

Migration, diversity and the city of Athens

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Abstract

Migration has traditionally influenced urban spatial segregation within the metropolitan area of Athens. However, this process has also been affected by economic restructuring mechanisms, taking place at the same time and continue to evolve. This study tries to address some empirical research questions related to these issues, in order to better understand whether a spatial segregation of immigrants exists within the metropolitan area of Athens, and the ways in which it has been developed between 2001 and 2011. Given previous evidence, indicating a *vertical segregation* and diffused immigrant settlements, it investigates the ways in which socio-spatial migrant structures have been affected by local economic restructuring processes, as well as the still on-going economic crisis. The study presents a set of urban segregation measures, covering aspects of evenness, exposure, concentration and centralization, as well as the most significant occupational changes between different migrant-status groups (non-EU and EU migrants), during this period. The evidence indicates that there has been an increase on immigrant settlement segregation, accompanied by a higher centralization trend in all cases. Moreover, economic restructuring that took place, following the overall EU trend towards a knowledge-based economic model, has consequently altered the immigrant labor market structure, leading to segregation patterns mostly driven by professionalization.

Keywords: migration, diversity, urban transformation, Athens

Introduction

The relationship between migration and urban transformation processes is considered to be twofold. Developmental processes, taking place within urban areas, have influenced the evolution of migration flows, between and within cities, whereas at the same time, migration as a phenomenon has played an essential role in the (re)shaping processes of urban spaces (Portes, 2000). According to Hall (2004), the socio-spatial compositions of large metropolitan areas have been, to a large extent, affected by three crucial forces: post-industrialization, globalization and migration. Migration and its socio-spatial outcomes should not be ignored, when trying to investigate transformative processes within urban spaces, alongside economic restructuring and internationalization. Although emphasis has been given on issues related to the latter two cases, the exploration of migrants' effects on the dynamics of urban change have largely been overlooked, throughout empirical research (Hatziprokopiou et al., 2016).

Diversity, in terms of social and cultural disparities that arise through migrant settlement in cities, is, for some, a source of inequality. However, for others, diversity is received as a powerful advantage for urban development and planning, which has not been fully specified, yet (Hatziprokopiou et al., 2016; Arapoglou, 2012). Until recently, strategic design of inclusion policies was underestimated within the broader political and urban agenda (Arbaci, 2008; La Cecla, 1998; Maloutas, 2003; Pareja & San Martin, 2000). However, new policies and interventions aiming to promote migrants' integration to local contexts have been developed during the last decade (Rebelo, 2012; Williams, 2009; Wills et al., 2009). The Urban Agenda for the EU (EC, 2016; p.4) emphasizes the importance of acknowledging the polycentric structure of Europe and its urban diversity, through prioritizing the inclusion of migrants and refugees in local societies. Its design was based on the EU contribution to the wider context of Sustainable Development Goals, introduced by the UN 2030 Agenda (UN, 2015), and specifically Goal 11 '*Make cities inclusive, safe, resilient and sustainable*', alongside with the global New Urban Agenda, as part of the Habitat III process.

Despite EU efforts to promote policies for increasing ethnic integration within European cities, evidence suggests that increasing levels of poverty and deprivation can be related to ethnic diversity characteristics (Arapoglou, 2012; Bolt, 2009). The lack of policy effectiveness, in cases like this, is reflected in various levels of spatial inequalities and patterns of segregation, revealing the underlying complex socio-economic framework of cities (Tamaru et al., 2016; van Gent and Musterd, 2016; Burgers and Musterd, 2002). Thus, the interplay of forces acting not only at a global, but also at a local scale, has been an important factor playing a key role in the production of urban socio-spatial inequality framework (Arapoglou, 2012).

This study tries to specifically explore the case of Athens, for which previous evidence has indicated a *vertical segregation* and diffused immigrant settlements in its industrial core and periphery (Kandylis et al., 2012). It investigates the ways in which these socio-spatial migrant structures have been affected by local economic restructuring processes, as well as the still on-going economic crisis, during the period between 2001 and 2011. The article is organized as follows. First, the theoretical framework illustrating the evolution of diversity and urban change interactions, alongside with issues referring to economic restructuring and the case of Athens, is presented in **Sections 2 and 3**, focusing on key aspects of this literature. **Section 4** describes the key methodological aspects, as well as the data sources, being used in the study. Results are illustrated and discussed in **Section 6**, whereas **Section 7** presents the final conclusions of this study.

2 Migration and diversity under the urban context

Urban dynamics and transformation processes have been largely affected by wider global phenomena related to economic restructuring, globalization and migration. Some of the most influential and comprehensive theoretical work regarding urban (re)shaping and change, try to identify the underlying mechanisms taking place and affecting these continuously evolving urban processes. In all cases, diversity, either in terms of ethnic or social characteristics, is treated as a central notion for capturing the essence of inequality.

