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**Dissertation:**

**Immigrant Residential Segregation in medium-sized Greek cities:**

**The case of Kalamata**

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## ABSTRACT

This master thesis explores the intra-urban pattern of immigrant segregation in a small-sized city of Greece, this of Kalamata. The impetus for such a study comes from the fact that, in spite of the large number of immigrants who find residence in small and medium-sized cities in Greece very few studies have explored the pattern of immigrant settlement within these areas.

Previous research on segregation of minority populations highlighted that immigrants tend to find residence in the city centers, where low-cost housing is available and where their co-ethnics are located.

As the time passes and their incomes rise, immigrants are inclined to move out to other areas, depending on the degree of discrimination they face from the local population and their own preferences for mixing up with the natives.

Findings from the small city of Kalamata indicate that the segregation levels remain quite low throughout the last six years. Immigrants can be found in all neighborhoods of the urban area and are distributed in a relatively even way. Therefore, no ethnic enclaves have been materialized. However, the city center and the other districts which provide low-cost housing seems to attract a relatively larger percentage of immigrants compared to the rest areas of the city.

**Keywords:** Immigrants segregation, locational preferences, Kalamata

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## CHAPTER 1. INTRODUCTION

### 1.1 Aim and Objectives

This dissertation examines the residential segregation patterns of immigrants in the small-sized city of Kalamata<sup>1</sup>. The impetus for such a study arises by two facts. First that there is a considerable number of immigrants which finds residence in small and medium sized cities in Greece, and second that there are very few pieces of research which have explored the patterns of immigrant settlements within these cities.

Over the last twenty years or so, Greece has seen a substantial influx of immigrant populations originating primarily from the countries of the ex USSR, the Balkans and the Eastern Europe as well as from Asia and North Africa. Currently, according to some estimates, people coming from such places make up about one million of Greece total population, compared to about fifty thousands in 1991, of which the vast majority (over 60%) are economic immigrants from Albania.

The phenomenon has attracted attention in the literature giving rise to a number of studies examining the social, economic and spatial implications immigration has for the country. As regards its spatial impact, the general trend reported is immigrants to move primarily into the larger urban centers which offer substantial employment opportunities and anonymity. As regards the intra-urban location pattern, studies indicate that the new comers tend to concentrate in areas where their co-ethnics reside and where low-cost housing can be found.

Although this literature has explored a number of key research questions, there are important aspects which require close investigation. For example, the majority of studies have focused their analysis on the metropolitan areas of Athens and Thessaloniki, whereas other cities, of medium and small size, have not been put under examination.

The current study comes to contribute to this area. It explores the intra-urban residential patterns of these new urban dwellers in the small-sized city of Kalamata, to shed light on their locational preferences, to assess their segregation patterns, and to explore whether specific ethnic enclaves are under formation. To achieve this aim the study poses a number of objectives:

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<sup>1</sup> According to the National Population Census 2001 released by the Hellenic Statistical Authority (EL.STAT), the Municipality of Kalamata amounts to 53,659 people.

1. to set up an appropriate conceptual and analytical framework to study residential segregation at an intra-urban level with specific reference to small-sized Greek cities,
2. to analyze the current pattern of segregation in a specific case of a small city, this of Kalamata, and,
3. to explore the dynamics of immigrant segregation and their evolution in Kalamata over the last years.

Accordingly, the research is expected to shed light to the following research questions:

1. What methodologies and what measures are available to assess segregation at the intra-urban level? Which are the most appropriate to be used in the small-sized cities of Greece?
2. What is the pattern of immigrant segregation observed in the case of a small-sized Greece city. Are immigrants concentrated, are centralized, are isolated, etc. from the native population? Are there any ethnic enclaves developed, and in which part of the city? Does the pattern observed differ from this of larger cities (as described in the literature) and if so, in what terms?
3. How the developed pattern of immigrant segregation has evolved through the years? Do we observe further concentration and isolation, or dispersal and exposure of the immigrant population?

Given the fact that officially yearly data on the intra-urban location of immigrants are not available, the study explores the above questions utilizing information related to student enrolments on twenty two Primary Schools which are evenly distributed within the seven districts of Kalamata.

Such a study should be useful to a number of recipients. First, to the local authorities and policy makers, which will acquire a clear picture of the residential preferences and segregation patterns of immigrants enabling them to draw appropriate policies? Second, to the research community, which will be enquired with an appropriate methodology to analyze segregation pertinent to the small sized-cities of Greece? Third, to the general public, which will be provided with the true description of the immigrants' location patterns and their presumptive enclaves?

The originality of this study lies on two grounds. First, it explores immigrant segregation patterns in a small-sized city, this of Kalamata, whereas previous literature has focused on the metropolitan areas of Athens and Thessaloniki. Second it

uses alternative sources of data to examine the evolution in these patterns, whereas previous literature provided a static picture of the phenomenon based on information from the last National Census.

## **1.2 Structure of the study**

The dissertation consists of six chapters excluding this introductory one.

Chapter 2 presents some facts and evidence on the migration that Greece has experienced over the last twenty years and outlines the changes that have occurred to the population structure of the country and that of the city of Kalamata.

Chapter 3 defines the concept of segregation and outlines the basic methodologies that have been developed to analyze the phenomenon, providing the bases for the methodological framework that this study espouses.

In turn Chapter 4 eclectically reviews some immigrant segregation studies from all over the world (U.S.A, Europe and Greece) to delineate the experience on the issue.

Moving to the empirical part of the research, Chapter 5 specifies the method to be used for the analysis of immigrant segregation in the city of Kalamata. This includes the data as well as the specific measures that would be employed to assess the phenomenon.

On these grounds, Chapter 6 conducts the empirical study to explore the patterns of immigrant segregation and its evolution in the small city of Kalamata.

Finally, Chapter 7 concludes the study identifying the key findings of the research.

## **CHAPTER 2. MIGRATION IN GREECE**

### **2.1 Introduction**

This chapter presents some facts and evidence on the immigration that Greece has experienced over the last twenty years. In particular, since 1990 where the communistic regimes in Easter Europe collapsed, a substantial number of people left these countries to find residence in Greece mainly for economic reasons.

Most of the larger (in Greek terms) cities, and primarily the two metropolitan centers received the bulk of this incoming population, who settled in inner-city locations where low cost housing is available. As more and more immigrants were entering the country this phenomenon was expanded to the small-sized cities, located both in the mainland and islands.

It goes without saying that the impact of this new reality was different for each city.

### **2.2 Immigration in Greece**

As Kostaki et.al (2009) indicate, immigration in Greece is an ongoing process that has implications for the demographic, as well as the economic, political and social profile of the country.

This was indeed the case. The massive influx of immigrants since the early 1990's (which are people of different nationalities and of demographic profiles), had a significant influence on the demographic and population structure of Greece.

Moreover, the fact that they were not evenly distributed across Greece had affected accordingly the population and demographic structure of the regions of the country.

It is evident that the massive inflow of foreigners, with a different demographic profile from that of the native population and their unequal spatial distribution throughout country, has affected both the population size as well as the sex and age distribution of the total population.

Below, we are going to present some evidence on the migration in Greece relying on a recent research on behalf of the Mediterranean Migration Observatory (Kyriakou, 2004).

However, it would be useful to pinpoint the following remark: the study of Kyriakou (2004) on behalf of the MMO is the most accurate and compact among the majority of similar data available for the numbers of immigration in Greece and in addition it covers a wide period of time. Such data are very useful to help us understand the phenomenon of its origins.

### **2.3 Migration in Greece during 1990-2004: Evidence and Facts**

After the massive emigration in Greece in the beginning of 90's which was caused by the collapse of the communistic regimes of the neighboring countries (and not only from these ones), the country has been through difficulties both from the implication of immigration's policy and the collection of statistical data for the extent of immigration.

Several years were passed until Greece launched, in 1997, the first program of immigrants' data recording.

The 2001 population census indicates that the actual number of registered foreigners who live in the country without Hellenic nationality was about 762,000 including expatriates, E.E citizens and children as well.

These data contradict other sources reporting a huge but unknown number of people who have received three-year duration residence permission by the Ministry of Public Order. Unofficial sources mention that the number of these permissions reaches the figure of 150,000-200,000.

Eventually, in 2004, the Ministry of Interior fully launched the residence permission database. These data remain unpublished, although they are the most useful and important data about the immigrants in Greece.

As far as we are concerned, the total number of immigrants in Greece in 1991 was about fifty thousands (Arvanitidis and Skouras, 2008) and the National population Census in 2001, revealed that the immigrants amount to 797,000 people, consisting the 7.3% of the total population of Greece. It is remarkable that within a decade the number of immigrants residing in Greece changed by 747,000 people. In fact, this number is not that accurate due to the presence of illegal and unregistered immigrants who reside all over Greece. Overall, the number of immigrants according to estimates amounts to 1.2 million people.

## 2.4 The composition of immigrants over Greece: data from 2001 population census

The 2001 National Census recorded 762,191 people living in this country without Greek citizenship, which account for 7% of the total population.

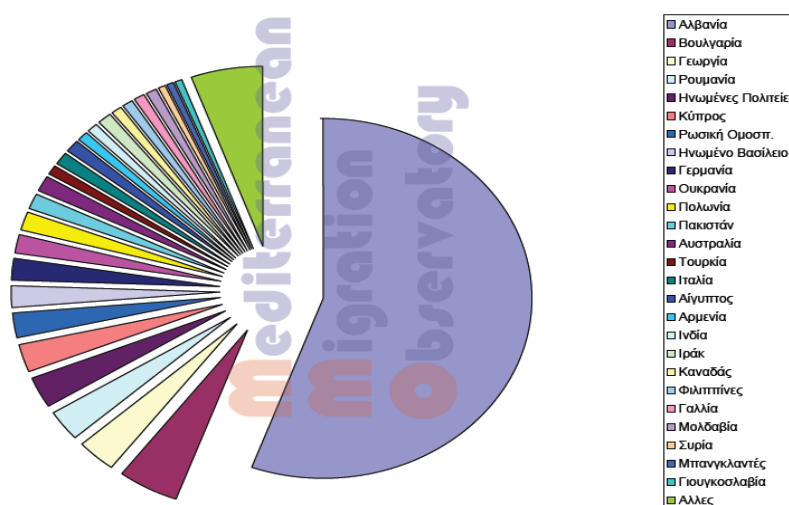
Of this number, 48,560 are foreigners from the EU or EFTA, and 17,426 are Cypriots who enjoy some residence privileges.

The remaining 690,000 are nationals of third countries (but not expatriates) and for those of them are adults (over 18) who are by law are required to have a normal residence permit in the country.

## 2.5 Composition of nationalities

Figure 2 below displays the composition of nationalities residing in the country based on the 2001 Census. Of these the vast majority are Albanians (56%). In fact Greece is the only EU country with such a big ethnic group which exceeds the 50% of all foreigners in the country.

ΣΧΗΜΑ 2: Κυριότερες Εθνικότητες, Απογραφή 2001



**Figure 1:** Main nationalities of immigrant residents in Greece

**Source:** Population Census and MMO

The countries appear at the legend are (in the same order as in the legend): Albany, Bulgaria, Georgia, Romania, USA, Cyprus, ESSR, United Kingdom, Germany, Ukraine, Poland, Pakistan, Australia, Turkey, Italy, Egypt, Armenia, India, Iraq, Canada, Philippines, France, Moldova, Syria, Bangladesh, FYROM, Other.

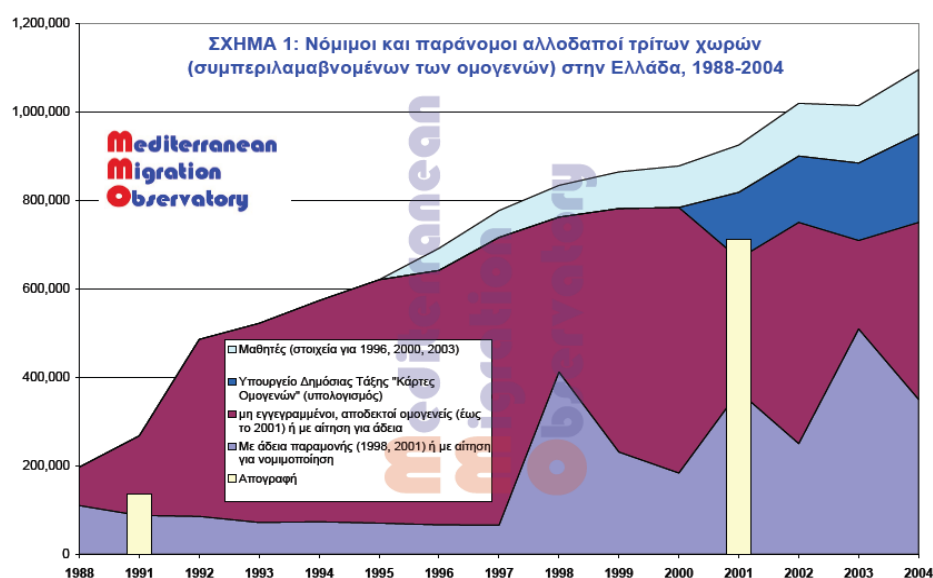
## 2.6 Migration trends in Greece

Until now there has been no attempt to quantify the migration trends in Greece.

This gap exists due to three remarkable problems:

- the great extent of illegal (and therefore non-computable) migration
- the chaotic nature of three regularization programs and the lack of evidence for the existence of these unrelated items from different ministries had no contact with each other and
- the problem with expatriates

It is obvious from the figure below, that the growth of migration in Greece since 1988 was enormous. At the end of the period examined (i.e. 2004) the number of immigrants in the country has been quintupled.



**Figure 2:** Legal and illegal immigrants from third countries (including expatriates) in Greece, 1988-2004

**Source:** Mediterranean Migration Observatory

where,

- Students (data for 1996, 2000, 2003)
- Ministry of Public Order "Expatriates' cards"
- Unregistered, accepted expatriates (up until 2001) or upon request for residence permission
- With residence permission (1998, 2001) or upon request for legalization
- National Censuses (1991, 2001)



Between 1991 and 1997, the number of residence permission issued by the Ministry of Public Order was declined besides the massive entrance of immigrants in the country. In turn, the permissions provided by the 1997 and the 2001 legislation programs had temporary duration and so the vast majority of immigrants returned to the illegal status when permissions expired.

The population census of 1991 did not record the exact number of migrants and collected data only for those who were citizens of the EU or those residing legally in the country.

The population census of 2001 made a substantial effort to record all immigrants residing to the country (legal and illegal). However, we are not able to estimate accurately neither the number of legal and illegal immigrants nor their overall number.

By 2004 the foreign population amounts to 900,000 people and if the citizens of E.E are included, the total reaches the amount of 950,000.

This number exceeds by 200,000 the number of foreigners registered in the 2001 census and raises the percentage of foreigners in the total population to 8.5%. But if we add the number of immigrants who are expatriates, then the number reaches 1.15 million people, or approximately 10.3% of the total population.

However, without data for all legal immigrants in Greece and without reliable data on the benefits of citizenship these numbers are unreliable.

## **2.7 Residence of immigrants in Greece**

The range of foreign population density in Greece is between 0% and 25%. As regards the non-EU foreigners we observe that the highest percentages (13-25%) of the total population of Greece appear in the islands, in Attica near Athens and at the northwest border of the country.

The lowest rates (0-1.7%) are in the northeast side of the country around Alexandroupolis and in some economically underdeveloped areas.

The largest concentration of foreigners from countries outside EE is observed in the Municipality of Athens where the 132,000 immigrants consist 17% of the total population while in the city of Thessaloniki there are 27,000 immigrants consisting only the 7% of the total population. After these areas, the suburbs of Athens follow. The islands of Crete, Rhodes, Corfu and Zakynthos exhibit high concentration of immigrant population as well.

## 2.8 Immigration in the city of Kalamata

Kalamata is a small-sized Greek city at the southern side of Peloponnesus and according to the 2001 census its population amounts to 53,659 people.

As regards the evolution of immigration in the city of Kalamata, the city followed the overall national pattern. More specifically, in 1990 it experienced huge inflow of immigrants, who in their majority are economic immigrants from Albania.

The north-western side of the city, namely the districts of Lagkada and Avramiou are the most deprived areas compared to the rest districts of Kalamata, in the sense that there are many refugee homes and lots of cheap and low-quality housing which is affordable for the immigrants. Therefore, these areas were the initial residence of the first immigrants who came to Kalamata.

Table 1 provides the population figures of foreigners per nationality as has been recorded in the 1991 and 2001 National population Censuses respectively.

Nationality	1991	2001	Change in %
<b>Egyptian (U.A.E)</b>	21	13	-8 (-38.09%)
<b>Albanian</b>	47	1552	1505 (3204%)
<b>Armenian</b>	-	99	99
<b>Australian</b>	61	111	50 (81.96%)
<b>Bulgarian</b>	-	194	194
<b>French</b>	7	20	13 (185.71%)
<b>German</b>	6	46	40 (666.66%)
<b>Georgian</b>	-	11	11
<b>Yugoslavian</b>	5	37	32 (640%)
<b>United states of America</b>	44	91	47 (106.81%)
<b>United Kingdom</b>	16	34	18 (112.5%)
<b>Indian</b>	-	12	12
<b>Indonesian</b>	-	16	16
<b>Italian</b>	10	23	13 (130%)
<b>Canadian</b>	46	73	27 (58.69%)
<b>Cyprus</b>	21	72	51 (242.85%)
<b>Moldavian</b>	-	13	13
<b>Dutch</b>	-	14	14
<b>Ukrainian</b>	-	61	61
<b>Polish</b>	279	168	-111 (-39.74%)
<b>Romanian</b>	6	134	128 (2133.33%)
<b>Russian</b>	-	26	26
<b>Syrian</b>	12	26	14 (116.66%)
<b>Philipina</b>	1	23	22 (2200%)

**Table 1:** Composition of Nationalities in Municipality of Kalamata; 1991 and 2001 National Censuses data

**Source:** Hellenic Statistical Authority

As we notice from the above table, in 1991, the starting year of the massive immigration wave towards Greece, in the city of Kalamata had experienced modest migration. Most of the immigrants were from Poland, Australia and Albania.

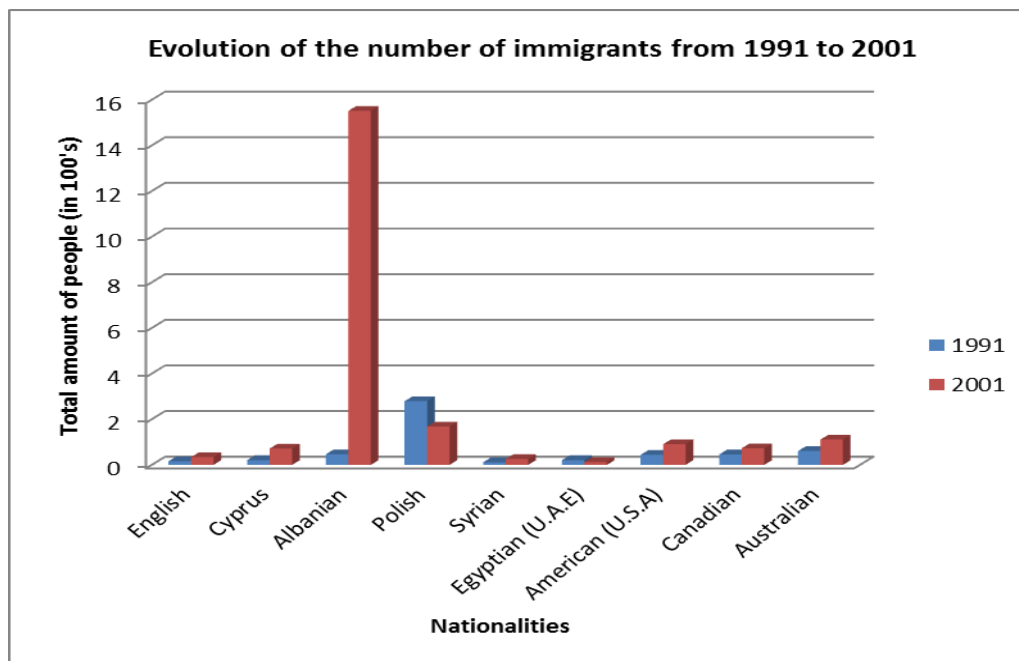
The picture is totally different a decade later, in 2001, where Kalamata experienced a bigger influx of immigrants coming from a number of countries as it is obvious from the above table.

It is obvious that much more immigrants resided in Kalamata in 2001 compared to 1991. Apart from the nationalities already existed, new immigrants were added.

The most notable difference between the two decades, is that the number of Albanian immigrants which was boomed within a decade and reached in 2001 the amount of 1,553 people from the amount of 47 in 1991 increased by 3204%.

The above tables aim to highlight the fact that the total number of the immigrants of the same nationalities in both censuses has raised within a decade. As already mentioned the most remarkable difference is at the number of Albanian immigrants.

The figure below gives a graphical representation of the above differences.



**Figure 3:** Evolution of the number of immigrants in the Municipality of Kalamata during the period 1991-2001

**Source:** Own construction

## 2.9 Conclusions

Since 1990 Greece has experienced a massive influx of immigrants mainly from East Europe and the Balkan countries.

The 2001 population census indicates that the number of registered foreigners who live in the country is about 762.000 including expatriates, E.U citizens and children as well. However the actual figure is much higher due to the unregistered immigrant population. It is estimated that at 2004 all foreigners (including those from EU) comprised the 10.3% of the total population of Greece. Of these, 56% are albanians.

The largest concentration of non-EU foreigners is observed in the Municipality of Athens where the 132,000 immigrants consist 17% of the total population while in the city of Thessaloniki there are about 27,000 immigrants consisting only the 7% of the total population.

Kalamata experienced a large influx of immigrants following the national pattern. According to the data provided by the Hellenic Statistical Authority, at the beginning of the 90's the number of immigrants who resided there was quite modest and in their majority of Polish and Albanian origins. One decade later, in 2001, the picture alters radically. The most remarkable change has been in the Albanian population which experienced a 3204% increase.

## **CHAPTER 3. SEGREGATION: METHODOLOGICAL ISSUES**

### **3.1 Introduction**

The previous chapter has discussed the immigration experience of Greece and outlined the changes that have occurred to the population structure of the country and of the city of Kalamata.

In this chapter we discuss the concept of residential segregation and outline the methodologies that have been developed to access it. In addition we provide some basic theoretical models that explain the dynamics of the immigrant settlement.

### **3.2 Defining Residential Segregation**

Residential, spatial, ethnic or simply segregation is a multi-dimensional phenomenon and concerns the physical separation of two or more groups of people within a specific area or spatial unit. As Massey and Denton (1988) nicely put it, it is the degree to which two or more groups live separately from each other in different parts of the city, or as Reardon and O'Sullivan (2004) identify it, it is the extent to which persons of different groups occupy and experience different social environments.

From a slightly different point of view, others (such as Feitosa et al., 2004) place emphasis on the links within a group to define residential segregation as the degree of spatial proximity between people that belong to the same community.

