ΠΡΑΞΗ:
«**ΘΑΛΗΣ-ΠΑΝΕΠΙΣΤΗΜΙΟ ΜΑΚΕΔΟΝΙΑΣ-**
**Το ανθρώπινο δυναμικό ως βασική συνιστώσα της αναπτυξιακής δυναμικής και**
**διαφοροποίησης των περιοχών: Η περίπτωση της Ελλάδας»**

**Κωδικός MIS 380421**


ΥΠΟΕΡΓΟ:
**«Το ανθρώπινο δυναμικό ως βασική συνιστώσα της αναπτυξιακής δυναμικής**
**και διαφοροποίησης των περιοχών: Η περίπτωση της Ελλάδας»**
**και α/α «01»**


ΕΠΙΧΕΙΡΗΣΙΑΚΟ ΠΡΟΓΡΑΜΜΑ:
**«Εκπαίδευση και Δια Βίου Μάθηση» (Ε.Π.Ε.Δ.Β.Μ.) 2007-2013**
**Υπουργείο Παιδείας και Θρησκευμάτων**


ΑΞΟΝΑΣ ΠΡΟΤΕΡΑΙΟΤΗΤΑΣ 11:
**«Ενίσχυση του ανθρώπινου κεφαλαίου για την προαγωγή της έρευνας και της**
**καινοτομίας στις 3 Περιφέρειες Σταδιακής Εξόδου»**


ΚΑΤΗΓΟΡΙΑ ΠΡΑΞΗΣ:
**«ΘΑΛΗΣ»**


Η Πράξη συγχρηματοδοτείται από το Ευρωπαϊκό Κοινωνικό Ταμείο (Ε.Κ.Τ.) και
από εθνικούς πόρους, μέσω του Προγράμματος Δημοσίων Επενδύσεων (Π.Δ.Ε.) του
Υπουργείου Παιδείας και Θρησκευμάτων


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ΛΑΜΠΡΙΑΝΙΔΗΣ ΘΕΟΛΟΓΟΣ

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ΚΑΛΟΓΕΡΕΣΗΣ ΑΘΑΝΑΣΙΟΣ


**ΜΕΛΗ ΟΜΑΔΑΣ ΕΞΩΤΕΡΙΚΩΝ ΣΥΝΕΡΓΑΤΩΝ (Ο.Ε.Σ.)**

SAMANTHA STOKES

Θεσσαλονίκη, 30/11/2015

**Πανεπιστήμιο Μακεδονίας**

**Ερευνητικό Πρόγραμμα ΘΑΛΗΣ**

Το ανθρώπινο δυναμικό ως βασική συνιστώσα της αναπτυξιακής δυναμικής και διαφοροποίησης των περιοχών: Η περίπτωση της Ελλάδας.

**ΟΜΑΔΑ ΕΡΓΑΣΙΑΣ 1**

**Πανεπιστήμιο Μακεδονίας**

Λαμπριανίδης Θεολόγος                         Καλογερέσης Θανάσης

Καραγιάννη Στέλλα                         Samantha Stokes

**Δ5. Ο ρόλος της εκπαίδευσης στην περιφερειακή ανάπτυξη**

*Παραδοτέο:  Π5.5.4: Ένα άρθρο προς υποβολή σε επιστημονικό περιοδικό*

# Education as a main component of internal migration movements in Greece[1]

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## Abstract

At a time of economic crisis, the dynamic procedure of human capital formation acquires a particular significance, due to its increased importance in the process of regional development. Moreover, it is obvious that internal migration movements could not be excluded from the list when trying to explore the main mechanisms that interact during this formation process and play a crucial role in maintaining and reinforcing it. Thus, in this paper by perceiving education as the key-proxy variable to measure regional human capital, we try to investigate the connection between internal migration within Greece and education. First, average years of schooling are chosen in order to measure the educational level of the regions and they are calculated at the reference spatial level we choose to use. Secondly, using census aggregate data (1991, 2001 and 2011) a descriptive analysis of internal movements within Greece is being performed, followed by a combinatorial analysis including the educational component. Finally, what emerges from our analysis is that human

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capital in one hand forms and at the same time is formed by internal migration flows within Greece.