Global trends have been influential on the socio-spatial outcomes of urban transformative processes, altering at the same time the existing theoretical frameworks accompanying those phenomena. Starting from the Chicago school, the *city mosaic* approach tried to explain urban diversity through a process of segregation between *little worlds which touch but do not interpenetrate* (Park, 1921). Under this context, spatial distance is considered as similar to social distance between different social sub-groups, without being able to separate notions such as ghettos and enclaves (Peach, 2005). The *melting pot* metaphor was used to express the fact that assimilation was considered to be an effective solution to segregation phenomena (Arapoglou, 2012). Lack of political economy aspects, throughout this theoretical approach, has been considered one of its main disadvantages.

As a respond to this drawback, the *global* and the *dual city* thesis encompass globalization processes, economic restructuring and the neo-liberalization framework, throughout their attempt to theorize the relationship between urban diversity and inequality. Segregation is now received as a spatial expression of a rising social polarization (Sassen, 1991), as well as a form of exclusion of the disadvantaged groups (Massey, 2007; Massey and Denton, 1993). The key metaphor in this case, which is related to increasing social divisions within global cities, is based on a *core and periphery* model (Mollenkopf and Castells, 1991; Sassen, 1991). Within this framework, any existing cultural, economic and political polarization derives as an urban restructuring process, incorporating and expressing a threefold contradiction between a metropolitan core of highly-skilled professionals, a disadvantaged inner city and a stratified periphery (Mollenkopf and Castells, 1991). The *global city* comprises a complex network of differences, each one of which could work as a trigger for social division (Hall, 2004).

Sassen (1996) highlights the role of immigrants for providing a new jumping-off point within the global city context, throughout the urban transformation process. Migrants could be potential forces, able to modify commercial and residential spaces, and thus, vehicles for change within and outside the city core (Sassen, 2005). Based on this featured role of migration to the urban transformation process, the Los Angeles school tried to highlight the ways in which cultural heterogeneity and economic inequality interact, for producing new fragmented urban spaces (Soja, 2000). The dynamics of migration,

alongside with social geography of cities, produce uneven patterns of urban restructuring, which affect the established relations within the up-until-now core-periphery model (Li, 2009; Davis, 2000).

The *fractal city* now becomes the main concept for explaining urban transformation, which according to Soja (2000), is able to capture the instability of social geography within a city, arising from the continuous shifts in ethnic distributions, within labour market structure and space. Through a poetic wandering, starting from the post-Fordist industrial *metropolis* and moving on the *cosmopolis*, Soja (2000) finally derives a comprehensive definition of *exopolis*, stating that it represents, on the one hand, *the city turned inside-out*, through the urbanization of the suburbs and the rise of the outer city, whereas at the same time, it represents *the city turned outside-in*, through the globalization of the inner city.

Moving one step forward, the concept of *superdiversity* adds to the overall discourse by highlighting the transnational dimension of contemporary migration flows, as well as their rising level of complexity due to the existing dynamic interactions (Vertovec, 2007). Urban space should be considered as a meeting place of interconnected diversified trajectories, whose resultant force forms the final spatial outcomes (Massey, 2007b). According to Syrett and Sepulveda (2012), the notion of superdiversity points out that modern cities do not comprise solely multiple ethnic fragmentations, but instead, they are also characterized by multiethnic localities. Under this context, it is important to understand that the existence of diversified local trajectories, requires at the same time, a continuous adjustment of local policies.

Regarding the role of welfare state in shaping the social outcomes of economic restructuring, Hamnett's (1996; 2004) contribution has been crucial, especially, in highlighting the distinction between professionalization and polarization phenomena within cities. Social and cultural outcomes of economic change may differ, according to the type of welfare state they occur, as well as the policies being implemented (Bourdieu 2005; Burgers and Musterd, 2002). Specifically, in Europe welfare regimes have strong impacts on urban conditions (Musterd and Ostendorf 1998; Tai 2006). In more liberal welfare state contexts, such as the US, social and ethnic inequalities tend to be expressed directly in urban space. These spatial patterns are characterized by diversified social and cultural groups, being almost clearly separated from each other (Musterd, 2005). When compared to the US case, welfare regimes in Europe indicate high levels of social protection and income redistribution mechanisms, mitigating the effects of economic restructuring and globalization processes (Musterd and Ostendorf, 1998). Under this context, social and ethnic segregation trends are being less noticeable in European-type forms of welfare state, compared to the liberal-oriented paradigm (Tammaru et al., 2016; Musterd, 2005; Arbaci, 2007).

At the same time, metropolises located in South Europe are destinations of a significant number of transnational migrants (Arapoglou and Sayas, 2009). Thus, the intersection of a wide variety of cultural and social differences produces new patterns of urban inequality, which in combination with the 2008 economic crisis and the implemented austerity policies, have put a significant strain on community relations, fostering racist attitudes (Arapoglou, 2012). Especially in the Greek case, both the economic crisis and the severe austerity measures, resulted in a decrease of the pro-poor policy framework being applied, leading to higher levels of residential segregation in Athens.

3 Economic restructuring and the case of Athens

Although the resulting socio-spatial outcomes and conditions, in areas of immigrant settlement, are influenced by the welfare state and the implemented policies, local economic structure is a focal parameter for understanding urban social dynamics, incorporating migration processes (Bourdieu 2005). The shift of urban economies to a post-industrial structure, has been accompanied by additional changes in their labour market structure.