An important reason for residential segregation is the desire of the members of a group to preserve their own identity or life-style, or even to give to the group a cohesive political voice. For some groups, residential segregation may be maintained by high land values, by redlining, or other discriminatory practices.

Ethnic minorities with extended families may seek out areas of affordable, large housing or may group together for information exchange and protection.

Furthermore, immigrants locate close to each other in order to take advantage of their closely-integrated social networks and to retain valued elements of their cultural heritage (such as language and religion) (Reardon and O'Sullivan, 2004).

### 3.3 The Massey and Denton methodology of segregation

As Massey and Denton (1988) mention, there is no commonly accepted methodology for the comprehension and assessment of segregation. Different researchers put forward different definitions and measures, whereas there is little agreement about which methodology is best to be used and under what circumstances.

On these grounds, Massey and Denton (1988) have attempted to bring some order to the field by providing a systematic documentation of the existing knowledge and developing a solid methodological framework to analyze residential segregation on the basis of five spatial dimensions axes: *evenness*, *exposure* (or *isolation*), *concentration*, *centralization*, and *clustering*.

By measuring the above dimensions, the degree of the spatial segregation of immigrants can be assessed and the characteristic of their spatial pattern to be identified. For each of the five dimensions of spatial segregation there are a number of different indices, which can be used for the measurement of these dimensions. These are discussed next.

#### 3.3.1 Evenness

According to Massey and Denton (1988, p.283), *evenness* refers to the “differential distribution of two social groups among areal units in the city” (p. 283). In other words evenness concerns the degree to which members of different groups are over- or under-represented in the different subareas of a city, relative to their overall proportions in the population (Reardon and O’Sullivan, 2004).

When evenness is maximized, segregation is minimized and vice versa. Evenness is maximized (and segregation is minimized) when all areas have the same relative number of minority and majority members as has the city on the whole. Conversely, evenness is minimized, (and segregation maximized), when the minority group is unevenly distributed, or, in other words, when no minority and majority members share a common area of residence (Massey and Denton, 1988).

For the measurement of evenness Massey and Denton propose the Dissimilarity index ( $D$ ), which has been the most common measure of segregation.

This index varies between 0 and 1 ( $0 \leq D \leq 1$ ), with one indicating the total evenness or in other words no segregation among immigrants and natives, and zero indicating total unevenness and complete segregation among immigrants and natives.

We can calculate this index as follows:

$$D = \frac{1}{2} \sum_{i=1}^n \left| \frac{x_i}{X} - \frac{y_i}{Y} \right|, \quad (1)$$

where

- $x_i$  : is the majority population of areal unit  $i$
- $X$  : is the total majority population in the whole city
- $y_i$  : is the minority population of areal unit  $i$
- $Y$  : is the total minority population in the whole city

### 3.3.2 Exposure

Residential *exposure* refers to the degree of potential contact, or the possibility of interaction, between minority and majority group members within the areas of a city (Massey and Denton, 1988).

From a different perspective, this identifies the degree to which group members live apart from others, or the probability of one member of a group to encounter another member at random (Arvanitidis et al., 2008). Massey and Denton argue that, by measuring exposure, we can actually assess the *experience* of segregation, as felt by the average minority or majority member.

For the measurement of exposure Massey and Denton propose the Isolation Index (I), which, according to Lieberson (1981), is calculated by the following formulae:

$$IIS_i = \sum_{i=1}^n \frac{X_i}{X} \frac{X_i}{t} , \quad (2)$$

where

- $X_i$  : is the number of minority population in areal unit  $i$
- $t_i$  : is the total population of areal unit  $i$
- $X$  : is the total population of the whole city

I varies between 0 and 1 (  $0 \leq IIS \leq 1$  ), where the greater the isolation (and the smaller the exposure) of immigrants into residential areas the greater the index is.

We should highlight that, although indices of exposure and evenness tend to be correlated to each other, they are conceptually distinct because the former depend on the relative size of the groups being compared, while the latter does not (Massey and Denton, 1988).

### 3.3.3 Concentration

*Concentration* refers to relative amount of physical space occupied by a minority group in the urban environment. Groups that occupy a small share of the total area in a city are said to be residentially concentrated (Massey and Denton, 1988). In contrast, if minority members occupy a large area within the urban frame we assume a low degree of residential concentration.

Massey and Denton (1988), propose as the most appropriate measure of spatial concentration the *Delta Index (DEL)*.

The *DEL* index is calculated as follows:

$$DEL = \frac{1}{2} \sum_{i=1}^n \left| \left[ \frac{x_i}{X} - \frac{a_i}{A} \right] \right|, \quad (3)$$

where

$x_i$  :is the number of minoritypopulation of areal unit i

X :is the total populationof minoritypopulationin the whole city

$\alpha_i$  :is the land area of unit i

A :is the total land area of the whole city

According Massey and Denton (1988), the Delta index is interpreted as the share of minority members that would have to shift units to achieve a uniform density of minority members over all units. In other words, the greater the DEL is, the more concentrated is the minority group within the certain area unit and vice versa.



### 3.3.4 Centralization

**Centralization** is the degree to which a group is spatially located near the center of an urban area. Groups that settle near the city center usually tend to be spatially concentrated as well, but this need not be so. Although, centralization is related to concentration, in fact, it is conceptually different (Massey and Denton, 1988).

Massey and Denton report that the simplest and most widely used measure of Centralization (PCC) is simply the number of people in a given group that live within the bounds of the central city, expressed as a proportion of the total number of minority members in the entire urban area (Massey and Denton, 1988):

$$PCC = \frac{X_{CC}}{X}, \quad (4)$$

where

$X_{CC}$ : is the number of minority population living near the city center  
 $X$ : the total number of minority population

Because of its ease of computation and minimal data requirements, PCC is frequently computed and presented (Grebler, Moore & Guzman 1970; Massey 1979).

However, there are some conceptual problems with the measure (Massey and Denton, 1988) arising from the fact that the boundaries of the city center are political rather than natural creations, the relative size of the city center is largely relies on the fact that is a function of the period in which the city was developed, and does not indicate the extent of a group's centralization in any real sense and it takes no account of the actual distribution of a group in space.

### 3.3.5 Clustering

The last dimension of residential segregation is the degree of **clustering** exhibited by a minority group, that is, the extent to which areal units inhabited by minority members adjoin one another, or cluster, in space (Massey and Denton, 1988).

High degree of clustering indicates that minority areas converge into ethnic enclaves or ghettos where minority members are living separately and at distance from the native population. In a sense, high clustering results to the creation of a “city” within the city.

In turn low degree of clustering shows that minority areas are more widely dispersed within the total urban frame.

As Massey and Denton (1988) argue, we should underline that, while residential clustering is often associated empirically with spatial concentration and centralization, at a conceptual level it is distinct. For instance, suppose we have two areas within the urban fabric with similar characteristics (same number of immigrants, same proportion of the total population, no immigrants share the same area with natives, the areas have the same geographical size etc.). In such a case, both areas would display identical measures of evenness, exposure, concentration, and centralization.

However, if all minority areas in one of the urban areas were contiguous to one another, but in the other area they were separated from one another, then the former area would be considered as more segregated since all minority members live within one single homogeneous ghetto, compared to the latter area, where they reside in minority neighborhoods that are scattered throughout the urban area.

In order to quantify the degree of clustering Massey and Denton propose the use of the Spatial Proximity Index (SP) developed by White (1986).

The formula of the SP index is the following:

$$SP = \frac{XP_{XX} + YP_{YY}}{TP_{tt}}, \quad (8)$$

Where,

$$P_{XX} = \frac{\sum_{i=1}^n \sum_{j=1}^n x_i x_j c_{ij}}{X^2}, \quad (5)$$

$$P_{YY} = \frac{\sum_{i=1}^n \sum_{j=1}^n y_i y_j c_{ij}}{Y^2}, \quad (6)$$

$$P_{tt} = \frac{\sum_{i=1}^n \sum_{j=1}^n t_i t_j c_{ij}}{T^2}, \quad (7)$$

and

$x_i, y_i, t_i$ : members of the natives, minority population and total residents in areal unit  $i$

$x_j, y_j, t_j$ : members of the natives, minority population and total residents in areal unit  $j$

$c_{ij}$ : is the negative exponential of the distance between  $i$  and  $j$

$c_{ij} = \exp(-d_{ij})$ ,  $d$  is the difference between the city centers of areal units  $i$  and  $j$

$X, Y, T$ : total number of natives, minority population and residents of the whole city

As can be seen, the SP is simply the average of the intra groups proximities  $P_{xx}/P_{tt}$  and  $P_{yy}/P_{tt}$ , weighted by the fraction of each group in the population.

### 3.4 Other Approaches to Spatial Segregation

Undeniably, Massey and Denton's constitute the first major attempt to provide a solid methodology for segregation. However, it has received some criticism on the grounds that the measures it proposes are in essence "a-spatial", that is, they do not take into account the spatial patterning of population distributions<sup>2</sup>.

As such, Reardon and O'Sullivan (2004), argue that the measurement of segregation must be based on appropriate measures which can define the appropriate social environment of each resident and, at the same time, estimate the extent to which these social environments differ across residents. The authors also indicate that the most appropriate measures of residential segregation are those which take into account the exact locations of residents and their proximities to one another in the examined urban space.

On these grounds, Reardon and O'Sullivan (2004) suggest another methodology of segregation which is based on two -instead of five- dimensions:

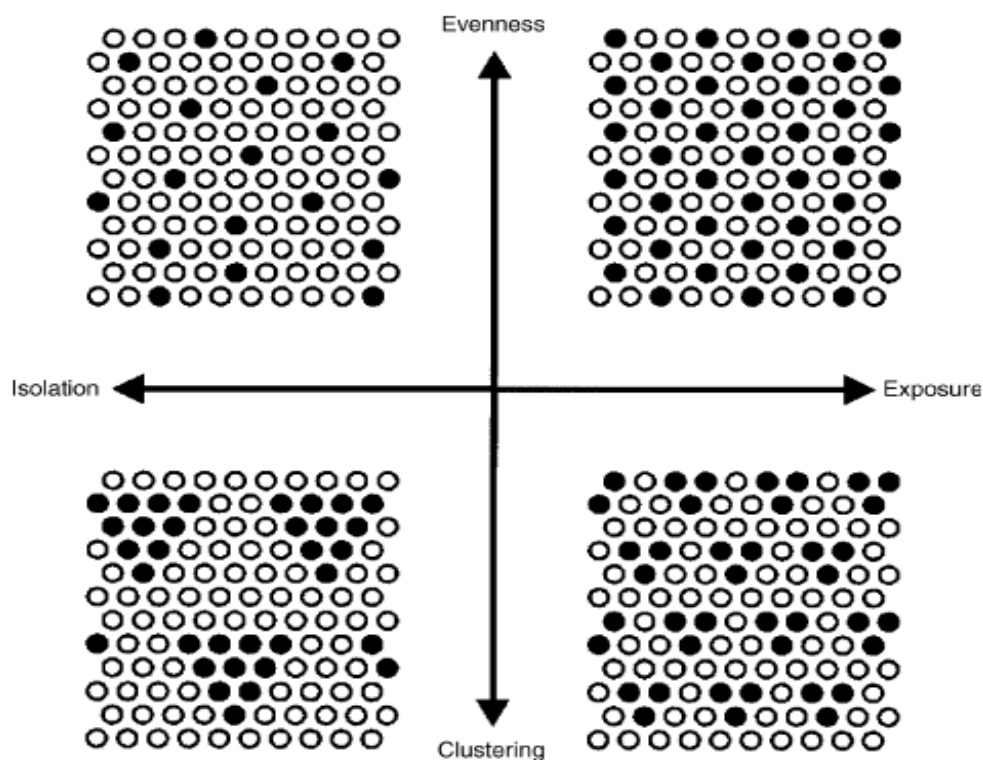
1. **spatial exposure** (or spatial isolation), which refers to the extent that members of one group encounter members of another group (or their own group, in the case of spatial isolation) in their local spatial environments and,
2. **spatial evenness** (or spatial clustering) which refers to the extent to which groups are similarly distributed in residential space.

Reardon and O'Sullivan, illustrate their approach with the following figure (Figure 4). As can be seen, there are four district areas with different patterns of segregation.

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<sup>2</sup> This argumentation highlights two specific problems that a-spatial measures suffer from: the "checkerboard problem" (Morill 1997; White, 1983) and the "modifiable areal unit problem" (Openshaw and Taylor 1979; Wong 1997) which make a-spatial measures less accurate

- “In the patterns of the upper half of the diagram minority and majority groups (black and white dots respectively) are evenly distributed throughout space. Both of these patterns have low levels of spatial clustering (or high levels of spatial evenness).
- In the upper right pattern however, there are more households in the local environment as compared to the pattern of the upper left indicating higher exposure (or lower isolation).
- in the bottom half of the figure, both patterns show greater clustering but roughly the same levels of exposure in comparison to the corresponding patterns above.



**Figure 4:** Dimensions of Spatial Segregation (Reardon and O' Sullivan, 2004, p. 126)

The methodology of Reardon and O'Sullivan is certainly more advanced than this of Massey and Denton, but the measures it proposes demand high amount of information and are hard in their calculation (require use of a GIS). As such a limited number of studies have used them (in contrast to those proposed by Massey and Denton which are now “classics”) making comparisons with other cases (in time or in space) less easy.

### 3.5 Models of spatial settlement

As Arvanitidis et al. (2008) following Freeman (2000), have identified three fully fledged explanatory models to examine the dynamics of spatial residence of immigrants: the spatial assimilation model, the place stratification model and the residential preference model.

The spatial assimilation model has been developed by the Chicago School of Human Ecology and asserts that during the initial stages of immigration it is expected that the newcomers would cluster together because they aim to take advantage of the networks such as social and kinship, of their co-ethnics. These networks provide support, information and of course employment opportunities. However, as the time passes, immigrants start to move out, of the places of initial residence, scattering all over the urban frame.

This is due to *acculturation*, which indicates that as time goes by, the gradual acquisition of the language, values and manners of the host society achieved through prolonged contact with natives and through mass institutions such as schools lead to spatial assimilation of immigrants.

The model of place stratification in turn, considers urban space as a hierarchy of places ordered in terms of desirability and the quality of life they provide to local dwellers. Natives occupy the most desirable places keeping immigrants and generally ethnic and racial minorities at distance.

The place hierarchy is maintained through both institutional mechanisms and discriminatory acts on the part of the host society. In the case of hierarchy disturbance natives are expected to depart from the invaded area progressively, leaving immigrants to constitute, slowly but steadily the majority of the area.

While the place stratification model envisages spatial segregation being imposed on immigrants, the model of residential preference asserts that this is in fact a decision of immigrants themselves. Meaning that, the members of the immigrant group prefer to reside in with their co-ethnics and to remain spatially segregated even when they have the financial means or the social status that would enable them to move elsewhere.

The key difference between this model and the first one is that there is no acculturation process taking place in the latter.

### **3.6 Conclusions**

This chapter introduced the notion of segregation and identified an appropriate methodological framework for its exploration with specific reference to the immigrant population. In addition, it outlined the basic theoretical models that are proposed to explain the dynamics of immigrant settlement.

Residential segregation is a multi-dimensional phenomenon and concerns the physical separation of two or more groups of people within a specific area or spatial unit. As Massey and Denton (1988) elegantly put it, it is the degree to which two or more groups live separately from one another, in different parts of an urban environment, or as Reardon and O'Sullivan (2004) identify it, it is the extent to which individuals of different groups occupy and experience different social environments. From a slightly different point of view, others (such as Feitosa et al., 2004) place emphasis on the links within a group to define residential segregation as the degree of spatial proximity between families belonging to the same community.

Our methodological framework was based on the work of Massey and Denton (1988), which identified five different dimensions of segregation (evenness, exposure, concentration, centralization and clustering) and provided simple but appropriate measures for their evaluation. A more refined framework was also developed by Reardon and O'Sullivan (2004), but certain difficulties in the calculation of the concepts proposed made it less appropriate for the current study.

## CHAPTER 4. IMMIGRANT SEGREGATION PATTERNS

### 4.1 Introduction

The previous chapter has dealt with the concept of segregation and explored the methodological frameworks that the literature has provided for the study of segregation.

This chapter eclectically reviews some immigrant segregation studies from all over the world to delineate the experience on the issue.

So, we will present studies from the United States of America, Canada, many European countries and from Greece. Also, we try to make a comparison between segregation patterns in both sides of the Atlantic. The studies about Greece concern the two big urban centers of the Athens and Thessaloniki as well as the medium-sized city of Volos.

### 4.2 Segregation studies in the United States of America and Canada

Starting the discussion from the United States of America, Iceland (2004) used census data from 1980 to 2000 on metropolitan areas nationwide and tracked trends in racial and ethnic residential segregation and examined the association between diversity<sup>3</sup> and segregation.

He found that multi-group segregation, as measured by the information theory index<sup>4</sup>, declined over the years, as did White and Black segregation. Hispanic segregation, however, changed little, and Asian and Pacific Islander segregation increased slightly.

He also found that diversity to be positively-associated with segregation, though it was not the case for African Americans. The latter result was consistent with previous findings that Black segregation tends to be lower in multiethnic areas (Frey and Farley, 1996; Lee and Wood, 1991).

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<sup>3</sup> Diversity refers to the number of different cultures and ethnics that reside in one common area. The diversity score is influenced by the relative size of the various groups in a metropolitan area while growing diversity was associated with increases in overall segregation

<sup>4</sup> Reardon and O'Sullivan (2004), define the spatial information theory index,  $\tilde{H}$ , as a measure of how much less diverse individuals' local environments are, on average, than is the total population of a region. It will be equal to 1 (indicating maximum segregation) only when each individual's local environment is monoracial.  $\tilde{H}$  appears to be the most satisfactory, as it satisfies the exchange criteria in the widest range of cases and is also the only index that has both a meaningful spatial and grouping decomposition. They conclude that the spatial information theory index  $\tilde{H}$  is the best of the spatial evenness measures.

Frey and Farley (1996) argued that Latinos and Asians serve as “buffer zone” groups between White and Black neighborhoods, resulting in less segregation between Blacks and the other minority groups than between Blacks and Whites (in Iceland 2004).

Cutler et al. (2008) also used decennial Census data to examine trends in immigrant segregation in the United States of America between 1910 and 2000. They found immigrant segregation to be decline in the first half of the century, but to rise steadily over the next three decades, driven by the willingness of foreigners to reside in with their co-ethnics and to remain spatially segregated.

Moving to Canada, Mohamed (2010) examined the location behavior of the Portuguese community and found evidence of segregation along with integration. In particular it was argued that ethnic segregation was voluntary decision of the immigrants as a means of providing them social and financial support, a way of preserving the cultural heritage and a method through which dialogue, engagement and communication with other, non-ethnic community members can take place.

On these grounds the study of Mohamed (2010) demonstrated that the spatial assimilation model cannot be universally applied, and the theory must be re-evaluated for its application to the Canadian context.

We could argue that as regards America, segregation was declined at the beginning of the twentieth century but it was raised again as a result of the voluntary decision of the minority groups to reside with their co-ethnics and take advantage of the existing networks. Some minority groups such as Latinos and Asians often serve as “buffer zone” between the different groups and decline the degree of spatial segregation. The same pattern applies in the case of Canada, where the Portuguese community chose to remain segregated.

In short, from the above studies is evident that most of the times the minority groups voluntarily remain at distance from the natives as a way of preserving their cultural heritage.



### 4.3 Segregation studies in Europe

A number of scholars have examined ethnic segregation in the Netherlands.

Zorlu (2007) finds that, the presence of co-nationals and immigrants from other ethnic minorities, as well as the socioeconomic characteristics of the neighborhoods influence significantly the residential location choice in the Netherlands.

In another study for Holland, Hartog and Zorlu (2009) find no evidence on the existence of mono-ethnic neighborhoods, indicating the housing composition as the possible attraction factor for the low-income immigrants who often come from a variety of non-Western countries.

Dagevos et al. (2010) used multivariate multilevel of survey data on ethnic minorities in the Netherlands and found that both the percentage of ethnic minorities and the degree of ethnic diversity relate to less contact with natives, but more contact with co-ethnics and other ethnic minorities. The mention that the percentage of co-ethnics is only related to more contact with co-ethnics.

Bolt et al. (2008) study the behavior of native Dutch living in neighborhoods with a high share of ethnic minorities, finding that the Dutch are more likely to move out of these neighbourhoods than the minority ethnic residents.

We see that in case of Holland there are conflicting findings. There are studies that indicate that Dutch prefer to be segregated from other minority groups while other scholars claim that minority groups are exposed to the natives since the major factor of locational preferences is the low cost housing. The former studies indicate that the presence of natives and foreigners and the size of the minority group along with the degree of ethnic diversity influence the level of spatial segregation.

In one of the few studies about the segregation in France, Pan Ké Shon (2010) using longitudinal data observes the residential mobility of residents in the “sensitive neighborhoods” and finds that most who move out are upwardly mobile; Africans find it harder to move out and are three times more likely to move into the least-advantaged neighborhoods; the more the neighborhood is disadvantaged, the more its residents move to another equally disadvantaged neighborhood. So, the evidence from France indicate that there is segregation; especially for those who reside in deprived neighborhoods.

Ibraimovic et al. (2010) by estimating two random parameter logit models and using data obtained from a preferences experiment, studied the immigrants’ pattern in Switzerland and in particularly in the city of Lugano. Most foreigners there are from

neighboring countries (Germany, France, Italy and Austria) and only a small proportion are recent immigrants coming from poorer European and non-European countries, who arrived to Switzerland for employment reasons or in search of asylum (Arend, 1991).

Their results suggest that the non-EU immigrants tend to choose neighborhoods with a lower concentration of their co-nationals. Likewise, they exhibit aversion towards neighborhoods with a higher percentage of foreigners, but their preferences do not differ from natives and European citizens in this respect.

Moreover, they find that foreigners that live for longer time in Switzerland choose more often neighborhoods with a higher concentration of the individuals from their origin countries and exhibit less negative preferences towards the foreigners' density compared to the more recent immigrants. Finally, the results show that the segregation on the social-interaction level influences negatively the segregation at the residential level.

Ibraimovic et al. (2010) also indicate that while Germans and Austrians show similar behavior as Swiss citizens, British and French tend to concentrate in "high quality" districts. Italians, Spanish and Turks, on the other hand, exhibit a greater concentration in "low quality" neighborhoods.

Cutler et al. (2008) also explored the segregation patterns of immigrants originated from the developed and less developed countries. They found that immigrants from Europe and other developed countries gravitate towards denser neighborhoods which separate them from native suburbanites but still put them in contact with a wide range of members of other ethnic and racial groups.

In turn, immigrants from less-developed countries isolate themselves in small, scattered enclaves, presumably to take advantage of shared resources while maintaining proximity to the centers of service industry and other low-wage employment areas.

