

INSTITUTE OF ECONOMICS
HUNGARIAN ACADEMY OF SCIENCES

BUDAPEST WORKING PAPERS ON THE LABOUR MARKET

BWP. 2004/1

The Employment of the Roma – Evidence from Hungary

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The paper is produced as part of the National Research and Development Programme on "Knowledge Base Society and Labour Market in Hungary in the 21th Century" funded by the Ministry of Education of Hungary (Contract No: OM-00042/2002)

ISSN 1785-3788
ISBN 963 9321 97 4

Published by the Institute of Economics, Hungarian Academy of Sciences
Budapest, 2004. With financial support from the Foundation for Job Creation
and the Hungarian Economic Foundation

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Copies are available from: Ms. Irén Szabó, Department of Human Resources, Budapest University of Economics, and Public Administration. H–1093 Budapest, Fővám tér 8. Phone/fax: 36-1 217-1936 E-mail address: iszabo@workecon.bke.hu; Ms. Zsuzsa Sándor, Library of the Institute of Economics, H–1502 Budapest P.O. Box 262, Fax: 36-1 309-2649; E-mail address: biblio@econ.core.hu.

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THE EMPLOYMENT OF THE ROMA – EVIDENCE FROM HUNGARY

BY GÁBOR KERTESI

Abstract

The paper is based on data of individual work histories of the 1993/94 representative Roma survey in Hungary. First the disappearance of full employment of Roma in the 1984-1994 period is documented by the use of a quasi cross-sectional macro model and the patterns of employment characteristics of the nineties are described. Then the erosion of employment is traced from individual histories controlling the effects of gender, age and schooling. Finally, particular aspects of low employment of Roma are accounted for, focusing on the role of low schooling, regional backwardness, and labour market discrimination.

Keywords: Economics of minorities and races, Discrimination, Regional inequalities, Transition

JEL Classification: J15, J7, R23

KERTESI GÁBOR

A ROMÁK FOGLALKOZTATOTTSÁGA – MAGYARORSZÁGI TAPASZTALATOK

Összefoglaló

A tanulmány három részből áll. Az első rész egy kvázi-keresztmetszeti makromodell segítségével rekonstruálja a cigányság (csaknem) teljes foglalkoztatásának 1984 és 1994 közötti leépülését és a kilencvenes évekre jellemző új foglalkoztatási minta kialakulását. A második rész a foglalkoztatás erózióját az egyéni életpályák mentén, a nem, az életkor és az iskolai végzettség függvényében követi nyomon. A harmadik rész az 1994-re kialakult foglalkoztatás területi jellemzőit, az iskoláztatás szerepét és a foglalkoztatási diszkrimináció problémáját elemzi.

Tárgyszavak: Kisebbségek közgazdaságtana, diszkrimináció, regionális egyenlőtlenségek, az átmenet közgazdaságtana

1. INTRODUCTION

The economic transformation has put the greatest burden of all on the Romany population. As a result, the Roma have lost the basis of their living for the second time in the twentieth century. In the first half of the century, the disintegration of traditional Romany communities and the disappearance of the markets for traditional Romany crafts were both the products of a slow, evolutionary progress, which brought about – at least in part – an adjustment on the part of the Romany population in the long-run. As opposed to this process, the appearance of massive unemployment at the time of the transformation has wiped out in only a few years time just about all of the results of the slow modernisation. This modernisation had led to the integration of the Roma into Hungarian society – if only on its margins – through the expansion of the primary education and growth of industries based on uneducated labour. Undoubtedly, this integration was to a great extent only an illusion: the jobs offered by the distorted socialist modernisation could not last for long. Nevertheless, the social ascension of the Roma was real: a large number of people formerly on the margin of society were able to integrate into the society and have taken the first steps towards a more civilised life. In this process the spread of basic education was of crucial importance. The massive job loss of the Roma has made all of this history. With the collapse of the socialist economy, the market value of basic education has been nullified and a large part of the people that have integrated into society found themselves on the outside of society in a few years. The disappearance of surpassed forms of living, which happened at an unbelievably fast pace did not make it possible for the bulk of the Romany population to find successful forms of adaptation beyond bare subsistence. The more time the Roma spend in their current way of life, the stronger the vicious circle of poverty – low education – unemployment – poverty shall become. The situation of future generations is by no means more promising.

The Hungarian Roma are in a severe and unprecedented crisis. This paper was written in order to direct attention once again¹ to this acute crisis. This report is based on the employment histories part of the 1993/94 representative Roma Survey² which has been cleaned after many years of work, so we

¹ Two earlier studies by the author focus on the employment of the Romany population based on a much narrower informational basis, see: Kertesi [1994], [1995].

² The survey, which comprises a 2 percent representative sample of the Hungarian Romany population was conducted by Kemény István, Havas Gábor and the present writer. For detailed information on the survey see: Kertesi–Kézdi [1998], chapters 1-3.

have at hand a previously unexplored database containing richer, more accurate information.

The 1993/94 representative Roma Survey contained a bloc of questions on the employment histories of the adults in all of the households of the sample. We considered all those persons as adults who were at least 15 years of age at the time of the survey, and were not regular students in any educational institution. In the 2222 households questioned in the survey we had 5800 adults. Their employment histories represent the work histories of about 250-260 thousand Romany adults. These employment histories are made up of a chain of consecutive events from the person's first employment to his labour market status at the time of the survey at the turn of 1993/94. For all of those individuals who had never held a job in their life, this piece of information was recorded.³

The employment histories of the 5800 adults contained a maximum of 17 different spells, while an average employment history was made up of 3-4 spells. Our first aim was to make possible the comparability of these life stories differing in length – depending on the age and the type of employment history of the individual. The life stories of the 5800 adults were assembled of 21500 individual events, which contained the pieces of information given in detail in *Footnote 3*.

The cleaning of the database containing the employment histories took quite a long time. The correction of contradicting informations was in many cases only possible by checking the individual questionnaires, and we also went through the tedious work of checking the consistency of the employment chronologies with other pieces of information: the course of schooling, the changing of domiciles, the timing of births and so on. All of this work has successfully come to an end, and the database became adequate for statistical analysis.⁴

³ For every event in the employment history of an individual we recorded the following pieces of information: 1. the starting and finishing year of the spell; 2. the type of activity in that spell (employment, unemployment, housewife, on child care leave, participation in education, member of the armed forces, in jail, retired); if the individual was employed: 3. what was her occupation; 4. how many months per year was she employed; 5. the industry of employment; 6. the settlement of the workplace; 7. the relation of the place of work to the place of habitation (same settlement, daily commuting, weekly, monthly commuting). We naturally had access to all the background information included in the Roma survey: the individual's gender, age, schooling, family status, the characteristics of the place of residence etc. So information on just about all the factors influencing labour market status were at hand.

⁴ We formed three files from the original database, all representing different perspectives on the individual employment histories. 1. A file that contains a snapshot of the

The use of this database is particularly useful in reconstructing the dramatic crowding out of Romany workers from the labour market from the second half of the 1980s to the date of the survey, 1993/94. Our interest is not only motivated by the curiosity of the historian seeking to document the dissolution of a withered system – the disappearance of full employment – although this also is a not an unimportant goal. But the story is instructive to date: it helps understand *the structure and characteristics of Romany employment* which emerged from the ruins of full employment by the middle of the nineties.

The paper is organised as follows. First the disappearance of full employment of Roma in the 1984-1994 period is documented by the use of a quasi cross-sectional macro model and the patterns of employment characteristics of the nineties are described. Then the erosion of employment is traced from individual histories controlling the effects of gender, age and schooling, and particular aspects of low employment of Roma are accounted for, focusing on the role of low schooling, regional backwardness, and labour market discrimination. In the final section we summarise the basic findings.

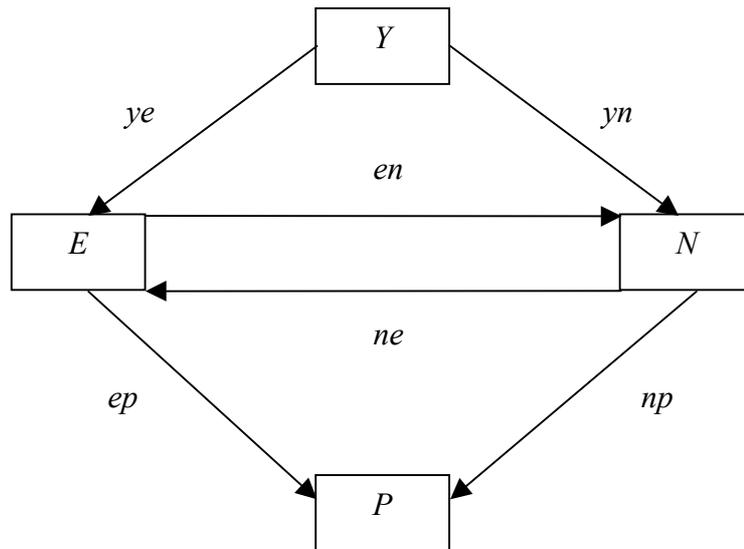
2. ROMANY EMPLOYMENT BETWEEN 1984 AND 1993: A QUASI CROSS SECTIONAL MACRO MODEL

Consider the following two-state macro model (see *Graph 1*). The working-age persons in a given year (t) are in one of two labour market states: they are either employed or not employed. The increase in year ($t+1$) of the stock of employed in year t (E_t) can be attributed to two sources: those labour market entrants (mostly young), who have become employed in the given year (ye_t), and those from the stock of non-employed who have found a job in the given year (ne_t). The *total inflow into employment* is the sum of the two above flows: $ye_t + ne_t$. The stock of employed persons is reduced

labour market status of the individual in the given year for all of the years from 1979 to 1994, this file shall be called “*snapshot file*”. 2. A second file which measures the number of months employed, the length of the employment spells, the number of children born, the fact of attending a night school in the period starting from the individual’s entry unto the labour market to January of the given year (1979, 1980, ..., 1994). This database shall be called “*flow file*”. 3. In the third file our observations were not the individuals, but the events of their employment histories: this file contains altogether 21500 spells with all the relevant information about the events in the employment histories. Naturally, more than one spell (observation) of the same individual can be found in this file which we called “*event file*”.

by two flows: those employed who have lost their jobs in the given year (en_t), and those employees who have retired (ep_t). By adding up these two flows, we receive the *total outflow from employment*: $en_t + ep_t$. Similar flows reduce and increase (in an inverse manner) the stock of non-employed (N_t).

Graph 1: Labour market stocks and flows



Notes: Y = labour market entrants
E = employed
N = non-employed
P = retired

Accordingly, the stock of employed (non-employed) in a given year ($t+1$) can be computed from the stock of employed (non-employed) in year t and the flows in year t by the use of the following equations:

$$(1) \quad E_{t+1} = E_t + (ne_t + ye_t) - (en_t + ep_t).$$

$$(2) \quad N_{t+1} = N_t + (en_t + yn_t) - (ne_t + np_t).$$

In the ideal case, information on the stocks can be found in cross-sectional databases, while the data on the flows comes from panel data. In our case, all of the information comes from the employment histories of the 5800 persons in the representative cross-section of the 1993/94 Roma Survey, so all of the data on the stocks in past years (E_t and N_t , where $t = 1984, \dots, 1993$) is taken from this database. Our estimates are based on the following

procedure: we reproduced the transition matrices in *Table 1* for each pair of years from the “*snapshot*” file using frequency weights.⁵

Table 1: Labour market stocks and flows

Year(t)	year ($t + 1$)		
	Employed	Non-employed	Retired
Employed (E_t)	ee_t	en_t	ep_t
Non-employed (N_t)	ne_t	nn_t	np_t
New entrant (Y_t)	ye_t	yn_t	–
All	E_{t+1}	N_{t+1}	P_{t+1}

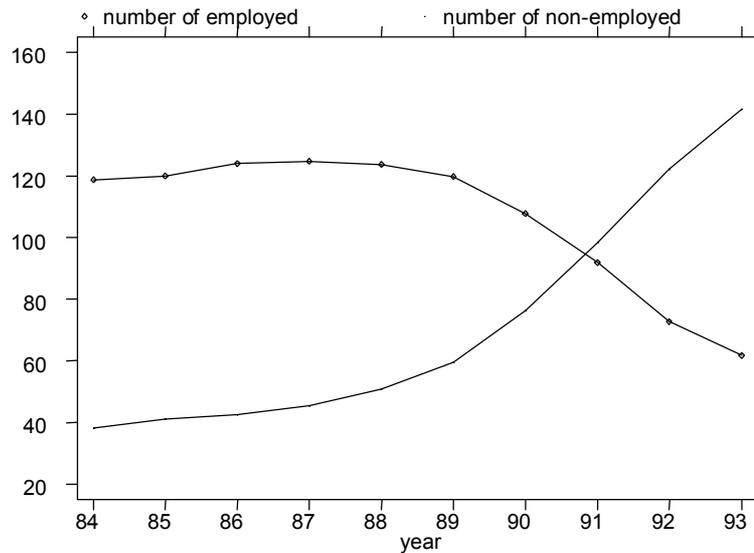
To make computations simpler, we considered all those as non-employed who were neither employed nor retired. In other words all unemployed persons, housewives, persons on childcare leave, in military service, jail and non-regular students were classified as non-employed. We note that the majority of the non-employed were unemployed, housewives or persons on childcare leave. Based on the transition matrices, we are able to estimate from our employment histories the stock of employed and non-employed persons as well as the labour market flows.