According to Burgers and Musterd (2002), professionalization seems to be the main driving force that has shaped urban labour markets in post-Fordist (advanced) economies. Given the fact that in European countries economic restructuring has been guided through a common perspective targeting to a knowledge-intensive economic structure, the transformation that took place within the urban space had major effects on economic activities and social compositions (van Gent and Musterd, 2016). Under this context, jobs related to the tertiary sector of production, such as business and consumer services, as well

as high-tech and white-collar jobs, started to dominate the urban labour markets. Thus, the positioning of newly arrived low-skilled migrants was largely affected by the type of vacancies at the time of their arrival, enabling them to attend solely jobs located at the lower end of the post-industrial *vacancy chains* (Burgers and Musterd, 2002; Waldinger, 1996).

In terms of local labour markets effects, the consequences of migration are not evenly distributed across space. The ways in which migration processes influence labour market outcomes, depend to a large extent on the skills' structure of immigrants and natives. A common skills' structure in a local labour market, may lead to an increased competition between immigrant and native workers, resulting to a more explicit local effect on wages. This could result to an uneven distributional effect of immigrant settlement throughout space (Dustmann et al., 2008). However, the effects on urban segregation, triggered by shifts in the industrial and ethnic division of labour, have not been yet thoroughly investigated in the literature. In cases of large US metropolitan areas that have been recorded, spatial segregation resulted through a suburbanization process of increasing job opportunities. This phenomenon, in combination of the fact that residential mobility of immigrants is highly associated with issues of residence and work proximity, resulted in trapped groups of low-skilled migrants in inner city neighborhoods (Wilson, 1996; Kasarda, 1989).

However, the case of southern European cities is considered to be different. Increased internal migration processes, that were crucial for their transformation into metropolises, were followed by immigration waves during the last decades. As Malheiros (2002) states, the emergence of residential segregation of ethnic minorities is a recent phenomenon throughout the developmental process of the southern European cities, that is in many cases related to social exclusion expressions. Several southern European cities, including Athens, are characterized by a dual spatial distribution of migrant and native groups, a higher degree of relative suburbanization and over-representation of non-EU immigrants in the inner city. Incorporating the ethnic dimension into the exploration of the spatial organization of the southern European metropolises, is not only altering the up-until-now understanding of these urban spaces, but is also leading to urban policy shifts (Malheiros, 2002).

The metropolitan area of Athens has been considered as one of the most influenced urban areas by the processes of globalization and economic restructuring, during the recent decades (Beaverstock et al., 2015). Both suburbanization and professionalization, have fostered social polarization and spatial segregation phenomena, resulting to an East-West division of Athens (Pantazis and Psycharis, 2016; Kalogirou, 2011; Maloutas, 2001). A comprehensive presentation regarding the evolution of socio-economic segregation in Athens has been given by Maloutas (2015), starting before the 1970s and moving on until the 2000s. The study highlights the abovementioned discrete spatial socio-economic distribution pattern within Athens, where high income areas are concentrated in the north-eastern and southern-eastern parts of the city, whilst low income areas are traditionally located in its western parts. In terms of labour market structure, the traditional location of the working class in western city districts was further intensified during the 1990s (Arapoglou and Sayas, 2009), whereas highly-skilled workers, such professional and managers, tend to relocate in the northern suburbia of Athens, reinforcing the existing spatial segregation. Under this context, migration should be treated as an additional focal parameter of economic growth and socio-spatial transformation taking place in Athens, during the last years (Rovolis and Tragaki, 2006; Arapoglou, 2005; Lianos, 2001).

Table 1 illustrates a brief description of the main findings presented in Maloutas (2015) regarding the spatial segregation process within Athens during the recent decades. In terms of urban core and suburban development, the before 1970s in-flow pattern towards the city center seems to be replaced by a movement of middle- and high-social classes towards suburban areas, between 1970 and 1990. This trend is followed by a significant arrival of immigrants during the 1990s, that were mostly settled in the inner city of Athens, where they could find affordable housing prices, leading to a class desegregation period within the city center. Another important finding is the fact that during the 2000s there were no significant changes in the existing spatial segregation patterns, despite the high level of social mobility in working-class areas. This might be caused due to several reasons, including: family solidarity networks, importance of spatial proximity with family and the fact that parental property is many times located in the same area.

Table 1: Evolution of the spatial segregation process within the metropolitan area of Athens (Maloutas, 2015).

Period	Description of segregation process
<i>Before 1970s</i>	Rapid urbanization process, leading to a deterioration of the living conditions in the inner city of Athens.
<i>1970-1990</i>	Geography of social segregation started to change. (Maloutas, 2000) Sub-urbanization trend. People belonging to high and middle-class groups start to move in the suburbs, mostly in north-east and south-east areas. Suburban growth period.
<i>1990-2000</i>	Presence of a large share of immigrants in the inner city has led to lower levels of social segregation, as immigrants could only find affordable apartments at the central part of Athens. (Maloutas, 2007; Maloutas et al., 2012)
<i>During 2000s</i>	No essential changes in the traditional social division of Athens, between east and west. Increased social mobility movements in working-class suburbs, not followed by high levels of residential mobility (Maloutas et al., 2006). Spatial entrapment of socially mobile groups due to family solidarity networks, importance of spatial proximity with family and the fact that parental property located in the same area (Maloutas, 2004).

