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The Impact of Education on Employment Prospects in Greece Across Regions and Time

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ABSTRACT

Using Labour Force Survey data, the size and direction of the impact of education on employment prospects in Greece is explored along two axes: region and time. The findings suggest that educational attainment is always important across regions, but its impact on employment prospects varies along both axes. In general, more educated individuals enjoy an employment premium, but there are considerable differences across regions, especially with regards to higher levels of education, that should concern policy makers. Moreover, during the recession the employment premium of education decreased except for post-graduate studies which seem to be recession proof and, thus, a legitimate choice to improve one's chances of being employed.

KEYWORDS: *Greece, region, education, employmentpremium, average marginal effects, JEL: J24, J64, O15, R23*

INTRODUCTION

Since the beginning of the fiscal crisis in 2008 Greece suffered losses more than a quarter of its GDP while employment dropped considerably, and unemployment soared to unprecedented levels. In 2019, after a slow growth since 2017, the GDP was still more than 23% smaller compared to 2008[1]. The impact on the labour market was severe. The employment rate for people over 15 years old fell from approximately 49% in 2008 to almost 37% in 2013 and increased gradually to almost 43% in 2019. Empirical evidence (Mitrakos et al., 2010 and Kanellopoulos et al., 2013) shows that during the economic recession education proved to be a valuable and rational investment from an individual's point of view in terms of both better employment prospects and monetary returns. Building on previous work with micro data that can verify the importance of personal attributes -education included- in determining both the unemployment probability (e.g.,Mitrakos et al., 2010) and unemployment differences between regions (López-Baro and Motellón, 2011), this paper takes a slightly different turn and focuses on the diversified role of education on employment prospects across regions and the way that role has changed during the past fifteen years.

The first question I wish to answer is whether -ceteris paribus- a specific level of educational attainment contributes similarly to employment chances across regions, i.e., whether graduating from a specific level of education is associated with the same employment premium or penalty across regions. A negative answer would suggest that education is treated differently across regional labour markets;that could offer a legitimate argument to move from one region to anotherto improve one's employment chances.The second question is whether education's contribution to the probability of being employed varied during the past fifteen years especially considering the intense economic fluctuations experienced meanwhile. To that end three periods are defined: 2004-2008, when the economy was growing fast, the labour market was doing well and the employment rate was high; 2010-2013, when labour market conditions worsened due to the economic recession leading to a bigger than 10 percentage points drop in the employment rate; and 2015-2019, when the labour market started to slowly recover following a weak upturn of the economic activity.[2] If the answer is positive, then the contribution of education to employment prospects depends on economic conditions and, thus, cannot be taken as granted. Due to the big fluctuations of economic activity over the time span chosen, Greece is an ideal case study.

1 GDP fall is calculated using data from the Eurostat at chain linked volumes (2010=100) and market prices (2008: €247.8 billion, 2019: €190.5 billion). The smallest GDP was recorded in 2016 (€182 billion).

2 Years 2020 and 2021 are deliberately excluded from the analysis due to the unusual conditions in the labour market caused by the pandemic and the associated state measures to protect public health. Years 2009 and 2014 are also excluded from the analysis to avoid mixing trends in the labour market.

THEORETICAL BACKGROUND

Regional labour markets are not identical and may respond differently to the same exogenous stimulus (Elhorst, 2003). Even though they belong to the same country, i.e., they have the same labour market institutions, wage setting regimes, social security settings, etc., (Layard et al. 1991, OECD, 1994; Bean, 1994; Scarpetta, 1996), there are often big differences in key labour market variables like unemployment or employment rates (Elhorst, 1995; Taylor and Bradley, 1997; European Commission, 1999). These differences may imply inefficiencies in the operation of regional economies and labour markets and, thus, there are benefits to be realised in remedying them (Taylor, 1996). Clearly, it is even more crucial to mend such inefficiencies, e.g., the low rate of human capital utilisation implied by low employment rates, when the economy is in recession.

Studies that explore labour market diversities across regions in Greece specifically rely either on nation-wide surveys, e.g., the Labour Force Survey (LFS), or small-scaled targeted surveys that usually involve specific regions and confirm the existence of regional and spatial labour market differences regarding employment prospects. Even though Greece is a small country, several sources of existing regional variation in economic activity and the labour market have been identified in the past. For example, diversely endowed regions adapted differently to the deindustrialisation of the country and the accession to the EU back in the 1980s.[3]Typically, there are poorer employment opportunities reflected in high unemployment rates in regions near the north borders of the country due to the relocation of mostly small businesses across the borders (i.e., falling labour demand), to benefit from lower taxes and wages (Labrianidis 2005). The deterioration of the business environment during the economic recession reinforced this trend further.[4] On the other hand, employment opportunities are usually scarcer in the rural areas of west and north-west Greece (Monastiriotis, 2009); partly because the manufacturing activity is concentrated around Thessaloniki and Athens. Central Greece and south-west Peloponnese specialise in agriculture, while service activities are concentrated in large cities and the islands, due to tourism. These facts can partly explain both the varying employment prospects across regions and the different responses to the external shock the crisis represented.

In the same context, Ioannides and Petrakos (2000) emphasize the role of the uneven distribution of urban centres across the country,coupled with the frequency and intensity of the business cycle, on the regions' success to respond to evolving economic conditions. The geography of Greece, i.e., several islands, mountainous and remote areas, also had an adverse impact on the availability of skilled labour force, infrastructure, and supply of investment projects. Moreover, pre-existing imbalances coupled with weak cross-regional adjustment mechanisms, argues Monastiriotis(2011), were likely intensified by policies implemented over the past ten years to contain the adverse effects of the economic recession leading to a cumulative process of regional divergence.

However, that does not rule out the existence of important spill-over effects causing regional variation (Lolos and Papapetrou, 2012), especially where there are no mechanisms to internalise those spill-over effects. Tourism, for instance, operates as a channel enabling a region to affect other areas by absorbing the excess supply of labour and,therefore, improving regional employment opportunities (Alexiadis and Eleftheriou, 2010). On the other hand, there is no evidence of spill-over effects for policy interventions aimed at relieving regions from shocks (Monastiriotis, 2009); perhaps due to the type of state interventions chosen. Moreover, it is reported that past unemployment spells negatively affect the duration of employment spells blocking the region's capacity to fight unemployment. It is not unlikely for such a mechanism to operate in some regions, but not in others, leading to uneven results coming from the same shock (Theodosiou and Zarotiadis, 2010). In a more targeted analysis of Greece, Prodromidis (2008, 2012) focuses on municipalities. The author's findings support the existence of considerable heterogeneity regarding labour market variables, i.e.,employment, participation, etc., that call for policy actions considering the spatial peculiarities and the links between neighbouring areas, to implement a more effective employment and, ultimately, growth policy.

The link between education and employment in Greece has been explored in a handful of studies. For instance, Rodokanakis and Vlachos (2012) argue that the impact of education on the unemployment probability differs across regions and time; thus,it is difficult to draw generalised conclusions about its effect. Monastioriotis and Martelli (2013), on the other hand, investigate the role of education, amongst other productivity determining attributes, and suggest that education has a statistically significant (marginal) impact only in Athens, Thessaloniki and the two partly industrialised regions of West Macedonia and StereaEllada. Their findings suggest two things. First, there is a deficiency of skilled jobs in Greece (i.e., weak demand) and second, there is a mismatch between skills supplied and demanded, which they label market deficiency. Finally, Kanellopoulos et al. (2013) confirm previous findings that the link between education and unemployment probability varies across regions and time.

