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Gauging ethnic and social inequality in urban contexts:

The case of Brescia, Italy

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The PhD programme in Economic Sociology and Labour Studies (ESLS) stems from the collaboration between four Universities, namely Università degli Studi di Brescia, Università degli Studi di Milano (administrative headquarter), Università degli Studi di Milano Bicocca, and Università degli Studi del Piemonte Orientale "Amedeo Avogadro".

Alla mia famiglia, che ha sempre creduto in me ed a tutti coloro che in questi anni hanno creduto in me.

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Abstract

This dissertation aims to improve our understanding of the link between migrant ethnicity, space and socio-economic inequality. In the last three decades, the migratory pressure in Europe has reached significant levels. The massive flux of different ethnic groups has created significant tensions in many countries, causing widespread political conflicts and is now eroding the credibility of traditional political institutions. Here, we focused on three main issues, i.e., the residential segregation of immigrants, the immigrant's earnings at the neighbourhood level and the school choice of immigrant families. Our approach has been quantitative and has tried to combine and integrate certain social, economic and geographical factors. The core of our study has been a detailed analysis on a census-style database on the Italian city of Brescia, which permitted us to geolocalise households at a block level. The structure of the dissertation includes four chapters.

Chapter 1 presents an extensive literature review that examined various socio-economic aspects of migrations. We first considered housing market discrimination, segregation theories, segregation measurement. Besides we introduced literature on labour market discrimination, social inequality and neighbourhood and network effects. Furthermore, we reviewed second generation problems, education inequality, social cohesion and assimilation theories.

Chapter 2 presents an empirical study on Brescia, one of the most relevant cities in Italy for the share of immigrants. While this context allowed us to reflect on complex forms of segregation in South Europe, we explored segregation in the city. We analysed segregation by aggregate ethnic groups to cover the whole city immigrant population. These aggregates are East Europeans, South Asians, Middle Easterns and North Africans, Sub Saharan Africans, Chinese, East and South East Asians and South Americans. Segregation is particularly strong for South Asians and Chinese communities.

Chapter 3 examines neighbourhood effect on immigrants' earnings. This chapter reproduces an article co-authored by F. Squazzoni and G. Ballarino, which is currently under revision in an international journal. The chapter considers the economic and social nexus of segregation by estimating neighbourhood effects on immigrants' earnings within an urban context. For doing this, we linked socio-economic and spatial-demographic characteristics of immigrants by following an "egohood" approach, which jointly considers socialisation and proximity effects. An egohood is an ego-centred circular neighbourhood of given dimension around individual residence. We found that immigrants in areas with high probability to meet co-ethnics had lower earnings; there was no effect for the probability to meet natives.

Chapter 4 examines ethnic differentials in school choices in primary school as a determinant of education inequality. It reproduces an article co-authored with Jochem Tolsma and Flaminio Squazzoni, which is under preparation. Education inequality is crucial in countries receiving considerable levels of migrations. We hypothesised that households choose schools by homophily, i.e. they chose a school with a high percentage of co-ethnics. Furthermore, we hypothesised

that and households prefer schools with a high share of high SES-pupils while being constrained by geographical proximity. Households are sensitive to socio-economic status, ethnic composition and home-school distance. However, we also found that choices by second-generation immigrants, i.e., those who were born in Italy, had lower differences with natives, while born abroad children display different choices.

Chapter 5 presents conclusions, limitation and future developments of this dissertation.

Finally, some chapters reproduce independent research articles. This implies that some repetitions are possible, especially when discussing previous research and presenting the study context.

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Chapter 1

Immigration and Inequality: A Literature Review

1.1 Introduction

Europe historically was both places of immigration and emigration. In much of the modern era, Europe has been a place of emigration. European emigrants founded many modern nations, which were populated by other European migrants, often to the detriment of indigenous peoples. Almost all the states of Oceania and the whole of the states of the American continent had this fate. These migratory flows were consistent until the first half of the twentieth century (Moch, 2003). From this moment on, some European states became a destination for migration.

These migrations were essentially post-colonial migrations. The labour demand for post-war reconstruction required a large amount of workforce, first through internal migrations and then through international migrations. It is possible to underline North African's migration of in particular from French-Algeria to France and the migration of South and East Asians to England (Hansen, 2003).

With the economic boom, migration also arrived in countries, such as Italy and Germany defeated in the Second World War. In these countries also began to migrate mostly internal. In Italy, there was a great migration of the southern Italians to the industrial centres of the North (Panichella, 2012). In Germany initially, there was a substantial migration DDR-DFR, so much so that in 1964 the DDR government closed the borders to avoid depopulation (Fassmann & Münz, 1994). In the following years, Germany imported workforce from abroad, the so-called Gastarbeiter, literally translated as Guest-workers. Germany began to use Guest workers mainly from Mediterranean countries, Spain, Greece, Turkey and Southern Italy (Hochstadt, 1999). There were similar policies also

in Austria (Herzog-Punzenberger, 2003) and Belgium (Del Boca & Venturini, 2005).

Countries of central and northern Europe from the 70/80s were the subject of new migrations, often of a post-colonial or continuation of previous migrations, e.g., Turkish migration in Germany, family reunification also boosted it (Hansen, 2003). Differently, from other countries such as Italy, Spain or Portugal, where regional disequilibria were strong, the internal migration was exploited (Ballarino & Panichella, 2015; Bentolila & Dolado, 1990; Greenwood, 1997).

With the fall of the Soviet Union, a new wave of migration arrived in Europe. This wave was strengthened by the Balkan war and by migrations coming from Africa and Asia directed towards Southern European countries that were previously impermeable to migratory phenomena (Brubaker, 2004). In southern Europe, migration began substantially during this period. Although initially, there were only workers, over time they became immigration of family groups, both for family reunification and for family migrations from scratch. Migration changed the demographic structure of the population. European countries have changed from being mono-ethnic countries to multi-ethnical countries. Due to the ageing of the population and low fertility, the weight of immigrants will be crucial in the coming years. For example, in Countries like Switzerland, the share of born-aboard people is 28.3%, in Sweden or Ireland 15.9%, by looking the population Germany has 11.9% foreign-born people, the UK 12.4%, and France 11.6. South European states have a substantial share of foreign-born people like 9.2% of Italy and 9.6% of Spain (Eurostat, 2013).

Our review has covered many aspects of the complex nexus of social, economic and spatial factors involved in residential segregation patterns, which are mostly interconnected with each other. Examining this complex nexus required first to provide a systematic overview of previous research in the migratory field. As pointed out by Hayek, (1942) in his critique of scientism, the actual basis of any social science is multi-disciplinarity.

The literature review is designed to be broad and show arguments both directly treated in the thesis and indirectly treated. The review is shown according to the logic of the steps of an immigrant arriving in the host country.

The first when immigrants arrive in a country they must find accommodation; usually, they could not directly buy a house. Therefore they have to rent. The section 1.2 showed research about discrimination of groups with low social status mainly in European rental market. Discrimination in the case was that they had less consideration as potential tenants in European real estate market contexts.

The section 1.3 had a strong correlation with section 1.2 and concerned residential segregation. The review begins with the American theories on segregation. These theories are often obsolete and linked only to the US context, where there is strong racial segregation, however it is necessary to show them. Many geographers showed how the hyper-segregation in the United States and the theories that explain it were not applicable in European welfare systems.

Besides, historical development of the cities affected the presence of segregated areas. However, European segregation models are different within them. The central and northern European models show a higher propensity towards rented social housing compared to the Mediterranean model where social housing was oriented to subsided ownership. According to the literature shown, it is social housing that was a key variable of segregation in many Central and North European countries. This can create a substantial difference in segregation probability.

The existence of segregation, in many cases, was perceptible through measurement only. Therefore the main segregation indexes were shown in section 1.4. Segregation was analysable in five dimensions: distributive uniformity or evenness, interactive probability, i.e. isolation and exposure, clusterisation, concentration and centralisation. For each dimension, we revised indices.The review continues with a section 1.5 about neighbourhood and network effects. These effects are treated in the same section because they were often correlated. The review shows research on the neighbourhood effects in the theoretical and empirical way. It also shows literature about neighbourhood effects and ethnic networks in job matching; the excess of homophily was a crucial factor in social inequality formation. The section 1.6 first shows the survival-oriented strategies that immigrants implement in their job research. After a definition of income penalties, we gave evidence revising literature on discrimination suffered by low social status groups. The difference in terms of wages created socioeconomic inequality. In section 1.7 we introduce the Kuznets' hypothesis and the link between the economic cycle and social inequality and related test. Economists show that economic growth was the main principal solution to social inequality. Skill-Biased technical change shows the importance of education. Indeed, education is the engine of growth and the fundamental variable for reducing social inequality.

