Education, unemployment and earnings: Decomposing the returns to education

Pavlina Karasiotou

Abstract

The return of education on earnings does not express only the effect on wages; it expresses and includes also the effect that education has on working time (both employment and labour supply). Following the methodology of Ashenfelter and Ham (1979) we first estimate the return of education on annual earnings and subsequently decompose it in a return on monthly wages, an effect on labour supply and an effect on unemployment. We conclude that the return on annual earnings is always higher than the effect on monthly wages, which confirms our initial hypothesis. This employment effect comes from the effect of education on labour supply as well as from the effect of education on unemployment; both are high and statistically significant. Finally we find that our sample (individuals 18-30 at their early career stages) has affected the results leading to a positive schooling coefficient for unemployment. However, for older individuals, the negative relationship between unemployment and education is re-established.

1. Introduction

In the economics of education some questions are in the centre of interest for many decades now. Such questions are for example: why do individuals spend an increasing amount of their time in education? What are individual gains (and costs) from such an investment? Why do countries seem to spend increasing amounts of money in educating their youth?

After the generic works of Mincer (1958, 1974) and Becker (1964), education is mainly seen as an investment in human capital with costs, receipts and a rate of return. Researchers aim at calculating this rate of return on education to provide some answers to the above questions (and many more). The cornerstone of the estimation of education returns has been the "Mincer" equation, which expresses the log of income as a linear function of schooling years and a quadratic function of experience. Throughout the years, the initial Mincer equation has undergone some important changes and improvements (addition of more explanatory variables, allowing for interactions of education and experience, non-linearities in schooling and many more), and faced challenges on methodological issues (OLS, IV, selection bias, measurement errors etc); despite all these, there remains one solid fact: education creates better chances for success for individuals. For almost five decades the literature reports strong positive returns of education on individuals wages; on the other hand, better-educated individuals seem to enjoy more time in employment and less time both in unemployment and inactivity.

Usually the literature that estimates returns on earnings differs from the literature that examines the relationship between education and (un)employment[1]. The estimated returns on earnings are implicitly assumed to express only the *wage effects* of education. The *employment effect* is neglected and is examined separately. However, since earnings are a combination of wages and employment time, both dimensions should be examined and this is our attempt in the present paper.

The starting observation is that individual annual earnings are the product of monthly wages and months in employment. As such, the return of education on annual earnings should be higher than either the return on wages or (un)employment months firstly because

[1] See for example Mincer (1991a) and Mincer (1991b), Nickell and Bell (1995), Kettunen (1997), McKenna (1996)

it is a combination of both and secondly because education normally affects positively earnings, wages and employment time. In the literature, although there exist some comparisons between returns on annual and monthly (hourly, weekly, etc.) earnings, only very rarely time in employment has been explicitly examined as a part of annual earnings (eg. Ashenfelther and Ham, 1979, Nickell, 1979). Here, we view wages and employment months as components of the annual earnings of an individual and will examine which component is more affected by education, providing in this way some further insight regarding this tripartite relationship.

The second basic pillar of this research is the focus on a particularly problematic group; that of young individuals who are in their first career stages. This specific group presents some unique characteristics. Firstly young individuals do not have any (or have very little) work experience; consequently education and other characteristics of the personality should play a more decisive role when they search for and get their first jobs (Brauns et al. 1999). Moreover, they do not yet have a clear picture of the labour market and the prevalent conditions; this may lead to wrong career decisions (e.g. accept or not a specific job offer, return to education or remain unemployed and continue searching etc.) based on either over-optimistic or pessimistic expectations. Finally, young individuals may wish to spend some time searching for a good job-match, often have to rely on family and friends for information as well as financial support, are at the beginning of creating their own family and their strengths (physical, mental and emotional) are at their peak. These characteristics of the group we are examining affect the results and differentiate them in respect to similar results presented in the literature on older age bands.

The first labour market experiences are decisive for the future careers of individuals. To the extend that education affects first labour market experiences, it also becomes a decisive factor for the subsequent career stages, even if at later stages the immediate effect of education on earnings diminishes (Brauns et al. 1999). The literature confirms the decisive effect of early market experiences in later career stages and the role of education on that. Brunello (2001) develops a two period model of earnings growth and shows that unemployment has a negative impact on subsequent earnings growth and this impact is higher for more educated individuals. Ruhm (1991) points out that unemployment has long lasting effects on subsequent wages and Holm et al (2001) show that unemployment that occurs in the early career stages affects subsequent unemployment experiences of individuals with higher education more than it affects unskilled workers, probably because of depreciation of the existing skills of educated workers.

The characteristics of young individuals as well as the importance of the early labour market experiences in subsequent careers are the main motivation for choosing our sample. We believe that by examining in detail the elements of the return of education on earnings and by decomposing it into its wage and employment elements for the extremely sensitive group of young labour market entrants we will get valuable information for policies dealing with young people and their transition from school to working life.

We first estimate returns on education on earnings and decompose them, into returns on wages, labour supply and unemployment following the methodology of Ashenfelter and Ham (1979). Our sample includes young individuals from Belgium (between 18 and 30 years old in 1994) who are undergoing the transition phase from school to the labour market. We find that the return on annual earnings is always larger than the return on wages, implying a strong effect of education on working time; this confirms our initial hypothesis. The employment effect results from the effect of education both on labour supply and unemployment; this differs from the findings of Ashenfelter and Ham who attribute the

difference between the return on annual earnings and monthly wages exclusively to the effect on unemployment. Finally, unlike most of the literature, we find a positive effect of education on unemployment, resulting probably from our sample characteristics. Young educated individuals who undergo a school- work transition have higher reservation wages and accept more difficultly a job offer, despite the fact that they receive more; these lead to a form of voluntary unemployment, where better educated individuals choose to spend more time unemployed searching for a better match. However, in later career stages the negative relationship between unemployment and education is re-established.

The paper is structured as follows: In Part 2 we will present and discuss our model. Part 3 discusses in detail the data, the related problems and the construction of our main variables (schooling, income and time variables). Part 4 is the main body of the paper; 4.1 includes the regressions and discusses the results particularly those concerning the decomposition of the return of education on annual earnings; In section 4.2 we go deeper into the relationship between schooling, employment and unemployment and discuss the specificities of the sample regarding this issue. Section 4.3 uses some alternative measures of education to examine how the results are affected when we account not only for schooling years but also for completed levels of education. Part 5 concludes.

2. The model

In the literature measuring the returns of education on earnings, the measure of earnings selected (i.e. annual, monthly, hourly etc) is very rarely discussed. Very often the choice of time frame over which to measure earnings is dictated by necessity; different datasets include information on different earnings' measures (Card, 1999).

However, the returns of schooling on annual earnings reported in the literature are usually higher than the returns on monthly or hourly earnings (see for example Card (1999) and Mincer (1974)). The explanation that lies behind this fact can be sought in the composition of annual earnings; they are defined as the product of wage per unit of time (monthly wage, weekly wage etc.) times the corresponding units of time (months, weeks etc.) an individual worked during the year. As such, annual earnings include two effects: the effect of education on (un)employment time and the effect of education on wages per time unit. It is a widely accepted fact that more educated individuals work more, so this can explain why returns on annual earnings are higher than returns on monthly (hourly, etc) earnings.

On the other hand, the next question should be why more educated individuals work more. This may occur, either because labour supply increases with schooling level or because more educated individuals become less frequently unemployed and/or spent less time in unemployment. Both of these explanations are plausible. Recent OECD data (2002) for Belgian 25 to 64 age band males report 92 % labour force participation rates for tertiary level (university and non-university) graduates, 87% for upper- secondary and post-secondary non-tertiary education graduates and 71% for those individuals with less than secondary education. The differences are even greater for women (86% for university graduates, 82% for non-university tertiary education graduates, 71% for those with upper-secondary education and 41% for those with less than secondary education). On the other hand more educated individuals seem to experience lower unemployment rates in most cases. Again OECD reports that for the year 2001 unemployment rates for Belgian individuals 25 to 64 age band were 2,4% for those with university degrees, 2,2% for those with tertiary non-university education degree (an exception to the general pattern), 3,9% for upper-secondary and post-secondary non-university graduates and 7,7% for those with less

than upper-secondary education. For women the unemployment rates were 3,3%, 3,0%, 7,0% and 13,5% for each of the above education levels respectively. These statistical data confirm that more time in employment for the better educated may be a result of either increased labour supply or less unemployment.

A vast amount of literature explores the reasons behind these stylised facts. Technological changes (Bartel and Lichtenberg (1987), Nickel and Bell (1991)), screening from employers (Holzer, (1996)), more efficient on- and off- the job searching (Mincer, (1991a)), psychological and sociological reasons (discouragement and exit from labour force for less-skilled workers, family decisions such as the raising of children) are only few of the reasons that have been explored as explanations for why education affects positively the time spent in employment and in the labour market in general. Of course the purpose of the present paper is neither to present nor to explore these reasons but it rather tries to examine and measure the part of the return of education on earnings that can be attributed to time in unemployment and time in the labour market.

The model we use, is developed by Ashenfelter and Ham (1979) (from now on referred as A&H). A&H assume that labour supply h* is simply the sum of employed (h) and unemployed (u) months h*=u+h. All months that are spent in activities other than in a job or in an active search of a job (i.e. unemployment) are assumed as a part of an individual's decision not to offer his labour into the market. This is true to the extent that, no compulsory schooling laws and other restrictions exist (e.g. compulsory military service), that influence a persons' available time for work or job search. In the following we will present how our model differs from that of A&H regarding the definitions of employment, unemployment and inactivity.

With a monthly wage w, desired earnings are then:

$$wh^* = w(h+u) \Rightarrow$$

$$wh^* = wh(1+u/h)$$

where wh are annual realised earnings and u/h is the fraction of unemployment to employment months. By taking logs the relationship becomes:

$$\ln wh = \ln w + \ln h^* - \ln(1+u/h)\,(^2) \qquad (1)$$

Equation (1) is a decomposition of annual earnings into wages, labour supply and unemployment/ employment ratio. An immediate result is that:

$$\partial \ln(wh)/\partial S = \partial \ln w/\partial S + \partial \ln h^*/\partial S - \partial \ln(1+u/h)/\partial S \qquad (2)$$

where S is a measure of schooling.

Equation (2) decomposes the effect of schooling into a sum of the effect of schooling on wages, labour supply and u/h. It is the components of equation (2) that A&H estimate in their paper and we also attempt to estimate them in the present paper.

As a second step A&H take each one of the components of equation (1) to be a linear function of schooling and a quadratic function of experience:

[2] A&H actually use the relationship $\ln wh = \ln w + \ln h^* - (u/h)$ instead of (1). The simplification $ln(1+u/h) \approx u/h$ that they make is true for small values of u/h, namely for $u/h<0,1$. This is a plausible assumption for 1979 when the A&H paper was written and one can assume that individuals spent only a small fraction of their time in unemployment. However today's experience saws that we can have u/h ratios very much above 0,1 (for example an individual with 10 months of unemployment and 2 months of employment has a u/h ratio equal to 5). This implies that the simplification of A&H may distort our results and consequently we will not use it in our estimations.

$$\ln y = \alpha + \beta S + \gamma E + \delta E^2 + \varepsilon, \quad (3)$$

where *lny* represents *ln(wh), lnw, ln(1+u/h)([3]) and lnh** respectively and E is experience measured in the conventional "mincerian" way (**E = Age – S - 6**).