LABOUR MARKET STATE OF PLAY

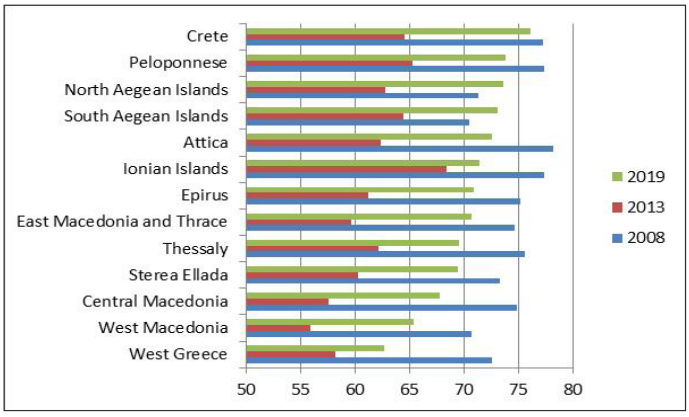
Even before the economic recession,there were noteworthy differences across regional labour markets in Greece (Graph

3 Some regions, e.g., those who had a favourable physical environment or were more densely populated (i.e., urban centres), managed to develop the tertiary sector to counterbalance the declining secondary sector, i.e., manufacturing, while others did not.

4 According to the World Bank (2020) Greece ranks 79th and Bulgaria 61st out of 190 countries in the ease of doing business in 2020.

1). Back in 2008 the employment rate ranged from 70.5% in South Aegean Islands to 78.2% in Attica. Even though the employment rate declined everywhere in the following years (2010-2013), the employment gap, i.e., the difference between the maximum and the minimum employment rate across regions, grew bigger. Monastiriot is (2011) argued at the beginning of the recession that planned austerity policies by construction and due to the heterogeneity of regions, with respect to reliance on public expenditure, public sector cuts, changes in incomes and taxes, would cause an additional region-specific shock on top of the one inflicted by the fiscal crisis itself. Hence, in 2013 the employment gap across Greek regions stood at 12.5 percentage points ranging from 55.9% in West Macedonia to 68.4% in the Ionian Islands. In the last period of slow economic recovery, the employment rates increased countrywide, but the gap widened even further to 13.5 percentage points in 2019. Crete stands out amongst regions; the employment rate peaked at 76.2% while West Greece lies at the other side of the spectrum with an employment rate of 62.7%. The widening of the employment gap means that regional labour markets moved at different speed both during the recession and the following recovery. For example, since 2013 the employment rate increased by more than 11 percentage points in Crete and East Macedonia and Thrace but only 3.1 percentage points in the Ionian Islands and 4.4 percentage points in West Greece.

Graph 1 Employment rates for people aged 25-54 by region



Source: Labour Force Survey (LFS) sample.

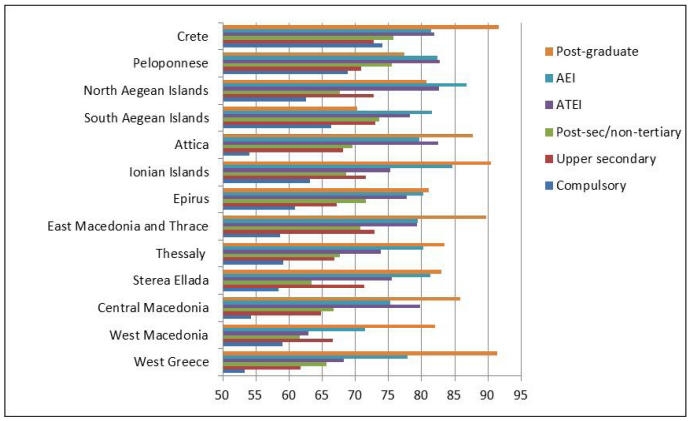
Note: ranking by 2019 employment rate.

The economic theory suggests that being employed has a lot to do with education (Becker, 1964). This is verified when comparing employment rates by level of education attained. More educated individuals are more likely to be employed. The employment rate in Greece in 2019 for someone who has completed compulsory education is over 58% while the respective figure for a post-graduate is 87%. According to the human capital theory (Becker, 1964) this is justified for two reasons. First, education is directly and positively associated with labour productivity and, second, more educated people are more willing to work to compensate for the cost (direct and indirect) of their investment in education. Moreover, more education may be used to signal higher inherent ability, which is linked to productivity and, thus, better employment prospects.

It is less straightforward to justify the size of the regional variation both within region (and across levels of education) and between regions (for the same level of education). Graph 2 allows comparisons across both these axes. The standard deviation of the employment rate for the same level of education[5], which I use as a measure of volatility, is the biggest amongst post-graduates (6.2 percentage points) and graduates from compulsory education (6.1percentage points) and the smallest amongst upper secondary education graduates (3.7percentage points) and AEI[6] graduates (3.9 percentage points)[7]. These differences do not seem to be linearly associated with the level of education, but they suggest that residing in a specific region is more important when one is either poorly or very well educated.

Second, there is considerable volatility in the employment rates of graduates from different levels of education within a given region.[8]The standard deviation in South Aegean Islands is as low as 5.5 percentage points followed by Peloponnese (5.7 percentage points). In other words, getting more education in those regions does little to improve one's employment prospects. On the other hand, West Greece, and Attica face more than double that volatility in employment rates across levels of education with 13.3 and 12.2 percentage points respectively. This means that getting more education improves the chances of being employed more in those regions with a high volatility in employment rates.

Graph 2 Employment rates in 2019 for people aged 25-54 by region and level of education completed



Source: Labour Force Survey (LFS) sample.

Note: ranking by 2019 employment rate (highest to lowest).

5 Employment rates (and standard deviations) are reported in (the last row of) Table A1 in the appendix.

6 AEI stands for Higher/Tertiary Education Institution also referred to as university.

7 Post-secondary non-tertiary education and ATEI, i.e., Technical Higher Education Institutions, lay somewhere in the middle with a standard deviation of 4.3 and 5.9 percentage points respectively.

8 Employment rates (and standard deviations) are reported in (the last column of) Table A1 in the appendix.

Hopefully it has been established so far, that regional employment rates differ substantially by level of education. The next section attempts to determine the contribution of every single level of education to the regional employment probability considering several other factors. For example, previous work (Cholezas and Kanellopoulos, 2015), and the lower female employment rate compared to male, verify that gender is an important determinant of employment. Hence, its effect should not be mistakenly attributed to education.

DATA AND METHODOLOGY

The sample consists of individuals aged 25-55 and is drawn from the Labour Force Survey (LFS) conducted by ELSTAT (i.e., the Hellenic Statistical Authority) four times per year. The age bandwidth is chosen to avoid self-selection to education or retirement. To consider an individual as employed she/he must have had at least one hour of paid employment in the week preceding the interview. This definition is standard, and it relies on the definition of unemployed by the ILO.

Being employed or not is a binary outcome. Let us typically assume there is a latent variable that determines whether someone is employed or not: when the latent variable is bigger than 0, the person is employed; otherwise, she/he is not employed. A probit model is used to estimate the probability of employment of the following form:

$$Pr(Y_i = 1) = \phi(\beta X_i) \qquad (1)$$

where Y=1/0 when the individual is employed/unemployed or inactive, X= a matrix of independent variables, which will be discussed next, and Φ is the cumulative normal distribution. Since the LFS tracks every individual for six consecutive quarters, the same individual can appear in the sample more than once. Thus, clustering is used[9] to estimate standard errors. Three augmented employment equations are estimated: before (period 2004-2008), during (period 2010-2013) and after (period 2015-2019) the recession. They represent fundamentally different periods of economic performance: growth, recession, and slow recovery.