**Keywords:** internal migration, migration flows, education, average years of schooling, Greece

## 1 Introduction

It is generally accepted throughout international literature that human capital plays a crucial role during the development process of the regions (Lucas, 1988; Romer, 1988, 1994). During the last two decades the acknowledgement of human capital as one of the most important component of economic growth has been further strengthened (Florida, 2002; Lundvall & Borrás, 1997; Nielsen & Lundvall, 2003; Scott, 2002), expanding the field of investigation towards a more adequate understanding of the underlying mechanisms that form it. Undoubtedly, these mechanisms apart from endogenous regional or individual forces, such as regional labor market structure and personal motivation, include also to a large extend exogenous dynamic processes. Moreover, migration is to be considered one of the most important dynamic processes, showing a severe alterative character regarding regional demographic syntheses. As a result, it could not be excluded from any analysis that tries to investigate human capital changes through time.

Furthermore, human capital by definition incorporates an extremely broad set of parameters, regarding schooling, informal education, on-the-job training, learning-by-doing etc. (Prados de la Escosura & Rosés, 2010). However, education most of the times is considered to be used as the main proxy-variable of estimating human capital, not only due to its predominant role in the human capital formation process, but also because of its characteristic of being measurable. Hence, an investigation of educational level changes through time would have as an ultimate goal the examination of human capital formation process.

In general, the interactions between regionally differentiated levels of education through migratory channels have for a long time been under examination by a large number of researchers. More specifically, two levels of analysis are usually considered in this field of study: the individual and the macro-level. In the first case,

analysis is focused on the ways in which education influence individual choices whether moving to other places or not. People in most cases consider education as an investment that aim to recoup through the returns it will generate in the future, thus migration helps them move to regions where they can get their expected returns (Allen & van der Velden, 2001; Massey et al., 1993; Quinn & Rubb, 2005; Sjaastad, 1962; Todaro, 1969).

On the other hand, when examining this interaction at a macro-level Rodriguez-Pose and Vilalta-Bufi (2005) showed that migration rates constitute a measure of the ability of an economy to effectively exploit its human capital stock in order to achieve development. In other words, migration results from a possible mismatch between the educational levels of supply and demand in the market. Furthermore, the synthesis of migration flows based on the educational level of the migrants (Avveduto & Brandi, 2002; Salt, 1997), in addition to their possible effects on the origin and destination regions (Beine, Docquier, & Rapoport, 2001; Bhagwati & Hamada, 1974; BHAGWATI, 1976; Grubel & Scott, 1966; Mountford, 1997; O Stark, Helmenstein, & Prskawetz, 1997; Oded Stark, Helmenstein, & Prskawetz, 1998; Vidal, 1998), have also been extensively investigated. Following the previous, education seems to emerge as a crucial parameter of migration, spanning throughout the whole process (motivation – formation – effects).

Regarding the case of Greece, according to Labrianidis (2011) the number of highly-skilled people that left the country before the period of economic crisis has been estimated up to 114-139.000. Of course, this number has increased during the last years and has reached a historically high value close to 150.000 scientists (Labrianidis & Sykas, 2013). Nonetheless, few are the researches that try to investigate migration flows within the country. Generally, in the case of Greece internal migration has always exhibited a rural-urban character, dominated by movements from peripheral areas towards large urban centers of the country, especially Attica and Thessaloniki (Panagiotopoulos, 1985), and only in some cases small counterforce flows (Katsikas & Labrianidis, 1994). Although, since the mid-80's there seems to be a general increasing trend of these inverse movements from urban to rural areas in other European countries (Kiriazi - Allison, 1998), in Greece this

phenomenon is still limited, even though offering a great potential for rural development (Labrianidis & Bella, 2004).

The outline of this paper is as follows: **Section 2** provides a detailed analysis of the main methodological contexts that were adopted in this research. In **Section 3**, a detailed analysis of the results along with pie charts and maps are illustrated for the sake of better understanding interregional migration movements. Finally, **Section 4** incorporates an overview of the findings followed by some concluding remarks and possible further research proposals.

## 2 Data and Methodology

Data from the last three censuses (1991, 2001 and 2011) were used in order to perform our analysis. The main areal unit that was chosen was that of NUTS3 level of the year 2001, for our results to be comparable between the three reference years. More specifically, in Greece there are 51 NUTS3 regions and for each one of them average educational level and synthesis of the migration flows were calculated.

