INFOCUS

EDUCATION AND THE LABOUR MARKET

Edited by

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INTRODUCTION

Following the beginning of transition one of the key determinants of labour market changes has been the revaluation of education and experience. The upward shift in demand for educated labour has not only resulted in the rapid increase of the returns to education but it may explain – at least in part – the persistent low level of employment also. The increase in the returns to education has resulted in the demand for education showing considerable growth. There was an expansion in education and the number and share of students following their studies at the upper secondary and higher level of education has increased substantially. Recently anxiety concerning over-education has arisen with some arguing that the composition of graduates by level and field specialisation does not meet market demand.

The aim of the present set of studies was to collect the results of empirical research analysing the link between education and the labour market from different aspects. The collection allows us to adopt a position on different questions. Is the Hungarian labour force well educated by international comparison or not? What were the reasons for educational expansion? What are the labour market effects of the increase in educational participation? What kind of changes could be observed in the transition from to school to work? During recent years important achievements have been attained in analysing these questions, but this collection also reveals the questions about which we have insufficient knowledge. Analysing some important problems – first of all the effects of the transformation of the vocational training system – is affected by not only the lack of empirical research but also the lack of adequate data collection. Some sections of this chapter call attention to these problems.

The collection consists of five sections. Section 1 investigates the connection between educational attainment and labour market success in terms of earnings and employment. One of the most important developments of the last decade was the huge increase in participation in upper secondary and higher education and this is why three sections focus on the expansion of education and its consequences. Section 2 presents the magnitude of educational expansion and the results of research investigating if there is any observable evidence on over-education today in Hungary and if educa-

tional expansion has resulted in the distortion of quality. Section 3 presents findings on the role of labour market information and expectations on educational decisions. Section 4 focuses on different aspects of school to work transition and labour market success of graduates. Finally, Section 5 discusses connections between educational attainment and migration.

1. EDUCATION AND LABOUR MARKET SUCCESS

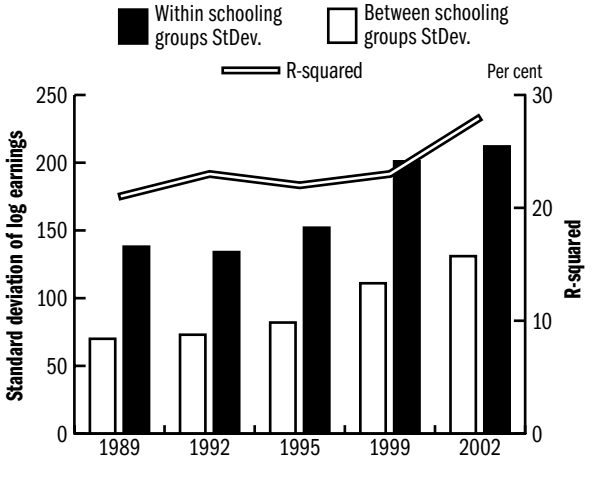
1.1 Education and Earnings

GÁBOR KÉZDI

This short study looks at the returns to education in terms of earnings in Hungary, between 1989 and 2002.[1] Since 1989, Hungary experienced not only a transition to a market economy but also an expansion in secondary and college education. Therefore, a particularly interesting question is how returns to education changed during this period.

Our measure of earnings refers to main job total yearly earnings including overtime and bonus payments. Education is measured in four categories: completed lower secondary school (*általános iskola*, 8 grades in Hungary) or lower; completed vocational training school without a baccalaureate exam (*szakmunkásképző*); completed upper secondary school with a successful baccalaureate exam (*középiskola*); and completed college or graduate school. Returns will also be estimated for education in years.

Figure 1.1: Schooling and standard deviation of log earnings



Earnings inequality has risen considerably since the fall of the communist system. Measured by the standard deviation of log earnings, inequality rose by more than 60 per cent between 1989 and 2002. Much of the increase

1 Source of the data is the Wage Surveys of the National Labor Center (NLC). NLC Wage Surveys ask detailed earnings questions of a sample of employees from firms and other establishments employing at least 5. Samples are large and the data contain basic demographics and can be matched with firm characteristics. See *Kertesi and Köllő* (1997) for details.

took place between 1995 and 1999. *Figure 1.1* documents the trends in the standard deviation of between-schooling level and within-schooling level log earnings. Both components increased for most of the period, but the former grew faster. As a result, the share of total variance explained by education (the R^2 of a simple variance analysis) increased from 21 per cent in 1989 to 28 per cent in 2002.

Conceptual problems

Returns to education will be measured by standard OLS Mincer-type earnings regressions run on cross-sections of employees (see, for example *Willis* 1986). Before turning to the estimates, however, we need to clarify some conceptual problems so that we can interpret the regression results and their year-to-year changes. The question of this section is whether our estimates are biased, and if yes, in what direction. Even more important is whether changes in the estimated returns are biased, and if yes, in what direction.

The first issue is the general identification problem of cross-sectional regressions. Ideally, one would like to measure returns to education in the following thought experiment. First, assign a certain level of education to an individual and measure her complete life-time earnings. Then, start the whole thing over, and assign a different level of education to the same individual and measure her lifetime earnings. The difference between the two earnings will then identify the causal effect of changing education level from the first to the second, the effect we conveniently call the returns to education. In this thought experiment we can make sure the difference between the two earnings levels are due to differences in education only. The thought experiment is, of course, impossible to carry out. The only way to identify returns to education is by comparing the earnings and education levels of different individuals. In such cases we would like to control for all other factors that affect earnings (but are not caused by education). It is, again, impossible to measure all such factors. Interpersonal comparisons can therefore identify the true effect of education on earnings only if those unmeasured characteristics are uncorrelated with education, i.e. if education is exogenous in the earnings equation. Without a controlled experiment (in which assignment of education would be properly randomized) we can never be sure of that.

In standard Mincer-type regressions estimated by OLS, one controls for all measured characteristics that could be correlated with earnings. Typically, 30 to 50 per cent of total (log) earnings variance can be explained by such regressions. The rest is due to unmeasured characteristics, luck, or measurement error in earnings. While the last two probably play an important role when we look at yearly earnings as opposed to complete lifetime earnings, unmeasured characteristics surely play a role. Unmeasured

factors that increase earnings (such as "ability" or "motivation") tend to increase education as well. This distortion is labeled as "ability bias" in the literature (*Willis* 1986; *Card* 1998). In plain words, it says that more educated people may earn more than others in part because they have unmeasured qualities that would make them earn more even if they had the same level of education. But since those unmeasured characteristics tend to help them attain higher education levels, it seems as though earnings differences were caused by to education. As *Card* (1998) showed, a reverse bias may also arise, especially if education is measured with some error. He reviews evidence showing that OLS estimates may actually be right on target or actually biased downwards. The direction of the bias is still in general an open question.

Our estimates are based on establishment-level data; therefore measurement error may be of a smaller importance. As a result, we can expect standard ability bias to dominate our OLS estimates, resulting in an upward bias in the estimated level of returns to education. On the other hand, the expansion of secondary, and especially, tertiary education led to a change in the ability distribution of more educated people, and this should have decreased the role of ability bias. When we look at changes in returns to education, therefore, our estimates probably underestimate the true increase. This is, at least, what we can expect from ability bias. But there are other measurement problems that may affect our estimates

The second important issue is selection into employment. Our estimates refer to the earnings of employed people. Communist countries tried to make sure all people were employed, but even they could not arrive at literally full employment. When profit motives and market forces took over however, many formerly employed people proved to be unemployable. The least educated saw their employment prospects deteriorate enormously, while the most educated, especially the most educated men, stayed at nearly full employment. If our goal is to estimate expected returns to education for all people, keeping all other things constant, we should take into account the effect of education on the probability of employment, again, keeping other things constant. OLS estimates of expected returns to education are biased if selection on unobservables is important ("selection bias"). If among the less educated people, only the more able are employed, whilst all of the better educated people are employed, earnings differences between the two groups underestimate the expected returns to education.[2]

Employment fell sharply in the early years of transition. As a result, selection bias is most important when we compare estimated returns for those years. Measured changes of the returns between 1989 and 1995 therefore most probably underestimate the true increase in expected returns to education in Hungary.

2 Section 1.2 addresses the effect of education on employment probabilities.

The third issue arises because we can measure total monetary earnings from the main job only. The data at hand does not allow the measuring of fringe benefits or earnings from secondary jobs. Using household survey data on more detailed labor income, *Horváth et al* (2004) reinforce what is both theoretically plausible and supported by anecdotal evidence. They show that in 2003, the better educated received a larger part of their labor income in non-monetary fringe benefits and they were also more likely to have a second job or additional sources of earnings.[3] As a result, this study most probably underestimates the effect of education on total labor income in post-communist Hungary. Unfortunately, we do not have comparable results for earlier years. Therefore, we cannot assess the resulting bias on changes in the estimated returns.

Taking the above three considerations together, we cannot tell for sure whether returns to education estimated in this study are biased upwards or downwards. But selection bias and the ignoring of important parts of total labor income probably balance ability bias, and therefore our results are more likely to underestimate the true effects. As for changes in returns to education, the picture is more complex. Expected returns to education most probably rose more from 1989 to 1995 than our estimates show. Changes after 1995 are probably a lot less biased.

Specification issues

The regressions are estimated by OLS, allowing for arbitrary form of heteroskedasticity and within-firm clustering. Dependent variable is log yearly earnings, which allows us to compare slope coefficients without having to worry about wage inflation. The NLC Wage Survey allows for controlling for a limited set of covariates. Besides education, the right-hand side variables include a gender dummy, industry, region, and settlement type dummies (of the firms), and estimated labor market experience and its square.[4] Regression estimates use the weights calculated by *Kertesi and Köllő* (1997). Un-weighted estimates are very similar.

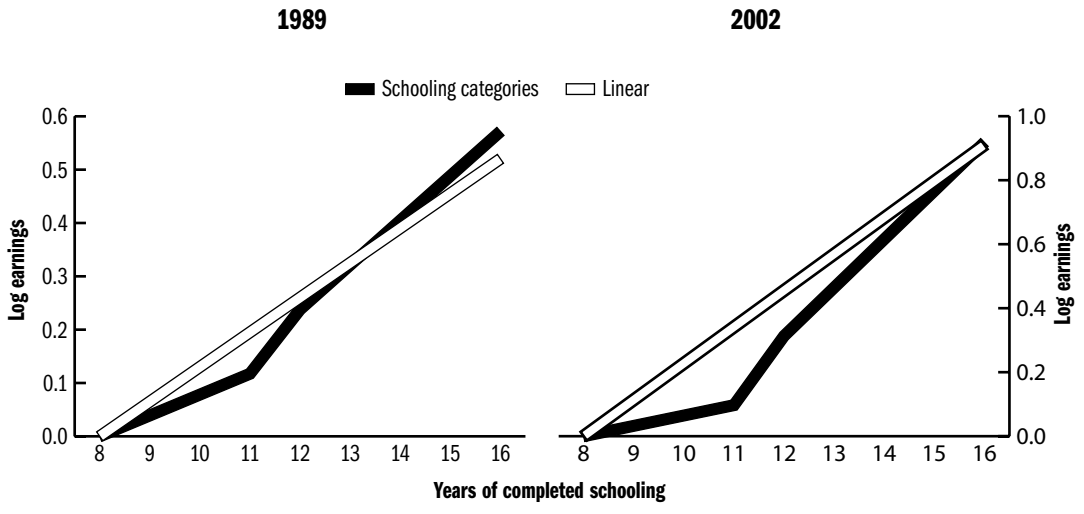
Based on human capital theory, standard earnings functions relate years spent in school to earnings, in a linear fashion. *Card* (1998) shows that in the U.S., the linear functional form is a good approximation of a non-parametric returns function. *Figure 1.2* shows that this is a bit less true for Hungary. The linear approximation was a bit off in 1989, and it became worse by 2002. It is the 11-year vocational degree that has been the important outlier. Already at the end of the communist system, but even more so by 2002, vocational training provided substantially smaller returns than what the 11 years completed would predict. We shall report results from both the linear and the 4 education category specification. The lat-

3 *Horváth* et al (2004) use a special labor incomes module from the 2003 TÁRKI Monitor Survey, a relatively small but very detailed household-level dataset. Their estimates are not directly comparable to the ones presented in this study, both because of different specifications, and more importantly, because the TÁRKI survey contains self-reported labor income measures.

4 Labour market experience is estimated by age minus modal age at highest completed education level. This overestimates actual labour market experience for those that had discontinued their employment career. Women and the least educated are considerably more likely to had done so. Therefore, returns to experience are estimated with a sizable bias for them.

ter is more correct a specification, while the former is useful for international comparisons.

Figure 1.2: Returns to schooling, different functional forms. 1989, 2002



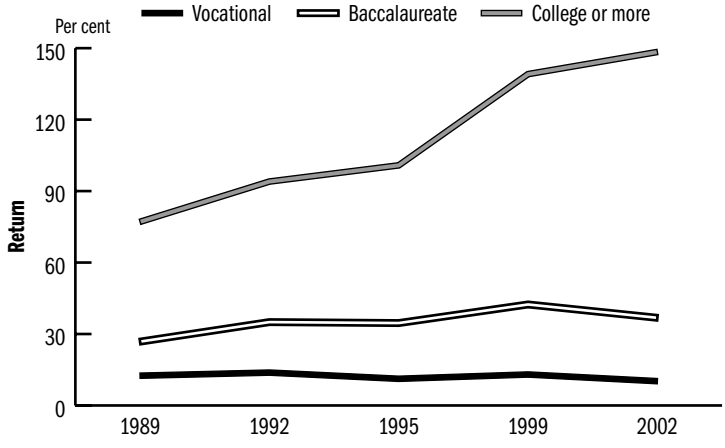
Dependent variable of Mincer-type regressions is log of earnings.[5] Coefficients from such regressions are easy to interpret if they are close to 0: and estimated 0.01 slope coefficient means a 1 per cent increase in earnings if the right-hand side variable in question increases by one unit. Larger estimates are more difficult to interpret. Let β denote the slope coefficient in which we are interested. The percentage effect then is $(e^{\beta} - 1) \times 100$ %, which is approximately 65 per cent if $\beta = 0.5$, and more than 170 per cent if $\beta = 1.0$. When interpreting the results, we shall convert all slope estimates to percentage returns based on the above formula.

Estimated returns to education in Hungary, 1989 to 2002

Figure 1.3 shows estimated returns to earnings of three education levels, relative to completed lower secondary (8 grades) or less, between 1989 and 2002. Detailed estimates are in *Annex A.1.* Percentage returns are estimated from dummy parameters on log earnings transformed the above mentioned way. Returns to completed vocational training has been 10 to 14 per cent, without a clear trend. Completed upper secondary school without further education increased from 30 per cent to 40 per cent. Returns to college or higher education increased dramatically: from 80 per cent in 1989, it initially increased to 100 per cent by 1995, and reached almost 150 per cent by 2002. Most of the increase concentrated on the late 1990's; the growth rate slowed down after 1999 but stayed significant.

5 There are at least two reasons for having a logarithmic left-hand side variable in earnings regressions. First, human capital theory interprets education as an investment. It relates opportunity cost of one more year in school to alternative investments. It is therefore the expected relative increase in future earnings that should be weighed against the returns to other investments, proxied by the interest rate. Relative returns are approximated in a logarithmic form in continuous-time decision morels. The other rationale for log earnings is a statistical one: earnings are close to lognormal, and therefore a regression on a logarithmic dependent variable is expected to produce more efficient estimates.

Figure 1.3: Returns to schooling levels, relative to 8 grades



Linear specification in years of schooling shows an increase from 7 per cent in 1989 to 12 per cent by 2002, an outstanding rate by international standards. The literature surveyed by *Card* (1998) estimates 6 to 8 percent returns. *Figure 1.4* shows the estimates based on the linear specification for the total population and also the youngest cohorts. Returns to education of the 30 to 34 year old group rose in accord with the overall increase. The 25 to 29 year-old group experienced an even more substantial increase, from 4 to 11 per cent.

Figure 1.4: Returns to completed years of schooling

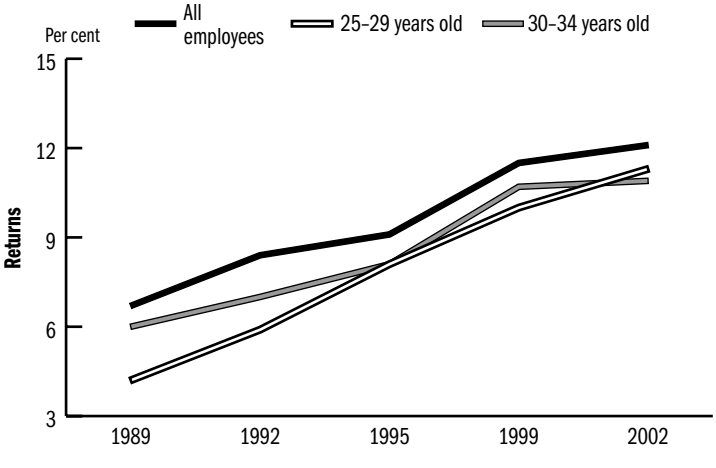
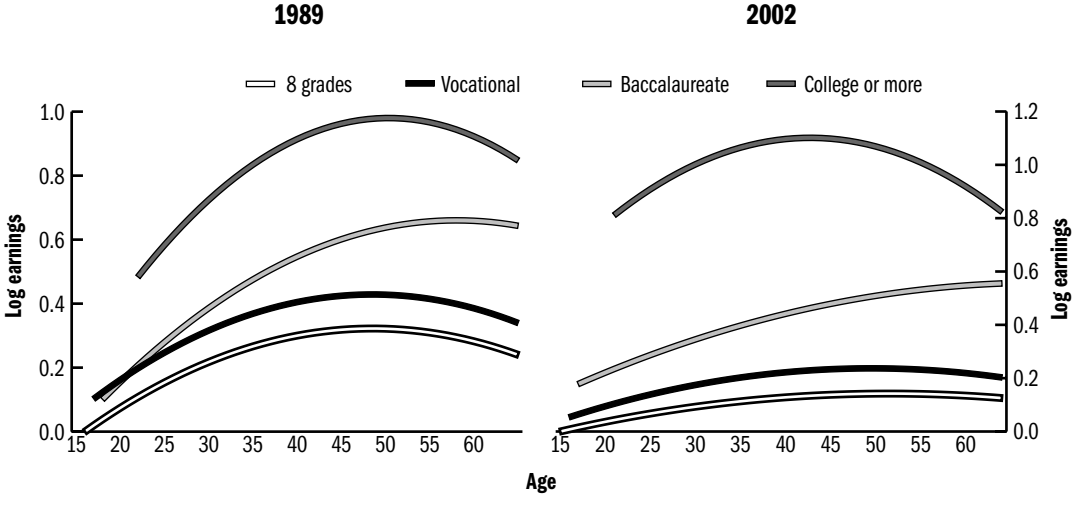


Figure 1.5 shows cross-sectional age-earnings profiles for 1989 and 2002. The figures are based on a quadratic specification, and they show earnings relative to the 16 year-old least educated employees. The figures highlight two striking phenomena. First, profiles of the different education levels

moved further away, in accord with the significant increase of the average returns to education. Secondly, the cross-sectional profiles have flattened considerably. The latter suggests another important consequence of transition: the dramatic improvement of the relative position of the youngest cohorts, especially among the most educated. This phenomenon is a common characteristic of most transition economies, as documented by *Kézdi and Köllő* (2000). It most probably reflects downgrading of experience accumulated in the communist economy.

Figure 1.5: Age-earnings profile by educational attainment, 1989, 2002



Summarizing the results returns to education increased substantially in Hungary between 1989 and 2002. Young cohorts experienced an even steeper increase, and intergenerational differences decreased substantially, especially among the most educated. Taking all shortcomings of the data and estimation method into account, the results most probably underestimate the true increase.

1.2 Employment and Educational Attainment in Hungary

GÁBOR KERTESI – JÚLIA VARGA

Although Hungary has successfully passed through the first period of transition and the economy has started to grow the employment level is still low and the rate of non-working (unemployed and inactive population) is extremely high by international comparison. There is a more than 10 percentage points lag behind the EU average in the employment rate. In this chapter based on the data of the 2001 census we will show that the main reason for the low level of employment in Hungary is that the low educated

have a larger share in the population than in the EU (15) average and that their employment probabilities are worse than in the EU.

It is very important both for employment and for education policy to determine the impact of the two components (the effect of the difference in the educational attainment of the population and the effect of the difference in employment probabilities for workers with the same educational attainment) on the overall lag in employment level. International comparison of the educational attainment of the population is hindered by the difficulties related to the classification of educational programmes. Classification can be made using different criteria.[6] As we want to analyse the connection between educational attainment and employment we have to classify educational programmes in such a way that within a group the accumulated human capital of individuals are comparable and so they are similarly employable as they acquire similar skills and competences. In the following we will distinguish three groups: (1) those whose educational attainment is less than upper secondary school; (2) those whose highest educational level is upper secondary school; (3) those who have at least college education.

There are differences in the educational systems of different countries at all educational levels, but the main differences can be observed at upper secondary level regarding the duration and content of studies. In Hungary – similarly to most of the post-socialist countries – a large part of secondary school graduates, graduates from vocational training schools (*szakmunkásképző*) and vocational schools (*szakiskola*) has studied for less years[7] and the content of their studies also differed from that of graduates from the other types of Hungarian secondary schools – gymnasiums (*gimnázium*) and vocational secondary schools (*szakközépiskola*). When we are forming internationally comparable groups by educational attainment the most important question is whether vocational training schools correspond to upper secondary level or not.[8]

Depending on the allocation of vocational training schools to upper secondary level or to less than upper secondary level educational attainment of the Hungarian population is very good in international comparison or on the contrary educational attainment falls behind the EU average (*Figure 1.6*). If we classify vocational training schools as upper secondary education, then the educational attainment of the 25–64 years old population is near to that of the most developed countries in the EU. Then the share of those who have attained at least upper secondary level is above the EU (15) average by 6 percentage points and only Germany, Norway, Denmark, Sweden and Finland have better results. If we use the opposite classification (that is we classify vocational training schools to less than upper secondary level) then Hungary is near to Italy concerning the share of popu-

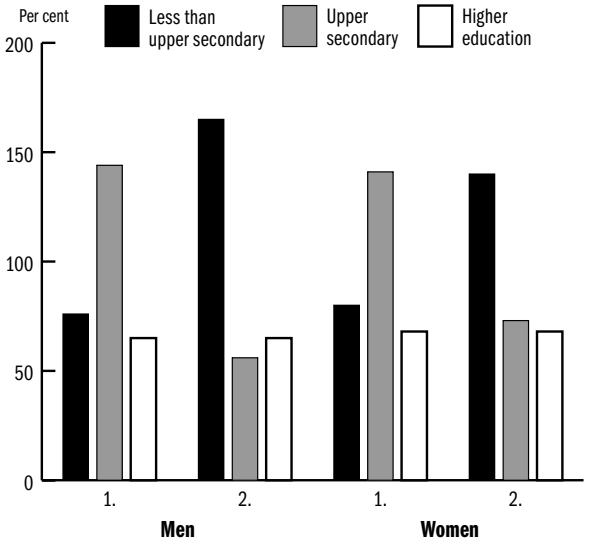
6 In the ISCED classification the level of an educational programme should be determined by its educational content. As it's very difficult to directly assess and compare the content of different educational programmes in an international comparative way ISCED–97 defines various criteria that should be used as proxies for the content of the programme. These include the duration of the programme, typical entrance qualification, type of subsequent education or destination, and programme orientation.

7 According to the data of the 2001 Census 6 per cent of those aged 25–64, who have vocational training school (szakmunkásképző) as their highest educational qualification have 10 years of schooling and 94 per cent have 11 years of schooling. In the same age group those whose highest educational qualification is (former type) vocational school (szakiskola) 12 per cent have 9 years of education, 32 per cent 10 years of education and the remaining part 11 years of education.

8 In the ISCED classification Hungarian vocational training schools are classified as ICED3C type of education, that is they are classified as upper secondary education. There is a wide variability in the duration and the level of content of ISCED 3C programmes and this leads to many problems in the international comparability on the educational attainment of the population. (See for example: *OECD* 1999:40–46.) In the following we argue that the classification of 3 years vocational training schools to upper secondary level distorts international comparability of educational attainment of the population and the investigation of the employment rate by educational attainment.

lation with at least upper secondary level and there are only two countries which have worse results: Spain and Portugal.

Figure 1.6: The proportion of those who have atteined different educational levels as a percentage of the EU average by both classifications by gender, aged 25–64, 2001



Source: EU-OECD Education at a Glance 2003; Hungary, Census, 2001.

The choice between the two classification possibilities shouldn't be arbitrary. One point of reference might be the comparison of completed years of education. Completed years of education is one of the measures of human capital.[9] If we compare cumulative years of schooling it turns out that for those who have finished Hungarian vocational training schools the cumulative years of schooling is below the average of upper secondary graduates in the EU (15) countries. For all EU countries the cumulative years of schooling for upper secondary education is at least 12 years[10] while for Hungarian vocational training schools graduates it's not more than 11 years (for the older age-cohorts only 10 years).

Figure 1.7 shows the average completed years of schooling and the share of those who have attained at least upper secondary education and the predicted years of schooling[11] in EU countries and in Hungary according to both classifications. It can be observed that using classification 1, that is if we classify vocational training schools as upper secondary education, then in Hungary the average actual completed years of schooling of the population are smaller by nearly one year than the predicted years of schooling. In contrast if we use classification 2, that is we classify vocational training schools as less than upper secondary education, then average completed

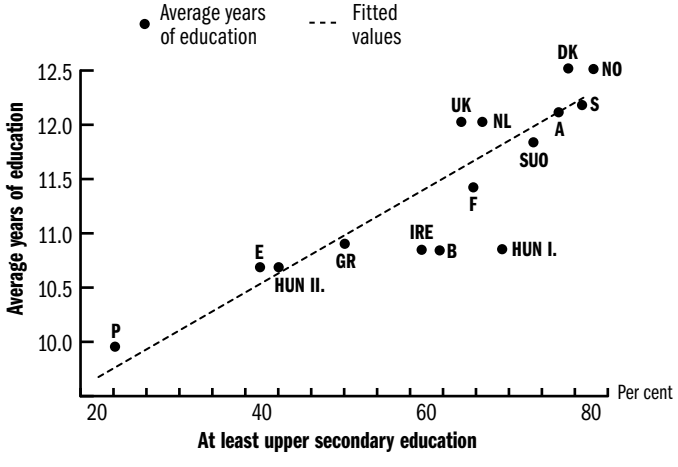
9 Assuming that human capital accumulation is linear and each additional year of education increases human capital by the same value. It is obviously a very restrictive assumption as school years at different levels and types of education might raise an individual's human capital differently, and might result in different returns. One solution for handling this problem is that the average level of human capital is related to the sum of years of schooling at different levels weighted by the return to that level of education. (See for example *Wossman* 2001.)