The least squares estimates of schooling in (3) will satisfy exactly the relationship

$$\hat{\beta}_{wh} - \hat{\beta}_{w} - \hat{\beta}_{h^*} = -\hat{\beta}_{u/h} \quad (4)$$

and this relationship holds also for the experience estimates in (3)[4]. Then we have four possible cases that explain the difference between monthly and annual earnings. The first is the trivial one that $\hat{\beta}_{wh} - \hat{\beta}_{w} = 0$ implying that education has no effect on time spent on employment and we have already mentioned that the literature concludes otherwise. Secondly $\hat{\beta}_{wh} - \hat{\beta}_{w} = \hat{\beta}_{h^*}$ would imply that education does not affect unemployment experiences of individuals and all the difference between annual and monthly earnings is due to the effect that education has on labour supply. The third case is the opposite one namely $\hat{\beta}_{wh} - \hat{\beta}_{w} = -\hat{\beta}_{u/h}$, implying that labour supply is independent of schooling and the last case is that all components of equation (4) are different from 0 and so the difference between annual and monthly earnings can be explained from the effect of education on labour supply as well as unemployment.

The results in the A&H paper fall into the third case, namely that the schooling coefficient in the labour supply coefficient is not statistically different from 0. They use a sample of white males aged 25 to 50 (in 1967) for the years 1967 to 1974 from the longitudinal data of the university of Michigan Income Dynamics Survey (IDS)[5]. They run OLS regressions for all of their four dependent variables and then maximum likelihood (Tobit) regressions for the u/h variable, since the OLS procedure ignores the fact that their u/h variable is truncated at 0 (we do not report here). Table 1 presents some of the results of the paper.

Table 1 Effects of schooling and experience on an 8-year average of earnings, wage rates and hours of unemployment in A&H.

	Dependent variables		
Coefficients of	ln(wh) (OLS)	ln(w) (OLS)	u/h (OLS)
Constant	7,771 (0,113)[6]	0,0830 (0,1196)	0,1350 (0,0393)
S	0,0942 (0,0050)	0,0880 (0,0054)	-0,0050 (0,0018)
E	0,0234 (0,0085)	0,0208 (0,0091)	-0,0055 (0,0030)
$E^2/100$	-0,0325 (0,0187)	-0,0177 (0,0198)	0,0139 (0,0065)
R-square	0,337	0,267	0,030

Source: A&H page S102

[3] From now on, instead of (1+u/h) we will use u/h for notational convenience

[4] Equation (4) is equivalent to (2) only under the assumption that OLS are the true estimates of the return of education on earnings. Throughout this paper we will assume so and ignore the well known problems of unobserved heterogeneity, selectivity etc that bias OLS estimates.

[5] Their sample had mean school years completed 12,4 years and mean experience 19,2 years in 1967.

[6] Standard errors in parenthesis

As can be seen from the table, the difference between ∂lnwh/∂S and ∂lnw/∂S is 0,0062 and the OLS estimate of u/h is -0,0050 and accounts for 81% for the discrepancy. A&H do not report the estimates of their variables in the labour supply model but they mention that the effect of schooling on labour supply is not statistically different from 0. They arrive at similar results for their experience estimates. When A&H fit their data for each of the 8 years instead of taking the average they reach similar conclusions, however they detect some variation in their coefficients from year to year, which is considerably large for certain years (1967, 1971 and 1974). They conclude that this variation is mainly a result of the effect of education on the incidence of unemployment, while schooling leaves the duration of unemployment unaffected.

Although we will use the A&H model with minor changes in the methodology we expect our results to differ in various ways. Both the samples and the countries of research differ greatly. Belgium and the US are two countries with very distinct educational systems (curricula, streams after compulsory education, duration of compulsory education etc) as well as labour market institutions (unemployment assistance and insurance, state mechanisms for helping young people etc). Neither in the A&H paper nor here we control for labour market institutions and we do not compare the educational systems; consequently there can be no comparison within this framework between the two papers. Secondly, we deal here with a time period 25 years later than the period in the A&H paper; the differences in the national and international environments are enormous. For example while during the A&H period the unemployment rate was on average around 4,7% (Henderson et al, 2003) it was 9,9% (the double) in Belgium in the period 1994-1996 (our research period) and so is the unemployment rate for highly skilled individuals (ISCED 5-7) (3,4% in Belgium, 1997 compared to 1,7% in US, 1971-74). We expect the positive effects of education on employment to be much smaller for individuals in our sample.

Due to our sample we also expect higher returns to earnings than in the A&H model. According to Brauns et al (1999) the relative weight of education in an individual's remuneration depends on the individual's career stage, having greater weight as performance indicator at earlier stages. In the A&H paper individuals are not new entrants in the labour market thus the education effect on earnings is expected to be smaller. Finally we expect education to affect labour supply. A&H sample is relatively homogenous in the sense that it includes white males. Women and non-white males who are two population groups with easy-changing labour force participation behaviour are excluded while are included in our sample.

3. The sample and construction of variables.

3.1 The data and sample selection

For our estimations we use the first three waves (1994, 1995 and 1996) of the European Community Household Panel (ECHP). The ECHP was launched in 1994 by Eurostat, responding in that way to a need for information on household and individual variables comparable at a pan-European level. The questionnaire was centrally designed by Eurostat in order to allow for comparability among countries; nevertheless it allowed flexibility for adaptation to national particularities. The data are collected by the "National Data Collection Units" (NDU's), which either are universities, research centres or national statistical services. For Belgium, the country of interest in the present paper, the NDU's are the University of Antwerp and the University of Liege.

ECHP contains data on households and individuals. Household data include information on its composition, the quality of life and its financial situation. Individual data include

information on the professional situation, unemployment and search for work experience, financial situation, education, health and migration.

As already mentioned the paper focuses on Belgium; the individuals included in the ECHP for this country are 6.710 for the first wave, 6.456 for the second and 6.151 for the third. From these individuals we selected those young individuals aged 18 to 30 (in 1994) who during the year prior to the survey were following a general education course[7] and at the moment of the survey were no longer in education. From the time they were included in the sample they were followed in all the subsequent periods we have information on; for example an individual who followed a general education course in 1994 and is not in education in 1995 is included for the first time in the sample in the 1995 wave and is also included in the 1996 wave (but not in the 1994). We were able in that way to calculate years of schooling (information that is not included in the survey) with accuracy. We will discuss this issue further in the next section.

Contrary to the A&H sample which included individuals aged 25 to 50, our includes individuals who have very recently entered the labour market and most of them are still undergoing the transition phase from education to employment. According to Green et al (2001) during the 1980s and 1990s the features of youth transitions in the European Union have changed dramatically making the description and the analysis of aspects of young and subsequent life courses more difficult and complicated. Youth transitions have tended to last more and to start and end at later stages of life (e.g. individuals stay longer in education, need more time to find a "stable" and "suitable" job etc.); as a result the "youth phase" of the life course should be more appropriately set to end at age 29/30 (the upper age limit in our sample) than 24/25 as is done in previous studies.

Transitions have also become more ambiguous, with the crossover from one status to another to be less clear-cut and thus the outcomes to be difficult to discern and analyse. Finally, transitions during the past 20 years have become more diverse; the possible routes one can choose have increased in number and complexity and the sequencing of events has changed (e.g. combination of work and part-time education, a sequence of education-unemployment-education etc).

Although the selection of the specific sample permitted us to calculate the years of schooling with a high degree of accuracy, gain further insight in a very problematic period of individual lives and arrive at very useful results, it created other problems. The most important of them were a) the loss of a very large number of observations because many individuals of that age are still in education, b) the difficulties in measuring employment and unemployment time due to the existence of multiple transitions from unemployment to employment and c) the fact that earnings in that period do not accurately reflect lifelong earnings due to employment in lower-paid and less satisfying jobs until the individual finds a desirable career and so generalised results are difficult to be drawn.

3.2 Construction of the schooling variable and related data problems

The ECHP does not contain direct information on the years of completed education of individuals, consequently we had to construct this variable. ECHP contains information on

[7] The term "general education course" includes the following four course categories: i) (general or higher education) and (vocational or training course) and (language or other adult education course) ii) (general or higher education) and (vocational or training course) iii) (general or higher education) and (language or other adult education course), iv) general or higher education only.

an individual's completed level of education, on the age he got his first job, on his activities during the year prior to the survey and the year of the survey[8] and some information on unemployment experience. By combining the above information we calculated schooling years for each individual:

Schooling years= Age- 6- time in the labour force

"Age" corresponds to the age of the individual at the time of the survey and "time in the labour force" is the sum of "working time" and "unemployment period before first job". "Working time" is the difference between an individual's present age and his age when he got his first job. As most of the individuals in the sample are either in their first job or in search for it, working time equals 0 or is very small (< 1 year). By the construction of the sample (young individuals who were in education the year prior to the survey year) those who have more than one year in the labour force should have experienced a transition from work to school and we subtract that from our schooling variable. We have also subtracted unemployment periods that occurred after an individual left school and before he started working (or returned back to school). Any unemployment periods that occurred after the individual got his first job do not affect the measurement of education[9] and consequently we do not account explicitly for them[10].

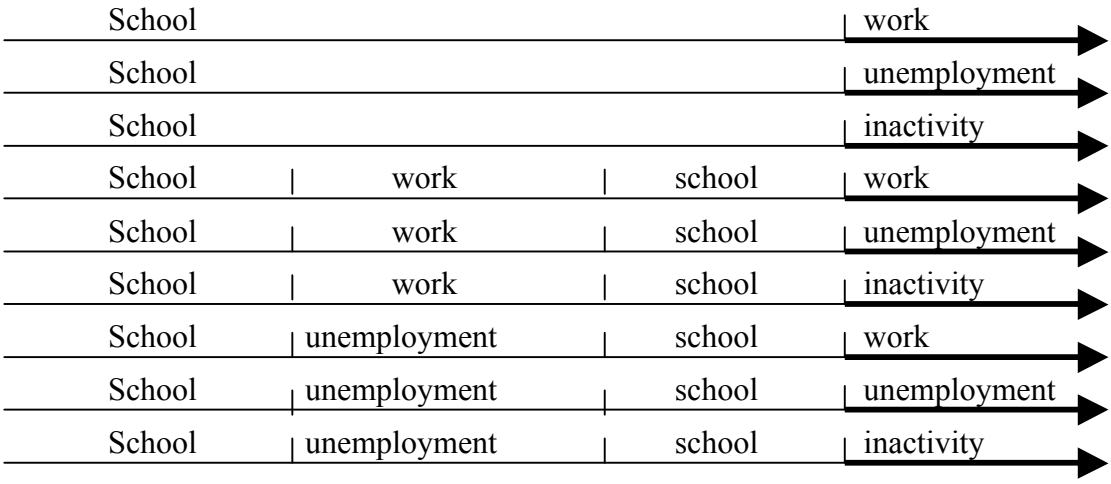
The information included in the survey allows us to follow exactly the transitions of individuals between all possible states (work, school, unemployment and inactivity) for the period 1993-1996. However the information we have for the period before 1993 is very limited. Therefore, an assumption we make in the calculation of schooling years is that we do not have any unobservable work-school-work transitions i.e. transitions that occurred before 1993. If such transitions existed this would imply that our schooling variable is underestimated and the time spent in the labour market is overestimated, introducing bias in our results. However we believe that the assumption of no multiple work-school transitions holds, because of the young age of individuals in our sample and the large proportion (approximately 62%) of those who at the time of the survey reported that they are at their first job (or business); for the remaining 38% we observe at least one work-school-work transition.

