

# Tertiary Education and Monetary Rewards in Greece: Overeducation Ahead?

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## Abstract

The rapid increase in the number of tertiary graduates and the persistence of high unemployment rates in Greece have created the need to investigate phenomenon of overeducation. The study of the phenomenon of overeducation was conducted according to the Human Capital Theory and concretely by applying the Screening (Filter) hypothesis in both its weak and strong version. The findings of the research were derived from the analysis of data from 6196 private households across the Greek territory, collected by the Hellenic Statistical Authority. According to the research results, the phenomenon of overeducation is not observed among male graduates, but only among female graduates. The contribution of this article focuses on the findings concerning the existence of overeducation in Greece, as well as the proposed indicative policies to address it.

## Keywords

Tertiary (Higher) Education, Overeducation, Human Capital Theory, Mincer Equation, Screening (Filter) Hypothesis (Strong Version, Weak Version), Rates of Return on Education

## 1. Introduction

Overeducation has become increasingly prominent due to the rising participation rates in higher education across most developed countries in recent decades (Delaney et al., 2020). A considerable amount of literature has examined how changes in labor supply can contribute to overeducation. It is widely perceived that overeducation predominantly affects tertiary graduates (see e.g., Baert, Cockx, & Verhaest, 2013; Carroll & Tani, 2015; Li & Miller, 2015).

In recent years, the number of tertiary graduates in Greece<sup>1</sup> has significantly increased, (see **Table A1** and **Table A2**). Given the increase in the number of tertiary graduates in Greece and the simultaneously high unemployment rates<sup>2</sup>, it is necessary for policy makers to investigate the existence of the phenomenon of overeducation in Greece.

There are many studies on the phenomenon of overeducation in Greece. The following are mentioned as indicative examples. **Lambropoulos and Psacharopoulos (1992)**, described the educational expansion in Greece and its related wage outcomes, indirectly addressing overeducation through their discussion of skill mismatches.

Subsequently, the study by **Patrinos (1997)** estimated overeducation in a sample of 2928 individuals, measuring it as the additional years beyond the typical requirements for a job. This study explored overeducation from a socioeconomic perspective, concluding that younger workers and those from lower socioeconomic backgrounds are more likely to be overeducated. It also found that social science graduates are often overeducated compared to engineers and doctors, who generally possess more specialized qualifications.

In their study, **Magoula and Psacharopoulos (1999)**, in a sample of 6,756 households analyzed across 18,882 individuals (HBS<sup>3</sup>), examined the existence of overeducation through the lens of the screening hypothesis. Their results indicated that for males, there is a moderate increase in earnings with years of experience, which does not support the screening hypothesis. However, for females, the initial earnings differential between tertiary-educated and secondary school graduates remains flat throughout their careers. In summary, their findings do not support the view that higher education is utilized solely as a screening device for either gender, suggesting that overeducation is not prevalent.

Also, **Pseiridis et al. (2018)** investigated overeducation in Greece using a sample of 832 questionnaires (712 from the Hellenic Open University and 120 from traditional universities, University of Macedonia and University of Crete). According to their study, they regard education not only as an investment in human capital but also as a consumption good that provides certain non-monetary (psychic and social) benefits to university graduates. A key finding of their research was that the probability of being overeducated is higher for individuals who derive psychic and social benefits from education. Their results indicate that females are 40% less likely than males to be overeducated, contrasting with the Theory of Differential Overqualifications, which posits that women face limited employment choices and are therefore more likely to accept positions for which they are overqualified. They also observed that the highest rates of overeducation were among

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<sup>1</sup>See: [https://www.oecd-ilibrary.org/education/trends-in-educational-attainment-of-25-34-year-olds-by-gender-2010-and-2020\\_76959216-en](https://www.oecd-ilibrary.org/education/trends-in-educational-attainment-of-25-34-year-olds-by-gender-2010-and-2020_76959216-en).

<sup>2</sup>Greece continues to experience a high unemployment rate of 11.1% while the corresponding average for EU27 countries is 6.1%.

