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# Overeducation in the labor market: a meta-analysis

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## Abstract

This paper contains a meta-analysis of studies on overeducation and undereducation in the labor market. It is found that of the four different definitions of overeducation distinguished in the literature, only the one based on variation in years of education within occupational groups appears to yield significantly lower-than-average rates of overeducation. The average rate of undereducation in the labor market depends on the definition of the undereducation variable. There is no indication that mismatches between education supplied and education required for the job have increased significantly in the past 20 years. The labor force growth rate has a positive effect on the incidence of overeducation, while the unemployment rate has a negative effect on the rate of return to education. © 2000 Elsevier Science Ltd. All rights reserved.

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## 1. Introduction

One of the most remarkable social developments of past decades in all Western countries has been the increase in the educational level of the population. This increase is best illustrated by comparing the educational attainment of different age groups. Of the population of OECD countries aged 55–64 years in 1992, about 38% had attained at least upper secondary education. Of the population aged 25–34 years, 65% had at least completed upper secondary education: an increase in the share of

the population with at least higher secondary education of more than 70% in less than 30 years (OECD, 1995b).

The increase in the education level of the work force has been accompanied by higher-than-average growth rates for jobs for higher-educated workers. Also, for a number of jobs there has been an upgrade in the skills needed to perform adequately. Despite this increase, it can be argued whether the increase in the demand for higher-educated labor has kept pace with the increase in the supply of skilled workers. If the growth in the supply of higher-educated workers outpaces the growth in demand, *overeducation* of the work force is the likely result. Workers are overeducated if the skills they bring to their jobs exceed the skills required for that job. With overeducation the allocation of skills over jobs may be less than optimal.

Different explanations can be given for overeducation. One explanation is that overeducation is a compensation for a lack of other human capital endowments, such as ability, on-the-job training or experience. Groot (1993,

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1996) and Sicherman (1991) find that overeducated workers have less experience, tenure and on-the-job training than correctly allocated workers. Groot and Maassen van den Brink (1996) find that workers who have experienced a career interruption — such as women with children — are more likely to be in jobs for which they are overeducated. Another explanation is that overeducation is part of a career mobility or insertion process in the labor market. Workers may enter the labor market in jobs for which they are overeducated and later on move to jobs that more match their educational attainment. Groot (1996) and Groot and Maassen van den Brink (1996) find that — after controlling for experience — younger workers are more likely to be overeducated than older workers. Further, in Sicherman (1991) it is found that overeducated workers change jobs more frequently. This also suggests that overeducation is part of a phase of adaptation in the early stages of working life.

In the past two decades a number of studies have appeared on the incidence of qualification mismatches in the labor market and on the pay-off for formal educational qualifications that are not fully required for the job. The main aim of this paper is to review what 20 years of research on the incidence and returns to overeducation has taught us. For this purpose a meta-analysis of the available studies on overeducation is presented.

A quick overview of the literature on overeducation shows that there is no uniform definition of overeducation. At least four different definitions can be distinguished in the literature. In Section 2 the different ways in which the ‘overeducation’ concept is operationalized are described briefly (for a more detailed discussion, see Hartog, 2000). There it is also argued that none of the four definitions is universally preferred over the other and that each of the different definitions has its advantages and drawbacks.

Perhaps more relevant than a discussion on how to define overeducation, is the question whether the way the concept is defined really matters: do some of the overeducation concepts lead to other conclusions about the incidence of, and the returns to overeducation than others? This question is addressed in Section 3 where the results of the meta-analysis are presented. One of the purposes of the meta-analysis is to establish how the rate of skill mismatches and the returns to overeducation vary with characteristics of the sample used, the operationalization of variables and institutional characteristics.<sup>1</sup> The meta-analysis not only provides an answer to the ques-

tion whether the definition of overeducation affects outcomes but also on questions such as:

1. Has the incidence of educational mismatches increased over time? And has the allocation on the labor market become less efficient?
2. Have the returns to overeducation and undereducation changed over time?
3. Are there gender differences in overeducation?
4. Are there differences in the incidence and pay-off to overeducation between European countries and the United States?
5. Do aggregate variables such as the unemployment rate or the labor force growth rate have an effect on overeducation?