10 In Austria, Denmark Germany and Italy it's 13 years.

11 Predicted years of schooling are based on the ratio of the population who has attained at least upper secondary education.

years of education is near to the predicted years of education. In the case of the use of classification 1 the difference between actual and predicted years of schooling is about one, that is the difference corresponds to the difference in years of schooling between vocational training schools and other types of upper secondary education. In the average EU country human capital of individuals whose educational attainment is upper secondary school is greater at least by one year than that of individuals who have finished Hungarian vocational training schools. The comparison of the years of schooling attained and the share in the population who have attained upper secondary education seems to be an argument for classification 2 being better for international comparison.[12]

Figure 1.7: Average and predicted years of education and the proportion of the population aged 25–64 who have at least upper secondary education (per cent)



Source: EU-OECD Education at a Glance 2003; Hungary, Census, 2001.

For the decision between the two alternative classifications it's worth examining the judgement of the market, that is what is an upper secondary education worth in employment probability by international comparison. *Figure 1.8* displays the relative employment rate[13] of those who have less than upper secondary education, the share in the population of those who have attained at least upper secondary education and the predicted relative employment rate of the undereducated by gender.[14] The figure shows that where the better educated is the typical individual of a country (the higher the share of those who have at least upper secondary education) the worse is the employment probability of the undereducated. For example in Portugal, where the share of those who have attained at least upper secondary level is the lowest, the employment level of the undereducated is near to the average employment level, while in Germany where the share

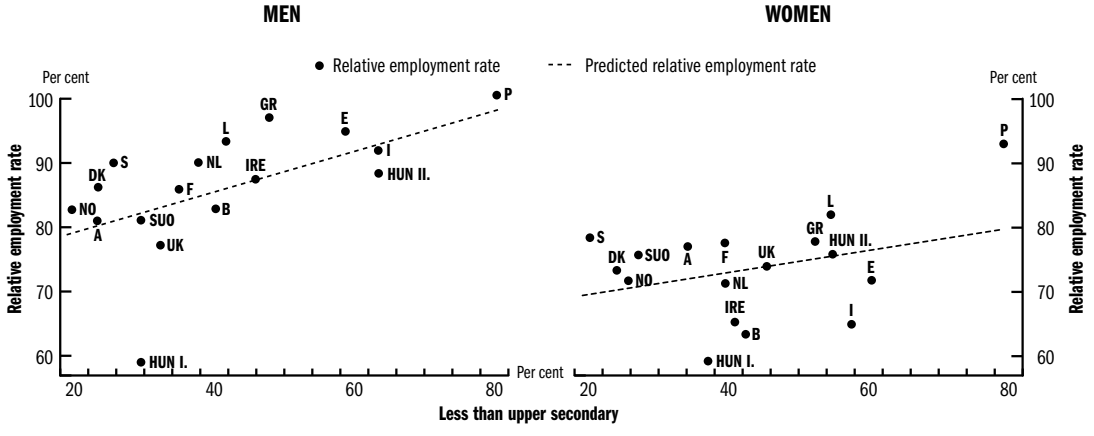
12 Difference in years of schooling seems to underestimate the difference in accumulated human capital between those whose highest educational attainment is upper secondary school or vocational training school as wage returns to upper secondary education are 40 per cent while for vocational training school it is 10 per cent. See *Kézdi, Section 1.1.*

13 Relative employment rate: employment rate of those who have less than upper secondary education (the under-educated) as a proportion of the average employment rate.

14 Employment rate of women differs substantially from that of men in several countries (excepting the highly educated) because of cultural reasons and because of differences in taking the responsibility for child care.

of those who have attained at least upper secondary education the employment probability of the undereducated is much worse than the average employment probability. (The connection between the relative employment level of the undereducated and the share of those who have at least upper secondary education is more pronounced for men but it can be observed for women as well.)

Figure 1.8: Relative employment rate of those who have less than upper secondary education (aged 25–64) and their share in the population by gender



Source:OECD Employment Outlook; OECD Education at a Glance; Hungary, Census, 2001.

In Hungary the relative employment level of the undereducated is lower than the predicted level of their employment, but in the case of using classification 1 the difference between the actual and predicted level of employment of undereducated is very large, while if using classification 2 the actual level of employment of the under-educated is much closer to the predicted level.

Both the average completed years of education and the relative employment level of the undereducated confirms that the allocation of Hungarian vocational training schools to upper secondary level causes a large distortion in international comparison.

Changes in the supply side of the differently educated labour are further points in favour of classification 2. These changes can be observed as changes in demand for the different educational programmes at secondary level. If there are no administrative restrictions in students' choices then students' will choose the secondary educational programme, which provides the highest private return for them (earnings, employment probability).[15] After the beginning of the transition[16] the share in applications to secondary education programmes providing baccalaureate exam (gymnasiums and secondary vocational school) required for college or university

15 On the role of labour market expectations in choice between different secondary educational programmes see *Hermann, Section 3.1.*

16 Administrative restrictions in enrolment to different secondary education programmes were terminated after 1989.

studies has increased considerably, while there has been a sharp decrease in applications to secondary training schools.[17] Changes in the composition of the different secondary education programmes have followed the changes of earnings gains and employment advantages of graduates from the different secondary education tracks.[18]

In sum, based on the average completed years of education and on labour market changes it seems a reasonable assumption that for international comparison classification 2 is more adequate, that is vocational training schools shouldn't be allocated to upper secondary level.[19] It means that the educational attainment of the Hungarian population lags behind the EU average both in average completed years of education and in the share of the population with at least upper secondary education. The proportion of individuals who have completed upper secondary education in the population aged 25 to 64 years is smaller by 17 percentage points and the proportion of individuals who have tertiary education in the same age-groups is smaller by 8 percentage points than the EU average. The drawback in skills and competencies which are essential for labour market success might be even larger as the results of international adult literacy surveys show. (See *OECD* 2000).

In order to determine how much of the differential in the employment level can be explained by the difference in the educational attainment, we decomposed the difference in the employment level of men aged 25 to 64 between the EU average and Hungary (using classification 2). Table 1.1 shows the results of the decomposition.[20]

Out of the 14 percentage points difference in the employment level between the EU and Hungary only 2.1–3.6 percentage points can be attributed to educated labour being less absorbed by the economy than in the EU. The bulk of the difference can be attributed to the employment problems of those who have less than upper secondary education. A 3.5–5.2 percentage points lag is due to the quantitative lag, that is the low educated having a larger share in the population than in the EU, and the remaining 5.3–8 percentage points lag can be attributed to the low educated being less employed than in the EU. It means that the major part in employment difference can be attributed to the employment problems of the low-educated. One of the main reasons for the worse employment probabilities of the low educated is the transport problems of Hungarian villages (see *Köllő* 1997; *Kertesi* 2000).

The lag in the educational attainment of the population aged 25 to 64 will have a long lasting effect in employment as individuals who belong to these age-groups will be in the labour market for a long time, the youngest of them for more than 30 years. During recent years major changes have

17 Concerning changes in applications to the different secondary educational programmes see *Lannert, 2.1.*

18 Returns to vocational training have been 10 to 14 per cent without a clear trend, returns to upper secondary education increased from 30 to 40 per cent. See *Kézdi, Section 1.1.*

19 Meantime programmes of vocational training schools have changed as has the name of that type of school. The new name of this type of secondary school is vocational school (*szakiskola* not to be confused with the old type of vocational schools which used to provide only 2-years vocational programmes). The duration of studies was extended to four years and the content of studies also has been changed. There has been no evidence on the effects of these changes yet. In this analysis we investigate the educational attainment of those aged 25–64 who had finished their studies before these changes.

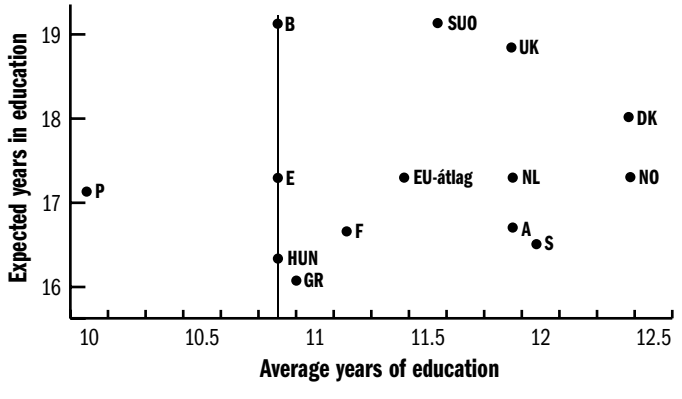
20 The standard Oaxaca-Blinder decomposition method was used. *See Annex A1.3.*

taken place in educational enrolment. A larger share of the younger age-cohorts has been enrolled to secondary schools which provide baccalaureate exam, the length of studies has been lengthened to four years in vocational training schools,[21] the ratio of students enrolled in higher education has increased and the expected years of education have also increased. *Figure 1.9* shows average completed years of education and the expected years of education based on the data of 2001. It turns out from the figure that in spite of the educational expansion Hungary is one of the countries where expected years of education are the lowest. Expected years of education are calculated using current enrolment levels and do not take into account drop-outs, so it does not show where the schooling career of a given cohort really ends. Using stock data the share of a given cohort entering the labour market with low education level can be shown. *Figure 1.10* shows the share of those who entered the labour market with no more than lower secondary education as the highest educational attainment in the succeeding cohorts.[22] For the calculation 2001 census data were used.

Table 1.1: Decompostion of the 14 percentage points difference in employment rate between the EU–15 and Hungary

Components	Education level	Weights			
		Hungarian employment rate EU educational attainment		EU employment rate Hungarian educational attainment	
		Difference percentage points	Difference %	Difference percentage points	Difference %
Composition effect		5.2	36.8	3.6	24.7
Parameter effect	Low	5.3	37.5	8.8	60.6
	High	3.7	25.7	2.1	14.7
Total		14.2	100.0	14.6	100.0

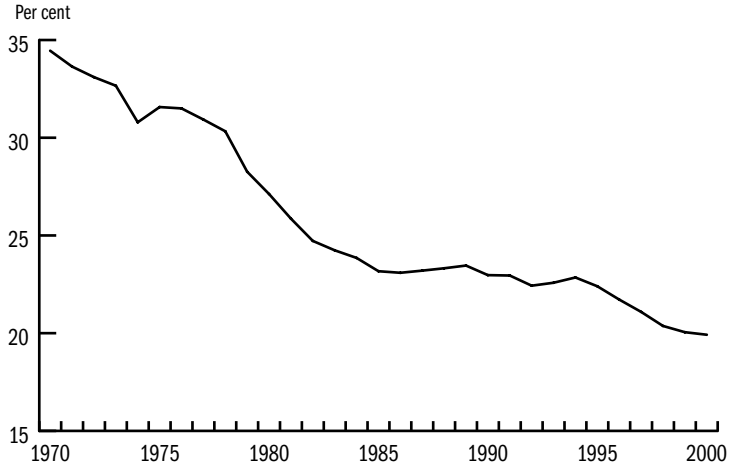
Figure 1.9: Average years of education and average expected years in education



21 Since 1998 at vocational training schools students were enrolled onto four-year programmes. The first classes of four-year programmes at vocational secondary schools finished their studies in the school-year 2001/2002.

22 Estimations were made for the 20 year olds in each cohort.

Figure 1.10: The share of under-educated (no more than old-type vocational education) in the population aged 20 (per cent)



Note: For example the estimation for 1981 was made with use of data of 41 year old in 2001.
Source: Census 2001.

The figure shows that the long-term trend of a decrease in the share of low-educated in the succeeding cohorts observed from the beginning of the 1970s came to an end in the mid 1980s. Between 1985 and 2000 at least 20 per cent of each cohort has entered the labour market without any qualification.[23] It means that the generation of the low educated still continues and the harmful consequences of this process will have an effect over at least the following thirty years.

1.3 Reallocation of Workers with the Higher Education Diploma, 1994–2002

PÉTER GALASI

The transition shock at the end of the '80s has had a long-lasting impact on the labour market tendencies of the '90s. At the beginning of the period – until 1993 – GDP and employment decreased, unemployment and inactivity increased. From the middle of the '90s to the end of the decade GDP started to grow and employment still stagnated whereas unemployment declined. At the end of the period, a slowing-down of GDP growth was coupled with decreases in both employment and unemployment.

Summarising the main results of papers studying the Hungarian labour market (*Kertesi – Köllő* 1995, 1997, 1999, 2002; *Kézdi* 2002; *Kőrösi* 1998, 2000, 2002), the transition process can be described as follows. The first phase (until 1995 or 1996) of the transition shock resulted in massive job

23 In 2001 there have been about 340 thousand aged 20–29 year old young people in Hungary who had no useful qualification (at least vocational training school). Of these 55 thousand were full-time students, 55 thousand are on maternity benefit grant. The remaining 200 thousand have already finished their studies. A quarter of them have been unemployed for at least 3 months and 87 thousand are jobless (unemployed and inactive).

destruction and a low level of job creation. A large number of older and less educated workers quit the labour market and the demand for educated workers did not increase either. The second phase (until the end of the '90s) was characterised by a massive restructuring of the economy, more and more modern jobs were created that represented a growing demand for educated workers. As a result, wage premiums for the young and better educated workers were considerably increased, and the labour market experience of older workers was devalued. An important fact is that in the second phase the labour demand for workers with the higher-education diploma and the wage premium for young and educated workers simultaneously increased, meaning that despite the growing higher-education output – observed throughout the period – the supply of young educated workers was still inelastic. These tendencies – described in the literature on the subject – could be observed up to the end of the '90s.

These tendencies are not consistent with the so-called qualification-inflation hypothesis (*Green – McIntosh – Vignoles* 1999) which states that employers are willing to hire more and more workers with the higher education diploma – due to their higher productivity and/or lower training costs –, and as a consequence of an elastic supply of the better educated young, the number of workers with a higher education diploma increases but the value of higher education diplomas decreases resulting in negligible (or no) wage premium.

On the basis of simple labour market statistics one can say that no change in trends detected by previous studies on the subject took place until 2002. Employment is still slowly increasing,[24] unemployment is declining,[25] the number of full-time students in higher education exhibits a 150 per cent level of growth from 1994 to 2002,[26] the proportion of better educated workers is still increasing while the proportion of poorer educated is decreasing,[27] the ratio of the monthly wages of those older workers with a higher education diploma to younger educated workers is declining, that of monthly wages of younger workers with higher education to those with high-school diploma is increasing – although the increases/decreases are slowing down over the last three years of the period in consideration.[28] There are some signs, however, that the position of the educated young would be deteriorating at the end of the period. The rate of unemployment of those 20 to 24 years old with a college diploma increased from 3 per cent to 7 per cent between 1999 and 2002, and that of the 20 to 29 year olds with a university diploma more than doubled (from 3 per cent to 7 per cent) between 2000 and 2002 (*KSH Labour Force Survey*). It is unclear whether this is due to the slowing down of the GDP growth, or a more elastic supply of, or a decreasing demand for, educated workers.

24 Annual increases in employment level are about 2 per cent in most of the years (*KSH LFS*).

25 5.8 per cent in 2002 from 10.7 per cent observed in 1994 (*KSH LFS*).

26 It amounts to 178 thousand in 1994, and 297 thousand in 2001(*Statisztikai tájékoztató. Felsőoktatás 2001/2002. Oktatási Minisztérium, Budapest 2002*).

27 The proportion of employees with at most primary education decreases from 23 to 17 per cent, that of workers with a higher education diploma increases form 16 to 21 per cent (*Wage Survey of the National Labor Center, ÁFSZ Bértarifa-felvétel*).

28 The ratio of monthly wages of 36 year and older workers with higher education diploma to those of 25 to 35 year old workers with higher education diploma is 42 per cent in 1994, and 13 per cent in 2002. The same ratio for 25 to 35 year old workers with higher education and high school diploma increases from 47 to 73 per cent (Wage Surveys of the National Labor Center).

The work in this section focuses on the redefinition of job requirements and the consequent reallocation of workers among jobs. Reallocation of workers due to increasing demand for educated workers might be detected if we simultaneously analyse changes in the wage premium for educated workers and their proportion among the employees. If both increase then it indicates inelastic supply of, and fixed or increasing demand for, educated workers, or relatively elastic supply of, and increasing demand for, educated workers. If one can observe this pattern on the labour market one would conclude that some exogenous technical change induces employers to hire more educated workers for new jobs or jobs designed previously for less educated workers. At the beginning of the process the supply of educated workers is relatively inelastic (it takes time for more educated cohorts to enter the labour market), this would result in increases in the wage premium for the educated workers, the number of jobs where a wage premium is paid for educated workers, and the proportion of educated workers employed in jobs requiring higher levels of education. A high or increasing wage premium for the educated workers induces then potential and actual workers to obtain more education thereby resulting in a more elastic supply of educated workers that might in turn slow down the increase in or diminish the wage premium whereas more and more educated workers would find jobs with higher-level education requirements.

We will analyse the reallocation problem between 1994 and 2002 on samples of workers with the higher-education and high-school diploma. We consider four indicators: the proportion of workers with the higher-education diploma, that of jobs requiring such diploma, the proportion of workers with the higher-education diploma working in jobs requiring higher education, and the wage premium paid for workers with the higher-education diploma in jobs requiring it.

In order to analyse workers' reallocation we have to classify jobs according to their skill requirements. Jobs and their skill requirements are however unobservable. We assume that occupations are good proxies to jobs[29] and that the occupational wage premium paid to workers with the higher education diploma in the given occupation captures the skill requirements of occupations. Occupations with a wage premium for workers with the higher education diploma are considered higher-education occupations (more exactly: occupations with higher-education requirements), otherwise the occupations are classified as high-school occupations. Here we follow *Gottschalk* and *Hansen* (2002) who assume that most occupations are heterogeneous in the sense that employers might hire workers both with higher-education and the high-school diploma for a given occupation depending on the actual state of the labour demand and supply. If workers with a given education are heterogeneous in terms of their produc-

29 Due to sample-size limits we will use a three-digit occupational classification. This amounts to 77 to 97 occupations in each of the years where workers with higher-education and high-school diploma are present.

tivity, then it might be that less productive workers with a higher-education diploma will be employed in occupations where they will obtain no wage premium as compared to workers with a high-school diploma. The same argument applies if the productivity of workers with a high-school diploma in a given occupation is higher than the average productivity of workers with a high-school diploma, since then workers with the higher education diploma might not realise any wage advantage in these occupations. In these occupations extra schooling does not produce a wage premium, thus they can be considered high-school occupations. If, however, employers pay more for workers with a higher-education diploma, this implies that extra schooling means additional skills and higher productivity, therefore employers will be willing to attract better educated workers. If the assumption of job-requirement redefinition holds and the elasticity of supply of workers with a higher education diploma is not zero, then we would expect more and more workers with a higher-education diploma in these occupations, and at the same time we would detect the presence of a wage premium for these workers. The redefinition of job-requirements might result in a reallocation process. Employers are more likely to hire workers with a higher-education diploma for these jobs. Whether they are able to realise this or not at a given wage premium would depend on the elasticity of supply of workers with a higher-education premium. If this supply is relatively inelastic, then increases in the number of workers with a higher-education diploma would be slow, and might be coupled with an increasing wage premium.

Another problem is the minimal wage premium to be applied. It would be obvious to choose some average observed value. *Gottschalk and Hansen* (*2002*) use a 10 per cent high minimum which is equal to the average returns to college education. By analysing returns to education in 28 countries, *Trostel – Walker – Woolley* (2002) find a 10–12 per cent high average wage premium. From papers examining the transition period of the Hungarian labour market we also know, however, that higher education yields much higher extra wages. We have chosen the average higher-education wage premium observed at the beginning of the period in consideration (1994) which amounts to 44 per cent. Thus occupations with at least a 44 per cent higher-education wage premium will be classified as higher-education occupations.

We use the annual samples of the Employment Office's wage survey.[30] In order to compute the occupational wage premium we have run earnings regressions for each of the occupations and for each of the years.[31] We have specified a simple, Mincerian-type earnings equation. Its dependent variable is the natural log of the monthly wage (before tax) that also includes one-twelfth of non-regular annual payments. The explanatory variables

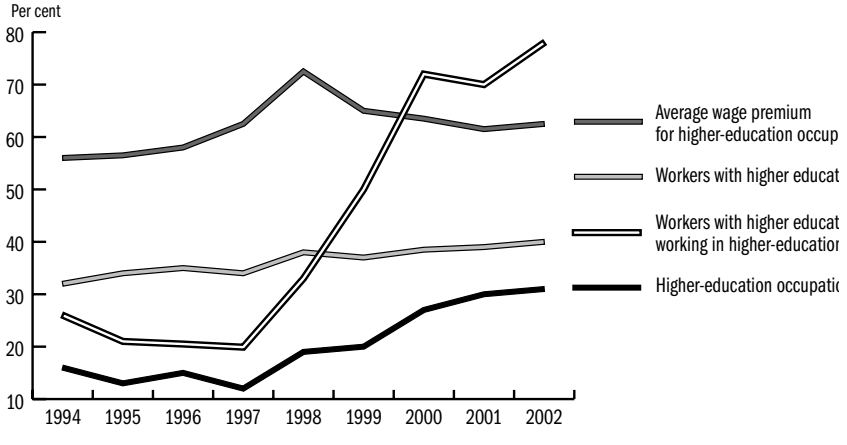
30 The original annual samples include all the employees of the public sector and a 10-per-cent random sample for business sector units with more than 10 employees. The original samples have been re-weighted and they are now representative of the employees by industry and firm size. The actual annual sample sizes include 74 to 103 observations. The author wishes to thank colleagues from the Institute of Economics of the Hungarian Academy of Sciences for making the data available.

31 Occupations with less than 100 observations have been excluded from the analysis. It affects 2 to 4 per cent of the observations of the annual samples.

are: a highest-degree dummy (high school = 0, higher education = 1), potential labour market experience and its square, and gender. The parameter estimates of the education dummy are then considered as the wage premium.[32] With parameter estimates at hand we have examined the coefficients of each of the equations, and on the basis of the 44 per cent threshold we have classified all of the occupations as higher-education or high-school occupations.[33] Finally all the observations have been classified as workers in higher-education or high-school occupations.

Results are displayed in *Figure 1.11.* Here one can find four indicators: (1.) the proportion of workers with a higher education diploma, (2.) the average wage premium for higher-education occupations – as a percentage, (3.) the proportion of higher-education occupations, (4.) the proportion of workers with a higher education diploma who are working in higher-education occupations.

Figure 1.11: The proportion of workers with higher education diploma, the average wage premium for higher-education occupations, the proportion of higher-education occupations, and the proportion of workers with higher education diploma working in higher-education occupations, 1994–2002 (per cent)



The results might be summarised as follows. The proportion of workers with a higher education diploma has continuously and slowly been increasing from 32 to 39 per cent. The proportion of higher-education occupations seems rather stable until 1997, and then it exhibits a quite rapid growth, the value of this indicator more than doubled between 1997 and 2002, from 12 to 31 per cent. Initially the wage premium associated with higher-education occupations was 55 per cent – a substantial extra pay for extra schooling –, then it starts increasing – first slowly then very rapidly – until 1998, when it peaks at 73 per cent. Between 1998 and 2002 the premium displays a ten-percentage-point high decrease, but at the end

32 Earnings equations have been estimated by OLS and robust standard errors. This might produce biased coefficient estimates, due to selectivity, endogeneity or simultaneity problems (S*ee Heckman* 1979; *Mroz* 1987; *Card* 1998, 2001).

33 We have used the standard – 5 per cent – level of significance for deciding whether the estimated coefficients are zero or not. At the same time we have examined the educational distribution of each of the occupations with non significant parameter estimates, since zero coefficients might be resulted from the distribution itself. We have found some occupations with non-significant parameter estimates where the proportion of workers with a higher education diploma has been 94 to 100 per cent, and these have also been classified as higher-education occupations.

of the period it still higher than 60 per cent. The proportion of workers with a higher-education diploma employed in higher-education occupations decreases between 1994 and 1997 (from 25 to 20 per cent), then it almost triples from 1997 to 2000, finally it hits its highest level in 2002 with 78 per cent.

Our results are in line with the findings of previous works on the subject referred to above. Between 1994 and 1997 growing higher-education output is coupled with a decreasing proportion of both higher-education occupations and workers with a higher education diploma employed in higher-education occupations, whereas the wage premium starts increasing in 1996. This implies increasing demand for more educated workers and inelastic supply. The supply becomes more elastic from 1997, and it results in increases in the proportion of both higher-education occupations, and workers with a higher education diploma employed in higher-education occupations. More elastic supply pushes down wages for higher-education occupations (from 1998), as well. At the end of the period one can observe a very high proportion of good occupation/education matches for workers with a higher education diploma, and a relatively high wage premium.

2. EDUCATIONAL EXPANSION

2.1 Facts on Expansion of Education

JUDIT LANNERT

The expansion of secondary education

The structure of public education and the possible ways of progression within the system have considerably changed in recent years. These changes in the horizontal structure of public education have been forced by the *expansion of upper secondary education*.[34]

A rapid increase in the number of full-time upper secondary school students started in the second half of the eighties. Between 1985 and 1990 the number of those continuing their studies in upper secondary education increased by nearly 20,000 – from 60,000 to 80,000. This increase in absolute numbers meant stagnation in relative terms, as there was, behind it, a growing population. Starting from the 90s the number of those enrolled in upper secondary schools barely changed nevertheless the rate of those enrolled grew while the student population rapidly fell.