Regarding the calculation of average years of schooling, the method of Barro and Lee (2010, 2000) was followed. More specifically, according to Barro and Lee (2010, 2000) we can use expression **(1)** to calculate the average years of schooling for the population living in a region over 15 years old:

$$s_t = \sum_{\alpha=1}^{A} l_t^{\alpha} s_t^{\alpha}$$

(1)

where    : is the proportion of the population over 15 years old,    : are the years of schooling of age group *a* - (*a*=1: 15-19 age group, *a*=22: 20-24 age group, … , *a*=13: 75 years and over). Years of schooling of age group *a* can be calculated by expression **(2)**:

$$s_t^{\alpha} = \sum_{j} h_{j,t}^{\alpha} Dur_{j,t}^{\alpha}$$

(2)

Of course there are many other ways to approximate human within a region, that include measures such as illiteracy or enrollment rates and proportion of people having tertiary education. However, the selection of average years of schooling as the main variable to measure the educational level of each region was based on the fact that this methodology offers an excellent way to calculate adequately educational stock of an area, by taking under consideration the accumulated years of participation in the educational process (Wößmann, 2003).

Moving on, concerning the synthesis of migration flows, existing aggregate census data referring to the NUTS3 region of residence 5 years before the reference year were used, in order to examine internal migration flows within the country. As a result, we have constructed a *51x51* table containing all the inter-regional migration flows for each census year (1991, 2001 and 2011) and for each sub-group. By using these tables, it was possible to calculate the composition of migration flows *from* and *to* each region, in order as a first step to reveal the role of distance to migration decisions. Expressions **(3)** and **(4)** show the decomposition of total in- and out-flows to their regional components for each areal unit respectively:

$$F\_in_{ij} = \sum_{i=1}^{N} \frac{F_{ij}}{F_{in\_j}} \quad (3)$$

Where       : is the participation of region *i* to region's *j* total inflows,     : is the number of inflow migrants from region *i* to region *j* and      : is the total number of inflow migrants to region *j*.

And in the case of outflows from a region **(3)** takes the following form:

$$F\_out_{ij} = \sum_{i=1}^{N} \frac{F_{ij}}{F_{out\_j}} \quad (4)$$

Where        : is the participation of region *i* to region's *j* total outflows,     : is the number of outflow migrants from region *j* to region *i* and       : is the total number of outflow migrants from region *j*.

In general, the previous regional decomposition might be performed using different or in some cases multiple grouping variables. In our case, we choose to expand the analysis incorporating educational level, after having restricted our data to specific age groups. This is essential for this research in order to highlight the exact educational levels that affect the most the formation of internal migration flows. The results of this descriptive analysis are illustrated in the following section.

## 3 Results

In this section we present the results of our analysis. **Map 1** depicts the results of average years of schooling calculations for Greece at a NUTS3 level for the years 1991 and 2001. As it is obvious from the maps below, although there is a large increase in the educational level during this period, the centers of educational concentration still remain around large metropolitan areas. These include the areas of Attica, Thessaloniki and Achaia for the year 1991, with the areas of Chios, Chania and Dodekanisos Prefecture to be added to this list in 2001. We do not illustrate here the average years of schooling results of 2011, due to the fact that only the previous reference years (1991 and 2001) constitute the initial conditions of internal migration flows of 2005/2001 period.