Our estimates are subject to some biases. E.g. stocks and the flows of the year 1984/85 do not contain those persons who have died since 1985, given that our information is based on the population of the year 1993/94. Due to this fact all of our estimates relating to absolute numbers are lower than the hypothetical estimates based on cross-sectional data. If we consider the biases of *relative* numbers, it is clear that the largest biases can be found in the estimates relating to the oldest cohorts, who are evidently made up of the retirees in a given year (ep_t and np_t). On the same grounds, it is easy to see that our estimates relating to the labour market entrants (ye_t and yn_t) are the least biased. Due to the number of deceased our estimates of the stock of employed and non-employed as well as the flows to and from these two

⁵ The Roma survey contains an about 2 percent sample of the whole Hungarian Romany population, so our frequency weights were of the order of about 50. The samples taken in Budapest and Miskolc are the exceptions because the sampling proportion in the first city was twice as large as in general, while in the second city it was four times as large. As a consequence the frequency weights used for the habitants of Budapest was about 25, while for the habitants of Miskolc it was about 12,5. The exact analytic weights differed from these values slightly due to the multistage sampling technique used. For further information see: Kertesi – Kézdi [1998] chapters 1 and 2.

states are biased to about the same extent, for the average ages of persons in these stocks are about the same in every year. Furthermore, those who are employed have on average more schooling than the non-employed, so we can expect the employed to have a lower mortality rate. In this manner, our estimates of the ratio of the stock of employed to the stock of non-employed should be considered as slightly upward biased in every year.

Graph 2: Changes in the number of employed and non-employed persons between 1984 and 1993 (thousands of people)



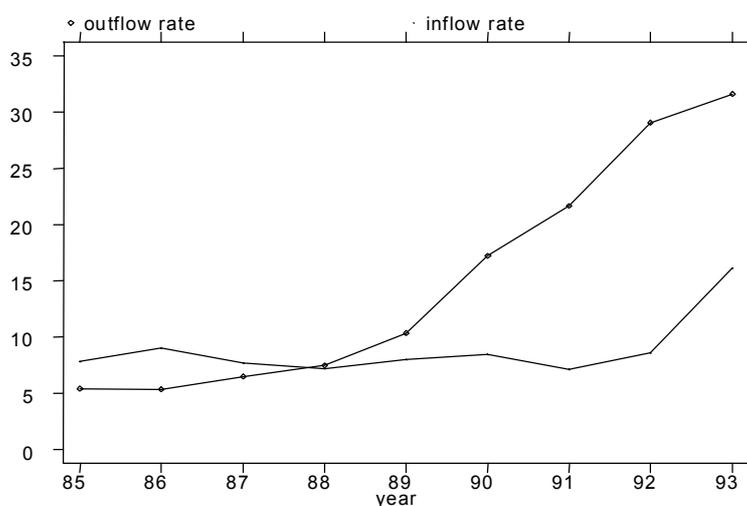
Graph 2 shows the time-path of the stock of employed (E_t), and non-employed (N_t). This graph makes clear the dramatic loss of Romany employment in the 1984 to 1993 period. In the middle of the eighties out of a working-age population of 160-180 thousand persons, there were about 120 thousand employed, and about 40-60 thousand non-employed. From the late eighties (1988-89) these proportions started to change gradually, so the stock of employed decreased first at a slow, then at a faster pace. By 1993 the stock of employed fell to about half (60 thousand persons) their number in the eighties, while the stock of non-employed (and not retired) grew by an enormous amount, to about 140 thousand persons. As a result, the employed/non-employed ratio, which was about 3:1 at the middle of the eighties, was worse than 1:2 in 1993.

We now decompose the change of employment relative to the stock of employed in the base year (in percentage) according to Equation (3):

$$(3) \quad \frac{E_{t+1} - E_t}{E_t} = \frac{(ne_t + ye_t)}{E_t} - \frac{(en_t + ep_t)}{E_t}.$$

The first term on the right hand side (the *inflow rate*) stands for the pace of flow into the stock of employed in a given year t , while the second term (the *outflow rate*) stands for the pace of outflow from the stock of employed in the same year. Both these terms measure the percentage of growth (decrease) relative to the employment in the base year that can be attributed to the flow into (out of) employment. The time-path of the inflow and outflow rates can be seen in *Graph 3*.

Graph 3: The yearly rates of flow into and out of the stock of employed between 1985 and 1993 (per cent)

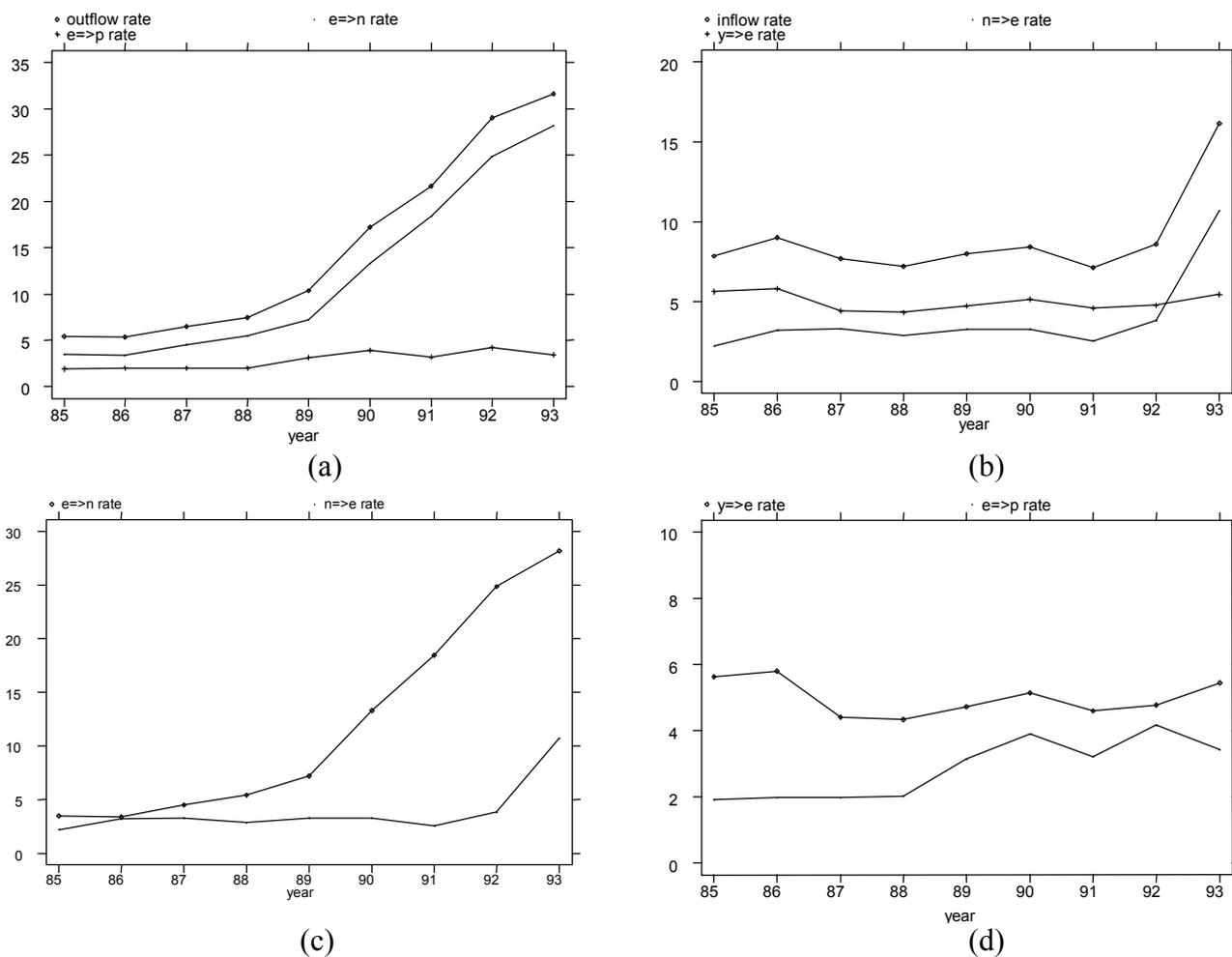


Based on the evidence found in the inflow and outflow rates it is fair to say that the employment of the Roma was in a steady state at the middle of the eighties when low and stable in- and outflow rates maintained a relatively stable (and high) level of employment. This equilibrium destabilised at the end of the eighties: the outflow rate was about 7 percent in 1988 and this rose to 30 percent in four years (1992), while the inflow rate stood at 7-8 percent at the same time. As a result, the stock of employed decreased at an ever faster pace between 1988 and 1992.

In 1992 and 1993 we can observe the first signs of a new trend: the outflow rate ceased to increase, while the inflow rate doubled from 8 percent to 16 percent. In what follows we shall argue that – based on our fragmentary information – we can expect Romany employment to stabilise at the end of the nineties at a new (low-level) steady state. We can anticipate that this new steady state shall be characterised by in- and outflow rates about twice those of the steady state in the eighties, these rates will stabilise at around 15 percent. In other words, an employment pattern typical of the Third World could appear, where the level of employment of an uneducated

group is not only very low, but the length of a typical employment spell is also very short and the stock of employed is alternating at a high speed. In this situation occasional work will be the dominant form of employment.

Graph 4: The yearly rates of flow into and out of the stock of employed persons between 1985 and 1993 (per cent)



(e: employed; n: non-employed; y: new labour market entrant (young); p: retired)

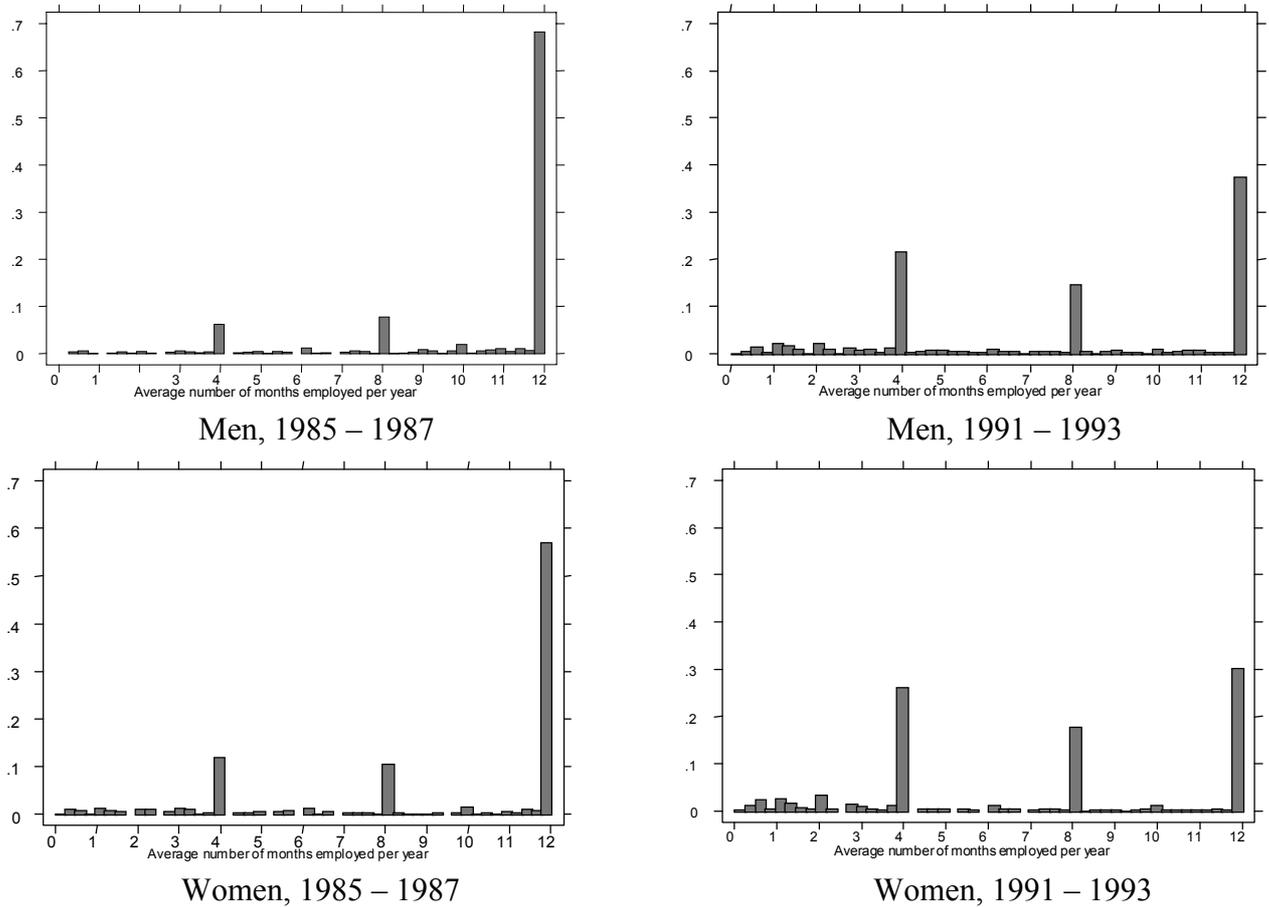
Now, we shall take a closer look at the components of the in- and outflow rates. *Graph 4* contains four panels: panel (a) shows the values of the outflow rate and its components – the rates of flow from employment to non-employment (en_t) and from employment to retirement (ep_t); while panel (b) shows the values of the inflow rate and its components – the flow from non-employment to employment (ne_t) and the flow of new entrants into employment (ye_t). In panel (c) we compare the flows between employment and non-employment (en_t and ne_t); while panel (d) concentrates on the rates of demographic change (ye_t and ep_t).

The changes in the structure of Romany employment are *basically* due to the changes in the rates of flow between employment and non-employment (see panel (c)), although the rates of demographic changes also altered somewhat in these ten years. This last development is not easy to see on panels (a) and (b), since the values of en_t and ne_t changed to such an extent between 1987 and 1993, that *in comparison* the changes in the rate of demographic change seem negligible. But panel (d) demonstrates that in the nineties the *balance* of demographic change is much lower than in the second half of the eighties: it fell from 2-4 percent to 1 percent. This difference can be attributed to both components of the demographic change: the rate of retirement in a given year (np_t) suddenly doubled after 1987/88 and stabilised at this higher level; while the employment rate of new labour market entrants deteriorated by one percentage point at the same time (it decreased from 6 to 5 percent and stabilised at that level).