Another problem is that we have no way to control whether the self-reported "age of first job" refers to a "regular" job acquired after completion of education or to a student or similar job during education years. We assume that individuals report their first "regular" job; otherwise we are again underestimating education and overestimating working experience. By combining the information on completed level of education, the minimum required years of schooling to complete each level of education and the reported age of first job, we concluded that our assumption can be valid.

At the time individuals are included in the sample none of them is in education anymore. However they can be either in employment, unemployment or inactivity. So throughout the paper we will deal with three possible states an individual can be in. Figure 1 below shows all possible combinations of schooling, work, unemployment and inactivity that are included in our sample (with the bold lines indicating the period during which individuals enter our sample).

[8] We have information on the main activity of the individual for each month for the twelve months prior to the survey and information on his activities at the moment of the survey.
[9] These unemployment spells are implicitly included in "working time"
[10] However, we will take those periods of unemployment into account when we will construct the variable, which measures the experience of an individual.

Figure 1



As can be seen from the diagram, all of the individuals in the sample are either at work, unemployment or inactivity in the period they first enter the sample and they were all at school in the period[11] before they entered the sample. None of the individuals has another work (unemployment)- school transition from the time he enters the sample, but they have work-unemployment (inactivity) and/ or unemployment (inactivity)-work transitions.

At this point we should explain in somewhat more detail what we mean by "work", "unemployment" and "inactivity" as they are of major importance to the paper. We consider as "working individuals" all those who are in paid employment (either full or part time), in paid apprenticeship, self-employment and special training schemes related to their employment. All individuals have to receive income from these activities. By the construction of the questionnaire and the data, these categories include individuals who are occupied in the specific activity for at least 15 hours per week. All those who work for less than 15 hours/week are classified as unemployed or inactive.

We consider as "unemployed" those who are not in any of the above situations and are actively seeking for a job. Unemployed individuals may or may not receive unemployment benefits, but this fact does not affect our analysis and we will not deal any further with it. So unemployment in our sample is self-reported and not based upon administrative data.

Finally as "inactive" are classified those individuals who are not working and are not actively seeking for a job. Among them are those who stay at home doing the housework, looking after children or other family members at need, those doing community or military service and all other who have classified themselves as inactive[12].

3.3 Which measure of education?

An issue closely related to the discussion in the previous section is which measure of education we should use. The standard earnings function dictates that log earnings are a linear function of *years of completed schooling.* Years of schooling is also the most

[11] As we will present very shortly the individuals did not spent all of the period (12 months) prior entering the sample in education.

[12] Those individuals have self-specified the reason for which they are inactive but these classifications are not available.

common measure of education in the literature. However, this specification entails two assumptions: a) that years of schooling is the correct measure of education and b) that each additional year of schooling has the same proportional effect on earnings, holding constant years in the labour market.

The first assumption is rather strong and does not take into consideration two very important issues. Firstly the issue of individual ability to understand, process information and increase his level of education. The issue of individual ability, the subsequent selectivity problem (more able individuals choose more schooling and therefore the schooling effect incorporates also the ability effect) and the ways to resolve them, have been extensively dealt with in the literature (Card, 1995, Card 1999, Heckman 1979, etc). Here we will not deal further with these issues but we plan to examine them further in a later stage of the research.

Moreover, the issues of school quality and expenditures for education may cause problems when using years of schooling as the correct measure of education. School quality has been found to affect positively student achievement (Krueger 1999, Angrist and Lavy 1999) and subsequently wages (Altonji and Dunn 1996, Card and Krueger 1992). Our data is not rich enough to allow for the inclusion of qualitative aspects of the Belgian schooling system. However, as we only estimate returns to education for only one country (Belgium) we assume that such differences (in quality of schools, quality of teachers, quality of curricula) are minimised[13].

The second assumption is also somewhat difficult to accept. Among others it implies that a year of university education affects future earnings as a year in secondary or even in primary education or that an individual who has spent for example 14 years at school (6 years primary education + 6 years in secondary education + 2 repetitions) would have the same return to education as someone with again 14 years of education but different combination (6 years primary education + 6 years in secondary education + 2 years in tertiary education).

These arguments have substantial validity in a country like Belgium, where repetition of classes is permitted by the system and is also a quite common phenomenon. According to data from the Ministry of the French community (2002) only around 45% of the student population (in the French community) have arrived at the end of their 6th year of secondary education (secondaire ordinaire) in the normal age during the academic year 2000-2001. More than 25% of the students have had one year of repetition, around 15% had 2 years of repetition and more than 10% of the students have had 3 or more repetition years. For the Flemish community, the statistics are better, but still high. According to the Ministry of the Flemish community, 22,3% of students have had 1 year of repetition at the end of their 6th year of secondary education and 8,1% had more than two repetition years.

Moreover in the Belgian education system exist multiple education streams. These include the existence of part- and full time secondary education, long- and short type post-secondary education, university and non-university tertiary education etc. One could suspect that all these different choices that an individual can make through his schooling years also affect his subsequent earnings and so earnings can hardly be a linear function of schooling years.

[13] However, these differences could exist in a country like Belgium with the division of the regions and the linguistic communities. Our data does not include information on the region that an individual went to school, which would permit some further analysis of the issue. Nevertheless, the educational system is very similar between the two main communities (French- and Flemish speaking), so for the present time we do not deal any further with the issue.

Around these issues just discussed has been evolved a part of the literature examining the so- called "sheepskin effect" namely the hypothesis that credentials (e.g. secondary education degree or university degree) matter more than years of schooling and subsequently completed levels of education should be used rather than actual years of education. In the literature there exist some very controversial results and other authors confirm (eg. Hungerford and Solon (1987), Jaeger and Page (1996)), while others dismiss the hypothesis of discontinuities of the earnings function in the "degree" years. More recent papers (Heckman et al., 2003 and Bjorklund and Kjellstrom, 2002) reject the hypothesis that earnings are linear in years of schooling (a basic assumption in the standard Mincer equation) and introduce measures of this non-linearity.

We do not aim here neither to estimate sheepskin effects nor to detect non-linearities in the Belgian returns to education. However we do not want our results to be affected by extra years of schooling, which do not lead to a degree (repetitions or uncompleted education). Therefore, we are going to relax the linearity assumption in order to see the effect of extra "non-degree" years of schooling on our results and decompose the return to education for each education level.

3.4 Measurement of time in the labour market

Let us now go back to the specification of the labour supply variable and the measurement of employment and unemployment time. A&H take unemployed hours at face value and they allow for labour supply h* to be the sum of u and h. An implicit assumption behind this definition is that the remaining time (12-h* if we were counting in years and months) is spent in inactivity (and not in education).

This assumption is important basically because we are interested in the effect of education on realised earnings (ex-post return) and secondly because labour supply should be a comparable variable among individuals (individuals should have a common time point when they enter the labour market).

In our sample individuals have been in education during a part t of the year prior entering the sample ($1 \leq t \leq 12$). This implies that we should take into account that people could have left education at any moment during the past year; consequently the amount of schooling received is closely connected to the time- point of leaving education. This relation could go both ways; for example more educated individuals have completed an academic year and remained in education until June or September, while less educated individuals did not complete the academic year and left earlier; however it might be the case that less educated persons have returned to school to gain some further education and so they report more months in education. Failure to incorporate these facts into our analysis could result into biased results since then we would implicitly assume time spent in education as time in inactivity and inactivity would be overestimated.

In ECHP individuals are asked about their main activity for each month during the past year; so it is easy to calculate h, u, h* and Ed (months spent in education) for an individual for the past year. Using this information, we first estimate returns to education taking the time variables (h*, h and u) at their face value and then we examine how the results are affected when we normalise the variables and express them as fractions of the number of months spent outside education.

So in the first case and following A&H we decompose annual earnings in the following way:

$$\ln wh = \ln w + \ln h^* - \ln(1 + \frac{u}{h}), \qquad (5).$$

The decomposition we will work on in the second case is:

$\tilde{h}^* = \tilde{u} + \tilde{h}$, where $\tilde{h}^* = \frac{h^*}{12 - Ed}$, $\tilde{u} = \frac{u}{12 - Ed}$, $\tilde{h} = \frac{h}{12 - Ed}$.

Following the steps of A&H the desired earnings are:

$w\tilde{h}^* = w\tilde{h}(1 + \frac{\tilde{u}}{\tilde{h}})$, and taking logs gives us our model:

$$\ln w\tilde{h} = \ln w + \ln \tilde{h}^* - \ln(1 + \frac{\tilde{u}}{\tilde{h}}) \qquad (6).$$

Comparing (5) and (6) we can easily see that the last term that expresses the time spent in unemployment remains unaffected by our decomposition. This is because it is already a fraction and expresses a relative measure of unemployment time.

Another issue related to the measurement of time in employment and unemployment was that of missing values. When constructed our time variables, h, u, h* and Ed we observed that for a large number of observations in our sample (around one fourth) individuals have reported annual income coming from work but zero months spent in employment. This led us to a substantial loss of observations.

A possible reason for those missing values is that all those individuals have been working non-regularly in probably non-formal jobs and have not considered this work as their main activity for any month. If this reason holds, these individuals should have gained very little for their work. Actually the mean *annual* income for those individuals who have reported 0 months in employment and yet income from employment is about 68.528 BEF (appr. 1700 €) so this strengthens our hypothesis. Moreover almost 83% of those individuals who have reported no months in employment and yet some income have also reported 12 months in education. We can safely assume that all those individuals have had a student job during their studies and we will take that into consideration later in the analysis.

In order to increase the observations in our regressions we tried to impute the missing values in our sample. We set months in employment to be a dependent variable and a list of regressors, which included the years of schooling, the gender, the annual income, the region, the calendar year and the years of working experience. The statistical package fits a regression on the list and imputes missing values with the predicted values of the dependent variable. The sample used for the imputations included all those individuals who have reported income from work as well as months in employment. The mean of the predicted values is approximately 1,48 employment months, which further strengthens the initial assumption that these individuals probably had a non-regular job and earned a small amount of money.