Moreover, Athens illustrates several additional interesting features, in terms of ethnic diversity, distinguishing it not only from international standards, but also from other southern European cities. First, high shares of Albanian nationals amongst the total immigrant population is a special characteristic of Athens and other Greek cities (Arapoglou, 2006; Pratsinakis, 2005; Hatziprokopiou, 2003; Labrianidis et al., 2001), diversifying them from other southern European cities. Second, segregation levels within Athens during the 1990s, calculated through the dissimilarity and Gini indices, were low compared to international standards and other southern European cities, in terms of ethnic diversity (Arapoglou, 2006). Finally, immigrant groups including nationals from developed countries illustrate an increased segregation trend, specifically around the most affluent parts of Athens (Arapoglou, 2006).

In conclusion, migration inflows have exerted influence to a large extent on spatial segregation within the metropolitan area of Athens. However, this process was also affected by economic restructuring mechanisms that were taking place at the same time, and continue to evolve. This study will try to address some empirical research questions related to these issues, in order to better understand whether a spatial segregation of immigrants exists within the metropolitan area of Athens, and the ways in which it has been developed between 2001 and 2011. Moreover, it will try to establish a broad picture of the most significant occupational changes between different migrant-status groups, during the period 2001-2011, and compare them with the EU-27 average to point out any existing differences. Under this scope, it will be possible to define specific occupational areas where economic restructuring took place, as well as the ways in which the labor market position of immigrants has changed between 2001 and 2011.

4 Data and methodology

The most important work for measuring diversity, in terms of urban segregation, has been performed by Massey and Denton (1988), who have defined a set of five key dimensions, trying to capture a wide variety of different segregation aspects: evenness, exposure, concentration, centralization and clustering. In this study, we have calculated measures referring to four out of five dimensions for the case of Athens, using migrant and occupational status as the main grouping parameters. In this way, we try to investigate whether urban segregation is affected by ethnic diversity and economic structural characteristics, within the metropolitan area of Athens. Moreover, comparisons between the years 2001 and 2011 help us explore whether the 2008 economic crisis has played an essential role to these

distributional features. Census data from the years 2001 and 2011 have been used for calculating the selected segregation indices.

Starting from the definition of the indices being used here, we follow the annotation of Massey and Denton (1988). According to their study, overrepresentation or underrepresentation of a minority group within space is a feature related to *evenness*, which in other words is related to distributional differences between social groups among urban areal units. The most commonly used measure of evenness is the dissimilarity index, which is given below (**eq.1**):

$$D = \frac{\sum_{i=1}^n [t_i | (p_i - P)|]}{[2TP(1 - P)]} \quad (1)$$

Where t_i and p_i are the total population and minority share of an areal unit $i = 1, 2, \dots, n$, and T and P are the population size and minority share of the total urban area. The dissimilarity index represents the maximum vertical distance between the equality line and the Lorenz curve, derived by the cumulative proportions of the minority and the majority groups. The index varies from 0 (complete integration) to 1 (complete segregation).

Additional measures for evenness include Gini, entropy and Atkinson index. We choose to also calculate the entropy index for the case of Athens, proposed originally by Theil (1972). The total urban entropy of an area is given by **eq.2**:

$$E = \sum_{i=1}^n \left[\frac{t_i (E - E_i)}{ET} \right] \quad (2)$$

Where: $E_i = p_i \ln \left(\frac{1}{p_i} \right) + (1 - p_i) \ln \left(\frac{1}{1 - p_i} \right)$ and $E = P \ln \left(\frac{1}{P} \right) + (1 - P) \ln \left(\frac{1}{1 - P} \right)$

The entropy index measures the weighted average deviation of each unit's i entropy (E_i) from the total metropolitan area's entropy (E), based on diversity criteria. It also varies between 0 (all areas have the same composition) and 1 (all areas contain one group only).

At the same time, *exposure* to the majority members is considered to be another segregation characteristic, indicating the degree of interaction or isolation between the minority and the majority groups. The two basic measures used in this case are based on these two aspects of exposure (Lieberson et al., 1981; Lieberson and Carter, 1982). First, the interaction index reflects the probability for a person belonging to the minority group to share a unit area with majority group person. It is expressed as the minority-weighted average of the majority share in each area. The formula for calculating the interaction index is given in **eq.3**:

$$Inter = \sum_{i=1}^n \left[\left(\frac{x_i}{X} \right) \left(\frac{y_i}{t_i} \right) \right] \quad (3)$$

Where: x_i , y_i are the minority and majority population of area i and X is the total minority population within the overall metropolitan area. In the case of isolation index, the coefficient represents the probability for the minority group members to be exposed only to one another. Both indices vary between 0 (no probability) and 1 (certainty). The isolation index is expressed as the minority-weighted average of the minority share in each area (**eq.4**):

$$Isol = \sum_{i=1}^n \left[\left(\frac{x_i}{X} \right) \left(\frac{x_i}{t_i} \right) \right] \quad (4)$$

Concentration and *centralization* are also two additional dimensions that should be taken into consideration when exploring urban diversity. The first one is related to the extent to which members

of the minority group occupy a short amount of physical space, whilst the latter one reflects the probability for the minority group to be placed around the urban core of the metropolitan area.