The *net* in- and outflow rates that have been cleaned from the effect of demographic flows show the same time pattern as the *gross* rates. We distinguish three different periods in the decrease of Romany employment. In the first phase, between 1985 and 1989 a gradual erosion can be observed: the rate of flow out of employment (mostly job loss) steadily increased from year to year, it has risen from the level of 4%/year in 1984 to 7%/year by 1989 while the rate of inflow remained constant at around 3-4%/year. The second phase is the period between 1989 and 1992, when the pace of job loss increased by a staggering amount, from the 7%/year level in 1989 to the 25%/year in 1992, while the rate of inflow failed to increase. As a result, the decrease of employment – the balance of net in- and outflow rates – jumped from 3-4%/year to 20-21%/year. This last piece of information means that in 1992 the stock of Romany employed decreased by one fifth in only one year. We are only able to register the beginning of the third phase starting in 1992, when the rate of decrease of employment is easing. Although the rate of outflow has not stopped rising (from 25 to 38 %), the pace of this increase is slowing down. This phase is marked by the sudden jump in the inflow rate (from 4 to 11%). The net result of these two changes is the fact that in 1993 – for the first time since 1986 – the rate of decrease of employment is slower than the rate in the previous year. This may indicate that the market is beginning to approach a new steady state – at a very low level of employment (with around 50-60 thousand employed persons). The lack of data prevents us seeing at what exact value these flows will stabilise (if such stable state exists) in the second half of the nineties. Nevertheless the additional information on the *structure of employment* does suggest that after 1993/94 a new pattern of employment of

Romany workers will emerge – characterised by *unstable employment and the dominance of occasional work*.

Graph 5: The average number of months worked per year by those who were employed in the period of 1985-1987 and 1991-1993



Look at *Graph 5*, where we measured the stability of Romany employment with the average length of an employment spell at the middle of the eighties and in the first part of the nineties. To describe each period, we chose three years and tried to answer the question: what was the typical length of the employment events in the individual histories in these two periods. The lengths of the employment spells were averaged over the three years and are measured in months per year.

We have to remark that the distribution of the length of employment spells in a given period is *independent* of the absolute level of employment in the given years. In principle, it is possible to have a situation where the level of

employment is low – as it was in the first half of the nineties⁶ – and at the same time most employment is secure (of 11-12 months per year length). In this case, the in- and outflow rates should be low, otherwise the representative spells of employment could not have been stable. According to an alternative scenario a low level of employment means at the same time a switch to occasional work of less than one year length. It is clear from *Graph 5* that the structure of Romany employment moved in this direction. The employment at the middle of the eighties meant the dominance of stable jobs – of 12 months/year length – while the employment of the first half of the nineties was made up of predominantly casual jobs of short duration. As opposed to the period of 1985 to 1987, when the ratio of long-run employment (12 months per year) was around 70 percent amongst Romany men, in the period of 1991 to 1993 the ratio of long-run employment fell to about half of that level (to 37-38%). A change of the same order came about in the structure of employment of Romany women.

This also means that in the middle of the nineties, the employment of Romany workers is not only characterised by its low level, but by the *high rate of in- and outflows*, so a pattern of *highly unstable* employment was in the making. Not only did the Romany population lose – once and for all – their jobs to a much larger extent than the average of the Hungarian population, and in this way were crowded out of the labour market, but those Romany persons who held on had to give up the hopes of a *long-term* employment relationship. The spread of unstable employment has caused social disintegration of those with a job: the lack of permanent employment also means the lack of a stable lifestyle, the continued presence of bread-and-butter worries, as well as a lower level of social transfers from the state and the employers – or even the loss of entitlements.

3. THE COLLAPSE OF FULL EMPLOYMENT IN A LONGITUDINAL PERSPECTIVE: ROMA AND NON-ROMA

Prior to their job loss during the economic transformation, the Romany workers driven out of the labour market – as *Table 2* shows – had long, continuous employment histories. Based on the evidence in *Table 2* we can say that the Romany workers who were crowded out of the labour market were not attached to the market to a lesser extent than those who were able

⁶ Based on the data in the year 1993: 60 thousand employed persons to a population of about 200 thousand working age persons not studying or retired means an employment rate of about 30 percent.

to keep their jobs in the nineties. The length of continued employment spells before 1989 of the Roma still working in 1994 does not differ markedly from that of those out of work, neither among men nor among women, or in groups defined by age. Full employment meant about the same type of employment for Romany workers as for the rest of Hungarian society: stable, all year-long work. In other words: the dissolution of the full employment *started off from the same basis* for the Roma as for the rest of Hungarian society.

Table 2: Prior labour market attachment of those Roma workers in 1989, who lost, as opposed to those who managed to keep their jobs by 1994

Age in 1989 (years)	The average number of years worked before 1989 of those, who			
	lost their jobs by 1994		were employed in 1994	
	men	women	men	women
20 – 24	5.3	5.3	5.8	5.4
25 – 29	9.9	7.9	10.5	8.6
30 – 34	14.3	11.9	14.2	12.4
35 – 39	18.1	13.6	19.7	15.1
40 – 44	23.4	15.0	24.3	17.2
45 – 49	28.9	18.4	28.2	23.4

The chance of job loss depends to a large extent on worker characteristics. With the collapse of the socialist economic model a large number of companies employing uneducated labour, manufacturing low-quality products and functioning inefficiently went bankrupt or contracted and the whole economy was forced into structural adjustments. The transitional crisis not only decreased overall labour demand, but it also altered the structure of demand: demand for low educated workers (with primary or vocational training school) underwent a dramatic decline, while the *relative* demand for labour with secondary (or higher) education increased. Furthermore: the employment crisis hit companies in the competitive sector much harder than the budgetary sector, so job loss was more frequent among blue-collar than among white-collar workers and in consequence struck the employment of men more than the employment of women.

The change in the structure of labour demand affected the Romany population particularly adversely because the typical Romany worker is blue-

collar, of low schooling and male, just the type of person whose work has become the most devalued since the middle of the eighties. In comparison: the median Hungarian worker has finished secondary school, and has an equal chance of being male or female. Because of these differences the only way to correctly assess the disappearance of Romany employment is to do this in comparison to the employment of the typical Hungarian worker, with special attention to the *differing composition* of the two populations. To put it another way: we must control the most important attributes – gender, age and schooling – when accounting for the decrease of employment. This is what we shall do in this section.

Choosing a group of workers characterised by gender, age and schooling – for example the male workers with completed primary school and were 25-29 years of age in 1984 – *we follow the employment history of this particular group* from year to year in the period 1984 to 1994. Our question is: what percentage of the group would retain its employed status over these years. Naturally our chosen cohorts gain in age as time passes, so the men aged 25-29 in the above example would be 35-39 years of age by the end of our story in 1994. The passage of historical and of personal time (years of age) forces us to restrict our attention to those of 20-39 years of age in 1984, because they would be 30-49 years of age in 1994 and in this way would still be of working age.⁷ As we showed in the previous section, this is the most important question: to what extent did the erosion of employment affect the *working age population*?

We chose 1984 as our starting point, because this probably was one of the “last years of peace” before the start of the transition in the labour market, so we can observe the “last stand” of full employment in the socialist economy. This is where a true long-run analysis should start off. We hope that it will be made clear in the discussion below that 1989 would not serve as a useful basis, for the gradual movement in the second half of the eighties foreshadowed the immense employment crisis after the economic transition (See Köllő [1998]).

⁷ In our study we mostly treat the group of persons aged 20-39 in 1984 at the aggregate level. We do not include the analysis of the employment of the five year birth cohorts, because their employment histories do not differ markedly. The case of the birth cohorts of all women is somewhat different for we found a gap of the order of 20 percentage points between the employment rates of the oldest and youngest cohorts in the second half of the eighties, which is probably due to the timing of births. We found no such tendency on the graph of the Romany women. The graphs for the five year birth cohorts are available from the author upon request.

We cannot grip the extent of job loss among Romany workers if we do not have a comparison group. This comparison will naturally be the whole of the Hungarian population. To our regret, a *longitudinal* database representative of the whole of the Hungarian population does not exist (nor a large sample of employment histories comparable to ours), which would make it possible to document starting from the middle of the eighties or from 1989 the impact of the economic transformation based on individual employment histories. Because of this lack of data we shall have to be content with second-best methods. Nevertheless, our chosen method of analysis – that we do not analyse the employment histories of *individuals*, rather *birth cohorts* – made it possible to work out a second-best solution. If we take year-by-year large sample cross-section databases, and fix our analysis to cohorts, we have a quasi-panel database of these cohorts. This can only be done if we have representative large sample cross-sections for *almost all years*, so that the accidental random variations occurring because of differing sample designs can be smoothed by the *continuity* of the longitudinal database.⁸

Out of the 11 years of our period, we found adequate databases for 8 years (only years 1985, 1986 and 1988 are missing). Our sources of data were the following (in each case we had large individual files):

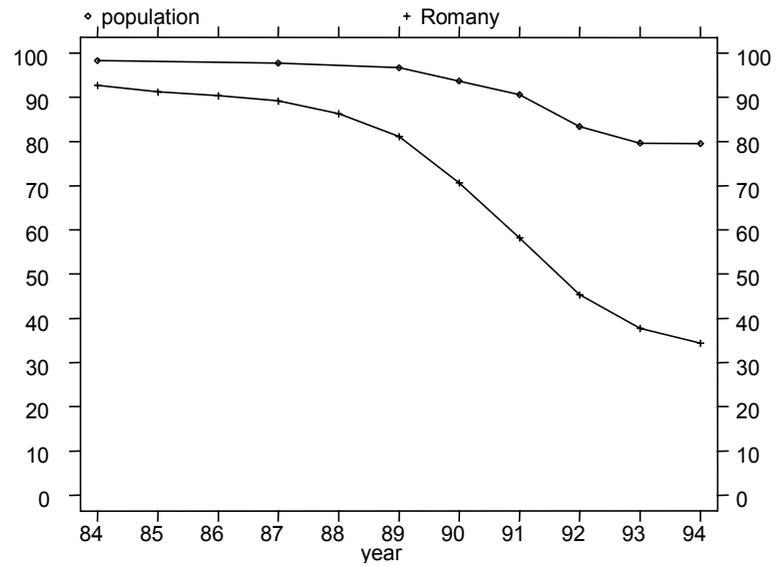
the 1984 CSO⁹ Microcensus,
 the 1987 CSO Household Expenditure Survey;
 the 1989 CSO Household Expenditure Survey;
 the 1990 CSO Census, 2 % representative file,
 the 1991 CSO Household Expenditure Survey;
 the 1992 CSO Labour Force Survey, simple average of the quarterly data;
 the 1993 CSO Labour Force Survey, simple average of the quarterly data;
 the 1994 CSO Labour Force Survey, simple average of the quarterly data;

In all the cases where we do not note otherwise, we calculated employment rates for the cohort aged 20-39 in 1984. In the following, we present our results by the use of *Graphs 6-11*.

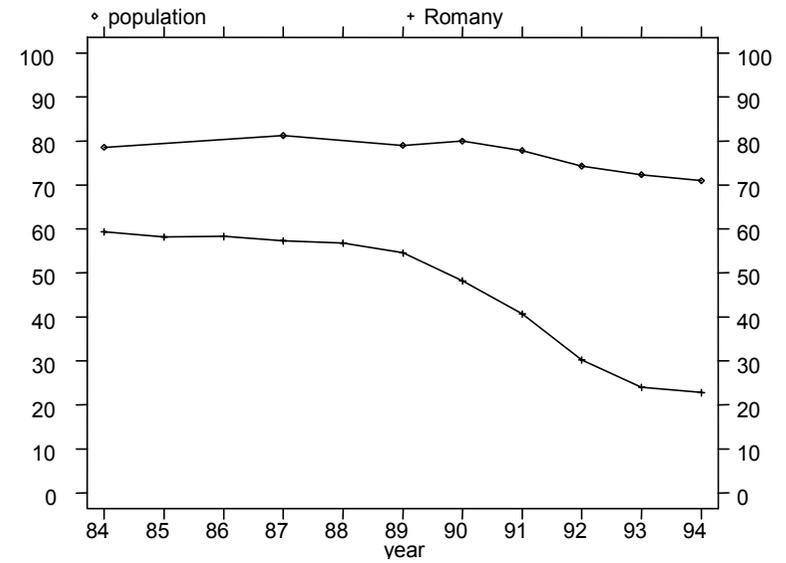
⁸ Naturally, it is also important to form the schooling and labour market status categories in exactly the same way in all of the individual cross-sections.

⁹ CSO = Central Statistical Office of Hungary.

Graph 6: What percentage of the population aged 20-39 kept their jobs between 1984 and 1994 depending on ethnic origin and gender?



(a) men



(b) women

The use of graphs (as opposed to tables) is motivated by the fact that we simultaneously operate with four (sometimes five) dimensions: gender, age, schooling, ethnicity (Romany/full population) and historical time. *Graph 6* presents the path of employment by gender, indicating data for both Romany and full populations. We have the following observations.

1. In our ten-year period the job loss among Romany workers was even more dramatic than the (far from negligible) job loss in the whole population. As opposed to the middle of the eighties, when the employment rate of Romany male workers was not far from that of the whole population – it was only behind by 4-5 percentage points – a decade later this small difference grew to an enormous gap of 45 percentage points. A disadvantage of the same order accrued in the employment of Romany women by the middle of the nineties, although at the middle of the eighties Romany women aged 20-39 already had an employment rate 20 percentage points lower than all women. In ten years about two-thirds of the middle-aged Roma lost their jobs.

2. The rather moderate employment losses (of 10 percentage points) of the 20-39 year old women in the whole population was because a large proportion of women had a white-collar job in the budgetary sector, which was less hit by the transitional employment crisis. In contrast, Romany women were employed to a larger extent by the non-budget sector in blue-collar jobs, so they lost their jobs in about the same proportion as Romany men did.