Main problems of the second generation were also shown in section 1.8. The thesis did not deal directly with the problems of the second generation. However, dealing with their education, it is necessary to show what may be the problems they encounter. The second generation lives in a sort of limbo; in fact, it has not the same social dignity as natives. However, second generations were not even wholly immigrants because it grew up in the destination country of the parents; at the same time they did not choose unlike their parents, the country where they lived. Often the society of the host country continues to assign them the same low social status as the previous generation, even though they want the same rights and the same opportunities as the native peers.

Section 1.9 shows the problems of educational inequality in Europe. Unlike in the United States in Europe, almost all education systems are freely accessible until the end of secondary education. This section shows how there was a devaluation of education in immigrant communities. In light of what was found in the previous review of the community, which assessed less education, they were the same as those who lived segregated and suffered more significant problems of discrimination. Therefore there are two main problems, the first being the devaluation of the value of education. The second is the state of poverty proba-

bly due to inadequate human capital and entrapment in ethnic social-networks. This does not allow us to evaluate investments in human capital properly.

In section 1.10 we revise works on social cohesion. The thesis did not deal directly with social cohesion. However, it was necessary to show that diversity could be harmful to social cohesion. A lack of social cohesion was a strong determinant in many social problems. Multi-Ethnic immigration could increase diversity and then have a deleterious effect on the social and economic system. However, this has a link to the last section number 1.11. The only solution to the lack of social cohesion on an ethnic basis is assimilation. The 1.11 section shows the main theories of assimilation. These theories are entirely developed in the United States and are not coherent with each other. In the section 1.12 there are a discussion and conclusions.

1.2 Housing market discrimination

Usually, immigrants do not have money to buy a house and so are more dependent on the local rental market. Such a market incorporates and reproduces discriminatory practices. Indeed, house-owners are less likely to rent houses to immigrants.

Experimental research examined ethnic discrimination in this type of markets, especially for specific ethnic groups. Carpusor & Loges (2006) performed a seminal e-mail based field experiment in Los Angeles County. They e-mails to landlords advertising apartments vacancies. The letter was signed by different names, one was White American, one Arab, and another was Afro-American. They found strong discrimination for Afro-American, mild for Arabs and almost none for Whites. Ahmed & Hammarstedt (2008) in Sweden used a methodology similar to Carpusor & Loges (2006). They found both gender (against male) and ethnic discrimination in the Swedish rental housing market, for Arabiac sounding name.

Bosch, Carnero, & Farré (2010) performed a field experiment on the Spanish rental market, following the same methodology of Carpusor & Loges (2006) They used different names for both Spanish natives and Moroccan for half candidate they provided information about their socioeconomic status, and for other half-not, also they controlled for spatial distribution of the immigrants. They found traces of discrimination especially against Moroccan males, regardless socio-economic status. Moreover, in neighbourhoods with low presence of migrants, there was a differential of answer of 30%, while this differential was reduced to zero when the immigration share increased. Bosch, Carnero, and Farre (2015) followed a similar design and differentiated between Spanish and Moroccanm in Spanish rent market. They found that Moroccans had 15% less probability to receive a response. However, in case of some Moroccan applicant, they included positive information about the application. This increased the response probability of 9%. Similar results also in Germany for Turkish immigrants (Horr, Hunkler, & Kroneberg, 2018).

In a field experiment in Italy in 41 Italian cities with the same design of Carpusor & Loges (2006) Baldini & Federici (2011) showed a multifaceted picture. The degree of discrimination varied across ethnic groups, sex and the level of information. In particular, Arabian/Mid-Eastern names faced more discrimination then East Europeans and Italians. This was confirmed by a qualitative analysis of housing policies in Northern Italy in 2011 by Ambrosini and Bonizzoni (2012), who showed that 80% of respondents found it difficult to find a house. This percentage was lower for East Europeans (65%) and higher for Sub-Saharan Africans (97%).

The results of the experimental literature show that groups considered of low status group suffer discrimination on the rental market. The problem with this literature is that often there is only one control group, that is the native one and no more groups except for Carpusor & Loges (2006) and Baldini & Federici (2011), which implemented an experiment with more groups. Moreover, this type of analysis can not control some fundamental variables, such as the personal cognitive experiences of the subjects or subjects belonging to the landlord social networks and their personal experiences.

1.3 Segregation Theories

Discriminative attitudes and practices can determine that immigrants have a high probability of living in an area with many co-ethnics, thus contributing to residential segregation. However, different causal mechanisms can account for this.

Many theories of segregation are developed in the United States, a country founded on migrations. However, these theories are very much affected by the specificity of the American society. In the American society every group except the English one faced segregation. Through assimilation, this segregation diminished over time. These theories reflect the American society and the *zeitgeist* of when they were formulated are now obsolete (Tosi et al., 2000). Segregation theory of the Chicago school (Carey, 1975; Parks & Burgess, 1921; Rosenthal, 1960), shows how immigrants were discriminated against because they were socially inferior and stop being so when they were assimilated. The institutional theory (McGovney, 1945; Wong, 2013) shows how institutionalized discrimination leads to segregation. This theory is based on the segregation of African-Americans and explained both old Afro-American segregation (Wiese, 1999), both new kind of internationalized discrimination as happened before sub-prime crisis (Massey, 2005; Sanders, 2008).

Besides, more modern approach like structuralist one (Arthur & Wilson, 2018; Fernandez, Massey, & Denton, 1993) explained segregation as reflection of social structure. Poor people face segregation in area where they could afford rent house, that usually were poor areas. Poor people live in area with low services, mainly poor educational facilities, then were trapped in this area. Other theoretical approaches tend to be more generalist. These were the Neo-classical

approach and the Analytical approach that is a derivation of the previous one. Considering the mechanics of choices, neoclassical economists suggested that property buyers or renters choose their houses depending on their willingness to pay for specific characteristics of buildings and areas (Bayer, McMillan, & Rueben, 2004; Wong, 2013). Analytical sociologists shared the idea of the importance of individual choices but considered segregation as an aggregate outcome of interaction in which unintended consequences can have a pivotal role. This includes the fact that segregation cannot merely reflect individual (discriminative) preferences, being only an interaction effect of adaptive decisions under social influences (Schelling, 1971). Schelling's model is logical and straightforward and explains ethnicity based residential segregation. It has a counter-intuitive explanation as it suggests that residential segregation is an outcome of agent interaction rather being the intended purpose of certain racist people. Schelling's approach is based on homophily. The model highlights segregation as a local rather than a global phenomenon and the tendency of individuals to self-segregate in their own community.

Not only did migrations target the US. Europe was also a target of migration. However, many authors highlight that American segregation model cannot be applied to study west European segregation. These problems were initially pointed out by Droogleever Fortuijn, Musterd, & Ostendorf (1998) and Kesteloot, Weesep, & White (1997) and successively developed by Van Kempen & Özüekren (1998), which showed that spatial segregation was dependent on the implemented welfare model. Moreover Musterd (2005), in a comparative study on both sides of the Atlantic, showed that spatial segregation is influenced by the welfare state and the particular role of the urban history in the European cities. This makes it difficult to compare inter-Atlantic contexts. Moreover, he highlighted that generally, segregation in Europe was mild compared to North American cities.

Due to differences between American and European contexts, we decided to focus only on European cases. France has been one of the primary destinations of migrations. Pan Ké Shon (2010), using a panel approach, with data between 1990 and 1999 showed that in France, there was segregation for African Immigrants, both North Africans and Sub-Saharans. European immigrants were not exposed to it. Contrary to common perceptions, residential mobility in social housing district was high. Residents were usually not trapped in them, with the only exception of Africans, both north and sub Saharan, that found harder to move out and they are three times more likely to move in. Furthermore, the author underlines that continuous migratory phenomena increase segregation. However, this is not typical only of France and can also be found in Britain (Simpson, 2004) and Sweden (Bråmå , 2006).

Rathelot & Safi, (2014) using a panel approach, with data between 1982 and 1999, found that there is a substantial heterogeneity when it comes to segregation since the pattern is concentrated only in large urban areas. There is a marked difference in the state of segregation between Europeans and non-Europeans. Note that their findings did not confirm the hypothesis of a white

flight in France. Moreover, they underlined that the highly heterogeneous composition of migrant populations decreased the strength of social segregation.