## 2. The definition of educational mismatches and description of the studies used in the meta-analysis

Broadly speaking, four ways of defining skill mismatches can be distinguished in the literature. These four can be classified into ‘objective’ and ‘subjective’ definitions. The subjective definitions are based on self-reports by individual workers on the rate of skill utilization. Either workers are asked directly whether they are overeducated or undereducated for the work they do, or workers are asked what the minimum educational requirements are for (a new worker in) the job. In the latter case, the self-report on the required education level is compared with the actual education level of the worker to determine whether the worker is overeducated or not. The ‘objective’ definitions can be classified in two types as well. In the first, overeducation is defined by comparing years of education attained with the average education level within the occupation of the worker. This classifies a worker as being overeducated if he/she has more years of education than the average years of education within the workers’ occupation plus one standard deviation. The second ‘objective’ definition is based on a comparison between the actual education level and job-level requirements. All of the definitions have their drawbacks and limitations; for a discussion on these, see Clogg and Shockey (1984), Dolton and Vignoles (2000), Halaby (1994) and Hartog (2000).

Table 1 summarizes 25 studies on overeducation.<sup>2</sup> The table provides information on the year of data collection, the definition of the overeducation variable, the specification of the wage equation for measuring the returns to overeducation, the incidence of skill mismatches

<sup>1</sup> One of the criticisms of meta-analysis is that, contrary to traditional literature reviews, meta-analysis does not discuss the studies being reviewed, looking for patterns and inconsistencies, and placing more weight on better-quality studies than on poorer studies (see Wolf, 1986).

<sup>2</sup> Some authors use the same results in different papers. In cases where the same results were used in multiple papers, we have included only one of the papers in our survey.

Table 1  
Survey of research on overeducation in the labor market

Study	Year	Definition <sup>a</sup> and specification <sup>b</sup>	Incidence of overeducation (male/female) (%)	Incidence of undereducation (male/female) (%)	Rate of return to years of education attained (male/female) (%)	Rate of return to years of education required (male/female) (%)	Rate of return to overeducation (male/female) (%)	Rate of return to undereducation (male/female) (%)
Alba-Ramirez (1993)	1985	D	15.3/20.6	28.0/13.8		9.2	4.0	-6.0
Beneito, Rerri, Moltó & Uriel (1996)	1990	B	15.2	15.3				
		C	27.9	10.9		3.3	1.9	-3.3
		D	25.6	16.5				
Cohn & Kahn (1995)	1985	B	13	12		8.4	5.9	-4.4
		D	33	20		7.7	4.9	-3.8
Daly, Büchel & Duncan (2000)	1976	D	38.5/36.8	16.3/11.3		6.1/9.0	4.5/6.1	-3.4/-3.6
	1985	D	31.8/33.5	21.2/16.8		7.8/10.9	5.4/8.6	-1.6/-2.5
	1984	D	14.3/20.7	6.9/7.4		9.0/9.0	4.9/6.6	-7.8/-3.8
Dolton & Vignoles (2000)	1986	D	29/31					
Duncan & Hoffman (1981)	1976	D	42	12			3	-4.2
Groeneveld (1996)	1994	A	30.7					
		D	19.3					
		C	13.4					
Groot (1993)	1983	B	16.0	21.8		5.5	-7.4	2.6
Groot (1996)	1991	B	13/10	10/8		4.5/5.6	-2.6/-3.0	12.2/10.9
Groot & Maassen van den Brink (1997)	1991	B	13/10	10/8		7.9/9.4	-2.6/-3.0	12.2/10.9
Groot & Maassen van den Brink (1996)	1995	C	19.3/33.4	14.6/8.1		7.9/9.4		
Halaby (1994)	1973/1977A		19					
		B	17					
		C	30					
Hartog (1985)	1977	A	25.7	20.6		6.5/4.7	6.5/3.7	-1.9/-4.0
Hartog & Oosterbeek (1988)	1982	D	21.8	16.0		9.5	6.2	-3.9
Hartog & Tsang (1989)	1969	D				7.8	4.4	-2.1
	1973	D				8.9	5.1	-1.3
	1977	D						
McGoldrick & Robst (1996)	1985	B	15.8/9.3					
Oosterbeek & Webbink (1996)	1995	B	30.1/31.5			6.8/6.2	5.2/6.3	-3.3/-1.1

