [4.34]**	-0.091 [9.74]**	-0.11 [10.78]**
Age 26 to 35	0.071 [2.28]*	-0.079 [3.12]**	0.021 [2.91]**	-0.152 [19.65]**
Age 46 to 55	-0.047 [1.25]	0.025 [0.80]	-0.094 [13.08]**	-0.023 [3.01]**
Age 56 to 64	-0.178 [3.46]**	-0.117 [2.84]**	-0.387 [46.61]**	-0.444 [52.04]**
Education 0-7 grades	-0.15 [5.08]**	-0.133 [6.37]**	-0.285 [15.53]**	-0.213 [12.31]**
Education vocational	0.063 [2.05]*	0.178 [5.79]**	0.206 [30.03]**	0.157 [20.00]**
Education secondary	0.151 [2.36]*	0.186 [3.44]**	0.255 [33.54]**	0.252 [35.76]**
Education higher	0.073 [0.35]	0.087 [0.43]	0.331 [36.65]**	0.367 [41.37]**
Region Central	0.191 [2.71]**	0.087 [1.55]	0.058 [5.42]**	0.04 [3.52]**
Region Mid-West	0.223 [4.23]**	0.266 [5.88]**	0.091 [9.07]**	0.099 [9.28]**
Region West	0.161 [2.84]**	0.199 [4.40]**	0.077 [7.42]**	0.072 [6.47]**
Region South-West	0.073 [1.58]	0.033 [0.91]	0.004 [0.40]	0.017 [1.53]
Region North	-0.031 [0.76]	0.033 [1.04]	-0.031 [3.11]**	0.01 [0.93]
Region East	-0.102 [2.28]*	-0.008 [0.22]	-0.01 [1.08]	-0.017 [1.69]
Town type Budapest	0.292 [3.73]**	0.2 [3.24]**	0.041 [4.04]**	0.018 [1.69]
Town type City	0.081 [1.87]	0.012 [0.34]	0.044 [5.00]**	0.045 [4.72]**
Town type Town	-0.008 [0.23]	-0.056 [1.99]*	0.033 [5.16]**	0.034 [4.87]**
Agglomeration	0.002 [0.05]	0.034 [1.03]	0.004 [0.63]	0.02 [2.66]**
Remote village	-0.063 [1.77]	-0.05 [1.66]	-0.077 [7.91]**	-0.052 [4.84]**
Constant	0.267 [5.78]**	0.172 [4.67]**	0.576 [55.77]**	0.485 [45.19]**
Observations	1404	1469	26006	27592
R-squared	0.2	0.18	0.23	0.23

Absolute value of robust t-statistics in brackets

* significant at 5%; ** significant at 1%

Table A4. Detailed results of the linear probability models, 2007.

	Roma male	Roma female	Non-Roma male	Non-Roma female
Age 16 to 25
	[.]	[.]	[.]	[.]
Age 26 to 35	0.08	0.079	0.01	-0.02
	[0.97]	[2.06]*	[0.25]	[0.83]
Age 46 to 55	-0.032	-0.012	-0.051	-0.018
	[0.76]	[0.31]	[5.16]**	[1.62]
Age 56 to 64	-0.137	-0.071	-0.317	-0.085
	[1.43]	[0.78]	[16.09]**	[3.38]**
Education 0-7 grades	-0.201	-0.16	-0.3	-0.336
	[3.19]**	[4.35]**	[4.33]**	[5.48]**
Education vocational	0.248	0.107	0.197	0.182
	[5.52]**	[2.12]*	[13.00]**	[12.71]**
Education secondary	0.195	0.448	0.246	0.331
	[1.48]	[6.63]**	[14.88]**	[24.06]**
Education higher	0.552	0	0.308	0.449
	[2.02]*	[.]	[16.68]**	[28.84]**
Region Central	0.016	-0.133	0.017	0.061
	[0.10]	[1.13]	[0.89]	[3.12]**
Region Mid-West	0.119	0.139	0.024	0.111
	[0.84]	[1.20]	[1.18]	[5.43]**
Region West	0.137	-0.099	-0.034	-0.047
	[1.05]	[0.96]	[1.75]	[2.29]*
Region South-West	0.013	-0.16	-0.081	-0.05
	[0.11]	[1.58]	[4.15]**	[2.43]*
Region North	-0.118	-0.255	-0.099	-0.11
	[0.93]	[2.46]*	[5.29]**	[5.69]**
Region East	0.306	0.097	-0.015	-0.082
	[2.32]*	[0.90]	[0.81]	[4.24]**
Town type Budapest	-0.096	0.107	0.016	0.027
	[0.45]	[0.71]	[0.60]	[1.01]
Town type City	-0.159	0.037	0.029	0
	[0.78]	[0.27]	[1.18]	[0.01]
Town type Town	-0.159	-0.052	0.019	-0.014
	[0.79]	[0.38]	[0.80]	[0.59]
Agglomeration	-0.054	0.005	-0.088	-0.055
	[1.03]	[0.12]	[4.74]**	[2.77]**
Remote village	-0.065	-0.058	0.05	-0.015
	[1.18]	[1.32]	[4.10]**	[1.17]
Constant	0.454	0.369	0.654	0.514
	[2.71]**	[3.51]**	[24.53]**	[20.38]**
Observations	566	700	594	7617
R-squared	0.2	0.26	0.14	0.17