Verdugo (2011) used data from 1968 to 1999 to check segregation dynamics in France. He found that public housing neighbourghoods (Banlieue) increased the degree of ethnic segregation. This was so regardless of the year of arrival of immigrants or their ethnic origin. He found that North Africans lived in segregated areas. Pan Ké Shon and Verdugo (2015) used a panel data approach from 1968 to 2007 to check inter-generational segregation in France. They found that the segregation of the first generation decreased with the increase of permanence in France. They highlighted that there is not a pattern of mono-ethnic ghettoisation; by contrast, many immigrants live in an area with high exposure to natives. Musterd and Deurloo (1997) found higher segregation for people living in public social housing in the Netherlands, particularly for Turks, Moroccans and Surinamese. Musterd and Elorduy-Zapaterieche (2008) found in Amsterdam segregation for non-Western foreigners especially located in post-war social housing. In particular, segregation was stronger for Moroccans. However, Surinamese people were strongly segregated by social housing in middle-value areas. Musterd & Ostendorf (2009) found decreasing segregation in the Hague and Rotterdam for Turks, Surinamese and Moroccans. Instead, they found a consistent increase of segregation for the same groups in Amsterdam, although the level of segregation of Turkish was still higher in Hague and Rotterdam than in Amsterdam.

In the UK, there were vast areas populated by South Asians residents with a significant amount of urban segregation (Peach, 1996). The same author later confirmed the same in a later work (Peach, 2009). Similar results were also found in Burgess, Wilson, & Lupton (2005) and Simpson (2004). They found a high level of residential segregation for South Asians in the UK even more than for Blacks. In Belgium, there was a high level of segregation for Moroccans and Turkish in the Bruxelles (Dujardin, Selod, and Thomas, 2008), although Italians composed the main minority. In Sweden, Malmberg et al. (2018) found high segregation for non-European immigrants though decreasing over time. Semyonov & Glikman (2009) found high level of segregation in Frankfurt of Turkish people.

It is worth noting that previous studies in varying contexts, such as France, Britain and The Netherlands, found that one of the primary determinants of segregation has been public social housing programmes. In fact, in all these countries mentioned above except Germany and Belgium, a considerable proportion of families live in public housing. For instance, 6.5% of Belgian stock of houses is public housing. The number of social housing grew for Denmark (20.9%), France (16.8%), with studies suggesting that social housing is the main responsible determinant of segregation (Pan Ké Shon, 2010; Pan Ké Shon & Verdugo, 2015; Rathelot & Safi, 2014); Netherlands (30%); UK (17.9%). Note that these studies have focused on segregation by enclave. This type of segregation is typical of Central/Northern Europe, or British, except France where the immigrant population has been ethnically fragmented.

If we consider the Mediterranean countries, we must consider that Mediterranean segregation model has been characterised by more heterogeneity, as highlighted by Malheiros (2002). With the unique exception of the Netherlands, which has a mixed composition as suggested by Van Kempen and Van Weesep (1998). The absence of international migration in the post-war period implied that the existence of degraded suburbs has been rare compared to central and northern Europe, where migration started early. Unlike these areas, informal housing in the suburbs was not the only choice that immigrants can make when they choose where to live. In Barcelona, Spain, Musterd and Elorduy-Zapaterieche (2008) found a strong propensity for Ecuadorians to live in working-class urban areas, with Moroccans live more frequently in old and worst rented houses. In Italy, there are no mono-ethnic/racial ghettos or enclaves like those of Central/Northern of Europe. Instead, there are areas with a shared non-Italian mixed population (Davico & Mela, 1999; Golini, 1997). This is probably due to the heterogeneity of migrants present in Italy, the type of urbanisation which characterised the country and a more stable real estate market. Crosta, Mariotto, & Tosi (2000) underlined that migration has been a typical phenomenon of Centre-north of the country, with a collective change, from the 2000s, towards a "wanted but not welcome" approach. They also underlined that the standard geographical approach in Italy is less relevant because unlike central and north European countries, micro-segregation is stronger than macro-segregation.

It is surprising that previous segregation studies have focused on southern Italian cities. However, 60% of the immigrant population resides now in the North, 25% in the centre and a marginal 15% in the South and the islands. For instance, Cristaldi (2002) examined segregation in Rome, an urban context influenced by the presence of the Vatical State. She found that the most segregated communities were Spanish and French, Sinhalese and Chinese. Busetta, Mazza, and Stranges (2015) measured segregation in Palermo. They found remarkable segregation of South Asians, especially Bangladeshi and Sinhalese. A similar result was found by Mazza, Gabrielli, & Strozza (2018) in Naples. While they found no segregation for eastern Europeans, Chinese were reported to have the highest voluntary segregation, followed by Sri Lankans, Filipinos and Dominicans.

To sum up, many theories of segregation were formulated in the United States. However, these theories were scarcely applicable in a European context. This poor applicability was due to differences in welfare models and historical differences between young America and old Europe. However, even in Europe, there were differences derived from differences in the welfare model. In countries with models of welfare Nordic, Continental or Anglo-Saxon where there was an availability of social housing were these to create segregation. However, in the Mediterranean model, this availability did not exist. It was the market through discrimination processes that generated segregation.

1.4 Segregation measurement

Evenness indices measure how much the distribution of population groups is uniform across the spatial units of the city area. It is a measure of over or under-representation of one or more groups in a city area or sub-area. High values of evenness indices mean that there is a high level of unevenness, therefore there is segregation.

Evenness is a relative measure, and it refers to a differential distribution of ethnic groups.It measures the degree of heterogeneity between two or more groups and reflect the heterogeneity in the composition of the population.

The main indices of Evenness used in the measure of segregation are in tree groups (although there are many others), the dissimilarity indices, the concentration indices, the entropy indices. These indices are income inequality indices adapted to the extent of segregation. Indices are constructed according to an axiomatic approach, i.e. built on the basis of certain properties that must satisfy. These properties are:

Organisation Equivalence (OE), i.e., when two geographical units are identical, the measure of segregation should not change when combined into one single unit. OE allows us to compare systems with different numbers of units.

Size Invariance (SI). Given two units, the segregation measurement must be invariant as the two units differ in the same and constant proportion. SI allows us to compare discrimination in different areas when dividing the population by a constant factor.

Composition Invariance (CI), i.e., a segregation measure should not be affected by proportional changes in any observed group. Therefore, CI allows us to compare units with different structures.

Pigou-Dalton's Principle of Transfer (PT). Ideally, any segregation measure should vary when people move from neighborhoods, where there is a high proportion of co-ethnics over total population, compared to neighbourhoods where there are fewer co-ethnics. PT allows us to control for the effect of neighbourhoods with different ethnic composition.

Possibility of Standardisation (PS), i.e., the possibility of scaling the variation of the index in a 0-1 (or 0-100) range, while maintaining full comparability with other measures.

1.4.1 Evenness

Evenness indices measure how much the distribution of population groups is uniform across the spatial units of the city area. It is a measure of over or under-representation of one or more groups in a city area or sub-area. High values of evenness indices mean that there is a high level of unevenness, therefore there is segregation.

Evenness is a relative measure, and it refers to a differential distribution of ethnic groups.It measures the degree of heterogeneity between two or more groups and reflect the heterogeneity in the composition of the population.

The main indices of Evenness used in the measure of segregation are in tree branches (although there are many others), the dissimilarity indices, the concentration indices, the entropy indices. Some of these indices are income inequality indices adapted to measure segregation. Indices are constructed according to an axiomatic approach, i.e. built on the basis of certain properties that must satisfy. These properties are:

1. Organisation Equivalence (OE), i.e., when two geographical units are identical, the measure of segregation should not change when combined into one single unit. OE allows us to compare systems with different numbers of units.

2. Size Invariance (SI). Given two units, the segregation measurement must be invariant as the two units differ in the same and constant proportion. SI allows us to compare discrimination in different areas when dividing the population by a constant factor.

3. Composition Invariance (CI), i.e., a segregation measure should not be affected by proportional changes in any observed group. Therefore, CI allows us to compare units with different structures.

4. Pigou-Dalton's Principle of Transfer (PT). Ideally, any segregation measure should vary when people move from neighborhoods, where there is a high proportion of co-ethnics over total population, compared to neighbourhoods where there are fewer co-ethnics. PT allows us to control for the effect of neighbourhoods with different ethnic composition.