The main engine of expansion was the growing interest in upper secondary schools. As a consequence of structural changes and the general crisis in the training sector and its restructuring, the number of those enrolled in vocational training schools has decreased considerably. In line with this the interest in upper secondary education leading to the baccalaureate exam (school-leaving certificate required for higher educational studies) has grown, the proportion of those entering education leading to the baccalaureate exam has increased, that is to say the expansion of secondary education got under way spontaneously. By the end of the nineties, as a result of restructuring, 70 per cent of those entering upper secondary education chose upper secondary schools with a programme leading to the baccalaureate exam.

In the early nineties only one fourth of upper secondary school students attended general secondary schools (gymnasiums) one-third attended vocational secondary schools and more than 40 per cent attended vocational training schools. In the school year 2002/2003 30 per cent of secondary school students attended general secondary schools (excluding students

34 Several interpretations of expansion of upper secondary education are possible. Expansion on one hand can be interpreted as an increase in the enrolment in upper secondary education or as an increase in the number of students in upper secondary schools, moreover of those with upper secondary qualification (baccalaureate exam). On the other hand expansion can have an absolute and a relative interpretation. In absolute terms it may be an increase like in upper secondary school enrolment while in relative terms there is no increase in the proportion of a given age cohort. The same may be true for the opposite case when enrolment does not increase in absolute terms but there is an increase in relative terms when a larger proportion of a given age cohort enters upper secondary education.

who are studying in gymnasiums with 6 or 8 grades),[35] 46 per cent attended vocational secondary schools and 24 per cent attended vocational training schools (see *Figure 2.1*). When those in the lower grades of structure-changing gymnasiums are also included, 34 per cent of upper secondary school students attended gymnasiums as opposed to 44 per cent attending vocational secondary schools. After 1990 not only the number but also the rate of those with a baccalaureate exam has increased in the group of 18-year-olds. In 1990 the proportion of those with a baccalaureate exam to all 18-year-olds was 36.9 per cent, while in 2001 it was 54.5 per cent (see *Table 2.1*). This proves that having a baccalaureate exam is becoming common, the lack of it is rather stigmatizing, therefore everybody strives to obtain it.

Table 2.1: Number of students graduating with a baccalaureate exam, number of students applying for admission to higher education 1990–2002 (in thousands)

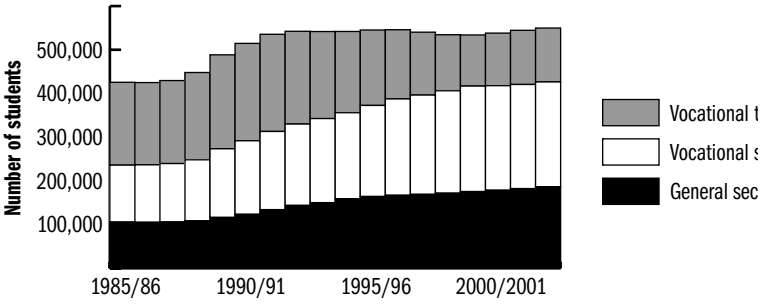
	1990	1995	2000*	2001	2002
Full-time students in gymnasium	24.1	31.2	32.2	32.5	33.5
All students in gymnasiums	27.2	34.6	37.1	38.0	40.0
Full-time vocational secondary school students	28.9	39.1	40.0	37.9	36.0
All vocational secondary school students	40.6	49.9	52.1	50.9	50.0
All full-time students	53.0	70.3	72.2	70.4	69.5
Number of students graduating with a baccalaureate exam at age 18-years	36.9	40.4	52.4	54.5	n/a
Number of students applying for admission to full-time higher education courses	46.8	86.5	82.9	84.4	89.0
Number admitted as full-time students	16.8	35.1	45.5	49.9	52.5
Number admitted as a percentage of applicants	36.0	40.5	54.9	59.1	59.1
Number admitted as full-time students as a percentage of those who graduated with a baccalaureate exam	31.7	50.0	63.0	70.8	75.5
Full-time students as a percentage of 18–22-year-olds	8.5	11.9	19.0	24.7	n/a
Number admitted to higher education, all students	32.1		103.9	112.9	124.9
Number of students graduated in higher education, full-time courses	15.9	20.0	29.8	29.7	30.8
Number of students graduated in higher education, all courses	24.1	26.2	46.9	47.5	50.5

* Public education data for year 2000 were estimated by the Ministry of Education based on a 98-per cent survey and trend.

Source: Magyar Statisztikai Évkönyv 1990–2001; OM Statisztikai tájékoztató, Oktatási Évkönyv 2001/2002 Oktatási adatok 2002/2003, KSH (Central Statistical Office, Hungarian Statistical Yearbook of Hungary 1990–2001; Ministry of Education Statistical information, Yearbook on Education 2001/2002 Data of Education 2002/2003, Central Statistical Office).

35 Since 1990 gymnasiums (general secondary schools) provide alternatively programmes from 5–12th grades (gymnasium 8 grades), 7–12th grades (gymnasium 6 grades) these are the so-called structure changing gymnasiums while the traditional gymnasiums still provide programmes for 9–12th grades (gymnasium 4 grades).

Figure 2.1: Total number of students in secondary education, by programme 1985/86–2002/2003



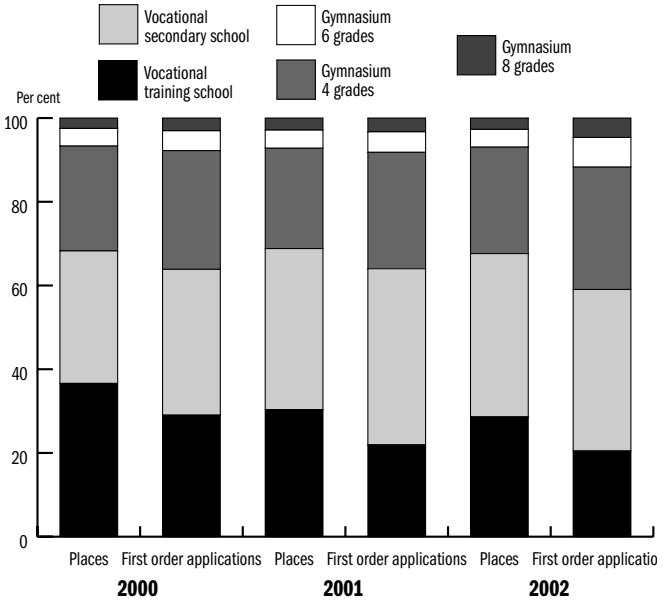
Supply of Upper Secondary Education

Data from the database of the *Information System on Upper Secondary School Entrance Exams* (KIFIR) indicate that on the whole the expansion of upper secondary education has no considerable quantitative limits moreover there is oversupply in nearly all types of secondary education, especially in programmes of vocational training. However, the inherited school network and the local social demands have produced a school supply that varies considerably by region.

The supply of institutions of secondary education exceeds the demand in all types of schools but not to the same extent. In 2000, 80 per cent of places available in 4-grade gymnasiums could be filled, while in 2002 this percentage was 85. In the gymnasiums (gymnasiums 8 or 6 grades) 90 per cent of places were filled in 2002, which may indicate a bottleneck. Regarding places available in vocational training, however, the rate of places filled did not change during the three years, less than 80 per cent of places available in vocational secondary schools and 65 per cent of places available in vocational training schools could be filled. Overall, the expansion of upper secondary education cannot be restricted by lack of places as supply well exceeds demand.

However, the analysis of supply and demand by various educational programmes shows that in certain areas there is a bottleneck. The demand for structure-changing (6 or 8-grade) gymnasiums exceeds supply (*Figure 2.2*). The expansion of this sector is restricted by the fact that on one hand county-level development plans do not opt for it and on the other hand the structure-changing (6 or 8-grade) gymnasiums are also interested in retaining the elite-type character of their education. The supply of 4-grade gymnasium places seemed to be sufficient in 2000 and 2001, by 2002 however, there were counties where demand, especially for programmes with extended foreign language teaching exceeded supply.

Figure 2.2: Rates of admission to higher education from different secondary education programmes, 1991–2001



Source: Calculations made by the author based on the database of Gábor Neuwirth.

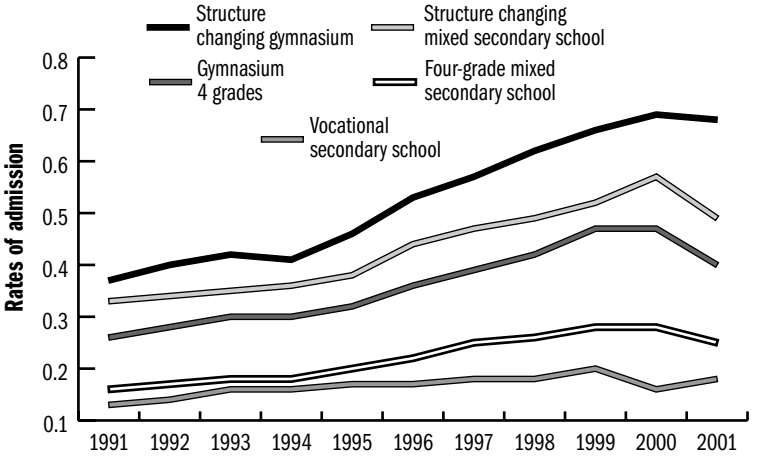
In spite of the expansion and the diversification of public education the Hungarian school system does not provide opportunities for upper secondary education for certain social strata. In the first round of applying for upper secondary school admission many (10 per cent) are unsuccessful. It is a warning signal that for the most part these students apply for vocational training where oversupply is the greatest. So these students are not welcomed by vocational training schools either, despite the fact that their admission would be in the financial interest of these institutions. Among those not admitted there are a lot of over-age children from Borsod and from Szabolcs counties and from Budapest, which shows that the expansion of upper secondary education is restricted not by quantitative but by qualitative obstacles, the Hungarian school system gives a lot of children up too early, which raises the issue of teachers' competence and motivation.

Vocational secondary education has proved to be the engine of upper secondary education expansion. Overall, the supply of vocational secondary programmes corresponds to the demand but its vocational composition does not follow the demand of the labour market dynamically enough, it rather reproduces the existing, often outdated vocational structure. The increase in the supply of vocational secondary schools was the result of restructuring within vocational training – in the counties places in voca-

tional training schools decreased by exactly the same figure as the one by which places in vocational secondary schools grew. This does not necessarily mean a qualitative shift, which is partly due to the fact that vocational training schools wanted to keep their trainers and school owners did not want to get into a sharp conflict with the school management. In some counties, however, a qualitative shift in secondary education has also taken place along with the changing supply.

Expansion was accompanied by the growth in differences between the most and the least effective groups of upper secondary schools; regarding the rates of admission to higher education the difference between the best and the worst groups of schools grew (*Figure 2.3*).[36] As of the mid-nineties the proportion of those admitted to higher education from the structure-changing gymnasiums has increased considerably while vocational secondary schools seem to have dropped behind.[37]

Figure 2.3: Supply and demand of secondary school places, by programme type 2000–2002 (in percentage)



Source: Calculated data based on KIFIR (Information System on Secondary School Entrance Exams).

Increase in the number of students in higher education

In the former socialist countries higher education was characterized by bottlenecks. Regarding the rates of participation in higher education of the 18–22 age cohorts these countries were considerably left behind as compared to the more developed states of Europe. Starting from the second half of the nineties – partly due to the increasing social demand generated by the growing number of those with the baccalaureate exam – there was an explosive expansion in higher education as well.

36 The first students completed their studies in structure-changing (6 or 8-grade) general secondary schools in 1996/97, as this type of programme was introduced in the early nineties. In the databases, however, the general secondary schools that introduced such programmes are classified as structure-changing ones retroactively as well and thus the indicators of admission to higher education show the results of students participating in 4-year programmes. In this period these indicators of such schools are only slightly higher than those of other secondary schools. In the mid-nineties, however, there was a sudden improvement, which may be due to the efficiency of this type of education or to the fact that education in structure-changing general secondary schools intensified selection mechanisms.

37 Regarding the average score of uniform written tests at the entrance examinations the difference between schools with the best and worst average also increased. Inequalities seem to have increased in other dimensions as well. The differences between counties with the best and worst admission average increased in ten years. Regional polarization can also be seen in average scores of written exams. In the last ten years the counties of Southern and Western Hungary performed the best at entrance tests while North Hungarian ones performed the worst (*Neuwrith* 2003).

As opposed to 1990 the number of full-time students admitted to higher education tripled by 2002. The number of students admitted to higher education of all types (full-time, part-time, correspondent courses) quadrupled. The expansion of higher education was of greater extent than that of secondary education, therefore the rates of continuing studies in higher education increased significantly. The number of full-time students admitted in 1990 was made up of one third of those who obtained their baccalaureate exam in the previous year, in 2002 it was three quarters. The rate of full-time students in the appropriate (18–22) age cohort also increased considerably. In 1990 full-time higher education students made up 8.5 per cent of the 18–22 age cohort, in 2002 this percentage was 25.

In this period the increase in the number of those who graduated from higher education was smaller. The number of full-time graduates and that of all graduates doubled. When the numbers of admitted and graduated students are compared it can be seen, however, that the smaller increase in the number of the latter cannot fully be explained by the fact that due to the length of study time the increase in the number of graduates follows the increase in the number of admitted students by delay. If the number of graduates is compared to the number of students admitted 4 or 5 years before, it can be seen that the total number of graduates is smaller by 25 per cent and that of full-time graduates is smaller by 20 per cent than could have been expected had all students completed their studies in due time. Whether this 20 or 25 per cent obtain their degree later or drop out of higher education altogether cannot be said on the basis of the available data.

2.2 Participation in Adult Education by Educational Attainment[38]

JÚLIA VARGA

This section, based on data of the averages of the 2002 Labour Force Survey simply describes the differences in participation rates in school-based adult education by educational attainment and age. The aim of such a descriptive subsection is to estimate the order of magnitude of education and training which leads to acquiring a formal qualification of the adult population outside of full time education and to call attention to the fact that although it would be essential to follow the educational career of drop-outs from full time school-based training in particular and participation in lifelong learning of the adult population in general the only existing data-collection which collects information on the participation in education and training of the adult population is the Labour Force Survey. We have still less information on the labour market experience of adults subsequent to participating in adult education or lifelong learning and there is no analysis which focuses on the outcome or labour market effects of adult training, except for higher education graduates (*see Section 4.4*).

38 Tables are based on estimations of *Gyula Nagy*.

In this assessment we take into consideration participation in formal education programmes leading to degrees, to learning activities that resulted in qualifications. We will distinguish basic and supplementary education. Basic education is defined as learning activities which lead to the acquiring of a first qualification or which can be regarded as usual progress in the school-system, while supplementary education is defined as learning activities which lead to the acquiring of a second or further qualification or which deviate from the usual progress in the school system.[39]

In 2002 participation rate in basic education of 15–74 year olds was 10 per cent and the participation rate in supplementary education was 3 per cent (*Table 2.2*). Only 15 per cent of those who have a less than lower secondary education were studying for a lower secondary degree and one fifth of those who have a lower secondary degree were studying for a higher degree. There are remarkable differences in participation rates among those whose highest educational attainment is more than lower secondary education by type of their secondary education. 28 per cent of those who had finished their studies in gymnasium (general upper secondary school with a baccalaureate exam) are studying for their first degree in higher education and 5 per cent of them are participating in supplementary education – that is the participation rate among them is outstanding. On the contrary the participation rate in basic education is only 2.4 per cent of those who have vocational training school qualification and 6.4 per cent of those who have vocational secondary school qualification (vocational secondary school with a baccalaureate exam).

Table 2.2: Participation in basic education and supplementary training by educational attainment (per cent) aged 15–74

Highest educational attainment	Not participating	Participating		Total
		Basic education	Supplementary training	
Less than lower secondary (8 grades)	85.2	14.7	0.1	100.0
Lower secondary (8 grades)	78.2	21.6	0.2	100.0
Lower secondary with vocational qualification	99.8	0.2	0.0	100.0
Vocational training school	97.6	0.0	2.4	100.0
Vocational school	93.6	0.0	6.4	100.0
Gymnasium	67.6	27.5	4.9	100.0
Vocational secondary school	89.3	6.1	4.6	100.0
College	92.5	0.0	7.5	100.0
University	92.7	0.0	7.3	100.0
Total	86.9	10.1	3.0	100.0

Sources: KSH Labour Force Survey 2002, I–IV. quarters.

The participation rate of those who are older than 30 is negligible both in basic and in supplementary education, but it is worth mentioning also that

39 It means that for those who have less than lower secondary education as the highest educational attainment participation in lower secondary education is basic education; for those who have lower secondary education participation in any form of upper secondary education and vocational training school is basic education, for those who have a baccalaureate exam participation in higher education is basic education. Education for obtaining a second qualification is supplementary education for all groups and also the uncommon tracks for instance when an individual who has vocational training school qualification is studying for a baccalaureate exam or another who has a baccalaureate exam is studying in vocational training school.

one quarter of the youngest age group (aged 15–20) do not participate in education or training and less than one fifth of those aged 21–30 had taken part in any form of education or training (*Table 2.3*).

Table 2.3: Participation in basic education and supplementary training by age-groups (per cent)

Age group	Not participating	Participating		Total
		Basic education	Supplementary training	
15–20	24.3	68.1	7.6	100.0
21–30	82.6	11.5	5.9	100.0
31–40	96.3	1.1	2.6	100.0
41–50	98.7	0.2	1.1	100.0
51–60	99.6	0.0	0.4	100.0
61–74	99.9	0.0	0.1	100.0
Total	86.9	10.1	3.0	100.0

Sources: KSH Labour Force Survey 2002, I–IV. quarters.

Table 2.4: Participation rate in basic education and supplementary training by highest educational attainment in age groups 15–20 and 21–30 (per cent)

Highest educational attainment	Not participating	Participating		Total
		Basic education	Supplementary training	
Aged 15–20				
Less than lower secondary (8 grades)	31.6	68.4	0.0	100.0
Lower secondary (8 grades)	16.6	82.9	0.4	100.0
Vocational training school	74.7	0.0	25.3	100.0
Vocational school	52.8	0.0	47.2	100.0
Gymnasium	15.4	67.4	17.2	100.0
Vocational secondary school	40.8	27.2	32.0	100.0
Total	24.3	68.1	7.6	100.0
21–30 years				
Less than lower secondary (8 grades)	98.5	1.1	0.5	100.0
Lower secondary (8 grades)	96.1	3.4	0.5	100.0
Vocational training school	96.3	0.0	3.7	100.0
Vocational school	93.5	0.0	6.5	100.0
Gymnasium	46.2	48.9	5.0	100.0
Vocational secondary school	80.0	13.8	6.2	100.0
College	81.5	0.0	18.5	100.0
University	80.6	0.0	19.4	100.0
Total	82.7	11.5	5.9	100.0

Sources: KSH Labour Force Survey 2002 I–IV. quarters.

Table 2.4 shows participation rates of the youngest age groups by educational attainment. Out of those aged 14–20 who have not finished lower secondary education (8 grades) more than one third does not learn anything and those aged 14–20 whose highest educational attainment is lower second-

ary school (8 grades) 16.7 per cent does not learn anymore. About half of those who have a vocational school qualification and a quarter of those who have a vocational training qualification are participating in supplementary education in the youngest age-group. In the same age group more than two-thirds of those who have finished gymnasium are studying in higher education and a further 20 per cent are in supplementary education. Participation rates of those who have finished vocational secondary school is lower, a third of them aged 15–20 are studying in higher education and another third takes part in supplementary training. About half of those aged 21–30 with a gymnasium qualification are still continuing studies in higher education, but only 10 per cent of those aged 21–30 with a vocational secondary school qualification. Participation in education and training in this age group is high for those who have a higher education qualification, one fifth of them are participating in supplementary education.

Table 2.5: Distribution of participants in supplementary education by highest educational attainment by types of education or training (per cent)

Type of education	Highest educational attainment					
	Vocational school	Vocational training school	Gymnasium	Vocational secondary school	College	University
Gymnasium	43.6	51.0	0.0	1.1	–	–
Vocational training school	7.7	1.8	3.3	–	–	–
Vocational training school	9.4	7.9	0.3	1.4	–	–
Vocational qualification listed in the NTR[a] (without baccalaureate exam)	9.4	14.7	1.1	3.5	0.2	–
Vocational secondary school	7.7	6.7	5.5	–		–
Vocational qualification following a baccalaureate exam	10.3	2.8	48.3	43.6	1.5	–
Post secondary vocational training	1.7	1.4	12.1	16.2	9.3	4.5
Accredited higher vocational training	6.8	0.3	5.8	5.5	4.8	3.5
College	–	–	–	–	31.2	9.8
University	–	–	–	–	31.0	33.7
PdD, DLA	–	–	–	–	0.5	21.9
Other	3.4	12.0	15.4	20.5	19.8	26.2
Non school-based training following baccalaureate exam	–	1.4	8.2	8.2	1.8	0.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

[a] NTR-National Training Register.
Sources: KSH Labour Force Survey 2002, I–IV. quarters.

Regarding the aim of the studies (*Table 2.5*) half of those who have a vocational training school qualification are studying to obtain a baccalaureate qualification the remaining half are studying to obtain a second vocational qualification. Out of those who have a gymnasium qualification and do not study in higher education the bulk want to obtain a vocational qualification.

Out of those who are participating in education and training with a college degree a third are following university studies, and another third are studying at college level for a second qualification. Of those university graduates who are studying one third want to obtain a second university level degree, 10 per cent a college degree and 20 per cent are participating in doctoral studies.

2.3. Over-education, Under-education and the Wage Premium on the Labour Market, 1994–2002

PÉTER GALASI

In Hungary, from the beginning of the nineties, a quite rapid higher education expansion has been taking place. This might lead to higher rates of unemployment for those with a higher-education diploma, or, if a crowding-out effect is present, more and more persons with a high-school diploma would quit the labour market. In addition it would result in decreases or the disappearance of a wage premium for educated workers.

The problem of over-education was first raised in a similar situation in the US in the mid-seventies. *Freeman* (1976) then argued that workers with a higher education diploma would work in jobs not requiring a higher-education diploma because of the expansion of higher education, this would produce lower returns to higher education resulting in less schooling investments, thus less students in higher education institutes. These expectations, however, were not fully realised, returns to higher education remained high, although participation in higher education decreased in the seventies (*Card – Lemieux* 2000). Higher education expansion in Britain has not produced a lower wage premium, either. Between 1978 and 1996 returns to higher education remained essentially the same (*Chevalier* 2003).

In Hungary a growing supply and demand for educated workers went hand in hand and this resulted in a high and increasing higher education wage premium in the nineties.[40] In this section we analyse the impact of under- and over-education on wages from the mid-nineties to the beginning of 2000. Over/under-education tries to capture an important element of the job/skill matching problem by using education as a matching indicator. The over-educated (under-educated) individual works at a workplace where the job requires less (more) education than they possess, whereas for the properly educated worker job and education make a good match in terms of required and possessed education. There has been a growing literature on the subject which is mainly concerned with returns to, and the extent of, over- and under-education. An important assumption of the recent over-education models is that matching has an impact on the wage premium (or returns to education), and consequently the same education

40 *Kertesi – Köllő* (1995, 1997, 1999, 2002); *Kézdi* (2002); *Kőrösi* (1998, 2000, 2002).

yields different wages depending on job requirements, that is job/education matching.

In order to examine the problem it is necessary to determine the education requirements of jobs, that is the education required in the job, then with the help of information about workers' schooling, all employees have to be classified as under-, over- or properly educated. This can be done in several ways.[41] Similar to other papers,[42] we use *Kiker – Santos – Oliveira*'s (1997) method. We assume that the recent occupation of the respondent is a good proxy for their job, and that modal years of education observed in a given occupation correctly represent the education requirement of that occupation. Modal years of education are then computed from the sample for each occupation, and these modal values are assigned to each respondent as years of required education. With observed and required education at hand, years of over- and under-education can also be computed. Then we will run wage regressions and we expect different returns to a year of over-, under, and required education.

The results of the empirical estimations mostly confirm the basic idea. The rate of return to years of education required by the job is normally positive and higher than the wage premium associated with over-education, whereas under-education produces wage penalties (negative estimated coefficients for a year of under-education).

The problem of over-education can be interpreted here in the context of an economy in transition. Some labour market consequences of the transition process were analysed in section 1.3. We have found that employers re-defined their job-requirements, that is they considered more and more jobs as requiring more educated workers than previously. Since the supply of educated potential workers became more elastic at the end of the nineties, employers were to a greater extent able to hire more educated workers needed for the jobs with re-defined requirements. This resulted in better education/occupation matches and a lower wage premium for the educated workers.

We consider three elements of the problem. First we analyse how required and observed education develop over time. If in Hungary – as others show[43] – the structure of labour market demand has been changing in favour of the better educated and the supply of educated workers has become more elastic, this might have resulted in increasing average required and observed education. Second we examine the extent of under- and over-education over time. Since both the demand for, and the supply of, educated workers has been growing over the period in consideration, one would expect an increase in the number of the over-educated, and a decrease in that of the under-educated over time if the proportion of good

41 See for example *Hartog* (2000); *Groot – Maassen van den Brink* (2000).

42 See *Cohn – Ng* (2000).

43 See *Kertesi – Köllő* (1995, 1997, 1999, 2002); *Kézdi* (2002); *Kőrösi* (1998, 2000, 2002).

matches remains stable. Finally we take a look at returns to over-, under-, and required education.

We use annual samples from the Employment Office's wage survey. This dataset allows us to capture only two elements of human capital: education (highest degree) and potential labour market experience.[44] Both are imperfect proxies to the given constituent of human capital, in addition we have no information of its other elements (tenure, job-training, abilities). For this reason our analysis might be considered as a first approximation to the problem.

The basic analytical tool is a wage regression, some extension of the Mincerian-type wage equation, that is able to simultaneously capture the gains and losses associated with over-, under- and required education. The individual's schooling is measured in terms of years of education and can be decomposed as follows:

$S = R + O - U$,

where S denotes the years of education the individual possesses, R stands for years of education required by the job, and O and U represent years of over- and under-education, respectively. If the individual has the required education, then $S = R$ ($O = U = 0$), if over- or under-education are present, then $S = R + O$ ($O > 0$, $U = 0$) and $S = R - U$ ($U > 0$, $O = 0$), respectively.