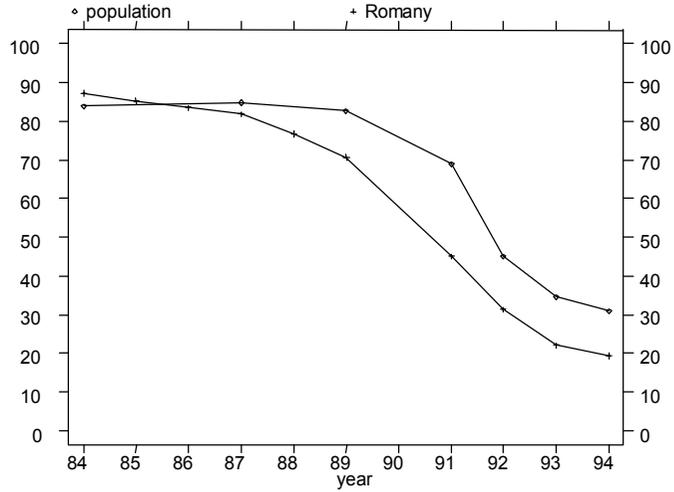
Graphs 7-8 show by gender the time path of the employment rate of the Roma and the whole population broken down by schooling categories relevant to Roma¹⁰: less than primary school, completed primary school, voc-

¹⁰ We left out of the analysis all those with secondary or higher education, because the number of observations in the Roma survey were too low to make detailed investigation possible.

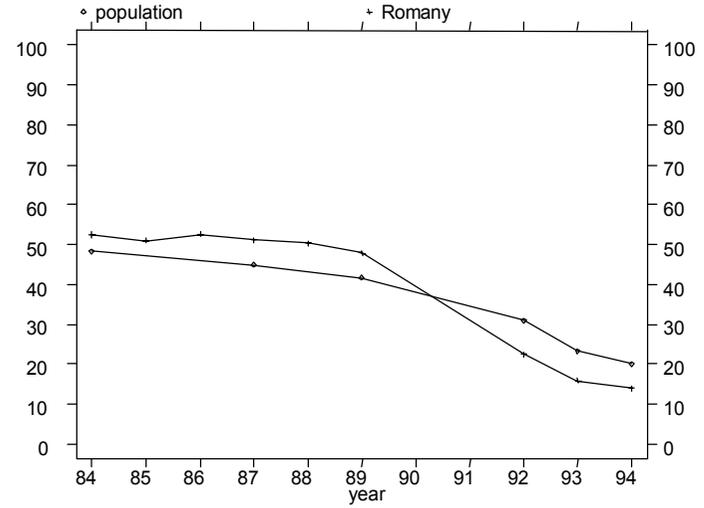
tional training school¹¹. The inclusion of the schooling variable makes it possible to draw a more detailed picture.

¹¹ In the case of the Romany population we included all those persons aged 20-39 who had secondary or higher education as well as those with vocational training school to increase the sample size. For the whole population this category is comprised only of persons with vocational training school. This does not have any important effect on our findings. First, the number of Roma with secondary or higher education is minimal. Second, their inclusion in this category probably makes their employment situation look somewhat better than it actually is, but it still is much worse than the employment of the same category in the whole population.

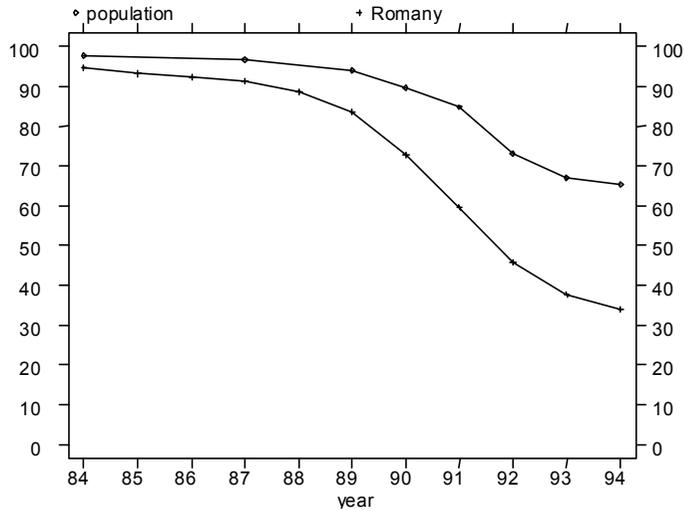
Graph 7: What percentage of the population aged 20-39 kept their jobs between 1984 and 1994 depending on schooling, ethnic origin and gender?



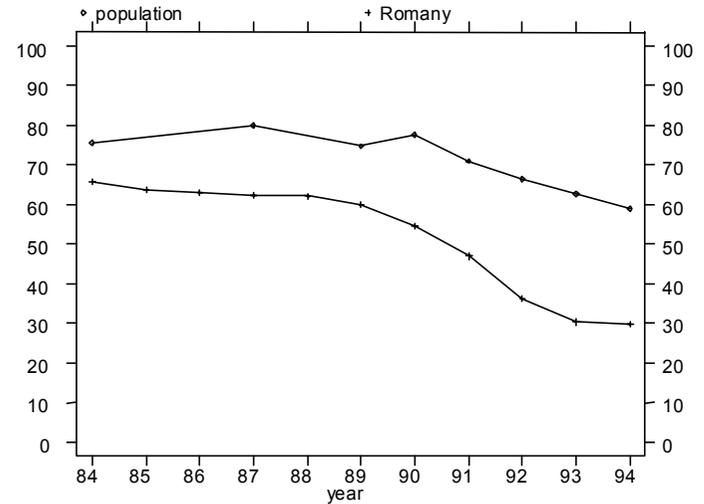
(a) men with 0-7 years of education



(b) women with 0-7 years of education

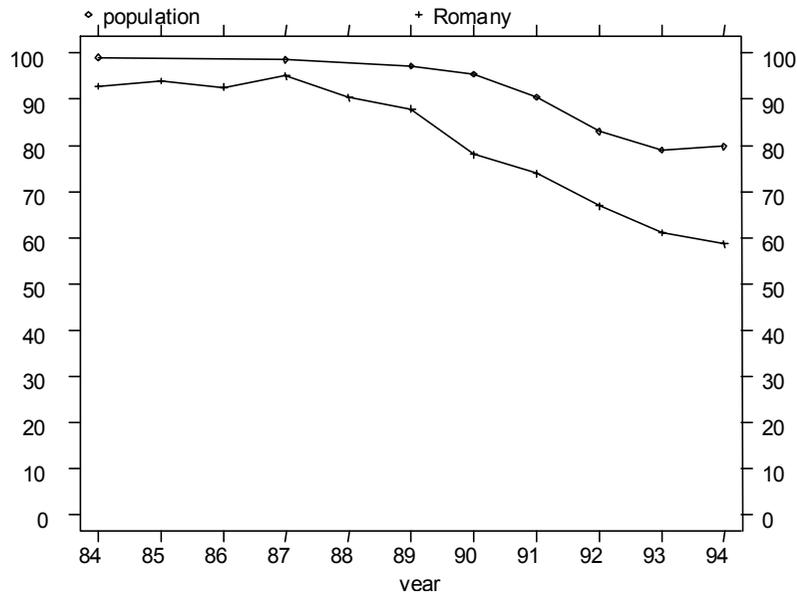


(c) men with 8 years of education

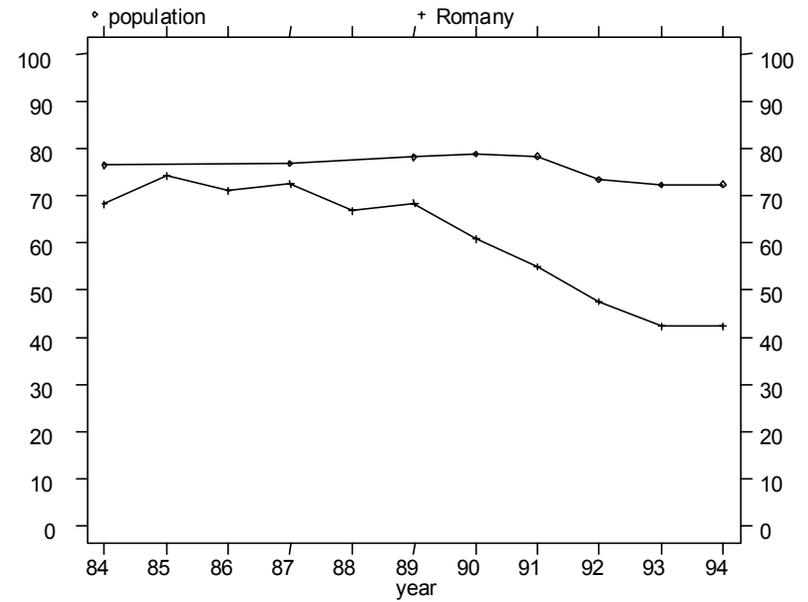


(d) women with 8 years of education

Graph 8: What percentage of the population aged 20-39 with completed vocational school kept their jobs between 1984 and 1994 depending on ethnic origin and gender?



(a) men



(b) women

1. First of all we can say that the huge gap between the employment rates of Roma and the whole population is *not only due to differences of composition*. The situation at hand is not only because the Roma have much less schooling and as a consequence, they have lost their jobs to a greater extent. Although the graphs by schooling categories also show the effect of this difference in composition¹², the fact is that in 1994 in all but one¹³ gender/schooling group Roma have a minimum 10, and mainly a 20-30 percentage employment lag whereas this difference was in every case smaller than 10 percentage points ten years earlier. This fact makes clear that there are factors other than differences in schooling (as well as gender and age) which govern the differences in employment probabilities between Romany workers and the whole population. These factors can be of three origins: unmeasured characteristics affecting productivity, regional differences and discrimination in the labour market. We try to account for these factors in the next section.

2. An even more interesting observation in *Graphs 7-8* is that the employment gap is smallest in the totally uneducated category (less than completed primary school) – in comparison to those with completed primary school or vocational training school – whilst it is clear that Roma in this category are the hardest hit by regional backwardness. So the composition effect of the regional dispersion of the Romany population¹⁴ plays a minor role in the widening employment rate differential between Roma and the whole population. This conjecture is confirmed by the calculations of *Section 3*, where we show that if the regional backwardness had the same effect on the employment probabilities of Romany workers as it does on the probabilities of the whole population with the same amount of schooling, then the regional dispersion of the Romany population would be of much less dramatic consequence on Romany employment than it is in reality.

In *Graphs 9-11* we include two further dimensions of our analysis: the employment rate of the *labour market entrants* and *early retirement*. The common characteristic of these two groups, – the market entrants and those of age potentially eligible for early retirement – is that both are *markedly exposed to the hazard of job loss*. Above we used the term “*potentially eli-*

¹² The differences between the graphs of the Roma and the whole population disaggregated by schooling category are much smaller than the gap between the graphs of the two populations not disaggregated by schooling (see Graph 6).

¹³ The only exception being females with less than completed primary school.

¹⁴ To be more exact: the Romany population is over-represented in the village category and in the settlements with high unemployment regardless of the settlement size. The order of this over-representation is higher, the lower the schooling of the given Romany or non-Romany group.

gible for early retirement” for all those working-age, but not young (over 35 years of age) persons, who are (1) severely ill or disabled; or (2) working in a job which if discontinued, does not accrue additional costs to the employer via side effects in other production-lines; or (3) in a marginal position in the internal or on the local labour market and do not have influential acquaintances in their community or workplace who would plead their cause. If the economy is in a crisis and jobs are destroyed, then it is least costly (and brings about the least conflict in the workplace) for employers to lay off these workers.¹⁵ The situation is the same if it is not the employers who initiate the retirement, rather it is *the workers who seek refuge in early retirement from the menace of unemployment*. The laxity in the process of awarding disability retirements gives ground for this kind of behaviour. These laxities can go unnoticed on the part of the social security (or the state budget), because what is lost on disability pensions is saved on unemployment benefits, plus this way of dealing with workers without much hope of reemployment in the future does not put a burden on state-run (and provided by the local governments) welfare system.

The new labour market entrants are in a danger zone for similar reasons, and in particular those with neither high-level education nor uncommon professions. At a time of cut-back most companies also do not take on new workers. If the whole economy is in contraction, then the aggregate probability of employment of labour market entrants will decrease too. It is reasonable to expect that at the time of a crisis the chances of employment of market entrants will decrease *faster* than the chances of job loss of employees will increase, or even if the pace of change of these two probabilities would be the same, the entrants’ chances of finding a job would start deteriorating *at an earlier date*. The reasons are similar to the case of early retirement: on the one hand it is less costly for the employer – *ceteris paribus* – to not hire somebody from outside than to fire a worker with some job-specific human capital, and he does not have to accrue the fixed costs of discharge; on the other hand the stop of hiring does not cause conflict on the inside of the workplace as opposed to firing.

¹⁵ See the report of Fazekas and Köllő [1990] (pages 215-219.) on this phenomenon at the end of the eighties.

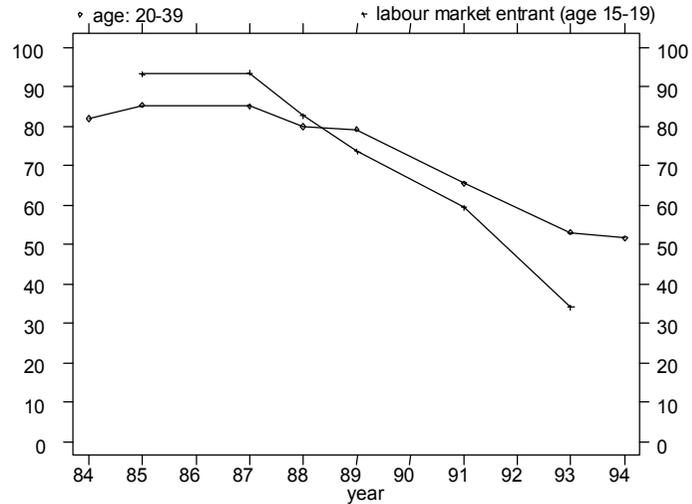
Graph 9: What percentage of the given age group kept their jobs or found a job between 1984 and 1994 depending on schooling, ethnic origin and gender?