5. Possibility of Standardisation (PS), i.e., the possibility of scaling the variation of the index in a 0-1 (or 0-100) range, while maintaining full comparability with other measures.

1.4.1.1 Dissimilarity index

The more straightforward and most commonly used measure of evenness is Dissimilarity index. It measures the percentage of population that have to change residence to has an even distribution of the population in analysed area. The most common index of dissimilarity is Duncan and Duncan (1955) dissimilarity index; it is defined as follows:

$$IS = \frac{1}{2}\left|\frac{x_i}{X} - \frac{y_i}{Y}\right|,$$

where x_i and y_i are the population counts for the two subgroups in the area unit i, while X and Y are the total counts for the two groups in the city object of the study.

However, despite its popularity this index it shows has some certain weaknesses. More importantly, like all evenness indices, it this index depends is dependent on the way a given the geographical area of interest was is fractioned

into sub-units. The the smaller the units, the higher the index value is (Carrington & Troske, 1997). Furthermore, It it also does not fully satisfy the PT which requires to reflect the index to be sensitive to all transfers of minority members over neighborhoods where they are differently represented (James & Taeuber, 1985). Considering that The the dissimilarity index explains depends on the difference that needs to be transferred to have obtain evenness, the index estimation can bias any segregation measure therefore in socio-geographical contexts characterized by a setting not presenting many only a few enclaves, such as the Southern European countries, it might lead to biased measures.

Index can be also Multigroup (Sakoda 1981), it was defined as follow:

$$IS_M = \frac{\sum_{m-1}^{M} \pi_m \sum_{j-1}^{J} \frac{t_j}{T^2} \left| \frac{\pi_{jm}}{\pi_m} - 1 \right|}{2 \left[\sum_{m-1}^{M} \pi_m (1 - \pi_m) \right]}$$

where $\pi_m$is proportion of m group, t_j is total cases of area j, T is total cases in the area.

1.4.1.2 Gini concentration index

Evenness indices usually adapted indices of income inequality, one of the most famous indices of income inequality is the Gini coefficient R[1] it is also used as segregation index. Indices of evenness are income inequality indices and as income inequality indices they are based on some axiomatic

First approach to inequality measurement were made by Max Lorenz with Lorenz Curve in 1905. Its curve is and its broken line are graphical technique of representing income inequality.

In 1912 the Italian statistician Gini published its famous coefficient. This coefficient is derived from the concept of mean absolute difference Δ a measure of variability; i.e. a measure that highlights the inequality of data between them, regardless of any average value, introduced by Whilem Jordan fifty year before.

$$\Delta = \frac{\sum_i^n \sum_j^n |x_i - x_j|}{n(n-1)}$$

with $i \neq j$.

The Gini coefficient definition hold usually on Lorenz's curve. But it can be easily calculated with the definition of the mean absolute difference. That is equivalent to the definition based on Lorenz's curve (Gini, 1912). The Gini concentration index, R, is the ratio between the concentration area and the area of maximum concentration underlying the line of equation of the Lorenz curve. By dividing the area of concentration into trapezoids, after some steps it is possible to derive the following formula:

[1] Although it is often abbreviated as G, in the original Italian version it is abbreviated as R for reddito, the Italian word for Income.

$$\mathrm{R} = \frac{\sum_i^n \sum_j^n |x_i - x_j|}{2n \sum_i^n x_i} = \frac{\Delta}{2\bar{x}}$$

The multinomial version purposed by Reardon and Firebaug (2002) is defined as follows

$$R_M = \frac{\sum_{m-1}^{M} \pi_m \sum_{i-1}^{J} \sum_{j-1}^{J} \frac{t_i t_j}{T^2} \left| \frac{\pi_{im}}{\pi_m} - \frac{\pi_{jm}}{\pi_m} \right|}{2 \left[\sum_{m-1}^{M} \pi_m (1 - \pi_m) \right]}$$

where $\pi_m$is proportion of m group, t_j is total cases of area j, t_i is total cases of area i, T is total cases in the area.

1.4.1.3 Entropy indices

Entropy is not originally a sociological concept; it is instead a physical concept introduced by Clausius in 1868 in thermodynamic studies. The second principle of thermodynamics is based precisely on the concept of entropy. The use of entropy indices in the social sciences derives however from the contribution of Shannon (1948), the father of information theory and the use of his index in ecology. Entropy in information theory is the index that measures impediment to clarity and univocity of the message. The higher the entropy, the less information is available. Translated into the social sphere entropy is the measure of social diversity, the larger entropy, the higher the social diversity. The Shannon entropy quantifies the uncertainty in predicting the species identity of an individual that is taken at random from the data-set. The necessary assumption of the Shannon index, however, is that the population tends to infinity. The index is created for electrical communications so an assumption like this is plausible, but it makes it less applicable to social contexts. Shannon index is equivalent to Gini Heterogeneity Index (also known as Gini-Simpson, Blau, Hirschman), $G = 1 - \sum p_i^2$, where $p_i$is the proportion of $i - th$ group, and commonly used as index of heterogeneity.

The Shannon entropy index measures the weighted average deviation of each areal unit from the metropolitan area "entropy" or ethnic diversity. It is defined as follow:

$$H_{Shannon} = -\sum_{j=1}^{N} p_j log_2(p_j)$$

where p_j is the proportion of characters belonging to the $j-th$ type of letter in the string of interest.

Theil's index introduced by Theil (1973) is a generalised version on Shannon's index that can be computed also in finite population.

$$H = k \sum_{j=1}^{N} \left(p_j \log \frac{1}{j} \right) = -k \sum_{j=1}^{N} (p_j \log p_j)$$

then it is possible to see how:

$$H_{\text{Theil}} = \sum_{j=1}^{N} \left(\frac{x_j}{N\overline{x}} log \frac{N\overline{x}}{x_j} \right)$$

The Theil index is $T_T = H_{\max} - H_{\text{Theil}}$ where $H_{\max}$ is the theoretical maximum entropy that is reached when there in only one group, i.e. $x_j = \overline{x} \, \forall \, j$. This is substituted into H_{Theil} to give $H_{\max} = \ln N$, a constant determined solely by the population. So the Theil index gives a value in terms of an entropy that measures how far H_{Theil} is away from the ideal $H_{\max}$.

	OE	SI	CI	PT	PS
Dissimilarity	YES	YES	YES	YES*	YES
Dissimilarity Multinomial	YES	YES	NO	NO	YES
Gini	YES	YES	YES	YES*	YES
Gini Multinomial	YES	YES	NO	NO	YES
Theil	YES	YES	NO	YES	YES
Theil Multinomial	YES	YES	NO	YES	YES
*in weak form only					

Table 1.1: Axiomatic proprieties of evenness indices

1.4.2 Exposure

Exposure indices measure the degree of potential contacts with people of one group to one-other or members of two groups inside a spatial unit. Exposure could be measured as isolation, i.e. the probability to have contacts with members of the same group. Besides, it could be measured as interaction, i.e. the probability to have contacts with another group inside the spatial unit. Exposure indices measure the potential experience of segregation. The equidistribution measured by the indices of evenness does not imply that there is less potential contact between those living in a segregated area and the majority group.

1.4.2.1 Interaction index

Bell (1954) proposed the so-called "index of interaction", Massey and Denton (1988:288) describe it as "the minority-weighted average of each spatial unit's majority proportion". Interaction index measures the extent to which a given group is exposed to another or relatively isolated in a given context.xPy measured the exposure of each minority group to natives as follows:

$$xPy = \sum_{i=1}^{N} \left(\frac{x_i}{X} \frac{y_i}{t_i} \right)$$

where X is the total population of ethnic group in the area, x_i is the population of the ethnic group in the tract, y_i is population of the natives in the

tract, $t_i$is the total population of the tract.The index can be interpreted as the probability that two individuals randomly extracted from the population of two different groups can be in the same egohood, thus in contact with each other.

1.4.2.2 Isolation index

Moreover Bell (1954) proposed the so-called "index of isolation", which measures the extent to which a given group is exposed to itself or relatively isolated in a given context.xPx the ethnic isolation index measured the degree of each minority is isolated from other population:

$$xPx = \sum_{i=1}^{N} \left(\frac{x_i}{X} \frac{x_i}{t_i} \right)$$

wherex_i was the number of co-ethnics in the area, X was the total number of co-ethnics, and t_i was the total population of the tract of interest. This allowed us to derive the expected probability that each individual has to interact with another one from the same ethnic group.