We assume that occupation is a good proxy for a job, and that modal years of schooling of an occupation might be considered as a fair indicator for the educational requirements of that occupation.[45] If one intends to examine over- and under-education over time and the labour market is not necessarily in equilibrium then it is not obvious whether modal years of education of a given year might be interpreted or not as the education requirement of an occupation for that year. This would be especially important for an economy in transition where the supply of educated workers is temporarily inelastic at the beginning of the transition, thus employers cannot hire all the educated workers they intend to at the going market wages. In this case using actual modal years of education would underestimate the actual educational requirements of an occupation, and therefore would overestimate the actual number of over-educated workers. This classification bias could be reduced if on the basis of findings of the literature on the subject referred to above, we assume that the supply of the educated workers becomes elastic by the end of the period in consideration, thus it is reasonable to use last year's (2002) modal years of education as the indicator for the "true" educational requirement of occupations.[46]

We expect the (almost) standard results for the estimated coefficients: positive coefficients for required and over-education, a negative one for the under-education variable. It is also expected that the return to a year of required education would be higher than that to a year of over-education,

44 The first element is years of schooling, the second one is computed as age-years of schooling – 6.

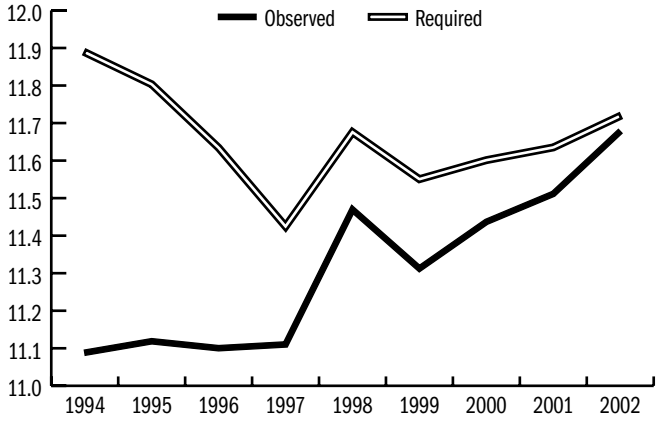
45 Due to sample-size limits we will use a three-digit occupational classification.

46 Estimations made with the help of actual modes also suggest that the 2002 mode might capture more correctly the educational requirements of occupations.

that is, that an over-educated individual would get lower wages than they would realise in an occupation requiring the years of education they have acquired, but obtain higher wages than other workers working in the same occupation with the required education. Finally, we expect wage penalties associated with under-education to be lower than the wage premium paid for a year of required education, implying that the under-educated worker gets higher wages than they would get in another occupation where they would be properly educated. (For the specification of wage equations see *Annex A.2.1.*)

The results show decreases in the average required education and no changes in the average observed education between 1994 and 1997. For these years the average observed education is lower than the average required education. This implies an inelastic supply of educated workers which induces employers to lower their occupational requirements. From 1997 to 2002 the value of both indicators increases, and this might result from a more elastic supply of educated workers and the parallel redefinition of educational requirements of occupations. The observed average education is growing faster over time than the required average education (*Figure 2.4*).

Figure 2.4: Observed and required schooling, 1994–2002 (years of schoooling)



As regards the proportion of under- and over-educated workers (*Figure 2.5*), at the beginning of the period about one third of workers were over- and every tenth of them were under-educated. The share of those under-educated has been continuously decreasing over the period and it amounts to less than 20 per cent in 2002. The proportion of the over-educated starts increasing in 1995, and it exceeds in number those under-educated at the end of the period (24 per cent). One of the consequences of the transition seems to be that over-education rather than under-education becomes the dominant form of occupation/education mismatch.

Figure 2.5: The proportion of the over- and under-educated, 1994–2002 (per cent)

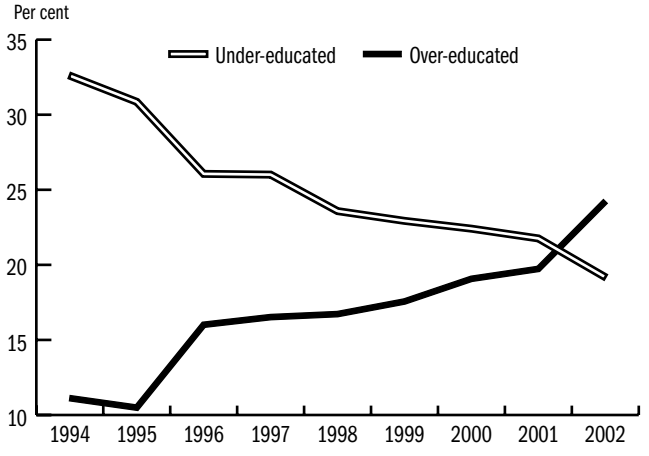
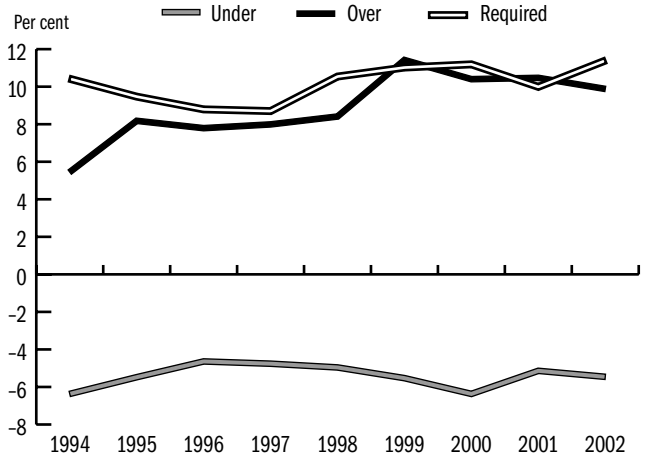


Figure 2.6: Returns to a year of over-, under- and required education, 1994–2002 (per cent)



The wage premium due to required education is relatively high (*Figure 2.6*): the return to a year of required education amounts to 9 to 11 per cent. It first decreases from 10 per cent in 1994 to 9 per cent in 1997, then increases to 11 per cent (2002). This suggests that employers are more and more willing to pay more for good matches, implying that a more elastic labour supply has been going hand in hand with raising the value of better matching.

The return to a year of over-education is always positive which is in line with the findings of the literature, and, except for two years, yields lower

returns than required education does. It increases or stagnates between 1994 and 1999, then starts decreasing. One detects a 1.5 percentage point decline between 1999 and 2002. It seems then that, at a given demand for educated workers, a less elastic supply of educated workers produces higher wages, and as the supply of educated workers becomes more elastic, the wage premium for over-education would be reduced.

The returns to a year of under-education are negative for each of the years. It oscillates between –5 and –6 per cent. Thus under-educated workers suffer from wage losses as compared to those possessing required education and employed in the same occupations. It also holds true that they realise higher wages than persons with the same education working in occupations where the education obtained by them is just the education required.

2.4 The Impact of Cost-priced Education on the Labour Market Situation of Higher-education Graduates

PÉTER GALASI

Since the second half of the '90s the system of Hungarian higher education has comprised public, church-run and private higher education institutions. In addition to state-funded places all the institutions may have cost-priced places meaning that students have to cover the whole costs of their schooling. Cost-priced education has been increasing since that time in terms of places to be offered, and the question arises whether growing demand for cost-priced education and higher-education institutes' motivation to cover the costs of their activities would lead to the worsening of the quality of cost-priced higher education. There are some signs that they would. First, the admittance scores for cost-priced places are lower than those for state-funded ones, and second the ratio of students admitted to students applying is higher in the case of cost-priced education. Both indicators suggest that entry requirements are lower with cost-priced higher education, thus its students are of lower quality in terms of skills and/or abilities. In addition, a number of cost-priced places are present at newly-founded higher-education institutes and it might be that it takes time to form a good quality staff of teachers.

In this section we examine the potential impact of cost-priced education on the labour market success of higher-education graduates. We consider two aspects of the problem: wages and labour market status.

We use the second wave of the so-called FIDEV survey, a dataset representative of the 1999 higher-education graduates, and containing information on their September 2000 labour market situation. One tenth of the sample studied at cost-priced places, a half of them were students at private, one third at church-run institutes, and two fifths graduated from

state-run higher-education institutions. Some 80 per cent of graduates from cost-priced education have a college degree, whereas the value of this indicator is only 60 per cent for the whole sample of graduates. In the case of some types of education (informatics, economics and business, technical) cost-priced students are over-represented.

Wage as a labour-market-success indicator might be interpreted in several ways. If profit-maximising firms are present on the demand side of the labour market, then observed wages can be considered as realised wage offers, reflecting employers' judgement about the productivity of would-be employees. If we assume that students from both cost-priced and state-funded education might be hired for a given job, then differences in wage offers imply differences in productivity, that is, if former cost-priced students get higher (lower) wages, then they are more (less) productive than those graduated from state-funded places. Note that the undeterminedness of relative wages is consistent with human capital models as well (*Becker* 1975; *Mincer* 1974).[47]

We have run wage regressions[48] with the natural logarithm of net (after-tax) monthly wages as the dependent variable. We have estimated three models with different specifications for cost-priced education. Model 1 only contains a dummy (cost-priced = 1, state-funded = 0), model 2 differentiates the three types of cost-priced education, state-run, church-run and private cost-priced education dummies are inserted into the equation. Finally, in model 3 three dummies for individual private institutes (Gábor Dénes College, Kodolányi János College, Modern Üzleti Tudományok College) are present in place of the private cost-priced dummy, in order to check whether these institutes differ in terms of wages.

47 Assume that the potential higher-education student maximises the present value of their life-time income, and – for simplicity – assume that they will be admitted to a higher education institution at the given probability of admission and the decision solely concerns the choice of a cost-priced or state-funded place. Then they will choose a cost-priced place if the present value of the lifetime wage gain due to the cost-priced diploma exceeds the additional costs of obtaining a diploma at a cost-priced place. The student will choose a cost-priced place (institution) if the following (in)equality holds:

$$\sum_{t=\mathrm{k}}^{T} \frac{(1-p)W_{CP} - pW_{SF}}{(1+i)^t} \geq \sum_{t=1}^{k-1} \frac{C_{CP} - C_{SF}}{(1+i)^t},$$

where C_{CP} and C_{SF} are the costs of a cost-priced and state-funded place for the potential student, respectively, W_{CP} and W_{SF} are the expected (annual) wage obtainable by graduating from a cost-priced or state-funded place, p denotes the probability of admission to a state-funded place, t is life-cycle time, the individual spends $k–1$ time periods on studies and k to T time periods on the labour market (with a final period of time T), and i is the individual's discount rate. By assumption. The potential student would choose a cost-priced place if; therefore the decision will depend on the wages and the admission probabilities associated with the two kinds of places. p is a function of the criteria of admission (entry exams, admission restrictions in terms of the number of students to be admitted, entry scores, etc.). If the criteria of admission are much stricter for state funded than cost-priced places ($1 - p > p$) then the student might end up with a choice. If the criteria of admission do not differ much or do not differ at all then choosing a cost-priced place will result in (*Galasi – Varga* 2002).

48 The estimated coefficients might be biased due to endogeneity, simultaneity or self-selection. We have run selectivity-bias corrected regressions following *Heckman*'s (1979) procedure.

All other independent variables are the same in all of the models. The working time variable is intended to control for the effect differences in hours of work might have on wages. We have an in-school labour market experience dummy (whether the respondents worked regularly for pay during their studies) which might capture the impact of labour market experience on wages. Education (college = 0, university = 1) and job training (whether the respondents participated in job training after graduation or not) dummies are inserted in order to consider two additional elements of human capital. Finally a series of type of education dummies might show whether they provide more or less opportunities in terms of wages.[49]

In order to see how cost-priced education influences labour market status, four states have been distinguished: employed, unemployed, full-time student and other inactive. Behaviourally the employed status means that the graduate wants to enter the labour market under the conditions it offers, and is successful given that employers are willing to hire her/him. The unemployed are also inclined to have a job but cannot find a proper one. The full-time student postpone their entry because the conditions wanted are not met, or because they expect better employment chances in the future. Finally, for an inactive person neither actual job-offers nor future ones seem attractive, and for this reason they do not enter the market and do not study.[50] The specification of cost-priced and state-funded education is the same as in the earnings equations.

One of the important problems of the estimation is that we have to separate the effect of cost-priced education from the impact of differences in labour market opportunities due to differences of education level and type of education. We have information about average wages and working time by types of education, and we also know in how many occupations a person with a given type of education can be employed. This is an occupational concentration index[51] showing the chance a person with a given type of education can be employed. Average wages and hours of work associated with a given type of education are interpreted as the mean wage and working-time offer a potential employee faces when considering entering the labour market.

49 For an analysis of other variables' impact on wages see section 4.3.

50 We have used multinomial logits for the estimations.

51 The index for type of education i with occupations o is as follows:

$$K_i^o = (1 - \sum_o p_{io}^2) \frac{N_o}{N_o - 1},$$

where p_{io} denotes the proportion of individuals with type of education i working in occupation o, N_o is the number of occupations, and $0 \leq KI_i^o \leq 1$. If it is zero, then individuals with a given type of education are concentrated in one occupation. If it is one, individuals with a given type of education are distributed evenly among occupations (*van Smoorenburg – van der Velden* 2000). When constructing the concentration index, we had 54 types of education and 117 occupations.

Table 2.6 displays the results.[52] Wages of former students graduated from cost-priced or state-funded places do not differ, and it also holds true if we distinguish state-run, church-run and private institutes. A significant wage dispersion is detected however among private institutes suggesting a considerable heterogeneity regarding the quality of education within cost-priced education provided by private colleges.

Career-beginners graduated from cost-priced education have better chances of being employees and they become full-time students with a lower probability than those graduated from state-funded education (model 1). This is also true of graduates from cost-priced education provided by state-run institutes (model 2 and 3). The chances of continuing higher education on a full-time basis are significantly lower for those who pay the full costs of education at church-run institutions, and for former-students of two of the three private colleges the probability of becoming inactive is lower than for those having been at state funded places of state-run institutions.

Table 2.6: The impact of cost-priced education on labour market status and wages*

	Wage	Labour market status**		
		Employee	Student	Inactive
Model 1				
Cost-priced		0.041	–0.052	
Model 2				
Cost-priced				
Church-run			–0.061	
State-run		0.042	–0.055	
Private				
Model 3				
Cost-priced				
Church-run			–0.064	
State-run		0.054	–0.059	
Private				
Gábor Dénes College	–0.156			
Kodolányi János College	0.287			–0.226
Modern Üzleti Tudományok College	0.353			–0.015

* Significant parameter estimates; ** multinomial logit, marginal effects.

All these suggest that in terms of wages and employment opportunities cost-priced places do not provide an education of worse quality than state-funded ones.

52 For detailed results see *Galasi – Varga* (2002) Tables A1–A9.

3. THE ROLE OF LABOUR MARKET EXPECTATIONS ON EDUCATIONAL DECISIONS

The increasing demand for upper-secondary education and for higher education seems to support that individual educational decisions take into account labour market returns to education. Using individual level data this section investigates determinants of individual educational decisions at the main ramifications of individuals' schooling career, first the choice between upper secondary programmes and the higher education decision.

3.1 The Impact of Labour Market Returns on Schooling Decisions after the Lower Secondary School

ZOLTÁN HERMANN

This chapter seeks to answer the question to what extent families consider the labour market returns when making schooling decisions after the lower secondary school. Since this decision has a long lasting effect on the entire educational career of students, it can be expected that labour market conditions may influence as early schooling decisions as those made at the end of lower secondary school[53] (*általános iskola*).

This analysis of schooling decisions builds on human capital theory. It is assumed, that families compare expected labour market returns to education with the direct and indirect (i.e. foregone earnings) costs of education. The larger the returns of education that a student may realise the higher is the likelihood of school continuation *ceteris paribus*. The most important factors affecting schooling decisions – according to both human capital theory and former empirical evidence – are the costs of education labour market returns to education, family income, the education of parents and individual ability (see for example *Becker – Tomes* 1986).

Since the previous studies on the impact of labour market returns have overwhelmingly focused on entering higher education (a notable exemption is *Micklewright – Pearson – Smith* 1990), it is especially interesting to analyse schooling decisions after the primary school. Moreover, the problem is also important in relation to regional disparities: the regional patterns of schooling decisions may enhance or mitigate these disparities.

The returns to schooling are not observable for the individual students. Thus, the analysis of the impact of returns to education can be built on

53 Choosing gymnasium (*gimnázium*), vocational secondary school (*szakközépiskola*) or vocational training school (*szakmunkásképző*) is assumed to reflect different strategies for the entire educational career of students and different levels of education to be achieved. Gymnasium can be considered as a step towards higher education, while choosing a vocational training school indicates that the student aims at gaining some qualification as fast and simply as possible. Vocational secondary school leaves open the route to higher education, though it may provide smaller chances for admission to the most popular universities compared to the gymnasium.

one of two approaches. The first approach uses the variation of individual expectations: if labour market returns of education have an impact on schooling decisions and students hold different expectations of the returns, these can be expected to affect schooling. The empirical evidence tends to confirm the positive effect of labour market returns – calculated from expected earnings and expected chances of employment at the individual level – on schooling (see e.g. *Kodde* 1998; *Varga* 2001). The other approach builds on regional or in time variation in returns to education, analysing these in relation to the demand for education (*see e.g. Fernandez – Shioj*i 2001; *Lauer* 2000; *Gianelli – Monfardini* 2000). If returns to schooling can be estimated at the regional level, it can be directly analysed whether larger returns really lead to a higher propensity for school continuation or not. Empirical evidence usually supports this hypothesis. A simplified version of this approach uses regional variations in unemployment instead of estimated returns to schooling (*Micklewright – Pearson – Smith* 1990; *Kodde* 1998; *Rice* 1999). In this context the impact of labour market returns on schooling decisions is interpreted assuming a correlation between returns to schooling and unemployment. If it is assumed that returns to schooling are increasing in line with unemployment than we can expect that the likelihood of further schooling is also increasing with unemployment. This paper builds on this approach: I analyse the impact of local unemployment on schooling decisions.[54]

Individual ability has an evident effect on the chance of further school success and the chance of getting the desired degree at the end of an educational career. Thus ability affects the expected value of earnings belonging to each schooling alternative. At the same time, if the cost of schooling can not be fully covered by education loans, families below a threshold income level are expected to face an effective budget constraint when making schooling decisions for their offspring. Furthermore, empirical evidence strongly suggests that the education of parents has an immense impact on schooling decisions. This impact may comprise several mechanisms. Better employment prospects and greater expected increments in earnings in the later stages of parents' careers ensure a more favourable future budget constraint for educated parents. Educated parents might be less risk-averse making schooling decisions for some reasons or they might have a better assessment of the ability of their children and – on the basis of their own former experiences – the requirements of schools at different levels. Finally, differences in preferences for education also provide a possible explanation.

This analysis is based on the data of the "9th grade survey" carried out by the National Institute of Public Education in 2003.[55] The probability of choosing gymnasium, vocational secondary or vocational training educa-

54 The first approach is hardly applicable in the case of schooling decisions after primary school since labour market entry belongs to the distant future for most of the students.

55 The survey covered all students studying at the 9th grade in Hungary, the number of respondents exceeded one hundred thousand, close to 80 per cent of the targeted student population. (For the data, non-response and the weights used to correct for this see *Hermann* 2003.)

tion was estimated at the individual level. The determinants of schooling in our model are gender, the average of grades at the 8th grade (as a proxy for ability and achievement), the education and employment status of parents, and finally two variables characterising the place of residence of students: settlement type and the local rate of unemployment (measured at the micro-region level).

Our results endorse former empirical evidence on the effect of parental education and individual ability as the major determinants of schooling decisions (see e.g. *Andor – Liskó* 2000). It is important to note that parental education has a strong net impact on the choice between general (gymnasium) and vocational secondary education, but not on the choice between vocational training schools and upper secondary education. This supports the hypothesis that the expansion of supply in secondary education in the 1990s has somewhat transformed social inequalities in education. While in the former period the accomplishment of upper secondary education (versus vocational training education) reflected the division between favourable and disadvantaged social background, now the social status of family seems to distinguish between vocational and general secondary education (where the latter reflects the intention to enter higher education). At the same time, the choice between vocational training and upper secondary education is mainly determined by achievement in the lower secondary school.[56] Altogether, vocational training education (versus upper secondary education) seems to be broadly determined by former achievement, while general and vocational secondary education provide a real alternative for students who are qualified for these and thus allowed to choose between the two. The better educated are the parents, the higher is the chance of choosing a general secondary school (gymnasium). Children of parents with upper secondary education have about a 20 percentage points higher probability of entering a gymnasium than students with less educated parents. A bachelor's and a master's degree adds a further 20–20 percentage points to this advantage, assuming an otherwise typical student, with a typical place of residence (*Figure 3.1*).

The appearance of new types of schools (e.g. six or eight grade gymnasiums) has led to the hypothesis – supported by anecdotal evidence –, that social background increasingly affects the choice of the actual school and less the choice between the broad types of general and vocational secondary education and vocational training education (*Andor – Liskó* 2000). However, detailed empirical results suggests that the education of parents still exerts a stronger impact on choosing between the broad types of education than on the choice among gymnasiums with low, medium and high prestige (*Hermann* 2003). In other words, the enrolment to a gymnasium represents a major social division. Inequalities related to the social background

56 An otherwise typical student with average grades in lower secondary school (about 3.5) chooses vocational training education only in a very few cases (see *Figure 3.1*), while a substantial share of low achievers in primary schools can later be found in technical schools. For example, assuming parents with secondary education, a boy with an average lower secondary school mark of 2.5 has a 40 per cent probability of choosing a technical school, while with an average mark of 2 this probability is 65 per cent.

of students have remained considerable in this respect, even compared to the choice among prestige groups of general secondary schools.

Figure 3.1: Estimated effect of parental education on the probaility of choosing different types of secondary schools

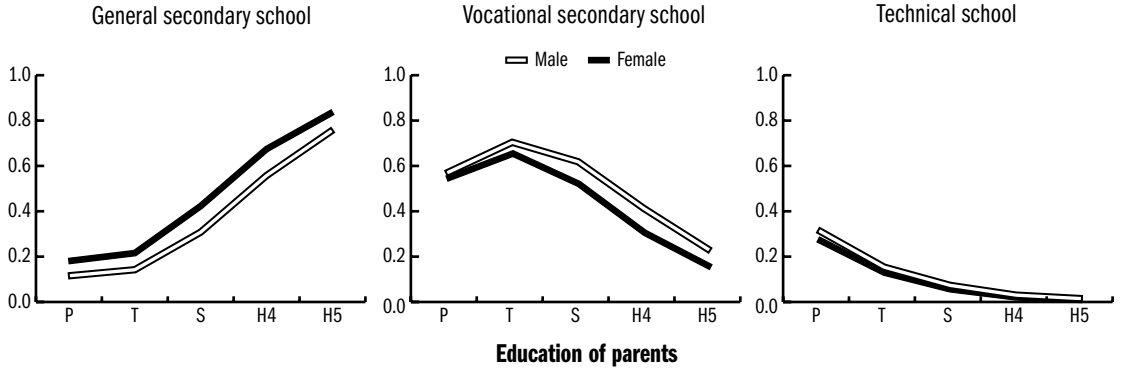


Table 3.1: The determinants of the schooling decision after primary school*

Independent variables	Marginal effects (dy/dx)		
	Gymnasium	Vocational secondary school	Vocational training school
Mother's education			
(reference category: baccalaureate exam)			
Lower secondary or lover	–0.129	0.042	0.087
Vocational training school	–0.124	0.080	0.044
Higher education BA	0.151	–0.128	–0.023
Higher education MA	0.258	–0.226	–0.032
Father's education			
(reference category: baccalaureate exam)			
Lower secondary or lover	–0.125	0.060	0.066
Vocational training school	–0.101	0.081	0.020
Higher education BA	0.108	–0.089	–0.019
Higher education MA	0.216	–0.187	–0.029
One or both parents unemployed	–0.028	0.001	0.027
Average grades in lower secondary school	0.283	–0.161	–0.122
Gender (reference category: female	–0.115	0.098	0.017
Rate of unemployment in the micro-region	0.521	–0.427	–0.095
Settlement type of the place of residence			
(reference category: town below 50,000)			
Budapest	0.053	–0.026	–0.026
Town above 50,000	–0.050	0.046	0.004+
Village	–0.073	0.051	0.022

* Multinomial logit estimation, marginal effects.
All variables are significant at the 1 % level, except those marked (+).
Number of observations: 99,828, count R^2: 0.655, adjusted count R^2: 0.410.
Right hand side variables not shown in the table (all dummies): mother's education missing, father's education missing, no gymnasium or vocational secondary school or

vocational training school in the micro-region, no respondent in gymnasium or vocational secondary school or vocational training school in the micro-region.
Source: calculated from the "9th grade survey" data file of the National Institute of Public Education.

The budget constraint seems to have only a minor impact on schooling decisions after the lower secondary school. For example, the unemployment of one or both of the parents in the previous year has a statistically significant, though rather weak effect on the schooling decision.[57] The wealth of the family exerts a somewhat stronger but still weak influence compared to parental education (*Hermann* 2003). Parents with a different level of education seem to follow different strategies in schooling their children and these strategies do not seem to depend on the wealth of the family or the employed/unemployed status of parents. Parents with a lower education tend to preserve a route for early labour market entry when they prefer vocational to general secondary education, while the children of better educated parents more easily make a commitment to higher education.

Gender differences are present though usually do not exceed 10 per cent in terms of probability of either option. Girls have a greater share in general education, while boys prefer vocational secondary education and to a certain extent technical schools as well, over general secondary schools relative to girls (*Figure 3.1*).

Comparing settlement types shows that students living in Budapest have the greatest share studying in a gymnasium, while, at the other extreme, students from villages are the least likely to choose this type of education. In the case of vocational training schools exactly the opposite pattern can be observed. When individual and family characteristics are controlled for, the choices of students from larger towns are similar to the choices of students from villages, while the effect of small and medium sized towns is closer to that of Budapest. However, the net impact of the place of residence is altogether quite weak; a typical student (with average grades and parents with secondary education) living in Budapest has a mere 10 per cent advantage in the probability of choosing a gymnasium relative to his fellow student with the same individual and family characteristics, but living in a village. Thus the impact of the place of residence is far below that which the directly observable differences might suggest.[58] Raw differences in schooling decisions are in part explained by the different composition of students with respect to the education of parents: in larger settlements parents are on average better educated, leading on average to higher shares of students choosing a gymnasium. Beside the composition of students settlement type differences in schooling decisions may reflect the lower cost of schooling (mainly lower transport cost) and the abundance in the supply of secondary schools in towns, while the choices of students from villages might be constrained by the limited set of schools accessible at low cost.