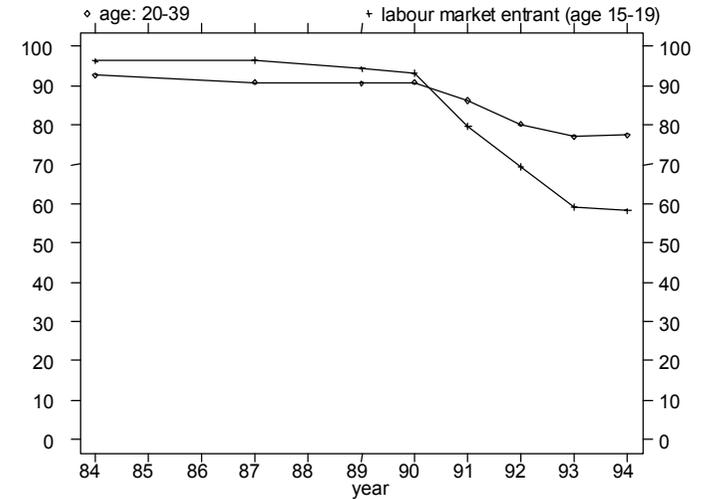
(a) Romany with 8 years of education



(b) population with 8 years of education

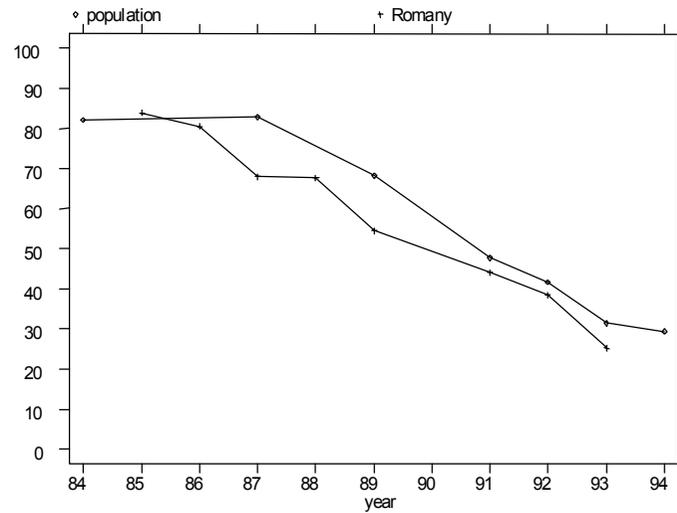


(c) Romany with completed vocational training school

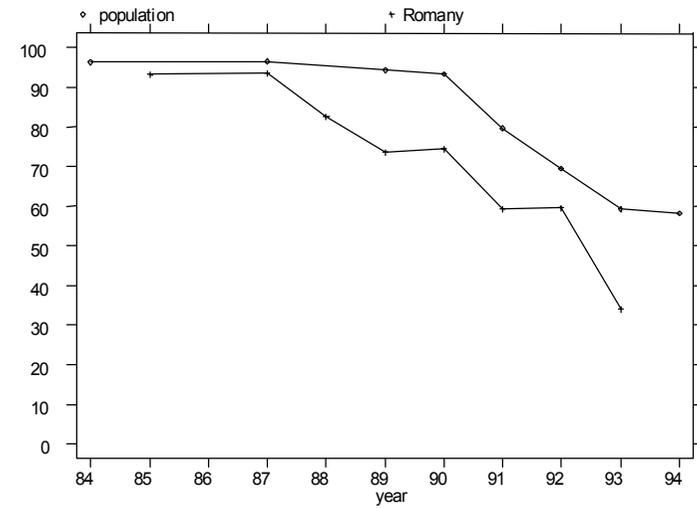


(d) population with completed vocational training school

Graph 10: What percentage labour market entrants (aged 15-19) with 8 years of education or completed vocational school could find a job between 1984 and 1994 depending on ethnic origin?



(a) persons with 8 years of education



(b) persons with completed vocational training school

This can be relevant here in two ways. First, there is in the Romany population a larger proportion of less healthy or less fortunate and of those in jobs easily dispensable than in the Hungarian population on average. Second, the Roma are less integrated into the local society or into the organisation of the workplace than the average person in Hungarian society. The consequence is clear in both cases: even if employers did not have preferences against Romany workers – simply because of working against weaker opposing forces – they would send them in greater proportion to early retirement or refuse hiring them.¹⁶ (Naturally all of this is worsened by the discrimination against Romany workers in the marketplace.)

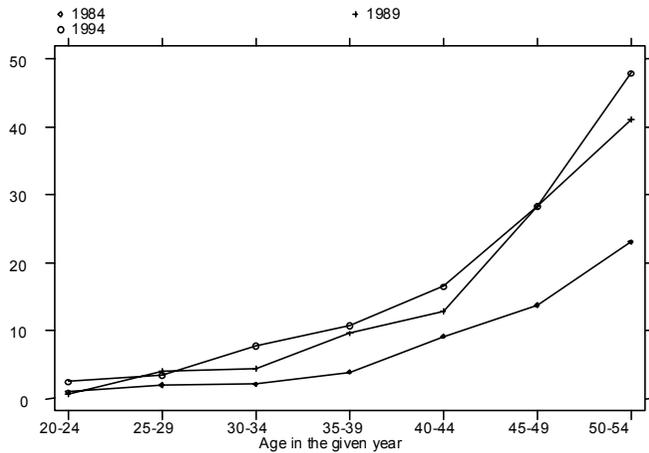
Graphs 9-10 show the employment rates of labour market entrants¹⁷, while *Graph 11* depicts the proportion of early retirees. We focused on the situation of entrants with completed primary school or vocational training school since they make up the bulk of the young Romany cohorts.¹⁸ Our results show that it was fair to say that when overall employment is declining, the chances of employment for entrants are particularly bleak. We see the same phenomenon in both the graphs of Romany youths and of youths on average: the chances of hiring of labour market entrants decline to a larger extent – independently of their schooling – than does the probability of job loss of employees with the same level of schooling increase.

¹⁶ No one has to think of some kind of a sinister plot. It is enough to consider the actual situation of admission or dismissal at a firm. In a case where there are no vacancies at a given firm, but there still are fresh graduates applying for a job, then an exception will only be made if a particular job applicant is supported by insiders (relations, friends working for the firm) or by outsiders having standing in the local society with connection to the firm's management. The same argument applies to lay-offs: those have a greater chance of survival, who have someone with authority standing up for them. These micro-scale decisions, which take place several thousand times shall have the consequence at macro level – without anyone's intention – that persons weakly integrated into the society – like the Roma – shall have smaller chances of keeping or getting a job – all other factors held constant – than the average person in that society.

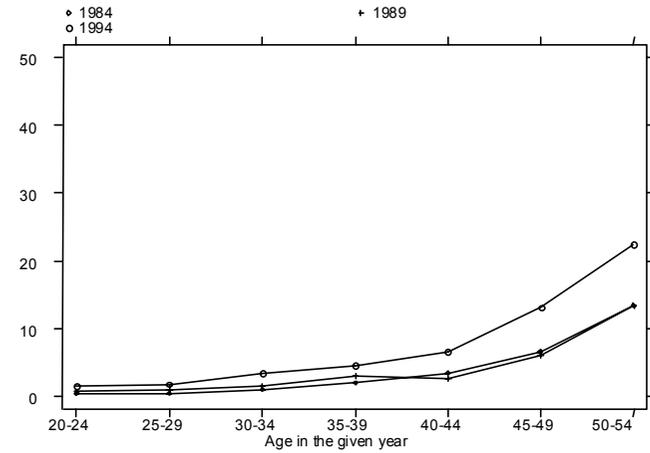
¹⁷ We defined the category of new labour market entrants the following way. In the "snapshot file" of the Romany employment histories we considered entrants all those persons with completed primary education who had 15-19 years of age in the given year and whose starting date of their *first* employment history event was of the same year. For the whole population we could not register directly labour market entry from our cross-section files, we simply defined the date of entry by the use of birth date and years of schooling.

¹⁸ We did not attempt analysing the situation of entrants with secondary or higher level education, because they represent a very small proportion of the Romany population, even in the youngest birth cohorts.

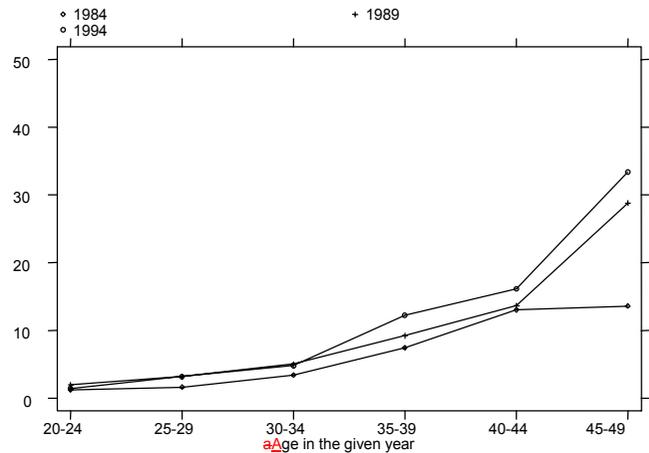
Graph 11: The percentage of retired persons in the given age groups in 1984, 1989, and 1994.



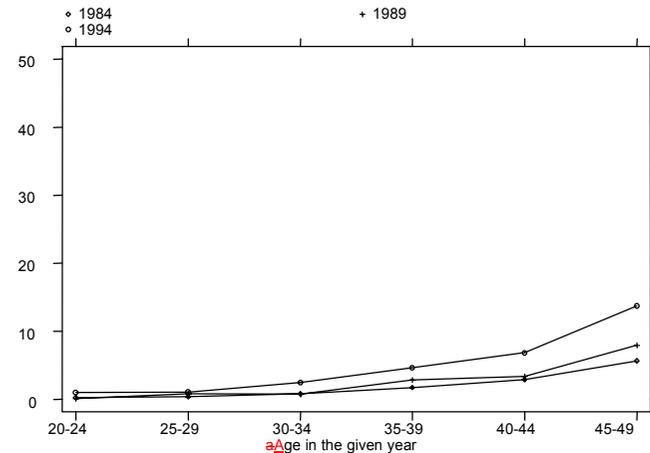
Romany men



Population, men



Romany women



Population, women

Not only is the situation of entrants worse than the older workers', but the employment crisis affected them earlier. *Graph 10* depicting the relative situation of entrants belonging to the Romany and the whole population by schooling category also confirms our conjectures: the employment rate of Romany entrants starts to decline *at an earlier date* and – in particular for those with vocational training school – *to a greater extent* than their counterparts in the population as a whole.

The problem of early retirement is shown in *Graph 11*. This graph – just as the one depicting the situation of entrants – is based on simple *cross-sectional* data: it shows the percentage of persons already retired in the given cohort¹⁹ in the given year (1984, 1989 and 1994). Because each of the cohorts is within working age, all of the data greater than zero is due to early retirement. There are three differing cases of early retirement: disability pensions, which can be awarded to persons with a decrease of working capacity of the order of 67 percent²⁰; early retirement, available to those within 3 years of retirement age whose employer provides pension payments until the age of retirement rather than firing the person; preferential retirement at reduced age, which is available to those working in jobs particularly detrimental to health and in some other professions (for example workers of the armed forces). Although we are not able to differentiate retirees by their source of entitlement, it is well known from aggregate statistics that persons on disability pensions make up the majority of early retirees. As already pointed out, the institutional system of the social security was a partner for a long time in supplying with this type of benefit workers who – with the loss of their jobs – had no other stable source of income. Applying for disability benefits has become one of the typical forms of *escape from unemployment*.

The fact that this way of escaping from unemployment was often used in the ten years between 1984 and 1994 is well documented in *Graph 11*. In 1994 – see panels (b) and (d) – the proportion of early retirees was almost the double of the proportion in 1984 amongst the men in the oldest three cohorts and was more than its double amongst women. It is highly unlikely that in these ten years the health of the Hungarian population has decayed at a pace that would explain the growth in early retirement. It is more than

¹⁹ In this case we *did not* follow the employment path of the given cohorts.

²⁰ In special cases persons with a decrease of working capacity of 50 percent were able to obtain disability pensions, but these persons were only entitled to a pension of much smaller value (the so-called temporary social allowance).

probable that this increase is due to job loss, which is a fairly well-known development of the economic transformation.

The story of the Romany workers is even more striking. (i) Early retirement has reached incredible rates in the Romany population. Although at the middle of the eighties the work histories of Romany workers already ended fairly often in early retirement – this is surely in connection with the health status of the Roma, who typically worked in jobs with unhealthy conditions and hard physical work – the fact that the proportion of early retirees in the five years between 1984 and 1989 among men aged 45-49 increased from 14 percent to 30 percent, among men aged 50-54 from 23 percent to 48 percent and among women age 45-49 from 13 percent to 30 percent indicates that in the case of Roma somewhat older than middle age early retirement was one of the *dominant* forms of job loss. (ii) The other characteristic of the Romany population is that the sudden increase in the proportion of early retirees happened five years earlier than in the whole population, in the 1984-89 period.²¹ It is particularly important to emphasise the *timing* of the flow of masses of Romany workers into disability retirement status, because in the same period according to the official Hungarian statistics there was hardly any unemployment and although there were layoffs – mostly in jobs with low qualifications –, the proportion of these layoffs was negligible. If we consider early retirement as a form of job loss – it makes no matter that it is the workers who apply for disability pensions – then we can say that the crowding out of Romany workers from the marketplace was fully in swing in the second half of the eighties, at the time of so-called full employment.

Finally, to end the discussion of the problem of labour market entrants and early retirement we have to underline that our evidence is in line with the observations we made based on the macro model in *Section 1*. In panel (d) of *Graph 4* the rate of inflow of entrants has started to decrease as early as 1986 – the order of decrease was 20 percentage points – and two years later (in 1988) with the increase of flow into early retirement the rate of outflow from employment doubled in just four years time.

²¹ There was no significant change by 1994 compared to the data for 1989.

