

Vertical Segregation In Southern European Cities. The Case Of Malaga Spain

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Abstract

The city of Malaga has experienced a huge increase of foreigners between 2003 and 2013, but their levels of residential segregation are generally low, as occurs in many South European cities. Nonetheless, it is worth to study if this increase of foreigners has been accompanied by a rise of the levels of vertical segregation. Using data from the Padron Municipal de Habitantes, focused on eleven selected neighborhoods, we have been able to demonstrate that, in fact, vertical segregation is present among foreigners.

Key words: Vertical segregation, immigrants, residential differentiation.

Resumen

Evidencias sobre la segregación vertical en ciudades del sur de Europa. El caso de la ciudad de Málaga

En la ciudad de Málaga el crecimiento de la inmigración ha supuesto un aumento de sus contingentes entre 2003 y 2013 de 133 por ciento, lo que ha incrementado el interés por su análisis. Los estudios realizados apuntan a que el grado de segregación social de los inmigrantes en los países del sur europeo no supera el de otras regiones, pero si indican la existencia de una fuerte precariedad habitacional. Bajo esta premisa nos planteamos si aunque no sea extrema la segregación residencial, la misma ha venido acompañada por un aumento de la segregación vertical. Tras efectuar un análisis sobre el estado de la cuestión, hemos caracterizado a los barrios objeto de estudio, y hemos procedido a la consecución de los datos, cuyo tratamiento nos ha permitido confirmar la constatación de dicha segregación.

Palabras clave: Segregación vertical, inmigración laboral, diferenciación residencial.

INTRODUCTION

In the last decades of the twentieth century foreign immigration in Spain has become a crucial demographic and social transformation factor. It has changed the traditional trends of migratory movements, and has led to the consolidation of a new migratory model (Fernández, 2001). In Spain, traditionally immigration from abroad has been a minor flow compared to the departures that have historically occurred; however, as departures declined, arrivals have been increasing steadily decade to decade, stepping up since 1990 and continuing throughout the first decade of the 21st century. Besides that, we could also identify a shift in the immigration pattern generated by the high degree of diversity that the phenomenon has acquired today (Larrubia, 2014). In this way, there has been a weakening of the residential and consumer flows, (mainly from Northern and Central Europe), and a simultaneous reinforcement of the production-based migration pattern, with a defined labor and feeded by natives of the other continents (Salvá, 2003).

The rapid growth of these migratory flows, which in the case of the city of Malaga has led to an increase in its quotas between 2003 and 2013 by 133%, has focused the interest for its analysis from different perspectives. Of particular interest is the spatial distribution of this group, taking into account not only their territorial distribution patterns, but also the processes of socio-spatial segregation due to the intense socio-economic and cultural changes that they entail (Escolano, 2007). In this context, the analysis of residential segregation of the foreign population in urban areas has become a constant in the European context, especially in those countries that, as Spain, have changed their migratory patterns from net emigration to net immigration, coinciding with the decrease of the welfare state benefits (Bayona, 2006).

Previous research establishes a comparison between the situation of segregation of the population in South European countries and those of the Northern Europe and North America. The expected finding is a lower level of segregation in the latter, due to both smaller restrictions in social welfare policy and a larger social housing stock. But it also has been found that the degree of social segregation of immigrants in the countries of southern Europe is not significantly higher than those in the remaining

areas, although they live in a situation of strong housing insecurity (Arbaci, 2010).

In the case of the municipality of Malaga, several studies (Ocaña, 1998, Natera, 2012) have shown that the increase of foreigners registered has been accompanied by a decrease in their levels of segregation, measured through segregation indexes, with the only exception of Sub-Saharan population. However, it has also been shown how this decrease has led to an increase in residential exclusion: immigrants have tended to concentrate in the worst housing stock, in greater extent than the Spanish people have done (Natera, 2015).

But vertical segregation is an aspect that is not studied enough. Practically absent in the corpus of American literature, the research devoted to this topic applied to European spaces is rare, and focused mainly on the Greek space (Maloutas, 1993, 2001). In this context, it is possible to consider whether the decrease in residential segregation has been accompanied by an increase in vertical segregation, that is, if there has been an increase in the amount of foreign population living in less desirable floors. Therefore the objective of our work tries to answer the following question: Is there vertical segregation between labor migrants in Malaga?

To achieve this goal, we will first make a review of the research devoted to vertical residential segregation; secondly we will describe the physical and sociodemographic characteristics of the neighborhoods and, finally, we will answer the question referred.

VERTICAL RESIDENTIAL SEGREGATION / DIFFERENTIATION

When the spatial distribution of the population in the city is studied, their sociodemographic characteristics have been a central theme in geographical research, because residential differentiation becomes an important factor in order to explain the behavior of individuals, and because the place of residence is a clear determinant of population's vital opportunities. Thus, since the beginning of the last century much of the research focused on the social division of urban space have been carried out around the concept of residential differentiation / segregation.

In sociological terms, segregation means the absence of interaction between social groups, and indicates the existence of differences or inequalities within a collective, and the separation of population into different categories of value. In geographical terms, residential segregation is a specific form of territorial segregation in which the categories that separate

individuals refer to their geographical location. Specifically, it refers to the degree to which two or more groups live separately from each other, in different parts of the urban tissue, and results in the existence of variations in certain characteristics between the residents of the different zones of the same city.

Research on residential differentiation has focused mainly on the study of the spatial location of population groups in the horizontal dimension of urban space; a variety of instruments is used to measure differentiation in any of its dimensions or, more recently, to inquire about the randomness of such distributions, using global and local indicators of spatial self-correlation¹.

Focusing on the European context, different patterns and different levels of residential differentiation have been identified between cities in Northern and Central Europe and those in Mediterranean Europe (Arbaci, 2010).

However, there are comparatively few researches focused on the vertical dimension of urban space, on the existence of patterns of location of social groups differentiated in height. Practically nonexistent in the North American context, also in the European context they are very scarce, having focused basically on the Greek space (Maloutas 1993).