**Map 1:** Distribution of average years of schooling in reference years 1991 and 2001 at a NUTS3 level.
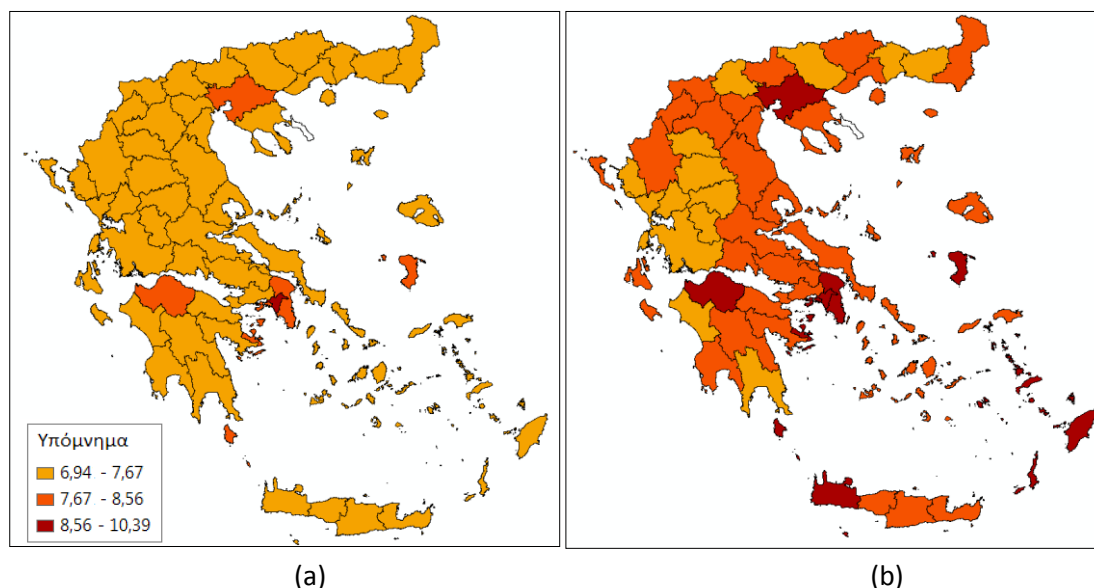


Υπόμνημα
- 6,94 - 7,67
- 7,67 - 8,56
- 8,56 - 10,39

(a)　　　　　　　　　　　　　(b)

*Source: Census 2001 (ELSTAT) and Authors' calculations.*

After having highlighted the main educational centers of the country, we choose to perform the regional decomposition of internal migration flows, in favor of revealing the role of distance in migration choices. As it is shown in **Maps 2 (a-b)** and **3 (a-b)**, only the two main metropolitan areas of the country, that of Attica and Thessaloniki, were chosen in order to visualize their results for the period 2005/11, due to their large number of migration in- and out-flows.

**Map 2:** Visualization of migration inflows between 2005/11 for (a) Attica and (b) Thessaloniki.
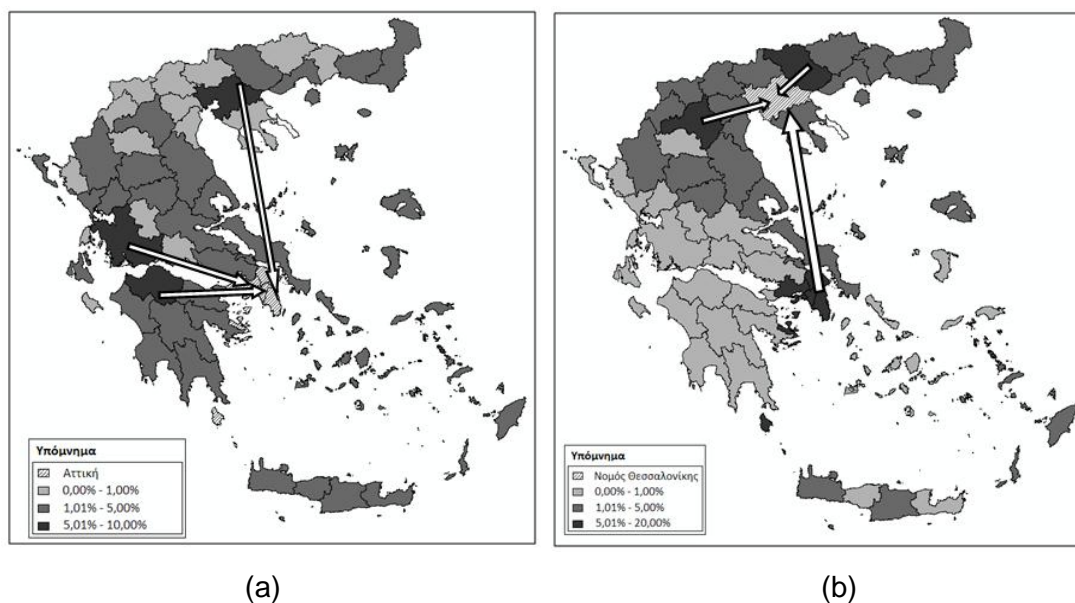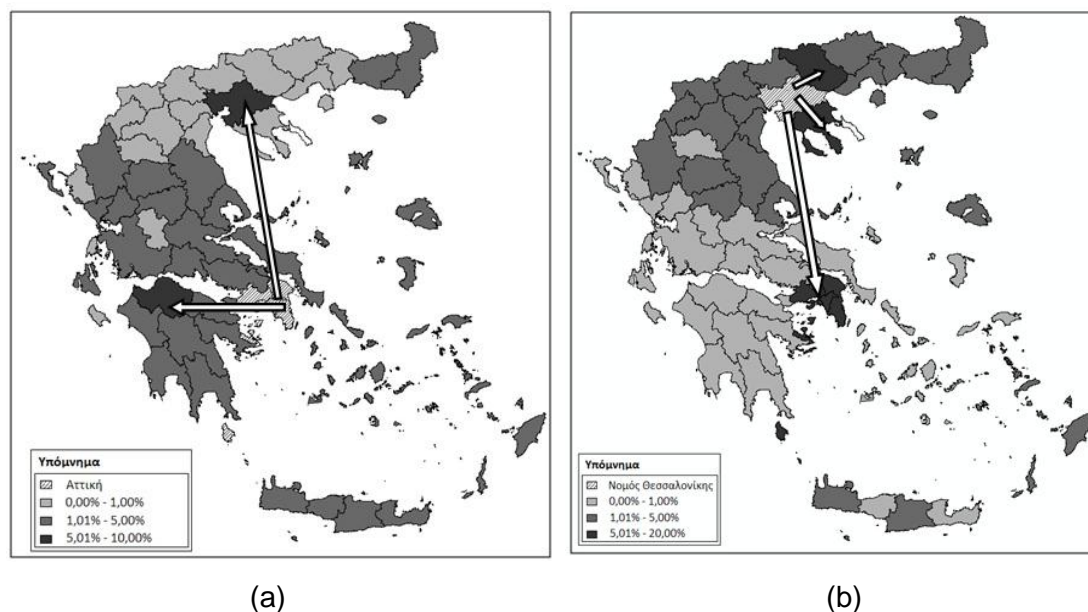