1.4.2.3 Eta^2

Isolation index could be very asymmetric, therefore Bell(1954) purposed an adjusted index of isolation that compensate for asymmetry, the correlation ratio, also known as eta-squared. Bell shows that eta^2 is just a standardized probability. It represents the probability standardised probability to meet co-ethnic: The index is defined as follow:

$$Eta^2 = \frac{\sum_{i=1}^{N} \left(\frac{x_i}{X} \frac{x_i}{t_i} \right) - \frac{X}{T}}{1 - \frac{X}{T}}$$

wherex_i was the number of co-ethnics in the area, X was the total number of co-ethnics, and t_i was the total population of the tract of interest, and T is total population. This allowed us to derive the expected probability that each individual has to interact with another one from the same ethnic group.

1.4.3 Concentration

Concentration refers to the physical space occupied by a group. It is used to measure overcrowding phenomena, according to Massey and Denton (1988), minority generally live in a small amount of space in area. However, such indices may suffer from bias if the areas include spaces in which the area is divided are heterogeneous, e.g. agricultural and housing areas or mining and housing areas.

Main measure of concentration was Delta index.Delta is first measure of concentration,proposed by Hoover (1941). It computes the relationship between minority members residing in an area and the average density of minority members in a wider area. Similarly to Dissimilarity index it gives the proportion

that must be transfer to another area to have uniform density. It was defined in the same way of Duncan and Duncan dissimilarity index:

$$\triangle = \frac{1}{2}\left|\frac{x_i}{X} - \frac{a_i}{A}\right|,$$

where x_i are the population counts for a subgroup in the area unit i and a_i is the area where minority live in unit i, while X is the total count for the group in case of study and$A$ is the total area. Moreover there are other two measures that can evaluate concentration in better way. These two measure are Absolute Concentration Index (ACI) and Relative Centralization Index (Massey and Denton, 1988).

ACI calculate total area where a group resides and compares this with the minimum and maximum areas that could accommodate a group of that size. ACI index varies from 0.0 to 1.0, where a score of 1.0 means maximum segregation.

$$ACI = \frac{\sum_{i=1}^{n} \frac{x_i a_i}{X} - \sum_{i=1}^{n_1} \frac{t_i a_i}{T}}{\sum_{i=n_2}^{n} \frac{t_i a_i}{T_2} - \sum_{i=1}^{n_1} \frac{t_i a_i}{T_1}}$$

where x_i are the population counts for a subgroup in the area unit i and a_i is the area where minority live in unit i, while X is the total count for the group,$n_1$rank of area where the sum of all t_i from area 1 (smallest in size) up to area n_1 is equal to X. $T_1 = \sum_{i=1}^{n} t_i$ in area 1 up to area n_1; $n_2$rank of area where the sum of all t_i from area 1 (largest in size) up to area n_2 is equal to X. $T_2 = \sum_{i=1}^{n} t_i$ in area 1 up to area n_2.

Besides, RCI is measured similarly. Instead it into takes account of the distribution of the majority group as well. This measure varies from -1.0 to 1.0.

$$RCI = \frac{\left(\frac{\sum_{i=1}^{n} \frac{x_i a_i}{X}}{\sum_{i=1}^{n} \frac{Y_i a_i}{Y}}\right) - 1}{\left(\frac{\sum_{i=1}^{n1} \frac{t_i a_i}{T_1}}{\sum_{i=n2}^{n} \frac{T_i a_i}{T_2}}\right) - 1}$$

where x_i are the population counts for a subgroup in the area unit i and a_i is the area where minority live in unit i, while X is the total count for the group, $n_1$rank of area where the sum of all t_i from area 1 (smallest in size) up to area n_1 is equal to X. $T_1 = \sum_{i=1}^{n} t_i$ in area 1 up to area n_1; $n_2$rank of area where the sum of all t_i from area 1 (largest in size) up to area n_2 is equal to X. $T_2 = \sum_{i=1}^{n} t_i$ in area 1 up to area n_2.

1.4.4 Clustering

As evenness clustering is an important segregation dimension, spatial clustering indices have been widely employed as an indicator of spatial segregation. Occupation of adjacent spaces might form an ethnic enclave. Higher is the level of clustering, therefore, greater the segregation degree. The spatial association

analyses allow eliminating the problem called modifiable areal unit problem. In which the geographic aggregation is to undermine the results of the analysis, in our case of segregation. Using an egohood approach also dampens the checkerboard problem. In this approach, segregation is therefore shown not as a single index but as a spatial dependence on the map, not limited to administrative neighbourhood. However, this type of analysis does not show the separation between the communities, but shows where the communities live. Instead other indices like Getis Ord G_i^*, or Anselin's Local Indicator of Spatial Association are able to spot where people are locally segregated.

1.4.4.1 Global: Absolute Clustering Index

Absolute clustering measure proportion between minority members nearby a defined area and total population in the same defined area. Area and distance are measured by centroids (Massey and Denton 1988: 294). It varies from 0.0 to 1.0. This kind of measure is a global clustering measure, i.e. does not identity clustering, but identify if there are clusters.

$$AC = \frac{\sum \left(\frac{x_i}{X} \sum c_{ij} xj - \frac{X}{n^2} \sum \sum c_{ij} \right)}{\sum \left(\frac{x_i}{X} \sum t_{ij} xj - \frac{X}{n^2} \sum \sum t_{ij} \right)}$$

where x_i are the population counts for a subgroup in the area unit i, $X = \sum_{n=1}^{i} x_i$, t_i the total population of area i, t_j the total population of area j, n is the number of areas.

1.4.4.2 Local Clustering: Getis Ord G_i^*

In the case of the Getis-Ord G^* index (Ord & Getis, 1995), it shows us where the spatial association is higher then average community value. It is the local version of Getis-Ord G (Getis & Ord, 1992). Getis-Ord G^* spatial statistics, is a tool to detect the presence of spatial hot spots of an attribute of the population. As a result, it is possible to see if an attribute has a spatial clusterisation in an area of predefined dimensions, in this case a circle of radius 500m around the block of residence of each immigrant.

The G^* statistic consist of a ratio of the weighted average of the values in the neighbouring locations, to the sum of all values including the value of the location:

$$G_i^* = \frac{\sum_{j=1}^{n} w_{i,j} x_j}{\sum_{j=1}^{n} x_j}$$

where x_j is the value of the j attribute; $w_{i,j}$ is the spatial weight between attributes i and j, n is equal to the total number of locations. To compute the local Getis-Ord statistics we need to generate z-score $Z\left(G_i^*\right)$ for each location

$$Z(G_i^*) = \frac{\sum_{j=1}^{n} w_{i,j} x_j - W}{S \sqrt{\left[\frac{n \bullet \sum_{j=1}^{n} w_{i,j}^2 - W^2}{n-1} \right]}},$$

where

$$\overline{X} = \frac{\sum_{j=1}^{n} x_j}{n},$$

,

$$W = \sum_{j=1}^{n} w_{i,j},$$

,

$$S = \sqrt[2]{\frac{1}{n}\sum_{j=1}^{n} x_j^2 - \overline{X}^2}$$

The presence of a hot spot, i.e. a point of a high clusterisation, means that the Z-value is higher than excepted. It means the presence of high segregation from a sociological point of view. Oppositely the presence of a cold spot, i.e. a point of a low clusterisation, means that the Z-value is lower than excepted. It means the presence of low value surrounded by other low values, so significantly low segregation. The absence of significance means that there is no segregation.

The interpretation of the Getis-Ord statistics on the map is very straightforward: a positive value suggests a high cluster or hot spot, usually indicated as red on the map, a negative value indicates a low cluster or cold spot, indicated as blue on the map. For generating the weight matrix $w_{i,j}$ it uses row-standardized weights.

1.4.4.3 Local Clustering : Local Indicator of Spatial Association (LISA)

There are in addition spatial distribution indices. On the opposite way of evenness, it is possible to see the clustering indices. LISA was the acronym of Local Indicator of Spatial Association Anselin (1995). It was a technique based on Moran's I index an indicator of spatial auto-correlation[**?**]. Spatial auto-correlation was as a proximity cluster of parameters with similar values. If the similar values of the parameters had a spatial localisation, positive spatial auto-correlation was present. On the other hand, spatial proximity of different values, which was not stable in space, indicates a negative spatial auto-correlation or spatial heterogeneity. Moran I is an index of spatial auto-correlation and it is comparable to index r of Pearson. Moran's I that is a global spatial auto-correlation index, i.e. measures the spatial auto-correlation on all location in a territory. Its definition is as follows:

$$I = \frac{N}{W} \frac{\sum_i^n \sum_j^n w_{ij}(x_i - \bar{x})(x_j - \bar{x})}{\sum_i (x_i - \bar{x})^2}$$

Where x_i is an attribute for feature i , $\bar{X}$ the mean of the corresponding attribute, $w_{i,j}$ is the spatial weight between feature i and j, n the total number of features and W is the sum of all $w_{i,j}$.