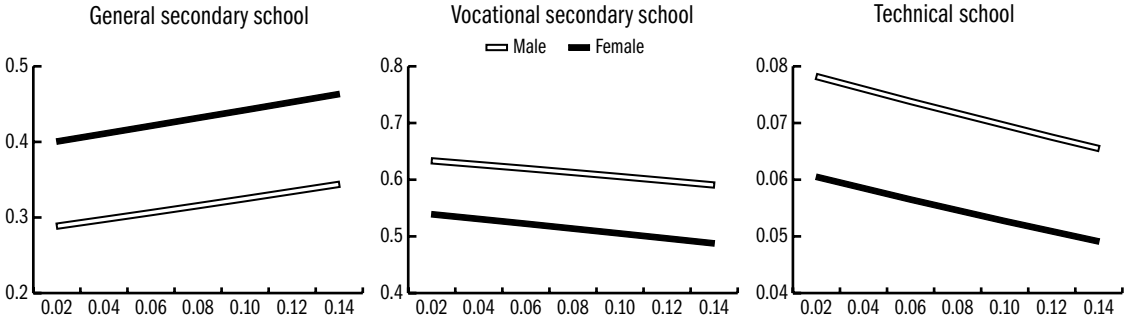
57 In the case of a typical student the unemployment of parents decreases the probability of choosing general secondary education by 3 per cent.

58 Raw differences (i.e. those not controlled for the composition effect) are at least twice as large (see e.g. *Lannert* 2003) as the estimated net impact.

I analysed the impact of labour market returns to education on schooling decisions according to the estimated effect of the local rate of unemployment (measured here by the number of unemployed relative to the 18–60 aged population). The results proved to be statistically significant; the rate of unemployment in the micro-region affects the probability of choosing any of the three school types. However, it has a stronger effect on the choice between general and vocational secondary education. The higher the rate of unemployment in a micro-region, the more likely it is that families decide to send their children to a general secondary school.

Nevertheless, the impact of local unemployment is rather weak compared to that of parental education or achievement in lower secondary school. The difference between the first and tenth deciles of students according to the local rate of unemployment (with a local rate of unemployment 2 and 14 per cent respectively) is just above five percentage points in terms of probability of choosing general secondary education (*see Figure 3.2*).

Figure 3.2: Estimated effect of unemployment rate of the micro region on the probability of choosing different types of secondary schools



The observed impact of local unemployment on schooling decisions can be explained by several mechanisms. First of all, the opportunity cost of education, i.e. the expected value of foregone earnings of the years spent in school is decreasing with an increase in the rate of unemployment. Where unemployment is high, students who decide to enter the labour market instead of school continuation are less likely to find a job than their counterparts living in regions with low unemployment.

Secondly, since unemployment at the local level is negatively correlated with the average education of the population (*Fazekas* 1997), it can be assumed, that in micro-regions with higher unemployment the returns to education in terms of employment exceed the return in low unemployment areas. If firms demand a similar mix of workers with high, medium and low level of education everywhere, then educated workers have better em-

ployment prospects relative to the less educated in regions with high unemployment, since the supply of educated workers is less abundant there due to the different composition of the population.

Local unemployment may have a positive impact on the schooling decision even if the returns to education are not related to the level of unemployment, assuming risk aversion (*Lauer* 2000). Education generally improves the prospect of employment but in regions with high unemployment the workers with a low level of education can have an extremely meagre chance of finding a job. In this case education yields more for risk averse individuals relative to regions with a low rate of unemployment.

Finally, education can be assumed to improve the opportunity to move to, and find a job in, another micro-region. Empirical analyses of migration behaviour unambiguously indicate that education increases the chance for migration, suggesting that better educated workers are more likely to take a job outside their micro-region of residence. If we assume that families compare the expected earnings with higher levels of education attainable by migration (i.e. either in the local labour market or elsewhere) with the expected earnings with lower levels of education in the local labour market, then schooling provides the highest returns for students living in regions with the highest unemployment.

At first sight the estimated impact of local unemployment on the schooling decision seems to be promising regarding regional inequalities in unemployment. Since high local unemployment is in part due to the lower average level of education of the population, the net impact of local unemployment on schooling tends to mitigate disparities in unemployment. This impact – *ceteris paribus* – urges students in regions with high unemployment to get a higher level of education than students in other regions. Unfortunately, the estimated impact of local unemployment is too weak to offset the effect of parental education which tends to maintain the regional disparities of unemployment. Since in regions with low unemployment parents on average are better educated, altogether more children choose general secondary schools than in regions with a high rate of unemployment. This composition effect dominates the net impact of local unemployment on the schooling decision. Thus we cannot expect the impact of the local labour market on schooling decisions to smooth regional inequalities in unemployment.

Our analysis concludes that upper secondary schooling decisions are in fact influenced by the labour market returns to education. The higher the local rate of unemployment, the higher returns education can be expected to yield and the lower the opportunity cost (i.e. foregone earnings) of education. Local unemployment has an impact on the choice between general and vocational secondary schools, since this is the alternative left

for individual decision – studying in vocational training schools is mostly determined by low achievement in the lower secondary school. However, the effect of local unemployment is not too strong, especially compared to the impact of parental education or former achievement.

3.2 The Role of Labour Market Information and Expectations on Students' Higher Education Enrolment Decisions

JÚLIA VARGA

During the last decade returns to higher education (in terms or earnings and employment probability increased considerably (see chapters 1.1. and 1.2) and there was a large increase both in the number of students applying for higher educational studies and in the number of students admitted to higher education. The upward shift in the number of applications is in line with human capital theory which states that expected labour market returns, net life-time wage-gain is the major determinant of individual choices on their optimal level and type of education and occupation. Although the expected returns to education have a decisive role in the human capital model there have not been any direct observations on earnings expectations until recently. There are two schools of thought in the economic literature regarding student's expectations. The first presumes that students base their expectations entirely on the present labour market situation that is their expectations are equal to earnings realized by an earlier age cohort (see for example *Freeman* 1971, 1976; *Lauer* 2000; *Gianelli – Monfardini*, 2000). The other assumption is that students, based on available information, forecast quite well future labour market changes, that is they have rational expectations (see for example *Siow* 1984; *Zarkin* 1985).

In recent years a growing number of studies have examined students' knowledge of current salaries, their earnings expectations and the economic rationality of students' choices on their level and type of education based on direct observations (*Smith – Powel* 1990; *Dominitz – Manski* 1996; *Betts* 1996; *Brunello – Lucifora – Winter – Ebmer* 2001; *Hartog – Webink* 2000). In the following, relying on the data of a survey carried out among Hungarian secondary school students[59] we will examine students' knowledge about current average earnings by educational attainment, students' earnings expectations and the role of expected returns in making an application decision regarding further studies.

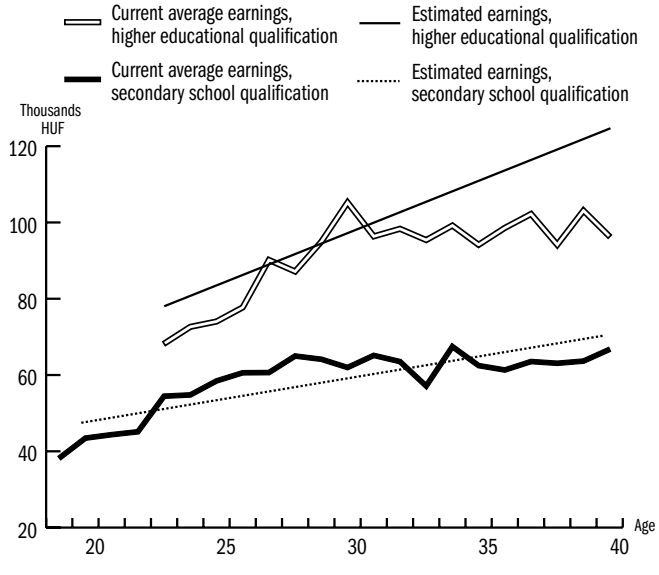
Students' knowledge on earnings

Students have surprisingly accurate knowledge concerning current average earnings by educational attainment and similarly they have good perceptions about the differences in earnings of highly qualified workers according

59 The survey was carried out in December, 2000. 60 secondary schools were randomly selected out of the total of 1,192 units in Hungary. In the selected schools all senior students were asked to answer the questions of the survey. The total number of observations was 4,954. In addition to questions about their personal and family background, their results in secondary schools, and plans about further studies students were asked to make estimations for three different points of time (starting salary, earnings at age 30, and earnings at age 40) on average earnings of people who have a secondary qualification and of those who have at least college education. Students were also asked to make estimations on the current average salaries of different higher educational occupations at age 30 and about their expectations on their employment probability and their future earnings expectations under different schooling scenarios. They were asked to state their expectations for the same three points of time as in the case of average salaries.

to qualifications. *Figure 3.3* shows the mean estimated wage profile and the real wage profile[60] both for workers with secondary school and higher educational qualification. The deviation of the mean estimated earnings from the true ones was about 10 per cent. The median of the estimations were even closer to the real earnings. The only exception was the earnings estimation for workers with a higher educational degree at age 40. The mean estimated earnings were 30 per cent; the median estimation was about 20 per cent higher than the actual mean earnings. As estimate errors for earnings with a secondary school diploma do not increase as we are moving to the upper end of the experience profile, it does not seem a likely assumption that the cause of the relatively high estimate error for earnings of workers with a higher educational qualification at age 40 is that students have less knowledge on earnings of the older age-groups in general. A more likely explanation is that students do not have information on the revaluation of experience after the transition. Students assumed that earnings increase with age and hence that earnings at age 40 are higher than at age 30 such assumption usually corresponding to the characteristics of age-earnings profiles, but in Hungary after the beginning of the transition the rise in the return to formal education was accompanied by a strong devaluation of market experience acquired during the socialist era, especially for workers with at least college education (see *Köllő* 2000) and this was overlooked by students when they made estimations for earnings of people with a higher education qualification at age 40.

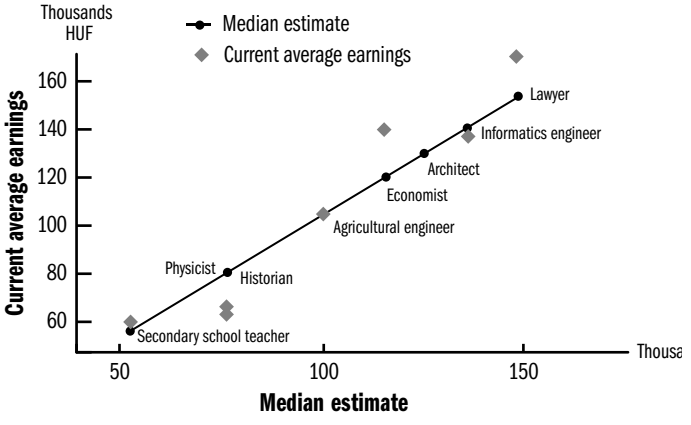
Figure 3.3: Estimated (median) and true wage profiles with secondary school and higher educational qualification



60 Data on actual earnings come from the Wage Survey conducted by the National Labour Center.

Students in general also made fairly accurate perceptions of average salaries by occupation at age 30 (*Figure 3.4*). The estimate error of the median was less than 10 per cent for all professions but for economists and lawyers. In the latter cases student's estimations were lower than current actual earnings by more than 10 per cent.

Figure 3.4: Estimated and current average earnings of different occupations at age 30 (1,000 HUF)



Students' earnings expectations

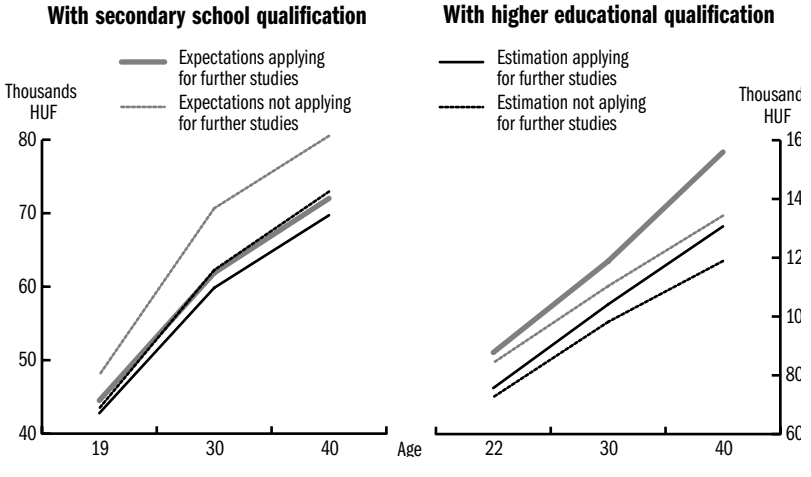
In schooling decisions it is not the beliefs about what current average earnings are which might have a role but the earnings expectations. Knowledge on current average earnings influences earnings expectations, but expectations may differ from wage beliefs for several reasons. First students' expectations reflect the assumption of the value of their schooling when they enter the labour market. Students may think that future relative earnings would differ from current ones, for example as a consequence of a shift in supply and demand for the differently educated labour. Furthermore there are very wide dispersions around the average in earnings. Students may think that because of their personal characteristics they have better labour market prospects than the average college/university graduate, for example by having better abilities, or finding an appropriate job in a better region, etc.

On average students earnings expectations were higher than their earnings estimations both for those with secondary school and with higher educational degree. Students' earnings expectations were about 5 per cent higher in the case of finishing their studies with a secondary school degree than their estimates for current earnings. Their expectations based on a higher educational qualification were about 20 per cent higher than their estimates. As students had good perceptions about current average earn-

ings the deviations of expectations from current average earnings are not likely to be caused by the lack of information. It may rather reflect the fact that students anticipate further increase in relative wage differences in the future or they may show that on average students assume that their own abilities and/or possibilities are going to be above the average.

The variety in students' earnings expectations was greater than in their earnings estimates, that is there are greater differences in students' judgment of their own possibilities than the average possibilities.[61] *Figure 3.5* displays earnings estimations and expectations of students by their intention of applying for higher educational studies. As far as wage profiles with secondary qualifications are concerned, students who don't want to continue their studies after finishing secondary school think the earnings possibilities of the average worker with a secondary school qualification are better than students who want to apply for further studies and the previous group think their own earnings potential with secondary school qualification to be the best. On the contrary students who will apply for further studies give higher estimations for average earnings with a higher educational qualification and are even optimistic concerning their own future earnings possibilities with a higher educational degree.

Figure 3.5: Estimations of current average earnings and wage expectations by intention to further studies



Students were also asked to evaluate their own chances of getting an appropriate job if they were to finish studying after graduating from secondary school and also in the event that they were admitted to college or university and they received their degree. The higher educational level students are of the view that there would be a greater increase in their employment probabilities expected from further studies. Students who are applying for

61 Standard deviation of earnings estimations were between 38 and 48 per cent, while that of earnings expectations was between 65 and 115 per cent.

higher vocational training expect a 7 percentage point increase in their employment probability, students who are applying for college an increase of 14, students who are applying for university studies an increase of more than 17 percentage points. Students' expected employment probability after graduation from higher education is lower than that of the current employment probability of graduates. The employment rate of graduates who have finished their studies in 1999 at universities was 78 per cent while for those who were studying in colleges it was 72 per cent one year later, in 2000 (the year when the survey of secondary school students were carried out). The reason for the relatively low expectations in employment probability might be that students don't have information on the employment prospects of graduates, but it also may reflect the fact that students take into account that as a consequence of the growing number of graduates employment prospects will worsen in the future for graduates with a higher educational degree.

Role of earnings expectations on application decisions

For analyzing the role of labour market expectations on application decisions we used a model[62] in which the probability of application was the function of labour market expectations, socio/economic status of students, type of secondary school, and ability. Three variables were used for describing labour market expectations: (i) the net present value of additional lifetime earnings with higher educational degree,[63] (ii) the expected probability of getting an appropriate job with a secondary school and (iii) with higher educational qualification. Socio/economic variables include per capita family income, highest educational qualification of father and mother, and a dummy variable indicating whether the student is studying at the same settlement where his or her family home is. Ability was measured by students' so-called "accumulated score".[64]

Table 3.2 reports the estimation results. Labour market expectations as far as the expected present value of net (additional) lifetime earnings are concerned have a significant effect on the probability of applying for further studies and on the decision as to which level of higher education to apply for. The higher the expected net lifetime earnings of a student the higher is the probability that they will apply for further studies. Expectations of job opportunities on the other hand have no significant effect on the educational decision of secondary school students. Neither those whose expected employment probabilities are higher with a secondary school degree apply for higher educational studies with a lower probability, nor those whose expected probability of finding a job are higher with higher educational qualification apply with greater probability for further education.

62 Ordered logit model. Dependent variable: 1 – not apply for further studies; 2 – apply in post-secondary vocational training; 3 – apply for college education; 4 – apply for university education.

63 For each student it was computed using their earnings expectations. It was assumed that earnings rise linearly between the points of time students made expectations for and the peak earnings occur at age 40 and then it is maintained until retirement. The estimated expected lifetime earnings were discounted with a discount rate of 10.

64 Accumulated score is based on students' secondary school achievement, grade point averages, language exams, etc.

Table 3.2: Determinants of application for further studies

Variable	Coefficient
Gender	
Male	0.5531[a]
Type of school	
Vocational secondary school	–0.7780[a]
Gymnasium 8 grades	0.3559
Gymnasium 6 grade	0.4964[a]
Labor market expectations	
Expected net lifetime wage gain	0.0004[a]
Expected probability of finding a job with a secondary school qualification	–0.0007
Expected probability of finding a job with a higher educational qualification	0.0022
Family background	
Studying at the same place where living	0.2255[a]
Father with secondary school qualification	–0.0711
Father with higher educational qualification	0.0172
Mother with secondary school qualification	0.0967
Mother with higher educational qualification	0.5401[a]
Per capita family income	
-30 000 HUF	–0.1575
31,000–50,000 HUF	–0.1733
51,000–100,000 HUF	–0.0838
Ability	
Accumulated score	0.1186[a]

Dependent variable: 1 = not apply for further studies; 2 = apply in post-secondary vocational training; 3 = apply for college education; 4 = apply for university education.
[a] Significant at 0.1 % level.
Cut 1: 0.1953; Cut 2: 1.8933; Cut 3: 6.2382.
R^2:0.2262; Number of observations 2141.

Two of the family background variables proved to have a significant effect on the probability of application. Students whose mother had at least a college degree apply for further studies with higher probability, furthermore students whose secondary school is on the same settlement where they are permanently living are also more likely to try entering a tertiary educational institution. The other variables indicating the educational attainment of parents have no significant effect on the probability of application, neither the secondary school qualification of the mother, nor the secondary nor the higher educational qualification of the father. The estimated coefficients of per capita family income were insignificant also, that is per capita family income not affecting directly the probability of application if other variables are controlled for. It seems that family income has an indirect effect on the probability for further studies by influencing earnings expectations. Students from lower income families expect a significantly lower wage-gain from higher educational studies,[65] a lower expected wage gain then decreases the probability of application.

65 Estimations regarding the determinants of earnings expectations see in *Varga* (2000).

The results highlight regional inequalities in application probability. There are secondary schools in all towns and cities in Hungary, therefore the majority of students studying at secondary level away from their family homes are from villages. These students are less likely to apply for further studies than the members of the reference group which may be the consequence of the considerably higher costs of further studies they have to bear.

Estimation results show that the type of secondary school also has a significant impact on the probability of a students' decision for application. Students who were studying in vocational secondary schools are significantly less likely to make an application than students who were studying in gymnasiums (4 grade) indicating that the stratified Hungarian secondary school system may increase the costs of further studies for students enrolled in vocational secondary schools. As expected, higher ability significantly increases the probability of application; more able students are more likely to continue their studies. There are significant gender differences also; men will apply for further studies with a greater probability.

Summary

In this chapter we first examined whether secondary school students have a good perception about wages by educational attainment in order to point out if when students earnings expectations deviate from current average earnings it can be put down to lack of information or might be caused by other reasons. We found that students in general have fairly accurate perceptions of current average earnings by educational attainment and field specialization when they form their expectations. The most important finding concerning students' earnings expectations was that students – whichever level and field specialization they apply for – expect much higher earnings with a higher educational qualification and slightly higher earnings with secondary school qualification than the current average earnings, that is they expected a wage gain higher than what can be observed currently. This may reflect the fact that students anticipate a further increase in relative wage differences in the future or it may show that students assume that their own abilities and/or possibilities are going to be above the average.

In the second part of the analysis we examined the role of labour market expectations in students' enrolment choices. The results confirmed that expected net life-cycle wage gain has an effect on educational decisions: on whether to apply for further studies and which level to apply for. It means that estimation results confirmed the assumptions of models which describe educational choices in a utility maximizing framework. The influence of expected employment probability proved to be insignificant. It suggests that the assumption that some may choose further studies simply to avoid becoming unemployed is not well-founded. It also turned out that most

of the family background variables do not have a direct effect on enrolment decisions, family background influences students' choices indirectly through earnings expectations.

4. TRANSITION FROM SCHOOL TO WORK

4.1 Changes in the Chances of Labor Market Entry and in the Structure of Entry Occupations

PÉTER RÓBERT

Structural changes in the economy have significantly affected the occupational structure as well as the labor market during the last one and half decades in Hungary. When analyzing changes over time and when the comparison goes back to the former state socialist times, the common experience indicates that "historical effects" generated by the political transformation have an especially strong impact on young cohorts. Accordingly, we assume that the economic processes in the nineties such as the shrinking of the labor force and increasing flexibility on the labor market had a stronger influence on the circumstances of labor market entry and more marked changes have appeared in the structure of the young labor market entrants. In fact, the entry occupations display the consequences of structural transformation in a pure form, while the distribution of the full occupational structure involves the results of further individual occupational moves during the life course.

Structural changes in the labor market entry

Table 4.1 displays the distribution of entry occupations in the light of two aspects. Data related to the nineties is compared to the earlier "socialist" data from the eighties, on the one hand, and, on the other hand, the changes in the time of labor market entry are compared to the modifications displayed by the complete occupational structure. Tendencies are investigated separately for men and women.

A relative majority of young men started to work as manual workers in both periods but there is a decline from 43 to 32 per cent over time. For the young women, the highest rates for entry jobs belong to the categories of low grade supervisors and routine non-manual workers. While the proportion of manual workers indicates a declining trend in the occupational structure between 1983 and 2000 (the Hungarian economy is becoming more post-industrial), it is noteworthy that a higher rate of men entered the labor force as unqualified workers in the nineties than in the eighties.

There are signs that more young people entered into the shrinking labor market in unqualified occupations – while the recent generation of youngsters is more educated than previous ones.

Table 4.1: Distribution of entry occupations by the time of labor market entry, and the distribution of the occupational structure in the same periods (per cent)

Category*	Labor market entry in the		Occupational structure in		
	1980s	1990s	1983	1992	2000
Men					
High supervisers	7.4	6.3	8.6	8.5	10.3
Low suprvisers	9.4	12.0	9.1	10.5	10.1
Routine non-manuals	2.0	3.4	2.6	1.9	2.3
Routine service	4.2	8.5	2.0	2.5	3.9
Self-employed with employee	0.5	1.3	–	–	2.4
Self-employed without employee	1.3	4.3	1.8	4.2	5.4
Self-employed in agriculture	1.1	0.7	0.9	1.1	1.9
Technician. foremen	7.0	4.8	2.5	1.7	7.5
Skilled worker	42.7	32.4	31.8	33.5	24.2
Semi-/unskilled worker	17.5	21.5	28.0	26.4	24.2
Agricultural laborer	6.9	4.8	12.5	9.7	7.8
Total	100.0	100.0	100.0	100.0	100.0
N	786	766	13,991	11,805	4,310
Women					
High supervisers	4.9	3.1	3.6	3.7	6.5
Low supervisers	22.8	21.8	15.7	17.6	19.7
Routine non-manual	20.6	20.3	12.9	15.4	14.5
Routine service	12.8	18.9	6.2	8.0	10.6
Self-employed with employee	0.5	0.4	–	–	0.8
Self-employed without employee	1.1	3.6	1.0	2.0	3.2
Self-employed in agriculture	0.2	0.3	0.3	0.4	0.4
Technician. foremen	3.3	2.1	0.4	0.4	3.8
Skilled worker	14.5	10.7	14.2	13.1	9.9
Semi-/unskilled worker	17.2	17.9	28.8	29.1	24.5
Agricultural laborer	2.1	0.9	17.0	10.3	6.1
Total	100.0	100.0	100.0	100.0	100.0
N	819	672	14,891	13,357	4,687

* Classification is based on the so-called EGP schema.

Source: Living conditions and time use survey, Central Statistical Office (CSO), for the labor market entry; Social stratification and life course survey, *CSO* (1983, 1992), and Living conditions and time use survey, *CSO* (2000) for the occupational structure.

The proportion of those who started to work in routine service jobs has doubled for men (4.2 vs. 8.5 per cent) between the eighties and the nineties, and almost every fifth of the young women had such an entry job in the nineties. There is a general increase for this occupational category (e.g. jobs in trade, catering), but the tendency is more marked for labor market entrants. A further typical feature of labor force entry is the decline

of numbers entering positions in high grade supervisor jobs between the eighties and nineties, and this holds for both young men and women. The percentage of the entry into low grade supervisor jobs has increased for men. Nevertheless, the proportion of high and low grade supervisors in the full occupational structure increased over time between 1983 and 2000. Thus, young people have probably a good chance to move upwards during their occupational career, they do not remain in their first, perhaps worst job forever. An important feature is that in the nineties more young people entered the labor market as self-employed than in the eighties. A similar trend in the increase of self-employment can be observed for the whole occupational structure. At the same time, the increase of self-employment also means that probably more young people enter into the labor force in more flexible and atypical jobs.