In the European context, we could indicate that the different social groups are distributed in the city following different patterns. The height of the buildings (when there were no elevators), the size of households and their facilities (water, toilets, gas, etc.) were the first vertical segregation mechanisms. According to this model, the high-income classes occupied the so-called “principal” and “mezzanine” dwellings, on the first and second floors. Whereas the low-income classes were situated on the upper floors. There was, therefore, an inverse relationship between social class and floor of residence. Also, in the nineteenth century, at the urban tissue surrounding the city centre, the interior houses, corralas and corridor houses, housed the popular classes. Subsequently the urban expansion and the introduction of public transport will make distance the differentiating criterion, generating horizontal segregation. (García, 1980).

Today, amidst the general predominance of horizontal segregation, divergent models are proposed in response to local particularities of urban and social development. And again the vertical segregation becomes an

¹ Among the numerous researchers that have paid attention to this topic are Shevky, 1955; White, 1983; Massey, 1988; Anselin, 1995. Ocaña, 1988; Leal, 1994; Maloutas, 1993, Martori, 2004; Leontidou, 2009; Sabatini, 1999; Rodríguez, J., 2001; Musterd, 2002; Malheiros, 2002; Fullaondo, 2007; Bayona, J 2006, 2011; Arbaci, 2010.

alternative paradigm when the residential attributes within a building are distributed unevenly among the floors. In the case of Spain, a relationship has been shown between the cost of the house and the floor at which it is located. This is pointed out by different market studies from Tecnocasa, one of the main Real Estates of the country. In their report for the first semester of 2013, it was shown that in the city of Malaga the price of houses without an elevator was 20% lower than the others that had this facility (Tecnocasa, 2013).

In this context, some authors have tried to demonstrate that Mediterranean city is shaped by forces different from those affecting Northern and Western European cities, forces that had led to the existence of segregation, not only horizontal, but also vertical, driven by social and ethnic differences. Segregation levels are weaker than those from Anglo-American city, where segregation, mainly horizontal, is based on a weak concentration of the working class with respect to the richest strata (Leontidou, 2009).

In many European cities, Naples (Dopp, 1968), Montpellier (Laquerbe, 1967), Lyon (Grafmeyer, 1991), vertical differentiation was a permanent feature of coexistence between middle and working classes in older buildings. The middle class occupied the first and second floors and the working class, the ground floor and the upper floors, in line with the Parisian and Viennese model (Maloutas, 2001). A more recent type of vertical cohabitation is found in some Italian cities, where the bourgeois lives in the upper floors of the old city center - especially when there are nice views and terraces - and darker apartments on the lower floors are occupied by the working class, immigrants or professionally marginal families.

In Athens vertical differentiation is more recent, and is found in buildings built during the 1960s that were not designed for this type of coexistence, as is the case of the neighborhoods of Málaga. The middle-class social structure of these dwellings has rapidly evolved since the mid-1970s towards coexistence between classes. As a result, where vertical differentiation has been detected, affluent inhabitants occupy the upper floors, while the working class and other manual workers are found at the lower ones, including the ground floor and the basement (Maloutas, 2001; Kakkali, 2010).

With these precedents, our work tries to verify if there is a different model of vertical segregation, linked to immigration and residential exclusion in the city of Malaga.

DATA SOURCES AND SPATIAL UNIT

To find out if a process of vertical segregation among immigrants has taken place in the municipality of Malaga, it is necessary to have information regarding both the nationality of the population and the floor in which they live. Nationality can be obtained from both the Population Censuses and the Municipal Padron of Inhabitants, but the floor is only available in the Padrón Municipal, through special processing. This is the reason why all the information we will use comes from this data source.

To accomplish our objective, we must have comparable statistics referred to, at least, two dates. Thematically it supposes no problem, as the variables used (nationality and floor) have not changed their definition between 2003 and 2013. But changes in spatial units of reference—change in their limits or in their number—, arise several problems, Modified Areal Spatial Unit (MAUP) the best known. MAUP appears when calculating indexes using information referred to a different number of spatial units. Its presence is very frequent when census tracts are used, since it is a unit delimited for strictly administrative purposes, changing their number on a yearly basis, generally by division in the peripheral areas of the cities, and by fusion in the central areas (Openshaw, 1984; Garrocho and Campos-Alanís, 2013).

Data available from the Padron are referred not only to census tracts, but also to neighborhoods; the boundaries of these spatial units were drawn by the city council using physical and typological criteria, date of construction, etc., and have remained stable since their delimitation. The advantages of using of this spatial unit are double: it makes possible to avoid the inconveniences caused by the MAUP, and allows to group the inhabitants into formal, infrastructural, etc. homogeneous spatial units.

To check if a process of residential exclusion has taken place, we have selected a set of 11 neighborhoods, with common characteristics. Their specific choice is based on a combination of factors: a significant presence of foreigners in them; their condition of neighborhoods undergoing a process of progressive physical deterioration, as they all correspond to a similar construction stage, which is associated with physical characteristics of housing far below current standards. But what makes them fit for our purpose is the fact that they are buildings with several floors, in all cases without an elevator; thus, in them the tendency to upper floors being more desirable is reversed, due to the lack of this facility.

The period of study runs from 2003 (first Padron that offers the necessary data) to 2013 (the year the foreign population reached its maximum number). In 2013, a total of 21,260 people were registered in the 11 neighbourhoods, and we have classified them in three categories: non-labour foreigners immigrants (nationals from EU15, the United States, Canada, Australia, New Zealand, Switzerland, Norway and Iceland); labour foreigners immigrants (the rest of non-Spanish nationals); and, finally, Spaniards. Although the characterization of the population of the neighborhoods has been made using their total population, as the aim of the research is to verify if there has been a process of vertical segregation between 2003 and 2013 we have selected only those people with a registration date after January 1, 2003, and prior to the same date of 2013. The debugging of the original database has led us to eliminate those records that do not include the nationality, the floor of residence or both at the same time, which leaves us a total of 5,701 people: 3,838 Spaniards, 1,745 foreign workers, and 118 corresponding to the rest of foreigners. On this set of population is focused the core of the research.