An immediate result of this procedure is that the sum of months in education, unemployment, inactivity and employment will be greater than 12. From our data it is not possible to distinguish whether an individual has performed a job and earned some money while being in “unemployment”, “inactivity” and/or “education”. So in order to restore the equality employment+ education+ unemployment+ inactivity=12 we reduced each one of them proportionally. So if for example an individual has reported five months in

unemployment we reduced his unemployment months by $(5/12) \times imputed\_employment\_months$.

The imputation increased our sample by 23 observations or 8,7% of the sample with no imputed missing values. We chose to leave outside the sample those observations for which individuals have reported income and 12 months of education. What we did was to create a dummy variable, which indicates whether an individual has had a student job while at full time education and we used it as an explanatory variable for the same individuals in the subsequent waves.

3.5 Which measure of earnings?

ECHP includes quite rich information on individual income, which facilitates our analysis. Almost all income components in ECHP are expressed in National currency (Belgian Francs for Belgium), are annualised, net of taxes and pertain to the year prior to the survey. Since the information on monthly activities of the individuals in the sample also corresponds to the previous year we can directly match these two sources of information and derive average monthly income.

One of the implicit assumptions of the Mincer equation is that for the schooling coefficient to express the rate of return to schooling, the earnings measure should capture the full benefits of the investment. For this to hold, when the purpose is to estimate the private returns to education (as it is here), earnings should be measured net of taxes and transfers and should also include non-pecuniary advantages of jobs. As already mentioned, ECHP income components are net of taxes and other transfers so these requirements are met.

In our regressions we use net personal income from work. We have already described what we mean by "work". Consequently "income from work" includes income from wages and salaries (from part- and full-time work, apprenticeship etc.), income from self- employment as well as extra payments that the individual may have received for his work (e.g. 13th salary, holiday allowances, shares from the company profits etc.). This last characteristic of our income components satisfies the assumption that earnings should capture the full benefits of the investment. Our earnings measure does not include non-pecuniary benefits from work (e.g. company car, child care etc.). However it seems that only a few of the individuals in our sample receive such non-pecuniary benefits (9 observations which report that their employer provides them with child-care facilities and 15 observations which report free or subsidised housing from the employer). A valid assumption would be that those non-pecuniary benefits come at later stages of an individual's career and after having spent some time within the company.

3.6 Explanatory variables

In the classical Mincer's earnings equation, wages are a function of years of schooling and experience of the form: $\ln y = \alpha + \beta S + \gamma E + \delta E^2 + \varepsilon$, where S measures actual years of schooling and E=Age-S-6. This form of the earnings equation has been widely used, and it is also used in the A&H paper. However, most studies in the literature choose to add explanatory variables in order to avoid or reduce biases in the estimated returns to education and to measure explicitly the effect of other important factors on earnings (such as the effect of gender, race, family background, union membership etc. -depending on the availability of information and the issues in question).

In our paper we will estimate earnings equations of the form:

$\ln y = \alpha + \beta S + x'\gamma + \varepsilon$ (7), where x is a vector of explanatory variables. Our list of regressors includes the following[14]:

a) Experience and square of experience (in years). This is equivalent to the E variable in the A&H paper. We constructed the E variable as: ***E=Age- Age of first job-Unemployment spells after first job - Education spells after first job***. In that way we measure the time an individual has spent in his present and previous jobs net of time in unemployment or education. The square of experience is included in the regressions in order to detect non-linearities in the wage- experience relationship. We expect that earnings increase with experience in a diminishing rate.

b) Gender dummy. We use a dummy that takes the values 1 if the individual is a woman and 0 otherwise.

c) Region dummies. We want to see how the different communities that exist in Belgium affect the earnings and the unemployment time of individuals. ECHP offers information on the region an individual lives in and according to that we have constructed three dummies; one being 1 if an individual resides in Walloon and 0 otherwise, one being 1 if an individual resides in Flanders and one being 1 if an individual resides in the Brussels region. Taking into consideration that region of residence and region of work can be different for a large number of Belgians it would have been preferable to use as an explanatory variable region of work; this would capture elements such as regional unemployment, wage differentials etc. However we have no information on that issue so have to be careful in the explanation of the region coefficients.

d) Dummies for calendar year. We use three dummies indicating each one of the years 1994, 1995 and 1996.

e) Dummy on student job. As we already mentioned there exist a number of individuals in the sample who report some income from work and 12 months of education. We make the assumption that these individuals have had some sort of a student job while in education. To capture the effect of a student job we construct a dummy variable taking the value 1 for those individuals in the sample.

f) Schooling variables. Besides a variable which measures the years spent in education in way we have already described above we are using a) interactions between the highest level of education completed and the extra years above the minimum required to complete a certain level. These variables are D_1*(S-15), D_2*(S-12) and D_3*(S-9), where D_1 corresponds to tertiary education (ISCED 5-7), D_2 corresponds to secondary (ISCED 3) and D_3 to less than secondary (ISCED 0-2). The use of these variables will indicate whether an individual gets a premium or receives a "punishment" for spending extra years in education than the minimum required. b) Instead of years of schooling we will use interactions between years of schooling and highest level of education completed (D_1S_1, D_2S_2 and D_1S_3). In that way we will be able to compare the schooling returns for each education level. Both a) and b) allow for non-linearities in the relationship

[14] We do not include here explanatory variables on the family background of the individual, despite the fact that are very widely used in the literature. However, our data does not include information on family background that could be easily used.

earnings- education and in that way we can distinguish between levels of education and see how our decomposition is affected by this.

3.7 Description of the sample.

After selecting the sample, we were left with 403 observations for the three periods (1994, 1995 and 1996), which correspond to 225 individuals. In the following table we describe more extensively our sample.

Table 2 Description of variables for the total sample (by level of education)[15]

Variable	All education levels	ISCED 5-7	ISCED 3	ISCED 0-2
Age	23,61 (4,20)	26,20 (2,47)	23,10 (3,78)	19,71 (3,81)
Male (%)	52,11	57,06	50,81	45,10
Female (%)	47,89	42,94	49,19	54,90
Annual income (BEF)	285.575,5 (280.558,3)	418.746,1 (303.930,2)	253.248,7 (221.077,7)	93.784,47 (152.622,9)
Monthly income (BEF)[16]	45.812,16 (45.629,99)	48.986,67 (42.637,81)	48.966,71 (60.028,24)	36.468,5 (24.755,82)
Years in the labour market	2,34 (3,27)	2,61 (2,71)	3,15 (4,07)	0,89 (2,57)
Months of Labour supply[17]	7,14 (4,94)	9,15 (3,87)	7,19 (5,08)	3,63 (4,48)
h*/(12-Ed)	0,94 (0,17)	0,95 (0,15)	0,96 (0,15)	0,92 (0,22)
Employment months	6,30 (4,77)	8,15 (4,09)	6,22 (4,83)	3,22 (4,16)
h/(12-Ed)	0,86 (0,25)	0,85 (0,24)	0,86 (0,24)	0,88 (0,26)
Unemployment months	0,84 (2,15)	0,99 (2,29)	0,98 (2,24)	0,41 (1,67)
u/(12-Ed)	0,082 (0,198)	0,096 (0,208)	0,096 (0,207)	0,041 (0,163)
1+u/h	1,29 (1,15)	1,40 (1,54)	1,24 (0,61)	1,18 (0,82)
Current activity: employed (%)	87,59	90,91	86,90	72,73
Current activity: unemployed (%)	9,57	7,27	11,90	15,15
Current activity: inactive (%)	2,84	1,82	1,19	12,12
Brussels (%)	15,87	19,08	12,30	14,71
Walloon region (%)	40,30	41,62	30,33	50,00
Flemish region (%)	43,83	39,31	57.38	35,29
Years of schooling	15,37 (2,98)	17,61 (1,80)	14,25 (2,19)	12,83 (2,65)
Observations	403	177	124	102

The average age of individuals is 23,61 years, while mean age increases with completed level of education as can be expected. Men and women are almost equally represented in the sample (52,11% and 47,89% respectively); however we see that men are

[15] Mean values of variables. Standard deviations in parenthesis
[16] Monthly income is calculated as (annual income)/(employment months)
[17] Imputed values of unemployment months are included

overrepresented in the highly educated group while the majority of individuals in the least educated group is women. The region of Brussels is under-represented in the sample (15,87% of the observations) and the other two regions are almost equally represented. Individuals who have completed tertiary education come almost in equal percentages from the Walloon and the Flemish region, the majority of individuals with secondary education reside in the Flemish region and the majority of those with less than secondary education in the Walloon region.

Both the annual earnings as well as monthly wages seem to increase with the level of education and this is a first indication of positive returns to schooling. However we can easily check that the earnings gap for different educational groups is not the same for annual and monthly earnings. Mean annual earnings for the group with completed secondary education is about 60% percent of the mean annual earnings for the group with completed tertiary education. However mean monthly earnings of these two groups are practically equal. Comparing the best educated group (ISCED 5-7) with the least educated (ISCED 0-2) we see that the last group receives only 24% of the annual income of the first but almost 74% of the monthly income of the best educated group. We can easily attribute these differences in the gaps in the time spent in (un)employment.

In rows 8-14 of the table we present the average values of the h*, u, h and u/h variables as well as the average values of their ratios to the time spent outside education in order to neutralise the effect of the moment an individual enters the labour market. Concerning the months of labour supply, while it seems that highly educated individuals spend around 2,5 times more time in the labour market than those with less than secondary education, their h*/(12-Ed) ratio is only slightly higher. This implies that individuals with low skills have spent more time in education (during a calendar year) than those with higher skills. We could explain this result if we think that that low-skilled individuals wished to increase their education in order to become more competitive in the labour market or they were obliged to do so in order to acquire professional rights; consequently they had to spent more time in education.

The pattern of months in employment is much more clear. Employment increases with education; individuals with secondary education work about 75% of the time an individual with tertiary education works and individuals with less than secondary education work about 40% of that same time. However, if we consider the ratios we see that individuals have worked almost for the same amount of time irrespectively of their educational level.

A striking effect that needs to be further examined is the fact that unemployment months as well as the unemployment ratio u/12-Ed increase with education. While individuals with tertiary education and individuals with secondary education seem to spend around one month of the year in unemployment, that time is about half for individuals with less than secondary education. As a result the ratio u/h, which shows the relative relation between unemployment and employment time is higher for the best educated. We will discuss this issue in detail in the next section where we will present the estimation results.

To discuss a little more the characteristics of our sample we see that individuals with secondary education are those who have had more working experience. Concerning the main activity status of the individuals at the time of the survey, the percentage of the employed is much higher for those who have completed tertiary education than for the other two categories. On the other hand the percentage of inactive individuals is noticeably high for the least skilled individuals.

A final remark is on the years of education. Taking into account that the minimum amount of years to complete tertiary education is 15, for secondary education is 12 and for those with less than secondary education is 9, we see that on average tertiary education graduates have 2,5 years of surplus, secondary graduates a surplus of 2,25 years and those with less than graduate education stay about 4 years more in education than they were supposed to. These extra years can be due to three reasons: a) repetitions within the completed level of education (or the former ones), b) years spent to the next level of education without acquiring a degree and c) only in the case of tertiary education, years that led to further degrees that we can not observe (e.g. long type education, university degree, master etc).