#### **4.4 Comparing segregation patterns in Europe and America**

Musterd (2005) argues that, although there had been quite a few studies which examine in North America and Europe only, few scholars have tried to bring together the experiences from both sides of the Atlantic, and to articulate their commonalities and differences.

As regards segregation in America, cities there show higher levels of ethnic segregation compared to the levels encountered in Europe as measured by the dissimilarity index. This is certainly true if the colored population is to be included. That population has, however, a somewhat unique position due to the US history of slavery. If the colored population is left out then it becomes evident that the levels of segregation in the US do not differ that much from those of the UK or of some cities in continental Europe.

These results seem to indicate two forces driving segregation: the voluntary segregation caused by preferences to live with co-ethnics in more privileged neighborhoods and the involuntary segregation caused by limited accessibility of low-income foreigners to higher quality districts (Ibraimovic et al., 2010).

As far as Europe is concerned, German cities seems to show the lowest levels of ethnic segregation to have relatively low levels of ethnic segregation (dissimilarity index was around 0.20), followed closely by cities like Oslo and Vienna.

French cities also have low index values but we should be careful with this finding because the measurement units (neighborhoods) are larger compared to the other cities mentioned.

Dutch cities follow those with the low segregation and score at around 0.40. They are accompanied by some British cities as far as the segregation patterns of Black Africans and Black Caribbean is concerned.

Above average levels of segregation can be found in Brussels, Antwerp, and Rotterdam (all with regard to Turks and North Africans), and in some but not all, British cities with regard to Pakistani and Bangladeshi.

In cities such as Oldham and Bradford, these ethnic groups tend to be much more segregated from the rest of the population when compared to the other immigrant categories and other cities.

In these other settings, these populations have a clear ‘within-group’ orientation and do not seem to follow a melting pot model<sup>5</sup> of integration.

Concluding it should be highlighted that the comparison of segregation patterns between America and Europe is somewhat problematic. This is mainly due to the fact that Europe is highly fragmented in different states, with different welfare regimes, different economies, and different histories, which is not the case (at least to the same degree) for America.

#### **4.5 Immigrant Residential segregation in Greece**

Arapoglou (2006) studied the residential patterns of immigrants in Athens, to find that immigrants from Central and Eastern Europe as well as those originating from less developed Asian and African countries, tend to be concentrated in small communities exhibiting high levels of isolation.

In contrast, immigrants from Albania, who constitute the vast majority of immigrants in the country, tend to be more integrated with the natives and more dispersed within the urban environment. This finding is consistent with the study of Hatziprokopiou (2003).

Maloutas (2007) showed that vertical segregation in Athens is a process that leads to decreasing segregation, but this finding cannot be considered as an unequivocally positive outcome since it also includes hosting of new socio-spatial separations and tensions. The same can be argued about gentrification, which is a process of social redistribution and re-appropriation of residential space in mature urban settings, where change no longer refers primarily to rapid urbanization but to internal reforming.

Arvanitidis and Skouras (2009) in their study of immigrant residential patterns in Athens also found evidence of immigrants’ dispersion. They highlighted the fact that immigrants are willing to change residence after a period of time and move towards peripheral locations. Also, they underlined that economic and cultural reasons determine the residential patterns of immigrants.

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<sup>5</sup> Describes a model of ethnic relations in which a nation-state’s constituent ethnic groups engage in a process of reciprocal fusion. This can take either the form in which all ethnic groups acculturate to a universalistic set of values and symbols with no ancestral connotations, or the form of which there is two-way influence between ethnic groups in the society such that no ancestral group achieves symbolic dominance.

There are no studies (to our knowledge) on immigrant segregation in medium or small cities apart from this of Arvanitidis et al. (2008) who examined the issue in the city of Volos. According to their findings, minority groups seemed to be dispersed in almost all urban neighborhoods and no significant level of segregation was identified while they confirmed the locational patterns observed in Athens and Thessaloniki. The difference of this study rests on an innovative method they use to access segregation. Instead of Census data they use on students' enrolments in the Primary Schools of Volos and by that, they managed to identify the locational preference of immigrants no matter if they were legal or not because by law the primary school attendance is obligatory for all the children in the country independently of country of origin and immigrant status.

#### **4.6 Conclusions**

This chapter presented evidence on residential segregation around the world. We notice that the residential segregation patterns vary across the ethnic groups; for instance, some of them choose to remain segregated such as the Portuguese community in Canada, segregation levels in America are high due to the colored population, some studies for Holland claim that there is segregation and the Dutch prefer to move out from neighborhoods with minority population while others support that foreigners are exposed to the natives since the locational decision is influenced by the cost of housing, studies from Greece provide evidence that Albanians residing in the country are fully exposed to the local dwellers.

The literature highlights that, the country of origin, the skin color, the financial and social status of the immigrants, the level of their education, and their the willingness to be exposed to the natives are some of the most important factors that determine a great extent the locational or re-locational choice of immigrants.

In some countries there are significant differences in the segregation levels of specific population groups (e.g. colored people) while in general immigrants from developed countries seems to be less segregated and to assimilate successfully with the native population.

As far as Greece is concerned both the large urban centers and the medium-sized cities exhibit similar patterns of low immigrant segregation. The most significant factors in determining the locational behavior of immigrants in most Greek cities are mainly economic, though cultural reasons might also play an important role. It seems

that initially immigrants get residence in the low-cost areas of the city (usually the urban center) but as time goes by and their finances improve they relocate out of these areas and are being dispersed all over the city.

## **CHAPTER 5. IMMIGRANT SEGREGATION IN KALAMATA: METHOD**

### **5.1 Introduction**

At chapter 4 we presented two basic methodological frameworks for segregation, Massey and Denton's and Reardon and O'Sullivan's and we maintained arguably the employment of the former for the study of immigrant intra-urban location in Greece, due to the substantial data requirements and the paramount computational difficulties that the latter exhibits.

On these grounds the current chapter specifies the method to be used for the analysis of immigrant segregation in the city of Kalamata. This includes the data as well as the specific measures that would be employed to assess the phenomenon.

### **5.2 Data**

Usually the data which the majority of segregation studies rely on are those of the national censuses, which in the case of Greece are conducted once every decade by the Hellenic Statistical Authority (EL.STAT).

This approach was not followed here for two reasons. The first was the fact that the most recent data available are from the national censuses of 2001, which today are quite outdated and inaccurate. Although, a new census was conducted in May of 2011, its final outcome and datasets have not yet been available. The second was the unavailability of the of time-series censuses data on immigrants' intra-urban location, making it impossible to examine the dynamics of the phenomenon and to make comparisons between different periods of time. Note that, not only the 2011 census data was not available, but also the 1991 census did not record such information.

Instead, the current study adopts the methodology of Arvanitidis et al. (2008) who assumed that the intra-urban location of immigrants is reflected in the school enrolments of their children. This is due to four reasons. First, both the spatial dispersion of schools in a city and the number of schools operating in each area are analogous to the population density of this area. Second, the main criterion for the enrollment of a student into a particular school is the proximity of his/her house to the school under question. Third, primary education is compulsory by law for all immigrant children residing in an area, independent of the legal status of their parents. Four, immigrants are generally eager for their children to get basic (primary school) education.

A number of advantages can be highlighted for the use of school enrollment data instead of those of the population censuses. They are available on a yearly basis enabling comparisons to be made between different of time and providing reliable picture of the evolution of immigrant segregation.

Furthermore, this set of data concerns both legal and illegal immigrants, (as it is compulsory to all to enroll their children into Primary Schools) whereas census data include only legal and officially listed immigrants.

So, by using this kind of data and by assuming that the proportion of foreigner students is indicative of the proportion of immigrants in each subarea, we can safely conclude for the pattern of spatial distribution and the degree of residential segregation of immigrants in every neighborhood of the examined urban area.

On these grounds, data were collected from all public primary schools in Kalamata urban area in order to explore the spatial distribution of immigrants in the city. The Messinia Directorate of Primary Education has provided us this information. In particular these data involves the number of native and immigrant students who have enrolled each one of the twenty two schools of Kalamata<sup>6</sup> for the last six school years i.e. from 2006 to 2012.

Although Kalamata's urban area is divided into nine districts/neighborhoods (see map\_1, Figure 5.1), seven of them are currently inhabited (Lagkada, Avramiou, Kentro- Palia Poli, Stratones, Notia Sinikia, Giannitsanika and Anatoliki Paralia). The schools are dispersed in seven neighborhoods of Kalamata<sup>7</sup> as follows (see map\_2, Figure 5.2):

- Lagkada incorporates the 9<sup>th</sup>, 14<sup>th</sup> and 16<sup>th</sup> primary schools
- Avramiou incorporates the 6<sup>th</sup> primary school
- Kentro-Palia Poli incorporates the 1<sup>st</sup>, 2<sup>nd</sup>, 5<sup>th</sup>, 13<sup>th</sup>, and 21<sup>st</sup> primary schools
- Stratones incorporates the 3<sup>rd</sup>, 12<sup>th</sup> and 17<sup>th</sup> primary schools
- Notia Sinikia incorporates the 4<sup>th</sup>, 11<sup>th</sup>, 19<sup>th</sup>, 24<sup>th</sup> and 26<sup>th</sup> primary schools
- Giannitsanika incorporates the 18<sup>th</sup> and 22<sup>th</sup> primary schools
- Anatoliki Paralia incorporates the 7<sup>th</sup>, 8<sup>th</sup> and 10<sup>th</sup> primary schools

Please, note that we included the 8<sup>th</sup> primary school not in the neighborhood of Notia Sinikia where it is actually located, but in Anatoliki Paralia. This was because we

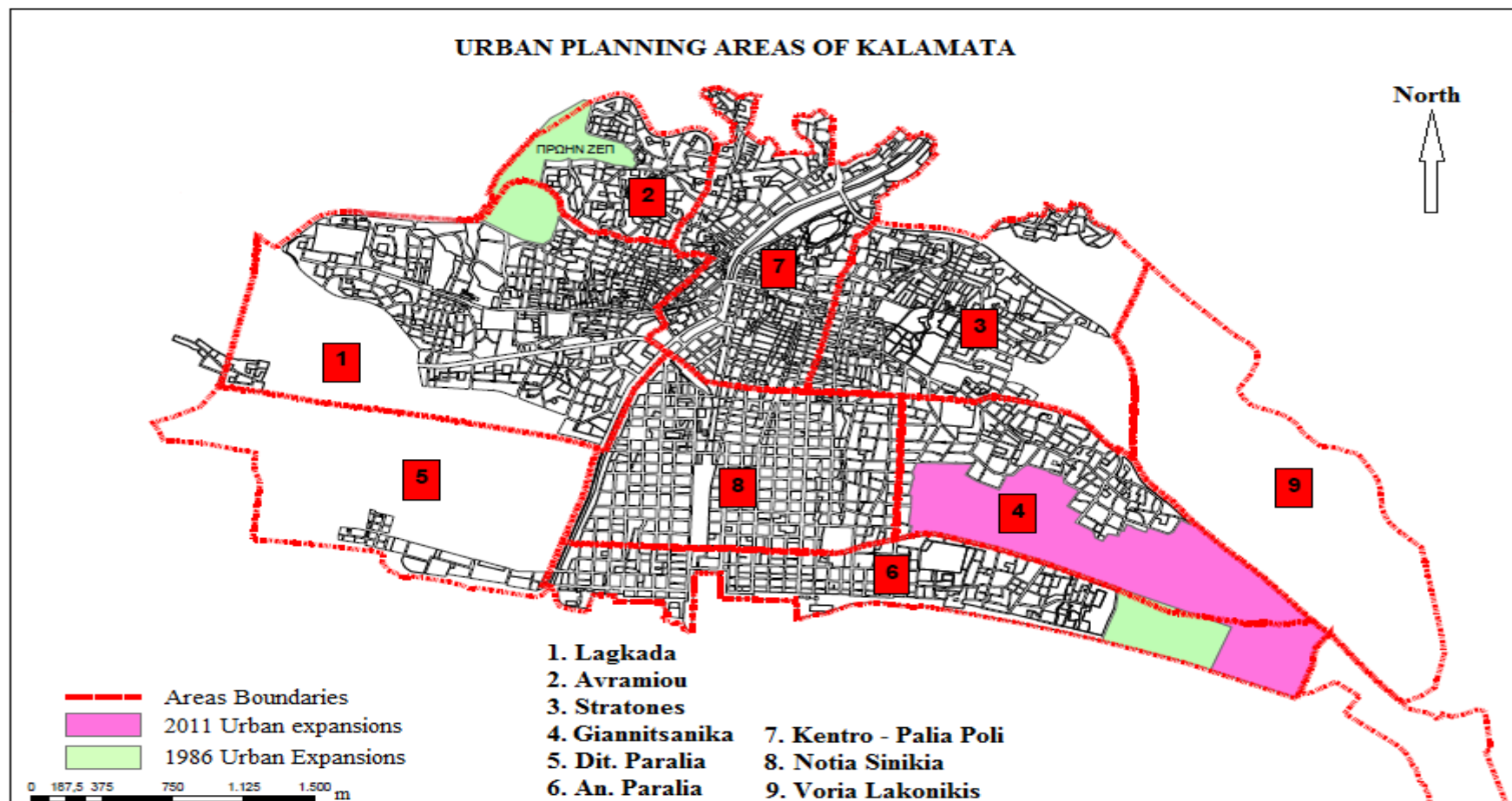
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<sup>6</sup> the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, 13<sup>th</sup>, 14<sup>th</sup>, 16<sup>th</sup>, 19<sup>th</sup>, 21<sup>st</sup>, 22<sup>nd</sup>, 24<sup>th</sup>, 26<sup>th</sup> primary schools of Kalamata.

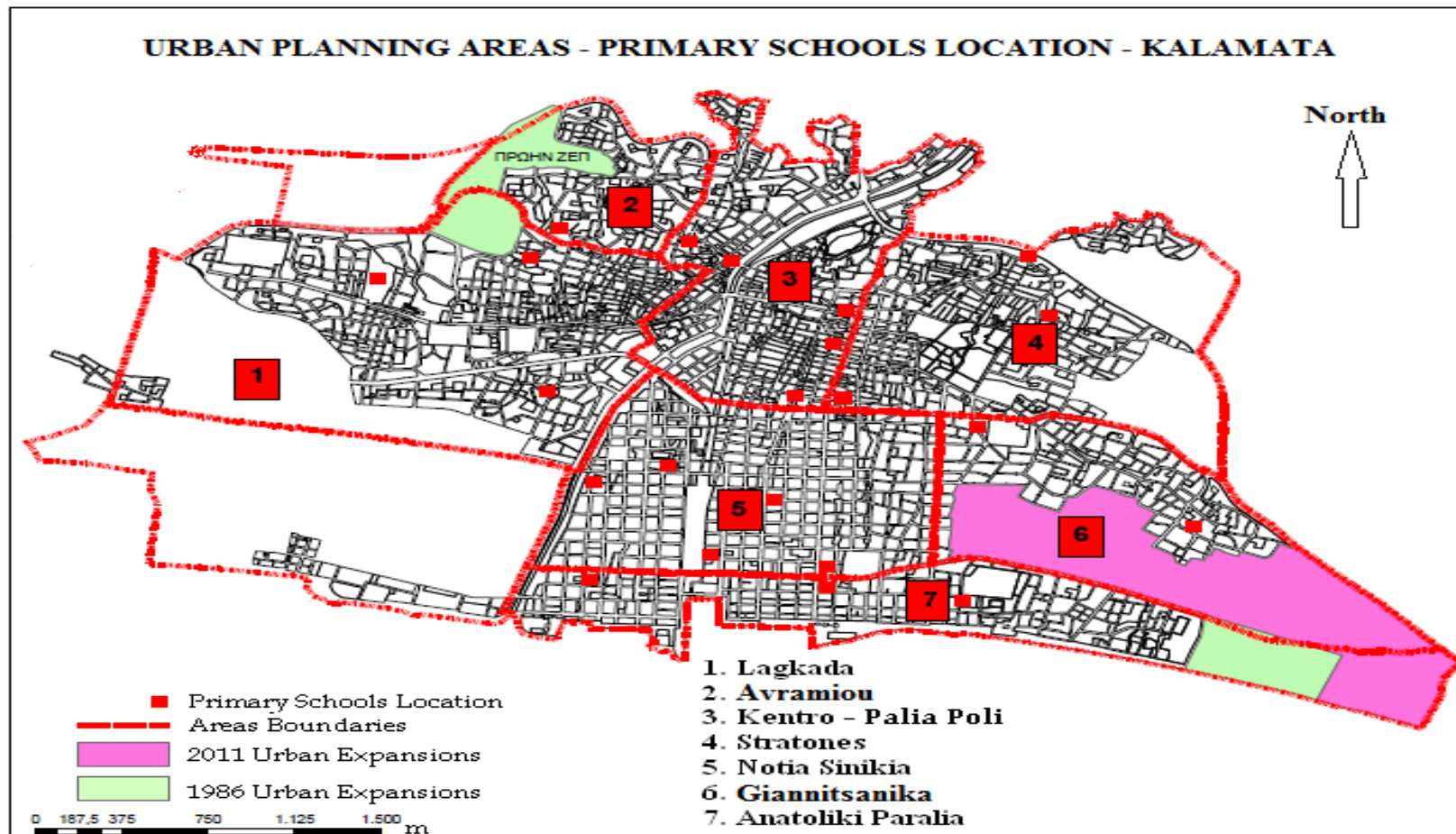
<sup>7</sup> According to the population census 2001, available from EL.STAT, the Municipality of Kalamata amounts to 53,659 people.



were informed from the Primary Education Directorate that this school is attended only by residents of the Anatoliki Paralia, since it is the only school which is closest to this area.



**Figure 5:** Urban Planning areas of Kalamata (map\_1)  
**Source:** Municipality of Kalamata



**Figure 6:** Urban Planning areas including the corresponding primary schools of each neighborhood of Kalamata (map\_2)  
**Source** Municipality of Kalamata

Before we proceed to identify the indices we used to assess immigrant segregation in Kalamata, it would be useful to explore the school enrollment data in order to shed light on its characteristics. The following tables and figures aim to shed light on the characteristics of the sample.

The following table (Table 3) displays the total number of students, namely natives plus immigrants, the total number of immigrant students and the percentage of the immigrant students as well, for each area's public schools in Kalamata from 2006 to 2012 while the figure (Figure 5.4) illustrates the evolution of immigrant students in percentage in each area of Kalamata for the same period of time.

Year	2006-07			2007-08			2008-09		
Areas	Total	Immigrants	% of immigrants	Total	Immigrants	% of immigrants	Total	Immigrants	% of immigrants
Lagkada	687	69	10,04	684	79	11,55	658	70	10,64
Avramiou	189	28	14,81	183	28	15,30	182	29	15,93
Kentro - Palia Poli	915	70	7,65	929	77	8,29	922	86	9,33
Stratones	386	31	8,03	383	36	9,40	379	47	12,40
Notia Sinikia	1005	48	4,78	1080	51	4,72	1096	54	4,93
Giannitsanika	304	17	5,59	308	23	7,47	293	17	5,80
Anat. Paralia	438	20	4,57	345	23	6,67	356	33	9,27
Year	2009-10			2010-11			2011-12		
Areas	Total	Immigrants	% of immigrants	Total	Immigrants	% of immigrants	Total	Immigrants	% of immigrants
Lagkada	669	84	12,56	650	81	12,46	620	75	12,10
Avramiou	186	41	22,04	185	40	21,62	173	38	21,97
Kentro - Palia Poli	898	111	12,36	876	108	12,33	874	110	12,59
Stratones	367	43	11,72	380	47	12,37	365	41	11,23
Notia Sinikia	1102	68	6,17	1094	75	6,86	1102	87	7,89
Giannitsanika	301	19	6,31	317	22	6,94	330	16	4,85
Anat. Paralia	381	40	10,50	386	35	9,07	406	33	8,13

**Table 2:** Total number of students, immigrant students and % of immigrant students in each district of Kalamata for the school years 2006-2012

**Source:** Directorate of Primary Schools of Messinia

In 2006-07, the total number of immigrant students in Kalamata varies from seventeen to seventy. The schools located at the area of Avramiou have the greater percentage of immigrant students (14.81%) while the schools in Anatoliki Paralia exhibit the lower percentage this of 4.57%.

In 2007-08 the situation is not highly differentiated since Avramiou still has the greater percentage of immigrant students (15.30%) while Notia Sinikia takes the place of Anatoliki Paralia displaying the lower percentage of non-native students (4.72%).

In 2008-09, the picture remains the unchanged with Avramiou and Notia Sinikia demonstrating the higher (15.93%) and the lower (4.93%) percentage respectively.

For the rest three years of the period under study, i.e. 2009-10, 2010-11, 2011-12, the situation remains the same as one year ago meaning that schools in Avramiou and Notia Sinikia still exhibit the greater and the lower percentage of immigrant students respectively.

The overall trend in the majority of cases is that the number of immigrant students is growing over the years. This could indicate that as time goes by, more and more immigrants find residence in the city of Kalamata, despite the recent economic crisis and all the structural problems and instability that Greece is experiencing or the birth rates in the area remain in low levels or due to the immigration of natives towards other countries to seek their fortunes.

It has become clear that the area of Avramiou is a highly preferred location for the immigrants residing in Kalamata due to the availability of low cost housing while that of Notia Sinikia remains relatively unaffected by the migration wave since this is considered to be unaffordable for the majority of immigrants.



**Figure 7:** Evolution of immigrant students at each area/neighborhood of Kalamata from 2006 to 2012 (in %)

**Source:** Directorate of Primary Schools of Messinia

More precisely, in Lagkada, the increase of the immigrants' percentage is relatively smooth through the years with a decline of two percentage points from 2007-08 to 2008-09 but next year that situation was conversed. From that point onwards is slightly declined.

The areas of Avramiou and Kentro – Palia Poli exhibit about the same pattern as far as the immigrant students' evolution in the public schools, with that of Avramiou displaying higher percentages compared to that of Kentro – Palia Poli.

As regards Notia Sinikia, the percentage is constantly increasing, but still remains in relatively low levels varying from 4.78% to 7.89%.

The area of Stratones, experienced an increase in the percentage of immigrant students' from 2006-07 to 2008-09 while from that point until the end of the period under study, there was slight decline every year.

The area of Giannitsanika has experienced the more fluctuations among the areas of interest but at the end of the period we observe that it reaches about the same levels as in 2006-07.

In the area of Anatoliki Paralia the percentage of non-natives grows larger since 2006-07 until 2009-10. From that point onwards, is decreasing until the end of the study period.

Finally, Table 2 and Figure 5.3 below display the percentage of foreigner students at the totality of the Primary School students for the school years 2006 to 2012.