Finally, we will indicate that the statistical treatment has been done using the Location Quotient, which, as some researchers have shown (Brown, 2006; Bayonne, 2011) is a very useful instrument in order to analyze the concentration of Foreign population. Its calculation has been made as follows:

$$CL = \frac{\frac{E_{op}}{E_o}}{\frac{E_p}{E_T}}$$

Where E_{op} is the number of new inhabitants from origin O in floor P; E_o is the total number of new inhabitants from origin O; E_p is the total number of new inhabitants in floor P; and E_T is the total number of new inhabitants in the 11 neighborhoods. Values greater than 1 are indicative of overrepresentation, and lower ones of underrepresentation.

BRIEF HISTORICAL ANALYSIS AND PHYSICAL CHARACTERIZATION OF THE NEIGHBORHOODS

We have selected eleven neighborhoods for our study; they are shown on Figure 1, and their main urban characteristics can be found in Table 1.

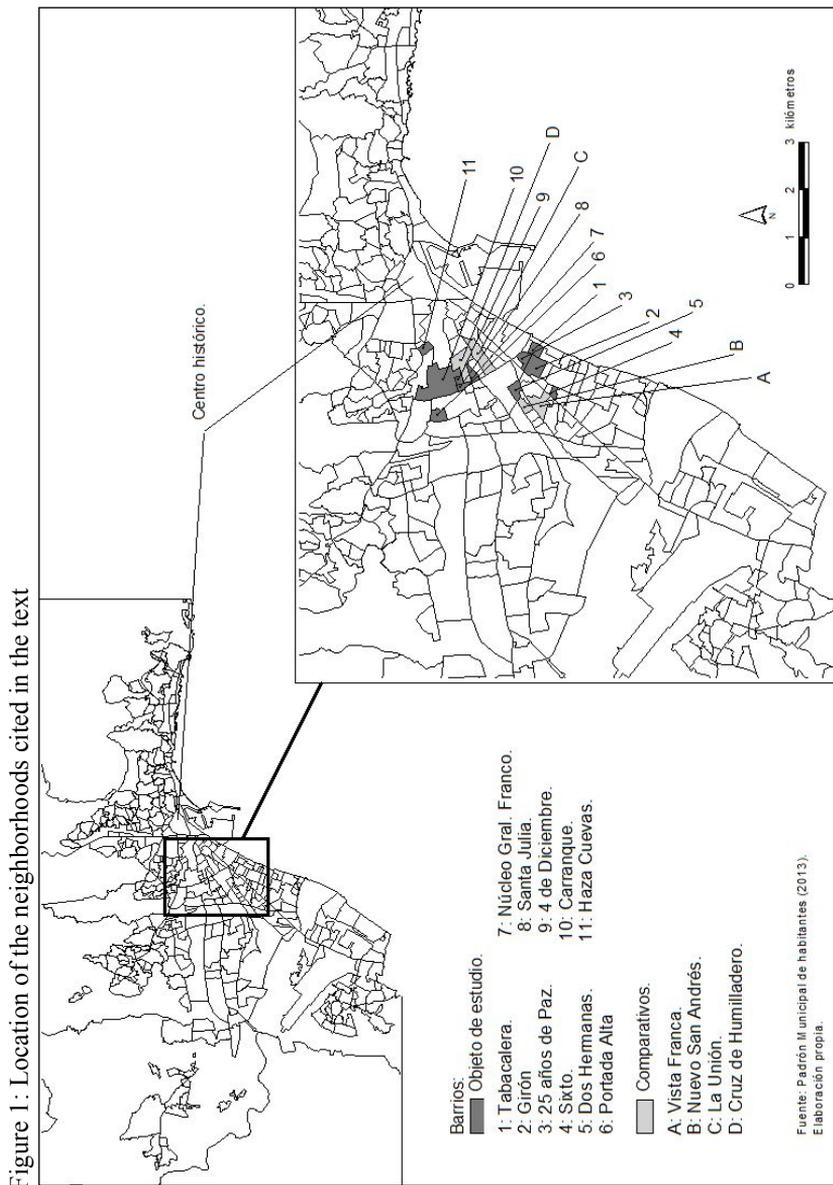


Table 1: Main physical and urbanistic characteristics of neighborhoods under study		Main Urbanistic Characteristics	
Neighborhoods	Period	Localization	Origin
Carraque	1953-57	Cruz de Humilladero	Conceived as part of the west end of the city as a self-sufficient unit. Completion: between the 1st and 2nd National Housing Plans. 2.929 dwellings (including those of Girón neighborhood).
Dos Hermanas.	1961	Carretera de Cádiz	It is included in the set of post-war residential developments to cover the housing needs caused by the Civil War damage and the rural exodus. This is a late promotion. Completion: II National Housing Plan. N° of dwellings: 904
José Antonio Girón	1954	Carretera de Cádiz	It is included in the set of post-war residential developments to cover the housing needs caused by the Civil War damage and the rural exodus.
25 años de Paz	1965	Carretera de Cádiz	This is the first large-scale operation of public housing in the post-war period and the first housing promotion of the Franco regime in the city. It was built after the initiative of the Spanish Falange and the JONS. N° of dwellings: 1.104.
Hazas Cuevas	1940	Cruz de Humilladero	Its origin can be found in the construction of three promotions of social housing, in the place occupied by two "cortijadas", as well as in other later constructions of public character. Completion: II National Housing Plan. N° of dwellings: 1.000
Portada Alta	1957	Cruz de Humilladero	Originally it consisted of three linear blocks with almost no gaps between them and other eight arranged around a central square, occupying a square parcel.
Santa Julia	1957	Ronda Intermedia	Linear blocks of narrow cradle with small interior courtyards, formed by the union of pieces with cruciform plant.
4 de Diciembre	1959	Cruz de Humilladero	The central housing complex contains four groups of U-shaped blocks; two more are arranged around a narrow inner courtyard.
Núcleo Generalísimo Franco	1959	Cruz de Humilladero	It consists of a set of blocks of four floors with almost no gaps between them. Originally it consisted of three linear blocks with plant of boomerang and other eight arranged around a central square, occupying a square parcel.
Sixto	1954	Carretera de Cádiz	Linear blocks of narrow cradle with small interior courtyards, formed by the union of pieces with cruciform plant.
Torres de la Sema	1946	Carretera de Cádiz	It is a set of 122 dwellings in autarkic style. It is U-shaped, with a large square backyards.