We proceed with the estimation results and their discussion.

4. Estimation results

4.1 Decomposition of the return of education on annual earnings

Following the model described in section 2 (equation 5) we have estimated equations:

$y_i = \alpha_i + \beta_i S + x_i^{'}\gamma + \varepsilon_i$, (i=1, 2, 3, 4) where y_1 =lnwh: the logarithm of annual earnings, y_2= lnw: the logarithm of monthly earnings, y_3 = lnh*: the logarithm of labour supply and y_4 =ln(1+u/h): an expression of the ratio of unemployment to employment months.

We described in section 3.6 in detail the variables included in vector x and their construction. Due to missing values we have a further significant loss of observations; however the characteristics of the sample as presented in section 3.7 and table 2 are unaffected.

Model 3.A in Table 3 does not include those individuals who have reported income from work but no months in employment. They are included in the models of the second panel (only those who report less than 12 months for education). The missing values for employment months have been imputed following the way described in detail in section 3.3. Model 3.B.2 also includes a dummy "studjob" to indicate those individuals who have had a "student job" when studying. However we do not include these years of "student jobs" in our regressions, as this would disturb the homogeneity of the sample (both students and workers included) and subsequently the results; this is the reason that the number of observations in 3.B.2 is the same with 3.B.1.

Table 3 Multivariate OLS regression results

A) Model 3.A: Non- imputed observations for missing employment months

Variable	lnwh	lnw	lnh*	ln(1+u/h)
Schooling	0,1283 (0,0191)*	0,0921 (0,0168)*	0,0537 (0,0138)*	0,0175 (0,0094)**
Female	-0,2866 (0,0955)*	-0,0910 (0,0839)	-0,0952 (0,0689)	0,1004 (0,0470)*
Experience	0,3551 (0,0395)*	0,0936 (0,0347)*	0,2217 (0,0284)*	-0,0398 (0,0194)*
Experience square	-0,0179 (0,0032)*	-0,0038 (0,0028)	-0,0116 (0,0023)*	0,0025 (0,0016)**
1994 dummy	-0,1875 (0,1305)	0,0335 (0,1147)	-0,2431 (0,0942)*	-0,0221 (0,0643)
1995 dummy	-0,2240 (0,1039)*	0,0176 (0,0913)	-0,1122 (0,0749)	0,1293 (0,0512)*
Walloon region	-0,0258 (0,1046)	-0,061 (0,0919)	0,10 (0,0754)	0,0645 (0,0515)
Brussels region	-0,3618 (0,1481)*	-0,2380 (0,1302)**	-0,0267 (0,1068)	0,0971 (0,0730)

Constant	10,0287 (0,3251)*	8,9500 (0,2856)	0,8956 (0,2344)*	-0,1830 (0,1601)
R-square	0,4103	0,1395	0,3034	0,1030
Observations	264	264	264	264

B) Models 3.B.1 and 3.B.2: Imputed missing employment months.

Variable	lnwh		lnw		lnh*		ln(1+u/h)	
Schooling	0,1106 (0,0203)*	0,1102 (0,0204)*	0,0566 (0,0166)*	0,0563 (0,0167)*	0,0778 (0,0142)*	0,0773 (0,0143)**	0,0238 (0,0095)*	0,0234 (0,0096)*
Female	-0,2389 (0,1070)*	-.0,4163 (0,1076)*	-0,0270 (0,0874)	-0,0283 (0,0879)	-0,1090 (0,0750)	-0,1125 (0,0754)	0,1029 (0,0502)*	0,1007 (0,0505)**
Experience	0,4388 (0,0438)*	0,4400 (0,0441)*	0,1093 (0,0358)*	0,1099 (0,0360)*	0,2715 (0,0307)*	0,2730 (0,3090)*	-0,0580 (0,0205)*	-0,0570 (0,0206)*
Experience square	-0,0235 (0,0036)*	-0,0236 (0,0036)*	-0,0054 (0,0029)**	-0,0054 (0,0297)**	-0,0143 (0,0025)*	-0,0144 (0,0025)*	0,0038 (0,0017)*	0,0037 (0,0017)*
1994 dummy	-0,2589 (0,1459)**	-0,2530 (0,148)**	-0,0531 (0,1192)	-0,0500 (0,1207)	-0,1658 (0,1023)**	-0,1581 (0,1035)**	0,0400 (0,0685)	0,0447 (0,0693)
1995 dummy	-0,2005 (0,1172)**	-0,2002 (0,1174)**	-0,0116 (0,0958)	-0,0115 (0,0959)	-0,0864 (0,0821)	-0,0861 (0,0822)	0,1023 (0,0550)**	0,1025 (0,0551)**
Walloon region	-0,1232 (0,1180)	-0,1250 (0,1184)	-0,0823 (0,0964)	-0,0832 (0,0968)	0,0680 (0,0827)	0,0657 (0,0829)	0,1090 (0,0554)**	0,1075 (0,0555)**
Brussels region	-0,3803 (0,1681)*	-0,3826 (0,1686)*	-0,1930 (0,1374)	-0,1942 (0,1378)	-0,0882 (0,1178)	-0,0913 (0,1181)	0,0990 (0,0789)	0,0971 (0,0791)
Stujob	-	0,0477 (0,1713)	-	0,0244 (0,1401)	-	0,0619 (0,1201)	-	0,0386 (0,0804)
Constant	10,0729 (0,3452)*	10,0732 (0,3458)*	9,4653 (0,2822)*	9,4654 (0,2827)*	0,3646 (0,2420)	0,3650 (0,2423)	-0,2430 (0,1620)	-0,2427 (0,1622)
R-square	0,3975	0,3976	0,0819	0,0820	0,3437	0,3444	0,1179	0,1186
Observations	285	285	285	285	285	285	285	285

*= Statistically significant coefficients at 95% confidence interval
**= statistically significant coefficients at 90% confidence interval
Standard deviations in parenthesis

Our results confirm the hypothesis that the return of schooling on annual earnings is the sum of the return on monthly wages and on labour supply minus the return of education on the unemployment/ employment ratio. As can be easily seen the estimated coefficients satisfy exactly the relationship in (4) and this holds not only for the schooling coefficients but for all other explanatory variables coefficients. We see that the schooling coefficient is larger when we do not include the imputed observations; this is because individuals for whom we imputed the missing employment months have spent only a small period of time working and the income they received was also relatively low. The inclusion of the imputed observations affected especially the schooling coefficient for monthly earnings; while in the model 3.A the return to monthly earnings is almost 3 quarters of the return to annual earnings in models 3.B.1 and 3.B.2 it is only just above the half. So when we account for individuals with non-regular or non-formal jobs, schooling affects annual earnings more through time spent in employment than through wages (which are usually very low). It is easy to check that while in 3.A the time spent in employment accounts for around 28% of the return of schooling on annual earnings, this percentage increases to 49% in 3.B.1.

For all three models we estimated, the schooling coefficient for labour supply is positive and statistically significant. This result contrasts with the A&H results where they conclude that labour supply is independent from schooling and the difference between the returns for annual and monthly earnings can be totally attributed to the effect of education in unemployment. The different samples could be one reason for this difference. A&H use only white males; this subgroup of the population includes the head of the households (males) and the relatively favoured in the labour market individuals (white). So, due to necessity to provide for their families and also the relatively favouring conditions they deal with, individuals in A&H sample condition their decision to participate in the labour market in factors other than education.

On the other hand, the young age of individuals in our sample plays an important role. Young individuals who are only a small period of time in the labour market are not easily discouraged and do not easily become inactive. Those who shortly after school become inactive are usually those who *a priori* knew that they would not work (e.g. women who wanted to get married after school, people with health problems etc.); most probably those individuals would not proceed with further education. Those who are willing to stay in the labour market either working or searching for a job (in order also to recuperate their investment in education) would be the ones who continue at school. In that sense education is very much connected with the decision to be active in the labour market, at least at this early career stage.

Another result that contrasts not only with the A&H model but also to most findings in the literature concerns the schooling coefficients for the ratio (1+u/h). For all three models the sign of the coefficients is positive implying that unemployment rises with education; moreover all coefficients are statistically significant. In the next section 4.2 we will examine the robustness of these results by checking whether the time an individual enters the labour market has biased our results. We will also try to provide some explanation relating these results to the young age of the individuals in the sample and the fact they are in an initial stage of their professional lives.

Women receive significantly less annual earnings than men, mainly because they are more hurt from unemployment. As we see the female coefficient for the u/h ratio is positive and statistically significant. On the other hand, even though the female coefficients for monthly wages and labour supply are negative, they are not significant in none of the estimated models.

Working experience also affects positively (and in a diminishing rate) not only annual and monthly earnings of individuals but also labour supply. Our results show that labour supply is positively affected by experience more than monthly earnings are. We attribute this fact again to the characteristics of our sample. Promotions and wage raises (i.e. wage increases) come in later stages of an individual's career. At the present stage, the benefits from experience are usually the change of jobs and the move to better-paid and more promising jobs, the move from part-time to full-time or from temporary (such as internships) to permanent job contracts. Consequently, at this early stage of individuals' careers the benefits they receive from experience could be mainly non-monetary; if individuals have a job and gain experience they become motivated to stay in the labour market. The results also indicate that experience affects negatively, significantly and in increasing rate the ratio (1+u/h), implying that experience either decreases unemployment experiences or increases employment of individuals.

A person who resides in the Flemish part of the country is more advantaged than those in Brussels or the Walloon region. The coefficients for the region dummies are negative in the annual and monthly earnings equations and positive in the (1+u/h) equations, although not significant in most cases. However because we have as an explanatory variable region of *residence* and not region of *work*, we need to be careful with the interpretation of the results. Especially in interpreting the significant negative coefficients for Brussels in the annual earnings equations it could be the case that earnings in the Brussels region are on average greater than in other regions of the country, however the well-paid individuals choose to live outside the city in nearby regions where quality of life is better.

Finally we see that having had a student job affects positively the annual and monthly earnings of an individual, although the coefficients were not statistically significant in any case.

4.2 Exploring the relationship between schooling and the (1+u/h) ratio.

In the results of section 4.1 the schooling coefficient in the u/h equation was positive and significant in all models. We will check the robustness of this result by using two alternative specifications. First we express the time variables in fractions of the time spent outside education. We perform regressions on each of the components of equation (6) based the analysis we made in section 3.3. The results are presented in Table 4 (model 4.A). Secondly we will perform regressions on the components of equation (5) but using only individuals who report no months in education during the year prior to the survey (Table 5). In both cases we will use the extended sample, which includes the imputed months in employment observations; however using the smaller sample does not affect the main results.

Table 4

Model 4.A: Time variables expressed in fractions of the time spent outside education.