(continued on next page)

Table 1 (continued)

Study	Year	Definition <sup>a</sup> and specification <sup>b</sup>	Incidence of overeducation (male/female) (%)	Incidence of undereducation (male/female) (%)	Rate of return to years of education attained (male/female) (%)	Rate of return to years of education required (male/female) (%)	Rate of return to overeducation (male/female) (%)	Rate of return to undereducation (male/female) (%)
Robst (1995)	1976, 1978, 1985	D	36	20				
Rumberger (1981)	1977	A	11–17			6.1/11.5	2.8/6.1	
Santos (1992)	1985	D	16			5.2/10.0	3.1/5.7	
Santos, Mendes Oliveira & Kiker (1996)	1991	B	15.4/20.0	6.4/3.7		3.5/3.4	1.5/0.9	-1.9/0.7
Sicherman (1991)	1976/1978D	A	28.8/40.0	44.2/25.9		10.0/10.4	3.4/3.0	-3.9/-6.6
Sloane, Battu & Seaman (1995)	1986	B	10.9/6.9	5.3/4.7	6.4/5.6		-9.5/-3.6	16.5/15.6
Smooenburg & Van der Velden (2000)	1994	I	40.8	16.0	3.8	4.8	3.9	-1.7
Verdugo & Verdugo (1989)	1980	D	30.1/32.3	19.2/12.1		6.6	3.3/2.5	-4.8/0.5
		I	39	2			4.8	-7.1
		II	10.9	9.9	7.2		-13.0	9.6

<sup>a</sup> Definition of over/undereducation: A based on job level or DOT classification; B based on average years of education within occupation; C self-report on skill utilization; D based on self-report on skill requirements (for new workers) on the job.

<sup>b</sup> Specification of the wage equation: I including years of education required, years of overeducation and years of undereducation; II including years of education attained, a dummy variable for overeducation and a dummy variable for undereducation; III including years of education attained, years of overeducation and years of undereducation.

reported in the study, and the estimated rates of return to education attained, education required for the job, overeducation and undereducation. We have distinguished four different ways of operationalizing overeducation: definition A — based on job level or DOT classification; definition B — based on average years of education within occupation; definition C — self-report on skill utilization; definition D — based on self-report on skill requirements (for new workers) on the job.

Table 1 shows that there is considerable variation in the incidence of skill mismatches and the rates of return to the different educational component among the studies. The incidence of overeducation varies from 10% to 42%, while it seems that the estimated rate of return to a year of overeducation can either be positive or negative depending on the study used. Similar conclusions can be drawn for the incidence of, and the returns to undereducation.

### 3. The results of the meta-analysis

From the 25 studies in Table 1 we can obtain 50 estimates on the incidence of overeducation and 36 estimates for the incidence of undereducation. The unweighted average of the incidence of overeducation is 23.3% (with a standard deviation of 9.9 percentage points), while the unweighted average incidence of undereducation is 14.4% (standard deviation is 8.2 percentage points). The unweighted averages of the rates of return to the different educational components are: 5.6% for years of education attained, 7.8% for years of education required for the job, 3.0% for years of overeducation and -1.5% for years of undereducation.