There are several attributes that affect the probability of being employed and, thus, should be included in equation (1). Note that the nature of the data employed allows for the use of personal attributes mainly, i.e., supply side determinants, which include gender, age, and educational attainment. Previous employment (Bentolila and Bertola, 1990; Emerson, 1998), i.e. the dynamic nature of employment, individual heterogeneity (Heckman, 1981), and the effect of past unemployment spells (Arulampalam et al., 2000) are not accounted for because that would require a different estimation strategy. Moreover, following previous work (e.g. Kanellopoulos et al., 2013), six dummies for aggregate levels of education are used; namely compulsory education (completed lower secondary at most), upper secondary (reference group), post-secondary non-tertiary, ATEI (tertiary technical education institutions), AEI (university) and post-graduate studies, including both first and second level of post-graduates. The number of years since graduation is used as a proxy for work experience, which is believed to be closely linked to productivity and, thus, it can improve the chances of getting a job in the first place up to a certain point(Mitrakos et al.,2010). Being a male in Greece also seems to be associated with better employment chances (Cholezas and Kanellopoulos, 2015).

Another attribute, that is likely to affect the employment probability, is the country of origin: being a native might improve employment prospects in some regions, but worsen them in others, depending on the productive structure of it and the associated demand for skills. It is not uncommon for immigrants to concentrate in sectors of economic activity, such as construction, agriculture, tourism, and housework, especially before the crisis (Cholezas and Tsakloglou, 2009). Marriage can also have an impact on the employment probability, because of both prejudices (e.g., married women devote more time to housework and, thus, less energy at work, married individuals tend to have a lower turnover rate) and efforts of different intensity to get a job or willingness to lower one's expectations, e.g., different reservation wage. Being the head of the household, i.e., bearing the main responsibility for its well-being, works the same way. The presence of children below 12 in the household that need care could also narrow employment choices and, thus, decrease the chances of getting a job. Finally, having other household members employed (the actual variable is the share of employed persons in the household) may relieve the pressure to accept a job offer or could provide a role model and have the opposite effect.

On the demand side the peculiarities of every region's labour market are expected to impact employment opportunities irrespective of personal attributes (Kanellopoulos et al., 2015). For example, low educated individuals probably have better chances of finding a job in a region that relies heavily on sectors that employ primarily low skilled individuals. Besides, regional diversity is the motivation for this paper in the first place. Therefore, thirteen dummies for regions are used to capture region specific effects. Moreover, interaction terms between education and region are used to estimate the effect of every region on the impact of education on the employment probability. The urban nature of the area of residence might also be crucial in getting a job since it can be associated with more opportunities for people with certain attributes and fewer for others (Mitrakos et al., 2010). Ceteris paribus seasonality might also affect employment probabilities since some economic activities are more seasonally sensitive, e.g., tourism, agriculture, construction. Finally, the economic cycle, although it is rather univocal within each period, can favour or limit job opportunities, so dummies for the year the interview was conducted are included (reference year: first year in every period).

9 See http://www.stata.com/manuals13/rprobit.pdf for a relevant discussion.

RESULTS

To answer the first question set in the introduction average marginal effects[10] are calculated and reported in Table 1 for period 2015-2019 based on the estimation results of equation (1), which are reported in Tables A2, A3 and A4 in the appendix. First, ceteris paribus compulsory education does not change the probability of employment compared to the reference group, i.e., upper secondary education graduates, at least in most regions. In those regions that it does, it is associated with a penalty of about 3 percentage points (West Greece) at most. The fact that upper secondary education does nothing to boost employment probabilities suggests that its added value is not appreciated by the employers, i.e., they could as easily hire either a compulsory or an upper secondary education graduate. On the other hand, in eight out of the thirteen regions the impact of post-secondary non-tertiary education is statistically significant and positive. Having graduated from post-secondary education is associated with an employment premium ranging from approximately 2.5 percentage points (Peloponnese) to almost 6 percentage points (Ionian Islands). However, there are five regions in which post-secondary education graduates have the same employment probabilities with upper secondary education graduates or even compulsory education graduates, e.g., East Macedonia and Thrace. It is somewhat shocking to realise that in some regions six additional years of education do nothing to improve employment prospects and this is something that should trouble policy makers and stir up a discussion as to what makes those regions different.

Tertiary education, on the other hand, is a completely different story. A degree from a Higher Technical Education Institution (ATEI) improves employment prospects in almost all regions except for West Macedonia and Sterea Ellada. The improvement ranges from 4.6 percentage points (Peloponnese) to more than 9 percentage points (South Aegean and Ionian Islands) compared to the reference group. These findings suggest that -ceteris paribus- a person in Attica has a stronger motive to acquire more education than in West Macedonia, because that would improve employment prospects more in the former.

This is even more apparent when University (AEI) is concerned. It is the first level of education the graduates of which have better employment prospects than the reference group irrespective of the region they reside. The smallest premium is found in North Aegean Islands and the largest in the Ionian Islands. Note that the difference is a bit smaller than 6 percentage points indicating a widening gap across regions as we move up the education ladder. Note also that North Aegean Islands is the only region where university graduates benefit from a smaller employment premium than ATEI graduates. The results are similar regarding post-graduate studies with employment prospects improving considerably everywhere. The employment premium ranges from approximately 11% in Peloponnese to almost 21% in the Ionian Islands increasing the gap across regions to 10 percentage points. Clearly employment premiums associated with post-graduate studies are the biggest. Moreover, the variation across regions is considerable and it increases for higher levels of education. Probably because the higher the level of education completed the more diverse the employment opportunities are, especially when considering the high skills mismatch in the Greek labour market[11].

Table 1. Average marginal effect by level of education and region, 2015-2019 (%)

	Compulsory		Post-sec		ATEI		AEI		Post-grad	
Crete	0.5		5.0	***	7.1	***	7.2	***	12.3	***
Peloponnese	-1.1		2.5	*	4.6	***	7.6	***	10.9	***
North Aegean Islands	-1.9		3.6		9.0	***	5.3	***	15.2	***
South Aegean Islands	0.2		3.2	**	9.1	***	10.5	***	12.2	***
Attica	-1.6	**	3.6	***	8.6	***	9.0	***	14.0	***
Ionian Islands	0.6		5.9	***	9.1	***	11.0	***	20.8	***
Epirus	2.2	*	4.7	**	8.0	***	10.4	***	16.0	***
East Macedonia and Thrace	0.7		0.9		5.7	***	7.9	***	17.0	***
Thessaly	-0.9		3.6	**	5.2	***	8.7	***	17.1	***
Sterea Ellada	-2.4	**	-1.1		2.1		9.2	***	16.1	***
Central Macedonia	-1.4	*	2.7	***	7.2	***	7.8	***	14.3	***
West Macedonia	-1.9		-0.4		2.4		6.0	***	20.2	***
West Greece	-3.1	***	-0.3		6.8	***	9.9	***	13.9	***

10 The average marginal effect equals the average of all changes caused in the probability of being employed by a small (zero to one) change in a single continuous (or dummy) independent variable. Note that all other covariates are used as they are observed.

11 According to the European skills index calculated by CEDEFOP, Greece ranked last amongst 31 European countries in skills matching in 2020.

Notes: *(**)*** statistical significant estimator at 1%(5%)10% level of significance. Upper secondary education graduates are the reference group. The table can be read either horizontally, i.e., to compare average marginal effect across levels of education and within a specific region, or vertically, i.e., to compare the average marginal effect of a specific level of education across regions. Compulsory = up to lower secondary (Gymnasium), Post-sec = post-secondary non-tertiary education, ATEI = Higher Technical Education Institution, AEI = Higher Education Institution/University, Post-grad = post graduate studies.

These findings suggest, for instance, that university graduates improve their employment prospects more in Attica than in Crete or post-graduates have a smaller employment premium in Attica than in Thessaly, always compared to the reference group in each region. The different impact of education across regions and time is consistent with previous findings regarding unemployment probabilities by Rodokanakis and Vlachos (2012) and Kanellopoulos et al. (2013). The fact that higher levels of education have a statistically significant impact on employment probabilities in all regions seems to contradict Monastioriotis and Martelli (2013), but different methodological frameworks may be responsible for that.