(a)                                                    (b)

*Source: Census 2001 (ELSTAT) and Authors' calculations.*

**Map 3:** Visualization of migration outflows between 2005/11 for (a) Attica and (b) Thessaloniki.



(a)                                                        (b)

*Source: Census 2001 (ELSTAT) and Authors' calculations.*

Undoubtedly, when looking at the previous maps there is a correlation between distance and migration decisions. The main question arising at this point is how does education affect these migration choices: *Do highly-skilled people tend to migrate more easily?*

Following the direction of this question, we then decompose interregional flows for the period 2005/11, by age group and educational level. Concerning the age, we choose to keep only groups over 30 years old, in order to exclude from our analysis possible flows for educational reasons. Moreover, five main groups are created in the case of education, in order to reveal any possible differentiation between them. The education groups created here are the following: upper tertiary (PhD and Master), tertiary, secondary, primary and not at all education.

Having as guideline this categorization, **Table 1** shows the results for one-dimensional decomposition of internal migration flows (2005/11), based solely on these five educational categories for Greece as a whole. When looking at the results, it is obvious that when moving into a higher educational level there is a simultaneous increase of the degree of mobility. Especially, in the case of upper tertiary education

there is a spectacular increase of the proportion of people that have internally migrated and people settling from abroad.

**Table 1:** One-dimensional decomposition of internal migration flows for Greece 2005/11.

| Educational level | Residing at the same place since 2005 (%) | Internally migrated (%) | Settling from abroad (%) | Total (%) |
|---|---|---|---|---|
| *Upper tertiary* | 69.4 | 19.9 | 10.7 | 100.00 |
| *Tertiary* | 79.5 | 17.4 | 3.1 | 100.00 |
| *Secondary* | 83.8 | 13.3 | 2.9 | 100.00 |
| *Primary* | 91.6 | 5.2 | 3.2 | 100.00 |
| *Not at all* | 90.8 | 3.4 | 5.8 | 100.00 |

*Source: Census 2011 (ELSTAT) and Authors' calculations.*

The previous findings reveal the role of education as a catalyst to migration decision. As a next step, it is important to understand whether this factor is important during the formation process of migration flows. So the new question that arises here is: *How does education affects the formation of internal migration movements?*

Regarding the investigation of the role of education and its effect on migration flow structure, a distinction should be made between each region's inflows and outflows. In the first case, we are interested in examining whether regions with higher educational level attract at the same time highly-skilled people; whereas in the latter the main hypothesis under investigation is the ability of a region to keep its highly educated population. As a result we examine each case separately, by calculating average years of schooling for inflows and outflows and comparing them.