Table 2 shows that that the different definitions lead to large differences in the incidence of overeducation. Studies using the variation of years of education within occupations (definition B) yield the lowest estimate of overeducation, while studies based on self-reports on the educational requirements of the job for new workers (definition D) yield the highest estimate. The rate of overeducation varies from 13.1% among studies using definition B to 28.6% in studies based on definition D.

There appears to be less overeducation in European countries than in the United States. The average value of overeducation among studies for the United States is 26.3%, while among European studies this is 21.5%. The same holds for the incidence of undereducation.

The incidence of overeducation appears to have declined rather than increased over the past 20 years. Studies using data for the 1970s on average find that 28.7% of the workers are overeducated. Among studies using data for the 1990s the average incidence of overeducation is 21%. With the decline in the incidence of overeducation over time, the average rate of return to a year of overeducation has declined as well. In studies for

the 1970s the pay-off to a year of overeducation was 4.6% on average. Studies for the 1990s find a rate of return of 1.4%. Both findings combined suggest that over time overeducation has become increasingly concentrated among lower-ability workers for whom the pay-off to a year of overeducation is low. The decline in the average incidence of overeducation may be dominated by the findings for the United States, where the labor market for higher-educated workers has tightened during the 1980s (see also Hartog, 2000).

The incidence of undereducation appears to have declined from 16% in the 1970s to 13% in studies for the 1990s. The joint decline in overeducation and undereducation suggests that skill mismatches in the labor market have decreased since the 1970s.

Overeducation is more frequent among female workers than among male workers, while the opposite holds for undereducation. Among studies using data for male workers, 21% are overeducated and 16.5% are undereducated. If data for female workers are used, the incidence of overeducation is 24% while 10.9% are undereducated.

Both conceptual arguments and empirical evidence can decide the validity of the different definitions of overeducation used in the literature. Hartog (2000) has focused on the limitations of the definitions. Here we concentrate on the question whether the way skill mismatches are defined affects the incidence of overeducation reported. For this purpose the information in Table 1 is used as input for a meta-analysis on the incidence of overeducation and undereducation. One question we address here is how much overeducation remains after controlling for variation between studies due to sample composition, year of data sampling, inter-country variation, etc. The same holds for the rate of return to education after controlling for study-specific variation in the meta-analysis. The incidence of skill mismatches and the rate of return to education after controlling for the variation across studies are referred to as the 'true' rate of skill mismatch and the 'true' rate of return, respectively. To obtain the 'true' incidence of overeducation and undereducation, and the 'true' rates of return to years of education required, years of overeducation and years of undereducation, five ordinary least-squares (OLS) equations were estimated.

The dependent variables in the OLS equations are the incidence of overeducation found in the study, the incidence of undereducation, the estimated rate of return to a year of education required for the job, the rate of return to a year of overeducation, and the rate of return to a year of undereducation, respectively. The explanatory variables in the equations are: two dummies for the decade to which the results refer (the 1980s or the 1990s) and three dummies for the definition of over- and undereducation [definition based on average years of education within occupation, on self-report on rate of skill utilization, or on self-report on the educational requirements

Table 2  
Average values by characteristics of the survey and characteristics of the sample used in the study (standard errors in brackets)