Table 2. Predicted employment probabilities by level of education and region, 2015-2019 (%)

	Compulsory	Post-sec	ATEI	AEI	Post-grad	SD
Crete	64.4	63.9	71.4	71.6	77.0	7.1
Peloponnese	64.2	65.3	70.0	73.1	76.7	6.0
North Aegean Islands	62.3	64.3	73.3	69.6	79.6	7.8
South Aegean Islands	63.9	63.7	73.6	75.1	76.9	6.3
Attica	62.8	64.5	73.3	73.7	78.9	7.0
Ionian Islands	62.7	62.0	71.9	74.1	84.9	9.4
Epirus	65.4	63.3	71.1	73.4	79.0	6.6
East Macedonia and Thrace	65.7	64.9	70.9	73.1	82.5	7.4
Thessaly	64.9	65.7	70.6	74.0	82.0	6.8
Sterea Ellada	62.4	64.7	66.7	73.8	80.5	5.2
Central Macedonia	64.2	65.6	72.4	73.0	79.0	7.0
West Macedonia	65.1	66.8	68.9	72.2	84.5	6.3
West Greece	62.8	65.9	72.3	75.2	78.8	5.5
SD	1.2	1.3	1.9	1.5	2.7	-

Note: SD stands for standard deviation. All estimates are statistically significant at the 1% level of significance. Compulsory = up to lower secondary (Gymnasium), Post-sec = post-secondary non-tertiary education, ATEI = Higher Technical Education Institution, AEI = Higher Education Institution/University, Post-grad = post graduate studies.

However, our findings so far say nothing about the actual employment prospects, and they do not allow for comparisons between regions. To compare regions with each other, Table 2 presents predicted employment probabilities[12] by level of education and region. Two remarks are in order. First, volatility across regions increases as we move up the education ladder as indicated by the increasing standard deviation (see last row in Table 2). This is consistent with the assumption that more education widens employment opportunities. Second, regions differ substantially. The smallest expected employment rates' standard deviation across levels of education is found in Peloponnese and the biggest in the Ionian Islands (see last column in Table 2). This means that in the former the benefit from more education in terms of employment opportunities is smaller than the latter. Finally, Table 2 allows for comparisons between regions, and it can provide an argument for moving from one region to another to improve one's employment prospects.

The second question to be answered is whether changing economic conditions affected the average marginal effect of education on employment prospects across regions (Graph 3). Post-secondary non-tertiary education graduates enjoyed an employment premium which decreased in period 2010-2013, i.e., when the economy was in recession, and then it recovered in period 2015-2019. However, in most regions it still falls short of period 2004-2008. There are exceptions though; in Thessaly, for example, there is a premium only during the last period, while in West Macedonia there was a premium only during the first period. ATEI graduates saw their premium declining during the recession in most regions, and it has not recovered to its pre-crisis levels despite the increase during the last period in some of them, e.g., Crete

12 Predicted employment probabilities are calculated using the probit estimation results reported in the appendix. While an average marginal effect of a covariate reveals how much the probability of being employed changes when a small change in the covariate occurs, the predicted probability of being employed reveals what the actual probability of being employed is.

and West Greece. Nevertheless, there are exceptions to this pattern also. In West Macedonia and East-Macedonia and Thrace, for instance, the employment premium for ATEI graduates marginally increased during the recession, but then fell in the period of slow recovery (2015-2019), while in Crete and North Aegean Islands the premium is bigger than ever recently.

The situation is not much different for AEI graduates. The employment premium declined during the recession in almost all regions and then made up for some of the lost ground during the slow recovery that followed. AEI graduates in North Aegean Islands and West Macedonia suffered the biggest losses since 2004-2008, while in Epirus, the Ionian Islands and Attica the employment opportunities remained unaltered throughout the time span studied. The employment premium for those with post-graduate studies exhibits a different, more volatile pattern across regions compared to other levels of education. The U-shape pattern is observed only in two regions, Thessaly and Central Macedonia, but the employment premium is bigger in period 2015-2019 than period 2004-2008. Except for West Macedonia and North Aegean Islands, post-graduates enjoy a bigger employment premium in the recovery period than the slow growth period, while in four regions the biggest premium was recorded during the recession. These findings suggest that post-graduates, contrary to other levels of education, improved their employment opportunities over time in most regions despite the recession or perhaps because of it.

CONCLUSIONS AND POLICY IMPLICATIONS

More education is associated with improved opportunities of being employed and higher levels of education graduates enjoy an employment premium. However, that premium is constant neither across regions nor over time. Relying on the labour force survey three periods of time were explored characterised by diverse economic conditions, namely a growth period (2004-2008), a recessionary period (2010-2013) and a slow recovery period (2015-2019), and 13 regions in Greece to verify this claim. The most interesting findings and policy implications are the following.

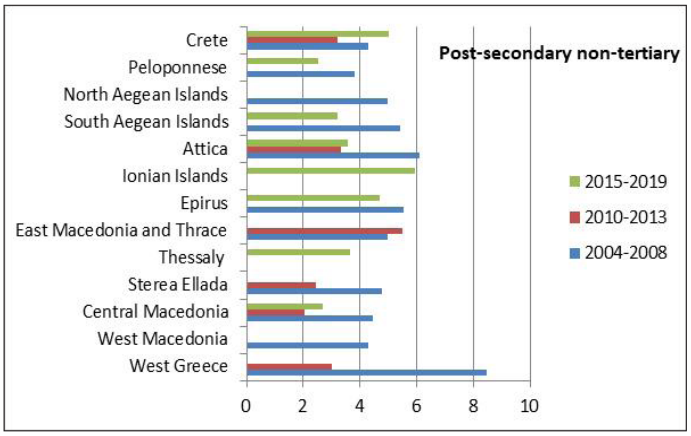
First, education is important in shaping employment prospects, in some regions more than others, while higher levels of education have a greater impact than lower levels of education. This is something that must be communicated to students and parents alike and considered by them when choosing the level of education to acquire.Second, post-secondary education and especially all levels and types of tertiary education improve employment prospects compared to upper secondary education in most regions. However, policy makers should focus on regions in which there is no employment premium, or it is too small, because such a finding implies that regional labour markets have different values attached to the same quality of education offered. A more detailed examination of the field of education, especially when higher education is concerned, may provide some explanation for this.

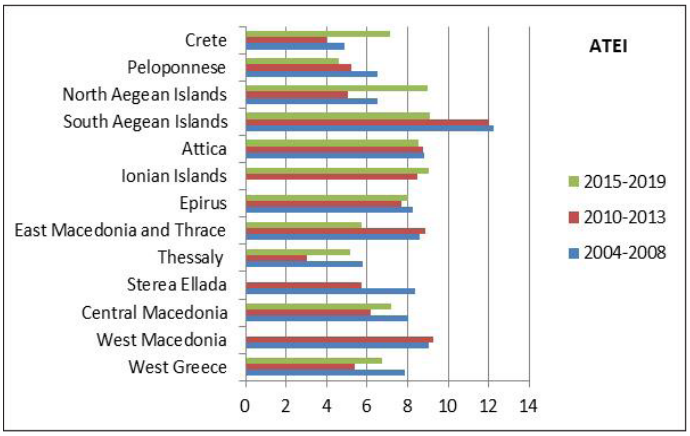
Third, the higher the level of education the more heterogeneity is found between regions in terms of employment prospects and the impact of education itself on them. This is probably explained by the increasing variety of job offers available to higher education graduates, but it could be a motive for people to move to regions that offer better employment prospects or even for the residents of a region to acquire more education causing regions to diverge further apart.