Moreover, because of the large number of Greek NUTS3 regions, we choose to show the results for the two tails of the educational distribution, e.g. for the highest and lowest educational centers of the country. The age group constraint (30+) still remains in both cases.

Starting from the inflows, **Table 2** shows the participation of each educational group in their regional structure. As it is clearly shown, Attica region distincts itself among other regions, specially in the case of upper tertiary education. Looking at the data more carefully, someone can see that 17.88% of its inflows consist of persons with

upper tertiary education (PhD or Master's); while at the same time this proportion turns out to be only 5.90% for Thessaloniki.

Furthermore, when looking at the bottom of the distribution, the participation rates of lower levels of education raise. For example, in the cases of Elia and Evrytania, participation of primary education has particularly high values (38.41% and 40.08% respectively). Similarly, the inflows of Xanthi and Rhodope seem to have an increased participation of not-at-all education component comparatively to all other regions (6.02% and 7.00% respectively).

**Table 2:** Participation of each educational group in internal inflow structure

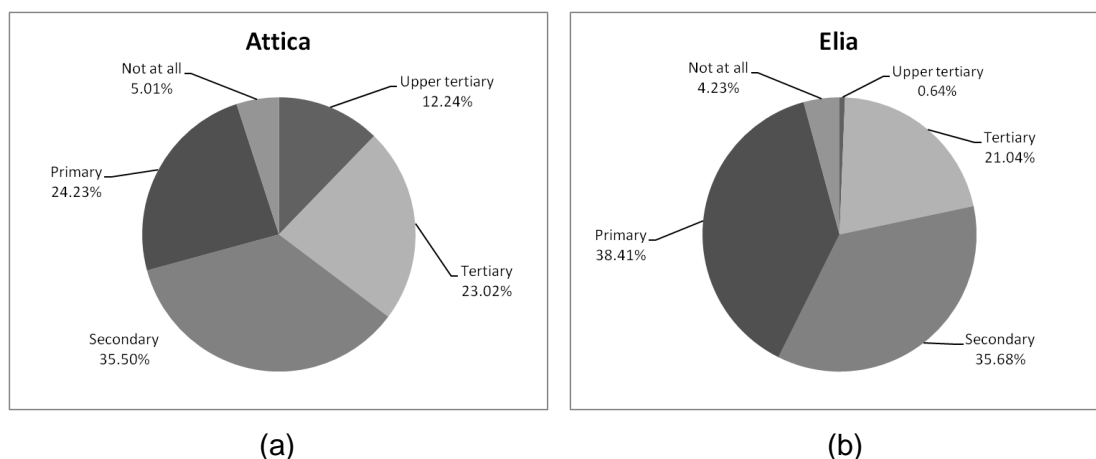| NUTS3 Region | Upper Tertiary | Tertiary | Secondary | Primary | Not at all | Total (%) |
|---|---|---|---|---|---|---|
| *Attica* | **17.88** | 25.45 | 31.07 | 21.21 | 4.39 | 100 |
| *Thessaloniki* | 5.90 | 31.90 | 34.81 | 23.16 | 4.23 | 100 |
| *Chios* | 5.25 | 32.23 | 42.99 | 17.88 | 1.66 | 100 |
| *Achaia* | 5.28 | 30.92 | 36.37 | 23.36 | 4.07 | 100 |
| *Chania* | 4.61 | 33.80 | 37.30 | 22.00 | 2.28 | 100 |
| | | | | | | |
| *Xanthi* | 4.94 | 34.68 | 33.57 | 20.79 | **6.02** | 100 |
| *Karditsa* | 2.44 | 28.59 | 35.41 | 30.33 | 3.24 | 100 |
| *Elia* | 1.91 | 19.76 | 35.68 | **38.41** | 4.23 | 100 |
| *Evrytania* | 2.62 | 22.25 | 30.12 | **40.08** | 4.93 | 100 |
| *Rhodope* | 6.42 | 31.57 | 37.32 | 17.69 | **7.00** | 100 |