	Incidence of overeducation (%)	Incidence of undereducation (%)	Rate of return education attained (%)	Rate of return education required (%)	Rate of return overeducation (%)	Rate of return undereducation (%)
All studies	23.3 (9.9)	14.4 (8.2)	5.6 (1.0)	7.8 (2.2)	3.0 (4.7)	-1.5 (5.8)
<i>Country</i>						
United States	26.3 (11.1)	15.6 (4.1)	5.5 (2.4)	8.1 (2.0)	3.9 (4.8)	-1.9 (3.8)
Europe	21.5 (8.8)	13.9 (9.4)	5.6 (0.8)	7.6 (2.4)	2.1 (4.6)	-1.2 (7.0)
<i>Year</i>						
1970s	28.7 (10.8)	16.0 (3.9)	3.8 (0)	7.9 (2.3)	4.6 (1.3)	-2.9 (1.2)
1980s	22.4 (8.2)	14.9 (7.0)	5.9 (1.1)	7.4 (2.4)	2.6 (5.7)	-2.1 (4.3)
1990s	21.0 (10.7)	13.3 (10.8)	5.7 (0.8)	8.2 (2.1)	1.4 (5.4)	0.85 (9.6)
<i>Definition of education<sup>a</sup></i>						
A	26.4 (9.2)	30.2 (12.4)		9.5 (2.4)	3.8 (1.5)	-5.3 (1.9)
B	13.1 (3.5)	9.6 (5.1)	5.8 (0.9)	7.4 (2.4)	-1.5 (7.2)	4.2 (8.5)
C	24.8 (8.2)	11.2 (3.3)		3.3 (0)	1.9 (0)	-3.3 (0)
D	28.6 (8.6)	15.5 (6.3)	5.0 (1.4)	7.9 (1.8)	4.9 (1.5)	-3.5 (2.1)
<i>Gender</i>						
Male	21.0 (8.5)	16.5 (11.0)	5.7 (1.1)	7.3 (1.9)	2.8 (4.3)	-1.3 (7.0)
Female	24.0 (11.5)	10.9 (6.3)	5.5 (0.5)	8.7 (2.4)	4.2 (3.4)	-0.7 (6.9)
Combined sample	24.8 (10.1)	15.4 (6.0)	5.5 (1.7)	7.4 (2.1)	2.0 (5.9)	-2.1 (4.4)
<i>Specification of the wage equation</i>						
With actual education	11.2 (3.7)	104 (7.9)	6.2 (0.8)		-8.4 (3.9)	11.1 (6.4)
With required education	24.4 (9.6)	14.9 (8.2)	5.4 (1.0)	7.8 (2.2)	4.5 (1.7)	-3.5 (2.0)

<sup>a</sup> Definition of over/undereducation: A — based on job level or DOT classification; B — based on average years of education within occupation; C — self-report on skill utilization; D — based on self-report on skill requirements (for new workers) on the job.

(for new workers) on the job]. The reference category consists of studies that use a definition based on job-level or occupational classification such as the Dictionary of Occupational Titles (DOT). To see whether skill mismatches differ between European countries and the United States, a dummy variable was included for studies that use data on a European country. We have counted each observation on the incidence of skill mismatches. This implies that studies that calculate the incidence of overeducation for men and women separately are counted twice in the sample. To correct for this two dummies for gender are included. The results of the OLS estimates are in Table 3.

The estimates in Table 3 show that only the definition of overeducation based on within-occupation variation in

years of education lead to a significantly lower measure of overeducation. Using definition B lowers the incidence of overeducation by 12 percentage points. Ignoring all insignificant variables the ‘true’ rate of overeducation is 26.2%. If definition B is used, the rate of overeducation is 14%.

The meta-analysis further shows that the definition of undereducation is more sensitive to the method of operationalization. Ignoring all other variation, the incidence of undereducation is 33.2% if definition A used, about 10% if definition B is used, 12% with definition C and 17% with definition D.

The incidence of undereducation among female workers is significantly lower than among studies using observations for male workers. The male–female differential

Table 3  
OLS parameter estimates incidence of, and returns to over- and undereducation (*t*-values in brackets)<sup>a</sup>