4. ACCOUNTING FOR THE LOW EMPLOYMENT: LOW SCHOOLING, REGIONAL BACKWARDNESS AND DISCRIMINATION

In this section we take a look at the *consequences* of the developments of this crucial decade. Based on individual level cross-section data, we try to measure the role of low schooling, regional backwardness and discrimination on the stabilisation of the low employment rate in the Romany population. We used as a reference group the data of the September - October - November wave of the 1993 CSO Labour Force Survey, which contained – in this single wave - the additional question of ethnic origin. We excluded all those families from our sample, who were indicated as Romany by the interviewer, this way our reference group is representative of the non-Romany population of the country. Both the sample of Romany and non-Romany populations were restricted to persons of working age in 1993 – men aged 15-59 and women aged 15-54 – and we also excluded students of regular educational institutions. We considered all those employed in the Roma sample who worked as employees or as entrepreneurs and were not registered as unemployed in the year of the survey; for the non-Romany population, the category of employed was made up of persons who worked at least one hour in the week prior to the date of the survey and usually worked at least 10 hours per week plus were not registered as unemployed.

LOW SCHOOLING

Tables 3-4 show the basic facts about the differences in schooling composition of the Romany and non-Romany working-age population and about the employment rates by schooling (plus gender and age) categories. *Table 3* shows the differences in schooling composition of the Romany and non-Romany population broken down by gender. It is clear that the Roma have much less schooling than the non-Roma – which is well known - but the magnitude of these differences is astonishing. Only 20 percent of Romany men have more than completed primary schooling opposed to the 65 percent in the reference group. This difference is even greater among women, with 60 versus 10 percent not having more than 8 years of schooling. This can be the cause of large differences in employment rates in itself. But it is made clear in *Table 4* that *schooling composition alone* – or even combined with gender and age – cannot explain the enormous gap in employment rates. Within almost all schooling categories – even after controlling for gender and age – we find differences of 20-30 percentage points in employment rates. There must be other factors than schooling at work here.

Table 3: The educational attainment of working age Romany and non-Romany population by gender, 1993 (%)

Education	Men			Women		
	Non-Romany	Romany	Difference	Non-Romany	Romany	Difference
0-7 classes	3,08	30,92	-27,84	2,24	43,46	-41,22
8 classes	31,19	50,45	-19,26	37,79	48,16	-10,37
Vocational school	32,36	16,44	15,92	17,47	6,63	10,84
Secondary school	23,22	1,92	21,30	32,07	1,53	30,54
College	10,15	0,26	9,89	10,44	0,22	10,22
All	100,00	100,00	-	100,00	100,00	-

Note: working age= men: 15-59 years of age, women: 15-54 years of age; population not in school.

Table 4: The employment-population ratio in the Romany and non-Romany population with completed primary and vocational training school, by gender and age, 1993 (%)

Group	age: 15-19	age: 20-24	age: 25-29	age: 30-39	age: 40-54
<i>men with completed primary school (8 classes)</i>					
Non-Romany	41,7	60,7	66,9	68,8	63,8
Romany	18,2	36,6	38,3	35,1	33,6
Difference	23,5	24,1	28,6	33,7	30,2
<i>women with completed primary school (8 classes)</i>					
Non-Romany	35,1	30,7	41,0	59,7	58,2
Romany	12,0	11,4	16,3	26,0	30,8
Difference	23,1	19,3	24,7	33,7	27,4
<i>men, vocational training school</i>					
Non-Romany	53,2	73,0	83,9	79,5	74,9
Romany	23,9	41,2	52,6	50,0	50,8
Difference	29,3	31,8	31,3	29,5	24,1
<i>women, vocational training school</i>					
Non-Romany	71,6	49,6	44,0	67,8	75,2
Romany	38,8	31,4	33,3	36,9	.
Difference	32,8	18,2	10,7	30,9	.

Note: persons not in school.

REGIONAL BACKWARDNESS

Another source of the disadvantage of Romany workers in finding employment might be the unfavourable regional dispersion of the Romany population. This might be due to two factors: Roma are over-represented in villages where the absence of work is more acute than in any other settlement category; and Roma are over-represented in those regions where employment is especially scarce – regardless of the type of settlement. The regional differences in the employment situation are well represented by the distribution of unemployment rates in the 170 labour office districts. In 1993 (when the national representative survey on Romany population was conducted) one can observe very large differences – of twenty to thirty percentage points in magnitude – between the unemployment rates of the micro-regions of the country.²²

Table 5: The distribution of working-age Romany and non-Romany population by type of settlement, 1993 (%)

Group	Budapest	county capital	other town	village	All
Non-Romany	20,21	17,56	26,21	36,02	100,00
Romany	8,02	9,86	19,04	63,07	100,00
Difference	12,19	7,70	7,17	-27,05	–

Note: working age= men: 15-59 years of age, women: 15-54 years of age; population not in school.

Table 6: The distribution of working-age Romany and non-Romany population by the local unemployment rate, 1993 (%)

Group	Local unemployment rate					All
	– 10 %	10–15 %	15–20 %	20–25 %	25 % +	
Non-Romany	32,43	39,93	19,14	6,79	1,71	100,00
Romany	16,37	27,56	32,98	13,20	9,89	100,00
Difference	16,06	12,37	- 13,84	- 6,41	- 8,18	–

Note: working age= men: 15-59 years of age, women: 15-54 years of age; population not in school; local unemployment rate: the unemployment rate of the labour office district, 1993 Autumn.

The regional disadvantage of the Romany population is documented in *Tables 5-8*. The difference in the geographic distribution of the Romany and

²² We calculated the unemployment rates for the 170 labour office districts of the OMK. The data used here is the unemployment rate for the third quarter of 1993. See Ábrahám – Kertesi [1998] for the exact calculations.

non-Romany population broken down by settlement type in *Table 5*, by the rate of local unemployment in *Table 6*, by settlement type and unemployment rate combined in *Table 7*. Finally, we have calculated the raw differences in employment rates of the two populations by regions, that is by settlement type and local unemployment rate, which is given in *Table 8*.

Table 7: The distribution of working-age Romany and non-Romany population by the local unemployment rate and settlement type, 1993 (%)

Group	Local unemployment rate					All
	– 10 %	10–15 %	15–20 %	20–25 %	25 % +	
	<i>county capitals</i>					
Non-Romany	17,62	73,27	9,11	.	.	100,00
Romany	16,26	68,29	15,45	.	.	100,00
Difference	1,36	4,98	–6,34	.	.	–
	<i>other towns</i>					
Non-Romany	14,42	42,75	31,01	10,90	0,92	100,00
Romany	8,75	23,67	36,73	20,78	10,07	100,00
Difference	5,67	19,08	–5,72	–9,88	–9,15	–
	<i>villages</i>					
Non-Romany	14,84	44,01	26,14	10,92	4,08	100,00
Romany	8,05	25,87	38,78	14,66	12,63	100,00
Difference	6,79	18,14	–12,64	–3,74	–8,55	–

Note: working age= men: 15-59 years of age, women: 15-54 years of age; population not in school; local unemployment rate: the unemployment rate of the labour office district, 1993 Autumn.

The evidence in these tables clearly shows that the geographic distribution of the Romany population is extremely unfortunate from the viewpoint of employment possibilities. 60 percent of the adult Romany population live in villages (opposed to 35 of the non-Romany population), and both in towns and in villages – as well as in the country overall – they live in a considerably greater proportion than the non-Romany population in settlements severely hit by unemployment. The effect of this difference on employment possibilities cannot be overstated, as seen in *Table 8*. Both the employment probabilities of Romany and non-Romany workers are adversely effected by the local unemployment rate. It might well be that the local unemployment rate and the level of schooling of the population is in an inverse relationship and this amplifies the effect of the regional differ-

ences on employment. The fact is that the variance of employment probabilities across local unemployment rates is greatest within the village settlement type, where the differences in schooling are the smallest. This points to the importance of regional labour markets in determining the probability of employment, independent of the schooling level. The employment situation of the Roma is as bleak as it is, because *a large proportion of the Romany population live in regions characterised by deep economic crisis.*

Table 8: The employment-population ratio in the working-age Romany and non-Romany population by the local unemployment rate and settlement type, 1993 (%)

Group	Local unemployment rate				
	– 10 %	10–15 %	15–20 %	20–25 %	25 % +
<i>Budapest</i>					
Non-Romany	64,3	.	.	.	.
Romany	35,8	.	.	.	.
Difference	28,5	.	.	.	.
<i>county capitals</i>					
Non-Romany	66,5	63,5	59,0	.	.
Romany	31,8	24,9	12,7	.	.
Difference	34,7	38,6	46,3	.	.
<i>other towns</i>					
Non-Romany	69,5	62,3	60,9	54,9	55,8
Romany	30,2	26,0	23,8	12,4	21,0
Difference	39,3	36,3	37,1	42,5	34,8
<i>villages</i>					
Non-Romany	65,9	57,4	55,2	47,5	48,7
Romany	36,2	25,0	24,5	16,7	10,9
Difference	29,7	32,4	30,7	30,8	37,8

Note: working age= men: 15-59 years of age, women: 15-54 years of age; population not in school; local unemployment rate: the unemployment rate of the labour office district, 1993 Autumn.

LABOUR MARKET DISCRIMINATION

We refer to discrimination in those cases where the employers value workers of the same quality – with the same schooling, labour market experience and not differing in most other attributes (those of importance in their market productivity) – differently: they hire these workers with different probabilities or at different wages. There can be many kinds of causes to this discriminative labour market policy. According to the most accepted explanation the employers discriminate between individuals belonging to different groups because they believe, based on previous experience – be this belief well-founded or completely irrational – that in these groups they will find workers appropriate for their purposes with differing probabilities *keeping the workers' observable attributes fixed*. Evaluating a job applicant's expected productivity is a very difficult task, for it is a function of a number of not easily measurable individual characteristics²³ outside of the applicant's observable attributes. The appropriate selection at the *individual* level is all the more important the more schooling is needed for the particular occupation or the higher up the job is in the hierarchy. This is why employers not only ask for meeting few formal criteria from applicants to these kinds of jobs, but they try to come to know the applicant in detail (by the use of aptitude tests, persons or works of reference, in-depth interviews and the likes). This obviously is a very costly way of hiring personnel, which is not affordable in simple blue collar jobs with low qualifications.

If the employers try to make their decisions based on statistical regularities and expect to find acceptable workers in one group – e.g. among the Roma – with lower probability, then they will use this group-level information in their decision, given that this is less costly than *screening at the individual level*. Most of the discrimination in the marketplace against Roma is of this – statistical – nature. It is not only a matter of the preferences of the employer for or against Roma – although this might also come into play for some individuals – when they decide about hiring a Romany worker, but it rather depends on *the relative cost of applying ethnic background as a screening device*. This makes the situation all the more difficult, for statistical discrimination leads to lower costs and in this way it is economically rational from the perspective of the employer – although it is morally and legally condemnable²⁴. Even an employer without prejudice against Roma

²³ Next to cognitive abilities social skills like reliability, ability to co-operate, good-fellowship etc. also play an important part.

²⁴ Not only is it condemnable morally, but legally too, for it is an inequity against the given person: even if it is true that persons in her group have a smaller probability of

has to consider whether it is affordable to employ an expensive human resource management team if it is possible to screen applicants with a high reliability – although calculating with the costs of making wrong decisions sometimes – based on observable characteristics (like gender, age or ethnicity).

These kind of statistical judgements are *mixtures* of substantive observations and pure prejudice. It is nevertheless clear that there can be enormous differences in the aptitude, knowledge and skills of workers with the same schooling and experience. It is also clear that these differences have something to do with the schooling career of these individuals. For example those youths who finish primary school over-aged after several repeated years (and probably with bad results) will have on the average less (learned) skills, aptitude etc. than those who had a straight schooling career. If the schooling career of Roma is broken to a larger extent, then – given that this information is widely known – this gives grounds to prejudice against the whole group.

Table 9: The ratio of over-aged and year-repeating students among Romany and non-Romany children attending primary school in 1974/75, 1981/82, and 1985/86

Group	Class	School year		
		1974/75	1981/82	1985/86
<i>Ratio of over-aged students (%)</i>				
Romany students	1-4. class	55.6	41.6	46.7
Non-Romany students	1-4. class	7.4	6.0	9.2
Romany students	5-8. class	62.9	52.7	51.2
Non-Romany students	5-8. class	12.5	8.3	9.3
<i>Ratio of year-repeating students (%)</i>				
Romany students	1-4. class	22.3	16.3	17.4
Non-Romany students	1-4. class	1.8	1.7	2.4
Romany students	5-8. class	14.5	13.5	14.4
Non-Romany students	5-8. class	1.6	1.5	1.9

* *Source:* Cigány tanulók [1986], pp. 51 and 58.

having some skill, she might be in command of the given ability – which is the condition of acceptance for the job - herself. The right to equal treatment requires that the process should treat her *as an individual*, not *as a member of some group*. By the same token it is clear why this law cannot be enforced easily: economic rationality and equitable human resources management are in conflict with each other.

It is a fact that Romany children stumble more often in their schooling career than the average child. If we take two randomly chosen persons with 8 years of education from the Romany and the non-Romany population then the Romany person has a much higher probability of having finished primary school over-aged, with repeated years and bad results. This is confirmed by the data in *Table 9*. (We only note in brackets – because it does not belong to the point of *this* study – that many of the broken schooling careers of Romany children can be attributed – at least in part – to some dysfunctional traits of the Hungarian educational system. The lack of primary schools or of resources in the small villages where the proportion of Roma is high; the growing segregation of Romany children inside the schools as well as the general incapability of the educational system to give adequate help to children with learning problems²⁵, all these factors contribute to the great number school failures among Romany children which in turn is one of the main causes of Romany unemployment.)

But if these statistical judgements do have real foundations, why do we still call this phenomenon discrimination? There are two reasons: first, because we should call discrimination all the cases where an individual gets treated according to the average expected characteristics of her group (and not her own characteristics), regardless of whether the statistical judgements about her group are “true”.²⁶ Second, even if the differences attributed to these

²⁵ One extreme example of this dysfunction is that special schools – which can be considered as dead-ends of schooling careers – are filled to growing proportions by Romany children. For example, in Borsod county for the 1996/97 school year while the proportion of Romany children was around 17 percent in normal primary schools (own calculations based on Kertesi–Kézdi [1998], page 316.), then it was 90 percent in special schools (see: Loss–Páczelt–Szabó [1998]). These same proportions were 14.3 and 50.6 percent for the 1977/78 school year (Cigány tanulók [1978], pages 31. and 43.). The over-representation of Romany children in special schools grew from 3,5 times to 5,3 times in twenty years for this county.