*Source: Census 2011 (ELSTAT) and Authors' calculations.*

In order to get a more comprehensive view of the results, we choose to focus on two diametrically opposed regions of **Table 2**, Attica and Elia. More specifically, we obtain **Diagrams 1a** and **b**, where the distinction between these two areas becomes even clearer. As it is illustrated in these two diagrams, the participation of upper tertiary and tertiary educational level to the overall structure is much more intensified in the case of Attica (35.26%), whilst in Elia region these two educational levels sum up only to 21.68%. The other characteristic variation between these two pie charts derives from primary education (24.23% for Attica and 38.41% for Elia). Secondary and not-at-all educational levels do not show any great differentiation.

**Diagram 1:** Pie charts of Attica and Elia regional inflow decomposition based on education



|                | (a)                          |                | (b)                          |
|----------------|------------------------------|----------------|------------------------------|

*Source: Census 2011 (ELSTAT) and Authors' calculations.*

Moving on, **Table 3** below illustrates the results of the outflow decomposition based on education. Comparing these results with what has previously been shown in **Table 2**, it becomes clear that the regions tend to have a similar behavior as before. The supremacy of Attica, regarding the increased participation rate of upper tertiary education compared to all other regions is still recognizable, whilst on the other hand, Elia and Evrytania exhibit large scale participation of primary and not-at-all education participation.

**Table 3:** Participation of each educational group in internal outflow structure

| NUTS3 Region | Upper Tertiary | Tertiary | Secondary | Primary | Not at all | Total (%) |
|--------------|---------------|----------|-----------|---------|------------|-----------|
| *Attica*      | **14.15** | 21.63 | 32.51 | 22.66 | 9.05 | 100 |
| *Thessaloniki*| 7.15  | 35.07 | 33.62 | 21.31 | 2.85 | 100 |
| *Chios*       | 9.42  | 31.47 | 39.50 | 13.82 | 5.79 | 100 |
| *Achaia*      | 8.04  | 36.09 | 31.92 | 20.75 | 3.20 | 100 |
| *Chania*      | 6.32  | 32.73 | 34.97 | 17.81 | 8.17 | 100 |
|               |       |       |       |       |      |     |
| *Xanthi*      | 6.10  | 35.51 | 32.97 | 19.32 | 6.10 | 100 |
| *Karditsa*    | 2.57  | 24.17 | 34.25 | 29.91 | 9.10 | 100 |
| *Elia*        | 1.96  | 17.29 | 30.35 | **33.16** | **17.23** | 100 |
| *Evrytania*   | 2.56  | 20.65 | 33.13 | **34.76** | 8.90 | 100 |
| *Rhodope*     | 5.86  | 38.94 | 35.30 | 15.33 | 4.56 | 100 |

*Source: Census 2011 (ELSTAT) and Authors' calculations.*

Notwithstanding, a critique to the former findings would be the fact that participation rates of each educational group are highly correlated with the educational distribution within each region. Thus, in order to examine the way in which internal migration flows affect the formation of the general educational level of each region, the balance between these two counterforce movements should be calculated.

In addition to that, the fact that these different educational groups influence unequally the general educational level of the area could also not be omitted from our research. As a result, in order for this additional parameter to be included in our analysis, average years of schooling were calculated for each region's inflows and outflows. The results are shown in **Table 4**, where the overall balance due to internal migration is also calculated.

**Table 4:** Average years of schooling of regional in- and out-flows - Overall balance.

| NUTS3 Region | Average Years of Schooling 2001 | Average Years of Schooling 2011 | Inflows - Average Years of Schooling | Outflows - Average Years of Schooling | Total Balance |
|---|---|---|---|---|---|
| *Attica* | 10.02 | 10.24 | 12.18 | 11.17 | **1.01** |
| *Thessaloniki* | 9.64 | 9.87 | 11.70 | 12.17 | -0.47 |
| *Chios* | 8.85 | 9.26 | 12.29 | 12.28 | 0.01 |
| *Achaea* | 8.85 | 9.21 | 11.65 | 12.27 | -0.62 |
| *Chania* | 8.92 | 9.18 | 12.01 | 11.60 | 0.41 |
| | | | | | |
| *Xanthi* | 7.40 | 7.74 | **11.68** | **11.86** | -0.18 |
| *Karditsa* | 7.02 | 7.65 | 11.07 | 10.22 | 0.85 |
| *Elia* | 7.46 | 7.60 | 10.08 | 8.74 | **1.34** |
| *Evrytania* | 7.00 | 7.53 | 10.04 | 9.81 | 0.23 |
| *Rhodope* | 6.94 | 7.52 | **11.71** | **12.41** | -0.70 |