	Incidence		Returns		
	Overeducation	Undereducation	Education required	Overeducation	Undereducation
Intercept	0.262*** (6.869)	0.332*** (6.761)	0.079*** (6.772)	0.026** (2.155)	−0.049* (1.755)
<i>Year of data collection</i> (reference category: 1970s)					
1980s	−0.018 (0.521)	0.061* (1.715)	0.014 (1.208)	0.005 (0.450)	−0.010 (0.577)
1990s	0.016 (0.384)	0.049 (1.134)	0.039** (2.409)	0.024 (1.528)	0.019* (1.755)
<i>Definition of overeducation</i> (reference category: definition A)					
Definition B	−0.120*** (2.995)	−0.235*** (5.419)	−0.023* (1.922)	0.007 (0.468)	0.042* (1.757)
Definition C	−0.019 (0.420)	−0.207*** (4.010)	−0.068*** (2.885)	−0.016 (0.642)	0.051 (1.489)
Definition D	0.034 (0.923)	−0.178*** (4.210)	−0.007 (0.604)	0.021* (1.697)	0.041* (1.677)
<i>Gender</i> (reference category: male)					
Female	0.042 (1.566)	−0.055** (2.182)	0.014* (1.789)	0.013 (1.588)	0.003 (0.253)
Combined	0.030 (1.167)	−0.011 (0.437)	0.004 (0.443)	−0.002 (0.186)	−0.030** (2.219)
<i>Specification of wage equation</i> (reference category: with years of education required)					
Education attained	−0.023 (0.538)	0.002 (0.051)	...	−0.123*** (9.080)	0.145*** (7.699)
<i>Country</i> (reference category: USA)					
Europe	−0.043 (1.430)	−0.040 (1.299)	−0.020* (1.677)	−0.014 (1.250)	−0.023 (1.516)
Observations	50	36	31	34	29
<i>F</i> -test	5.600	4.249	2.378	17.515	13.250
Adj- <i>R</i> <sup>2</sup>	0.458	0.455	0.269	0.818	0.797

<sup>a</sup> ... — omitted from the equation due to singularity of the data; \* — significant at 10% level; \*\* — significant at 5% level; \*\*\* — significant at 1% level.

in the incidence of undereducation is 5.5 percentage points. There are neither significant gender differences in the incidence of overeducation, nor in the rate of return to different educational components.

The year of data collection has an effect on the rate of return to years of education required only. The point estimates of the coefficients indicate that the rate of return to a year of education required for the job was about 7.9% in the 1970s and 1980s and increased to almost 12% in the 1990s.

Few of the other variables included in the equations for the rates of return to different education components are significantly different from zero. It appears therefore that there is little systematic variation between the estimated rates of return in the various studies in Table 3. The coefficients suggest that the ‘true’ rate of return to a year of overeducation is about 2.6%, while the rate of return to a year of undereducation is  $-4.9\%$ . The latter coefficient is significantly different from zero at the 10% level only. An advantage of meta studies is that it enables us to include information on aggregate data in the analysis that cannot be included in the individual studies. In particular, it can be tested whether the incidence of, and returns to overeducation are determined by changes in the (aggregate) supply and demand for labor. If unemployment is high or the labor force is growing rapidly, workers may have to do with a job for which they are overeducated more frequently than in periods in which unemployment and the labor force growth rate are low. High unemployment and high labor force growth rate may further lower the rate of return to (over)education. To test these hypotheses we add data on the unemployment rate and the labor force growth rate to the equations. The data on unemployment and labor force growth refer to the period and the country in which the data for the original study are collected and are taken from various issues of the OECD Employment Outlook (OECD, 1995a).

The coefficients of the unemployment rate and labor force growth rate variables in the equations are reported in Table 4. For brevity the coefficients of the other control variables are not reported in the table. To test the robustness of the findings three different specifications of each of the five are estimated: one with the unemployment rate, one with the labor force growth rate, and one with both variables included.

The results indicate that an increase in the labor force growth rate increases the incidence of overeducation. A one percentage point increase in the labor force growth rate increases the incidence of overeducation by about two percentage points. The results further show that the rate of return to education is negatively affected by the unemployment rate. A one percentage point increase in the unemployment rate decreases the rate of return to a year of education required by about 0.13 percentage points. This finding is parallel to the results from studies

on the wage curve which show that the unemployment elasticity of wages is about  $-0.1$  (see Blanchflower & Oswald, 1990; Groot, Mekkelholt & Oosterbeek, 1992). Combining these findings it seems that both the rate of return to education and the wage rate are negatively related to the unemployment rate.