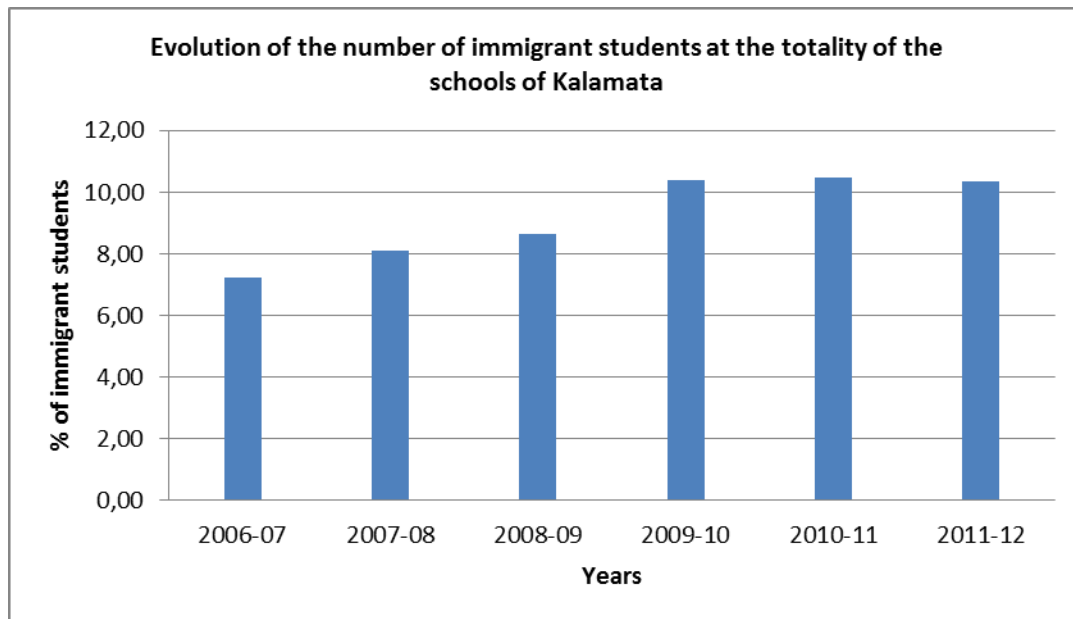
Undoubtedly, the percentage of immigrant students has been increased over the years, although there is a small drop over the last period (from 2010-11 to 2011-12). The greatest increase was from 2008-09 to 2009-10 where the presence of immigrant students increased by 1.75% or by seventy more immigrant students.

<b>Years</b>	<b>% immigrant to the total Students</b>
<b>2006-07</b>	7.21
<b>2007-08</b>	8.10
<b>2008-09</b>	8.65
<b>2009-10</b>	10.40
<b>2010-11</b>	10.49
<b>2011-12</b>	10.34

**Table 3:** Evolution of the number of immigrant students at the totality of students from 2006 to 2012 (in %)

**Source:** Directorate of Primary Schools of Messinia





**Figure 8:** Evolution of the number of immigrant students at the totality of students from 2006 to 2012 (in %)

**Source:** Directorate of Primary Schools of Messinia

It becomes clear the fact that the number as well as the percentage of immigrant enrolment in the public schools of Kalamata is growing larger on a yearly basis during the whole period of study. To be more accurate, we may pinpoint that for the first three years that percentage is rising, while it seems to be steady for the last three years.

### 5.3 Indices

As it has been mentioned, this study uses the methodological framework of Massey and Denton (1988) in which segregation is assessed along five dimensions: evenness, exposure (or isolation), concentration, centralization and clustering. Each dimension is measured by the following indices, the formulas of which are presented next (note that the indices have been presented in detail in chapter 3).

The first dimension, Evenness, is measured by the Dissimilarity Index (D):

$$D = \frac{1}{2} \sum_{i=1}^n \left| \frac{x_i}{X} - \frac{y_i}{Y} \right|, \quad (1)$$

where

- $x_i$  : is the majority population of the areal unit  $i$
- $X$  : is the total majority population in the whole city
- $y_i$  : is the minority population of the areal unit  $i$
- $Y$  : is the total minority population in the whole city

The second dimension, Exposure, is measured by the Isolation Index (I):

$$I = \sum_{i=1}^n \frac{X_i}{X} \frac{X_i}{t_i}, \quad (2)$$

where

- $X_i$  : is the number of minority population in areal unit  $i$
- $t_i$  : is the total population of the areal unit  $i$
- $X$  : is the total population in the whole city

The third dimension, Concentration, is measured by the Delta Index (DEL):

$$DEL = \frac{1}{2} \sum_{i=1}^n \left[ \left| \frac{x_i}{X} - \frac{a_i}{A} \right| \right], \quad (3)$$

where

- $x_i$  : is the number of immigrant population of areal unit  $i$
- $X$  : is the total immigrant population in the whole city
- $a_i$  : is the land area of areal unit  $i$
- $A$  : is the total land area of the whole city

The fourth dimension, Centralization, is measured by the PCC measure:

$$PCC = \frac{X_{CC}}{X}, \quad (4)$$

where

$X_{CC}$ : is the number of immigrant population living near the city center

$X$ : is the total number of immigrant population in the whole city

The fifth and the final dimension, Clustering is measured by the Spatial Proximity

Index (SP):

$$SP = \frac{XP_{XX} + YP_{YY}}{TP_{tt}}, \quad (5)$$

where,

$$P_{XX} = \frac{\sum_{i=1}^n \sum_{j=1}^n x_i x_j c_{ij}}{X^2}, \quad (6)$$

$$P_{YY} = \frac{\sum_{i=1}^n \sum_{j=1}^n y_i y_j c_{ij}}{Y^2}, \quad (7)$$

$$P_{tt} = \frac{\sum_{i=1}^n \sum_{j=1}^n t_i t_j c_{ij}}{T^2}, \quad (8)$$

and

$x_i, y_i, t_i$ : members of the natives, immigrant population and total residents in areal unit  $i$

$x_j, y_j, t_j$ : members of the natives, immigrant population and total residents in areal unit  $j$

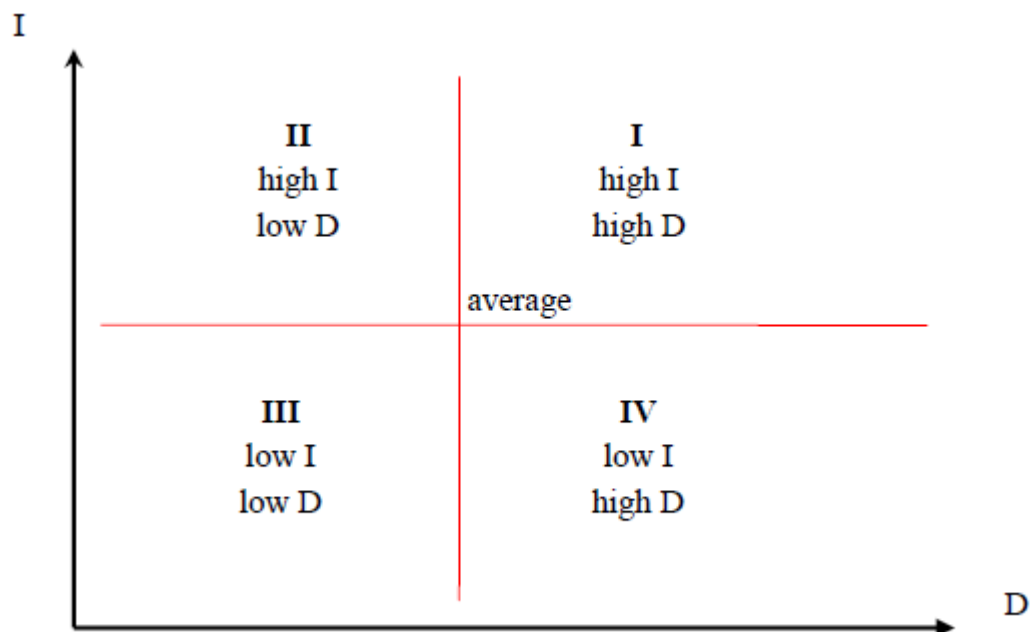
$c_{ij}$ : is the negative exponential of the distance between areal units  $i$  and  $j$

$c_{ij} = \exp(-d_{ij})$ ,  $d$  is the difference between the city centers of areal units  $i$  and  $j$

$X, Y, T$ : total number of natives, immigrant population and residents of the whole city

In addition to the above measures, we also used the two dimensional system of Arvanitidis and Skouras (2011) in order to explore the combined effect of evenness and exposure (Figure 5.5).

The horizontal axis records the degree of Dissimilarity Index (D) in each neighborhood while the vertical one the level of Isolation Index (I). Setting as “zero point” the average values of D and I we get a quadrant area which enables us to easily identify neighborhoods characterized by relatively higher or lower degrees in the aforementioned indices. More specifically, quadrant I indicates areas of higher (in comparison to the average) isolation and dissimilarity, quadrant II areas of higher isolation but lower dissimilarity, quadrant three areas of both isolation and dissimilarity and finally quadrant IV areas of higher dissimilarity but lower isolation.



**Figure 9:** The two-dimensional system of Dissimilarity (D) and Isolation (I)  
**Source:** Arvanitidis and Skouras, 2011

## 5.4 Conclusions

The current chapter specifies the method to be used for the analysis of immigrant segregation in the city of Kalamata. This includes the data as well as the specific measures that will be employed to assess the phenomenon.

As regards the former the study adopts the approach of Arvanitidis et al. (2008) who assume that the intra-urban location of immigrants is reflected in the school enrolment of their children. So, data concerning the student enrollment from the twenty two public primary schools of Kalamata for the period between 2006 and 2012 were collected, in order to explore the spatial distribution of immigrants in the city.

As regards the latter, the study used the indices proposed by Massey and Denton (1988) which measure segregation in five dimensions (evenness, exposure, concentration, centralization and clustering).

To explore the combined effect of the two most commonly assessed dimensions (and indices used) we employ the two dimensional system of Dissimilarity and Isolation proposed by Arvanitidis and Skouras (2011).

## CHAPTER 6. IMMIGRANT SEGREGATION IN KALAMATA: EMPIRICAL STUDY

### 6.1 Introduction

The previous chapter specified the data and the specific measures that will be employed to assess immigrant segregation in the city of Kalamata. This takes place in the current chapter, which is comprised by eight sections.

The first five present the evaluation of the five dimensions of segregation, i.e. evenness, exposure, concentration, centralisation and clustering, on the basis of the indices identified in the previous chapter. The next one provides an evaluation of the combined degree of evenness and exposure, based on the two-dimensional diagram of and Skouras (2011).

On the basis of the findings acquired section eight provides some directions for further research, whereas section nine concludes the chapter.

### 6.2 Evenness

In this section we evaluate the degree of immigrant evenness in Kalamata on the basis of the Dissimilarity Index.

The table presents the dissimilarity index by neighborhood for the city of Kalamata for the years 2006 to 2012. As it has been already mentioned, this index can vary from 0 (complete evenness) to 1 (complete unevenness). Overall we observe high degree of evenness (all figures are below 0.1).

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	Average
<b>Lagkada</b>	0.0370	0.0405	0.0213	0.0198	0.0175	0.0152	0.0252
<b>Avramiou</b>	0.0274	0.0226	0.0216	0.0031	0.0282	0.0280	0.0218
<b>Kentro-Palia</b>	0.0076	0.0030	0.0102	0.0242	0.0220	0.0274	0.0157
<b>Poli</b>							
<b>Stratones</b>	0.0060	0.0085	0.0232	0.0066	0.0010	0.0046	0.0083
<b>Notia Sinikia</b>	0.0598	0.0627	0.0664	0.0641	0.0545	0.0375	0.0575
<b>Giannitsanik</b>	0.0094	0.0034	0.0136	0.0000	0.0016	0.0252	0.0089
<b>a</b>							
<b>Anat.Paralia</b>	0.0089	0.0085	0.0036	0.0005	0.0008	0.0125	0.0058
<b>Average</b>	0.0223	0.0213	0.0229	0.0169	0.0179	0.0215	0.0205

**Table 4: Dissimilarity Index by neighborhood for the years 2006-2012**

Source: Own construction

As we see from the last row of the above table, the average D values vary from 0.0169 to 0.0229 for the city of Kalamata. The index remains almost stable for the period of study without remarkable fluctuations, excluding the values of 2009-10 and 2010-11 where there is a decline in the index but the next year it reaches its previous levels.

In sum, the average D for each single year of the period of study is very low indicating even distribution of immigrants among the areas of Kalamata.

If we consider each area separately, we notice that the average D –for the period 2006-2012- varies between 0.0058 and 0.0575. The extreme values correspond to Anatoliki Paralia and Notia Sinikia respectively. This finding indicates that in the former area, the spatial distribution of immigrants is almost ten times more even than in the latter one.

In Lagkada, D varies from 0.0152 to 0.0405 and the average value is 0.0252. The values mentioned correspond to 2011-12 and 2007-08 respectively. We should note that Lagkada at the end of the study period i.e. in 2011-12, seems to be two and a half times more even than in 2006-07.

In Avramiou, D varies from 0.0031 (in 2009-10) to 0.0282 (in 2010-11) while the average is 0.0218. This area does not exhibit any particular fluctuations, excluding the value in 2009-10 and the distribution of immigrants remains almost unchanged within the period of study.

In Kentro – Palia Poli, D values vary from 0.0030 to 0.0274 with an average of 0.0157. In this case, we observe that there are variations in the index throughout the years and in 2011-12 it reaches its higher level.

The area of Stratones, exhibits D values which vary from 0.0010 to 0.0232 while the average is 0.0083. Here, D remains low for the whole period of study with an exception in 2008-09.

Notia Sinikia exhibits the most uneven distribution among the areas of Kalamata. The values of the index vary from 0.0375 to 0.0664 and the average is 0.0575, the greater among all the areas. We observe that the lower and the higher value is answered in 2011-12 and 2008-09 respectively.

Giannitsanika experience significant fluctuations in the values of D throughout the period of study; from 0.0000 to 0.0252, in 2009-10 and 2011-12 respectively. The average (0.0089) indicates that there is even spatial distribution of immigrants.

Finally, in Anatoliki Paralia,  $D$  varies from 0.0005 to 0.0125 and the average is 0.0058. In 2011-12, the distribution of immigrants seems to be more uneven compared to that of 2006-07.

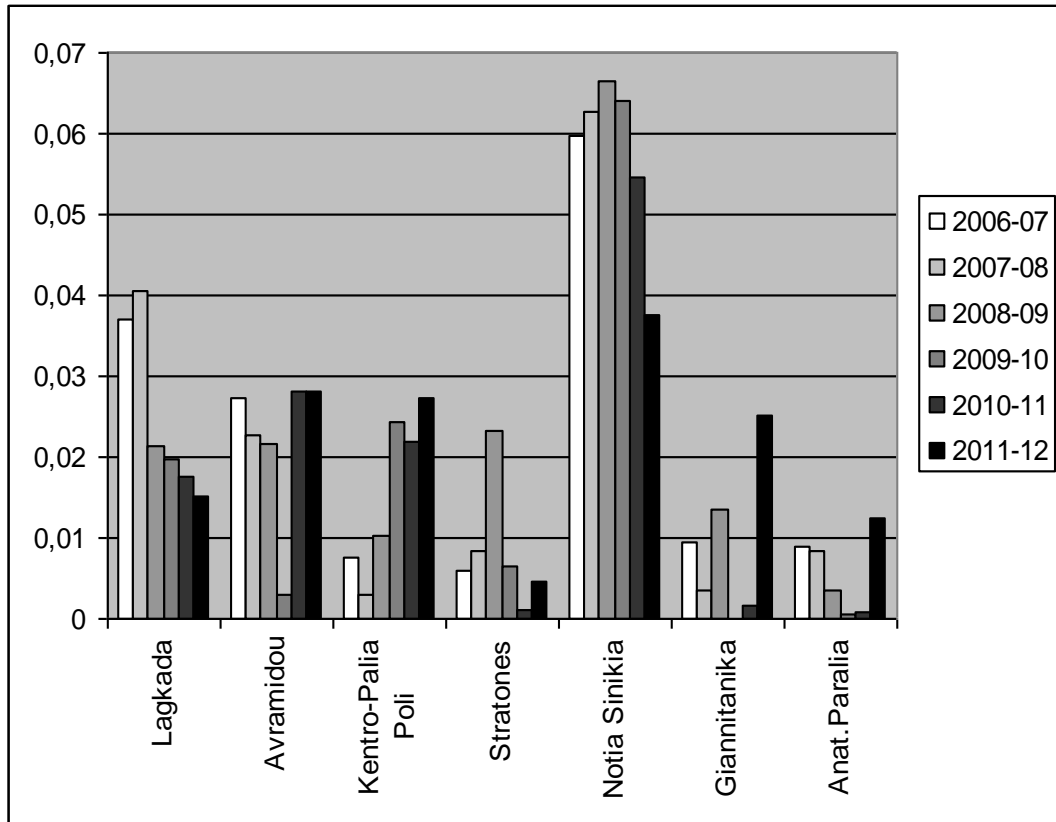
The values of  $D$  for all neighborhoods between 2006 and 2012 vary from 0 to 0.0664, which means that there is not even spatial distribution of immigrants. All the values remain extremely low for all the neighborhoods during 2006-2012 which brings us to the conclusion that there is no remarkable segregation of immigrants and natives.

We observe from the above table that there are differences between areas and in the evolution of  $D$  throughout the years. For instance, according to the values of  $D$  in Lagkada, in 2006-07  $D$  is 0.0370 while at the end of the study period has declined to 0.0152, meaning that as time goes by, the residential segregation of immigrants becomes more even. Furthermore, there are variations between areas as well. In Notia Sinikia  $D$  is eight times greater compared to that of Stratones, meaning that the spatial distribution in the former area is much more uneven than the latter.

If we give a closer look we find out that the lowest  $D$  value is 0 and belongs to Giannitsanika in 2009-10 while the greater value of  $D$  refers to Notia Sinikia (0.0664 in 2008-09).

While the above results do not reveal high levels of uneven immigrant segregation across the city of Kalamata, it is quite useful to visualize the  $D$  figures through a graph in order to see the evolution of the index at the totality of neighborhoods per year (see Figure 6.1).





**Figure 10:** Dissimilarity Index by neighborhood for the years 2006-2012

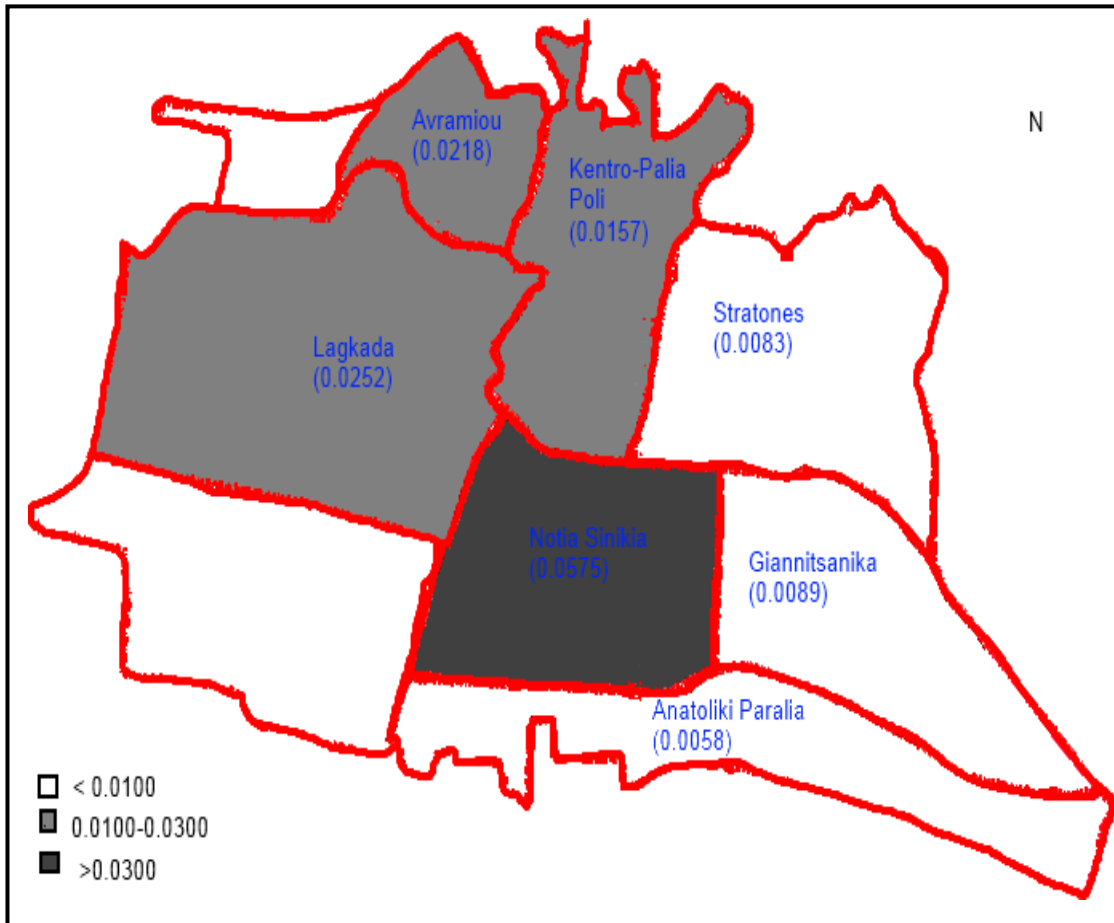
**Source:** Own construction

It is obvious that for all the years of the study, Notia Sinikia has the greater level of dissimilarity among all the neighbourhoods, although it drops significantly from 2009 onwards, indicating that in this area immigrants are over-represented as compared to other neighborhoods.

The picture changes dramatically in 2011-12 where most of the districts increase their D values<sup>8</sup>, something which indicates in the segregation pattern.

Below, we see the map of Kalamata with the corresponding values of the D index according to the calculations. We categorized the areas according to the range of the index's size. Here, we followed the categorization used in the segregation literature.

<sup>8</sup> In fact the values of the dissimilarity index remain relatively low, but increase in comparison to those of the previous years.



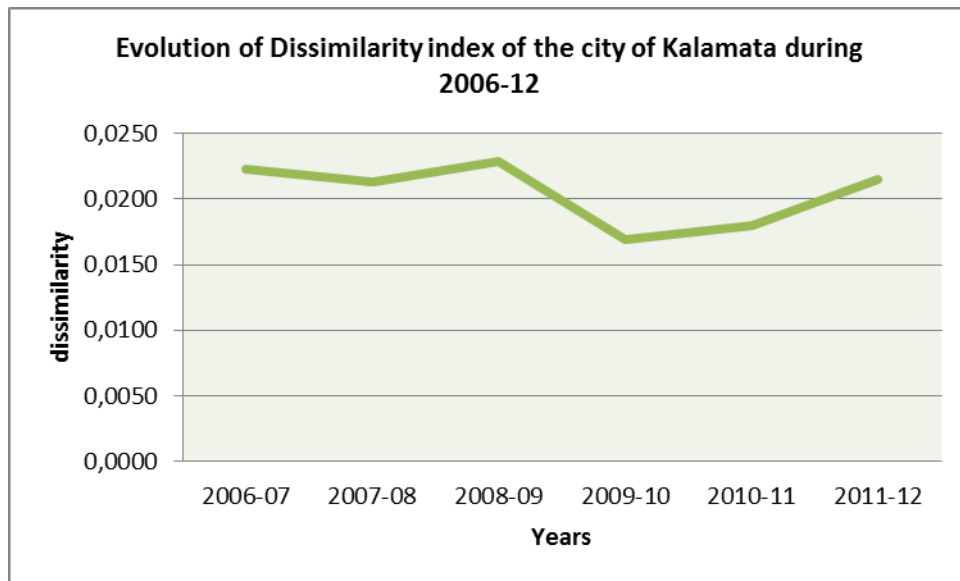
**Figure 11:** Map of Kalamata according to dissimilarity index (average of the study period)

**Source:** Own construction

Finally, the graph below illustrates the evolution of the dissimilarity index for the whole city of Kalamata.