Source: Ayuntamiento de Málaga (2010), Jiménez, (1980), Jiménez, (2005), Remoso, (1982), Remoso, (2005). Author's elaboration.

They are located along three major axes of the city (Intermediate Ronda, Carretera de Cádiz and Cruz de Humilladero), and when they were erected they were part of the west front of the city of Malaga.

These are post-war residential complexes built on the periphery of the urban tissue, to try to solve the housing problems caused by Civil War — damages— and the pressure that the rural exodus (tied to the process of Spanish development) began to exert on the reduced quantity of houses that were available by the time. The oldest of our neighborhoods dates back to the 1940s (Haza Cuevas), while the rest was erected throughout the 1950s/1960s.

They share a similar typological and constructive design, according to the ruralizing spirit of the autarchic city, and have in common the fact that they are composed by multilevel buildings (although in Carranque coexist with some detached one-floor houses). In the older neighborhoods the buildings are in the margins of streets, articulated by a main way. Those others erected by the II National Housing Plan are isolated blocks in H-shaped or T-shaped, and are the first attempts to lodge vast quantities of immigrants (Egea, 2008a; Egea, 2008b; Arias, 2000). Their buildings have up to 5/6 floors, and, unlike later housing complexes, they do not have an elevator (lack shared by all the buildings located in our eleven neighborhoods), and they were never planned with vertical social cohabitation in mind.

All of them have suffered from physical and social degradation, which turns them into spaces with low levels of environmental quality, associated with low or very low status social classes. In fact, in the 80s our neighborhoods were classified as low social status (Ocaña, 1998), a situation that has not been reversed: all of them, with the exceptions of Haza Cuevas and Torres de la Serna, were classified as vulnerable neighborhoods by the Ministerio de Fomento (1991-2006)².

In terms of housing, the main feature to be highlighted is their small size (21.9 m²/hab.), clearly below the city average (27.6 m²). Along with this, the frequency of housing without toilet is 1.4%, being the municipal average 1.06%; and there is a 12.7% of poorly maintained houses, a percentage well above the one of the city (2.85%). The fact that a vast majority of the houses are more than 30 years old undoubtedly helps to explain this situation.

² In this study, urban vulnerability is understood as the process of unrest in cities produced by the combination of multiple dimensions of disadvantage, in which any hope of upward social mobility, of overcoming its social condition of exclusion is regarded as extremely difficult to achieve (Ministerio de Fomento, 1991-2006).

Spanish population has been leaving these houses progressively, and they have been replaced by foreign population. Natera and Batista (2012b) include nine of the eleven neighborhoods in a demographic dynamic of “declining population with increase of foreigners” (decrease of Spanish and total population, increase of foreigners). The remaining two neighborhoods (Haza Cuevas and Sixto) do so in the dynamics of “population increase with increase of foreigners (increase of foreign population combined with a decrease of the Spanish one, finally resulting in a positive balance). These dynamics are caused by the presence of empty houses of low quality and with few facilities which, due to their comparative low Price, are occupied by population of scarce resources. A fact that has also been detected in other Spanish metropolitan areas (Bayona, 2006; Sheriff, 2006; Vecina, 2011; De Esteban, 2006).

CHARACTERIZATION OF THE STUDIED POPULATION

There were 21.260 people living in 2013 at the 11 neighborhoods under study, 3,72% of the total population of the municipality of Málaga (570.289 inhabitants). Carranque is the neighborhood with the largest population volume (27,83%); Dos Hermanas, 25 Años de Paz, Portada Alta and Girón share each about 10%, followed by Santa Julia, 4 de Diciembre and Sixto (between 5% and 10%). Haza Cuevas and General Franco share around the 4% each, and Torres de la Serna is the smallest neighborhood, contributing with a share of 1,06%.

As we said before, these neighborhoods have experienced a slight loss of population in the decade under study (22.565 inhabitants in 2003, 21.260 in 2013). And, along with this fact, a large increase in the number of foreigners registered has been detected (507 in 2003, 2,059 in 2013, an increase of 1.552 individuals, more than 400%). Accordingly, the foreigners' rate has increased to a level (9,86%) above the municipal one (8,8%), being Haza Cueva the neighborhood with the highest proportion of foreigners, twice as high of that corresponding to Malaga.

The fact that the majority of the foreign immigration that has settled in these neighborhoods is labor, gets clear when we consider, firstly, that 54,48% of the population is Moroccan (25%), Nigerian (7,6%), Ukrainian (10,3%), Romanian (7,9%) and Paraguayan (6,8%); secondly, that there are very few inhabitants from origins belonging to countries with high economic levels. As an example, the EU-15 nationals are only 104, and even adding the nationals from rest of the countries of Western Europe, plus

other developed countries, the total amount is still very weak, only 118 people.