²⁶ Even if the employer’s practice is economically rational from his own point of view. A society can make the decision – by the way of her political representatives – to make the application of group level screening *more costly* – because it judges these morally inadmissible – through legal regulation and establishing institutions that guarantee the enforcement of rights. A sufficient law to counter discrimination would deter at least a part of the employers with powerful sanctions from the application of such practices. Although the Hungarian legal system is rather far from such a situation (not the sufficient laws, but rather institutions that guarantee the enforcement of rights are lacking), we can speak of hopeful first steps – these come only from non-governmental institutions. There is a method frequently applied in other countries of pointing out hidden discrimination (the *audit studies*), which has been first adopted in 1999 – in the case of the employment of a Romany person – by a legal aid bureau, the *Nemzeti és Etnikai Kisebbségi Jogvédő Iroda* (NEKI) (see: Fehér Füzet [1998] és

groups by the statistical judgements existed in reality, we cannot be sure of their effect on the future productivity in the job. To our best knowledge – probably because of the lack of data – there has been no attempt at measuring the effect of skills not captured by school attainment on labour market performance.²⁷ It is not clear whether at very low levels of schooling are there significant productivity differentials between individuals with successful and with unsuccessful schooling careers at all. But even if there are, we must point out: *no matter how small* these differences in expected productivity would be in reality, if they serve as bases to statistical judgements operated as a group level screening device, they would have the same effect on employment differentials *as if they were very large*. For the employment decision is made in a situation of uncertainty and it is a decision with binary choice (hire/do not hire).

It is clear from the discussion above, that no matter what method we choose to measure the extent of labour market discrimination, the measured effect will be a mixture of two components: the effect of unmeasured skills plus the “true” effect of discrimination. This is the consequence of the technique used to measure discrimination. The only way we can grip the differential valuation of labour of the same quality is to try to specify – to the best of our knowledge - all the individual and contextual factors having an effect on the probability of employment and in this way build a model within which we are able to control for the heterogeneity of the quality of labour. All of the phenomena that we cannot attribute to economic mecha-

[1999]). Given that this is a new and very important method, we take the freedom to present it briefly, based on Fehér Füzet [1998], pp. 12.: “The basis of this method – which is particularly useful in exposing problems in the labour and the housing market – is that a tester, who is a member of the given minority group and another one, who belongs to the majority, but otherwise has the same relevant [*observable*] skills and characteristics, pays a visit to the accused company or individual with the same goal, questions and requests. If the experience in this situation confirms the grievance – that is, the member of the minority group does not get the same reactions as her fellow majority tester, and the details of the testing procedure also attest that we have a discriminatory case at hand –, then we start off a legal procedure, where we use the documents of the audit and the testimony of the tester as evidence. “ It is obvious that the consequences of a legal process like this are very important. On the experience of the audit studies see: Heckman–Siegelman [1992], Neumark [1996], and Goldin–Rouse [1997].

²⁷ For such measurement very detailed data are needed, for example the results of ability tests which have been conducted before entry unto the labour market and earnings data for the same persons from several years later. In other words: a longitudinal database containing very fine data is needed. To our knowledge there are only a few these in the world. One of these is the database that has been used by an excellent recent study: Neal – Johnson [1996].

nisms, in other words all of the residual effects, we consider as the consequence of discrimination (or of the non-measurable elements of skills).

**Table 10: The estimation of employment probabilities (logit)
(men aged 15-59, women aged 15-54, persons not in school)**

Independent variable	Non-Romany*			Romany**		
	Coefficient	t-value	p-value	Coefficient	t-value	p-value
Male	-0,409	-14,83	0,000	-0,635	-8,32	0,000
Years of age:						
15-19	-2,315	-40,09	0,000	-0,716	-5,24	0,000
20-24	-1,077	-22,66	0,000	-0,341	-2,98	0,003
25-29	-0,684	-14,40	0,000	-0,157	-1,35	0,177
40-54	-0,185	-4,95	0,000	-0,140	-1,34	0,181
55-59	-1,654	-23,18	0,000	-1,170	-3,71	0,000
Schooling:						
0-7 classes	-1,056	-11,98	0,000	-0,801	-8,83	0,000
Vocational school	0,894	25,00	0,000	0,548	5,21	0,000
Secondary school	0,816	24,11	0,000	0,948	3,93	0,000
College	1,606	28,55	0,000	1,103	1,73	0,084
Married	0,240	6,88	0,000	0,142	1,49	0,135
Number of children	-0,259	-15,80	0,000	-0,202	-7,37	0,000
Local unemployment rate						
10-15 %	-0,095	-3,03	0,002	-0,387	-3,64	0,000
15-20 %	-0,227	-5,99	0,000	-0,477	-4,61	0,000
20-25 %	-0,489	-9,07	0,000	-1,021	-7,16	0,000
25+ %	-0,618	-6,29	0,000	-1,299	-7,84	0,000
Constant term	0,984	18,39	0,000	0,283	1,96	0,050
Log-likelihood	-17483,9			-2265,4		
LR chi2 (15)	8060,52			528,62		
Pseudo R ²	0,1873			0,1045		
Number of cases	32235			4607		

* CSO Labour Force Survey, 1993 Autumn.

** The 1993/94 representative Roma Survey of the Institute of Sociology, HAS

The results of our attempt at measuring the effect of discrimination can be found in the equations estimating the probability of employment of *Table 10*. The equations contain the parameters of a host of individual variables (gender, age, schooling, family background: number of children and marital status) and a variable measuring the situation in the local labour market

(the unemployment rate of the labour office district). We are interested in predicting the difference in employment probability between Romany and non-Romany workers, using these independent variables. We shall state our predictions relative to our reference category, that is those unmarried men aged 30-39, with completed primary school, without children, who live in a district with low unemployment rate (under 10 percent).

We base our predictions of the employment probabilities on the following calculations. Let us denote the vector of independent variables $(1, \mathbf{x}_1, \mathbf{x}_2, x_3, \mathbf{x}_4, x_5, x_6)$ ²⁸, where the variables are in turn: constant, four schooling dummies, four unemployment dummies, gender, five age category dummies, marital status, number of children. Let us denote the vector of estimated parameters $(\hat{b}_0, \hat{\mathbf{b}}_1, \hat{\mathbf{b}}_2, \hat{b}_3, \hat{\mathbf{b}}_4, \hat{b}_5, \hat{b}_6)$. Our reference category shall be fixed at men ($\hat{b}_3 = 0$) aged 30-39 ($\hat{b}_4 = 0$), not married ($\hat{b}_5 = 0$), with no children ($\hat{b}_6 = 0$), our interest is in the predicted employment probabilities based on schooling (i) and local unemployment rate (j), given by the following equation:

$$(4) \quad \hat{p}_{klm}^{ij} = \frac{1}{1 + \exp(-(\hat{b}_0^k + \hat{b}_{1i}^l x_{1i}^l + \hat{b}_{2j}^m x_{2j}^m))} .$$

The indices k, l, m – which can take on three values: r (Romany), n (non-Romany), $.$ (missing) – shall denote whether the parameters of constant (k), schooling (l) and unemployment rate (m) variables are fixed at the values from the equation for the Romany (r) or the non-Romany (n) population or it is fixed at the reference value ($.$).

Based on the different predictions \hat{p}_{klm}^{ij} we can evaluate a number of experimental situations: we can look at the predictions of employment probabilities of Romany and non-Romany workers based on different assumptions. Prediction \hat{p}_{nmr}^{ij} gives the employment probability of a Romany ($m=r$) man aged 30-39 years, who is not married and has no children with i schooling, who lives in a district with unemployment rate j if the elements of his stock of human capital measured by schooling attainment as well as the elements not measurable were evaluated at the same level by the market as the human capital of a non-Romany male. We make this assumption operational by predicting the employment probability of Roma using the parameters of the constant term and the schooling dummies from the non-Romany equation ($k, l = n$) in formula (4) instead of using the parameters from the Romany employment equation.

²⁸ The indices of variables \mathbf{x}_1 are $i = 1, \dots, 5$ (0-7 classes, 8 classes=base category, ..., higher education), and the indices of variables \mathbf{x}_2 are $j = 1, \dots, 5$ (-10 %= base category, 10-15 %, ..., 25+ % local unemployment rate), the indices of variables \mathbf{x}_4 are $r = 1, \dots, 6$ (15-19 years, ..., 30-39 years=base category, ..., 55-59 years of age).

Table 11: The difference in predicted employment rates^a of Romany and non-Romany men of age 30-39 and the decomposition of of these differences based on alternative assumptions about the source of the employment probability differentials

The source of the employment probability differentials ^b			The overall difference in predicted employment rates (%)	The overall difference in predicted employment rates= 100%			
Constant term	Education	Local unemployment rate		1. decomposition ^c		2. decomposition ^d	
				Composition effect (%)	Parameter effect (%)	Composition effect (%)	Parameter effect (%)
1. (n, r)	(n, n)	ref.	26,3	47	53	61	39
2. (n, n)	(n, r)	ref.	12,2	100	0	85	15
3. (n, r)	(n, r)	ref.	26,9	46	54	51	49
4a. (n, n)	(n, n | e = 8 class.)	(n, r)	8,9	20	80	37	63
4b. (n, n)	(n, n | e = vocat.)	(n, r)	6,3	20	80	44	56
5a. (n, r)	(n, r | i = 8 class.)	(n, r)	25,5	7	93	13	87
5b. (n, r)	(n, r | i = vocat.)	(n, r)	27,6	5	95	14	86

^a The predictions were based on parameters in the employment probability equations ran separately for the Romany and non-Romany population (see *Table 10*). For the detailed description of the decomposition procedure, see the *Appendix*. The meaning of the (n, r); (n, n), and ref. symbols is the following: (n, r) = for calculating the non-Romany and Romany employment probabilities we used the parameters of the equation of the given population; (n, n) = we used the parameters from the non-Romany equations to predict both the Romany and the non-Romany employment probabilities; ref.= we fixed the value of the given variable at the reference level.

^b The numbers used in the lines of the table are the same as the decomposition equations in the *Appendix*.

^c The composition effect was calculated using the non-Romany parameters.

^d The composition effect was calculated using the Romany parameters.

The results of the predictions using different assumptions are summarised in *Graph 12* and *Table 11*. In *Table 11* the outcomes of five different hypothetical situations are shown. In the first three scenarios (the first three lines of *Table 11*) we fixed the unemployment rate at its lowest level and measured the Romany/non-Romany differences dependent upon (1) differences in the parameters of the constant term, (2) differences in the parameters of the schooling dummies, (3) differences in the parameters of both the constant and the schooling variables. In lines *4a-4b* we fixed the parameters of the constant term and the schooling dummies at their values from the non-Romany equation and measured the effect of unemployment rates on the across-group differences in employment probabilities. Finally in lines *5a-5b* we measured the combined effect of differences in the values of the constant term, schooling and unemployment dummies on the employment probabilities of persons with completed primary school and vocational training school.

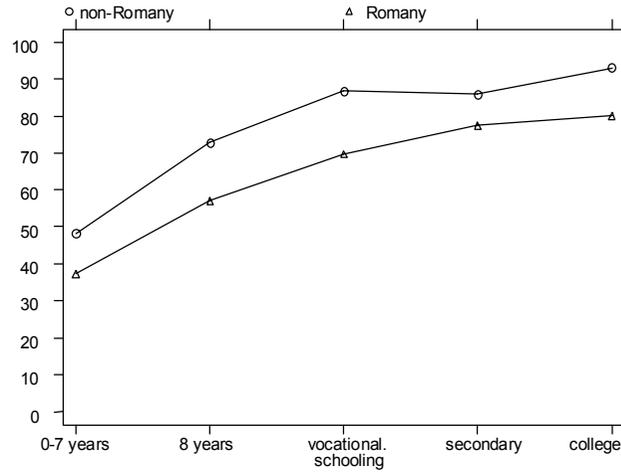
The results of our predictions are documented in graphical form in *Graph 12*. The four panels of the graph contain the predictions of lines 3; *4a*, *4b* and *5a*, *5b* of *Table 11* in turn. Panel (*a*) graphs the effects of schooling and the constant term with the local unemployment rate fixed at its lowest level (less than 10 percent). The differences – depending on the level of schooling – are of 11-17 percentage points in magnitude for the three lowest schooling categories which account for 97 percent of the working age Romany population.²⁹ As we emphasised above, this difference is the sum of two effects: the differences in human capital *within* a given schooling category and the discrimination in the labour market. We are not able to separate these two effects, but – as it is made probable by the data in *Table 9* – the effect of differences in human capital within schooling categories is not negligible.

Based on the evidence of *Table 11* – see the third line – at the aggregate level Romany men aged 30-39 (and living in regions with the lowest unemployment) have a disadvantage of 27 points in employment rates due to this component compared to non-Romany men with the same attributes. About half of this difference is the composition effect, which exists because the composition of Romany and non-Romany populations by schooling categories differs markedly (see *Table 3*), the other half of the disadvantage is due to differences in the predicted probabilities by schooling categories (this is the parameter effect).³⁰ We surely can say that *the*

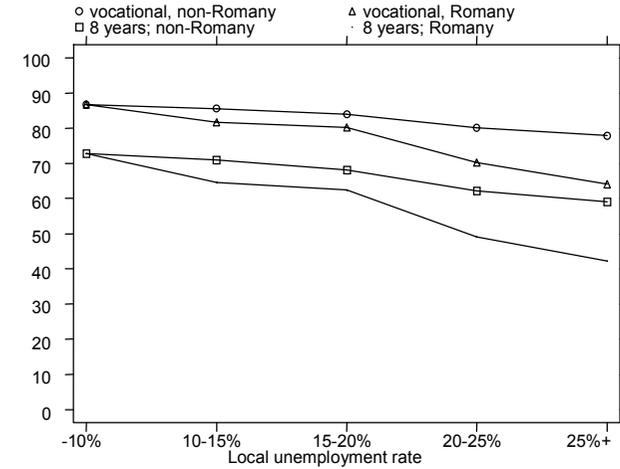
²⁹ This difference is 8 percent at the level of secondary school, and 13 at the level of higher education.