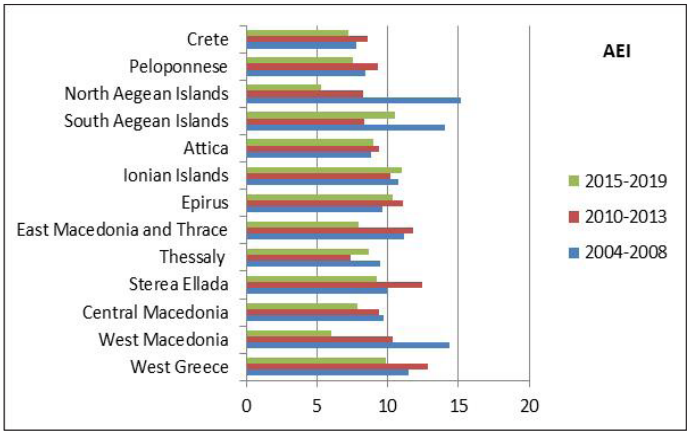
Fourth, the employment premium for AEI graduates at most decreased during the recession (2010-2013) and increased in the following recovery period (2015-2019) in most regions. However, the impact of education on employment prospects still falls short of its pre-crisis level, although there are a couple of exceptions. For example, in Attica, which represents one fourth of the sample, the employment premium for AEI graduates remained almost unchanged over time.

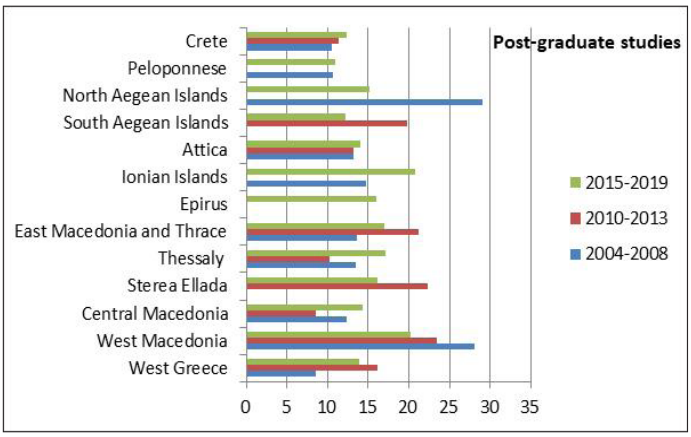
Fifth, post-graduate studies do not fit this pattern. In most regions the employment premium is larger during the recovery period, while in two regions the employment premium was bigger during the recession. This suggests that post-graduate studies pay in terms of improved employment chances especially during recessionary times, at least during the period analysed. However, it would be interesting to explore this issue further to decide whether this is the unwelcome outcome of substituting less for more educated individuals simply because wages have dropped during the recession and labour demand still falls short of labour supply of skilled individuals.

Graph 3 Average marginal effects by level of education, region and period









Note: Only statistically significant (up to the 10% level of significance) average marginal effects are reported in the graph. Non-statistically significant average marginal effects are set to zero (practically no bars are displayed)

REFERENCES

1. Alexiadis, S. & Eleftheriou, K. (2010).A note on the morphology of regional unemployment in Greece. Economics Bulletin 30(4): 2779-2786.
2. Arulampalam, W., Booth, L.A. & Taylor, M.P. (2000). Unemployment Persistence. Oxford Economic Papers 52(1): 24-50.
3. Bean, C.R. (1994). European Unemployment: A Survey. Journal of Economic Literature32: 573-619.
4. Becker, S.G. (1964).Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education. 3rd edition, The University of Chicago Press.
5. Bentolila, S. &Bertola, G. (1990). Firing costs and labour demand: How bad is Eurosclerosis? Review of Economic Studies 57: 381-402.
6. Cholezas, I. & Kanellopoulos, N.C. (2015). Decomposing gender unemployment differentials in Greece. KEPE Discussion Paper Series No.148.
7. Cholezas, I. & Tsakloglou, P. (2011). The Employability of Tertiary Education Graduates: Semantic Approaches and Review of International and Greek Empirical Literature. In: Kontis A (ed.) Labour as a Factor of Growth: Migration - Economy – Technology. Papazisis Publishing, Thessaly University Publications, pp 505-558.
8. Cholezas, I. & Tsakloglou, P. (2009) The economic impact of immigration in Greece: taking stock of the existing evidence. Southeast European and Black Sea Studies 9: 77-104.
9. Elhorst, J.P. (2003). The mystery of regional unemployment differentials; a survey of theoretical and empirical explanations. Journal of Economic Surveys 17: 709-748.
10. Elhorst, J.P. (1995). Unemployment Disparities between Regions in the European Union. In: Armstrong HW, Vickerman RW (eds) Convergence and Divergence among European Unions. Pion, London, pp 190-200.
11. Emerson, M. (1988). Regulation or deregulation of the labour market, policy regimes for the recruitment and dismissal of employees in the industrialised counties. European Economic Review 32: 775-817.
12. European Commission (1999). Sixth Periodic Report on the Regions. European Commission, Brussel/ Luxembourg.
13. Heckman, J. (1981). Heterogeneity and state dependence. NBER Chapters. In: Studies in Labor Markets, pages 91-140, National Bureau of Economic Research, Inc.
14. Ioannides, M.Y. & Petrakos G. (2000). Regional disparities in Greece: The performance of Crete, Peloponnese and Thessaly. EIB Papers 5(1): 30-58. Available at: https://www.econstor.eu/dspace/bitstream/10419/44795/1/319154173.pdf
15. Kanellopoulos, N.C., Mitrakos, Th., Tsakloglou P. & Cholezas, I. (2013). The impact of the current crisis on private returns to education in Greece. Bank of Greece Economic Bulletin 38: 35-68.
16. Layard, R., Nickell, S. & Jackman, R. (1991).Unemployment, Macroeconomic Performance and the Labour Market. University Press, Oxford.
17. Lolos, S. & Papapetrou, E. (2012). Unemployment Disparities and Persistence: Assessing the Evidence from Greek Regions, 1981-2008. Regional and Sectoral Economic Studies 12(1): 55-76.
18. López-Baro, E. & Motellón, E. (2011). The regional distribution of unemployment. What do micro-data tell us? Working Paper 2011/25, Research Institute of Applied Economics (IREA). Available at: https://pdfs.semanticscholar.org/91f3/4811fa543e791d2b3e952845334729b4cf9c.pdf

19. Mincer, J. (1974).Schooling, Experience and Earnings. New York: Columbia University Press.

20. Mincer, J. (1958) Investments in human capital and personal income distribution. Journal of Political Economy 66(4): 281-302.

21. Mitrakos, Th., Tsakloglou, P. & Cholezas, I. (2010). Contributing factors on the youth unemployment probability in Greece with emphasis on tertiary education graduates. Bank of Greece Economic Bulletin 33: 23-68.

22. Monastiriotis, V. &Martelli, A. (2013). Beyond Rising Unemployment: Unemployment Risk, Crisis and Regional Adjustments in Greece. GreeSE Paper No. 80, Hellenic Observatory Papers on Greece and Southeast Europe.

23. Monastiriotis, V. (2011). Making geographical sense of the Greek austerity measures: compositional effects and long-run implications. Cambridge Journal of Regions, Economic and Society 4: 323-337.

24. Monastiriotis, V. (2009). Examining the consistency of spatial association patterns across socio-economic indicators: an application to the Greek regions. Empirical Economics 37(1): 25-49.

25. OECD (1994).The OECD Jobs Study. Paris, OECD.

26. Pissarides, C.A. & Wadsworth, J. (1989). Unemployment and the inter-regional mobility of labour. The Economic Journal 99: 739-755.

27. Prodromidis, P. (2012).Modelling Male and Female Employment Policy in Greece from Local Data. Economic Modelling 29(3): 823-839.