In the case of concentration, two simple measures are referred in the literature representing absolute and relative concentration of a group. In the first case, absolute concentration index tries to capture the degree to which a minority group has achieved the highest possible spatial concentration. The formula for calculating the index is (eq.5):

$$ACO = 1 - \frac{\left[\sum_{i=1}^{n_1} \left(\frac{x_i a_i}{X} \right) - \sum_{i=1}^{n_1} \left(\frac{t_i a_i}{T_1} \right) \right]}{\left[\sum_{i=n_2}^n \left(\frac{t_i a_i}{T_2} \right) - \sum_{i=1}^{n_1} \left(\frac{t_i a_i}{T_1} \right) \right]} \quad (5)$$

Where: a_i is the land area of unit i and the areal units are ranked by geographical size. Moreover, n_1 refers to the rank of the area where the cumulative total population of areal units (t_i) equals the total population of the minority group (X), starting from the smallest unit; and n_2 refers to the rank of the area where the cumulative total population of areal units (t_i) equals the total population of the minority group (X), starting from the largest unit. T_1 is the sum of all t_i from 1 to n_1 and T_2 is the sum of all t_i from n_2 to n .

The index varies from 0 (maximum possible spatial de-concentration) to 1 (maximum possible spatial concentration). The previous index illustrates evidence the spatial concentration of the minority group, however it is essential to compare this concentration relatively to the corresponding concentration of the majority group. Thus, the calculation of the relative concentration index adds to the overall segregation discussion, when it comes to comparative analysis, between different social groups. The formula for calculating the relative concentration index is given below (eq.6):

$$RCO = \frac{\left(\frac{\left[\sum_{i=1}^{n_1} \left(\frac{x_i a_i}{X} \right) \right]}{\left[\sum_{i=1}^{n_1} \left(\frac{y_i a_i}{Y} \right) \right]} - 1 \right)}{\left(\frac{\left[\sum_{i=1}^{n_1} \left(\frac{t_i a_i}{T_1} \right) \right]}{\left[\sum_{i=n_2}^n \left(\frac{t_i a_i}{T_2} \right) \right]} - 1 \right)} \quad (6)$$

Where n_1 , n_2 , T_1 and T_2 are defined as above. In this case, the values of the index vary between -1 and 1, as it refers to comparative analysis between two groups. A value of -1 means that the concentration of the majority group (Y) exceeds that of the minority group (X) to the maximum extent, whereas 1 illustrates the opposite. A 0 value of the index indicates that the two groups are equally concentrated in space. Massey and Denton (1988) point out that *the relative concentration index measures the share of urban space occupied by group X compared to group Y*.

Finally, absolute and relative centralization indicate the degree to which a group is located close to the urban core of the metropolitan area, in absolute and relative terms respectively. The equation for calculating absolute centralization, proposed by Duncan and Duncan (1955), is given below (eq.7):

$$ACE = \sum_{i=1}^m (X_{i-1} A_i) - \sum_{i=1}^m (X_i A_{i-1}) \quad (7)$$

Where: m is the areal units of the metropolitan area, ranked by increasing distance from the central business district, and A_i refers to the cumulative proportion of the land area from unit 1 to i . Its values vary from -1 to 1, with positive values indicating a tendency for members belonging to group X to reside close to the city center (Massey and Denton, 1988). At the same time, the calculation formula for the relative centralization index is (eq.8):

$$RCE = \sum_{i=1}^m (X_{i-1} Y_i) - \sum_{i=1}^m (X_i Y_{i-1}) \quad (8)$$

Where m is defined as above. The values for this index also vary from -1 to 1, with positive values indicating a tendency for members belonging to group X to reside closer to the city center when compared to members of group Y (Massey and Denton, 1988).

It is important to notice that the definition of minority groups in these cases can be based on different selection criteria. In our case, first, we choose to use three different migrant-status groups: non-EU and EU immigrants, as well as Greek nationals. Secondly, occupational status is also used as a defining parameter for the social grouping of the population, including the 9 ISCO-08 categories: 1) managers; 2) professionals; 3) technicians and associate professionals; 4) clerical support workers; 5) service and sales workers; 6) skilled agricultural, forestry and fishery workers; 7) craft and related trades workers; 8) plant and machine operators and assemblers; and 9) elementary occupations. The main findings regarding the distribution of immigrants, as well as the occupational structure, within the metropolitan area of Athens are presented in the following section.

5 Empirical findings

Starting the empirical analysis, **Table 2** illustrates the evolution of the indices of urban segregation between 2001 and 2011, for the non-EU and EU immigrant groups. The empirical findings illustrate that the distribution of these two groups of immigrants have been largely changed during the period under investigation. In terms of *evenness*, there seems to be a shift towards a higher socio-spatial segregation patterns, as both the dissimilarity and the entropy index have been increased between 2001 and 2011. It is interesting to notice that the rise in these measures is slightly higher in the case of non-EU immigrant group, indicating higher polarization trends for them within the metropolitan area of Athens.