We notice that from 2006 to 2008 the index is almost stable without remarkable fluctuations, while the year after it reaches its lowest point, and from that point onwards it rises until the end of the period of study.

Overall the dissimilarity index is relatively low without significant variation which means that immigrants are almost evenly distributed across the city.



**Figure 12:** Evolution of Dissimilarity Index for the city of Kalamata during 2006-2012  
**Source:** Own construction

### 6.3 Exposure

In this section we evaluate the degree of exposure or isolation of immigrants. High levels of exposure mean that residential space are shared equally by the population groups. In turn, high degree of isolation means that immigrants tend to isolate and to have low levels of interaction with the natives.

Table 5 and Figure 13 above provide the values of the Isolation Index (I) for every neighborhood of the city of Kalamata during the period of study. As can be seen, I is quite low and below 0.05.

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	Average
<b>Lagkada</b>	0.0018	0.0023	0.0019	0.0027	0.0026	0.0023	0.0023
<b>Avramiou</b>	0.0011	0.0011	0.0012	0.0023	0.0022	0.0022	0.0017
<b>Kentro-Palia Poli</b>	0.0014	0.0016	0.0021	0.0035	0.0034	0.0036	0.0026
<b>Stratonos</b>	0.0006	0.0009	0.0017	0.0013	0.0015	0.0012	0.0012
<b>Notia Sinikia</b>	0.0006	0.0006	0.0007	0.0011	0.0013	0.0018	0.0010
<b>Giannitsanika</b>	0.0002	0.0004	0.0003	0.0003	0.0004	0.0002	0.0003
<b>Anat.Paralia</b>	0.0002	0.0004	0.0008	0.0011	0.0008	0.0007	0.0007
<b>Average</b>	0.0008	0.0011	0.0012	0.0018	0.0018	0.0017	0.0014

**Table 5:** Isolation Index by neighborhood for the years 2006-2012  
**Source:** Own construction

Looking at the last line of Table 5, we notice that the average (of all the areas of Kalamata)  $I$  is gradually increasing within the period of study. This means that year by year, immigrants tend to be more and more isolated from the local dwellers.

If we compare the average of each area, we will see that the most isolated area is that of Lagkada with  $I$  equal to 0.0023 and the least isolated is that of Giannitsanika with  $I$  equal to 0.0003. It is obvious that the latter area is the area with the greater exposure of immigrants to local inhabitants.

The districts of Kentro-Palia Poli, Lagkada and Avramiou exhibit the highest levels of isolation while the lowest scores are evident at Giannitsanika and Anatoliki Paralia, meaning that immigrants residing at the former group of areas seem to be segregated while immigrants at the latter group are more exposed to the natives compared to the former group.

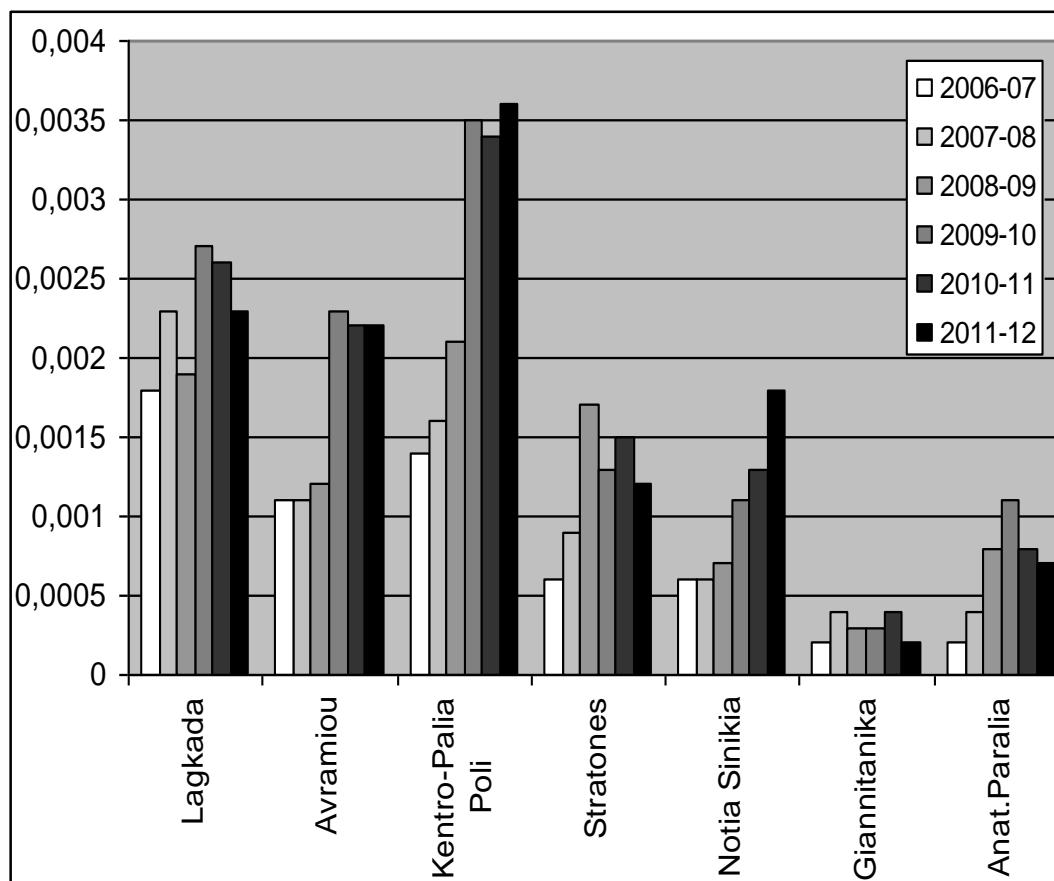
When we examine each area on a yearly basis –strictly speaking-, we conclude that as a general trend, the  $I$  levels are constantly rising within the period of study. This finding is indicative of low levels of interaction with the natives.

We also notice that  $I$  has significant fluctuations and so immigrant exposure at all neighborhoods is quite smooth.

The Figure 13<sup>9</sup> below presents the values of  $I$  for all the areas of Kalamata from 2006 to 2012.

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<sup>9</sup> Again, despite of the height of the bars that is under consideration here, the levels of isolation in fact are very small.

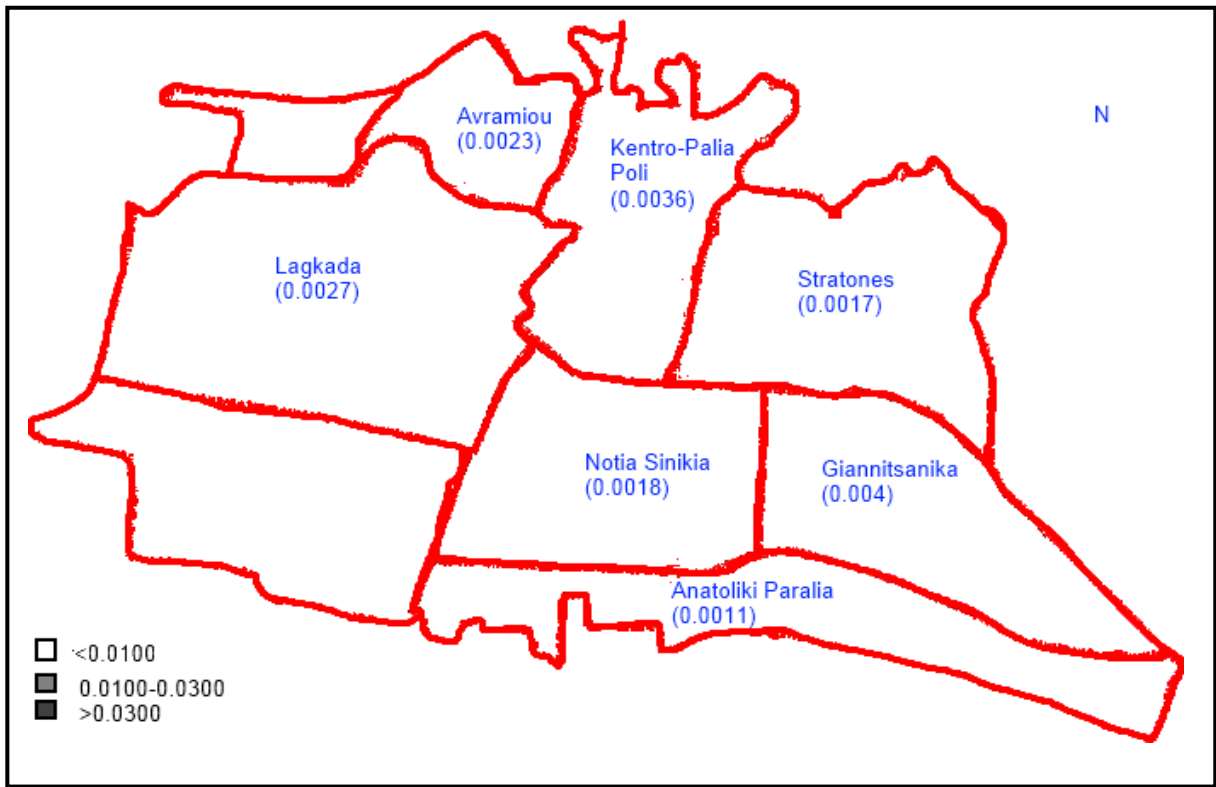


**Figure 13:** Isolation Index of Segregation by neighborhood for the years 2006-2012  
**Source:** Own construction

Figure 13 shows the evolution of I in each areas from 2006 to 2012. It becomes more clear that the districts of Avramiou and Kentro – Palia Poli and Notia Sinikia experienced a boom in the isolation levels of minority groups.

However, we must have in mind that these numbers, in fact, are extremely low –the first two decimals are zero-. This evidence means that the isolation of the immigrant population in the city of Kalamata is extremely low. In other words the immigrant groups are fully exposed and at high interaction with the native population.

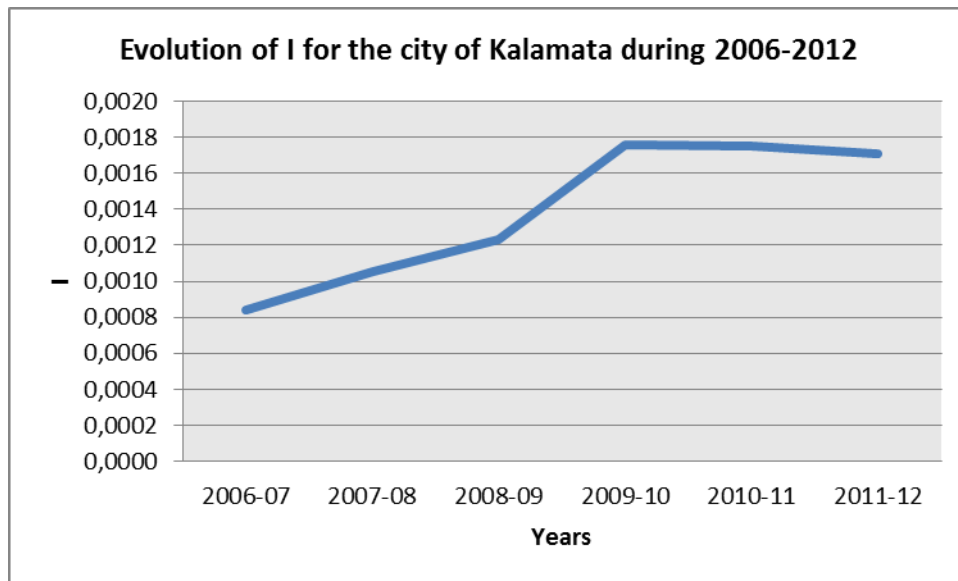
The map below illustrates the I levels for each area of Kalamata from 2006 to 2012. The choice of the categories is based on the relevant literature on segregation.



**Figure 14:** Map of Kalamata according to I (average of the study period)  
**Source:** Own construction

Finally, the graph below illustrates the evolution of I for the whole city of Kalamata. As can be seen, there is a gradual increase of I from 2006 to 2008. From that point onwards the rise becomes steeper until it reaches its maximum in 2009-10. Afterwards, it becomes stable until the end of the period of study.

Overall, although it remains low, it doubles from 0.0008 to 0.0017 within the six years examined.



**Table 6:** Evolution of Isolation Index by neighborhood for the years 2006-2012  
**Source:** Own construction

#### 6.4 Concentration

This section deals with the evaluation of the degree of concentration of immigrants in Kalamata. This depends on the size of the area which immigrants occupy. In case that immigrant population occupy a small share of the total area, the concentration is high. In contrast, if immigrants occupy a large share of the total area they said to be residentially diluted.

The degree of immigrant concentration is measured by the Delta Index. Table 7 below, provides the values of the Delta index for the city of Kalamata during the period of study, while Figure 15 displays the results.

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	Average
<b>Lagkada</b>	0.0247	0.0220	0.0424	0.0431	0.0473	0.0528	0.0387
<b>Avramiou</b>	0.0179	0.0126	0.0116	0.0190	0.0175	0.0160	0.0158
<b>Kentro-Palia Poli</b>	0.0558	0.0536	0.0601	0.0689	0.0645	0.0697	0.0621
<b>Stratones</b>	0.0268	0.0248	0.0117	0.0286	0.0240	0.0304	0.0244
<b>Notia Sinikia</b>	0.0081	0.0038	0.0037	0.0071	0.0152	0.0321	0.0117
<b>Giannitsanika</b>	0.0030	0.0032	0.0077	0.0096	0.0061	0.0130	0.0071
<b>Anat.Paralia</b>	0.0274	0.0265	0.0136	0.0135	0.0198	0.0215	0.0204
<b>Average</b>	0.0234	0.0209	0.0216	0.0271	0.0278	0.0336	0.0257

**Table 7:** Concentration Index by neighborhood for the years 2006-2012

**Source:** Own construction

The last line of Table 7 displays the average of Delta index corresponding to the whole city of Kalamata on a yearly basis. It varies from 0.0209 to 0.0336, and the lowest score is answered in 2007-08 while the highest in 2011-12. As a general trend we could argue that the minority groups of the city are becoming more concentrated as time goes by.

The area of Giannitsanika is the least concentrated (its average equals to 0.0071) within the period of study, meaning that the immigrants are residentially diluted while Kentro – Palia Poli appears to be the most concentrated (its average equals to 0.0621), namely, there are low levels of interaction between the minority groups and the native population.

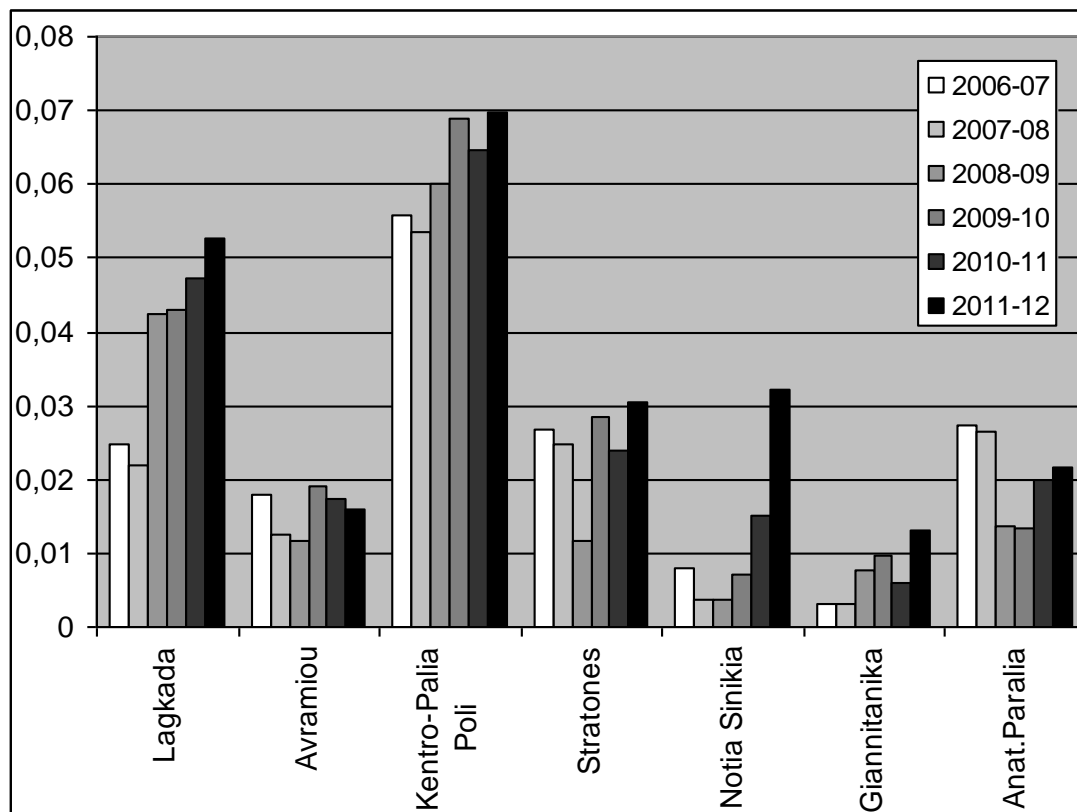
In the area of Lagkada the concentration has been douplicate from 2006 to 2012 and in the areas of Notia Sinikia and Giannitsanika, the concentration has been quadruplicate within the period of study. The rest of the areas have experienced modest variation in the Delta index from 2006 to 2012.

Again, we should highlight the fact that the concentration in Kalamata, despite of the increase in the Delta index, still remains in very low levels indicating that immigrants are dispersed and do not seem to have create any enclaves.



As Figure 15 demonstrates, for the whole period of study, the neighborhood Kentro-Palia Poli is the most concentrated one. The first two years examined, Anatoliki Paralia scores second but for the years that follow Lagkada takes this place. The third place is mostly reserved from Stratones, with two exceptions in 2008-09 where Anatoliki Paralia scores third and in 2011-12 where Notia Sinikia scores third.

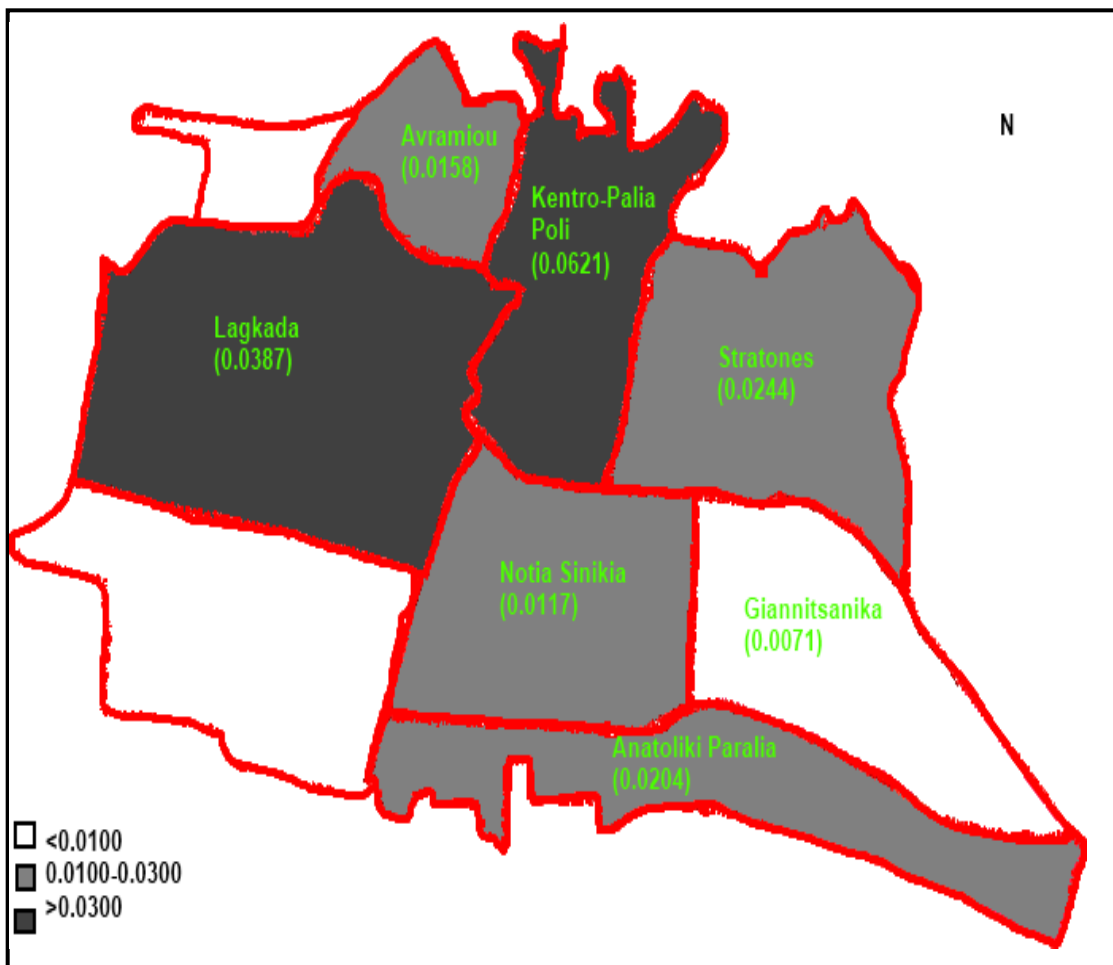
Overall, there are not significant changes to concentration between neighborhoods during the period of study.