<sup>3</sup>The Household Budget Survey was conducted by the Hellenic Statistical Authority, covering 6,756 private households in the entire country comprising 19,882 individuals.

individuals aged 45 - 50, which contradicts the Career Mobility Theory that suggests overeducation decreases with age.

Given that in the aforementioned studies, the assessment of the phenomenon of overeducation is conducted through the completion of questionnaires based on the respondents' judgment, the contribution of this study is significant because it focuses on investigating the existence of the phenomenon based on Human Capital Theory (Becker, 1964; Mincer, 1974, 1993) and the application of Screening (Filter) Hypothesis (Arrow, 1973).

The rest of this paper is organized as follows: Section 2 briefly describes the phenomenon of overeducation as well as the Human Capital Theory and the Screening Hypothesis (strong and weak version), Section 3 outlines the Methodological Issues, Section 4 presents the Data, Section 5 discusses the Empirical Results and Section 6 concludes presenting indicative Policy Proposals.

## 2. Theoretical Issues: Overeducation—Human Capital Theory—Screening Hypothesis

The phenomenon of overeducation is generally defined as the mismatch between the years of schooling attained by an individual and the usual number of years of required schooling associated with a particular occupation; that is, the individual has completed more years of schooling than is usually necessary at the particular time for the particular job s/he has obtained (Patrinos, 1997). Overeducation can arise from various factors, including mismatches between educational systems and labor market needs, economic downturns, or a surplus of graduates in certain fields.

According to the Ortiz and Kucel's (2008) research, overeducation tends to be concentrated in specific fields of study, particularly in social sciences and humanities, as skill assessment by employers in these areas is more complex due to the absence of a specific definition of competencies.

Based on the studies of Sánchez-Sánchez and McGuinness (2015) and Caroleo and Pastore (2018) overeducated workers typically experience a wage penalty compared to individuals with similar educational levels who are well-matched to their jobs. Overeducation is also associated with job mobility (Verhaest & Omey, 2006) and low job satisfaction (McGuinness & Sloane, 2011; McGuinness & Byrne, 2015; Mateos-Romero & Salinas-Jimenez, 2018).

In this analysis, the phenomenon of overeducation is explored through the lens of Human Capital Theory (Becker, 1964). Based on the Human Capital Theory, individuals invest in education and training to enhance their skills and productivity, thereby increasing their earning potential. Therefore, higher levels of education typically lead to better job opportunities and higher wages. According to this Theory (Mincer, 1974, 1993), the returns on education in terms of wage are estimated through the Mincer Equation.

It is noted that following the findings of Magoula's (2023, 2024a, 2024b) studies, the rates of return on tertiary education in Greece fell to value 8.63% (overall)—

men receive 8.4% returns and women receive 10.23% returns on tertiary education in Greece (see **Table 1**).

**Table 1.** RR on tertiary education by sex and economic sector, 2022.

HBS, 2022	Public sector	Private sector	Public and Private
Men	4.85% (N = 472)	10.1% (N = 1146)	8.4% (N = 1618)
Women	10% (N = 535)	9% (N = 978)	10.23% (N = 1513)
Total (Men + Women)	6.1% (N = 1007)	9.6% (N = 2124)	8.6% (N = 3131)

Source: ELSTAT (Hellenic Statistical Authority), Household Budget Survey.

Europe and Central Asia have higher returns on tertiary education. Men receive 10.6% returns and women 12.4% (Montenegro & Patrinos, 2021; **Table 4**). So, the lower rates of return on tertiary education in Greece provide an additional reason to investigate the phenomenon of overeducation.

Complementary to the Human Capital Theory, the Screening (Filter) hypothesis (Arrow, 1973) suggests that employers use educational credentials as a filter to select candidates for jobs, rather than relying on actual job-related skills. According to this hypothesis, education does not necessarily enhance an individual's productivity but instead serves as a mechanism for "screening" or sorting workers. In this context, individuals with higher education may be more likely to be hired, even if their educational qualifications exceed the requirements of the job. This can lead to a condition where many educated individuals occupy positions that do not fully utilize their skills, contributing to the phenomenon of overeducation.