28. Prodromidis, P. (2008).The Spatial Distribution of Male and Female Employment and Unemployment in Greece. KEPE Study 66, Athens.

29. Rodokanakis,S. & Vlachos, V. (2012).Measuring the Unemployment Risk in Northern Greece from the LFS Micro-data during the Period 1994-2006. Review of Economic Analysis 4(2): 224-246.

30. Scarpetta, S. (1996). Assessing the Role of Labour Market Policies and Institutional Settings on Unemployment: A Cross-Country Study. OECD Economic Studies 26: 43-98.

31. Taylor, J. (1996). Regional Problems and Policies: A European Perspective. Australasian Journal of Regional Studies 2: 103-131.

32. Taylor, J. & Bradley, S. (1997). Unemployment in Europe: A Comparative Analysis of Regional Disparities in Germany, Italy and the UK. Kyklos 50: 221-245.

33. Theodosiou, I. &Zarotiadis, G. (2010).Employment and unemployment duration in less developed regions. Journal of Economic Studies 37(5): 505-524.

34. World Bank. 2020. Doing Business 2020: Comparing Business Regulation in 190 Economies. Washington, DC: World Bank Group.

APPENDIX

Table A1 Employment ratesby level of education and region in 2019

	Compulsory	Upper sec	Post-sec	ATEI	AEI	Post-grad	SD
Crete	74.1	72.8	75.7	81.9	81.5	91.7	7.0
Peloponnese	68.9	70.8	75.5	82.7	82.3	77.4	5.7
North Aegean Islands	62.5	72.8	67.7	82.6	86.7	80.7	9.4
South Aegean Islands	66.3	73.0	73.6	78.2	81.6	70.3	5.5
Attica	54.1	68.2	69.5	82.5	79.6	87.7	12.2
Ionian Islands	63.2	71.6	68.6	75.3	84.7	90.4	10.2
Epirus	60.9	67.2	71.6	77.8	80.2	81.1	8.0
East Macedonia and Thrace	58.7	72.8	70.8	79.3	79.4	89.7	10.4
Thessaly	59.1	66.9	67.7	73.8	80.3	83.4	9.1
Sterea Ellada	58.4	71.4	63.4	75.5	81.3	83.0	9.8
Central Macedonia	54.3	64.8	66.8	79.8	75.3	85.8	11.4
West Macedonia	59.0	66.6	61.7	62.9	71.4	82.0	8.4
West Greece	53.4	61.7	65.7	68.2	77.9	91.4	13.3
SD	6.1	3.7	4.3	5.9	3.9	6.2	:

Notes: Compulsory = up to lower secondary (Gymnasium), Upper sec = upper secondary education (Lyceum), Post-sec = post-secondary non-tertiary education, ATEI = Higher Technical Education Institution, AEI = Higher Education Institution/ University, Post-grad = post graduate studies, SD = standard deviation.

Table A2 Probit estimation results 2004-2008 (Stata ouput)

Dependent: employed=1	Coef.	Robust Std. Err.	z	P>z
Education				
Compulsory	-0.124	0.027	-4.560	0.000
Upper secondary (ref. group)	-	-	-	-
Post-secondary non-tertiary	0.401	0.036	11.260	0.000
ATEI (Higher Technical Education Institutions)	0.601	0.057	10.480	0.000
AEI (University)	0.601	0.034	17.720	0.000
Post-graduate studies	0.957	0.097	9.880	0.000
Region				
East macedonia and thrace	-0.088	0.040	-2.200	0.028
Centralmacedonia	-0.044	0.027	-1.600	0.109
Westmacedonia	-0.048	0.052	-0.930	0.353
Epirus	-0.033	0.039	-0.830	0.404
Thessaly	0.015	0.040	0.380	0.705
Ionianislands	0.015	0.062	0.240	0.812
Westgreece	-0.020	0.037	-0.550	0.582
Stereaellada	-0.065	0.038	-1.730	0.083
Attica (ref. group)	-	-	-	-
Peloponnese	-0.004	0.037	-0.100	0.917
Northaegean	-0.208	0.057	-3.680	0.000
Southaegean	-0.189	0.047	-4.000	0.000
Crete	0.013	0.037	0.350	0.729
Education#Region				
Compulsory#eastmacedonia and thrace	0.112	0.054	2.090	0.037
Compulsory#centralmacedonia	0.077	0.041	1.870	0.061
Compulsory#westmacedonia	0.069	0.072	0.960	0.336
Compulsory#epirus	0.089	0.054	1.660	0.096
Compulsory#thessaly	0.172	0.057	3.010	0.003
Compulsory#Ionianislands	-0.026	0.081	-0.320	0.752
Compulsory#westgreece	0.172	0.052	3.300	0.001
Compulsory#stereaellada	0.044	0.052	0.850	0.393
Compulsory#peloponnese	0.156	0.054	2.910	0.004
Compulsory#northaegean	0.039	0.077	0.510	0.612
Compulsory#southaegean	0.026	0.065	0.400	0.692
Compulsory#crete	0.046	0.052	0.900	0.371
PostSec#eastmacedonia and thrace	-0.077	0.093	-0.840	0.403
PostSec#centralmacedonia	-0.119	0.060	-1.990	0.047
PostSec#westmacedonia	-0.150	0.131	-1.140	0.253
PostSec#epirus	-0.054	0.098	-0.550	0.582
PostSec#thessaly	-0.261	0.100	-2.610	0.009
PostSec#ionianislands	-0.191	0.151	-1.270	0.205
PostSec#westgreece	0.123	0.105	1.170	0.241
PostSec#stereaellada	-0.095	0.107	-0.890	0.376

PostSec#peloponnese	-0.149	0.103	-1.440	0.149
PostSec#northaegean	-0.104	0.133	-0.780	0.434
PostSec#southaegean	-0.070	0.128	-0.550	0.583
PostSec#crete	-0.093	0.082	-1.140	0.253
ATEI#eastmacedonia and thrace	-0.018	0.114	-0.160	0.875
ATEI#centralmacedonia	-0.074	0.080	-0.920	0.359
ATEI#westmacedonia	-0.055	0.142	-0.390	0.697
ATEI#epirus	-0.066	0.103	-0.640	0.523
ATEI#thessaly	-0.229	0.106	-2.160	0.031
ATEI#ionianislands	-0.403	0.220	-1.830	0.067
ATEI#westgreece	-0.118	0.112	-1.050	0.292
ATEI#stereaellada	-0.042	0.127	-0.330	0.743
ATEI#peloponnese	-0.153	0.132	-1.160	0.246
ATEI#northaegean	-0.207	0.177	-1.170	0.244
ATEI#southaegean	0.194	0.213	0.910	0.362
ATEI#crete	-0.248	0.108	-2.310	0.021
AEI#eastmacedonia and thrace	0.180	0.091	1.970	0.048
AEI#centralmacedonia	0.048	0.054	0.890	0.376
AEI#westmacedonia	0.316	0.120	2.640	0.008
AEI#epirus	0.034	0.079	0.430	0.670
AEI#thessaly	0.037	0.082	0.450	0.654
AEI#ionianislands	0.195	0.173	1.130	0.260
AEI#westgreece	0.135	0.084	1.600	0.109
AEI#stereaellada	0.076	0.098	0.770	0.439
AEI#peloponnese	-0.008	0.083	-0.100	0.919
AEI#northaegean	0.402	0.144	2.800	0.005
AEI#southaegean	0.335	0.130	2.590	0.010
AEI#crete	-0.012	0.079	-0.150	0.882
PostGrad#eastmacedonia and thrace	0.034	0.470	0.070	0.943
PostGrad#centralmacedonia	-0.105	0.174	-0.600	0.546
PostGrad#westmacedonia	1.481	0.466	3.180	0.001
PostGrad#epirus	-0.520	0.398	-1.310	0.192
PostGrad#thessaly	0.007	0.422	0.020	0.987
PostGrad#ionianislands	0.211	0.374	0.570	0.572
PostGrad#westgreece	-0.423	0.229	-1.840	0.065
PostGrad#stereaellada	-0.866	0.817	-1.060	0.289
PostGrad#peloponnese	-0.178	0.364	-0.490	0.625
PostGrad#northaegean	1.953	0.381	5.120	0.000
PostGrad#southaegean	-	-	-	-
PostGrad#crete	-0.122	0.232	-0.530	0.598
Additional variables				
Female (=1)	-1.231	0.017	-72.350	0.000
Immigrant (=1)	-0.143	0.021	-6.880	0.000
Years since graduation	0.128	0.003	48.760	0.000
Years since graduation^2	-0.003	0.000	-50.080	0.000