#### 4. Conclusion

A meta-analysis of studies on the incidence and returns to overeducation has been presented. The main conclusion that can be drawn from this meta-analysis is that of the four different definitions of overeducation distinguished in the literature, only the one based on within-occupation variation in years of education appears to yield significantly lower estimates of overeducation than studies that use another definition. Ignoring the downward bias of the latter definition, the ‘true’ or overall incidence of overeducation in the labor market appears to be about 26%. It further seems that the rate of overeducation has not changed significantly over the past decades. The average rate of undereducation is lower among female workers than among male workers. The gender differential in undereducation is about 5.5 percentage points. The estimate of the incidence of undereducation is more dependent on the definition used than the estimate of the rate of overeducation. The ‘true’ rate of return to a year of education required was 7.9% in the 1970s and 1980s. In the 1990s the rate of return to education required increased to about 12%. There is little systematic variation in the rate of return to overeducation and undereducation. The intercept terms in the equations suggest that the ‘true’ rate of return to a year of overeducation is 2.6%, while the rate of return to a year of undereducation is  $-4.9\%$ .

A major advantage of meta-analysis is that it allows the researcher to include sources of (aggregate) data that cannot be included in cross-sectional studies based on individual data. In this study information on the unemployment rate and labor force growth rate are added to the estimations. It is found that labor force growth rate has a positive effect on the incidence of overeducation, while the unemployment rate has a negative effect on the rate of return to education. So it seems that cyclical fluctuations through the unemployment rate affect the pay-off to education, while structural changes such as the changes in the labor force growth rate affect the incidence of skill mismatches.

Most of the studies on overeducation have assumed that the skills that workers bring to their job are acquired only through schooling. Overeducation is then taken to be equivalent with underutilization of skills or with skill mismatches in general. Workers’ skills are not only acquired through education, but also through on-the-job training and general work experience. As a result work-



Table 4

OLS parameter estimates of unemployment and labor force growth variables in equations for incidence of, and returns to over- and undereducation (*t*-values in brackets) (for a list of other control variables in the equations, see Table 3)<sup>a</sup>

	Incidence		Returns		
	Overeducation	Undereducation	Education required	Overeducation	Undereducation
<i>Specification with unemployment rate</i>					
Unemployment rate/100	-0.168 (0.822)	0.239 (1.298)	-0.133* (1.801)	-0.121 (1.604)	0.111 (0.824)
Adj- <i>R</i> <sup>2</sup>	0.429	0.403	0.208	0.817	0.741
<i>Specification with labor force growth rate</i>					
Labor force growth rate/10	0.220** (2.503)	-0.125 (1.398)	0.086 (0.325)	0.043* (1.889)	-0.024 (0.648)
Adj- <i>R</i> <sup>2</sup>	0.492	0.408	0.112	0.823	0.738
<i>Specification with unemployment and labor force growth rate</i>					
Unemployment rate/100	-0.001 (0.069)	0.018 (0.960)	-0.135* (1.737)	-0.079 (0.922)	0.091 (0.613)
Labor force growth rate/10	0.218** (2.321)	-0.101 (1.085)	-0.003 (0.098)	0.034 (1.377)	-0.015 (0.364)
Adj- <i>R</i> <sup>2</sup>	0.481	0.407	0.176	0.822	0.731

<sup>a</sup> \* — Significant at 10% level; \*\* — significant at 5% level; \*\*\* — significant at 1% level.

ers with different levels of education may have similar skill endowments if the lack of formal education (undereducation) is compensated by skills obtained through training or experience. Conversely, overeducation may be a compensation for lack of other relevant productive skills necessary for the job.

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