Variable	$\ln w\tilde{h}$	lnw	$\ln \tilde{h}^{*}$	$\ln(1+\tilde{u}/\tilde{h})$
Schooling	0,0587 (0,0202)*	0,0566 (0,0166)*	0,0259 (0,0095)*	0,0238 (0,0095)*
Female	-0,2327 (0,1061)*	-0,0270 (0,0874)	-0,1028 (0,0503)*	0,1029 (0,0502)*
Experience	0,2400 (0,0434)*	0,1092 (0,0358)*	0,0726 (0,0206)*	-0,0580 (0,0205)*
Experience square	-0,0130 (0,0036)*	-0,0054 (0,0029)**	-0,0037 (0,0017)*	0,0038 (0,0017)*
1994 dummy	-0,0698 (0,1448)	-0,0531 (0,1192)	0,0232 (0,0686)	0,0399 (0,0685)
1995 dummy	-0,1543 (0,1163)	-0,0116 (0,0958)	-0,0403 (0,0551)	0,1023 (0,0550)**
Walloon region	-0,2658 (0,1171)*	-0,0823 (0,0964)	-0,0744 (0,0555)	0,1090 (0,0554)**
Brussels region	-0,2709 (0,1668)**	-0,1930 (0,1374)	0,0211 (0,0791)	0,0990 (0,0789)
Constant	9,0957 (0,3426)*	9,4653 (0,2822)*	-0,6125 (0,1624)*	-0,2430 (0,1620)
R-square	0,1928	0,0819	0,1144	0,1179
Observations	285	285	285	285

Table 5

Model 5.A: Individuals with no time spent in education

Variable	lnwh	lnw	lnh*	ln(1+u/h)
Schooling	0,0539 (0,0232)*	0,0508 (0,0188)*	0,0168 (0,0122)**	0,0138 (0,0117)
Female	-0,2654 (0,1187)*	-0,0481 (0,0965)	-0,0950 (0,0624)**	0,1222 (0,0598)*
Experience	0,3537 (0,0507)*	0,1973 (0,0412)*	0,0727 (0,0266)*	-0,0836 (0,0255)*
Experience square	-0,0203 (0,0038)*	-0,0112 (0,0031)*	-0,0041 (0,0020)*	0,0050 (0,0019)*
1994 dummy	-.0,2212 (0,1665)	-0,0581 (0,1354)	-0,0074 (0,8755)	0,0564 (0,0839)
1995 dummy	-0,2333 (0,1283)**	-0,0678 (0,1044)	-0,0359 (0,0674)	0,1294 (0,0647)*
Walloon region	-0,2958 (0,1296)*	-0,0640 (0,1054)	-0,1349 (0,0681)**	0,0968 (0,0653)
Brussels region	-0,2903 (0,1814)**	-0,1566 (0,1476)	-0,0253 (0,0954)	0,1084 (0,0914)
Constant	11,4281 (0,4212)*	9,3456 (0,3427)*	2,0669 (0,2214)*	-0,0156 (0,2123)
R-square	0,2895	0,1456	0,0886	0,1333
Observations	202	202	202	202

*= Statistically significant coefficients at 95% confidence interval
**= statistically significant coefficients at 90% confidence interval
Standard deviations in parenthesis

The schooling coefficient for u/h remains positive. In model 4.A the coefficient of interest is exactly the same with the coefficient in 3.B.1. The expression of the time variables as fractions of the time spent outside of education has not affected the u/h variable, which is already a relative measure of time. In 5.A the schooling coefficient for u/h remains positive; however it is not statistically significant. By construction, the individuals included in the regression 5.A are in a later phase in their careers compared to individuals in 3.B.1. This is a first indication that as individuals proceed with their careers the initially positive effect of education on u/h gradually decreases and will probably become negative at some point.

While the schooling coefficient for monthly earnings does not change significantly comparing both 4.A and 5.A with 3.B.1, the schooling coefficient for annual earnings is now much smaller and difference between the two coefficients is negligible in both 4.A and 5.A. This decrease in the annual earnings' schooling coefficient seems to be resulting from the decrease in the effect of schooling in labour supply. We have already seen in the sample description that when accounting for the time spent out of education, the differences in the labour supply of different educational groups become negligible. We also see that the effect of schooling in h* and in u/h almost cancel out, which results in an almost equal effect of schooling in annual earnings.

Experience in 5.A has now a much larger positive effect on monthly earnings and a larger negative effect in u/h, implying that it plays a much more important role as individuals proceed in later stages in their career, both in terms of wages as well as unemployment experiences.

Going back to the effect of schooling on u/h, it would be useful to see whether the positive coefficient comes from a positive relation between schooling and unemployment, from a negative relation between schooling and employment or from a combination of the two. The sample description earlier indicates that the positive coefficient should be a result of u, implying that individuals in our sample spend more time in unemployment the more schooling they have acquired. To gain some further insight on the issue, we have regressed

the variables u and h separately on the list of explanatory variables we used in previous regressions. Model 6.A runs the regressions on those individuals who have reported some income during the past year, so in that model h>0; these are the individuals in models 3.B.1, 3.B.2, and 4.A. Model 6.B is based in a more extensive sample; it includes also those individuals for whom h=0 (and they have not reported any income from work during the past year).

Table 6 Regressions on unemployment and employment months

	Model 6.A		Model 6.B	
Variable	h	u	h	u
Schooling	0,1523 (0,0762)*	0,0994 (0,0538)**	0,1740 (0,0700)*	0,0781 (0,0631)
Female	-1,1284 (0,4006)*	0,5755 (0,2829)*	-1,8667 (0,3915)*	1,2559 (0,3531)*
Experience	1,6402 (0,1640)*	-0,1787 (0,1158)	2,0655 (0,1597)*	-0,4135 (0,1440)*
Experience square	-.0,8907 (0,0135)*	0,0108 (0,0096)	-0,1179 (0,0138)*	0,0277 (0,0125)*
1994 dummy	-1,4360 (0,5463)*	0,1394 (0,3859)	-1,7718 (0,5180)*	0,1855 (0,4671)
1995 dummy	-1,2539 (0,4389)*	0,6110 (0,3100)**	-1,1495 (0,4372)*	0,5706 (0,3943)
Walloon region	-0,3001 (0,4419)	0,8751 (0,3121)*	-0,3070 (0,4292)*	1,0584 (0,3871)*
Brussels region	-0,7219 (0,6293)	0,6505 (0,4445)	-0,3938 (0,6246)	0,6379 (0,5633)
Constant	4,0280 (1,2926)*	-1,0617 (0,9130)	2,4436 (1,2047)	-0,1331 (1,0865)
R-square	0,3932	0,1003	0,4666	0,0991
Observations	285	285	362	362

*= Statistically significant coefficients at 95% confidence interval
**= statistically significant coefficients at 90% confidence interval

The results in table 6 confirm the hypothesis that the positive sign of the schooling coefficient for the u/h variable results from a positive relationship between schooling and unemployment months and not from a negative relationship between schooling and employment. The schooling coefficient for u is positive, although not significant in 6.B model. Regressions using the u/(12-Ed) and h/(12-Ed) instead of u and h variables do not alter this main conclusion.

We base our explanation for this result in the fact that individuals in the sample are very young and at the first stages of their career. It is possible then that individuals with more schooling spend more time in unemployment searching and trying to find a better match. We will present here very shortly some elements of job search theory that will help us explain higher unemployment duration for more educated individuals.

According to job search theory the duration of unemployment is related to the probability of leaving unemployment. More specifically, in a stationary environment[18], given a reservation wage w^*, i.e. the minimum wage an individual would accept, the rate at which an individual escapes unemployment is simply: $\phi = \lambda\left[1 - F(w^*)\right]$ (8), where λ is the job offer arrival rate, $F(w^*)$ is the wage offer distribution and $1 - F(w^*)$ is the probability that a

[18] We aim here to present some basic elements of the job search theory in order to explain the relationship between education and unemployment duration, without testing further whether the environment we are examining is stationary or not.

job offer is accepted. Then the length of a completed search- unemployment spell (i.e. the duration of the spell) is distributed exponentially with mean $E(T) = \frac{1}{\phi}$ (Mortensen, 1986).

Reservation wages are positively related to the net instantaneous utility when unemployed (value of leisure minus monetary cost of searching), the job arrival rate λ, the mean of the wage offer distribution and the dispersion of the wage offer distribution. It is negatively related to the discount rate and the job destruction rate. The mean unemployment duration is affected in the same way by the above parameters (in a stationary environment), with only exception the parameter λ. This is because λ affects the escape rate out of unemployment also directly as we see in (8) and this effect is positive (so E(T) is affected negatively). Which one of the two effects will prevail is ambiguous.

The question of course now is how education affects each one of the components of the reservation wage and consequently the duration of unemployment. Table 7 presents some features of the individuals by educational level in our sample; we calculated these statistics from the responses of individuals in the corresponding questions of the survey; therefore the information included on table 7 are descriptive sample statistics and regression results.

Table 7. Search behaviour of individuals by level of education

	ISCED 5-7	ISCED 3	ISCED 0-2
Reservation wage (mean)[19]	42188,46 (10949,93)	39461,54 (12706,63)	32092,59 (11609,05)
Reservation wage (minimum)	20000	6000	4500
Reservation wage (maximum)	70000	65000	60000
Receipt of unemployment benefits (% of those who receive unemployment benefits for all education levels)[20]	53,3	27,1	19,6
Receipt of unemployment benefits (% of those who are unemployed in the same education level)	55	67	65
Monthly income from unemployment benefits (mean)[21]	12.096 (14.748,24)	11.951 (16.901,93)	17.998 (37.045,19)
Receipt of a job offer during past 4 weeks (% of those who are searching) (λ)[22]	25,6	25,9	10
Acceptance of job offer (% of those who have received an offer) (1-F(w^*))[23]	30	42,8	100
Unemployment escape rate: $\phi = \lambda[1 - F(w^*)]$	7,68	11,08	10
Income from sources other than wages and unemployment benefits (%)[24]	34,25	31,5	34,25
Income from sources other than wages and unemployment benefits (mean)	88.254 (112473,4)	54.114 (61516,56)	34.010 (47620,06)

Source: ECHP data waves 1-3,

[19] ECHP variable PS007: "Minimum net monthly income the person would accept to work"
[20] ECHP variable PS009: "Unemployment benefit or assistance received at present- yes, no"
[21] ECHP variable PI131: "Unemployment related benefits- amount received"
[22] ECHP variable PS011
[23] ECHP variable PS012
[24] ECHP variables PI121 "Capital income- amount received" and PI122A " Assigned property/ rental income"

(Standard deviations in parenthesis)

We see that more educated individuals have higher reservation wages. The net monthly wage that an individual with less than secondary education would accept is only 76% of the net reservation wage of an individual with tertiary education. We also see a very large difference between the minimum reservation wage reported for each educational level (Minimum reservation wage for ISCED 0-2 is less than 50% of the minimum reservation wage reported for ISCED 5-7). This discrepancy may also reflect that less educated individuals are willing to take temporary, non-formal or part-time jobs, which are those who pay such low wages, while more educated individuals search for more stable, permanent and/or full time jobs.