**Figure 15:** Delta Index by neighborhood for the years 2006-2012

**Source:** Own construction

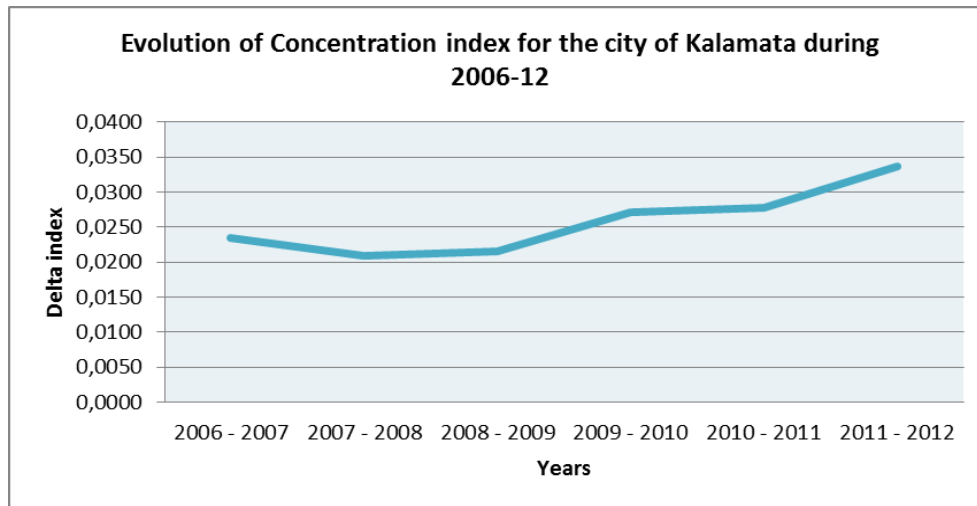
The map below presents the average Delta index for each area in Kalamata within the study period. The categorization is the same as in the previous indices.



**Figure 16:** Map of Kalamata according to Delta index (average of the study period)  
**Source:** Own construction

Figure 17 illustrates the evolution of the concentration for Kalamata from 2006 to 2012.

As a general trend, we could claim that there is a smooth and slight increase in the concentration without particular fluctuations in the period of study.



**Figure 17:** Evolution of Concentration by neighborhood for the years 2006-2012

**Source:** Own construction

## 6.5 Centralization

This section examines the centralization of immigrants in Kalamata, or, the degree at which immigrants are spatially concentrated on the city center.

Unfortunately, the city center of Kalamata is not one of the identified neighborhoods. It is mainly in the city of Kentro – Palia Poli, but the latter includes other areas (apart from the city center) as well. In any case, for our analysis we considered these areas as the city center of Kalamata.

The number of immigrants who live in Kentro - Palia Poli, and its proportion of the total number of immigrants of the city, gives us the degree of centralisation for each year as measured by the PCC index.

Table 8 presents the results of the Index by year, while Figure 18 shows its evolution for the whole city of Kalamata throughout the examined period.

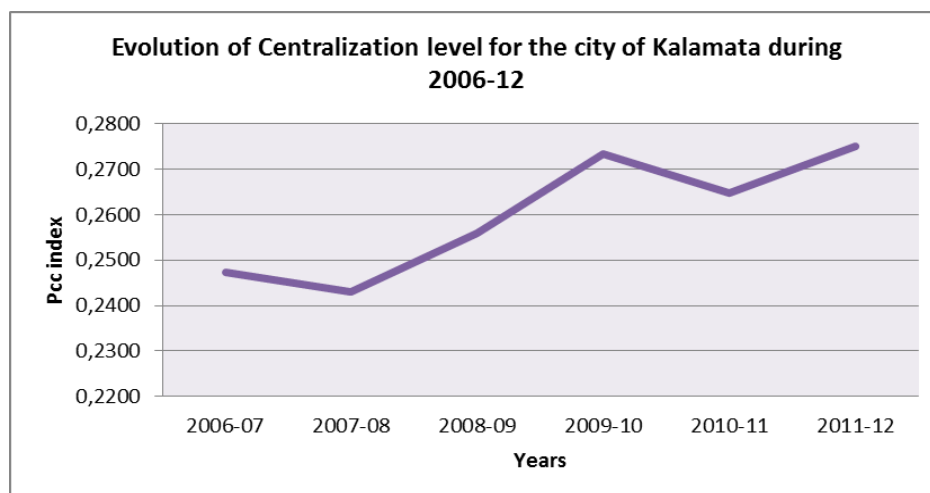
As we can see from the Table 8 below, the PCC index has not experienced remarkable fluctuation. The lowest value is observed in 2007-08 and the highest one in 2011-12 and the average is 0.2599. Also, we can argue that there is evidence of centralization within the urban fabric.

Years	PCC
2006-07	0.2473
2007-08	0.2429
2008-09	0.2560
2009-10	0.2734
2010-11	0.2647
2011-12	0.275
Average	0.2599

**Table 8:** PCC calculations for the city of Kalamata during 2006-2012  
**Source:** Own construction

It is noticeable from Figure 18 below, that the centralization level fluctuates over time but the general trend is that moves upwards. From 2007-08 up until 209-10 it is constantly increasing. This means that for this period the city center received a substantial influx of immigrants probably because they arrived in the city and they were seeking for low cost residences which are available at the city center. Before and after that point, a decrease is recorded, presumably due to this relocation to other areas of the city.

In 2010-11 up to the end of the study period it is rising again probably due to the financial crisis, which reduced incomes and has driven immigrants back to the low cost housing of the city center.



**Figure 18:** Evolution of Centralization Level for the city of Kalamata for the years 2006-2012

**Source:** Own construction

## 6.6 Clustering

In this section we evaluate the degree of clustering within the whole urban area of Kalamata from 2006 to 2012. High levels of clustering indicate that neighbourhoods of immigrants are close to each other (have common borders), making wider clusters of immigrant-areas and possibly wider ethnic enclaves. In contrast, levels of residential clustering remain low if minority areas are dispersed within the whole city.

The index of spatial proximity (SP) is used to measure the degree of residential clustering within the whole city. Table 9 provides the values of the Index for the period examined.

SP of 1.0 indicates no clustering at all, whereas values above 1.0 show the existence of various levels of clustering and the formation of ethnic enclaves.

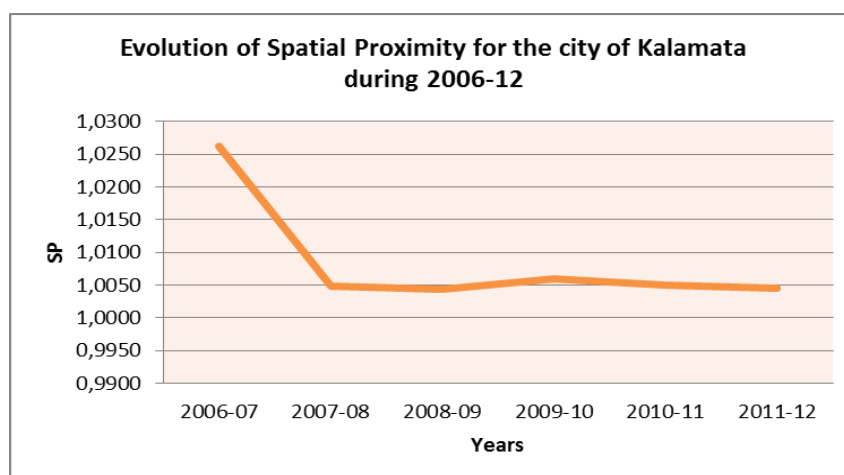
In the case of Kalamata the SP is somewhat above one which means that there is some clustering but one which is very small. As regards its evolution, we see that in the first examined year the SP declines but from that point but from that point onwards it remains steady without fluctuations.

Years	SP
2006-07	1.0263
2007-08	1.0048
2008-09	1.0044
2009-10	1.0059
2010-11	1.0051
2011-12	1.0045
Average	1.0085

**Table 9:** Index of Spatial Proximity for the years 2006-12

**Source:** Own construction

As a general remark we could argue that although SP is slightly above one, this does not constitute evidence to support the claim that there is considerable residential clustering and formation of ethnic enclaves. This is further supported by the fact that the SP diminishes as time goes by (Figure 19).



**Figure 19:** Evolution of Spatial Proximity for the city of Kalamata during 2006-2012

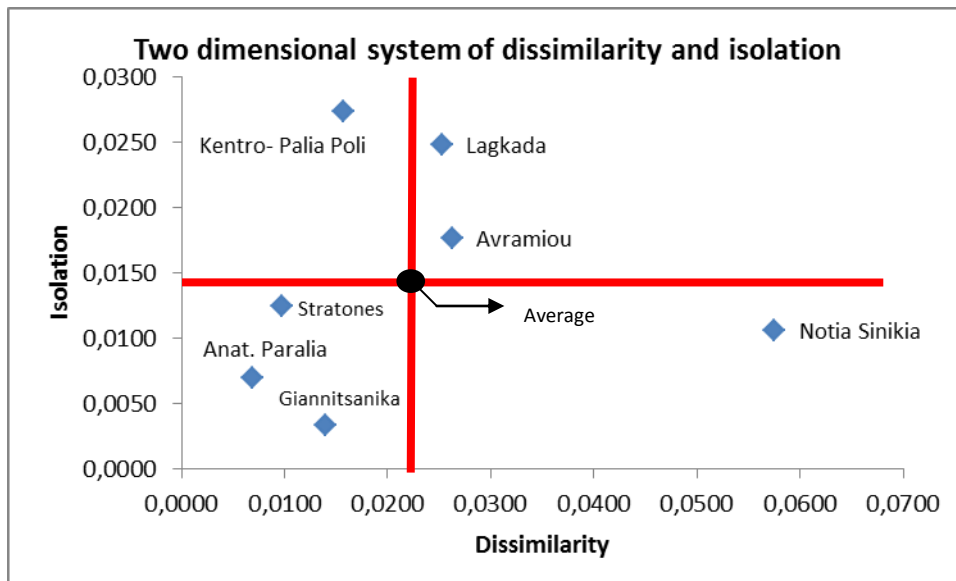
**Source:** Own construction

## 6.7 Combined degree of Evenness and Exposure

After having evaluated the five dimensions of residential segregation, this section explores the combined effect of evenness and exposure for the period 2006 to 2012.

The different neighbourhoods of Kalamata are placed into the combined D-I diagram, according to their values of the (previously calculated) D and I indices. Moreover, the overall average value of each index is plotted (the “red cross”), which helps us to identify where each neighbourhood stands with regards to the four quadrants. The position of each neighbourhood within these quadrants gives us more solid evidence on their degree of residential segregation.

As discussed, areas which are placed in the upper right quadrant are those which experience higher levels of segregation. Their scores on both combined indices of segregation are higher than the city average and, as a result, immigrants who live in these areas tend to be more segregated (overrepresented and isolated) than in other neighbourhoods. The exactly opposite quadrant, which is the bottom left one, includes areas with lower scores on both indices than the city average. This means that these areas experience less segregation of immigrants who tend to be more integrated with the natives. The rest two quadrants include areas which are in an intermediate situation. Areas of the upper left quadrant record higher levels of isolation and lower levels of dissimilarity, indicating that immigrants are under-presented in those areas but are isolated from the native population. On the contrary, areas of the bottom right quadrant show high dissimilarity and low isolation values, which means that they house relatively higher numbers of immigrants which are quite espoused to the majority population.



**Figure 20:** The Two dimensional system of Dissimilarity and Isolation  
**Source:** Own construction

The final graph (Figure 20, above) displays the combined effect of dissimilarity and isolation for the whole period of study. Each point corresponds to the average of both indices for each neighbourhood, whereas the point that the two lines intersect (the “red cross”) refers to the total average of the two indices for all neighbourhoods for the whole period of study. A number of conclusions can be drawn.

At the upper right quadrant there are the districts of Lagkada and Avramiou, both of which exhibit the highest degree of segregation as it is assessed by both isolation and dissimilarity. These areas not only amass higher number of immigrants but the latter are relatively isolated from the majority population. At the down left side there are the neighborhoods of Stratones, Anatoliki Paralia and Giannitsanika. These show the lowest degree of segregation (lowest dissimilarity and isolation levels), meaning that house low numbers of immigrants which are quite mixed with the natives.

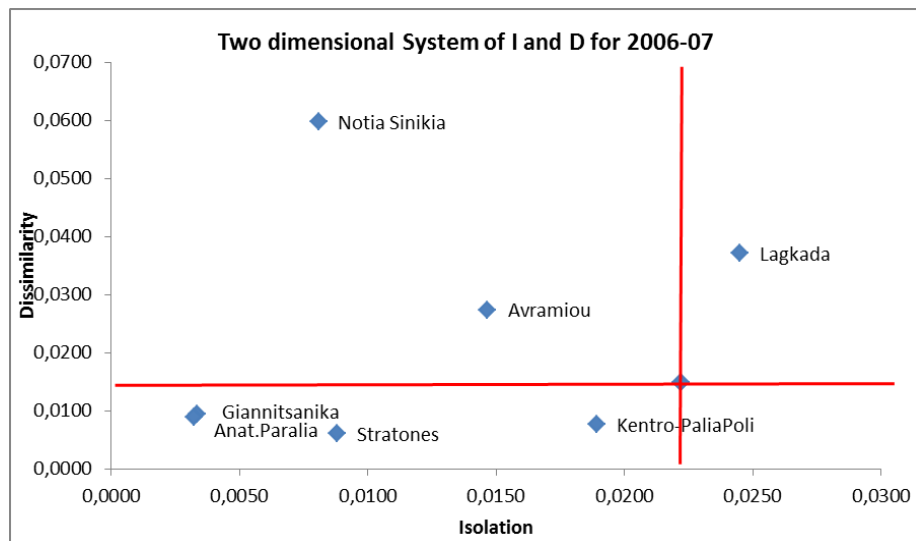
At the upper left quadrant we find the neighbourhood of Kentro - Palia Poli. It exhibits higher isolation and lower dissimilarity indicating that immigrants are underrepresented but more isolated as compared to the other areas. Finally Notia Sinikia exhibits a segregation pattern described by high dissimilarity and low isolation, which means that immigrants are quite a few there but are highly exposed to the native population.

For a better understanding of the immigrant segregation in Kalamata, we will construct the two dimensional system of (I) and (D) for all neighbourhoods and each



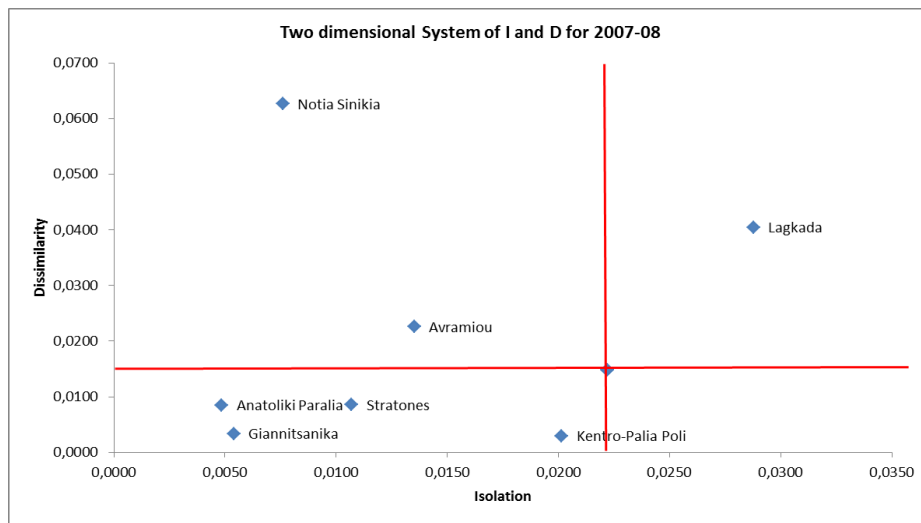
single year. The point of the lines intersection is the average (D) and (I) of all years as in the Figure 20 above.

As we see from the Figure 21 below, in 2006-07, the areas of Notia Sinikia and Avramiou exhibit high levels of dissimilarity and low levels of isolation whereas the areas of Giannitsanika, Anat.Paralia, Stratones and Kentro-Palia Poli, exhibit low levels of dissimilarity and isolation. Lagkada is characterized by high dissimilarity and isolation levels.



**Figure 21:** The Two Dimensional System of Isolation (I) and Dissimilarity (D) for the year 2006-07  
**Source:** Own construction

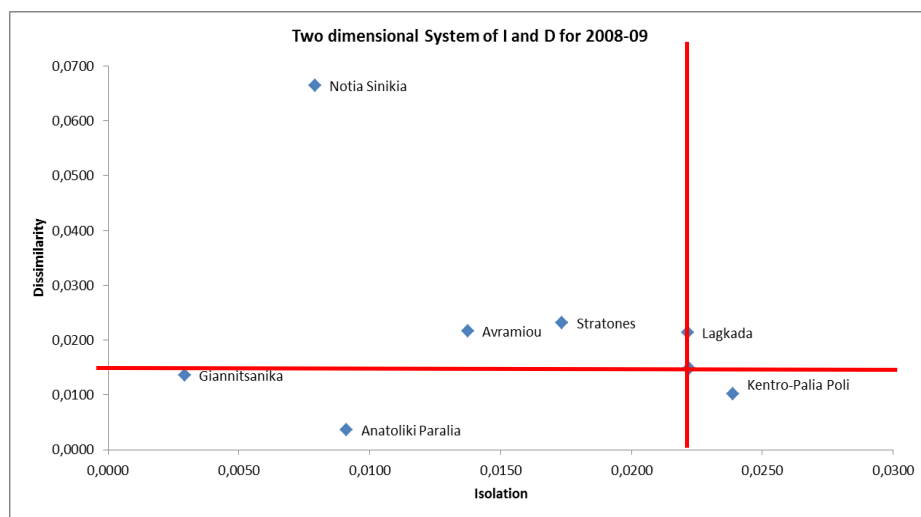
It is evident from the Figure 22 below that in 2007-08 the segregation pattern remained the same as the previous year.



**Figure 22:** The Two Dimensional System of Isolation (I) and Dissimilarity (D) for the year 2007-08

**Source:** Own construction

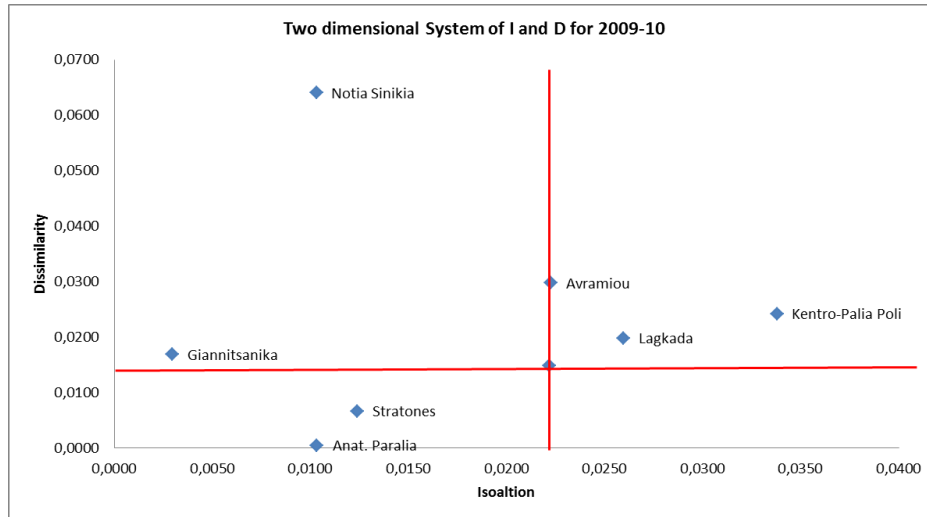
In 2008-09 the picture changes. The area of Stratones moves from the bottom left to the upper left quadrant, along with Notia Sinikia and Avramiou. Kentro-Palia Poli lies in the low D and high I quadrant, whereas the area of Lagkada is close to the averages of D and I.



**Figure 23:** The Two Dimensional System of Isolation (I) and Dissimilarity (D) for the year 2008-09

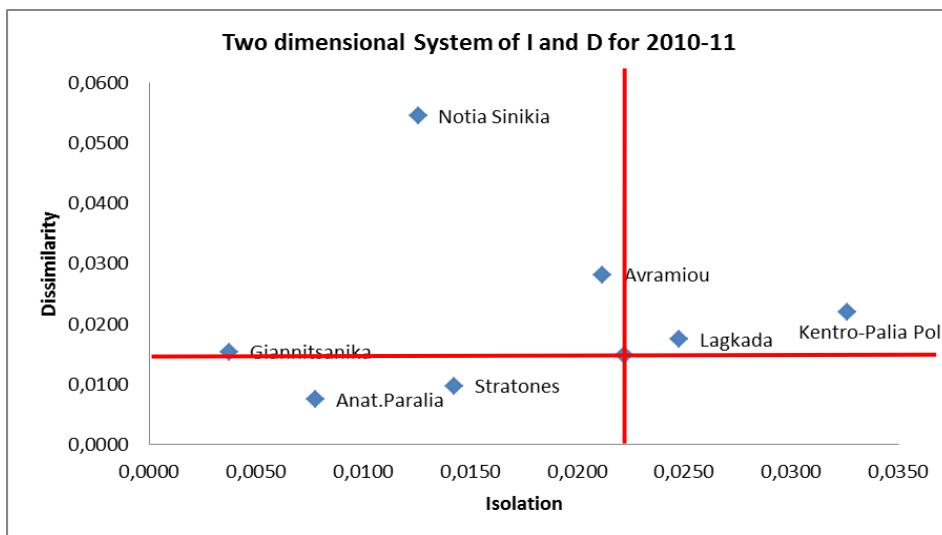
**Source:** Own construction

As we notice in the Figure 24 below, further changes occur over the year 2009-10; Notia Sinikia and Giannitsanika remain in the upper left quadrant, but the areas of Avramiou and Kentro-Palia Poli move to the upper right quadrant of high D and I.



**Figure 24:** The Two Dimensional System of Isolation (I) and Dissimilarity (D) for the year 2008-09  
**Source:** Own construction

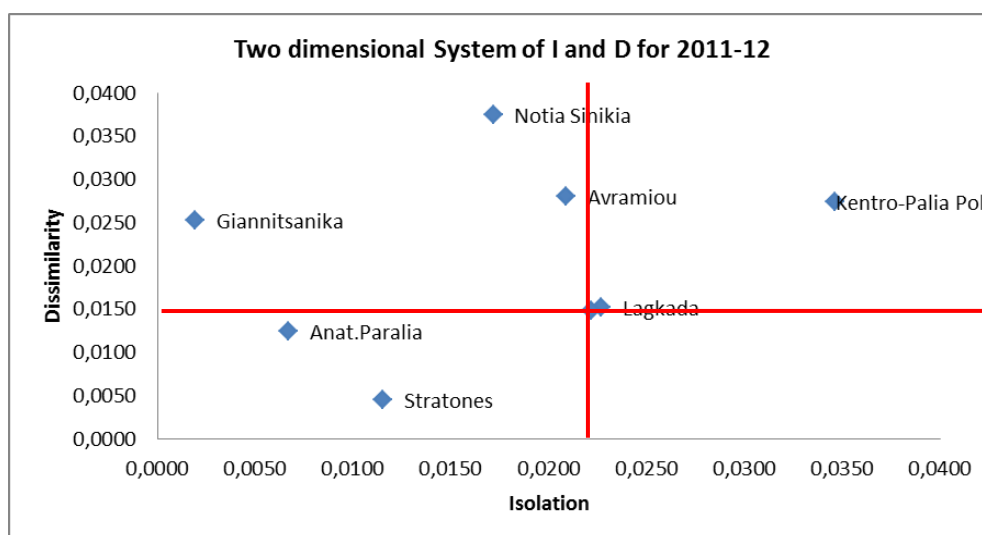
In the next year, 2010-11, the picture remained almost the same. Most of the areas experienced variations at the values of the indices, but they retain their positions in the diagram, apart from the area of Avramiou which moves to from the upper right to the upper left quadrant (high D and low I levels).