This pattern is visible too when we consider the origin distribution inside the neighborhoods (Table 2). Inhabitants from Africa are the main group in 8 of the 11 neighborhoods, nearly 90% of the foreigners in 4 de Diciembre (mainly Moroccan and Nigerian population) and more than 60% in General Franco (Moroccans and Algerians) and Portada Alta (Moroccans and Nigerians). As a result, foreigners of European origin, are less significant (they represent between 35 and 50% of the immigrant population in 25 years of Paz, Sixto, Carranque and Girón), being the most representative Ukrainians and Romanians. Finally, in a context of a scarce presence of American immigration, they have a remarkable presence at Haza Cuevas (Paraguayan, Bolivian This pattern is visible too when we consider the origin distribution inside the neighborhoods (Table 2). Inhabitants from Africa are the main group in 8 of the 11 neighborhoods, nearly 90% of the foreigners in 4 de Diciembre (mainly Moroccan and Nigerian population) and more than 60% in General Franco (Moroccans and Algerians) and Portada Alta (Moroccans and Nigerians). As a result, foreigners of European origin are less significant (they represent between 35 and 50% of the immigrant population in 25 years of Paz, Sixto, Carranque and Girón), being the most representative nationalities Ukrainian and Romanian. Finally, in a context of a scarce presence of American immigration, they have a remarkable presence at Haza Cuevas (Paraguayan, Bolivian and Argentinean) and Torre de la Serna.

It is worth to analyse some structural characteristics of these labor immigrants (Table 3). Their sex ratio is very low (51.74%), a situation opposed to that related to total population of these neighborhoods and to the municipality, although it is necessary to bear in mind the weight that the female population is gaining, especially in groups from Latin America and Eastern Europe, in line with what has been revealed in studies carried out at Andalusian level (Larrubia, 2014). In a context of an aging age structure of the population of these neighborhoods, the age structure of labor migrants confirms their economic nature, since the working-age population (aged 15-64) represents 82,72%, compared to 68% of the population in the neighborhoods. Finally, low levels of instruction are one more element that characterise these neighborhoods, a situation which is aggravated in the immigrant group: almost 44% of them do not have basic education, compared to 40% of the aggregation. Likewise, the immigrant population that finished high school is one half (5,48%) of that of the total population of the neighborhoods.

Table 2: Distribution of foreigners according to their origin (percentage values)

	Europe	Africa	America	Asia and Oceania	Stateless and unknown	Total
Malaga	3,12	2,49	2,53	0,63	0,03	8,8
Aggregation	3,12	3,82	2,26	0,45	0,03	9,68
25 paz	5,98	4,66	3,11	0,61		14,35
4 de diciembre	0,19	4,45	0,32			4,97
B. Girón	2,80	1,36	1,60	0,08		5,84
Carranque	3,19	2,48	2,35	0,68		8,71
Dos Hermanas	1,66	3,88	2,06	0,50		8,10
Haza Cuevas	3,83	6,19	6,29	0,10		16,42
N.G.Franco	1,86	4,30	0,23		0,12	6,51
P. Alta	2,77	7,10	1,73			11,60
S. Julia	4,91	5,64	3,50	0,43		14,48
Sixto	3,89	2,40	1,49	1,32		9,11
T.Serna	1,77	0,44	4,42	2,65		9,29

Source: Author's tabulation of 2013 Padron Municipal de Habitantes.

Table 3: Structural characteristics of labor inmigrants (2003-2013)

	Population	%
<i>Sex structure</i>		
Female	846	48,26
Male	907	51,74
<i>Age structure</i>		
<15	271	15,46
15-64	1.450	82,72
>64	32	1,83
<i>Level of instruction</i>		
Illiterated > 10	151	8,61
Illiterated <10	72	4,11
Less than Basic studies	542	30,92
Basic studies	400	22,82
Middle studies	96	5,48
High studies	65	3,71
Unknown	427	24,36
Total population	1.753	100

Source: Author's tabulation of 2013 Padron Municipal de Habitantes.

PATTERNS OF VERTICAL SEGREGATION OF THE IMMIGRANT POPULATION IN MALAGA

In the previous section we have analyzed the general characteristics of the resident population of the 11 selected neighborhoods, the characteristics of their urban tissue, and the population dynamics that have affected them in the last decade.

This is the context in which we have to consider whether, during the process of increase of foreign population in the neighborhoods under study, there has occurred a process of vertical segregation or, if access to the most desirable levels –the ground floor- by labor immigrants has taken place in the same proportions as the one corresponding to the Spaniards. Recall that to elucidate this issue we will focus on the population that has joined the 11 neighborhoods in the period 2003/2013, a total of 5.701 people (118 from developed countries, 1.745 labor immigrants).

Table 4 and Figure 2 show the distribution of the three groups in absolute numbers and in percentages, and it can be seen how the access to the floors has been different according to the group to which we refer. Less than one-third of the new Spanish residents accessed to a house on the ground floor, a percentage that rises slightly above 50% if they are added to the residents of the first floor of the building, three quarters if inhabitants on the second floor are also added. In other words, ground floor and first and second floors have hosted three of each four Spaniards registered in the neighborhoods under study. There is a very sharp decline from this last level, and it is also important to point out that there is a systematic decrease in the percentages as we go up in height.

This distribution contrasts sharply with labor immigrant's one: only 19,43% were able to access the dwellings on the ground floor, with many more residing in the first to third floors. Certainly in this contingent can also be observed the decrease of the percentages as we increase the height, but this trend begins at the first plant (not at the ground floor, as in the case of the Spanish), and the percentages are higher.

Finally, the distribution belonging to the rest of the foreigners is very similar to the Spaniards' one, with the bulk of the population in the lower plants, and a systematic decrease of as we increase the height.

A complementary and perhaps more adjusted view is provided by the use of the Location Quotient, since its results show the overrepresentation or underrepresentation of each group in each level with respect to the weight they have in the total of new inhabitants. The information is shown in Table 5.

Table 4: Distribution of population by origin and floor, absolute numbers and percentages

	Total	Spanish	Labor foreigners	Rest of foreigners	% Spanish	% Labor foreigners	% rest of foreigners
PBJ	1.542	1.169	339	34	30,46	19,43	28,81
P01	1.314	833	447	34	21,70	25,62	28,81
P02	1.208	798	387	23	20,79	22,18	19,49
P03	1.007	609	378	20	15,87	21,66	16,95
P04	451	294	153	4	7,66	8,77	3,39
P05	84	63	21	0	1,64	1,20	-
P06	52	36	13	3	0,94	0,74	2,54
P07	15	11	4	0	0,29	0,23	-
P08	11	11	0	0	0,29	-	-
P09	8	8	0	0	0,21	-	-
P10	9	6	3	0	0,16	0,17	-
Total	5.701	3.838	1745	118	100	100	100

Source: Author's tabulation of 2013 Padron Municipal de Habitantes.