Married (=1)	-0.428	0.017	-24.810	0.000
Head of household (=1)	0.701	0.018	39.410	0.000
Residing in big city (=1)	-0.146	0.013	-11.620	0.000
Child below 12 in household (=1)	0.739	0.013	54.910	0.000
Share of employed in household	0.055	0.000	148.930	0.000
Year dummies				
2004 (ref. group)	-	-	-	-
2005	0.005	0.010	0.520	0.600
2006	0.015	0.013	1.160	0.244
2007	0.017	0.013	1.300	0.195
2008	0.010	0.013	0.730	0.468
Quarter dummies				
1	-0.017	0.003	-5.180	0.000
2 (ref. group)				
3	0.004	0.003	1.240	0.214
4	-0.007	0.004	-1.640	0.100
Constant term	-2.294	0.039	-59.060	0.000
Number of obs =603,999	Pseudo R2 = 0.5265			
Wald chi2(93) = 26,773.18	Log likelihood = -162,918.88			
Prob> chi2 = 0				

Table A3 Probit estimation results 2010-2013 (Stata output)

Dependent: employed=1	Coef.	Robust Std. Err.	z	P>z
Education				
Compulsory	-0.157	0.032	-4.850	0.000
Upper secondary (ref. group)	-	-	-	-
Post-secondary non-tertiary	0.192	0.037	5.200	0.000
ATEI (Higher Technical Education Institutions)	0.522	0.049	10.670	0.000
AEI (University)	0.563	0.036	15.740	0.000
Post-graduate studies	0.825	0.082	10.110	0.000
Region				
East macedonia and thrace	-0.145	0.045	-3.240	0.001
Centralmacedonia	-0.021	0.031	-0.670	0.502
Westmacedonia	0.012	0.053	0.220	0.826
Epirus	-0.061	0.044	-1.380	0.167
Thessaly	0.083	0.041	2.010	0.044
Ionian islands	-0.171	0.064	-2.680	0.007
Westgreece	-0.010	0.042	-0.230	0.815
Stereaellada	-0.100	0.038	-2.600	0.009
Attica (ref. group)	-	-	-	-
Peloponnese	-0.004	0.040	-0.090	0.926
Northaegean	-0.128	0.064	-2.010	0.045
Southaegean	-0.051	0.058	-0.880	0.378
Crete	-0.033	0.038	-0.870	0.383

Education#Region				
Compulsory#eastmacedonia and thrace	0.234	0.063	3.740	0.000
Compulsory#centralmacedonia	0.066	0.049	1.330	0.182
Compulsory#westmacedonia	0.059	0.083	0.720	0.474
Compulsory#epirus	0.211	0.064	3.300	0.001
Compulsory#thessaly	0.143	0.062	2.290	0.022
Compulsory#ionianislands	0.167	0.089	1.890	0.059
Compulsory#westgreece	0.184	0.061	3.000	0.003
Compulsory#stereaellada	0.097	0.057	1.700	0.090
Compulsory#peloponnese	0.193	0.061	3.180	0.001
Compulsory#northaegean	-0.031	0.092	-0.340	0.736
Compulsory#southaegean	-0.102	0.083	-1.220	0.221
Compulsory#crete	0.131	0.057	2.300	0.021
PostSec#eastmacedonia and thrace	0.127	0.100	1.270	0.206
PostSec#centralmacedonia	-0.078	0.066	-1.190	0.234
PostSec#westmacedonia	-0.134	0.115	-1.160	0.246
PostSec#epirus	-0.106	0.103	-1.020	0.307
PostSec#thessaly	-0.219	0.099	-2.210	0.027
PostSec#ionianislands	-0.016	0.179	-0.090	0.928
PostSec#westgreece	-0.030	0.105	-0.280	0.776
PostSec#stereaellada	-0.058	0.094	-0.620	0.538
PostSec#peloponnese	-0.080	0.121	-0.660	0.511
PostSec#northaegean	0.008	0.143	0.050	0.958
PostSec#southaegean	-0.283	0.129	-2.190	0.028
PostSec#crete	-0.003	0.085	-0.040	0.971
ATEI#eastmacedonia and thrace	0.003	0.113	0.030	0.977
ATEI#centralmacedonia	-0.171	0.077	-2.220	0.026
ATEI#westmacedonia	-0.025	0.133	-0.190	0.851
ATEI#epirus	-0.071	0.108	-0.650	0.513
ATEI#thessaly	-0.352	0.103	-3.420	0.001
ATEI#ionianislands	0.014	0.189	0.070	0.943
ATEI#westgreece	-0.226	0.104	-2.160	0.031
ATEI#stereaellada	-0.201	0.112	-1.800	0.072
ATEI#peloponnese	-0.213	0.116	-1.830	0.067
ATEI#northaegean	-0.230	0.166	-1.380	0.167
ATEI#southaegean	0.219	0.179	1.230	0.221
ATEI#crete	-0.284	0.096	-2.960	0.003
AEI#eastmacedonia and thrace	0.150	0.094	1.600	0.110
AEI#centralmacedonia	-0.023	0.058	-0.390	0.699
AEI#westmacedonia	-0.004	0.122	-0.030	0.974
AEI#epirus	0.107	0.090	1.180	0.236
AEI#thessaly	-0.130	0.081	-1.610	0.107
AEI#ionianislands	0.093	0.164	0.560	0.572

AEI#westgreece	0.178	0.087	2.040	0.042
AEI#stereaellada	0.169	0.091	1.860	0.062
AEI#peloponnese	0.013	0.090	0.150	0.882
AEI#northaegean	-0.072	0.136	-0.530	0.594
AEI#southaegean	-0.068	0.139	-0.490	0.624
AEI#crete	-0.033	0.082	-0.400	0.691
PostGrad#eastmacedonia and thrace	0.582	0.320	1.820	0.069
PostGrad#centralmacedonia	-0.333	0.143	-2.320	0.020
PostGrad#westmacedonia	0.610	0.376	1.620	0.105
PostGrad#epirus	-0.479	0.430	-1.120	0.265
PostGrad#thessaly	-0.203	0.270	-0.750	0.452
PostGrad#ionianislands	-0.468	0.499	-0.940	0.349
PostGrad#westgreece	0.143	0.256	0.560	0.576
PostGrad#stereaellada	0.645	0.293	2.200	0.028
PostGrad#peloponnese	-0.823	0.504	-1.630	0.103
PostGrad#northaegean	-0.671	0.692	-0.970	0.332
PostGrad#southaegean	0.551	0.279	1.980	0.048
PostGrad#crete	-0.101	0.296	-0.340	0.734
Additional variables				
Female (=1)	-0.853	0.017	-50.940	0.000
Immigrant (=1)	-0.140	0.021	-6.720	0.000
Years since graduation	0.125	0.003	43.560	0.000
Years since graduation^2	-0.003	0.000	-40.700	0.000
Married (=1)	-0.282	0.018	-15.880	0.000
Head of household (=1)	0.470	0.017	27.110	0.000
Residing in big city (=1)	-0.120	0.014	-8.690	0.000
Children below 12 in household (=1)	0.663	0.015	44.190	0.000
Share of employed in household	0.055	0.000	148.800	0.000
Year dummies				
2010 (ref. group)	-	-	-	-
2011	-0.027	0.010	-2.670	0.007
2012	-0.065	0.013	-4.870	0.000
2013	-0.082	0.014	-6.070	0.000
Quarter dummies				
1	-0.006	0.004	-1.570	0.117
2 (ref. group)	-	-	-	-
3	0.001	0.004	0.180	0.855
4	-0.012	0.005	-2.420	0.016
Constant term	-2.663	0.042	-63.940	0.000
Number of obs =417,193	Pseudo R2 =0.5151			
Wald chi2(93) =27,094.85	Log likelihood = -127,726.9			
Prob> chi2 = 0				