In sum, structural changes in entry jobs indicate unfavorable tendencies in comparison to the structural changes of the complete occupational structure. The latter one basically displays an increase in the post-industrial character, and an improvement of the occupational structure. This, however, is *not* a consequence of a cohort change, i.e. the labor market entrants start to work in higher status jobs. Their situation – at least in the short run, from the perspective of the "quality" of their first jobs – has become more difficult. As an explanation, we argue that transition from school to work has become a longer and more flexible and uncertain process in Hungary. An entry job means something different in the nineties than earlier because more youngsters start to work during their studies. This means that we can observe more "life-cycle jobs", using the term introduced by *Oppenheimer and Kalmijn* (1995), and this is a different and new situation in comparison to the earlier one when young people entered into fulltime jobs only when they completed their studies. Entry jobs are more temporary in the nineties than they used to be in the eighties. In the last decade of socialism the majority (about 60 per cent) of the labor market entrants spent more than two years in their first job. This percentage fell to 40 per cent in the nineties and the proportion of those who left their first job after 6 months doubled. In fact, one-fifth of the labor market entrants spent less than 6 months, another one-fifth 6–12 months and a further one-fifth 12–24 months in their first job in the nineties. Interestingly, those who started to work before completing their studies spent longer in their entry jobs, while the first job change occurred faster for those who started to work only after leaving education (*Róbert* 2003). As a general feature the Hungarian labor market is of greater assistance to the insiders, the prospects of the outsiders are always worse. Seemingly, the labor market requires more sacrifice from the outsiders for an entry than earlier.

Changes in the odds of labor market entry between the eighties and nineties

In order to analyze the changes in the odds of labor market entry, a dataset is used where youngsters were interviewed who have completed full-time education and tried to find a first job. We have three research questions (dependent variables). First, we investigate if one was able to enter the labor force at all; second we analyze how odds of labor market entry have changed for employees and self-employed and for employees in the public and private sector. Third, we focus on the odds of entering into a concrete occupational category (*see Table 4.2*).

Table 4.2: Changes in the odds for labor force entry and for the character of the entry jobs between the eighties and nineties*

Category	Odds**	
	Men	Women
Probability of entry into the labor force	0.8886[b]	0.9054[a]
Sector for labor market entry		
– self-employed	1.3834[a]	1.0685
– employee in private sector	1.1270[b]	1.2176[b]
– employee in public sector	0.5003[b]	0.6427[b]
Entry job		
– high supervisers	0.8122	1.4010
– low supervisers	1.2515	0.8019[b]
– routine non-manual	1.3467	0.9222
– routine service	1.3294[a]	1.5386[b]
– skilled worker	0.6840[b]	0.8457
– semi-/unskilled worker	1.1714[a]	0.9543

* Discrete event history analysis was performed. For labor market entry it is binary logit estimation, entered (1) or did not enter (0) into the labor force. For the sector or for the concrete entry job category it is multinomial logit estimation with the reference: did not enter into the labor market.

** If the odds is lower than 1, the probability of the event examined has declined, if the odds is larger than 1, the probability of the event examined has increased between the eighties and the nineties.

[a] Significant estimation at $p < 0.1$ level.

[b] Significant estimation at least $p < 0.05$ level.

Results indicate that labor force entry became more difficult for youngsters in the nineties than it used to be in the eighties. Statistical estimates show that the odds of successful labor market entry have declined by 11 per cent for men and by 9 and a half per cent for women from one decade to the other. The probability of labor entry as a self-employed person has increased for men to a considerable extent, by about 38 per cent. A rise appears for women, too, but it is not statistically significant. For a better interpretation of this finding, we ought to know more about the circumstances of labor market entry. We have no information on the op-

tions, whether young men used the new entrepreneurial and market opportunities, whether they entered the labor force as self-employed more frequently than earlier, or we are faced with the well-known phenomenon that employers tend to employ young people if they can provide an invoice for their work and the employer can thereby save on the additional labor costs and taxes in this way.

For labor force entry in the nineties, there is an increase in the odds of finding a first job in the private sector and a decrease in the odds of starting in the public sector in the case of both sexes, in comparison to the eighties. Odds of labor market entry in the private sector increased greater for women (22 per cent) than for men (13 per cent); the probabilities of having an entry job in the public sector decreased mostly for men (50 per cent) but also for women (36 per cent). One explanation is obviously the spread of the private employment in the nineties, as a consequence of the privatization of companies. At the same time, insiders have especially safe and favorable employment conditions in the public sector, thus outsiders such as labor market entrants have more difficulties in finding a job there because "there is no vacancy". Furthermore, the tendencies reveal that changes in the odds of labor force entry increased gender segregation among employees in the public and private sector.

A further characteristic change in labor force entry is that youngsters have much higher probabilities (men by 33, women by 54 per cent) of entering simple service jobs, which do not require high qualifications. A similar trend for men is that the odds of entering the labor market as a skilled worker declined by 32 per cent, while the odds of an entry job as an unskilled worker increased by 17 per cent. These tendencies are in line with our descriptive results but the present model gives us information about labor force entry after the completion of fulltime education, thus results are not affected by the less qualified "life-cycle jobs". For women, the probability of an entry job in the low service class has also decreased by 20 per cent. Changes for other occupational categories between the eighties and nineties are not statistically significant.

Level of schooling completed has evidently an impact on the odds of labor force entry. Estimates presented in *Table 4.2* are taken from such equations, where estimates are controlled for education. According to those results not presented here, higher educational investments increased the odds of successful labor market entry. The "most useful" qualification in the Hungarian labor market is the degree obtained through tertiary education, frequently not the university but the college degree. Not surprisingly, compulsory (primary) level of schooling is hardly enough for finding an entry job, but even a grammar school education has less value in the labor market in comparison to some vocational training. A higher level of school-

ing increases the odds of finding a higher status job as well; labor market entrants having a tertiary level of schooling have more chance of finding an entry job as managers or professionals in the nineties in comparison to the eighties. At the same time those youngsters without any qualification found themselves in a more disadvantaged situation; completion of some vocational training has increasingly become an entry requirement even for unskilled jobs, which do not require any qualification.

This short piece of writing does not allow for the presentation of all findings in detail. The complete model for labor force entry also took into account that a small number of young people who could not enter into the labor market have returned to school (*Róbert* 2002). A further characteristic of the entry process is that the search period has lengthened for the nineties in comparison to the eighties (*Róbert* 2003). However, if someone was not able to find a job within 1–2 years after completion of education, their chances have become worse as time has passed by (*Róbert* 2002). The value of the qualification (if any) has declined, on the one hand, and on the other employers tend to consider it a bad signal if somebody could not find any job for a lengthy period,. This means that accepting even a poor job offer can be a useful strategy for a young person because one can continue to search for a better job even while being in employment and employers appreciate more labor force experience. Finally, one more result shows that a significantly higher proportion of youngsters entered the labor force in jobs with fixed-term contracts in the nineties than in the eighties (*Róbert* 2003). This is also an indication of the increasing flexibility of labor market entry.

4.2 Ambitions and Chances of Secondary School Leavers

ILONA LISKÓ

In recent years the ambitions of secondary school pupils to continue their studies have increased substantially, while less school leavers plan to start working immediately after finishing school. This study presents the results of a repeated questionnaire-based survey on continuing education and labour market prospects provided by different types of secondary schools conducted among secondary school pupils.

At the time of the first survey one third of pupils in the last year of their secondary studies planned not to continue their education but to take up a job after leaving school. This ratio was lowest among students of gymnasiums (less than 10 per cent of those studying in 6 or 8-grades gymnasiums and slightly more than 10 per cent of those studying in regular 4 grades gymnasiums), but also applied to around half of secondary vocational secondary school students (42 per cent) and to vocational training

school trainees (56 per cent). Those planning to take up a job were those who were performing more weakly, moreover the larger the settlement and the higher the education levels of parents were, the lower was the propensity to find a job after leaving secondary school.

Table 4.3: Distribution of students according to their plans to start working/continue their education, and their labour market status after leaving school (per cent)

	Plans before			Labour market status after finishing secondary school				
	Start working	Continue education	Total	Student	Employed	Unemployed	Other	Total
Gender								
Male	38.6	61.4	100.0	69.0	15.5	6.5	9.0	100.0
Female	26.5	73.5	100.0	66.5	15.6	12.3	5.6	100.0
Type of settlement								
Budapest	28.1	71.9	100.0	70.7	14.7	7.3	7.3	100.0
County capital	26.1	73.9	100.0	71.7	16.6	5.0	6.7	100.0
Town	25.0	75.0	100.0	68.5	16.7	5.6	9.3	100.0
Small town	33.5	66.5	100.0	70.7	14.1	8.7	6.5	100.0
Village	41.1	58.9	100.0	59.0	16.7	16.7	7.7	100.0
Education levels of parents								
Lower secondary school	45.8	54.2	100.0	63.6	9.1	9.1	18.2	100.0
At least vocational training school	46.8	53.2	100.0	53.9	20.2	16.9	9.0	100.0
At least upper secondary school	33.1	66.9	100.0	66.7	19.2	8.3	5.8	100.0
At least higher education	25.1	74.9	100.0	86.7	2.2	4.4	6.7	100.0
Both higher education	12.5	87.5	100.0	86.0	8.0	2.0	4.0	100.0
Type of school								
Gymnasium 6 or 8 grades	9.4	90.6	100.0	97.1			2.9	100.0
Gymnasium 4 grades	13.0	87.0	100.0	88.9	4.9	1.3	4.9	100.0
Vocational secondary school	41.5	58.6	100.0	66.4	14.6	10.9	8.0	100.0
Vocational training school	55.7	44.3	100.0	35.4	35.4	19.5	9.8	100.0
Total	32.6	67.4	100.0	67.4	15.8	9.6	7.2	100.0
N			1,808					335

The results of the repeated survey show that 6 months after leaving secondary school more than two thirds (68 per cent) were full time students, thus previous plans on continuing education are fulfilled, and even exceeded because the share of actual full time students is higher than the ratio of those planning to continue education before finishing secondary school (*see Table 4.3*).

Considering the extent to which plans to continue education were realised in different groups of secondary school leavers, it can be concluded that among girls slightly less than those planning to do so actually did go on studying. Plans failed to the greatest extent among vocational training school leavers (instead of 44, 35 per cent continued their education).

Plans to take up a job were realised to a much lesser extent than those to take up further education. Only 16 per cent of those leaving secondary

or vocational school in the spring of 2003 started to work, another 10 per cent became unemployed and 7 per cent were in the so-called other inactive category, i.e. either they were doing their military service or were on maternity leave. According to the type of secondary school, plans failed to a greatest extent among vocational secondary school leavers. Among vocational training school leavers only slightly more than half of those who had previously indicated such intentions were in employment. Among vocational training school leavers the total share of the employed and the unemployed approximately equalled the percentage of those who planned to take up a job after leaving school. This suggests that their plans failed because of the shortage of adequate jobs. At the same time, among vocational secondary school leavers the total share of the employed and unemployed was 10 per cent lower, while the share of those continuing their education was 10 per cent higher than originally planned. Thus this group modified their plans to a greater extent and continued studying rather than entering the labour market.

Considering those in employment 34 per cent of vocational secondary school leavers worked in their original vocation, (15 per cent in non-blue-collar positions and 19 per cent as skilled workers but in their original profession), 7 per cent worked as skilled worker in other trades, and 22 per cent had to take up semi-skilled or unskilled jobs. Among those who finished vocational training school, 58 per cent worked in their vocation, and 32 per cent did semi-skilled or unskilled work. In conclusion, this means that 6 months after finishing school only 5 per cent of vocational secondary school leavers and 20 per cent of those who had finished vocational training school were in employment. This indicates a fundamental change and suggests that the times are past when young people could leave secondary school with clear career expectations and trust that their vocational qualifications would help them secure their existence.

Data on further plans of last year secondary school pupils suggest that their labour market position is very insecure. Most of them are still trying to find their place, thus their situation – regardless of whether they are in employment or unemployed – can not be considered stable or long-term. 40 per cent of vocational secondary school leavers and 50 per cent of vocational training school leavers who did not continue their education experienced unemployment in the previous six months.

80 per cent of the unemployed vocational secondary school and 64 per cent of the unemployed vocational training school leavers claimed that they had no possibility of taking up casual work. Those who do have, often have to accept jobs that are not related to their qualifications. Apparently, this also plays a role in the fact that 60 per cent of the unemployed vocational secondary school leavers and 56 per cent of the unemployed vocational

training school leavers said they wanted to find a job as soon as possible. Others planned to continue their education which they expect would improve their labour market situation. Entrepreneurship and starting up an own business appeared among the long term plans of only a few youngsters, possibly due to the lack of knowledge, skills and capital.

If not only full time students, but all those who continue their education after leaving secondary school are taken into account, then it can be concluded that only 20 per cent finished their education at the secondary level (*see Table 4.4*). Therefore, both the plans and the actual situation of young people show that for the majority of them finishing from secondary school does not mean the end of their schooling.

Table 4.4: Continuing education after secondary school by characteristics of students (per cent)

		Student					
		Higher education		Secondary level			
	No studies	Full time	Part-time	In vocation of the first qualification	In new vocation	Out of level	Total
Gender							
Male	18.7	31.6	1.9	19.4	21.9	6.5	100.0
Female	19.6	38.5	3.9	11.7	20.7	5.6	100.0
Type of settlement							
Budapest	12.2	31.7	9.8	17.1	22.0	7.2	100.0
County capital	15.0	55.0	1.7	15.0	8.3	5.0	100.0
Town	14.8	40.7	7.4	16.7	16.7	3.7	100.0
Small town	16.3	37.0	0.0	10.9	29.3	6.5	100.0
Village	30.8	16.7	1.3	17.9	25.6	7.7	100.0
Education levels of parents							
Both lower secondary school	18.2	18.2	0.0	27.2	36.4	0.0	100.0
At least vocational school	29.2	9.0	2.2	19.2	30.3	10.1	100.0
At least upper secondary school	21.7	33.3	5.0	15.0	18.3	6.7	100.0
At least higher education	0.0	64.4	0.0	17.8	15.6	2.2	100.0
Both higher education	6.0	74.0	2.0	2.0	16.0	0.0	100.0
Type of school							
Gymnasium 6 or 8-grades	0.0	80.0	2.8	5.7	8.6	2.9	100.0
Gymnasium 4-grades	4.9	74.1	4.9	3.7	11.1	1.3	100.0
Vocational secondary school	18.2	21.2	3.6	22.6	24.1	10.3	100.0
Vocational training school	43.9	1.2	0.0	18.3	31.7	4.9	100.0
Labour market status							
Student	0.0	52.2	0.9	17.7	26.5	2.7	100.0
Employed	69.8	0.0	5.7	5.7	11.3	7.5	100.0
Unemployed	68.8	0.0	0.0	3.1	3.1	25.0	100.0
Other	25.0	0.0	20.8	29.2	16.7	8.3	100.0
Total	19.4	35.2	3.0	15.2	21.2	6.0	100.0

School leavers continue their studies approximately equally at tertiary and secondary levels (38 and 36 per cent respectively). Over one third (35 per

cent) of the total is enrolled full time and 3 per cent part time in higher education. 15 per cent of school leavers continued their education in their original vocation and 21 per cent started learning a new trade at secondary level. In addition, 6 per cent of the school leavers participated in training. The choice between the different forms of further education is clearly related to the type of secondary school and the social status of the pupil. The percentage of those who did not continue their education was highest among vocational training school leavers (44 per cent) and those of lower social status.

Considering the type of secondary school, it can be concluded that the ratio of full-time tertiary education students is well above the average among graduates from gymnasiums. Secondary vocational school leavers tend to continue their vocational education at secondary level above the average, while vocational training school leavers often start to learn new vocations. Thus "re-training" immediately after leaving school – either as a result of previous wrong choice of vocation or lack of labour market demand – is most common among vocational training school leavers. Looking at the social status of the pupils, it can be argued that full-time tertiary education is predominantly an option for those with higher social status, while for those from a less favourable social background continued secondary education or training courses offer a possibility to pursue further studies. Considering participation in further education from the perspective of labour market status, we see that one third of those in employment are involved in education or training, mainly in some form of secondary education. Also one third of the unemployed are studying, most likely participating in training or labour market programmes, and 75 per cent of the other inactive category indicates involvement in some sort of education or training.

As far as motivation is concerned, nearly half of the secondary school leavers (45 per cent) who decided to continue their education hoped to have a better job as a result, and almost the same percentage (47 per cent) claimed that they wanted to learn more, gain new knowledge. One third of the school leavers (27 per cent) expect better payments, while nearly one fifth wanted to postpone entering the labour market. 7 per cent answered that they continued their education because they had no chances of finding a job after leaving secondary school. In conclusion, these figures show that most young people expect an improvement of their labour market prospects from further education.

In the autumn of 2003 only 49 per cent of secondary school leavers claimed to be fully satisfied with their own situation. Among them, full time students were over-represented. The majority of school leavers thought they could rely on the support of their families (87 per cent) and friends (60 per cent) in achieving their aims. However only 8 per cent expected

support from their school and nearly one third (31 per cent) claimed that besides their families they could rely only upon themselves. Taking into consideration other factors as well, it can be concluded that for pupils with more favourable social status (i.e. parents with higher education, secondary school pupils) both the personal social network and the institutional network (school) provided stronger support, and unemployed youth felt most of all that they could only count on their families and themselves to realise their ambitions. In other words, those secondary school leavers whose families can provide least help are most likely to be left without support.

4.3 Labour Market Success of Higher-education Graduates

PÉTER GALASI

In this section we focus on the labour market success of higher-education graduates by analysing their wages and labour market status on samples of the first and second FIDÉV surveys (FIDÉV1 and FIDÉV2).[66] We will use the pooled sample of these surveys as well (FIDÉV12). The two surveys differ in their variables, and for this reason some specifications are only run on FIDÉV1 or FIDÉV2.

Determinants of wages of higher-education graduates

One of the most important indicators for labour market success is the wage a person is able to obtain on the labour market. We consider the following elements: 1. whether university as compared to college education, and 2. in-school labour market experience produces any wage premium, 3. whether more diversified knowledge taught at the higher education institutes leads to higher wages, 4. whether some rather general skills such as knowledge of foreign languages and mastering IT have an impact on wages. (Section 2.4 focuses on the role cost-priced and state-funded higher education might play in wage formation).

The problem is treated in a simple Beckerian-Mincerian human-capital setting (*Becker* 1975; *Mincer* 1975), where earnings are related to two components of human capital: education and labour market experience. As a dependent variable the natural log of wage rate, constructed with the help of net monthly wage and working time, is used.

The average wage rates are 467 (FIDÉV1) and 621 HUF (FIDÉV2), respectively. For the pooled sample, where 1999 wages are converted to 2000 prices, this amounts to 566 HUF. Due to lack of comparable data it is hard to say whether these wage rates are high or low. In terms of net monthly wages, however, our career-beginners earn 11.8 per cent (FIDÉV1) and 16.5 per cent (FIDÉV2) more than the average Hungarian employee does in the same year.

66 The first survey contains information on the September 1999 labour-market situation of young career-beginners graduated from public higher education as full-time students in 1998 (FIDÉV1). The second one describes the 2000 labour market situation of persons graduated from higher education as full-time students in 1999 (FIDÉV2).

Education is measured by a dummy: whether the individual has a college or bachelor (= 0) or a university or master (= 1) degree. University diploma-holders constitute about 40 per cent of the samples. Labour market experience is in-school (*Light* 2001), it is also proxied by a dummy variable: whether or not the respondent worked regularly for pay during their studies (0 = no, 1 = yes). The proportion of persons having in-school labour market experience is 30 per cent in the sample (FIDÉV2). We insert a gender dummy in order to capture women's relatively disadvantageous labour market position (women = 1). The proportion of women in FIDÉV1 is about 54 per cent. The customary way of treating the gender wage-gap is to estimate earnings equations for men and women separately. Here we do not do this, because the persons in our samples are at the beginning of their labour-market life-cycle and all have higher-education diplomas. Differences attributable to either family division of labour or labour market discrimination are likely to be formed during later phases of the life cycle due to marriage and/or child rearing. The standard result is, however, a negative parameter estimate for the coefficient, although it might be that estimated gender differences will be zero, as the literature on the subject, at least for Central-European transition countries, detects a very important decline in the gender pay-gap (*Brainerd* 2000 *Hunt* 2002). In addition, we use two dummies for foreign language skills (whether the respondent speaks English or German, FIDÉV1), and a dummy that is intended to proxy the IT skills of the respondent (whether they regularly use the Web when working, FIDÉV1). If these skills become more valuable on the labour market of a transition economy in the '90s, as the stronger integration of Hungary as a small and open economy into the European economy and the direction of the so-called skill-biased technological changes suggest, we expect positive signs for these variables.

The diversity of initial skills might be important for higher-education graduates, since it can affect both their access to jobs and the returns to human capital on a labour market with heterogeneous jobs and skill requirements. Two variables, that might have something to do with skill diversity acquired in a higher education institution, are added to the wage equation. The first one is a dummy measuring that the graduate has one or two fields of study (0 = one, 1 = two); 16.5 per cent (FIDÉV1) and 21.1 per cent (FIDÉV2) of persons in the two samples have two fields of studies. The second one is an occupational concentration index[67] that shows how individuals with a given type of education are distributed among occupations. Some types of education provide skills that might be useful for a relatively large number of occupations – they are labelled "broad" fields of education by *van Smoorenburg and van der Velden* (2000) –, some prepare students for a small number of occupations ("narrow" fields of study).

67 For a detailed description of the index see section 2.4. footnote 51.

The concentration index is used to proxy this problem. Its value is zero if individuals with a given type of education are employed in only one occupation, it is unity if individuals with a given type of education are distributed evenly among occupations. A type of education with zero value is, in this sense, very "narrow", whereas a type of education with a unit value is very "broad". "Narrower" fields of study can assure an education/job match of better quality but with relatively high searching costs, that is, it might be costly to find a good match due to the "narrowness" of the type of education. "Broader" types of education might result in a match of worse quality but with relatively low costs of searching. The question is whether "narrower" or "broader" types of education provide advantages in terms of wages. They might work in both ways depending on the actual structure of labour demand and the resulting searching costs of finding a job with given skill requirements. If the parameter estimate of the variable is positive, that means that a person with a "narrower" type of education is worse off since they could not find a good education/job match. If the reverse holds true then an individual with a "broader" type of education will be worse off in terms of wage premium for the same reason. In the case of job-starters the type of education they have obtained might be important, that is why a series of type-of-education dummies is inserted into the models. In Hungary an important point of the debate on higher-education policy is the quality of cost-priced education. In order to see whether this results in higher or lower wages the equations include a cost-priced dummy (FIDÉV2).[68] Equations for the pooled sample also comprise a dummy (Wave) indicating that observations are from the first or the second surveys, that is, capturing changes in the labour situation of the young between the two surveys, if any.[69] The results of the most important parameter estimates of different specifications are displayed in Table 4.5.[70]

University education yields extra wages as compared to college education for all the samples and specifications: 19 and 22 (base and extended models, FIDÉV1), 25 and 27 (base and extended models FIDÉV2), and 20 per cent (pooled sample).[71] The estimates do not confirm that in-school experience has an impact on wages. Another important result is that cost-priced and state-funded students do not differ in terms of wage rate. Having one or two fields of study do not produce any wage advantage for the second wave, but leads to significant wage premium for the first one. As regards the occupational concentration index, the graduates differ in their accessibility to jobs, due to the skills embodied in the type of education they have. The results are mixed as to whether "broader" or "narrower" types of education lead to higher wages or not. As for the first wave the answer is that they definitely do not. However, this factor has an impact on wages for the second wave.

68 The impact of cost-priced education on the labour market success of graduates is discussed in section 2.4.

69 Due to endogeneity of education (*Card* 1998; *Bound – Solon* 1999), simultaneity of wages and working time (*Killingsworth* 1983 *Mroz* 1987), or ability bias (*Willis – Rosen* 1979; *Maddala* 1983), wage equations are estimated by 2sls with using instruments (*Bedi – Gaston* 1999; *Brunello – Miniaci* 1999; *Levin – Plug* 1999). We have checked both the endogeneity of variables and the validity of instruments (*Wooldridge* 2002).

70 The models also include variables capturing occupational and regional labour market effects. For detailed results see *Galasi* (2003a).

71 Note that returns to university education are higher if the wage equations are estimated by 2sls as compared to ols estimations. It is not an unusual result (*Card* 1998, *Trostel – Walker – Woolley* 2002).

Table 4.5: Parameter estimates from wage equations

	FIDÉV1 Coef.	FIDÉV2 Coef.	Pooled Coef.	FIDÉV1 Coef.	FIDÉV2 Coef.
Working time[b]	–0.267[a]	–0.237[a]	–0.254[a]	–0.407[a]	–0.276[a]
University	0.188[a]	0.247[a]	0.197[a]	0.223[a]	0.270[a]
Mark of GCE exam				–0.101	
Female				–0.015	
Cost-priced					0.436
Experience					0.068
Two fields of studies	0.101[a]	–0.043	0.013	0.097[a]	–0.021
Speaks English				0.059[a]	
Speaks German				0.040	
Uses the Web				0.064[a]	
Field of Study					
Agricultural	–0.028	–0.483[a]	–0.188[a]	0.012	–0.438[a]
Humanities	0.020	–0.320[a]	–0.060	0.027	–0.319[a]
Foreign languages	0.149[a]	–0.195	0.093[a]	0.143[a]	–0.219
Small languages	–0.067	–0.237	–0.058	–0.165	–0.195
Teacher	0.000	0.000	0.000	0.000	0.000
Physical education	0.031	–0.408[a]	–0.059	–0.016	–0.397[a]
Informatics	0.390[a]	–0.058	0.198[a]	0.404[a]	–0.215
Technical	0.099	–0.296[a]	–0.019	0.112	–0.262
Arts	–0.233[a]	–0.276	–0.034	–0.199	–0.236
Health care	–0.381[a]	–0.419[a]	–0.400[a]	–0.282[a]	–0.396[a]
Law, social public administration	–0.061	–0.453[a]	–0.233[a]	–0.005	–0.377[a]
Economics and business	0.263[a]	–0.157	0.130[a]	0.341	–0.144
Social sciences	–0.095	–0.492[a]	–0.222[a]	–0.088	–0.406[a]
Natural sciences	–0.060	–0.310[a]	–0.094[a]	–0.049	–0.287
Occupational concentration	–0.448	0.703[a]	0.137	–0.519	0.643[a]
Wave	–	–	0.080[a]	–	

[a] Significant at the p = 0.01 level.
Dependent variable: natural logarithm of net wage rate.
[b] Natural logarithm.