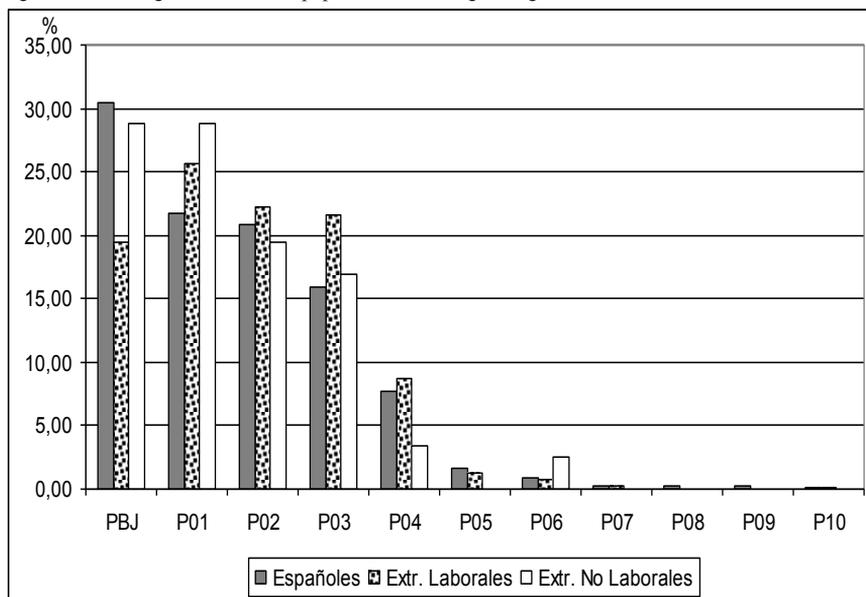
Table 5: Distribution of population according to origin and floor, absolute numbers and location quotients

	Total	Spanish	Labor foreigners	LQ Spanish	LQ Labor foreigners
PBJ	1.542	1.169	339	1,13	0,72
P01	1.314	833	447	0,94	1,11
P02	1.208	798	387	0,98	1,05
P03	1.007	609	378	0,90	1,23
P04	451	294	153	0,97	1,11
P05	84	63	21	1,11	0,82
P06	52	36	13	1,03	0,82
P07	15	11	4	1,09	0,87
P08	11	11	0	1,49	-
P09	8	8	0	1,49	-
P10	9	6	3	0,99	1,09
Total	5.701	3.838	1745	1	1

Source: Author's tabulation of 2013 Padron Municipal de Habitantes.

It can be observed the overweight of Spaniards at the ground floor, and a systematic underrepresentation in the rest, up to the fourth level. On the other hand, the values of the foreign inhabitants show an opposite trend, underrepresentation in the ground floor, and systematic overweight in the rest, also up to the fourth level.

Figure 2: Percentage distribution of population according to origin and floor



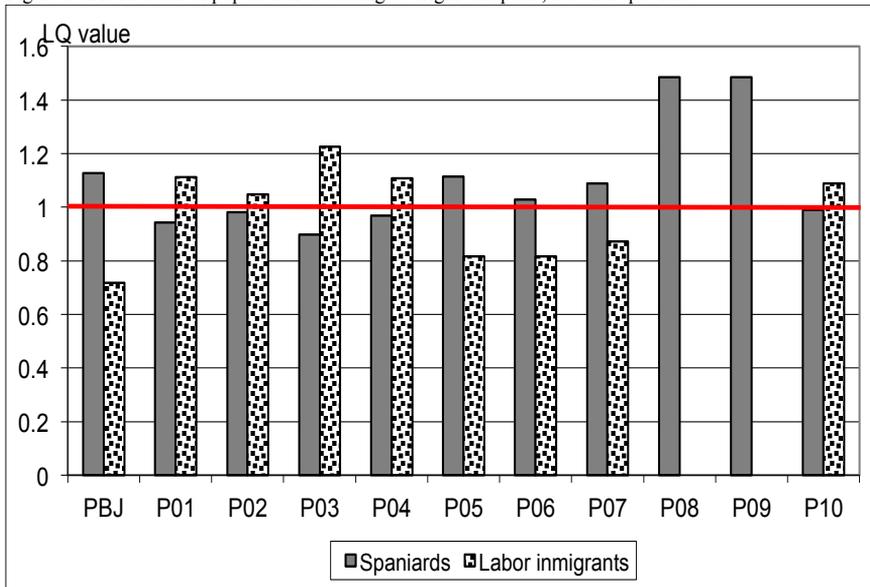
Source: Author's tabulation of 2013 Padron Municipal de Habitantes.

These differences can be seen more clearly in Figure 3, where we have highlighted the value 1, indicating that the weight of each group in a particular level is the same as that of the total population. It can be seen clearly how the values of the Spaniards are above 1 on the ground floor, and below that figure in the rest, a situation that is the opposite of the one of foreign labor immigrants.

As we said before, these dynamics are clearly visible up to the fourth floor, blurring above that. This fact is believed to be due to the small contingents of population living in the houses located on the upper floors: as shown in Table 1, levels 5 to 10 contain only 179 people, 3,13% of the new inhabitants; this low figure influences decisively the values of the location quotient and, therefore, the dynamics of access to the most desirable plants by Spanish and foreign laborers can be clearly traced where population volumes are significant (the ground floor and first to fourth floors, accounting for 97% of the new inhabitants).

Evidence of the existence of vertical segregation can be observed not only in the neighborhoods taken as a whole, but also in neighborhoods taken individually.

Figure 3: Distribution of population according to origin and plant, location quotients



Source: Author's tabulation of 2013 Padron Municipal de Habitantes.