**Figure 25:** The Two Dimensional System of Isolation (I) and Dissimilarity (D) for the year 2010-11  
**Source:** Own construction

According the Figure 26 below, in 2011-12, the picture remained unchanged as the year before. If we compare the last year of the study period to the first one, we see a

totally different pattern. The areas of Giannitsanika and that of Kentro-Palia Poli experienced the greater changes. The former was moved from the low I and D quadrant to that of high D and low I while the latter from the low I and D quadrant to that of high I and D.



**Figure 26:** The Two Dimensional System of Isolation (I) and Dissimilarity (D) for the year 2011-12  
**Source:** Own construction

Overall, we can argue that due to the quite low and relatively stable figures in all segregation dimensions, there seems to be not strong and clear pattern regarding the residential preferences of immigrants in the city of Kalamata. Seen from another perspective, one could claim that since immigrants are highly exposed to the native population and there is no profound evidence of ethnic enclave materialization, the spatial assimilation model is perhaps the most appropriate to describe the dynamics of immigrant settlement.

However, the economic crisis the country is experiencing since 2007-08 have affected the pattern of immigrant segregation in the city. As we have seen concentration, isolation and centralisation have generally increased over the last years indicating the preference of immigrants to cluster together in the city centre, probably due to economic reasons (the drop of their incomes) and the relatively low cost of living (in housing, transportation, etc.) that central areas afford.

## 6.8 Directions for future research

On the basis of the above findings, this section outlines some suggestions for future research.

Our research used data regarding primary school enrolments of immigrant students for a period of six school years and within this period there has not been seen any remarkable change in the pattern of immigrant segregation in the city. On these grounds it would be useful to collect data for a long period, perhaps for the last twenty years or so, and repeat all calculations in order to shed light on the intertemporal change of segregation and see whether a much clearer pattern is evident.

Another possible extension could be to divide the immigrant population into sub-groups depending on their country of origin, nationality or religion and explore the pattern of segregation for each one of these sub-groups.

In case somebody wants to generalize the study, he could consider other small cities of Greece, collect data for the Primary School enrolments for both immigrant and native students over the last twenty years and examine the locational preferences, residential patterns and evolution of segregation of immigrants.

## 6.9 Conclusions

This chapter shed light on the pattern of immigrant segregation in Kalamata over the last six years, i.e. 2006-2012, on the basis of the five-dimension segregation framework of Massey and Denton (1988).

Data from immigrant student enrolments in twenty-two Primary Schools which are located to seven districts of Kalamata were used.

The general trend is that although the number of immigrants increases over the whole period of study, segregation is not assessed (on the basis of the indices calculated) to be of a high degree. In particular, the dissimilarity index lies between 0 and 0.07 which means that there is no particularly strong presence of immigrants in any area of the city.

Even lower are the figures of the isolation index (though a slight increase is reported over the years), indicating that immigrants in Kalamata are quite exposed and assimilated to the native population. Similar is the case for concentration and centralization, although we observe some increase in the last years.

As regards clustering, there is some evidence that the areas where the immigrants reside adjoin one another, but the small number of neighbourhoods and the low SP

figures denote that clustering is minor and that there is no ethnic enclave under formation.

Of the neighbourhoods, the one that immigrants are most overrepresented is Notia Sinikia, probably due to the fact that this area provides a wide variety of housing at quite affordable prices, whereas Kentro – Palia poli is the district with the highest concentration and isolation values probably because it is the oldest area of Kalamata full of old, cheap and low quality housing stock. These findings are consistent with previous studies examining the patterns of immigrant residence in medium-sized Greek cities (Arvanitidis and Skouras, 2009) which highlight the importance of housing stock (especially this of low cost) in the residential choices of immigrants.

On the other hand, the two dimensional D-I diagram shows that the district of Kentro - Palia Poli exhibits higher isolation and lower dissimilarity indicating that immigrants are underrepresented but are more isolated as compared to the other areas while Notia Sinikia exhibits a segregation pattern described by high dissimilarity and low isolation, which means that immigrants are quite a few there but are highly exposed to the native population. In addition, if we construct the two dimensional system of I and D for every year, we see that there are not significant fluctuations at the I and D levels but if we compare the figures of the first and the last year of the study period, we see that the areas of Giannitsanika and that of Kentro-Palia Poli experienced the greater changes. The former was moved from the low I and D quadrant to that of high D and low I while the latter from the low I and D quadrant to that of high I and D.

Overall, based on the findings of our research we assert that there is no strong and clear pattern regarding the residential preferences of immigrants in the city of Kalamata and generally we can accept that immigrants are quite exposed to and spatially assimilated with the native population. From a different perspective, the natives seem to have accepted the presence of minority groups and they do not keep the latter at distance.

As far as future research is concerned, a possible extension would be to collect data for longer time frames or to explore the segregation of the various sub-groups (defined by the country of origin, nationality, religion, etc.) that comprise the immigrant population. For generalization purposes, one should also consider examining other small cities from Peloponnesus or the whole country.

## CHAPTER 7. CONCLUSIONS

This dissertation has analysed the intra-urban residential pattern of immigrants in a small-sized Greek city, this of Kalamata. In particular, the study achieved all its objectives by identifying an appropriate conceptual and analytical framework to do so, this of Massey and Denton's (1988), by assessing the degree of immigrant residential segregation in Kalamata through the calculation of all the indices of spatial segregation and this of the combined effect of I-D proposed by Arvanitidis and Skouras (2011), and by outlining its evolution over the last six years. To achieve this goal, the study used data on student enrolments in the twenty-two Primary Schools of Kalamata.

In addition to the above, the current study, answered all the research questions set at the beginning of this thesis. More precisely, the dimensions of spatial segregation of Massey and Denton (1988) are quite appropriate to draw inferences about the locational preferences of the immigrants in the case of a small city such this of Kalamata. As regards the pattern of immigrant residence in Kalamata and its evolution within the period of study, we found that spatial spatial segregation is very low. During the first years, most of the immigrants find residence in the city centre i.e. in Lagkada and Avramiou, but as time goes by, the move out of the centre, to the others areas of the city, a finding which leads us to the conclusion that the immigrant population of Kalamata is quite exposed and dispersed all over the city. We observe that even in the case of a small city, that of Kalamata, the residential pattern of immigrants is similar to this of the metropolitan areas; at the early stages immigrants residing in the downtown but as their incomes rise, they move towards every direction in the city.

The National population censuses of 1991 and 2001 indicated that the actual number of registered foreigners who live in Greece without Hellenic nationality, were about 50,000 and 750,000 respectively.

By 2004 the foreign population increased 950,000. Thus, in 2004 the percentage of foreigners was about 10.3% of the total population, the majority of which are immigrants from Albania (56% of the total immigrants).

We should underline the fact that, the actual number of foreigners that live in Greece remains unknown due to the existence of unregistered immigrants. Unofficial sources claim that the current amount of immigrants in Greece is about 1.2 millions.

Turning the attention in the case of Kalamata, according to the data provided by the Hellenic Statistical Authority, at the beginning of 90's the number of immigrants who resided in Kalamata was quite low (the 1991 National Census, recorded 639 immigrants) and in their majority were Polish and Albanians. One decade later, in 2001, the composition of immigrants in the city changes considerably (following the national pattern) and the city houses immigrants of various nationalities (National Census in 2001 recorded 2972 immigrants). Still, Albanians constitute the vast majority of foreigners in Kalamata experiencing a huge increase in numbers from 47 to 1,552 people while new nationalities have been added to the picture.

The residential preferences of immigrants and the spatial patterns that result from their location decisions have been discussed in the literature under the theme of segregation. Residential, spatial, ethnic or simply segregation is a multi-dimensional phenomenon and concerns the physical separation of two or more groups of people within a specific area, or as Reardon and O'Sullivan (2004) put it, it is the extent to which persons of different groups occupy and experience different spatial and social environments.

Although there is no commonly accepted methodology for the comprehension and assessment of segregation, a large number of studies have followed the approach developed by Massey and Denton (1988) spatial dimensions/axes, *evenness*, *exposure*, *concentration*, *centralization* and *clustering*.

However other scholars have criticised the aforementioned approach on the grounds that it is in essence "a-spatial", meaning that it does not take into account the spatial patterning of population distributions. On these grounds, Reardon and O'Sullivan (2004) have put forward another methodology for segregation which is certainly more advanced than that of Massey and Denton but it demands high amount of information and is difficult in the calculations (require use of GIS). It is on these grounds, therefore, that the current study adopts the methodological framework of Massey and Denton and puts forward a number of indices to assess segregation in the five aforementioned dimensions.

There are many empirical studies which have examined the issue of ethnic segregation in America –where the topic has been explored for quite many years-, Canada and Europe. As regards the former, with regard to ethnic segregation, studies have identified that segregation was declined at the beginning of the twentieth century but it was raised again between White and colored population again as a result of the



voluntary decision of the minority groups to reside with their co-ethnics and take advantage of the existing networks. Some minority groups, such as Latinos and Asians, often serve as “buffer zone” between the white and colored population and decline the degree of spatial segregation. The same pattern applies in the case of Canada, where the Portuguese community chose to remain segregated to exploit the social networks of their co-ethnics.

At the same time, the picture in Europe is far from clear. In the Netherlands some studies indicate that the Dutch prefer to live at distance from minority groups while others find that minority groups to be quite exposed to the natives since the major factor of their locational choices is the low cost housing. In France evidence indicate that there is immigrant segregation; especially for those who reside in deprived neighborhoods.

Other studies for Europe, find that Germans, Austrians, Swiss, British and French show similar locational behavior and tend to concentrate in “high quality” districts while Italians, Spanish and Turks exhibit a greater concentration in “low quality” neighborhoods.

Overall studies find that the non-EU immigrants tend to choose neighborhoods with low concentration of their co-nationals while immigrants from Europe and other developed countries gravitate towards denser neighborhoods which separate them from native suburbanites but still put them in contact with a wide range of members of other ethnic and racial groups.

Some results seem to indicate two forces driving segregation: the voluntary segregation caused by preferences to live with co-ethnics and the involuntary segregation caused by limited accessibility of low-income foreigners to higher quality districts.

Comparing the segregation patterns in America and Europe, there are cities in the former which show higher levels of ethnic segregation compared to the levels encountered in Europe as measured by the dissimilarity index. However any comparisons between the two sides of the Atlantic are somewhat problematic. This is because the idiosyncrasy of the groups residing in America and Europe do not exhibit similar characteristics and each country has totally different patterns of immigrant residential segregation.

As regards immigrant segregation in Greece both the urban centres and the medium sized cities, seems to exhibit similar patterns i.e. within the first years they reside in

the city centre where low cost housing is available but as their finances being improve they relocate to other areas of the city.

Although researchers have shown some interest in analysing the locational preferences of immigrants in the two Greek metropolises (Athens and Thessaloniki), and to a lesser extent in some medium-sized cities, there have been no studies (to our knowledge) exploring immigrants' residential patterns in the small Greek cities. The current study therefore comes to contribute to this area, exploring empirically the segregation patterns of immigrants in the small-sized city of Kalamata.

Unfortunately, there are no up-to-date official statistics available, specifying the spatial distribution of immigrants at the intra-urban level. As such, our study, following Arvanitidis et al. (2008), assumes that the intra-urban location of immigrants is reflected at the school enrolments of their children and collects such data from the twenty-two public primary schools in Kalamata in order to explore the spatial distribution of immigrants in the city. A number of conclusions have been drawn.

The general trend is that the number and the percentage of immigrant students respectively, is constantly and steadily increasing for the whole period of study.

Results indicate that the spatial distribution of immigrants in the city of Kalamata is quite even (the dissimilarity index remains in very low levels within the period of study), finding which shows no significant segregation between natives and foreigners. The population of immigrants seems to have been assimilated by the local communities.

The empirical facts indicate that the isolation of the immigrant population in Kalamata is extremely low. Meaning that, the minority groups are fully exposed and are not being kept at distance from the local community. Isolation gradually increases over time, but in fact it remains at very low levels.

As regards concentration, the most concentrated neighborhood within the period of study Kentro – Palia Poli probably due to higher accessibility and low cost housing. As a general trend, concentration is increasing but still remains in low levels.

The centralization level experienced fluctuations over time but the general trend is that is moving upwards. This probably happens because the city center received a substantial influx of immigrants seeking for low cost residences which are available at the city center.

Although the SP Index is slightly above one, this does not constitute evidence to support the claim that there is considerable residential clustering and formation of ethnic enclaves. This is further supported by the fact that the SP diminishes as time goes by.

Regarding the interpretation of the two dimensional D-I diagram, this indicates that the district of Kentro - Palia Poli exhibits higher isolation and lower dissimilarity indicating that immigrants are underrepresented but more isolated as compared to the other areas while Notia Sinikia exhibits a segregation pattern described by high dissimilarity and low isolation, which means that immigrants are quite a few there but are highly exposed to the native population. Furthermore, if we construct the two dimensional system of I and D for every year, we see that there are not significant fluctuations at the I and D levels but if we compare the figures of the first and the last year of the study period, we see that the areas of Giannitsanika and that of Kentro-Palia Poli experienced the greater changes. The former was moved from the low I and D quadrant to that of high D and low I while the latter from the low I and D quadrant to that of high I and D.

As a concluding remark, we could argue that, the districts of Lagkada, Avramiou and Kentro – Palia Poli offer more opportunities of cheap and low cost housing and as a consequence, immigrants who reside there are more isolated and concentrated whereas the area of Notia Sinikia hosts mostly immigrants who reside in Kalamata for many years and have a stable income to cover the cost of living there.

The most appropriate model to explain the evolution of segregation pattern in the city of Kalamata is the *Spatial Assimilation model* because as we concluded the immigrant groups are fully exposed to the native population and there is no evidence of ethnic enclaves or high degree of clustering as the immigrants reside all over the city. The natives seem to have accepted the presence of minority groups and they do not keep them at distance.

As far as future research is concerned, a possible direction would be to collect data for longer time periods or to explore the segregation of the various sub-groups (defined by the country of origin, nationality, religion, etc.) that comprise the immigrant population. For generalization purposes, one should also consider examining other small cities from Peloponnesus or from the whole country.

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## **Appendix**



School	Years																	
	2006-2007			2007-2008			2008-2009			2009-2010			2010-2011			2011-2012		
	GR	IM	Tot	GR	IM	Tot	GR	IM	Tot	GR	IM	Tot	GR	IM	Tot	GR	IM	Tot
1 <sup>st</sup>	176	13	179	183	10	193	187	11	198	178	11	189	192	15	207	190	12	202
2 <sup>nd</sup>	154	18	282	142	18	160	141	24	165	134	24	158	133	25	158	133	24	157
3 <sup>rd</sup>	187	21	208	175	24	199	167	28	195	151	27	178	151	33	184	159	21	180
4 <sup>th</sup>	250	12	262	254	20	274	276	5	285	259	39	298	244	46	290	241	48	289
5 <sup>th</sup>	103	8	111	103	11	114	81	14	191	92	18	110	75	16	91	70	22	92
6 <sup>th</sup>	161	28	189	155	28	183	153	29	182	145	41	186	145	40	185	135	38	173
7 <sup>th</sup>	212	5	217	196	6	202	177	24	201	186	5	191	170	4	174	187	10	197
8 <sup>th</sup>	134	2	136	134	11	145	139	15	184	157	15	172	164	12	176	179	13	192
9 <sup>th</sup>	227	33	260	222	39	261	220	29	249	225	37	262	218	39	257	224	38	262
10 <sup>th</sup>	79	6	85	82	5	87	86	6	92	85	8	93	90	10	100	99	8	107
11 <sup>th</sup>	187	12	199	200	8	208	195	10	205	201	8	209	212	8	220	217	8	225
12 <sup>th</sup>	111	8	119	116	9	125	108	9	117	114	4	118	120	6	126	108	10	118
13 <sup>th</sup>	156	14	170	159	20	179	183	16	199	168	29	197	180	22	202	187	27	214
14 <sup>th</sup>	208	25	233	205	26	231	192	28	220	182	35	217	166	27	193	153	26	179
16 <sup>th</sup>	183	11	194	178	14	192	176	13	189	178	12	190	185	15	200	168	11	179
17 <sup>th</sup>	57	2	59	56	3	59	57	10	67	59	12	71	62	8	70	57	10	67
18 <sup>th</sup>	129	13	142	140	17	157	135	10	145	149	12	161	150	15	165	160	10	170
19 <sup>th</sup>	151	6	157	142	4	146	145	1	146	142	1	143	141	1	142	143	3	146
21 <sup>st</sup>	256	17	273	265	18	283	244	21	265	215	29	244	188	30	218	184	25	209
22 <sup>nd</sup>	158	4	162	145	6	151	141	7	148	133	7	140	145	7	152	154	6	160
24 <sup>th</sup>	253	13	266	237	13	250	249	14	263	246	15	261	252	16	268	227	18	245
26 <sup>th</sup>	109	12	121	106	7	113	98	12	110	99	17	116	97	13	110	95	12	107
<b>Total</b>	<b>3641</b>	<b>283</b>	<b>3924</b>	<b>3595</b>	<b>317</b>	<b>3912</b>	<b>3550</b>	<b>12</b>	<b>3886</b>	<b>3498</b>	<b>406</b>	<b>3904</b>	<b>3480</b>	<b>408</b>	<b>3.888</b>	<b>3470</b>	<b>400</b>	<b>3870</b>

**Table 10:** Numbers of both native and immigrant students from 2006 to 2012 for the 22 Primary Schools of the sample

**Source:** Directorate of Primary Schools of Messinia

Years	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
<b>School</b>						
1 <sup>st</sup>	6.88	5.18	5.56	5.82	7.25	5.94
2 <sup>nd</sup>	10.47	11.25	14.55	15.19	15.82	15.29
3 <sup>rd</sup>	10.10	12.06	14.36	15.17	17.93	11.67
4 <sup>th</sup>	4.58	7.30	1.78	13.09	15.86	16.61
5 <sup>th</sup>	7.21	9.65	14.74	16.36	17.58	23.91
6 <sup>th</sup>	14.81	15.30	15.93	22.04	21.62	21.97
7 <sup>th</sup>	2.30	2.97	11.94	2.62	2.30	5.08
8 <sup>th</sup>	1.47	7.59	9.74	8.72	6.82	6.77
9 <sup>th</sup>	12.69	14.94	11.65	14.12	15.18	14.50
10 <sup>th</sup>	7.06	5.75	6.52	8.60	10.00	7.48
11 <sup>th</sup>	6.03	3.85	4.88	3.83	3.64	3.56
12 <sup>th</sup>	6.72	7.20	7.69	3.39	4.76	8.47
13 <sup>th</sup>	8.24	11.17	8.04	14.72	10.89	12.62
14 <sup>th</sup>	10.73	11.26	12.73	16.13	13.99	14.53
16 <sup>th</sup>	5.67	7.29	6.88	6.32	7.50	6.15
17 <sup>th</sup>	3.39	5.08	14.93	16.90	11.43	14.93
18 <sup>th</sup>	9.15	10.83	6.90	7.45	9.09	5.88
19 <sup>th</sup>	3.82	2.74	0.68	0.70	0.70	2.05
21 <sup>st</sup>	6.23	6.36	7.92	11.89	13.76	11.96
22 <sup>nd</sup>	2.47	3.97	4.73	5.00	4.61	3.75
24 <sup>th</sup>	4.89	5.20	5.32	5.75	5.97	7.35
26 <sup>th</sup>	9.92	6.19	10.91	14.66	11.82	11.21

**Table 11:** Evolution of the number (in %) of immigrant students at twenty-two primary schools of Kalamata from 2006 to 2012

**Source:** Own construction

	2006-07			2007-08			2008-09		
	GR	IMM	TOT	GR	IMM	TOT	GR	IMM	TOT
<b>Lagkada</b>	618	69	687	605	79	684	588	70	658
<b>Avramiou</b>	161	28	189	155	28	183	153	29	182
<b>Kentro-Palia Poli</b>	845	70	915	852	77	929	836	86	922
<b>Stratones</b>	355	31	386	347	36	383	332	47	379
<b>Notia Sinikia</b>	1053	48	1005	1029	51	1080	1042	54	1096
<b>Giannitsanika</b>	287	17	304	285	23	308	276	17	293
<b>Anatoliki Paralia</b>	322	20	438	322	23	345	323	33	356
<b>TOTAL</b>	<b>3641</b>	<b>283</b>	<b>3924</b>	<b>3595</b>	<b>317</b>	<b>3912</b>	<b>3550</b>	<b>336</b>	<b>3886</b>
	2009-10			2010-11			2011-12		
	GR	IMM	TOT	GR	IMM	TOT	GR	IMM	TOT
<b>Lagkada</b>	585	84	669	569	81	650	545	75	620
<b>Avramiou</b>	145	41	186	145	40	185	135	38	173
<b>Kentro-Palia Poli</b>	787	111	898	768	108	876	764	110	874
<b>Stratones</b>	324	43	367	333	47	380	324	41	365
<b>Notia Sinikia</b>	1034	68	1102	1019	75	1094	1015	87	1102
<b>Giannitsanika</b>	282	19	301	295	22	317	314	16	330
<b>Anatoliki Paralia</b>	341	40	381	351	35	386	373	33	406
<b>TOTAL</b>	<b>3498</b>	<b>406</b>	<b>3904</b>	<b>3480</b>	<b>408</b>	<b>3888</b>	<b>3470</b>	<b>400</b>	<b>3870</b>

**Table 12:** Numbers of native and immigrant students at each neighborhood of Kalamata from 2006 to 2012

**Source:** Directorate of Primary Schools of Messinia

\*\* GR=GREEKS

\*\*IMM=IMMIGRANTS

\*\*TOT=TOTAL

AREAS	DISTANCE AREAS	m	km	C		
	AREAS	1 to 1	0	0	C <sub>11</sub>	1
	AREAS	1 to 2	1284.39	1.28	C <sub>12</sub>	0.27
	AREAS	1 to 3	1617.66	1.61	C <sub>13</sub>	0.20
<b>Lagkada</b>	AREAS	1 to 4	2754.73	2.75	C <sub>14</sub>	0.06
	AREAS	1 to 5	1787.02	1.79	C <sub>15</sub>	0.17
	AREAS	1 to 6	3050.52	3.05	C <sub>16</sub>	0.047
	AREAS	1 to 7	2460.9	2.46	C <sub>17</sub>	0.08
	AREAS	2 to 1	1284.39	1.28	C <sub>21</sub>	0.28
	AREAS	2 to 2	0	0	C <sub>22</sub>	1
	AREAS	2 to 3	994.31	0.99	C <sub>23</sub>	0.37
<b>Avramiou</b>	AREAS	2 to 4	2215.94	2.21	C <sub>24</sub>	0.11
	AREAS	2 to 5	2057.27	2.05	C <sub>25</sub>	0.13
	AREAS	2 to 6	2862.48	2.86	C <sub>26</sub>	0.06
	AREAS	2 to 7	2895.67	2.89	C <sub>27</sub>	0.06
	AREAS	3 to 1	1617.66	1.61	C <sub>31</sub>	0.20
	AREAS	3 to 2	994.31	0.99	C <sub>32</sub>	0.37
	AREAS	3 to 3	0	0	C <sub>33</sub>	1
<b>Kentro-Palia Poli</b>	AREAS	3 to 4	1253.7	1.2	C <sub>34</sub>	0.28
	AREAS	3 to 5	1296.73	1.29	C <sub>35</sub>	0.27
	AREAS	3 to 6	1871.36	1.87	C <sub>36</sub>	0.15
	AREAS	3 to 7	2117.15	2.11	C <sub>37</sub>	0.12
	AREAS	4 to 1	2754.73	2.75	C <sub>41</sub>	0.06