Table 2: Indices for urban segregation for non-EU and EU citizens in Athens (2001, 2011).

Dimension	Measures of segregation	Non-EU immigrants			EU immigrants		
		2001	2011	Diff (%)	2001	2011	Diff (%)
Evenness	Dissimilarity index	0.235	0.260	10.64	0.251	0.276	9.96
	Entropy	0.040	0.053	32.50	0.031	0.040	29.03
Exposure	Interaction	0.881	0.853	-3.18	0.890	0.851	-4.38
	Isolation	0.105	0.119	13.33	0.016	0.029	81.25
Concentration	ACO	0.446	0.456	2.24	0.475	0.407	-14.32
	RCO	-0.450	-0.499	10.89	-0.343	-0.594	73.18
Centralization	ACE	0.543	0.549	1.10	0.399	0.523	31.08
	RCE	0.247	0.297	20.24	0.089	0.281	215.73

Source: Greek Census (2001, 2011) and authors' calculations.

In terms of *exposure*, the non-EU immigrant groups seem to be more isolated, when compared to EU immigrants, in both cases. When looking at the relative difference, the interaction and isolation indices indicate, as expected, opposite trends, with the isolation pattern being the one to be positively affected throughout the period 2001-2011. For the case of EU immigrant groups, their very low isolation values illustrate a sharp relative increase during the economic crisis period.

Concentration in absolute terms, indicates an opposite movement for the two migrant-status groups. There seems to be a rise in spatial concentration for non-EU immigrants in 2011, whereas the EU immigrants have experienced a de-concentration period. Despite the contrast between these movements, both groups present similar level of absolute concentration in space, fact which does not occur with the case of relative concentration. When comparing the minority groups' concentration with that of the Greek nationals, the findings reveal that in all cases the concentration of the majority group exceeds that of the minority groups. Moving to *centralization*, it appears that both immigrant groups tend to reside closer to the urban core of Athens, as the values of ACE are positive in all cases. Moreover, non-EU immigrants are traditionally more centralized than EU and national residents, situation which has

been intensified during the period 2001-2011. However, EU immigrants experience a much sharper shift during this period, towards a more centralized spatial distribution.

As it has been shown in **Table 2**, the differences between spatial distribution patterns of non-EU and EU immigrants have been smoothed during the period under investigation. Given the fact that the traditional variations within their segregation patterns originated from an existing vertical segregation pattern within the overall immigrant population, it is essential to explore whether there have been any significant changes in terms of economic restructuring in the overall labor market structure, but also within these two immigrant groups, that could have possibly affect them.

Starting from the overall labor market structure for the case of Athens, relatively to the EU general trend, **Table 3** presents the occupational distribution within the metropolitan area, as well as the EU-27 shares, in order to better understand the changes that took place during this decade. The recorded changes and trends of the labor market restructuring process, have been similar in both cases. Firstly, during the period 2001-2011 there has been an essential economic restructuring process, in terms of the labor market structure, within the area of Athens. More specifically, there has been a rise in the labor market share related to professionals (group 2) and service and sale workers (group 5), whereas the shares of managers (group 1), clerks (group 4) and craft and related trades workers, plant and machine operators and assemblers and elementary occupations (groups 7, 8 & 9) have decreased.

It is crucial to notice that the changes between 2001 and 2011, have led to a diversified structure of the shares of groups 2, 4 and 789, which have come to indicate similar values in 2011. This process highlights a significant economic restructuring period for Athens, towards a more knowledge-based labor market structure, where professionals and service workers start playing an important role throughout the overall economic structure of the labor market. Within this new framework, jobs related to lower skills, such as crafts, machine operators and elementary occupations, are losing ground and become less attractive to the market structure.

Table 3: Occupational distribution (%) of total labor market in Athens (2001-2011).

Occupational category (ISCO - 08)	EU-27 countries			Athens		
	2001	2011	Diff.	2001	2011	Diff.
1. Managers	7.60	6.15	-1.44	10.18	6.09	-4.09
2. Professionals	12.22	17.99	5.77	16.24	22.80	6.56
3. Technicians and associate professionals	15.00	15.53	0.54	11.13	11.96	0.83
4. Clerical support workers	11.71	9.99	-1.73	14.55	10.82	-3.73
5. Service and sales workers	13.28	17.17	3.89	15.72	22.66	6.94
6. Skilled agricultural, forestry and fishery workers	6.45	4.13	-2.33	0.88	0.61	-0.27
7. Craft and related trades workers						
8. Plant and machine operators and assemblers	33.74	29.04	-4.70	31.31	25.05	-6.26
9. Elementary occupations						

Source: Greek Census (2001, 2011), Eurostat [lfsa_egais] and authors' calculations.