*Source: Census 2011 (ELSTAT) and Authors' calculations.*

Comparing column (2) with columns (4) and (5), it is noticeable that there is a gap between the average educational level of a region and its migration flows. This difference obviously results from the increased degree of mobility of highly-skilled people. Moreover, when looking at the last column of **Table 4**, we cannot detect any possible pattern between the regions examined here. Nonetheless, the cases of

Attica and Elia stand out of the list, because of their high positive balance, but each one of them for different reasons.

In the first case, Attica as it was mentioned before is the largest metropolitan center of Greece and at the same time has the highest educational level. Hence, the positive balance of internal migration movements derives from the fact that Attica is an attractive destination for highly skilled people and at the same time can keep persons with high educational level. This behavior is completely consistent with the literature and is caused mainly by reasons concerning the regional labor market structure, the amenities it offers to its residents etc.

In the latter case, the large positive educational balance of Elia, although this region differs to a large extend from Attica, derives probably from completely different reasons. This region's low initial levels of education, which were just a little bit higher than primary education in 2001, also justify the low values of outflows' average years of schooling during the period 2005/11. Thus, the high positive balance in this case results from the initial educational conditions in this area.

Finally, it must be pointed out that in the cases of Xanthi and Rhodope high levels of average schooling years are observed concerning internal migration flows, despite their initially low levels of education. This might be probably caused by the fact that these two areas include universities, in which people having already tertiary education decide to undertake their doctoral research. In order to exclude these movements from our analysis, a higher age group filter should be applied, but such a decision would cause a large decrease in the size of migration flows.

## 4 Conclusions

In this paper, the dialectic between education and internal migration movements within Greece has been investigated. A general initial assumption, concerning the treatment of internal migration movements as behaving in an analogous way to international migration flows, has been adopted throughout this research.

Furthermore, the focus on age groups higher than 30 years old was considered to be necessary, in order to exclude from our analysis possible movements motivated by educational causes. However, even a small number of that kind of movements that

could not be eliminated did make a difference in our final results, forming a distortion factor.

In general, education seems to play an important role in the formation of internal migration flows with a dual character. More precisely, human capital of the regions affects but at the same time is also affected through the process of migration. At the same time, internal migration flows are also influenced by the distance between the origin and destination areas.

Starting from the active character of education during the migration process, as it is illustrated from the results of this paper, its impact extends not only at an individual level, but also at a macro-level. More specifically, education increases the probability of migration of each person, leading to a considerable contrast in the degree of mobility between upper tertiary and lower educational levels, concerning Greece as a whole. Furthermore, after having calculated the average years of schooling for each NUTS3 region separately, it seems that as we move to lower parts of the distribution, the average educational level of regional internal migration inflows also slightly decreases. This means that the existence of large initial human capital stocks in a region constitute a crucial parameter that attracts highly-educated people.

Moving on to the passive character of education, we have calculated the total balance between in- and out-flow average years of schooling for each areal unit. As it was shown, there were no extreme differences between these bidirectional movements. However, the regions of Attica and Elia illustrated a similar positive balance, generated by different causes. In the first case, we have a relatively high level of inflows and at the same time a relatively low level of outflows. This could be interpreted as a special characteristic of Attica region, which composes an attractive place for highly-skilled people, within a labor market structure that has the ability to preserve and leverage its human resources. On the other side of the fence, we have the Elia region whose increased positive balance is produced due to its low outflow educational level. This of course is generated by the respectively low initial human capital stock of the region.

Finally, in must be pointed out that although education has proven to be a crucial parameter of internal migration movements' formation process, it is not the only.

Further research should be done, in order for scientists to understand adequately the underlying mechanisms that reinforce and maintain such migratory phenomena, aiming to future policy proposals concerning regional development.

## Acknowledgements

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