The results suggest that a "broader" type of education produces a wage premium for it leads to a better education/job match due to lower job-search costs resulting from accessibility to many jobs. It seems that some rather general (and "modern") skills (using the Web, knowledge of foreign languages) are coupled with wage advantages. Finally, there is no sign of significant gender wage difference in the samples.

Determinants of the labour market status of higher education graduates

Determinants of the labour market status of higher-education graduates are treated here in a supply-side framework that is we focus on factors influencing the choice of labour market status in which – as both classical labour-supply

and job search models emphasise (*Devine – Kiefer* 1991; *Heckman* 1979; *Killingsworth* 1983) – reservation wages play a major role. If wage offers exceed the reservation wage of the individual, then they are willing to accept a given job, if not they refuse working. In some models potential workers consider hours-of-work-wage offer packages (*Gørgens* 2002), thus both time preferences and reservation wages influence the labour market participation decision.

Reservation wages, however, are mostly unobservable in practice, therefore researchers have to work with offered and accepted wages, that might be interpreted as realised wage offers. Higher wages result in higher labour market participation probability at given hours of work. The effect of hours-of-work offers might have on participation depends on the time preferences of the potential workers. These, in turn, depend on the relative subjective value of consumption and leisure, the expected stability of the job – that is the expected risks associated with the job that would be influenced by the stability of the income stream which the job offers.

The literature does not always offer clear-cut answers to the question of the behavioural relevance of labour market states. Applied search models are mainly concerned with the unemployed, and it is not always clear whether the unemployed and the inactive differ or not behaviourally.[72] We distinguish five labour market states: employee, self-employed, unemployed, full-time student, other inactive.

The distribution of our samples by labour market status is as follows. The proportion of employees is 78 per cent that of self-employed is 4 per cent we have 6 per cent unemployed persons, 8 per cent students, and 3 per cent other inactive.

The dependent variable is the five labour market states.[73] We assume that the employees and the self-employed differ in their preferences *vis-à-vis* labour market risks (stability of wage and job) and autonomy of work. The self-employed are less risk-averse prefering more autonomy at work, including perhaps shorter working time. The unemployed are willing to accept a job at given market wages but they actually do not find one. It is assumed that potential wage offers have a greater influence on their decision than working time offers. Inactive persons cannot accept available wage and hours-of-work offers and for this reason they do not search for a job. It is an important empirical question whether they differ from the unemployed in this way. Finally, students do not enter the labour market after having obtained their first higher education diploma. They rather continue studying either because they cannot accept actual wage and/or hours-of-work offers, or because they expect better job offers by making extra human capital investments.

Our two most important explanatory variables are the wage and working time. We assume that the choices are influenced by the wage and working

72 See *Clark – Summers* 1982; *Flinn – Heckman* 1983; *Tano* 1991; *Gönül* 1992; *Micklewright – Nagy* 1999. As a rule classical labour supply models do not explicitly model participation decisions. Most of them consider the problem as a source of selectivity bias for wage and hours-of work equations.

73 The models are estimated by multinomial logits.

time that graduates with the same level of education and type of education might expect (both variables are computed from our samples).[74]

Higher wages would result in higher probability for becoming employee and self-employed, and cause the probability of being unemployed and inactive to decline. The relationship between wage level and the choice of status of students is not unambiguous. It might be that the individual finds the actual wage offers too low and rather opt for studying further. This would imply a negative relationship. But it also might be the case that they actually observe high wages but expect even higher wages in the future and thus decide to study further in the presence of high actual wages. Then higher wages would be associated with higher probability of being a student, implying a positive relationship between the two variables.

How working time affects the choice of the labour market status is theoretically undetermined, the available labour supply models do not produce any meaningful prediction in this respect. In addition, in our models, the working time effect is measured at fixed wages, thus its sign would depend on individuals' preferences about which no empirical findings are available.

Three additional variables, also used for wage equations, will be inserted into the models: level of education (college/university), occupational concentration, and number of fields of study (one or two). These variables are available for both samples thus this model – the base model – is estimated on the first, the second, and the pooled samples, as well. Equation for the pooled sample also comprises a dummy (Wave) indicating that observations are from the first or the second surveys, that is, capturing changes in the labour situation of the young between the two surveys, if any.

Extended models are also estimated with variables present only in one of the surveys including knowledge of foreign language (FIDÉV1), in-school labour market experience and cost-priced student (FIDÉV2).

Table 4.6: Determinants of labour market status, marginal effects

	Base model			Extended model	
	FIDÉV1	FIDÉV2	Pooled	FIDÉV1	FIDÉV2
1. Employee					
University	-0.015	-0.047[a]	-0.034[a]	0.010	-0.042[a]
Experience	–	–	–	–	0.035[a]
Cost-priced	–	–	–	–	0.034[a]
Two fields of study	0.042[a]	0.025	0.034[a]	0.041	0.022
Occupational concentration	-0.458[a]	-0.374[a]	-0.399[a]	-0.467[a]	-0.355[a]
Speaks English	–	–	–	-0.006[a]	–
Speaks German	–	–	–	-0.049	–
Working time	0.341[a]	0.171[a]	0.270[a]	0.333[a]	0.192[a]
Wage	0.079[a]	0.074[a]	0.091[a]	0.091[a]	0.063[a]
Wave	–	–	0.022[a]	–	–

74 The working time variable is the natural logarithm of the average hours of work a graduate with a given type and level of education might expect. This is interpreted as the average working time offer. The wage variable is the natural logarithm of the median wage a graduate with a given type and level of education might expect. This is thought of as the expected median wage offer.

	Base model			Extended model	
	FIDÉV1	FIDÉV2	Pooled	FIDÉV1	FIDÉV2
2. Self-employed					
University	0.016[a]	0.016[a]	0.015[a]	0.014[a]	0.014[a]
Experience	–	–	–	–	0.027[a]
Cost-priced	–	–	–	–	0.007
Two fields of study	–0.014[a]	–0.011[a]	–0.012[a]	–0.014[a]	–0.010[a]
Occupational concentration	0.082[a]	0.102[a]	0.101[a]	0.085[a]	0.096[a]
Speaks English	–	–	–	0.018[a]	–
Speaks German	–	–	–	0.003	–
Working time	–0.154[v]	–0.105[v]	–0.134[a]	–0.151[a]	–0.087[a]
Wage	–0.007	–0.005	0.002	0.004	–0.008
Wave	–	–	–0.008[a]	–	
3.Unemployed					
University	–0.022[a]	–0.015[a]	–0.020[a]	–0.020[a]	–0.013[v]
Experience	–	–	–	–	–0.023[a]
Cost-priced	–	–	–	–	–0.001
Two fields of study	–0.001	–0.016[a]	–0.009	–0.001	–0.016[a]
Occupational concentration	0.333[a]	0.141[a]	0.194[a]	0.327[a]	0.139[a]
Speaks English	–	–	–	–0.016[a]	–
Speaks German	–	–	–	–0.017[a]	–
Working time	–0.066	0.025	–0.034	–0.076[a]	0.012
Wage	–0.075[a]	–0.074[a]	–0.068[a]	–0.065[a]	–0.069[a]
Wave	–		0.000	–	
4. Student					
University	0.008	0.039[a]	0.021[a]	0.003	0.033[a]
Experience	–	–	–	–	–0.042[a]
Cost-priced	–	–	–	–	0.052[a]
Two fields of study	–0.023[a]	–0.003	–0.011	–0.022[a]	–0.002
Occupational concentration	0.068	0.163[a]	0.132[a]	0.050[a]	0.155[v]
Speaks English	–	–	–	0.027[a]	–
Speaks German	–	–	–	0.080	–
Working time	–0.107[a]	–0.084	–0.110[v]	–0.091[v]	–0.110[a]
Wage	0.038[a]	0.028	0.035[a]	0.020	0.036[a]
Wave	–	–	0.014[a]	–	–
5. Inactive					
University	0.012[a]	0.008	0.018[a]	0.013[a]	0.008
Experience	–	–	–	–	0.003
Cost-priced	–	–	–	–	0.013
Two fields of study	–0.004	0.005	–0.002	–0.004	0.006
Occupational concentration	–0.025	–0.032[a]	–0.028	–0.003[a]	–0.035[a]
Speaks English	–	–	–	–0.001	–
Speaks German	–	–	–	–0.026	–
Working time	–0.014	–0.007	0.008	–0.015	–0.007
Wage	–0.050[a]	–0.024[a]	–0.061[a]	–0.049[a]	–0.022
Wave	–	–	–0.027[a]	–	–

[a] Significant at the p = 0.01 level.

Table 4.6 presents estimation results (marginal effects).[75] Higher wage offers increase the probability of employment and decrease that of unemployment and inactivity for all equations. Chances of becoming self-employed are not affected by wage offers. The probability of being a student gets higher as wage offers increase, implying that students expect even higher wages after further studies. The results are essentially the same for both the base and the extended models. Longer hours of work lead to higher (lower) probability if becoming employed (self-employed), no working time effect is detected in the case of unemployment and inactivity. In two out of three equations increases in hours of work leads to a higher probability of being a student. All these suggest that self-employment is attractive for those who prefer higher risks and shorter working time, whereas choosing an employee status might be tantamount to obtaining more stable jobs with longer hours. As regards student status, some individuals prefer not entering the labour market but studying instead as a result of longer working time.

Education plays a role in the case of some labour market states. It holds for all the equations that persons with a university education have a higher probability of being self-employed. A higher degree thus means choosing higher risks at a given wage and working time. Persons with a university education would become inactive with a higher probability at given wages and hours of work than those with a college degree, implying that graduates with a university diploma value leisure more than those with a college diploma. A university degree has a favourable (negative) effect on becoming unemployed, whereas it does not affect the chances of employment. In some equations graduates with a university degree study further with a higher probability but the estimated coefficients are not significant in the case of the extended model.

As regards the occupational concentration index, the results suggest that graduates with "broader" types of education would have better chances for becoming self-employed, unemployed or students, whereas those with "narrower" types of education would rather be employees or inactive. Having one or two fields of study does not affect the choice of labour market status. Speaking English has a positive effect on becoming self-employed, or a student, and a negative one on employment and unemployment, whereas speaking German does not seem to matter. In-school labour market experience increases the chances of being self-employed, or an employee, and decreases the probability of becoming unemployed or a student. Persons graduated from cost-priced places are more (less) likely to be employees (students), thus higher educational costs might induce graduates to enter the labour market.

75 For detailed results see *Galasi* (2003c).

4.4 Job-training of Higher-education Graduates

PÉTER GALASI

Job training constitutes an important part of both the labour market and the educational system. A labour-market-centred human-capital approach to the problem has become an integral part of the labour economics since the mid 1960s (for theoretical summaries see *Becker* 1962, 1975; *Hashimoto* 1981; *Parsons* 1990; *Stevens* 1994). In the '90s, training seems to be more important than ever in Hungary, especially among young higher-education graduates. When leaving full-time education many higher-education graduates continue accumulating knowledge and skills through formal or informal, on-the-job or off-the-job training. Training might improve the productivity of young school-leavers, contribute to forming better job-employee matches, and ameliorate their opportunity for obtaining stable and higher-paid jobs.

Three elements of the problem are analysed here with the help of a survey representative of Hungarian higher education graduates:[76] the impact of education on participation in training, the length of training, and the share of training costs between employees and employers.

As regards the relationship of education level with training probability (occurrence and length, etc.) it is of great importance whether education level and training are positively or negatively correlated. If the former holds then differences in human capital between employees with lower and higher levels of education will widen on the labour market, and the less educated will have lower chances of ameliorating their labour market position by training, and the more educated will be able to accumulate even more human capital. If the reverse is true then differences due to in-school human capital will be diminished on the labour market. The literature provides no unambiguous answer to the problem, some papers arrive at a negative, others at a positive relationship between training and education.[77] This is not surprising since actual predictions and results depend on both the theoretical contexts of the models and the properties of data (especially the time horizon the samples cover). In a simple short-run setting, where more education implies higher job-productivity and the training is intended to provide workers with additional skills and knowledge so as to reach actual (fixed) job-productivity, more education is associated with lower training probability for a given job, and this is the case if more education indicates better learning abilities, as well. In a long-run utility- (profit-) maximisation model, where the more educated have better learning abilities thus lower marginal training costs and/or higher returns to training, workers with higher levels of education will experience more training, especially in the case of firms with long career ladders or "internal labour markets".

76 The survey contains information about the 2000 labour market situation of young persons graduating from Hungarian higher education in 1999.

77 The papers of *Lillard and Tan* (1992), *Lynch* (1992), *van Smoorenburg and van der Velden* (2000), *Goux and Maurin* (2000), *Ariga and Brunello* (2002), *Garcia, Arkes and Trost* (2002) assume/obtain either negative, or positive correlation, or both, and the values of the estimated coefficients also show a great variety of patterns. *van Smoorenburg and van der Velden* (2000), focusing on the training probability of Dutch career-beginners, argue that higher level of education implies higher ability and this reduces the costs of a given training, therefore level of education and training probability will be positively correlated. The estimated parameters support their hypothesis, and the result is robust to model specifications.

The second problem is how the employer and the worker share the costs of training. In the spirit of *Becker*'s (1962) fundamental model, training might be classified as perfectly general and specific. Training is (perfectly) general if worker's productivity (marginal product) increases by the same amount with many employers. It is (completely) specific if the increase of productivity with a given employer does not affect productivity with other employers. Since both parties can terminate the contract in the future, sharing the costs serves as an element of insurance against future losses in returns. One implication of the model is that general (specific) training is financed by the worker (the employer), and in-between (neither completely specific, nor perfectly general) training implies cost sharing between the parties.

The sample includes young workers with a higher education diploma, some 53 per cent of them took part in training and, on average, spent 61 days on training between graduation (summer of 1999) and September 2000.

Three equations will be estimated: a training-participation-probability, a training-length, and a cost-sharing equation. Let us first see the training-probability equation.[78] A key explanatory variable – as we have seen in the literature – is human capital. In the spirit of the standard, Mincerian human capital model (*Mincer* 1974), it has two components: one accumulated by attending school and one on the labour market (labour market experience). In our case both components are initial, pre-labour market and pre-training human capital endowments. We know the highest educational degree of the respondents, and we use this as a proxy for human capital accumulated by attending school. Since our workers are all higher-education graduates, this results in a dummy variable: college (or bachelor) degree (with 2–4 years of higher education = 0) and university (or master) degree (with 5 to 7 years of higher education = 1). The proportion of university diploma-holders is 39 per cent. For the other component (labour market experience) we use in-school labour market experience. This is measured by a dummy: whether the respondent regularly worked for pay during their study (no = 0, yes = 1), and almost one third of the respondents possess in-school experience. As regards the expected sign of the coefficient the problem is similar to that of education. In a short run setting where training is intended to bridge the gap between initial human capital and actual productivity requirements in the job, if in-school experience leads to higher productivity at the work place, the correlation will be negative, and this would be the case if in-school experience indicates good abilities/skills required by the job. In a life-cycle model if in-school experience results in higher productivity, and/or indicates better learning skills in training, then the more experienced will be more likely to be trained.

78 Since only employees can participate in training, and they might constitute a non-random sample of the population of working age, some sample-selection bias might be present. For this reason in estimating participation probability we use probit with sample selection. This is a two-equation estimator. The first equation is a labour market participation probit (dependent variable: whether the person is employed or not) in which education, in-school labour market experience, type of education, and the rate of unemployment of the types of education are inserted as explanatory variables. The second one is the training participation equation with variables mentioned in the text. Having made use of probit with sample selection seems to be justified for the error terms of the training probability and employment probability equations are correlated. For detailed results see *Galasi* (2003b).

In addition to variables proxying human capital endowments, two other variables have been inserted in the model in order to capture the effect of workers' heterogeneity on training probability. A series of dummies has been included so as to detect how types of education might affect training probability (reference category: teachers in primary schools). These variables might reflect differences in labour demand for skills embodied in types of education. A type of education represents a special combination of skills learned in school, and the marketability of a given combination of skills depends on the actual state of the labour market. This might influence the quality of education/job match, and a better-quality match might lead to a lower training probability. An occupational concentration index[79] – already used in section 2.4. – is also inserted into the equation. It shows how individuals with a given type of education are distributed among occupations. Its value is zero if individuals with a given type of education are employed in only one occupation and it is one if individuals with a given type of education are distributed evenly among occupations. A type of education with zero value is, in this sense, very "narrow", whereas a field of study with a unit value is very "broad". "Narrower" fields of study can assure education/job match of better quality but with relatively high searching costs, that is, it might be costly to find a good match due to the "narrowness" of the type of education. "Broader" fields of study might result in a match of worse quality but with relatively low costs of searching. If an individual with a "narrow" type of education can find a job with a good quality match, they need little or no training. If not, then much training will be necessary in order to bridge the gap between actual skills and job requirements. Individuals with "broader" types of education can be employed in many occupations but need some training due to the relative worse quality of the match. The sign of the estimated coefficient can be either positive or negative. A negative sign means that individuals with "broader" ("narrower") types of education are less (more) likely to be trained, thus "broader" types of education produce a better education/job match than the "narrower" ones, and consequently "broader" fields of study imply less training costs. With a positive sign the reverse holds.

Finally, a series of firm-size dummies is included (firms with more than 1000 employees as reference). One can argue that a firm's size affects training costs. There are some signs that larger firms train their employees to a greater extent than smaller ones (*van Smoorenburg – van der Velden* 2000), and this can be attributed to the economies of scale which larger firms might have in providing and/or purchasing training services. As for the costs of training they can be spread over a larger number of employees with larger firms and/or larger firms can purchase training courses at lower prices. One can also argue that larger firms provide more stable and bet-

79 For a detailed description of the index see section 2.4 footnote 62.

ter job opportunities so that it is more advantageous for workers in larger firms to participate in training. If this is so, training probability and firm size will be positively correlated.

As regards the training-length equation, the dependent variable is the natural log of the length of training measured in days.[80] Here a sub-sample of employees is considered, namely, those having received training. The same explanatory variables are used as in the training probability equation, for similar reasons and their interpretation is also similar.

The dependent variable of cost-sharing equation is a dummy: whether the training is financed entirely by the firm (= 1) or otherwise (= 0). For 46 per cent of the participants training is financed entirely by the firm, and the costs of training are covered by the worker in 45 per cent of the cases.[81]

The explanatory variables include two dummies proxying the general/specific nature of the training, the two human capital indicators (education and experience), the length of training (in days, natural log), the post-training wage (wage rate, natural log), and a series of firm-size dummies. We have two kinds of training programmes that might be considered as general: foreign language and computer skills. Foreign language and computer skills are more or less transportable, that is, they can be utilised at many firms. Strictly speaking no information can be obtained from the data on whether the training is firm-specific or not. Rather, some training programmes seem to be job-specific, namely, special and supplementary skills needed in the actual job. Although these are not necessarily firm-specific training programmes, one can argue that the knowledge and skills accumulated with the help of these programmes are less transportable than foreign language and computer skills, thus in the spirit of the Becker's model we can expect that firms will be more likely to finance these programmes, than those providing general knowledge and skills. We have then included two dummies one for general and one for job-specific training programmes, and the reference is the dummy representing all the other programmes being assumed to be a mixture of not perfectly specific and not completely general programmes. If the classification works and the assumptions are correct, we expect a positive sign for the specific, and a negative one for the general dummy.

Education and in-school labour market experience might play a role in cost-sharing decisions. If more education and experience indicate better abilities, learning skills and higher productivity in the job, then, from long run profit-maximisation considerations, it might be advantageous for the firm to cover the training costs for the better educated and more experienced to a greater extent.

Higher post-training wage implies higher post-training costs, that is, less expected profit at fixed expected post-training productivity. This might

80 It is very likely that the schooling variable is endogenous, due to the unobserved heterogeneity of individuals in terms of productivity or/and ability needed in the job and also to the heterogeneity of jobs in terms of firm-specific skills. Levels of education and (unobserved) productivity/ability and/or firm-specific skill requirements might be correlated, and as a consequence ols would produce biased parameter estimates for the schooling variable. The empirical model will be estimated by 2sls with one IV. Both endogeneity of schooling and the validity of the instrument have been confirmed (see *Galasi* 2003b).

81 Since participation in training might be non-random another sample selection problem would be present. Here we also use probit with sample selection. The auxiliary equation is the training participation equation we have used. The assumption of sample selection seems to be justified for the error terms of the training and the cost-sharing equations are correlated. For detailed results see *Galasi* (2003b).

induce firms to cover smaller proportions of the training costs in order to minimise their losses for the training and post training period. If this is so, then higher post-training wages would result in smaller firm's shares. At the same time the post-training wage may reflect a firm's expectations as regards the post-training productivity of the trainee. If the firm expects a high productivity increase due to training, that is, high post-training productivity, then it would be willing to cover a greater proportion of the training costs, than in the case of lower post-training productivity and wage. Then higher post-training wage results in a more intensive participation in financing the training programme on the part of the firm. Training length is also included in the equation so as to control for differences in the amount of training workers need. Firm-size dummies are inserted in the equation, and it is assumed that due to economies of scale, lower fixed per capita training costs, and better intra-firm job-mobility opportunities, larger firms cover the costs of training with a higher probability than smaller ones. Results are summarised in *Table 4.7.*

A brief summary of results is as follows. Graduates with a university diploma are less likely to participate in training than those with a college diploma. This is consistent with a short run fixed-productivity requirements model where training is intended to increase the productivity of the career-beginners in order to reach the level of productivity needed in the job. In-school labour market experience leads to a higher participation probability. If experience indicates higher productivity and/or better abilities/skills, then this would be consistent with the assumption that for graduates with labour market experience marginal training costs are lower, and/or increases in productivity are higher at fixed training costs, therefore the profit-maximising employer are more likely to train them than graduates with no experience. University education reduces the length of the training, as well. Thus school-leavers with a university diploma have shorter training programmes than those who have graduated from colleges. In-school labour market experience has no effect on the length of job-training.

Another important result is that school-leavers holding diplomas with "narrower" types of education are more likely to obtain training. This implies a more severe matching problem in the case of "narrower" types of education, possibly due to prohibitive searching costs for finding a good-quality match.

Results for the cost-sharing decision are in line with Becker's idea, since the firm is less likely to entirely cover the costs of general training and more likely to finance job-specific training programmes. As regards the relationship between education and training costs, the firm is rather more willing to cover the costs of training for the better educated (university degree) than those with college education. This suggests that higher schooling implies

better abilities/skills, thus more rapid increases in productivity. In-school experience does not affect cost-sharing.

Table 4.7: Determinants of training participation, training length and cost-sharing of training

	Participation*	Length**	Cost-sharing***
	Marginal effect	Coefficient	Marginal effect
Length of training	–	–	-0.080[a]
Wage	–	–	0.014
Job-specific training	–	–	0.034[a]
General training	–	–	-0.048[a]
University	-0.030[a]	-0.582[a]	0.057[a]
Experience	0.084[a]	-0.096	0.006
Type of education			
Agricultural	0.215[a]	1.980[a]	–
Humanities	0.215[a]	2.151[a]	–
Foreign language	0.189[a]	1.967[a]	–
Small language	0.199	1.414	–
Physical education	0.230[a]	1.511[a]	–
Teacher	0.000	0.000	–
Informatics	0.194[a]	0.733	–
Technical	0.208[a]	1.412[a]	–
Arts	0.055	0.491	–
Health care	0.193[a]	-0.379	–
Law	0.193[a]	1.607[a]	–
Business/economics	0.220[a]	1.256[a]	–
Social sciences	0.219[a]	1.338[a]	–
Natural sciences	0.093	2.128[a]	–
Occupational concentration	-0.423[a]	-3.663	–
Firm size			
10 or less	-0.129[a]	0.504[a]	-0.162[a]
11–50	-0.092[a]	0.334[a]	-0.162[a]
51–100	-0.093[a]	0.002	-0.125[a]
101–500	-0.039	0.190	-0.064[a]
501–1000	-0.059[a]	-0.033	-0.061[a]
More than 1000	0.000	0.000	3,590[a]
Constant	–	4.925[a]	–

[a] Significant at the p = 0.01 level.

* Estimator: probit with sample selection. Dependent variable: whether the individual participated in training. Selection equation: whether the individual is employed (dependent variable), schooling, in-school labour market experience, 14 type of education dummies, rate of unemployment of types of education.

** Estimator: 2sls. Dependent variable: length of training (days, natural log). Endogenous variable: schooling. Instrument: date of admission to the higher education institute (year).

*** Estimator: probit with sample selection. Dependent variable: whether the firm covers all training costs. Selection equation: the participation equation.

5. EDUCATION AND MOBILITY

5.1 Mobility and Schooling in Hungary at the Beginning of the 2000s

ZSOMBOR CSERES-GERGELY

Human capital can be compared to physical capital in many ways: it can be accumulated, it depreciates and it can be relocated.[82] Similarities between the two types of capital lead to similar conclusions in terms of optimal management, both in the case of accumulation or renting out of the capital. One can show that both actions can be represented as a function of different parameters describing the environment of an actor, and the underlying rule can be studied to extract an optimal decision. An important question that arises when harvesting the benefits from capital is: in what economic surrounding – geographically speaking: where – it should be used. In what follows we take a look at whether relocation of human capital, mobility and migration in Hungary after 2000 can be connected to its optimal use.

Empirical researchers dealing with mobility have to make similar assumptions as do others dealing with data and the number of assumptions to be made is in inverse proportion to the information content of the data at hand. Without going into very much detail, we have to mention that modelling mobility has no sophisticated economic theory which would be agreed upon by many researchers. Empirical investigation usually amounts to formulating the decision in terms of a binary outcome, which depends on the costs and benefits of the move considered. Differences between empirical implementations usually boil down to the use of different types of data, econometric methods and explanatory variables. Specifications of costs and benefits are usually motivated by the portability of human capital and by the fact that holding everything else constant, the act of mobility "transports" human capital to a location where it is best put into use.