There are two versions of the Screening (Filter) Hypothesis: the strong version and the weak one.

According to the strong version, employers continue to offer high wages to the more educated regardless of their productivity. Therefore, to investigate whether the strong version of the Screening Hypothesis holds, we compare the rates of returns on the same level of education in the private sector with those of employees in the public sector. If the rates of returns on education are higher for employees in the private sector, then the strong version of the hypothesis does not hold, and thus the phenomenon of overeducation is not observed.

On the contrary, the weak version suggests that employers initially provide higher wages to more educated employees because their educational credentials (sheepskin) signify their potential for higher productivity. Subsequently, if their productivity is merely nominal due to the "degree," their wages, reflecting their productivity, converge with those of less educated but more productive workers. In the next section titled "Methodology Issues", we examine the investigation of weak version of Screening Hypothesis using the modified Mincer equation, which includes the coefficient  $\delta$ , that is, the interaction coefficient of education with work experience.

### 3. Methodology Issues

The examined sample focuses on the presence of the weak form of the filter hypothesis. The analysis is restricted to employees in the private sector. The sample consists of private sector workers who have completed tertiary education. To test the weak filter hypothesis, we utilize the modified Mincer equation.

The Mincer equation provides estimates of the average monetary returns of one more year of education. According to the standard Mincer equation, income from work is equal to:

$$\ln W = a + bS + c(EXP) + d(EXP)^2 + u \quad (1)$$

In (1), the dependent variable  $W$  (wages), which is the income from work, is determined by the following independent variables:

$S$  (schooling), which equals years of education; ( $EXP$ ) experience, which corresponds to work experience. Work experience ( $EXP$ ) is calculated as follows:  $EXP = AGE - S$  (total years of study)  $- 6$  (age of enrolment in compulsory education).

To examine the phenomenon of overeducation, we will use workers who have completed tertiary education (given that secondary education is considered nearly mandatory) and are employed in the private sector.

Therefore, the modified Mincer equation that will be utilized is:

$$\ln W = a + b_3S_3 + c(EXP) + d(EXP)^2 + \delta(S_3 * EXP) + u \quad (2)$$

where  $S_3$  is equal to 1 for persons who completed at least a university degree, 0 otherwise.

In Equation (2), work experience negatively affects the returns to tertiary education if the coefficient “ $\delta$ ” takes a negative value. In other words, this occurs when an individual’s productivity does not increase with work experience. In this situation, the weak filter hypothesis holds.

Next, based on the available data, we will estimate the coefficient “ $\delta$ ” discretely for male tertiary education graduates employed in the private sector, as well as for female tertiary education graduates also employed in the private sector.

### 4. Data

We processed data from the Household Budget Survey.

The HBS survey, conducted by the Hellenic Statistical Authority, covers 6196 private households and analyzes 13.661 individuals throughout the country. The Household Budget Survey is a national survey that collects information from representative samples of households regarding household composition and members’ expenditures.

### 5. Empirical Findings

The results from the estimation of Equation (2) for male tertiary graduates working in the private sector are presented in the following table (**Table 2**).

**Table 2.** Testing for the screening hypothesis (men).

Variables	Coefficient	t-value	Sig.
Constant	8.627	123.635	0.000
Higher	0.233	3.063	0.002
Experience	0.053	9.476	0.000
(Experience) <sup>2</sup>	-0.001	-7.699	0.000
(Experience)*(Higher)	0.008	2.585	0.010
<b>STATISTICS</b>			
R		0.486	
R <sup>2</sup>		0.236	
Adj.R <sup>2</sup>		0.233	
St. Error of the estimate		0.503	
F		82.075	
dF		4	
Sig.		0.000	
N		1067	

Source: ELSTAT (Hellenic Statistical Authority), Household Budget Survey.

The value of “ $\delta$ ” is 0. This value indicates that the weak version of the Screening hypothesis (or Filter hypothesis) is marginally not valid. This means that the phenomenon of overqualification does not marginally occur for employed male graduates. Thus, employers marginally consider the degree of male employees as an indicator of their expected productivity due to their education. However, this value writes down that earnings from work are nearly maintained at their initial level throughout their careers. In other words, it suggests that in the case of males, the initial earnings remain almost essentially flat for the remaining of their career.