LISA is a local indicator, i.e. it measures the presence of similar values in the considered sub-area. Local Moran definition is:

$$I_i = \frac{x_i - \overline{X}}{\left[\frac{\sum_{j=1,j\neq i}^{n} w_{i,j}\left(x_j - \overline{X}\right)^2}{n-1}\right]^2} \cdot \sum_{j=1,j\neq i}^{n} w_{i,j}\left(x_j - \overline{X}\right)$$

Where x_i is an attribute for feature i , $\bar{X}$ the mean of the corresponding attribute, $w_{i,j}$ is the spatial weight between feature i and j, n the total number of features and W is the sum of all $w_{i,j}$.

To compute the LISA we need to generate z-score $Z\left(I_i^*\right)$ for each location:

$$Z_{I_i} = \frac{I_i - E\left[I_i\right]}{\sqrt{E\left[I_i^2\right] - E\left[I_i\right]^2}}$$

where $E\left[I_i\right]$ is the excepted value of I_i and it is defined as $E\left[I_i\right] = -\frac{\sum_{j=1,j\neq i}^{n} w_{i,j}}{n-1}$

A positive value of I indicates that a location has a neighbouring location with similar value, hence this feature is a part of a cluster. If their value is positive, we have a core of spatial cluster that can be characterized by high values High-High (HH) i.e, groups of features with high values or low values Low-Low (LL) i.e, groups of features with low values. On the other hand, a negative value for I indicates that a location has a neighbouring location with dissimilar value. If their value is negative, we have palce of interest that can be characterized by high values High-Low (HL) i.e, dissimilarity outliers with an high number of low values or Low-High (LH) i.e, dissimilarity outliers with an low number of high value. By comparison HH and LL are the core of a spatial cluster, instead HL and LH where we can see outlayer values. Is mandatory remark that core HH and LL are the core of cluster and not cluster themselves, like an iceberg where only a small part emerges. Instead, HL and LH are like boats where all interesting part is emerged.

The presence of a hot spot, i.e. a point of a high clusterisation, means that the Z-value is higher than excepted. It means the presence of high segregation from a sociological point of view. Oppositely the presence of a cold spot, i.e. a point of a low clusterisation, means that the Z-value is lower than excepted. It means the presence of low value surrounded by other low values, so significantly low segregation. The absence of significance means that there is no segregation.

1.5 Neighbourgh & Network effects

Research shown that networks effects affect behaviour of actors in a wide number on decision about social and economic aspect of their lives. Networks effects have influences on student graduation rates (DeGiorgi et al. 2009), student performances (Fletcher & Tienda 2009) employment out of college (Marmaros & Sacerdote 2002), employment in the same block (Bayer, Ross, & Topa 2004;

Calvo-Armengol & Jackson 2004) and Calvó-Armengol & Jackson, 2007), ethnic based job matching (Galster 2007; Frijters et al. 2005; Battu et al. 2005), co-working and trust (Bianchi, Casnici, & Squazzoni, 2018)

However this thesis deals with social inequality, therefore we focus on networks and social inequality and related neighbourghood effects.

A large part of the studies on networks are studies on neighbourghood, in fact the primary source of social bonds is given by the place where one lives. People living in the same context are socially constrained in their decisions (Manski, 1993). In the same way, a contextual effect can occur (Manski, 1995). These two effects were correlated. However without a correct explanation of social mechanism these effects are hardly distinguishable (Durlauf and Ioannides 2010). Furthermore, they have endogenous effects that bias estimations (Durlauf 2003; Blume and Durlauf 2001; Cohen-Cole and Zanella 2008). Durlauf and Akerlof examined membership and inequality. Durlauf (2002, 2006) theorised poverty as a membership-based theory. His idea was that individual's socioeconomic prospects influenced by groups, such as neighbourhood, schools and firms. Durlauf (2006) argued that groups and their social influences cause inequality. Akerlof (1997) suggested that class positioning, for each different ethnic group, depends from choices like education or childbearing. Akerlof and Kranton (2010) showed that social identity was a determinant of socioeconomic behaviour, using a principal-agent model. Wilson (1987) showed that living in a deprived or segregated neighbourhood penalised minorities. This situation reinforced attitudes and behaviour, for instance, adopting different work ethics or stigmatisation by natives. Massey (1990) showed how black immigrants remained segregated in their neighbourhood. In addiction Fernandez, Massey, and Denton (1993) showed the circular causal mechanism of segregation of Black Ghettos in the US. Case and Katz (1991), in a study in the Boston Area, showed that living in low-income neighbourhoods increased the likelihood of adopting a negative behaviour. Evidence suggests that such patterns are not only typical of an American context but can also cast light on Europe.

In the case of job matching in particular the neighborhood network effects play a very strong role. Often the persistence of unemployment arises from a failure to meet demand and supply of work. Topa (2001) for example showed that certain minority communities could have higher job opportunities thanks to preferential attachment via ethnically cohesive social networks. Lately, Bayer, Ross, & Topa (2004) showed the causal link between the living in the same block and had the job in the same place. This was possible through the exploitation of strong ties in the social network of the observed subjects. From a sociological point of view can be seen as the effect of the social structure on job opportunities. People live in the same block because of the social class they belong to, which reflects their ability to pay. Calvo-Armengol & Jackson (2004) and Calvó-Armengol & Jackson (2007) offered robust evidence that sow correlation of wages and employment of individuals linked network. Andersson, (2004) showed that Swedish people with lower job market position gain better benefits if they live in a high-income neighbourhood due to the better probability to access to a good information network. Better influences are effective if people were members of

similar classes, similar result also in Galster (2007). Frijters et al. (2005) showed the importance of local social networks to account for immigrants' weak performance in job matching. Similarly, Battu et al. (2005) found that Pakistani and Bangladeshi in the UK tend to overuse their social networks to find a job, which penalises them significantly. In a study on Boston, Bayer et al. (2008) showed that co-ethnics residing in the same block had a 33% probability of having a job in the same location due to referrals via social networks, similar results were also in Boeri et al. (2015). In a study on the effect of minorities' social networks on their labour market outcome in England, Patacchini and Zenou (2012) found that social network effects are relevant only for people living nearby. However, in ethnic economies on metropolitan areas, the access to a homo-ethnic social network can have a long term effect of lock minority members into a secondary labour market characterised by low-paying jobs with fewer career opportunities (Porter & Landolt, 1997; Portes & Zhou, 1993). Reardon et al. (2000) to consider ethnic networks as sources of inadequate social capital because immigrants can benefit from connections with local natives more than from contacts with co-ethnics. In the American literature for justifying the discrimination effect of minorities. However, as pointed out by Fernandez and Fernandez-Mateo (2006), explanations in terms of "wrong networks" are consistent only if minorities are underrepresented in each step of the recruitment process. Moreover Granovetter (2017) suggested that network effects can greatly depend on context-specific conditions, for example neighbourghood conditions.

To summarize the effects of networks they were very important in job searching. Job search was a problem of information asymmetry between supply and demand. Social networks made it possible to bring together demand and supply, thus lowering the likelihood of unemployment. However, the presence of social networks on an ethnic basis can be exclusive, especially when minorities are excluded from some selection steps.

1.6 Job Market Integration and Penalties

The theory of human capital explained why immigrants have problems in accessing the labour market in their new countries. Research considered in particular individual endowment of skills, job experience and other educational competencies. An educational qualification which is considered high in the migrant's country of origin could be considered scarce in the host country. Educational certifications gained in the country of origin may even not be recognised in the host countries. Human capital developed in the country of origin could often be useless as it is not portable. Usually, immigrants did not know the functioning of the host labour market and sometimes have linguistic barriers that do not help (Chiswick, 1978; Friedberg, 2000).

The perception of the temporary status of migration implies that any employer can have a low propensity to train immigrants. Furthermore, the strategies implemented by foreign workers were often oriented to survive. They did not look for well-paid jobs. Instead, their search is limited to jobs that would

provide an income in the short-term. They did this even though this income meant having a low status (Chiswick, 1978; Dustmann, 2000; Kogan & Kalter, 2005).