Regarding the occupational structure of the overall immigrant population, it is very interesting to point out the differences not only between 2001 and 2011, but also between non-EU and EU migrant-status groups (**Table 4**). Although their trends follow the overall labor market trend, it is crucial to notice that there is a structural difference between them. EU migrant-status group indicates higher than the average values in highly-skilled jobs, such as: managers (group 1); professionals (group 2); technicians and associate professionals (group 3); and clerical support workers (group 4). On the other hand, non-EU immigrants are mostly related to lower social status jobs, including: service and sales (group 5); craft

and related trade (group 7); plant and machine operators and assemblers (group 8) and elementary occupations (group 9).

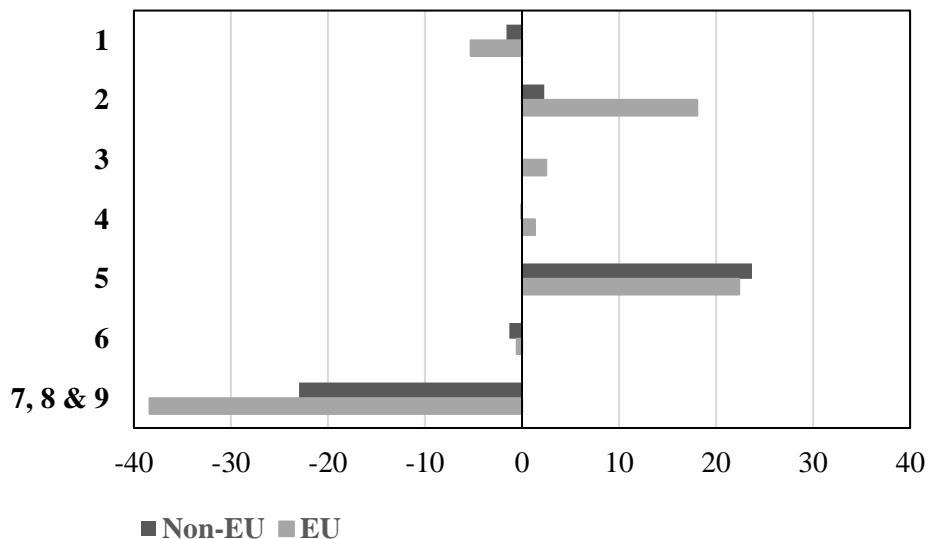
The hierarchical structure of the occupations referring to non-EU immigrants remains the same between 2001 and 2011, with only a slightly higher increase in the professionals (group 2), whilst the EU migrant-status group experiences a structural change during this period. The shift occurs between the groups of professionals (group 2), the service and sales workers (group 5) and the lower social status groups (7, 8, and 9). More specifically, the composition of the EU migrant group shifts towards an even more definite structure, characterized mainly by professionals and service workers, instead of the lower social status occupations. These changes can also be noticed more clearly in the bar chart of **Figure 1**, where the differences between the distribution of occupations during the period 2001-2011, especially for the EU migrant group, are illustrated.

Table 4: Occupational distribution of total, non-EU and EU immigrants in Athens (2001-2011).

Occupational category (ISCO - 08)	2001			2011		
	Total immigrants	Non-EU	EU	Total immigrants	Non-EU	EU
1	3.27	2.49	7.60	1.16	0.90	2.29
2	4.49	2.69	14.60	10.02	4.99	32.65
3	2.74	2.03	6.74	3.35	2.04	9.22
4	3.20	2.64	6.36	3.44	2.50	7.70
5	13.20	13.42	11.93	36.62	37.13	34.32
6	1.33	1.46	0.58	0.13	0.15	0.03
7, 8 & 9	71.78	75.26	52.19	45.28	52.28	13.79
Total	100.00	100.00	100.00	100.00	100.00	100.00

Source: Greek Census (2001, 2011) and authors' calculations.

Figure 1: Differences in occupational structure for the non-EU and EU migrant-status groups in Athens between 2001 and 2011.



Source: Greek Census (2001, 2011) and authors' calculations.

Given the existing deviations in terms of occupational status, between the two immigrant groups being investigated in this study, it is crucial to include an exploration of the spatial segregation patterns in terms of the different occupational groups. This is considered to be an important step towards a better understanding of the residential segregation patterns within Athens. **Table 5** presents the calculated values for each occupational group, referring to the total working population, the non-EU and the EU

immigrant groups. As it can be seen, both groups are illustrating higher values of segregation when compared to the overall labor market population. Furthermore, when comparing the two migrant-status groups the EU group is characterized by higher values of residential segregation.

Table 5: Dissimilarity index for different occupational structures of immigrant groups in Athens, 2011.

Occupational category (ISCO - 08)	Total	Non-EU immigrants	EU immigrants
1. Managers	0.159	0.192	0.282
2. Professionals	0.172	0.221	0.295
3. Technicians and associate professionals	0.063	0.171	0.243
4. Clerical support workers	0.046	0.181	0.251
5. Service and sales workers	0.086	0.210	0.280
6. Skilled agricultural, forestry and fishery workers	0.079	0.315	0.784
7. Craft and related trades workers	0.127	0.240	0.318
8. Plant and machine operators and assemblers	0.180	0.206	0.254
9. Elementary occupations	0.174	0.364	0.353

Source: Greek Census (2001, 2011) and authors' calculations.