Additionally, the  $r$  value indicates that there is potential for improvement, as the model does not fully explain the variance of the dependent variable.

Furthermore, it is noted that according to the data in **Table 1**, the rate of return on tertiary education for men employed in the private sector (10.1%) is more than twice that of their counterparts in the public sector (4.85%). Thus, the strong version of the Screening (or Filter) hypothesis does not hold. Therefore, male employees tend to be compensated based on the productivity they have gained from their education, rather than simply being compensated due to their degree.

The value of “ $\delta$ ” is marginally negative, at -0.008. This means that the weak version of the screening (or filter) hypothesis is marginally valid. Thus, the phenomenon of overqualification appears marginally among female tertiary graduates.

Additionally, the data from **Table 1** show that the rates of return on tertiary education for women working in the private sector are 9%, which is lower than the rates of return on higher education for female tertiary graduates working in

the public sector, which stand at 10%. Therefore, the strong version of the Screening (or Filter) Hypothesis appears to hold. This suggests that women are selected and continue to be compensated based on their degree, which acts as a sheepskin for their expected productivity (**Table 3**).

**Table 3.** Testing for the screening hypothesis (women).

Variables	Coefficient	t-value	Sig.
Constant	8.498	94.013	0.000
Higher	0.519	5.857	0.000
Experience	0.040	6.004	0.000
(Experience) <sup>2</sup>	-0.001	-4.876	0.000
(Experience)*(Higher)	-0.008	-2.074	0.038
<b>STATISTICS</b>			
R		0.325	
R <sup>2</sup>		0.106	
Adj.R <sup>2</sup>		0.102	
St. Error of the estimate		0.534	
F		26.768	
dF		4	
Sig.		0.000	
N		909	

Source: ELSTAT (Hellenic Statistical Authority), Household Budget Survey.

## 6. Discussion and Concluding Remarks

In the present study, the existence of the phenomenon of overeducation was examined through the Screening (or Filter) Hypothesis (strong and weak versions). It was found that, in the case of men, the phenomenon of overeducation does not occur; however, the zero value for the parameter “ $\delta$ ” indicates that the wages of male tertiary graduates have remained at the same levels and do not increase in accordance with the productivity resulting from their education combined with their experience.

In the case of female tertiary graduates, both the weak and strong versions of the Screening Hypothesis appear to hold, and therefore, the phenomenon of overeducation is observed. Furthermore, the study notes the historically lower wages of women compared to those of men (see **Table A4**), as well as the higher unemployment rates among women relative to those of men (see **Table A3**).

Therefore, to address the issue of overeducation in general, and specifically the problem of overeducation among women, the following indicative measures are proposed:

- 1) Strengthening the presence of women in STEM fields, where professional

opportunities are more abundant. Given that the phenomenon of overeducation is more pronounced among graduates of social and humanistic studies (Ortiz & Kucel, 2008).

2) Imposing transparency regulations on salaries and adopting policies aimed at reducing wage disparities. According to research findings, the overeducation of women was addressed in countries that implemented protective policies for women. For example, McGuinness et al. (2018), who analyzed data from the Labor Force Survey across 27 EU countries, observed that overeducation rates are lower in countries with higher female participation rates. This outcome is consistent with findings by Davia, McGuinness, and O'Connell (2017), which utilized EU-SILC data to analyze regional variations in overeducation, concluding that such variations tend to be lower among females in regions with strong employment protection legislation.

In conclusion, addressing the phenomenon of overeducation among women in Greece has a significant impact on macroeconomic indicators. This can lead to lower unemployment rates, particularly among tertiary graduates, which is a crucial indicator for macroeconomic policy. In addition, reducing overeducation can increase participation and employment rates. Higher employment rates enhance overall economic productivity and can improve GDP growth. Finally, addressing the issue of overeducation among women can lead to improved gender equality in the labor market that contributes to more robust economic performance.

## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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## Appendix

**Table A1.** Persons aged 30 - 34 years who have completed tertiary education, 2011-2022.

Years	Total (Men + Women)		Men		Women	
		%		%		%
2011	241,102	29.1	110,964	26.8	130,138	31.5
2012	253,144	31.2	113,031	28.1	140,113	34.2
2013	278,860	34.9	124,030	30.8	154,830	39.0
2014	289,336	37.2	129,632	32.9	159,704	41.6
2015	302,411	40.4	130,665	35.3	171,646	45.5
2016	307,498	42.7	127,105	36.2	180,393	48.8
2017	305,133	43.7	130,592	37.0	174,542	50.2
2018	294,525	44.3	125,507	37.5	169,018	51.3
2019	270,273	43.1	113,595	36.7	156,678	49.3
2020	264,590	43.9	115,816	39.2	148,774	48.5
2021	255,788	44.3	107,640	39.4	148,149	48.6
2022	261,143	44.8	108,991	38.0	152,151	51.3

Source: Population, Employment and Cost Living Statistics Division, ELSTAT (Hellenic Statistical Authority).

**Table A2.** Employment rates of individuals aged 25 - 64 by level of education.

GREECE	2014	2015	2016	2017	2018	2019	2020	2021
Bachelor's degree	67.3%	67.5%	69.2%	70.8%	73.0%	74.6%	73.6%	73.4%
Master's degree	78.8%	79.1%	82.0%	82.6%	82.4%	81.8%	80.8%	83.6%
Doctorate	87.2%	91.4%	87.5%	85.2%	89.7%	88.3%	91.3%	93.1%
OECD	2014	2015	2016	2017	2018	2019	2020	2021
Bachelor's Degree	81.9%	82.6%	82.9%	83.6%	84.1%	84.3%	83.2%	84.2%
Master's Degree	86.6%	87.0%	87.3%	87.9%	87.8%	88.2%	87.6%	88.7%
Doctorate	91.4%	91.1%	91.7%	92.4%	92.3%	93.1%	92.5%	92.9%
EU 22	2014	2015	2016	2017	2018	2019	2020	2021
Bachelor's Degree	80.4%	81.3%	81.9%	82.9%	83.8%	84.1%	83.3%	84.1%
Master's Degree	86.0%	86.4%	87.1%	87.7%	88.1%	88.4%	87.9%	89.2%
Doctorate	90.9%	91.0%	91.9%	92.6%	92.8%	93.0%	93.0%	93.5%

Source: OECD, Education at a Glance (<https://doi.org/10.1787/b35a14e5-en>).

**Table A3.** Unemployed men and women, in thousands.

	Years	Men	Women
Higher Education	2019	109.9	201.9
	2020	123.0	180.4
	2021	102.8	172.8
	2022	82.2	145.1
	2023	77.0	131.2

Source: ELSTAT (Hellenic Statistical Authority).

**Table A4.** Average gross annual earnings, in euros.

Educ level	2006		2010		2014		2018	
	Men	Women	Men	Women	Men	Women	Men	Women
Total	26,863	18,178	25,673	19,989	21,471	17,288	19,236	15,922
1	19,899	13,381	21,166	14,961	15,740	11,745	13,852	9924
2	18,361	13,259	20,189	13,943	16,639	10,682	13,861	9741
3	27,498	16,982	22,889	17,345	17,656	14,135	14,451	12,764
4	22,026	14,485	24,324	20,039	22,392	18,216	17,869	15,206
5	26,252	17,964	27,980	20,651	21,643	17,597	22,793	17,015
6	27,389	21,265	33,050	25,130	29,076	21,687	28,404	21,047
7	34,126	24,343	37,080	29,414	37,283	27,211	42,629	27,144
8	43,673	32,629	38,939	34,577	30,694	27,912	34,847	28,965

1: Primary School, 2: Middle School, 3: High School, 4: IEK (Higher Vocational Schools), 5: TEIs (Technological Educational Institutes), 6: Universities, 7: Master's Degrees, 8: PhDs. Source: ELSTAT (Hellenic Statistical Authority): SES Four-year survey on structure and distribution of earnings.