Let us now discuss a bit further each of the components of equation (8) and of the reservation wage. From table 7 we see that λ is higher for more educated individuals, however the rate of job acceptance (1-F(w*)) is lower due to higher reservation wages. While only 30% of those with tertiary education who have received a job offer have accepted it, all of the individuals with less than secondary education have accepted received job offers[25]. From the results we see that the effect of the job acceptance rate prevails, so unemployment escape rates are lower for ISCED 5-7 compared to the other education groups.

It seems that more educated individuals afford to stay longer unemployed mainly because they receive income from sources such as capital. Although the percentage of those who receive rental or capital income is almost the same for all educational levels, more educated individuals receive on average much higher capital income. This could be an indication that more educated individuals come from wealthier families and so they can more easily finance their unemployment spells and increase their utility from being unemployed.

On the other hand it does not seem that more educated individuals finance their unemployment spells through higher unemployment related benefits. Even though they are the largest part of those who receive an unemployment related benefit, only 55% of those unemployed *with tertiary education* receive an unemployment related benefit, compared to 67% and 65% of the unemployed in the rest two categories. Moreover the mean monthly amount they receive as unemployment related benefit is smaller for tertiary education graduates.

The differences in the amount of unemployment related benefits individuals receive can be attributed to the specificities of the Belgian unemployment benefit system. According to it, individuals who have completed secondary education, are searching for their first job and no longer pursue any education related activity have the right to receive a "waiting benefit" (allocations d' attente) for a certain period of time depending on their age. According to the National Employment office of Belgium (ONEM) the amount of the waiting benefit on November 1, 2002 was 359,58 €/month (about 14500 BEF/month) for individuals 18 to 20 who lived alone and this amount increased with age and was lower for individuals who lived with their parents and higher if the individuals were in charge of their families. On the other hand, individuals who have already worked for a certain period of time (around nine months during the last 1,5 year for individuals who are less than 36 years old) have a right to unemployment benefit (allocations de chômage). Unemployment benefits are calculated as a percentage of the remuneration in the previous job (within floor and ceiling limits) and vary according to the family situation of the individual but in any case are much higher than

[25] However the number of individuals who are searching for a job in our sample, is quite small for all education levels (less than 50 observations).

the waiting benefits. In ECHP there is no distinction between the two kinds of benefits; they are all under the general name "unemployment related benefits". It is valid then to assume that the money that individuals with tertiary and secondary education receive when unemployed are "waiting benefits" (since in our sample they search mainly for their first job), while the money that individuals with less than secondary education should be unemployment benefits (since in any case these individuals have no rights to waiting benefits). This seems to be the main reason why individuals with higher education in our sample seem to receive less unemployment related benefits than less educated individuals; however we can not exclude other reasons such that more educated individuals spend more time in their parents homes while less educated are in charge of their families etc.

Concerning the wage offer distribution it is valid to assume that it is approximately equivalent to the existing wage distribution described in Table 2. There are no reasons for the wage offers to be different than the existing wages since our sample is relatively homogeneous in age and labour market experiences; employers have no reason to offer different wages to individuals with similar characteristics (age, education etc.) and experiences. We see (from Table 2) that more educated individuals have higher mean wages and also greater dispersion of wages. Higher mean offered wage increases the probability of receiving a higher wage, so reservation wage increases too. Higher dispersion of income makes it worthwhile for an individual to have higher reservation wage and to remain more time in unemployment because the probability of receiving a very high wage offer increases.

To sum up, the picture we get is that more educated individuals in the early stages of their careers have higher reservation wages and are more selective in accepting job offers. As a result, they spent more time in unemployment, which they mainly finance through capital or other property income and not so much through unemployment benefits.

Finally we would like to see, whether education continues to have similar effects on unemployment time in later career stages. We will not proceed with estimating equations on unemployment for older individuals because we have no way to measure the years of schooling for them in a comparable way to the sample we used here. However we used individuals aged 25 to 65 from the ECHP for Belgium to calculate sample statistics on u, h, u/h and h* by level of education (Table 8). The results in Table 8 should be compared with the results in the 9th, 11th and 13th row in Table 2, which present the same variables as here but for the 18-30 age band.

Table 8 Mean months in various states of activity by age and educational level[26]

Variable	Education	25-35 age band	35-45 age band	45-65 age band	Total
Employment (h)	ISCED 5-7	10,5 (3,5)	11 (3,18)	8,5 (5,36)	10 (4,27)
	ISCED 3	9,5 (4,52)	9,5 (4,74)	6,5 (5,89)	8,40 (5,32)
	ISCED 0-2	9,5 (4,52)	8,13 (5,45)	4,12 (5,62)	5,83 (5,88)
Unemployment (u)	ISCED 5-7	0,64 (2,30)	0,30 (1,73)	0,48 (2,27)	0,48 (2,129)
	ISCED 3	1,6 (3,78)	1,06 (3,24)	0,66 (2,66)	1,1 (3,25)
	ISCED 0-2	2,34 (4,58)	1,74 (4,06)	1,1 (3,38)	1,46 (3,81)
u/h	ISCED 5-7	0,1 (0,71)	0,036 (0,43)	0,043 (0,54)	0,061 (0,58)

[26] Standard errors in parenthesis

	ISCED 3	0,145 (0,78)	0,086 (0,759)	0,024 (0,232)	0,090 (0,668)
	ISCED 0-2	0,204 (1,08)	0,108 (0,712)	0,037 (0,367)	0,101 (0,713)
Inactivity	ISCED 5-7	0,6 (2,25)	0,69 (2,68)	3,02 (5,14)	1,44 (3,76)
	ISCED 3	0,77 (2,73)	1,4 (3,79)	4,8 (5,82)	2,44 (4,75)
	ISCED 0-2	1,5 (3,92)	2,1 (4,49)	6,8 (5,89)	4,7 (5,8)

Source: ECHP data for Belgium (waves 1-3)

We see that when accounting for older individuals in various stages in their career, re-establishes the negative relationship between unemployment and education that has been so extensively discussed in the literature. Unemployment decreases with age and schooling, with the exception of the 45-65 age band tertiary education graduates. Employment on the other hand increases by education level and also it seems to exist a quadratic relationship between age and employment, which can be explained by the increase in inactivity months with age.

As a result of both the relationship between education-employment and education-unemployment, the u/h ratio decreases with education for all age bands; Only exception to this is the u/h ratio for tertiary education graduates in the age band 45-65 which is higher than the u/h ratios for less educated individuals in the same age band. This could result from the fact that more educated individuals of that age remain in the labour market when unemployed in greater extent than the less educated ones, who choose to become inactive.

Even though we have not examined thoroughly the relationship education-employment-unemployment for higher age bands, we have first indications that our results on the positive unemployment- education relationship are highly dependent to the fact that individuals in our sample are very young and still in a transition phase from education to the labour market.

4.3 Specification of schooling and the decomposition of the returns to education

In this last part of the paper we use two different specifications of the schooling variable and we decompose the returns on annual earnings following equation (5). We have already discussed the issue of years of schooling being the correct measure of education; here we will use firstly years of schooling plus interactions of the completed levels of education with the years above the minimum number of years required to complete each level. This adds three explanatory variables: $D_1*(S-15)$, $D_2*(S-12)$ and $D_3*(S-9)$, where $D_1=1$ if individual has completed tertiary education, 0 otherwise, $D_2= 1$ if individual has completed secondary education, 0 otherwise and $D_3= 1$ if individual has acquired less than secondary education. Equation (7) now becomes: $\ln y = \alpha + \beta S + \delta_1 D_1(S-15) + \delta_2 D_2(S-12) + \delta_3 D_3(S-9) + x'\gamma + \varepsilon$ (model 9.A). This specification helps us to get a clearer picture of whether no-degree or repetition years harm the earnings and the labour market experiences of the individuals and which one is more hurt.

The second specification we are going to use is regressing on interactions between schooling and level of schooling completed rather than years of education. The three new schooling variables are: D_1*S, D_2*S and D_3*S. The model we estimate is now: $\ln y = \alpha + \beta_1 D_1 S + \beta_2 D_2 S + \beta_3 D_3 S + x'\gamma + \varepsilon$ (model 9.B) and it permits us to have a different schooling coefficient for each level of schooling. Table 9 presents the results of the two models with the new specifications of education.

Table 9

Variable	Wh		W		h*		u/h	
Schooling	0,2870 (0,0433)*	-	0,1424 (0,0363)*	-	0,1422 (0,0315)*	-	-0,0024 (0,0212)	-
D_1*(S-15)	-0,2410 (0,0733)*	-	-0,1717 (0,0613)*	-	-0,1193 (0,0533)*	-	0,0500 (0,0359)	-
D_2*(S-12)	-0,2045 (0,0477)*	-	-0,0659 (0,0399)**	-	-0,0936 (0,0347)*	-	0,0450 (0,0234)**	-
D_3*(S-9)	-0,1688 (0,0340)*	-	-0,1039 (0,0285)*	-	-0,0361 (0,0247)	-	0,0288 (0,0166)**	-
D_1*S	-	0,0776 (0,0225)*	-	0,0419 (0,0185)*	-	0,0699 (0,0161)*	-	0,0342 (0,0107)*
D_2*S	-	0,0673 (0,0269)*	-	0,0444 (0,0221)*	-	0,0656 (0,0192)*	-	0,0428 (0,0128)*
D_3*S	-	0,0309 (0,0297)	-	0,0130 (0,0244)	-	0,0607 (0,0213)*	-	0,0428 (0,0142)*
Female	-0,2889 (0,1047)*	-0,2096 (0,1050)*	-0,0468 (0,0876)	-0,0115 (0,0864)	-0,1349 (0,0762)**	-0,1026 (0,0753)	0,1070 (0,0512)*	0,0955 (0,0501)**
Experience	0,3502 (0,0450)*	0,4019 (0,0439)*	0,0614 (0,0377)**	0,0873 (0,0361)*	0,2450 (0,0328)*	0,2639 (0,0315)*	-0,0437 (0,0220)**	-0,0505 (0,0209)*
Experience square	-0,0175 (0,0036)*	-0,0213 (0,0036)*	-0,0020 (0,0030)	-0,0042 (0,0029)	-0,0125 (0,0026)*	-0,0138 (0,0025)*	0,0028 (0,0017)**	0,0032 (0,0017)**
1994 dummy	-0,3656 (0,1409)*	-0,3052 (0,1433)*	-0,1058 (0,1179)	-0,0784 (0,1179)	-0,2009 (0,1025)**	-0,1758 (0,1028)**	0,0588 (0,0690)	0,0509 (0,0684)
1995 dummy	-0,2729 (0,1130)*	-0,2515 (0,1155)*	-0,0545 (0,0945)	-0,0406 (0,0950)	-0,1028 (0,0822)	-0,0971 (0,0829)	0,1155 (0,0553)*	0,1137 (0,0551)*
Walloon region	-0,0514 (0,1140)	-0,0624 (0,1166)	-0,0381 (0,0953)	-0,0450 (0,0959)	0,0822 (0,0829)	0,0801 (0,0836)	0,0954 (0,0558)**	0,0975 (0,0556)**
Brussels region	-0,3944 (0,1614)*	-0,3414 (0,1648)*	-0,1977 (0,1350)*	-0,1630 (0,1356)	-0,0990 (0,1174)	-0,0820 (0,1182)	0,0976 (0,0790)	0,0963 (0,0786)
Constant	8,1860 (0,5494)*	10,7932 (0,4098)*	8,5476 (0,4596)*	9,7777 (0,3372)*	-0,3372 (0,3998)	0,5398 (0,2940)**	0,0243 (0,2690)	-0,4756 (0,1956)*
R-square	0,4554	0,4274	0,1307	0,1159	0,3609	0,3465	0,1323	0,1333
Observations	285	285	285	285	285	285	285	285

*= Statistically significant coefficients at 95% confidence interval
**= statistically significant coefficients at 90% confidence interval

Discussing first the results for model 9.A it is apparent that extra schooling that is either repetitions or non-degree years imply a very severe penalty for individuals; this penalty is highest for those who have continued to tertiary education. The coefficient for schooling now indicates the return for those who have no “lost” years. Those individuals could be considered as the most able ones who complete education on time and enter immediately in the labour market. This can explain the large schooling coefficient for annual and monthly earnings as well as for labour supply. On the other hand we see that for those individuals with no “lost” years in education the schooling coefficient for u/h is negative (although very small and not significantly different from 0).