Absolute value of robust t-statistics in brackets

* significant at 5%; ** significant at 1%

Table A5. Probit models for employment.

	1994		2003	
	Men	Women	Men	Women
Age 26-35	0.405	0.085	0.462	0.077
	[0.033]**	[0.031]**	[0.035]**	[0.033]*
Age 36-45	0.386	0.57	0.396	0.56
	[0.031]**	[0.031]**	[0.033]**	[0.032]**
Age 46-55	0.123	0.259	0.13	0.275
	[0.033]**	[0.032]**	[0.034]**	[0.033]**
Age 56-64	-0.99	-1.287	-0.984	-1.274
	[0.037]**	[0.043]**	[0.038]**	[0.043]**
Education 8 grades	-0.833	-1	-0.862	-1.098
	[0.042]**	[0.046]**	[0.048]**	[0.052]**
Education vocational	-0.367	-0.44	-0.356	-0.447
	[0.025]**	[0.029]**	[0.026]**	[0.030]**
Education secondary	0.203	0.099	0.202	0.085
	[0.031]**	[0.031]**	[0.031]**	[0.032]**
Education higher	0.623	0.5	0.608	0.484
	[0.047]**	[0.046]**	[0.047]**	[0.046]**
Town type Budapest	-0.038	-0.002	0.026	0.037
	[0.050]	[0.048]	[0.053]	[0.049]
Town type City	0.078	0.111	0.132	0.122
	[0.039]*	[0.037]**	[0.040]**	[0.038]**
Town type Town	0.107	0.073	0.118	0.072
	[0.025]**	[0.025]**	[0.026]**	[0.026]**
Region Central	0.032	0.028	0.085	0.074
	[0.048]	[0.046]	[0.049]	[0.047]
Region Mid-West	0.08	-0.021	0.106	0.036
	[0.042]	[0.040]	[0.042]*	[0.040]
Region West	0.198	0.087	0.238	0.144
	[0.046]**	[0.044]*	[0.047]**	[0.044]**
Region South-West	-0.032	0.04	-0.064	0.049
	[0.041]	[0.040]	[0.042]	[0.041]
Region North	-0.112	-0.013	-0.091	-0.016
	[0.041]**	[0.040]	[0.042]*	[0.041]
Region East	-0.101	-0.114	-0.099	-0.077
	[0.039]*	[0.039]**	[0.040]*	[0.040]
Agglomeration	-0.04	-0.002	-0.05	-0.001
	[0.029]	[0.029]	[0.030]	[0.029]
Remote village	-0.123	-0.164	-0.154	-0.205
	[0.037]**	[0.038]**	[0.039]**	[0.040]**
Local unemp. rate	-2.083	-1.347	-1.597	-0.833
	[0.410]**	[0.409]**	[0.423]**	[0.421]*
Local unemp × Roma	-1.26	-0.117	-2.581	-3.278
	[0.549]*	[0.594]	[0.552]**	[0.639]**
Roma	-0.49	-0.648	-0.374	-0.381
	[0.082]**	[0.087]**	[0.083]**	[0.087]**
Constant	0.673	0.324	0.566	0.239
	[0.069]**	[0.070]**	[0.071]**	[0.071]**
Observations	19364	21011	18094	19685

Z-statistics in brackets.

* significant at 5%; ** significant at 1%