In terms of occupational status, higher (groups 1 and 2) and lower (groups 7, 8 & 9) social status groups of occupations seem to be more spatially segregated in all cases. This was expected, as similar social status working groups tend to locate close to each other, leading to a more uneven distribution within the metropolitan area of Athens. The lowest values for the dissimilarity index has been calculated for technicians and clerks, fact which is in line with the findings of Arapoglou (2006) for the year 2001. Moreover, calculated values for the skilled agricultural, forestry and fishery workers (group 6) are not very indicative for the two immigrant groups, as they refer to a very small number of residents.

The dissimilarity index provides information regarding the distribution of immigrants in terms of different occupations, by comparing it to the overall active population. In order to further explore urban occupational segregation, we have also calculated the absolute centralization index for the different occupational groups. As it is shown in **Table 6**, there is a tendency for people working in lower social status occupations to reside closer to the city center of Athens. It is important to notice that the absolute centralization index values decline as we move to higher social status occupations.

Table 6: ACE index for different occupational structures of immigrant groups in Athens, 2011.

Occupational category (ISCO - 08)	Total	Non-EU immigrants	EU immigrants
1. Managers	0.228	0.358	0.374
2. Professionals	0.310	0.460	0.484
3. Technicians and associate professionals	0.322	0.463	0.490
4. Clerical support workers	0.354	0.495	0.527
5. Service and sales workers	0.378	0.520	0.558
6. Skilled agricultural, forestry and fishery workers	0.330	0.531	0.912
7. Craft and related trades workers	0.414	0.559	0.603
8. Plant and machine operators and assemblers	0.364	0.500	0.550
9. Elementary occupations	0.488	0.635	0.611

Source: Greek Census (2001, 2011) and authors' calculations.

When comparing the two immigrant groups, this trend continues to exist, but to a higher extent, illustrating a higher tendency of immigrants to locate closer to the city center, throughout all occupational groups. Thus, the hypothesis of a suburbanization trend of the non-EU migrants cannot be supported in this study. This is in alignment with the findings of Arapoglou (2006) for Athens for the

year 2001, which have rejected the hypothesis of Malheiros (2002), regarding the higher degree of suburbanization of migrants coming from less developed and non-EU countries.

In general, the level of centralization indicates similar values between the two minority groups, meaning that there is no deviation in location choices between different migrant-status groups, when comparing the same occupational groups. This fact indicates a spatial segregation outcome within the metropolitan area of Athens, that is more closely related to labor market structural characteristics than sub-ethnic divisions.

6 Conclusions

Starting from the *city mosaic* approach, introduced by the Chicago School, and moving on to more recent theoretical perspectives regarding urban segregation processes, that treat cities as *global* or *fractal* syntheses, we have tried to explore the evolution of diversity theories. Migration and economic restructuring are found to be common forces, affecting the overall spatial outcomes of diversity, introducing each time different lines upon which new gaps arise within the urban space.

The quest for paths and links between diversity and city formation processes should always take into consideration crucial structural turning points of economic history. First, the transition to a post-industrial economic growth model, accompanied by globalization and followed by a knowledge-based economic structure, constitute two important parameters that have affected not only the labor market structure, but also the processes of immigrant assimilation, especially within the urban space. These parameters have played and continue to play a key role during social segregation processes, not only as centripetal forces for immigrant flows, but also as centrifugal vectors for widening socio-economic inequalities through spatial isolation.

Taking Athens as our main case study, we have tried to shed light on the spatial residential segregation patterns that have aroused during the last decade, within its metropolitan area. As in the most Southern European countries, throughout this period, spatial segregation within Athens has been largely affected by immigration, alongside with economic restructuring processes. However, its levels have not largely increased.

Findings of this study illustrate that there has been an increase in spatial segregation in the case of non-EU and EU immigrants. This increase has been relatively higher in the case of non-EU immigrants. Moreover, exposure to different migrant-status persons has indicated a decrease, leading to higher values of the isolation index, especially for the case of EU citizens. Absolute and relative concentration measures have shown that there is not any important ethnic concentration trend within the metropolitan area of Athens, that could potentially work as a boosting parameter for spatial segregation. However, both immigrant groups tend to reside closer to the city core, trend which has been intensified during the period under investigation.

Given the fact that no important elements exist in favor of the hypothesis of a high ethnic segregation pattern within Athens, we have also tried to explore any possible underlying patterns of urban segregation based on occupational characteristics. The labor market restructuring, that has been taking place in Athens between 2001 and 2011, follows the overall EU economic restructuring model. The same also happens with the two migrant-status groups that we explore. Segregation information that arises from the combination of these two parameters, indicates higher dissimilarity values for both non-EU and EU immigrants, compared to the total labor market population. However, occupational structure seems to play an essential role in the case of absolute centralization, as it is negatively related to the social occupational status.

In conclusion, we have shown that during the last decade the spatial segregation phenomena within Athens have been intensified, without indicating very high levels. Moreover, centralization of immigrants has also been enhanced. The overall labour market structure has followed the general trend towards a more knowledge-based economy, without illustrating any evidence supporting the hypothesis of an increasing migrant-group segregation. Finally, this shifting trend towards a knowledge-based economic model, has consequently led to segregation patterns mostly driven by professionalization.

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