Job markets tend also to discriminate against people of a different culture. For instance, de Beijl (2000) documented the existence of immigrant discrimination in Western Europe. His contribution focused on Belgian, German, Dutch and Spanish labour markets. Many scholars stressed that after many variables, such as education, gender, experience, an unexplained residue survives standard control variables; this residue is called the ethnic penalty (Berthoud, 2000; Heath & Cheung, 2007; Heath & McMahon, 1991). This penalty seems not to correlate with class attainment, as suggested by Reyneri and Fullin (2010). Moreover, Bisin et al. (2011) indicated that the probability to be employed is a function of ethnic identity. It is thus likely that the unequal social conditions in which immigrants are embedded could originate from the labour market.

An ethnic penalty determinant was ethnic hierarchy (Hagendoorn, 1995; Kleinpenning & Hagendoorn, 1993). Groups in lower tier of hierarchy face more discrimination then others.

When human capital presents ethnical elements, ethnic penalties can also be inter-generational. This is likely when members of a specific group are in the minor positions of the ethnic social hierarchy. The descendants of people of Germanic or Celtic ethnicity, such as Germans, Norwegians, English, Dutch or Irish immigrants in the US in the twentieth century had the same job positions of natives (Heath, 2007). Empirical evidence suggests that in the United States, groups from southern Europe have similar performance of those from central Northern Europe.

On the contrary, the same groups, mostly represented by Italians, struggle to find work, especially in Belgium and Germany (Heath, 2007) where their status was lower. The situation of groups from non-European countries, such as Turkey, Morocco, Pakistan or Bangladesh, was more serious. In an analysis of guest workers in 40 years in Austria, Herzog-Punzenberger (2003) found that the Turkish group had systematically high levels of unemployment and that this pattern was stable over time. Similar evidence was found by Crul, Schneider, & Lelie (2012) in Austria, Belgium and the Netherlands. On the contrary, Turks did not have the same penalty in France or Sweden (Crul & Mollenkopf, 2012; Lessard-Phillips, Fibbi, & Wanner, 2012).

In this respect, numerous field experiment of employment discrimination was performed in many European countries. In Italy Allasino, Venturini, & Zincone (2004) performed a pioneering field experiment. They tested discrimination of Moroccan workers in three main Italian cities, Turin, Naples and Rome.They found that natives were more appreciated then immigrants; in many cases, Moroccan were excluded from the selection process without their skill even begin evaluated.

In France, Duguet, Leandri, L'horty, & Petit (2010) tested the simultaneous effect of place of residence and ethnicity. They found consistent discrimination against Moroccans. Moreover, they found no stigma effects from the place of residence, while also gender had no effect.

In the Netherlands, Andriessen, Nievers, Dagevos, & Faulk (2012), tested labour market discrimination for Dutch, Moroccan, Turk, Surinamese and Antillean ethnicity. They found substantial discrimination for non-Dutch immigrants. In Germany, Kaas & Manger (2012) constructed a field experiment about labour market discrimination with the same techniques used in experiments about housing market discrimination for Turkish immigrants. They found a call-back level for Germans 10% higher then Turkish applicants.

Discrimination disappeared for applications including reference letter with favourable information about candidate personalities.

Similar findings with the similar experimental design were made also in Switzerland, in which Fibbi, Lerch, & Wanner (2006) found discrimination for ex-Yugoslavians in both French-Speaking cantons and German Speaking cantons. Turkish still subjects faced discrimination, but less then ex-Yugoslavians. In Greece, Drydakis & Vlassis (2010) found that for Albanian males in the low skilled job position face more discrimination in job market compared to natives. Moreover, in Sweden, Bursell (2014) found discrimination against Arabic and North African sounding named people, but no discrimination against females. They found that male employer tended to overcompensate female name applicants. Instead, female employers tended to favour foreign named man in particular.

To sum up, the research shows us how human capital varies according to the context in which it is generated. It also shows how immigrants use survival strategies to get safe jobs instead of well paid. Furthermore, literature shows us how the actors of the labor market tend to discriminate people from different cultures. It is carried by experimental literature that shows how people with low social status derived from ethnicity face discrimination in the labor market.

1.7 Social Inequality

Historically, the solution to inequality has been economic growth. Differently from economic theory, Kuznets (1955) showed a non-linear relationship between income inequality and economic growth. He hypothesised an inverted U-shaped relationship between income inequality and economic growth. His hypothesis was the subject of extensive debate and in the end successfully tested by Persson & Tabellini (1991). Ravallion (2014) argued that inequality dynamics was a function of the development reached by a country's economy. Moreover, social inequality was a complex phenomenon and probably this is why many theorists explained it differently.

Neoclassical economists used the concept of human capital . According to this theory, persons gain earnings by their own human capital (Becker, 1964; Mincer, 1958, 1974). The first agent allocates time and resources investing in the constitution of his own human capital. The agent earning profile depends on the amount of this investment and personal characteristics, such as gender, family background and personal skills. Agents can develop skills, which an be

learnt by experience. The main source of inequality is skill formation from investments by employers.

The end of the "golden age" was characterised by the late trend of the demand for mid-skilled workers. The introduction of new technologies which improved productivity and required high-skilled personnel (Goldin & Katz, 1999), was called Skill-Biased Technical Change (SBTC). SBTC polarised high paid jobs to high skilled people, and promoted STEM jobs, by creating consistent education-driven inequality (Aghion, 2002). Over the last decades, SBTC created income inequality mainly in Western economies, by skilled job polarisation (Adermon & Gustavsson, 2015; David, Katz, & Kearney, 2006; Goos, Manning, & Salomons, 2009, 2014). Recently, SBTC affected even social inequality in emerging economies, such as India (Berman, Somanathan, & Tan, 2005) or Brazil (Fajnzylber & Fernandes, 2009).

The advent of the Schumpeterian theories considered innovation as the engine of growth (Aghion, 2002; Schumpeter, 1942). Education and technology investments are the engines of growth and therefore are seen as sources of a possible reduction of inequality. In the post-WWII period, Blau, Boudon and Jenks have looked at the effect of social structure and education on social inequality (Blau, 1977; Boudon, 1974; Jencks, 1972). Shavit and Blossfeld (1993) considered education as the main catalyst of social mobility as it could have a disruptive effect on previous social structure equilibrium. In this respect, micro sociologists have stressed the role of education. Gambetta (1987) focused on the individual decision in education based on the rational–choice paradigm. Similarly, Breen and Goldthorpe (1997) showed that education was the main equaliser of class and gender differences. Several empirical analysis found that the inequality of educational opportunities was less effective in developed economies (Breen, Luijkx, Müller, & Pollak, 2009, 2010).

Several studies underlined the importance of the embeddedness of educational choices by examining social contexts in more detail (Stocké, 2007; Van de Werfhorst & Hofstede, 2007).

To sum up, in the modern society social inequality was a function of educational attainment. In the industrial age education was an advantage to improve one's social status. After the skill biased technical change, education is the key advantage to improve one's social status, both from a sociological and an economic point of view.However, some factors such as the social environment in which the neighborhood or, for example, the family lives, can strongly influence educational choices and distort them.

1.8 The Second Generation: Problems and Specificities

The First Generation (FG) of migrants were motivated by finding new and better-living conditions. Their pay-offs were specific. They accepted a degrading job to have the opportunity to live in the host country. Portes (1995) called

this process "downward-assimilation". Instead, the Second Generation (SG) of migrants, i.e., the immigrant's children, lived a different situation. Portes and MacLeod (1996) underlined that the primary goal of FG is the well-being of SG. In pursuing this ambition, the family background is decisive in influencing the scholastic success and the socio-professional positions of children. This depends on a variety of social and economic factors. Social factors could be related to ethnicity, religion, family education level; economic factor concerns the family income. According to Portes and Rumbaut (2001), FG with higher human capital could better promote the social inclusion and integration of SG.

In the sociological literature, the second generation means every person born into a family where at least one parent was an immigrant. Children of immigrants have a hybrid position compared to children of natives. They were grown between two nations, the parent's country and the host one. The influence of parent's national culture matters if they were born in the country where they grew up. In some way, they were mediators of the culture of their parents and the culture of the host society. Unlike the first, the second generation did not choose the country in which they live. This means that SG migrants are usually minority members, who grew-up in close contact with natives.