	AREAS	4 to 2	2215.94	2.21	C <sub>42</sub>	0.11
	AREAS	4 to 3	1253.7	1.25	C <sub>43</sub>	0.29
<b>Stratonos</b>	AREAS	4 to 4	0	0	C <sub>44</sub>	1
	AREAS	4 to 5	1503.52	1.50	C <sub>45</sub>	0.22
	AREAS	4 to 6	909.85	0.91	C <sub>46</sub>	0.40
	AREAS	4 to 7	1967.4	1.97	C <sub>47</sub>	0.14
	AREAS	5 to 1	1787.02	1.79	C <sub>51</sub>	0.17
	AREAS	5 to 2	2057.27	2.06	C <sub>52</sub>	0.13
	AREAS	5 to 3	1296.73	1.30	C <sub>53</sub>	0.28
<b>Notia Sinikia</b>	AREAS	5 to 4	1503.52	1.50	C <sub>54</sub>	0.22
	AREAS	5 to 5	0	0	C <sub>55</sub>	1
	AREAS	5 to 6	1369.46	1.37	C <sub>56</sub>	0.25
	AREAS	5 to 7	841.72	0.84	C <sub>57</sub>	0.43
	AREAS	6 to 1	3050.52	3.05	C <sub>61</sub>	0.05
	AREAS	6 to 2	2862.48	2.86	C <sub>62</sub>	0.06
	AREAS	6 to 3	1871.36	1.87	C <sub>63</sub>	0.15
<b>Giannitsanika</b>	AREAS	6 to 4	909.85	0.91	C <sub>64</sub>	0.40
	AREAS	6 to 5	1369.46	1.37	C <sub>65</sub>	0.25
	AREAS	6 to 6	0	0	C <sub>66</sub>	1
	AREAS	6 to 7	1400.26	1.40	C <sub>67</sub>	0.25
	AREAS	7 to 1	2460.9	2.46	C <sub>71</sub>	0.08
	AREAS	7 to 2	2895.67	2.89	C <sub>72</sub>	0.05
	AREAS	7 to 3	2117.15	2.11	C <sub>73</sub>	0.12
<b>Anat. Paralia</b>	AREAS	7 to 4	1967.4	1.97	C <sub>74</sub>	0.14
	AREAS	7 to 5	841.72	0.84	C <sub>75</sub>	0.43
	AREAS	7 to 6	1400.26	1.40	C <sub>76</sub>	0.25
	AREAS	7 to 7	0	0	C <sub>77</sub>	1
	AREAS	1 to 1	0	0	C <sub>11</sub>	1

**Table 13:** Distances between neighborhood centers

Source: Planning Agency

<b>Average proximity between members of minority groups</b>						
<b>PXX *</b>	<b>2006-07</b>	<b>2007-08</b>	<b>2008-09</b>	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>
PX <sub>1</sub> X <sub>1</sub>	0.0594	0.0621	0.0434	0.0428	0.0394	0.0352
PX <sub>1</sub> X <sub>2</sub>	0.0067	0.0061	0.0050	0.0058	0.0054	0.0049
PX <sub>1</sub> X <sub>3</sub>	0.0120	0.0120	0.0106	0.0112	0.0104	0.0102
PX <sub>1</sub> X <sub>4</sub>	0.0017	0.0018	0.0019	0.0014	0.0015	0.0012
PX <sub>1</sub> X <sub>5</sub>	0.0069	0.0067	0.0056	0.0058	0.0061	0.0068
PX <sub>1</sub> X <sub>6</sub>	0.0007	0.0009	0.0005	0.0005	0.0005	0.0004
PX <sub>1</sub> X <sub>7</sub>	0.0015	0.0015	0.0017	0.0017	0.0015	0.0013
PX <sub>2</sub> X <sub>1</sub>	0.0067	0.0061	0.0050	0.0058	0.0054	0.0049
PX <sub>2</sub> X <sub>2</sub>	0.0098	0.0078	0.0074	0.0102	0.0096	0.0090
PX <sub>2</sub> X <sub>3</sub>	0.0091	0.0079	0.0082	0.0102	0.0096	0.0097
PX <sub>2</sub> X <sub>4</sub>	0.0012	0.0011	0.0013	0.0012	0.0012	0.0011
PX <sub>2</sub> X <sub>5</sub>	0.0021	0.0018	0.0018	0.0022	0.0023	0.0026
PX <sub>2</sub> X <sub>6</sub>	0.0003	0.0004	0.0002	0.0003	0.0003	0.0002
PX <sub>2</sub> X <sub>7</sub>	0.0004	0.0004	0.0005	0.0005	0.0005	0.0004
PX <sub>3</sub> X <sub>1</sub>	0.0120	0.0120	0.0106	0.0112	0.0104	0.0102
PX <sub>3</sub> X <sub>2</sub>	0.0091	0.0079	0.0082	0.0102	0.0096	0.0097
PX <sub>3</sub> X <sub>3</sub>	0.0612	0.0590	0.0655	0.0747	0.0701	0.0756
PX <sub>3</sub> X <sub>4</sub>	0.0077	0.0079	0.0102	0.0083	0.0087	0.0080
PX <sub>3</sub> X <sub>5</sub>	0.0115	0.0107	0.0112	0.0125	0.0133	0.0164
PX <sub>3</sub> X <sub>6</sub>	0.0023	0.0027	0.0020	0.0020	0.0022	0.0017
PX <sub>3</sub> X <sub>7</sub>	0.0021	0.0021	0.0030	0.0032	0.0027	0.0027
PX <sub>4</sub> X <sub>1</sub>	0.0017	0.0018	0.0019	0.0014	0.0015	0.0012
PX <sub>4</sub> X <sub>2</sub>	0.0012	0.0011	0.0013	0.0012	0.0012	0.0011
PX <sub>4</sub> X <sub>3</sub>	0.0077	0.0079	0.0102	0.0083	0.0087	0.0080
PX <sub>4</sub> X <sub>4</sub>	0.0120	0.0129	0.0196	0.0112	0.0133	0.0105

PX <sub>4</sub> X <sub>5</sub>	0.0041	0.0041	0.0050	0.0039	0.0047	0.0050
PX <sub>4</sub> X <sub>6</sub>	0.0026	0.0033	0.0028	0.0020	0.0025	0.0017
PX <sub>4</sub> X <sub>7</sub>	0.0011	0.0012	0.0019	0.0015	0.0014	0.0012
PX <sub>5</sub> X <sub>1</sub>	0.0069	0.0067	0.0056	0.0058	0.0061	0.0068
PX <sub>5</sub> X <sub>2</sub>	0.0021	0.0018	0.0018	0.0022	0.0023	0.0026
PX <sub>5</sub> X <sub>3</sub>	0.0115	0.0107	0.0112	0.0125	0.0133	0.0164
PX <sub>5</sub> X <sub>4</sub>	0.0041	0.0041	0.0050	0.0039	0.0047	0.0050
PX <sub>5</sub> X <sub>5</sub>	0.0288	0.0259	0.0258	0.0281	0.0338	0.0473
PX <sub>5</sub> X <sub>6</sub>	0.0026	0.0030	0.0021	0.0020	0.0025	0.0022
PX <sub>5</sub> X <sub>7</sub>	0.0052	0.0050	0.0068	0.0071	0.0068	0.0077
PX <sub>6</sub> X <sub>1</sub>	0.0007	0.0009	0.0005	0.0005	0.0005	0.0004
PX <sub>6</sub> X <sub>2</sub>	0.0003	0.0004	0.0002	0.0003	0.0003	0.0002
PX <sub>6</sub> X <sub>3</sub>	0.0023	0.0027	0.0020	0.0020	0.0022	0.0017
PX <sub>6</sub> X <sub>4</sub>	0.0026	0.0033	0.0028	0.0020	0.0025	0.0017
PX <sub>6</sub> X <sub>5</sub>	0.0026	0.0030	0.0021	0.0020	0.0025	0.0022
PX <sub>6</sub> X <sub>6</sub>	0.0036	0.0053	0.0026	0.0022	0.0029	0.0016
PX <sub>6</sub> X <sub>7</sub>	0.0010	0.0013	0.0012	0.0011	0.0011	0.0008
PX <sub>7</sub> X <sub>1</sub>	0.0015	0.0015	0.0017	0.0017	0.0015	0.0013
PX <sub>7</sub> X <sub>2</sub>	0.0004	0.0004	0.0005	0.0005	0.0005	0.0004
PX <sub>7</sub> X <sub>3</sub>	0.0021	0.0021	0.0030	0.0032	0.0027	0.0027
PX <sub>7</sub> X <sub>4</sub>	0.0011	0.0012	0.0019	0.0015	0.0014	0.0012
PX <sub>7</sub> X <sub>5</sub>	0.0052	0.0050	0.0068	0.0071	0.0068	0.0077
PX <sub>7</sub> X <sub>6</sub>	0.0010	0.0013	0.0012	0.0011	0.0011	0.0008
PX <sub>7</sub> X <sub>7</sub>	0.0050	0.0053	0.0096	0.0097	0.0074	0.0068
<b>TOTAL</b>	<b>0.3454</b>	<b>0.3418</b>	<b>0.3411</b>	<b>0.3477</b>	<b>0.3469</b>	<b>0.3586</b>

**Table 14:** Average proximity between members of minority groups

**Source:** Own construction

**\*X:** Minority Population

where 1= Lagkada, 2= Avramiou, 3= Kentro Palia Poli, 4= Stratones, 5= Notia Sinikia, 6= Giannitsanika, 7= Anatoliki Paralia

**Average proximity between members of majority groups**

PYY **	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
PY <sub>1</sub> Y <sub>1</sub>	0.0288	0.0283	0.0274	0.0280	0.0267	0.0247
PY <sub>1</sub> Y <sub>2</sub>	0.0021	0.0020	0.0020	0.0019	0.0019	0.0017
PY <sub>1</sub> Y <sub>3</sub>	0.0078	0.0079	0.0077	0.0075	0.0072	0.0069
PY <sub>1</sub> Y <sub>4</sub>	0.0011	0.0010	0.0010	0.0010	0.0010	0.0009
PY <sub>1</sub> Y <sub>5</sub>	0.0082	0.0081	0.0081	0.0083	0.0080	0.0077
PY <sub>1</sub> Y <sub>6</sub>	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007
PY <sub>1</sub> Y <sub>7</sub>	0.0013	0.0013	0.0013	0.0014	0.0014	0.0014
PY <sub>2</sub> Y <sub>1</sub>	0.0021	0.0020	0.0020	0.0019	0.0019	0.0017
PY <sub>2</sub> Y <sub>2</sub>	0.0020	0.0019	0.0019	0.0017	0.0017	0.0015
PY <sub>2</sub> Y <sub>3</sub>	0.0038	0.0038	0.0038	0.0035	0.0034	0.0032
PY <sub>2</sub> Y <sub>4</sub>	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004
PY <sub>2</sub> Y <sub>5</sub>	0.0016	0.0016	0.0016	0.0016	0.0016	0.0015
PY <sub>2</sub> Y <sub>6</sub>	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
PY <sub>2</sub> Y <sub>7</sub>	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
PY <sub>3</sub> Y <sub>1</sub>	0.0078	0.0079	0.0077	0.0075	0.0072	0.0069
PY <sub>3</sub> Y <sub>2</sub>	0.0038	0.0038	0.0038	0.0035	0.0034	0.0032
PY <sub>3</sub> Y <sub>3</sub>	0.0539	0.0562	0.0555	0.0506	0.0487	0.0485
PY <sub>3</sub> Y <sub>4</sub>	0.0065	0.0065	0.0063	0.0059	0.0060	0.0059
PY <sub>3</sub> Y <sub>5</sub>	0.0184	0.0185	0.0189	0.0182	0.0177	0.0176
PY <sub>3</sub> Y <sub>6</sub>	0.0028	0.0029	0.0028	0.0028	0.0029	0.0031
PY <sub>3</sub> Y <sub>7</sub>	0.0025	0.0026	0.0026	0.0026	0.0027	0.0028
PY <sub>4</sub> Y <sub>1</sub>	0.0011	0.0010	0.0010	0.0010	0.0010	0.0009
PY <sub>4</sub> Y <sub>2</sub>	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004

PY <sub>4</sub> Y <sub>3</sub>	0.0065	0.0065	0.0063	0.0059	0.0060	0.0059
PY <sub>4</sub> Y <sub>4</sub>	0.0095	0.0093	0.0087	0.0086	0.0092	0.0087
PY <sub>4</sub> Y <sub>5</sub>	0.0063	0.0061	0.0061	0.0061	0.0062	0.0061
PY <sub>4</sub> Y <sub>6</sub>	0.0031	0.0031	0.0029	0.0030	0.0033	0.0034
PY <sub>4</sub> Y <sub>7</sub>	0.0012	0.0012	0.0012	0.0013	0.0013	0.0014
PY <sub>5</sub> Y <sub>1</sub>	0.0082	0.0081	0.0081	0.0083	0.0080	0.0077
PY <sub>5</sub> Y <sub>2</sub>	0.0016	0.0016	0.0016	0.0016	0.0016	0.0015
PY <sub>5</sub> Y <sub>3</sub>	0.0184	0.0185	0.0189	0.0182	0.0177	0.0176
PY <sub>5</sub> Y <sub>4</sub>	0.0063	0.0061	0.0061	0.0061	0.0062	0.0061
PY <sub>5</sub> Y <sub>5</sub>	0.0836	0.0819	0.0862	0.0874	0.0857	0.0856
PY <sub>5</sub> Y <sub>6</sub>	0.0058	0.0058	0.0058	0.0061	0.0063	0.0067
PY <sub>5</sub> Y <sub>7</sub>	0.0110	0.0110	0.0115	0.0124	0.0127	0.0136
PY <sub>6</sub> Y <sub>1</sub>	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007
PY <sub>6</sub> Y <sub>2</sub>	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
PY <sub>6</sub> Y <sub>3</sub>	0.0028	0.0029	0.0028	0.0028	0.0029	0.0031
PY <sub>6</sub> Y <sub>4</sub>	0.0031	0.0031	0.0029	0.0030	0.0033	0.0034
PY <sub>6</sub> Y <sub>5</sub>	0.0058	0.0058	0.0058	0.0061	0.0063	0.0067
PY <sub>6</sub> Y <sub>6</sub>	0.0062	0.0063	0.0060	0.0065	0.0072	0.0082
PY <sub>6</sub> Y <sub>7</sub>	0.0017	0.0018	0.0017	0.0019	0.0021	0.0024
PY <sub>7</sub> Y <sub>1</sub>	0.0013	0.0013	0.0013	0.0014	0.0014	0.0014
PY <sub>7</sub> Y <sub>2</sub>	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
PY <sub>7</sub> Y <sub>3</sub>	0.0025	0.0026	0.0026	0.0026	0.0027	0.0028
PY <sub>7</sub> Y <sub>4</sub>	0.0012	0.0012	0.0012	0.0013	0.0013	0.0014
PY <sub>7</sub> Y <sub>5</sub>	0.0110	0.0110	0.0115	0.0124	0.0127	0.0136
PY <sub>7</sub> Y <sub>6</sub>	0.0017	0.0018	0.0017	0.0019	0.0021	0.0024
PY <sub>7</sub> Y <sub>7</sub>	0.0078	0.0080	0.0083	0.0095	0.0102	0.0116
<b>TOTAL</b>	<b>0.3650</b>	<b>0.3653</b>	<b>0.3676</b>	<b>0.3660</b>	<b>0.3638</b>	<b>0.3641</b>

**Table 15:** Average proximity between members of majority groups

Source: Own construction

\*\*Y: Majority Population

Average proximity between members of total population groups						
PTT ***	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
PT <sub>1</sub> T <sub>1</sub>	0.0307	0.0306	0.0287	0.0294	0.0279	0.0257
PT <sub>1</sub> T <sub>2</sub>	0.0023	0.0023	0.0022	0.0023	0.0022	0.0020
PT <sub>1</sub> T <sub>3</sub>	0.0081	0.0082	0.0080	0.0078	0.0075	0.0072
PT <sub>1</sub> T <sub>4</sub>	0.0011	0.0011	0.0011	0.0010	0.0010	0.0010
PT <sub>1</sub> T <sub>5</sub>	0.0075	0.0081	0.0080	0.0081	0.0079	0.0076
PT <sub>1</sub> T <sub>6</sub>	0.0006	0.0007	0.0006	0.0006	0.0006	0.0006
PT <sub>1</sub> T <sub>7</sub>	0.0017	0.0013	0.0013	0.0014	0.0014	0.0014
PT <sub>2</sub> T <sub>1</sub>	0.0023	0.0023	0.0022	0.0023	0.0022	0.0020
PT <sub>2</sub> T <sub>2</sub>	0.0023	0.0022	0.0022	0.0023	0.0023	0.0020
PT <sub>2</sub> T <sub>3</sub>	0.0042	0.0041	0.0041	0.0041	0.0040	0.0037
PT <sub>2</sub> T <sub>4</sub>	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
PT <sub>2</sub> T <sub>5</sub>	0.0016	0.0017	0.0017	0.0017	0.0017	0.0016
PT <sub>2</sub> T <sub>6</sub>	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
PT <sub>2</sub> T <sub>7</sub>	0.0003	0.0002	0.0002	0.0003	0.0003	0.0003
PT <sub>3</sub> T <sub>1</sub>	0.0081	0.0082	0.0080	0.0078	0.0075	0.0072
PT <sub>3</sub> T <sub>2</sub>	0.0042	0.0041	0.0041	0.0041	0.0040	0.0037
PT <sub>3</sub> T <sub>3</sub>	0.0544	0.0564	0.0563	0.0529	0.0508	0.0510
PT <sub>3</sub> T <sub>4</sub>	0.0065	0.0066	0.0066	0.0062	0.0063	0.0061
PT <sub>3</sub> T <sub>5</sub>	0.0163	0.0179	0.0183	0.0178	0.0173	0.0176
PT <sub>3</sub> T <sub>6</sub>	0.0028	0.0029	0.0028	0.0027	0.0028	0.0030
PT <sub>3</sub> T <sub>7</sub>	0.0031	0.0025	0.0026	0.0027	0.0027	0.0029
PT <sub>4</sub> T <sub>1</sub>	0.0011	0.0011	0.0011	0.0010	0.0010	0.0010
PT <sub>4</sub> T <sub>2</sub>	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
PT <sub>4</sub> T <sub>3</sub>	0.0065	0.0066	0.0066	0.0062	0.0063	0.0061
PT <sub>4</sub> T <sub>4</sub>	0.0097	0.0096	0.0095	0.0088	0.0096	0.0089

<b>PT<sub>4</sub>T<sub>5</sub></b>	0.0056	0.0060	0.0061	0.0059	0.0061	0.0060
<b>PT<sub>4</sub>T<sub>6</sub></b>	0.0031	0.0031	0.0030	0.0029	0.0032	0.0032
<b>PT<sub>4</sub>T<sub>7</sub></b>	0.0015	0.0012	0.0012	0.0013	0.0014	0.0014
<b>PT<sub>5</sub>T<sub>1</sub></b>	0.0075	0.0081	0.0080	0.0081	0.0079	0.0076
<b>PT<sub>5</sub>T<sub>2</sub></b>	0.0016	0.0017	0.0017	0.0017	0.0017	0.0016
<b>PT<sub>5</sub>T<sub>3</sub></b>	0.0163	0.0179	0.0183	0.0178	0.0173	0.0176
<b>PT<sub>5</sub>T<sub>4</sub></b>	0.0056	0.0060	0.0061	0.0059	0.0061	0.0060
<b>PT<sub>5</sub>T<sub>5</sub></b>	0.0656	0.0762	0.0795	0.0797	0.0792	0.0811
<b>PT<sub>5</sub>T<sub>6</sub></b>	0.0050	0.0055	0.0054	0.0055	0.0058	0.0062
<b>PT<sub>5</sub>T<sub>7</sub></b>	0.0123	0.0105	0.0111	0.0119	0.0120	0.0129
<b>PT<sub>6</sub>T<sub>1</sub></b>	0.0006	0.0007	0.0006	0.0006	0.0006	0.0006
<b>PT<sub>6</sub>T<sub>2</sub></b>	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
<b>PT<sub>6</sub>T<sub>3</sub></b>	0.0028	0.0029	0.0028	0.0027	0.0028	0.0030
<b>PT<sub>6</sub>T<sub>4</sub></b>	0.0031	0.0031	0.0030	0.0029	0.0032	0.0032
<b>PT<sub>6</sub>T<sub>5</sub></b>	0.0050	0.0055	0.0054	0.0055	0.0058	0.0062
<b>PT<sub>6</sub>T<sub>6</sub></b>	0.0060	0.0062	0.0057	0.0059	0.0066	0.0073
<b>PT<sub>6</sub>T<sub>7</sub></b>	0.0021	0.0017	0.0017	0.0019	0.0020	0.0022
<b>PT<sub>7</sub>T<sub>1</sub></b>	0.0017	0.0013	0.0013	0.0014	0.0014	0.0014
<b>PT<sub>7</sub>T<sub>2</sub></b>	0.0003	0.0002	0.0002	0.0003	0.0003	0.0003
<b>PT<sub>7</sub>T<sub>3</sub></b>	0.0031	0.0025	0.0026	0.0027	0.0027	0.0029
<b>PT<sub>7</sub>T<sub>4</sub></b>	0.0015	0.0012	0.0012	0.0013	0.0014	0.0014
<b>PT<sub>7</sub>T<sub>5</sub></b>	0.0123	0.0105	0.0111	0.0119	0.0120	0.0129
<b>PT<sub>7</sub>T<sub>6</sub></b>	0.0021	0.0017	0.0017	0.0019	0.0020	0.0022
<b>PT<sub>7</sub>T<sub>7</sub></b>	0.0125	0.0078	0.0084	0.0095	0.0099	0.0110
<b>TOTAL</b>	0.3543	0.3616	0.3637	0.3619	0.3602	0.3619

**Table 16:** Average proximity between members of total population groups

**Source:** Own construction