An example of this is the distribution in three specific neighborhoods: Carranque, the one of greater population; Haza Cuevas, the oldest, and Tabacalera, one of the smallest. The use of the location quotients clearly shows the trends recorded in the aggregation (Table 6). Overweight of the Spanish in the ground floors, and systematic decrease of the quotient as we climbed in height (the exception, Tabacalera, where the quotient of first floor equals that of the ground one). In the case of labor immigrants, the situation is the opposite: underrepresentation in the ground floor and overweight in the rest of them, with a tendency to increase the LQ value with height. In the case of Carranque it is also shown how the tendencies are diluted from fifth to eighth floors, just as in the case of the aggregation, only 58 people living in floors 5 to 8, 3,86% of the total.

On the other hand, we can also wonder if this situation affects only the foreign laborers taken as a whole, or if we could see some differences between the different nationalities that comprise them. We have taken the five nationalities with greater presence in our neighborhoods: Ukrainians, Paraguayans, Moroccans, Nigerians and Romanians, and in Table 7 we show their location quotients per floor, plus those corresponding to the Spaniards for comparison. It is clearly shown how, once again, and with the sole ex-

ception of the Paraguayans, all of them show a clear underrepresentation at the ground floor, and an overrepresentation in the rest. When taking into account the nationality the pattern of all foreign workers is repeated. As we have just indicated, the exception are Paraguayans, the only nationality that is overrepresented, albeit slightly, on the ground floor. This is in line with other findings, indicative of a more favorable residential situation for all Latin Americans: they have lower levels of residential differentiation and lower levels of residential exclusion than the rest of the labor migrants (Natera, 2015).

Table 6: Distribution of new inhabitants according to origin and floor, and location quotient (Carranque, Haza Cuevas and Tabacalera neighborhoods)

Floor	Carranque		Haza Cuevas		Tabacalera	
	Spanish	Labor foreigners	Spanish	Labor foreigners	Spanish	Labor foreigners
PBJ	1,17	0,60	1,26	0,63	1,08	0,88
P01	0,87	1,28	0,95	1,11	1,08	1,08
P02	0,94	1,16	0,91	1,12	0,71	1,15
P03	0,83	1,42	0,88	1,15	-	-
P04	0,98	1,09	-	-	-	-
P05	1,02	1,02	-	-	-	-
P06	1,30	0,35	-	-	-	-
P07	1,20	0,59	-	-	-	-
P08	1,44	0,00	-	-	-	-

Source: Author's tabulation of 2013 Padron Municipal de Habitantes.

Table 7: Location ratios of the new inhabitants of the main nationalities, per floor

Planta	Spanish	Moroccans	Ukrainians	Romanians	Nigerians	Paraguayans
PBJ	1,13	0,57	0,55	0,53	0,86	1,02
P01	0,94	1,29	0,95	1,37	1,17	1,08
P02	0,98	1,22	1,27	1,05	0,99	1,10
P03	0,90	1,02	1,65	1,14	1,44	1,27
P04	0,97	1,30	0,90	1,36	0,47	0,11
P05	1,11	-	-	0,49	-	0,57
P06	1,03	0,75	-	-	-	-
P07	1,09	-	-	-	-	-
P08	1,49	-	-	-	-	-
P09	1,49	-	-	-	-	-
P10	0,99	-	-	-	-	-

Source: Author's tabulation of 2013 Padron Municipal de Habitantes.

According to information shown above, it appears that there has been a process of vertical segregation in the neighborhoods under study. Nevertheless, we believe it is necessary to compare the results with those corresponding to neighborhoods located in the same areas as those studied, composed by buildings in height but, unlike the previous ones, they do have an elevator. The neighborhoods selected for comparison are Nuevo San Andrés, Cruz del Humilladero, Vistafranca and La Unión (Figure 2). They are all neighborhoods defined as vulnerable, their construction dates are one or two decades later, and are clear exponents of mass housing promotions. In addition, the presence of foreigners is high, the rate is 35,2%, and labour immigrants are the bulk (2.080 of 2.193 foreigners registered in 2013).

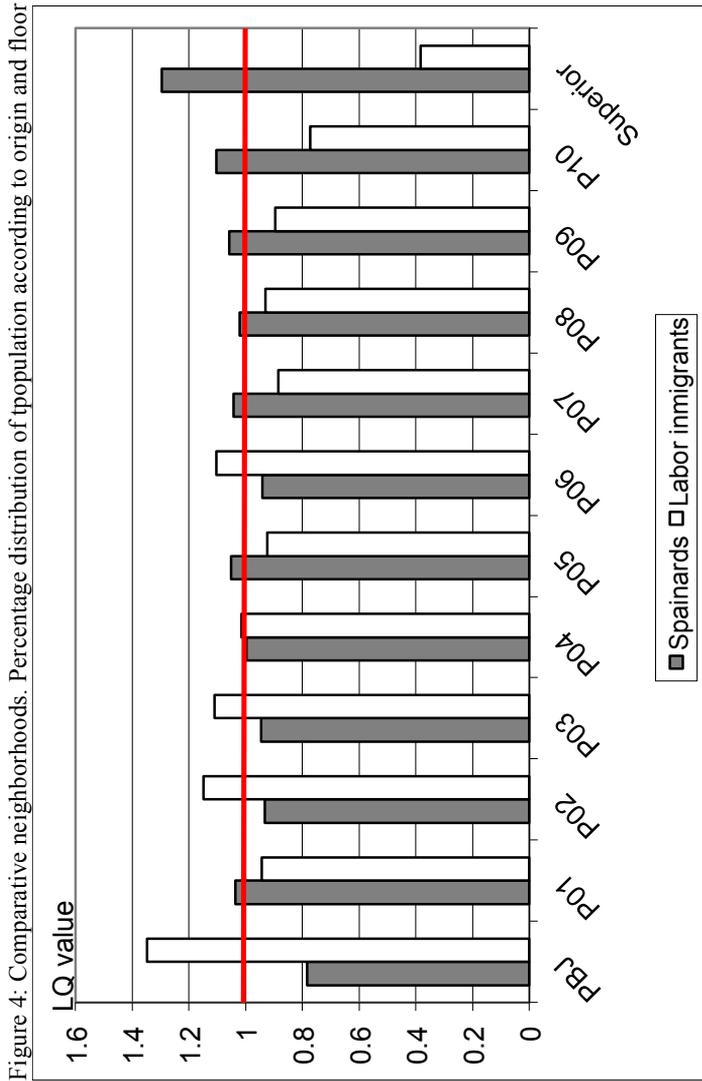
Figure 4 shows how in these neighbourhoods the trend of population distribution in floors is not as clear as the previous one, but it is still possible to detect the opposite one: an overrepresentation of labor immigrants in the lower plants, and a greater weight of the Spaniards in the highest.