Table A4 Estimation results 2015-2019(Stata output)

Dependent: employed=1	Coef.	Robust Std. Err.	z	P>z
Education				
Compulsory	-0.094	0.039	-2.390	0.017
Upper secondary (ref. group)	-	-	-	-
Post-secondary non-tertiary	0.213	0.039	5.410	0.000
ATEI (Higher Technical Education Institutions)	0.527	0.048	10.940	0.000
AEI (University)	0.555	0.037	14.930	0.000
Post-graduate studies	0.907	0.067	13.540	0.000
Region				
East macedonia and thrace	0.025	0.041	0.610	0.539
Centralmacedonia	0.060	0.031	1.910	0.056
Westmacedonia	0.131	0.052	2.530	0.011
Epirus	-0.070	0.049	-1.420	0.156
Thessaly	0.071	0.045	1.590	0.112
Ionianislands	-0.137	0.057	-2.390	0.017
Westgreece	0.079	0.043	1.840	0.066
Stereaellada	0.013	0.043	0.300	0.761
Attica (ref. group)	-	-	-	-
Peloponnese	0.048	0.041	1.170	0.243
Northaegean	-0.014	0.058	-0.240	0.811
Southaegean	-0.045	0.050	-0.910	0.361
Crete	-0.035	0.040	-0.850	0.393
Education#Region				
Compulsory#eastmacedonia and thrace	0.136	0.063	2.170	0.030
Compulsory#centralmacedonia	0.018	0.056	0.330	0.742
Compulsory#westmacedonia	-0.005	0.090	-0.060	0.952
Compulsory#epirus	0.218	0.077	2.810	0.005
Compulsory#thessaly	0.047	0.075	0.630	0.531
Compulsory#ionianislands	0.133	0.087	1.520	0.129
Compulsory#westgreece	-0.078	0.067	-1.160	0.246
Compulsory#stereaellada	-0.035	0.069	-0.510	0.610
Compulsory#peloponnese	0.030	0.068	0.430	0.664
Compulsory#northaegean	-0.013	0.098	-0.130	0.895
Compulsory#southaegean	0.108	0.079	1.360	0.173
Compulsory#crete	0.123	0.065	1.890	0.059
PostSec#eastmacedonia and thrace	-0.161	0.084	-1.920	0.055
PostSec#centralmacedonia	-0.065	0.068	-0.970	0.334
PostSec#westmacedonia	-0.233	0.112	-2.080	0.037
PostSec#epirus	0.049	0.114	0.430	0.671
PostSec#thessaly	-0.013	0.092	-0.140	0.886
PostSec#ionianislands	0.155	0.119	1.300	0.195
PostSec#westgreece	-0.228	0.094	-2.440	0.015
PostSec#stereaellada	-0.276	0.093	-2.960	0.003

PostSec#peloponnese	-0.063	0.088	-0.720	0.472
PostSec#northaegean	-0.007	0.138	-0.050	0.959
PostSec#southaegean	-0.017	0.100	-0.170	0.865
PostSec#crete	0.092	0.081	1.130	0.259
ATEI#eastmacedonia and thrace	-0.179	0.094	-1.900	0.057
ATEI#centralmacedonia	-0.121	0.071	-1.710	0.087
ATEI#westmacedonia	-0.402	0.118	-3.410	0.001
ATEI#epirus	-0.068	0.106	-0.640	0.520
ATEI#thessaly	-0.238	0.101	-2.350	0.019
ATEI#ionianislands	0.047	0.139	0.340	0.734
ATEI#westgreece	-0.142	0.101	-1.400	0.162
ATEI#stereaellada	-0.412	0.111	-3.710	0.000
ATEI#peloponnese	-0.252	0.109	-2.320	0.020
ATEI#northaegean	0.012	0.152	0.080	0.935
ATEI#southaegean	0.062	0.128	0.480	0.630
ATEI#crete	-0.086	0.095	-0.900	0.366
AEI#eastmacedonia and thrace	-0.068	0.076	-0.890	0.375
AEI#centralmacedonia	-0.110	0.058	-1.890	0.059
AEI#westmacedonia	-0.231	0.111	-2.070	0.038
AEI#epirus	0.048	0.090	0.530	0.597
AEI#thessaly	-0.057	0.082	-0.700	0.486
AEI#ionianislands	0.158	0.133	1.190	0.235
AEI#westgreece	0.017	0.093	0.180	0.854
AEI#stereaellada	-0.012	0.096	-0.120	0.902
AEI#peloponnese	-0.087	0.090	-0.970	0.334
AEI#northaegean	-0.245	0.121	-2.030	0.042
AEI#southaegean	0.131	0.116	1.130	0.257
AEI#crete	-0.104	0.081	-1.290	0.198
PostGrad#eastmacedonia and thrace	0.246	0.189	1.300	0.195
PostGrad#centralmacedonia	-0.053	0.116	-0.450	0.650
PostGrad#westmacedonia	0.310	0.259	1.200	0.231
PostGrad#epirus	0.076	0.387	0.200	0.845
PostGrad#thessaly	0.159	0.189	0.840	0.401
PostGrad#ionianislands	0.612	0.574	1.070	0.286
PostGrad#westgreece	-0.084	0.224	-0.380	0.707
PostGrad#stereaellada	0.107	0.290	0.370	0.712
PostGrad#peloponnese	-0.207	0.258	-0.800	0.423
PostGrad#northaegean	0.067	0.409	0.160	0.870
PostGrad#southaegean	-0.096	0.253	-0.380	0.706
PostGrad#crete	-0.099	0.231	-0.430	0.667
Additional variables				
Female (=1)	-0.849	0.016	-52.180	0.000
Immigrant (=1)	-0.159	0.023	-7.010	0.000
Years since graduation	0.117	0.003	39.140	0.000
Years since graduation^2	-0.002	0.000	-34.220	0.000

Married (=1)	-0.269	0.017	-15.450	0.000
Head of household (=1)	0.391	0.016	23.900	0.000
Residing in big city (=1)	-0.094	0.014	-6.580	0.000
Child below 12 in household (=1)	0.698	0.015	46.060	0.000
Share of employed in household	0.056	0.000	147.850	0.000
Year dummies				
2015 (ref. group)	-	-	-	-
2016	-0.005	0.012	-0.460	0.643
2017	0.001	0.015	0.100	0.921
2018	0.006	0.015	0.420	0.678
2019	0.028	0.015	1.830	0.068
Quarter dummies				
1	-0.026	0.004	-6.640	0.000
2 (ref. group)	-	-	-	-
3	0.004	0.004	1.020	0.309
4	-0.010	0.005	-2.030	0.043
Constant term	-2.847	0.044	-65.280	0.000
Number of obs =429,752	Pseudo R2 =0.5253			
Wald chi2(93) =27,334.18	Log likelihood = -128,666.71			
Prob> chi2 = 0				

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