Recently I have carried out research that was similar in spirit to the above logic (*Cseres-Gergely* 2003b, 2004) – the resulting papers followed immediately the one by *Kertesi* (1997), which was the first study of Hungarian migration that used micro-data and economic reasoning. Mainstream migration research concentrates on two main areas: the measurement of the effect of economic and in particular labour market related pull and push

82 Let us abstract from the otherwise not negligible fact that human capital normally can not be sold.

forces on mobility and migration (see *Böheim – Taylor* 2000 as an example), and the question of whether mobility is able to equilibrate regional inequalities and if yes, what is the time horizon of such a change (see *Pissarides – McMaster* 1990, for example). Considering that the rate of mobility and migration is much lower in Hungary than in the western part of Europe or in the US, the relevant question in this context is why this low rate prevails, especially when regional dispersion in wages and unemployment rates are not negligible. Do economic incentives have any effect on mobility, or are they swept away by other, non economic motivations?

Research results considering Hungary present mixed evidence on the role of economic incentives. My investigation failed to show such an effect using macro-level data[83] and although they were present in the results from individual-based models, their effect is diminishing. In the latter type of models however, schooling and age exerted a consistently positive and negative effect, respectively. The age effects can quite plausibly be attributed to different positions within the life-cycle, but one might want to ask the question what really is the effect, whose impact on the probability of moving the schooling variable measures? The trivial explanation is, in line with the simple theoretical model, that schooling measures human capital alone. The results however hint towards the possibility that there is some uncontrolled heterogeneity present to which schooling serves as a proxy, confounding the effect of human capital to something else. The most important uncontrolled effects are possibly the following.[84]

Schooling is merely a proxy to wealth. The effect we see is actually driven by the fact that more affluent families are more likely to move simply because they can afford to finance a desired move. Moving house is also a risk, in which a great amount of money can be lost (see *Hegedűs* 2003 on this) – it is again possibly the wealthy that can bear such loss more than others.

Schooling is a proxy to "experience in moving". Moving house requires certain skills in organisation, and migration also requires a great degree of adaptability. Those who lack such experience might also be hindered by a kind of perceived uncertainty. Those with more schooling however are relatively likely to have already moved, as education, especially higher education is usually only available in larger towns. If the movement of boarders near a school or back home is a major cause of migration, and the respective population is not isolated, schooling can be found to be a very strong predictor of migration.

Schooling is a proxy for organisational skills. The situation described above can arise even if the skills for organisation are not obtained through a move, but are acquired through schooling itself. It is well known that schooling does not only transmit specific knowledge, but generic skills as

83 In the meantime, I run a new macro-data based research, using county-to-county migration data (*Cseres-Gergely* 2005). As opposed to previous results which were based solely on migration outflows from micro-regions, a gravity model estimated does show an effect of both wages and employment rate on migration and mobility.

84 Let us sidestep the possibility of agglomeration effects here. Such an effect is present if similar people tend to move to the same place, possibly because there is abundant supply of an amenity. Although we have only limited knowledge about such tendencies in the case of Hungary, recent suburban developments make them likely. *Hermann* (2002) shows that the availability of primary schooling in villages does not count as a substantial pull force for migration. *Dövényi – Kok – Kovács* (1998) points out that those moving to suburban belts around greater towns, primarily those around Budapest, have not yet developed their local infrastructure, or shaped the one present to their own needs.

well. Because of this link, schooling can have a positive effect on the propensity to migrate.

Schooling is a proxy to special human capital. The more schooling one has, the more specialised one's knowledge is, which can not be sold anywhere easily. Because people in Hungary are usually not mobile, and the distribution of ability is probably uniform in space, migration of those with more schooling can be explained by a process matching specific skills and the demand for them.

Schooling is a proxy to general human capital. Demand for educated labour has been high for more than a decade now, and such labour easier to put into use on better working labour markets. Because of this, educated workers in depressed regions can obtain jobs in better labour markets more easily, hence are more likely to move.

Finding out which of the above is the actual driving force behind the strong relation of migration and schooling is not an easy task. Firstly, one has to have a large number of observations to tell apart the behaviour of movers with different ages, family background, or coming from different places (labour markets). Secondly, personal characteristics are also needed to control for effects that are correlated with individual characteristics that might affect both the migration decision and correlated with the key explanatory variables in our model. Unfortunately, there is no such database available in Hungary. There do exist databases which however do not make it possible to look at individual mobility decisions, or are not accessible to the public. Unfortunately most individual-level survey data are not suitable for the analysis of mobility and migration either.[85]

In what follows, I shall illustrate the problems raised by the confounding nature of the schooling variable through a simple estimation using the *2003 Survey of Living Conditions* conducted by the *HCSO*.[86] This data source has the advantage that even if we can not follow individuals over time, we have at least partial information on what happened to them: for every person who moved after 1996, we know when and from where they moved into their present apartment, and also from which settlement they moved. Individual characteristics are known but unfortunately only at the moment of collecting the survey data, in 2003. These include education, and age of the respondent, characteristics of their job (including the "*FEOR*" job identifier), and there is also information on family income. Those who did not want to give an outright answer to the latter questions were presented with intervals to choose from – in such cases I used the interval midpoints and inserted them into the continuous variable.

Because data were not collected at the end of the year and the number of observations is not large, I used *spells*, rather than individuals as a unit of observation, pooling data from 2002 and 2003.[87] Because of this, if a

85 Macro-level data include the "TSTAR" database of the HCSO and the IE, HAS. Individual data are collected by the Home Office, but not disclosed to the public. The 1996 Microcensus of the HCSO and the 1999 and 2003 survey of living conditions are examples of data that could in principle be used to study migration. These contain retrospective information on the last move of a person, but are not of true longitudinal nature. Being able to follow a person over time is nevertheless crucial, since one has to control for important transitions in life, such as going to school and marriage.

86 I am greatful to *József Hegedűs*, who pointed out this survey and made it accessible to me.

87 Those who are worried because of the independence of these two parts of the sample are right in principle, but actually such dependence is taken care of in the estimation. It is important however that the estimates would be consistent even without this measure.

change of residence occurred between 2002 and 2001, the value of the "migrant" indicator variable is 1, and it is 0 if there was no such change. The same rule applies to those observed in 2003, independently of their previous migrant status. I consider two types of moves: every mover including those within settlements (versus non-moves) and longer distance movers including those within counties, but between settlements and "longer" distance movers (versus shorter distance movers and all non-moves).[88] Because there is no real temporal information available, explanatory variables are the same in both cases: schooling, age, income per household member. Auxiliary explanatory variables include: occupational code of the household-head and identifier of the micro-region.

The decision to move is modelled with a logit model, in which the outcome is the "migrant" indicator, whereas schooling, age, age squared, and household income per head are explanatory variables. Properties of the previous settlements are taken into account as fixed effects: this way I treat data as a panel of micro-regions and spells as their individual realisations.

Estimation results concerning the working age population are shown in *Table 5.1*: the top part of the table shows effects on the probability of a move using the broader, the bottom using the narrower definition of mobility, with results from different specifications in the columns. The first column replicates already known results in the case of both forms of migration (every mover and migrants across micro-regions): the propensity to move diminishes with age and increases with higher education.[89] Based only on this evidence, we can not tell apart the possible hypotheses concerning the role of schooling in determining migration.

Focusing on hypothesis 1, we might want to separate the effect of income by including a direct measure for it. Entering per capita income as a regressor, results change quite remarkably. In the model considering both short and long range moves, income clearly captures the effect formerly attributed to schooling: the parameter on higher education shrinks to a fourth of its previous value and becomes insignificant. Such an effect is absent in the case of long-range moves: the parameter value of higher education increases a little bit, but that of income is not significant. It seems therefore that in the case of short range moves, schooling acts merely as a proxy for income (hypothesis 1), while over longer ranges, it seems that it is really more educated people who move (hypothesis 2–5).

The above results were obtained using working age, 16–65 year old population. This raises the question, whether or not the large number of students in secondary and higher education – many of them moving to dormitories for their period of study – changes the results in a way suggested by hypothesis 2. To look at this effect, I restricted the sample to persons over the age of 24. While significant parameters of the first estimate did

88 Actually I experimented with two other definitions, long-distance movers between micro-regions but within regions (versus shorter distance movers and non-movers) and movers between counties (versus shorter distance movers and non-movers). These however yield results that are direct extrapolation of the first two models and hence were omitted.

89 Schooling was measured on a finer scale in a previous version, but I omitted insignificant indicators in due course.

not change considerably, schooling becomes insignificant in the second model. If we do not believe that moving over long-distances is a peculiarity of young age,[90] then this evidence points towards the conclusion that schooling influences migration mainly through the spatial structure of the schooling system.

Table 5.1: A simple model of migration probability – fixed effect logit estimates

	Coefficients		
	Aged 15–64	Aged 15–64	Aged 25–64
All moves			
Higher education	0.251[a]	0.099	0.028
Age	–0.258[b]	–0.230[b]	–0.269[b]
Age squared	0.002[b]	0.002[b]	0.002[b]
Income per household member		0.003[b]	0.003[b]
N	11,740	11,157	10,247
Number of micro-regions	108	108	101
Log-likelihood	–1872	–1771	–1479
Moves between small regions			
Higher education			
Age	0.690[a]	0.824[b]	0.431
Age squared	–0.477[b]	–0.476[b]	–0.604[b]
Income per household member	0.005[b]	0.005[b]	0.006[b]
N	–0.000	0.001	
Number of micro-regions	7,665	7,094	5,467
Log-likelihood	47	45	34
–317	–291	–213	

[a] Significant at 5 per cent; [b] significant at 1 per cent.
Source: Spell database generated from the cross section of the 2003 Living conditions survey, HCSO

Although parameters of the variables of interest vary over a somewhat wide range depending on the parameter chosen, the effect of age seems to be insensitive to such changes. This confirms previous results which stress that even though labour-market related motivations do have their effect on migration in Hungary, other forces seem to dominate them. Whether these are of demographic or some other nature is impossible to tell confidently on the basis of the data at hand. Answering this question would require panel data that documents demographic, education and labour market related events on the individual level. Once such data become available, one might ask the question again: do economic considerations, income and schooling in particular, have an effect on the migration decision: But one has to wait most probably until then.

90 Although in Hungary this is not completely impossible.

5.2 Effect of Education on Migration Decisions

ÁGNES HÁRS

According to the neo-classical theory potential migrants make their decisions on the basis of the profit which they hope to obtain in a certain period of time and they also take into consideration the costs measurable in cash and other (cultural, social, etc.) commodities. In this model migration probably concerns those people who may expect the biggest potential gain or who may suffer the smallest potential loss during migration.

Return of human capital in migration decisions

The probability of migration grows with greater human capital – higher level of education, qualification – if it may be presumed that the receiving labour market – similarly to the home market – pays more to the qualified labour or if the probability of employment is higher in the receiving country (*Massey et al* 1993). It is frequently suggested that the labour market situation of foreigners is more disadvantageous than that of domestic labour, their unemployment rate is higher and there is a wage discrimination against them so their incomes are substantially lower (e.g. *OECD* 2003). However, this discrimination is not justifiable if their unemployment rate and wages are compared to the domestic labour force of similar composition. In a simple comparison the analyses are frequently devoid of aspects (e.g. knowledge of language, acclimatisation, etc.) which can explain the differences. The acclimatisation of foreigners needs a relatively long period (10–15 years) and by the time they assimilate into the receiving country their wages and unemployment rate are less different and the return of human capital can be more easily proven (*Borjas* 1994; *Constant – Massey* 2002).

The expected wage gain of migrants is not explicit in the receiving labour market and those who seek jobs abroad return to their home country. Returning is not accidental because contradiction effects of selection can be observed. On the one hand, those return who could gain the least through their emigration decisions, i.e. the less qualified (*Borjas – Bernt* 1996), on the other hand, the higher qualification and the access to the social and information networks enhance returning home (*Bauer – Gang* 1998). According to *Stark* (1991) in the first period the receiving environment pays for the *supposed* performance of the foreign group so the wage expectations of the educated and highly qualified are less realised than those of their fellows with lower qualifications. The income expectations of more qualified foreigners are less paid by the receiving labour market so return migration of the more qualified is considerable and this fact results in lower qualification of foreigners participating in the receiving labour market.

Discrimination against foreigners can be observed in the access to the individual jobs: their chances to obtain certain jobs are less than those of domestic labour. Often they enter a segmented labour market where they accept unqualified, temporary jobs with bad working conditions, without any hope of advancement in the secondary market of the receiving country, and their aim is to receive the highest possible income in the shortest possible time (*Piore* 1979). The traditional guest-worker type of the 60s and 70s can essentially be described in this manner. Until the middle of the 70s immigration was determined by the mass recruitment of partly temporary labour, in the 70s and 80s the control of migration and the settlement of the already emigrated population were characteristic, and by the late 90s the recruitment of different well defined migrant groups took place.

Factors influencing the labour migration of Hungarians

In the section below we are going to examine what kind of selection mechanisms are present in the migration decisions in Hungary and, primarily, to what extent education influences the migration decision.

In the course of the Labour Force Survey (LFS) of the Hungarian Central Statistical Office (CSO) in the first quarter of 2003 the respondents were also asked about their *migration ideas*, and close to 6 per cent of 15–49 years old have already been considering the possibility of working abroad. One half of this group has also taken steps (collected information about the possibilities, at least) but at the time of questioning only one in ten has had the actual possibility of obtaining a job.

Up to university graduation, the higher the level of education the more frequent is the inclination to work abroad. Taking all migration plans, in the case of those with vocational training school graduation, compared to the share of those who consider the possibility the ratio of those is higher who have serious intentions to work abroad, that is, they have already collected information about the potential jobs. The ratio is also somewhat higher in the group of university educated people. In the case of those, however, who attended only elementary or secondary school there is only the phrasing of the possibility and their ideas are uncertain, their ratio is lower the seriousness of their plans is questioned (*Table 5.2*). Examining by gender the ideas strongly depend on the level of education. In the case of both sexes it is unambiguous that those of low qualification have less plans for migration. The return of higher qualification (secondary school, university) abroad is expected to a certain extent more by women, than by men, in the case of men, however, the expectations of those who attended vocational training school are the highest – similarly to a U-curve – and the ratio of this group significantly exceed the number of those who refuse the possibility of migration.

Table 5.2: 15–49 years old population and education of those who consider migration (per cent)

Education	Do not plan	Plan	Collected information	Together
Men				
Less than lower secondary	2.0	0.6	0.7	1.9
Lower secondary	24.5	15.6	11.6	23.7
Vocational training school	39.3	42.3	48.5	39.6
Upper secondary school	23.5	30.8	28.1	24.1
Higher	10.7	10.7	11.1	10.7
Total	100.0	100.0	100.0	100.0
N (pers.)	2,272,909	191,841	99,062	2,464,750
Women				
Less than lower secondary	1.9	0.7	0.4	1.9
Lower secondary	26.3	18.1	12.6	26.0
Vocational training school	23.9	21.5	23.8	23.8
Upper Secondary school	33.9	43.8	42.8	34.3
Higher	14.0	15.9	20.4	14.0
Total	100.0	100.0	100.0	100.0
N (pers.)	2 ,397,376	94,663	48,614	2,492,039
Together				
Lower than lower secondary	2.0	0.6	0.6	1.9
Lower secondary	25.4	16.4	12.0	24.9
Vocational training school	31.4	35.4	40.4	31.6
Upper secondary school	28.8	35.1	32.9	29.2
Higher education	12.4	12.5	14.1	12.4
Total	100.0	100.0	100.0	100.0
N (pers.)	4,670,286	286,503	147,679	4,956,789

Source: CSO Labour Force Survey 2003, 1. quarter.

In order to examine the role of the factors which influence the human capital in migration decisions we set up models in which we explained the decision of foreign job-seeking by looking at the respondent's age, sex and education, both for the possibility if the migration intention is only verbally expressed and for the possibility if the person in question has already taken some positive steps to become more familiar with the possibilities of employment (*see Table 5.3*). The estimation confines itself to the age-group 15–49 years old.

The role of age decreases the formulation of the migration decision by a small extent but the case that the potential migrant is female to a much greater extent. In the case of education we see that – considering the elementary school as the base category of comparison – the education lower than 8 classes decreases the probability of the migration decision to a very large extent, education at vocational school level and secondary school with vocational qualification increases it to a similar extent, the secondary school increases it a little more than that, and university graduation

increases the probability of the migration decision similarly to the education of secondary school.

Table 5.3: Effect of education, age and gender on the probability of migration decisions

Variable	Considered migration Coefficient	Have more serious migration intention Coefficient
Age	-0.064	-0.057
Woman	-0.765	-0.716
Education		
Less than lower secondary	-0.679	-0.446
Vocational training school	0.983	1.363
Upper secondary school + vocational qualification	0.936	1.183
Upper secondary school	1.058	1.172
Higher education	1.074	1.436
Constant	-1.330	-2.520

All evaluated parameters are significant at 1 % level.
Base category: lower secondary education.

The possibility of migration can be considered to be more serious if the person in question has already had a look around and collected information about the prospects. Examining the more serious intentions we see that the decreasing role of age is somewhat lesser which refers to the fact that the conceptions of the younger ones may be more uncertain. Considering the more serious decision intentions the women, however, also seek foreign jobs with less of a probability than men. The role of education in migration plans referring to more serious migration decisions is somewhat different: in comparison to those who attended only elementary school in every higher educational group the probability of the migration decision increases, and in comparison to those with secondary school graduation the probability of formulating a more serious intention is greater in the case of those with secondary school graduation with a vocational qualification.

All in all, we can see (*Table 5.4*) that in the decisions determining foreign job-seeking higher education unambiguously increases the probability of the migration decisions, age decreases it, and females want to seek jobs abroad to a lesser extent. In formulating the more serious intentions, however, the role of secondary level education (secondary school or secondary school with vocational graduation) is essentially bigger.

Migration decisions are not independent of the expected job abroad, demand of the receiving labour market determines the migration of a labour force and the receiving countries usually control their labour market, they motivate the desirable labour force with strict selection and bilateral contracts, and limit the inflow of non-desirable ones. For that reason we have

examined to what extent the actual professions influence the migration plans, and whether certain professions substantially increase the probability of foreign job-seeking. For the answer we have used the one-digit occupational groups of FEOR categories as variables.

Table 5.4: Effect of actual profession, education, age and sex on the probability of migration decision

Variable	Considered migration coefficient	Have more serious migration intention coefficient
Age	-0.068	-0.062
Woman	-0.718	-0.646
Education		
Lower secondary	-0.656	-0.381
Vocational training school	0.856	1.098
Upper secondary school + vocational qualification	0.953	1.094
Upper secondary school	1.128	1.211
Higher education	1.218	1.453
FEOR categories		
Managers	-0.177	0.058
Independent professionals with higher education	0.025[a] (0.025)	0.251
Non-independent professionals with higher/secondary education	0.007 (0.391)	0.155
Office clerks	0.028	0.117
Employed in services	0.176	0.465
Employed in industry/construction industry	0.422	0.713
Machine operators. assembly workers. drivers	0.312	0.407
Unskilled workers	0.506	0.516
Constant	-1.369	-2.579

Base category: lower secondary school. agricultural skilled worker
[a] Significant at 5 % level. All the other evaluated coefficients are significant at 1 % level.

Results show that the probability of migration is largely decreased by age, female status, low education (8 classes or less) and high labour market status (working as a manager in public administration or the competitive sector). In comparison to the agricultural profession every other profession increases the possibility of migration (with the exception of managers). The probability of migration is much stronger if the person in question is a manual worker in the industry or construction industry, or assembly worker, machine operator or driver. In addition, it is very strong in the case of the migration decisions of unskilled workers.

According to our earlier considerations if we take into account whether the migration intention is more serious (did the person in question take steps to get to know the possibilities of work) the role of the factors influencing the decision is different. The role of age and sex is fundamentally

unchanged but the explanatory power of vocational training becomes more important in the decision. As compared to formulating the possibility of migration, among the actual occupations there are the professions in industry/ the construction industry, machine operation and services which have an important role in the decisions, and similarly unskilled status has a substantial explanatory effect.

So in the conceptions referring to migration we may well identify, on the one hand, the expectations concerning the anticipated return of the education or, on the other hand, the driving effect of limited sectors which offer potential jobs for foreigners. The potential migrants have experience and knowledge concerning it. Earlier experience of jobs abroad has been gained by more than one quarter of skilled workers who formulate migration plans, one fifth of those who attended secondary school and are skilled, close to one third of those who have graduated from university, but only 7 per cent of those with secondary school graduation and barely 10 per cent of those who have primary education (in the case of more serious conceptions every ratio is higher by 3–5 per cent).

In our study we examined the factors determining the migration *concepts*; because of lack of data our analysis cannot say anything about the motivating factors of *real* migration decisions and the anticipated (expected) return of education in the migration decisions.

6. ANNEX

A.1 Tables

Table A1.1: Detailed OLS results. Dependent variable: logarithmic earnings. Education entered years completed

	1989	1992	1995	1999	2002
Female	–0.21423	–0.137898	–0.114109	–0.118123	–0.101109
Experience	0.02729	0.024385	0.020623	0.020405	0.014123
Experience^2	–0.00039	–0.000326	–0.000241	–0.000268	–0.000171
Education	0.06504	0.080326	0.086729	0.108630	0.113805
2-digit industry dummies	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes
City-town-village dummies	Yes	Yes	Yes	Yes	Yes
Constant	8.22843	7.614628	7.642688	9.130891	9.913645
Observations	145198	131745	153112	164706	137713
R^2	0.43	0.44	0.41	0.42	0.42

All variables are significant at 0.01.
Standard error estimates are robust to heteroskedasticity and firm-level clustering.
Own regression estimates based on NLC Wage Surveys, employees between 16 and 65 years of age.
Left-hand side variable: log of deflated after-tax earnings. Right-hand side variables: female dummy; potential labour market experience (difference of age and modal age at highest completed education) and its square; education (computed years completed: 8 if 8 grades or less; 11 if vocational school, 12 if secondary school with a baccalaureate, 16 if college or more). All regressions contain 2-digit industry dummies, 7 region dummies, and 4 city-size dummies (Budapest, other city, small town, and village).

Table A.1.2: Detailed OLS results. Dependent variable: logarithmic earnings. Education entered in three categories (reference: 8 grades or less)

	1989	1992	1995	1999	2002
Female	–0.221833	–0.15396	–0.13249	–0.14249	–0.12743
Experience	0.027930	0.02491	0.02059	0.02162	0.01687
Experience^2	–0.000427	–0.00036	–0.00026	–0.00031	–0.00025
Vocational sch.	0.117344	0.12931	0.10610	0.12195	0.09701
Secondary sch.	0.237784	0.30011	0.29741	0.35363	0.31321
College	0.571678	0.66290	0.69716	0.87188	0.91789
2-digit industry dummies	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes	Yes
City-town-village dummies	Yes	Yes	Yes	Yes	Yes
Constant	8.770922	8.30731	8.40765	10.10147	10.95878
Observations	145198	131745	153112	164706	137713
R^2	0.44	0.45	0.43	0.45	0.44

All variables are significant at 0.01.
Standard error estimates are robust to heteroskedasticity and firm-level clustering.

Own regression estimates based on NLC Wage Surveys, employees between 16 and 65 years of age.
Left-hand side variable: log of deflated after-tax earnings. Right-hand side variables: female dummy; potential labor market experience (difference of age and modal age at highest completed education) and its square; categories of highest completed education level (reference: 8 grades of primary school or less). All regressions contain 2-digit industry dummies, 7 region dummies, and 4 city-size dummies (Budapest, other city, small town, and village).

Decomposition

Table A1.3: Employment rate and educational attainment of men aged 25–64 in Hungary and in the EU (15), 2001

Educational attainment	Emplyment rate		Ratio in population	
	Average of EU (15) countries	Hungary	Average of EU (15) coutries	Hungrary
Less than upper secondary education	0.71	0.57	0.38	0.63
Upper secondary education*	0.82	0.75	0.39	0.22
At least college	0.88	0.84	0.23	0.15
Total (unweighted)	0.79	0.65	1.000	1.000

Unweighted difference: 0.14.
* For Hungary Classification2 is used: upper secondary education includes gymnasiums and vocational secondary schools.
Sources: Employment rate of EU countries: OECD Employment Outlook 2003. Statistical Annex Table D., Educational attainment of the population: OECD Education at a Glance. OECD 2003.
Hungarian data are estimations based on data of 2001 Census.

Let denote employment rate by F, employment rate of those whose educational attainment is i by f^i, and ratio of population whose highest educational attainment is i by s^i. Let use EU és M indexes for the average of the EU countries and Hungary respectively. We can decompose the difference in two ways:

$$F_{EU} - F_M = \sum_i f^i_M (s^i_{EU} - s^i_M) + \sum_i s^i_{EU} (f^i_{EU} - f^i_M)$$
$$= \sum_i f^i_{EU} (s^i_{EU} - s^i_M) + \sum_i s^i_M (f^i_{EU} - f^i_M) .$$

In the first case – see the first line of the equation – using the Hungarian employment rates of educational categories and the EU ditribution of the population by educational categories for weighting. In the second case – see the second line of equation – using the EU employment rates of educational categories and the Hungarian distribution of the population by educational categories for weighting.

A.2

The earnings function we have used:

$$W = \alpha_0+\alpha_1 R+\alpha_2 0+\alpha_3 U+\alpha_4 E+\alpha_5 E^2+\alpha_6 R\times E+\alpha_7 O\times E+\alpha_8 U\times E+\alpha_9 SEX\,,$$

where W is the natural logarithm of the monthly (before tax) wage, E stands for (potential) labour market experience, inserting variable SEX (male = 1, female = 0) is intended to control for potential disadvantage of women.

Interaction terms $R\times E,\ O\times E,\ U\times E$ are inserted to see whether the impact of under- or over-education on wage is independent of labour market experience or not. From our point of view the following partial derivatives are relevant:

$$\frac{\partial W}{\partial R} = \alpha_1 + \alpha_6 E,$$

$$\frac{\partial W}{\partial O} = \alpha_2 + \alpha_7 E,$$

$$\frac{\partial W}{\partial U} = \alpha_3 + \alpha_8 E,$$

We will focus on α_1,α_2, α_3.

The wage regressions were run on nine annual samples of Employment Office's wage survey for the period 1994 to 2002. They were estimated by ols with robust standard errors that might produce biased coefficients due to endogeneity, simultaneity or selectivity bias. Detailed estimation results are found in *Galasi* (2004b).

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