The breakdown by nationality also shows how, with the sole exception of Nigerians, labor migrants are overrepresented on the ground floor. In addition, a tendency to underrepresentation can be detected, albeit diffusely, in the higher, more desirable, and therefore more expensive floors, due to the presence of an elevator in the buildings (Table 8).

CONCLUSIONS

The recent migratory phenomenon in Spain has caused important changes. We have seen how the process has been accompanied by transformations and socio-economic and cultural diversification, especially in those neighborhoods and cities where the number of foreign immigrants has been remarkable, as is the case of Malaga. The rapid growth and heterogeneity of these migratory flows have increased the interest for their analysis from different perspectives. The spatial distribution of this group is emphasized, attending not only to its territorial distribution patterns, but also to the processes of socio-spatial segregation.

In this sense, it should be pointed out that, although the analysis of residential segregation has a long academic history based, in particular, on the studies developed by the Chicago School in the early XX century, these studies have prioritized the analysis of horizontal segregation.



Source: Author's tabulation of 2013 Padron Municipal de Habitantes.

Table 8: Comparative neighborhoods. Location ratios of main nationalities population, per floor

Planta	Spanish	Moroccans	Ukrainians	Romanians	Nigerians	Paraguayans
PBJ	0,78	3,24	1,28	1,72	0,61	1,84
P01	1,04	1,51	1,05	0,79	0,90	0,66
P02	0,93	1,36	1,32	1,48	0,89	1,17
P03	0,95	1,20	0,81	0,78	1,13	1,24
P04	1,00	0,87	0,76	0,89	0,95	0,97
P05	1,05	1,52	0,95	0,43	0,67	1,94
P06	0,94	0,79	2,08	1,20	0,74	1,12
P07	1,04	0,47	0,27	1,79	0,93	0,33
P08	1,02	0,14	1,01	0,86	1,98	0,76
P09	1,06	-	0,44	0,96	1,74	0,67
P10	1,10	-	1,59	0,30	0,75	0,17

Source: Author's tabulation of 2013 Padron Municipal de Habitantes.

Recent studies dealing with residential insertion of the foreign population in Spanish and South American cities show reduced or relatively moderate segregation values, which seems to indicate that these values of segregation do not correctly catch the residential exclusion suffered by immigrants (Bayona, 2011). This is why the study of vertical segregation is gaining importance, as an element of the increase in the precariousness of the residential situation of the foreign population.

This is the reason why we have tried to find out if vertical segregation is present in Malaga. We have selected 11 neighborhoods, erected between 1940 and 1960, all undergoing a process of progressive physical deterioration, their dwellings are substandard attending the physical characteristics, and none of the buildings have elevators. As a result their price is comparative low and are available to foreign population, to a lesser extent national, but in both cases of scarce resources.

The population dynamics of these neighborhoods are characterized by losses of total population combined with an increase of foreigners; they also present an age structure with the bulk of population located at ages of working, in line with the economic nature of migrations, with low levels of training and a gradual increase of the female population.

The paper intends to open new lines of research in a not widely explored field such is vertical residential segregation, the most remarkable results being the following:

Vertical residential segregation is a proven fact in the city of Malaga, steamed by the direct relationship that occurs in Spain between the price of housing in the same building and level at which it is located. When elevators are present, upper floors are more desirable than the lower ones within a context of low quality houses. But when this facility is absent, the opposite relation occurs.

In our neighborhoods (no elevator present), access to the floors of the dwellings has not been homogeneous. Both the Spanish population and non-working foreigners opted for the ground floor and first and second ones (in more than 75%). This situation contrasts with the group of foreign laborers, where only 20% have been able to access these lower floors.

A complementary view has been provided by the use of the Location Quotient. It shows that Spaniards are overweighted on the ground floor, and systematically underrepresented in the rest. On the other hand, the values corresponding to foreign immigrants are the opposite, underrepresentation in the ground floor, and systematic overweight in the rest.

To verify that this vertical segregation can only be extrapolated to housing deprivation situations, we have recorded the distribution of foreign immigrants in neighborhoods, also with high rates of foreigners, in buildings with several floors, but with elevator. In them we have found the opposite situation, an overrepresentation of labor immigrants in the lower floors, and overrepresentation of the Spaniards in the highest.

As a final conclusion, it can be pointed out that, since vertical residential segregation is a relatively new topic, it would be interesting to pay special attention to the short and medium term evolution of the process. Segregation processes are linked to those of vulnerability, because vulnerable groups are forced to locate in those places where housing is more affordable; but also in neighborhoods with poor environmental quality, more distanced from work and equipment, and often with problems of physical isolation and accessibility.

In this sense, an increase in the low-income immigrant in this set of neighborhoods, already with connotations of low constructive qualities, can give rise to the perception of the rest of the inhabitants of Malaga that they are being the redoubt of the poorest population of the city; so infrastructural deficiencies, effectively present, can be joined by an incipient processes of stigmatization of its inhabitants. A situation that must be taken into account from the institutions (local and autonomous) with competence both in terms of urban spatial planning and in the fight against social exclusion.

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