³⁰ The details of the methods of decomposition can be found in the Appendix.

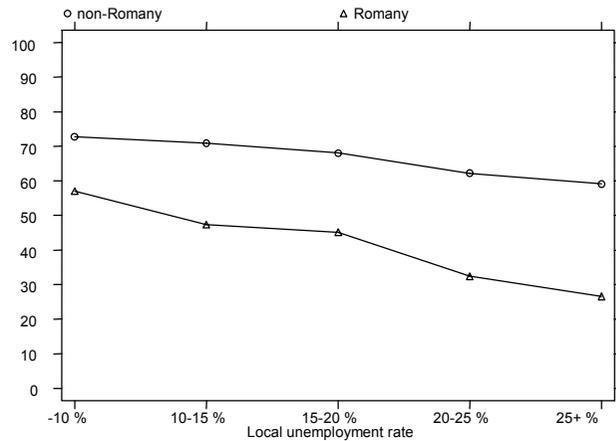
Graph 12: The predicted employment probabilities of men (based on Tables 10 and 11)



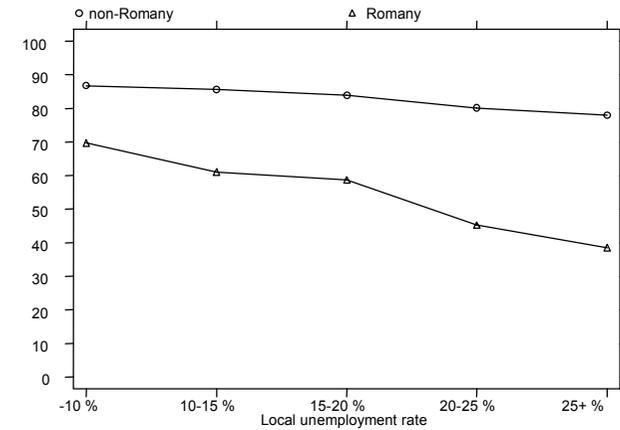
(a) the effect of the constant term and schooling (3)



(b) the effect of the local unemployment rate, with the constant term and the schooling parameters from the non-Romany equation (4ab)



(c) the effect of the local unemployment rate, the constant term and schooling parameters for persons with 8 years of education (5a)



(d) the effect of the local unemployment rate, the constant term and schooling parameters for persons with vocational education (5b)

differences in the probability of employment by schooling categories is due only to a smaller extent to discrimination and that this is - for the most part – the consequence both of low schooling and disadvantages in other, non-measurable, skills.

As for the effect of the local unemployment rate, the picture is rather different. At first look, the composition effect does not seem negligible – while almost one fourth of the Romany population lives in districts with extremely high unemployment rates (higher than 20 percent) and more than half of them live in districts with an unemployment rate higher than 15 percent, then the bulk of the non-Romany population (more than two-thirds) lives in districts with less than 15 percent unemployment³¹ – but the burden of the economic crisis would be a lot less heavy on the Romany population had its negative effect on their employment probabilities been of the same size as the effect on the employment of the non-Romany population with the same schooling.

The reference group, as before, is composed of males aged 30-39 who are unmarried and have no children. In districts with low unemployment the disadvantage in employment probability of both Romany workers with completed primary school and with vocational training school is not too large (of 16-17 percentage points).³² If we supposed – *following just one line of thought* – that *all* of this disadvantage of 16-17 percentage points is due to *differences in quality* – that is, to unobservable skills – still it is hard to explain *why this gap is growing with the worsening of local unemployment*. The fact that in districts with higher unemployment rates the relative employment probability of Romany workers is declining – see panels (b)-(c)-(d) of *Graph 12* – is a sign that the crisis of the local economy hit the employment of the Romany population much harder than the employment of non-Romany people with the same gender, age, schooling, and family background. This difference is substantial: in the case of workers with completed primary school the gap grows from a base of 16 percentage points to 32 percentage points in the districts with the highest unemployment (see panel (c)) while in the case of workers with vocational training school the difference grows from 17 to 40 percentage points (see panel (d)). *It is hard to interpret this phenomenon as a sign of anything other than discrimination in the labour market*. Our data bear witness to stronger discrimination in those parts of the country, where the competition for jobs needing only low qualifications is strong and the employment problems of

³¹ See Table 6.

³² See Table 12. Panel (a).

majority workers with low schooling can be relieved at the expense of Romany workers searching for a job.³³

5. CONCLUSION

Based on individual employment histories, we tried to document the crowding out of Romany workers from employment in the ten years between 1984 and 1994. With the use of a quasi cross-sectional macro model, we demonstrated that the employment of working age Roma fell from 75 percent to 30 percent in ten years. We put forward the hypothesis that the employment of Romany workers at the middle of the nineties was not only at a very low level, but was characterised by high in- and outflow rates and an employment pattern – known from the Third World – with unstable employment and short employment spells was emerging. Not only did most of the Romany population lose their jobs to a much larger extent than the average of the Hungarian population, but those Romany persons who held on had to give up the hopes of a *long-term* employment relationship. The spread of unstable employment has caused social disintegration of those with a job: the lack of steady employment also means the lack of a stable lifestyle, the continued presence of bread-and-butter worries, as well as a lower level of social transfers from the state and the employers – or even the loss of entitlements.

We also traced the crowding out of Romany workers from the market along the individual employment histories, comparing this development to the situation of the non-Romany workers. We observed a growing gap between the employment possibilities of the two populations (to the disadvantage of the Roma), that cannot be fully attributed to the differences in the composition of the two populations. The Roma have lost their jobs to a far greater extent not only because they have much less schooling, but we suspect that along with their disadvantageous regional dispersion, discrimination in the market place against them also plays an important part. We pointed to a few regularities in the employment of new labour market entrants and early retirees suggesting the presence of discrimination. We also presented evidence that the job loss of Romany workers through early retirement had already started in the second half of the eighties, at the time of so called full

³³ In these districts the proportion of the Romany population is higher than the average proportion for the whole country: see the maps in the Appendix of Ábrahám-Kertesi [1996]!

employment. The labour market consequences of the economic crisis hit the Roma first, yet none of the companies or industries first swept out by the crisis had a particularly high proportion of Romany workers.

Finally, based on individual cross-sectional data, we tried to compare the relative weights of the different causes of low employment: low schooling, regional disadvantages and discrimination. With equations predicting the probability of being employed, we demonstrated that about half of the differences in employment probabilities depending on the type of schooling were caused by the effect of differences in the composition of the Romany and non-Romany populations by schooling. Our analysis of regional disadvantages pointed out that although the effect of differences in composition is sizeable, these disadvantages have a much more depressing effect on the employment of the Roma than on the employment of non-Romany workers with the same attributes. It would be hard not to interpret this phenomenon as a sign of discrimination. Based on our research we can say that the employment prospects – and from another viewpoint: life chances – of the Romany population are rendered feeble by basically three factors: low schooling, regional disadvantages and discrimination. All therapy should work to mitigate these forces.³⁴

³⁴ See Kertesi [1995] and Kertesi-Kézdi [1996] for details of some earlier proposed policy reforms.

**APPENDIX: THE OAXACA-BLINDER DECOMPOSITION
OF EMPLOYMENT PROBABILITIES**

Let us denote the distribution of the Romany (r), and the non-Romany (n) population by schooling (i) and local unemployment rate (j) f_r^{ij} , and f_n^{ij} . Naturally:

$$\sum_i f_r^{ij} = \sum_i f_n^{ij} = \sum_j f_r^{ij} = \sum_j f_n^{ij} = 1.$$

We denote the predicted employment probabilities by \hat{p}_{klm}^{ij} , where i ($i = 1, \dots, 5$) represents the given schooling dummy, and j ($j = 1, \dots, 5$) the given dummy for the local unemployment rate; whereas k , l and m – which can only take two different values: $r = \text{Romany}$, $n = \text{non-Romany}$ – tell us whether we fixed the parameters of the constant term (k), the schooling (l), and the unemployment rate (m) variables at the value taken from the equation for the Romany (r) or the non-Romany equation (n), or at value for the reference group (\cdot) when making the employment probability predictions. The exact expression for the predicted probabilities is the following:

$$\hat{p}_{klm}^{ij} = \frac{1}{1 + \exp(-(\hat{b}_0^k + \hat{b}_{1i}^l x_{1i}^l + \hat{b}_{2j}^m x_{2j}^m))} \quad (\text{where: } i, j = 1, \dots, 5 \text{ and } k, l, m = r, n, \cdot)$$

For example, the prediction \hat{p}_{nmr}^{ij} makes it possible to quantify what employment probability – depending on the local unemployment rate – a Romany man with i schooling, aged 30-39, not married and having no children if we used the constant term and the parameters for the schooling dummies taken from the non-Romany equation for making the prediction. (This means that we assume that the schooling and unmeasured skills of Romany men were valued at the same level on the market as the characteristics of non-Romany men.)

Now, using the above predicted employment probabilities, and the data on the distribution of the Romany and non-Romany populations by schooling and local unemployment rate, we are able to decompose the aggregate differences in employment probabilities depending upon schooling by the use of equations (1), (2) and (3), while the differences depending upon the local unemployment rate can be decomposed according to equations (4a) and (4b), or (5a) and (5b). In every case, the first component reflects the composition effect, while the second the parameter effect. We used two kinds of decompositions for every question: in the case of the first decomposition we used the non-Romany parameters for calculating the composition effect, while in the second we used the Romany parameters in the calculation.

$$\begin{aligned}
1. \quad & \sum_i f_n^{i1} \hat{p}_{nn}^{i1} - \sum_i f_r^{i1} \hat{p}_{rn}^{i1} = \sum_i (f_n^{i1} - f_r^{i1}) \hat{p}_{nn}^{i1} + \sum_i (\hat{p}_{nn}^{i1} - \hat{p}_{rn}^{i1}) f_r^{i1} \\
& = \sum_i (f_n^{i1} - f_r^{i1}) \hat{p}_{rn}^{i1} + \sum_i (\hat{p}_{nn}^{i1} - \hat{p}_{rn}^{i1}) f_n^{i1} . \\
2. \quad & \sum_i f_n^{i1} \hat{p}_{nn}^{i1} - \sum_i f_r^{i1} \hat{p}_{nr}^{i1} = \sum_i (f_n^{i1} - f_r^{i1}) \hat{p}_{nn}^{i1} + \sum_i (\hat{p}_{nn}^{i1} - \hat{p}_{nr}^{i1}) f_r^{i1} \\
& = \sum_i (f_n^{i1} - f_r^{i1}) \hat{p}_{nr}^{i1} + \sum_i (\hat{p}_{nn}^{i1} - \hat{p}_{nr}^{i1}) f_n^{i1} . \\
3 \quad & \sum_i f_n^{i1} \hat{p}_{nn}^{i1} - \sum_i f_r^{i1} \hat{p}_{rr}^{i1} = \sum_i (f_n^{i1} - f_r^{i1}) \hat{p}_{nn}^{i1} + \sum_i (\hat{p}_{nn}^{i1} - \hat{p}_{rr}^{i1}) f_r^{i1} \\
& = \sum_i (f_n^{i1} - f_r^{i1}) \hat{p}_{rr}^{i1} + \sum_i (\hat{p}_{nn}^{i1} - \hat{p}_{rr}^{i1}) f_n^{i1} . \\
4 \text{ ab} \quad & \sum_j f_n^{ij} \hat{p}_{nnn}^{ij} - \sum_j f_r^{ij} \hat{p}_{nrr}^{ij} = \sum_j (f_n^{ij} - f_r^{ij}) \hat{p}_{nnn}^{ij} + \sum_j (\hat{p}_{nnn}^{ij} - \hat{p}_{nrr}^{ij}) f_r^{ij} \\
& = \sum_j (f_n^{ij} - f_r^{ij}) \hat{p}_{nrr}^{ij} + \sum_j (\hat{p}_{nnn}^{ij} - \hat{p}_{nrr}^{ij}) f_n^{ij} . \\
5 \text{ ab} \quad & \sum_j f_n^{ij} \hat{p}_{nnn}^{ij} - \sum_j f_c^{ij} \hat{p}_{rrr}^{ij} = \sum_j (f_n^{ij} - f_r^{ij}) \hat{p}_{nnn}^{ij} + \sum_j (\hat{p}_{nnn}^{ij} - \hat{p}_{rrr}^{ij}) f_r^{ij} \\
& = \sum_j (f_n^{ij} - f_r^{ij}) \hat{p}_{rrr}^{ij} + \sum_j (\hat{p}_{nnn}^{ij} - \hat{p}_{rrr}^{ij}) f_n^{ij} .
\end{aligned}$$

In the case of decompositions 4a and 5a we calculate the distributions and the predicted probabilities for the group of persons with 8 years of schooling ($i = 2$), while in decompositions 4b and 5b the same is done for the group with completed vocational training school ($i = 3$).

We predicted the employment probabilities with the parameters taken from the logit equations in *Table 10*; the distributions were taken from the same data. When calculating the distributions we had to make the following simplifications to get around problems stemming from small cell size: in equations (1), (2) and (3) we calculated the schooling distributions for men aged 30-39 living in districts with an unemployment rate of less than 10 percent (which means that we did not disaggregate by marital status and number of children); while in equations (4a) and (5a) we calculated the distribution of men aged 30-39 with 8 years of schooling by local unemployment rate categories (once again we did not disaggregate by marital status and number of children); finally for equations (4b) and (5b) we calculated the same distribution for men with completed vocational training school (in this case, we were not able to disaggregate the sample either by age, or by marital status and number of children). These simplifications might bias our results somewhat – especially for equations (1), (2), (3), (4a) and (5a) – but we are convinced that the magnitude of these biases is ignorable.

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