In model 9.B we get the result that an extra level of education significantly increases annual earnings of individuals. This difference is largest between the lowest and middle education levels (less than secondary and secondary education). The difference between annual earnings for individuals with tertiary education and secondary education mainly comes from the effect of education on u/h. Although an extra year of schooling increases unemployment experiences *within the same educational level,* this increase is significantly smaller for those who have completed tertiary education. On the other hand, the difference between annual earnings for secondary education graduates and less than secondary education is mainly due to the fact that having a secondary education certificate increases monthly wages significantly compared to not having it. Labour supply seems to be mainly affected by years of schooling and not by the level of education completed.

5. Conclusions

Following a model initially developed by Ashenfelter and Ham (1979) we examine the components of the return of education on annual earnings for individuals who are in a very significant and turbulent period of their careers. We decompose the schooling effect on annual earnings into an effect on wages, labour supply and the ratio of unemployment to employment hours.

The choice of estimating returns on individuals who are in the initial stages of their professional careers and who have not yet completed the transition period from education to the labour market has posed problems in our analysis and produced some results that are in contrast with the findings in the literature in similar works; however it gave an interesting picture of the first experiences of individuals when they leave education.

For a long time employment has not been given the appropriate attention an integral part of the return of education on earnings and was examined in a different part of the literature. However as we have shown, a large part of the return of education on earnings results from the increased time spent in employment and not from increased wages. Another result, that was in contrast with the original A&H paper, is that in our models labour supply in not independent from schooling. Although the effect of schooling decreased when we accounted only for the time an individual was out of education within a year, it remained positive and significant.

The second result, which is in contrast to the literature and would worth some deeper examination is that of the ratio u/h to increase with schooling. By regressing separately u and h on the explanatory variables we got the result that the positive coefficient results from a positive relationship that seems to exist between schooling and unemployment. The result was robust when we accounted only for those individuals who had no months in education in the year prior to the survey and when we expressed the time variables in time outside education. However, it seems that for older individuals this relationship is reversed so for them education affects negatively the time spent in unemployment.

The literature on the transition from education to the labour market shows that this is a particularly problematic period in someone's life, as it is a period characterised by high unemployment rates, high job-instability etc. This paper indicates that transition from school to work might be particularly problematic especially for young highly educated individuals. Because they have higher reservation wages and usually are able to finance longer unemployment periods, they are more selective when they receive a job offer. It seems therefore that unemployment for young high skilled individuals is voluntary, at least

up to a certain point. This is a point that needs further examination and discussion. It would be particularly interesting to examine the issue of young unemployment in relation to the expectations young individuals form about the labour market conditions, the wages etc. when they are at school and take decisions about their future career. To find that young highly skilled individuals remain unemployed because they have overestimated their skills and expect more than the market gives calls for action and specific measures such as to inform students and their parents about the highly-demanded professions, which sectors are developing and which are not, the prevalent wages in the market etc. These measures (and many more) could provide young individuals with valuable information about the labour market, which otherwise would acquire after a (maybe long and painful) unemployment period.

References

Altonji, J.G., Dunn, T.A., (1996) "Using siblings to estimate the effect of school quality on wages", Review of Economics and Statistics, vol. 58(4), November 1996

Angrist, J.D., Lavy, V., (1999) "Using Maimonides rule to estimate the effect of class size on scholastic achievement", Quarterly journal of Economics, Vol. 114(2), May 1999

Ashenfelter, O., Ham, J., (1979) "Education, unemployment and Earnings", Journal of Political Economy vol. 87(5), part 2 October 1979

Bartel, A.P., Lichtenberg, F. R., (1987) "The comparative advantage of educated workers in implementing new technology", The Review of Economics and Statistics, Vol. 69 (1), February 1987

Bauer, T., Dross, P. J., and Haisken deNew, J. P., (2002) "Sheepskin effects in Japan", CEPR working paper 3609, November 2002, www.cepr.org/pubs/dps/DP3609.asp

Becker, G.S., (1964) "Human Capital" New York: Columbia University Press for the National Bureau of Economic Research

Bellman, D., Heywood, J.S. (1991) "Sheepskin effects in the returns to education: an examination of women and minorities", The review of economics and Statistics, Vol 73(4) November 1991 pp. 720- 724

Bjorklund, A., Kjellstrom, C., (2002) "Estimating the return to investments in education: how useful is the standard Mincer equation?", Economics of Education Review Vol. 21, Elsevier 2002.

Brauns, H., Gangl, M., Scherer, S., (1999) "Education and unemployment: Patterns of Labour market entry in France, the United Kingdom and West Germany", Manheimer Zentrum für Europäische Sozialforschung, Working paper No. 6, 1999

Brunello, G., (2001) "Unemployment, education and earnings growth", IZA discussion paper No. 311, June 2001

Card, D., (1995) "Earnings, schooling and ability revisited", Research in Labor Economics, Vol. (14) pp. 23-48

Card, D., (1999) "The causal effect of education on earnings" in O. Ashenfelter and D. Card (eds), "Handbook of labour economics", Volume 3

Card, D., Krueger, A.B., (1992) "Does School quality matter? Returns to education and the characteristics of public schools in the United States", Journal of Political economy, vol. 100(11), 1992

Denny, K., Harmon, C., (2000) "The impact of education and training on the labour market experiences of young adults", Working paper no 00/08, the Institute for Fiscal Studies.

Eurostat (1999) "ECHP UDB manual. Waves 1, 2 and 3", November 1999

Eurostat (2002) "Statistical yearbook 2002"

Eurydice (2002) "Key data on education in Europe 2002", Luxembourg 2002

Eurydice (2001) "The education system in Belgium, (2000-2001)", Eurybase- the information database on education systems in Europe www.eurydice.orgEurybase/frameset_eurybase.html

Eurydice (2000) "Key data on education in Europe 1999-2000", Luxembourg 2000

Green, A.E., Owen, D.W, Wilson, R.A., (2001) "Regional Labour Force differences among young people in the European Union", Eurostat working papers, Theme 3-Population and social conditions, 3/2001/E/no 7, Luxembourg 2001

Greene, W., (2000) "Econometric analysis", 4th edition, Prentice Hall International, Inc., New Jersey 2000

Heckman, J.J., (1979) "Sample selection bias as a specification error", Econometrica, Vol. 47(1), January 1979

Heckman, J., Lochner, L.J., Todd, P., (2003) "Fifty years of Mincer regressions", NBER Working paper 9732, May 2003.

Flynn Patrice (2003) "Employment indicator: statistics on employment and unemployment" in Henderson H., Lickerman J., Flynn P., (eds) *Calvert-Henderson Quality of life indicators*, www.Calvert-Henderson.com

Holm, A., Groes, N., Olsen T.H. (2001): "Youth unemployment and opportunities in the labour market- The myth of lifelong hysteresis" Labour, Vol. 15(4) pg 531-554

Holzer, H. J. (1996): "What employers want: Job prospects for less educated workers", New York: Russell Sage Foundation, 1996

Hungerford, T., Solon, G., (1987) "Sheepskin effects in the returns to education", The review of economics and statistics", Vol. 69(1), February 1987, pp. 175-177

Ichino, A., (2002) "The problem of causality in the Analysis of educational choices and Labor market outcomes", Slides for lectures, www.iue.it/Personal/Ichino/welcome.html

Jaeger, D. A., Page, M. E., (1996) "Degrees matter: New evidence on sheepskin effects in the returns to education" The review of economics and statistics, vol. 78(4) pp. 733-740

Kettunen, J., (1997) "Education and unemployment duration", Economics of education Review, Vol. 16, No. 2 pp 163-170

Kiefer, N. M. (1985), "Evidence on the role of education in labor turnover", the Journal of human resources vol. 20 pp. 445-452

Krueger, A., (1999), "Experimental estimates of education production functions" Quarterly journal of Economics, Vol. 114(2), May 1999

McKenna, C.J., (1996), "Education and the distribution of unemployment", European Journal of Political Economy, Vol. 12 pg. 113-132

Mincer, J., (1958), "Investment in Human Capital and personal income distribution", Journal of Political Economy, Vol. 66(4), pp. 281-302

Mincer, J., (1974) "Schooling, experience and earnings", Columbia University Press, New York

Mincer, J., (1991a) "Education and unemployment", NBER working paper 3838

Mincer, J., (1991b) "Education and unemployment of women", NBER working paper 3837

Ministère de la Communaité française (2002) "Statstiques des établissements, des élèves et des diplômes de l'enseignement de plein exercise et budget 2001 des dépenses d'enseignement. Annuaire 2000-2001" Vol.1, Service general de l'information et des statistiques, 2002

Ministerie van de Vlaamse Gemeenschap (2000) "Vlaamse onderwijsindicatoren in internationaal perspectief", Departement Onderwijs, Editie 2000, www.ond.vlaanderen.be/onderwijsstatistieken

Mortensen, D.T., (1986) "Job search and labor market analysis" in Orley Ashenfelter and Richard Layard's (eds) Handbook of labor Economics, Vol. II, Elsevier Publishers, 1986.

Nickell, S., (1979) "Education and lifetime patterns of unemployment", Journal of Political Economy, vol 87(5) part 2, October 1979

Nickell, S., Bell, B., (1995) "The collapse in demand for the unskilled and unemployment across the OECD", Oxford review of Economic Policy, vol. 11(1), spring 1995

OECD (2002) "Education at a glance 2002", Paris 2002

STATA, (2003) "Stata Base Reference Manual", STATA Press, Texas 2003