Moreover, they are sensitive to rights, at least in theory as natives. Even more than their parents, SG migrants require equal treatment, social promotion and identity recognition (Ambrosini, 2004). For the SG ties with the parent, country societies are usually less tight. Their expectation formation depends on their socialisation process. If they socialise in ethnic segregated neighbourhood, their expectation will be the bounded by SG ethnic group. On the other hand, if SG socialise with natives, their expectation will be the same as natives. However usually, SG migrants are in a disadvantaged position. Indeed, they are in the between of their parents' world and the world of their native peers, whose social needs are different. The SG assimilation process is therefore vital to the well-being of SG members.

The second generation lives in a sort of limbo; in fact, it has not the same social dignity as natives. However, second generations were not even wholly immigrants because it grew up in the destination country of the parents; at the same time they did not choose unlike their parents, the country where they lived. Often the society of the host country continues to assign them the same low social status as the previous generation, even though they want the same rights and the same opportunities as the native peers.

1.9 Education Inequality in Europe

The children of non-European migrants where the social value of education was low usually face educational problems. These educational disadvantages were especially relevabt for Turkish, North Africans, South Asians and Caribbean Black migrants. Burgess, Wilson, and Lupton (2005) in an analysis school population and census data in 2001 considered the main thirteen migrant groups.

They showed higher segregation for South Asian pupils, such as Bangladeshis and Pakistanis, in particular. Their segregation was also higher than that of Black pupils in England. Furthermore, Bangladeshis and Pakistanis suffered higher education segregation compared to other South Asians, such as Indians.

Moreover, for most ethnic groups, children face more segregation at school than in the neighbourhood where they live. Jackson, Jonsson, and Rudolphi (2012) performed a longitudinal study on Swedish and English schools and found education segregation in England for the Black Caribbean. However, they found that segregation and school leaving was a matter of choice. They found the same for Turkish and South American in Swedish school system. Research conducted in France suggested a high level of educational segregation of Africans. Segregation was unusually high for North Africans, either FG or SG (Brinbaum & Cebolla-Boado, 2007). In Belgium, educational segregation was found for three main groups, i.e., Moroccans, Turks and Italians. The Italian ethnic group was the first foreign minority in Belgium. Phalet and Swyngedouw (2003) found that in case of Moroccans and Turks segregation was persistent over generations, whereas in case of Italians, it disappeared with the second generation. Indeed, while Italian migration in Belgium was concentrated between 1946 and 1961, Moroccan and Turks experienced mechanisms of exclusion through a class disadvantage, which in turn increased their chance of disinvesting in tertiary education, as it is reflected in their high drop-out rate.

In the Netherlands, research suggested high levels of education segregation for Turkish, Moroccans of second generation if compared with their Dutch counterpart (Crul and Doomernik, 2003). They found that Turks and Moroccans had language deficiencies and poor primary school achievements. This explains problems in vocational training or lower secondary short school tracks. However, it is important to note that Moroccan SG now outperformed Turkish SG, but their students have higher dropout rates, especially in case of girls. Tolsma, Coenders, and Lubbers (2007) in a study on the Netherlands focused on ethnic, educational inequality of four of the largest groups, i.e., Turks, Moroccans, Surinamese and Antilleans. They used an immigrant survey, the SPVA, for years 1988, 1991, 1994, 1998, and 2002. They found that ethnic minorities improved their situation at the lowest educational levels. Under-representation faced by them within vocational tracks of secondary education decreased over time, although inequality was still significant in case of the tertiary education. They also found that the university system was monopolised by Dutch natives.

Herzog-Punzenberger (2003) in an analysis over forty years of Guest workers policy in Austria found that Turkish migrants were over-represented in lower school levels, even without evidence of high levels of residential segregation. Furthermore, she found that Turkish pupils were less present in high tier part of the education system. This penalty had a substantial effect on unemployment.

Kristen and Granato (2007) analysed factors leading to Abitur obtainment (German-style high school diploma) in Germany. They found ethnic segregation among Turkish of FG and SG and Italians of FG only. Similar evidence for Turkish was found in Worbs (2003), Kalter and Granato (2007), to name a few.

A panel data analysis from 1984 to 2001 in Denmark by Colding (2006),

revealed that being Turkish or Pakistani led to a poor completion rate of secondary school. This is particularly true for Turkish students. This was explained by the inter-generational transmission of parents' weak socio-economic status, which encouraged school dropout. The dropout rate however for Pakistani has experienced a substantial reduction. Interestingly, the study found that in Copenhagen education segregation was high for immigrants though residential segregation was low. This was due to presence of private schools as suggested by Rangvid (2007). These private schools allowed circumventing the block imposed by the state regulation that connects the district of residence to the school.

Fekjær and Birkelund (2007) in a study on Norway found that the impact of social background on low education performances was significant for Indians, Pakistani and Turkish. In the UK, Heath, Rothon, and Kilpi (2008) examined the general certificates of Secondary Education examinations. They found that Indians outperformed all other immigrant groups. They also outperformed white British peers. For the top class, white also outperformed other minorities (Blacks and Pakistani/Bangladeshi). Moreover, if we look at the lower classes, Indian and Whites were better than Blacks, Pakistani and Bangladeshi.

In any case, education inequality can be the outcome of individual choices. Research usually focused on secondary and tertiary education because this had direct and measurable outcome on the job market. There is general consensus on the fact that ethnic education inequalities are connected to school choice. As noted by Denton (1995) in systems without freedom of school choice, residential segregation and school segregation conflate with each other. Indeed, school choice is shaped by local information, home-school distance and other social constraints related to neighbourhoods. These social mechanisms create a persistent school segregation outcome. However, there is research considering also freedom of school choice as a source of segregation. This is especially true where private schools were the only alternatives to state schools. Johnston, Burgess, Wilson, and Harris (2006) suggested that they hindered transaction costs of white flight.

Furthermore, research suggested that school composition influences school choice, especially in periods of massive migrations. In a study on Germany, Kristen (2008) found that Turkish families were more likely to send their children to schools with a high share of foreigners. On the contrary, native families preferred homogeneity. These results were also found by Riedel, Schneider, Schuchart, & Weishaupt (2010) and Schneider et al. (2012). In a study on England, Burgess, Greaves, Vignoles, & Wilson (2015) found a significant effect of schools' ethnic composition. Natives prefer schools more homogeneous ethnically. This effect also correlates with the social stratus of families. Middle or upper-class majorities prefer not enrolling their children in schools with a certain amount of minority pupils (Uusitalo 2005).

In Europe almost all education systems are freely accessible until the end of secondary education. This section shows how there was a devaluation of education in immigrant communities. In light of what was found in the previous review of the communities that less evaluated education are same as those

who lived segregated and suffered more significant problems of discrimination. Therefore there are two main problems, the first being the devaluation of the value of education. The second is the state of poverty probably due to inadequate human capital and entrapment in ethnic social-networks. This does not allow us to evaluate investments in human capital properly.

1.10 The Challenge of Social Cohesion

Social group conflicts usually arose when there is no homogeneity in social groups. These differences are called heterogeneity or diversity. They could affect social and economic factors, such as economic growth, institutional performance and social cohesion. While research has developed semi-quantitative or quantitative variables to measure heterogeneity, it must be noted that these measures are based on arbitrary factors. This is due to the fact that these factors can be relevant to examine an ethnic group, but irrelevant in case of others.

First, heterogeneity could be explained in terms of transaction costs. These transaction costs are often created by prejudices or fear. Politicians often exploit these mechanisms for electoral purposes. Research on social conflict suggested that the weaker is social cohesion caused by ethnic heterogeneity (EH), the stronger the effect of socio-cultural polarisation is on individual life. Previous studies indicated that EH affects the government quality, commons management, altruism, trust and as consequence, social capital.

Mauro (1995) showed a positive correlation between ethnic heterogeneity and corruption. In a similar study, Treisman (2000) showed that heterogeneous countries have a higher level of perceived corruption. Glaeser & Saks (2006) showed that ethnic-bonds could be tight. Ethnic group members tend to support politicians or bureaucrats of their group when they know that they are corrupt. Porta & Lopez-de-Silanes (1999) found that ethnolinguistic heterogeneity undermined the quality and performance of institutions. In a study on Australian neighbourhoods, Leigh (2006) found that ethno-linguistic heterogeneity had a stronger effect on institutional factors than economic inequality. Dinesen & Sø nderskov (2012) analysed Danish dynamics of trust and population heterogeneity from 1979 to 2009. They found a negative intertemporal relationship between trust and heterogeneity. In the same vein, Dinesen & Sø nderskov (2015) found that ethnic diversity affects trusts in case of microsegregation.

Not only do ethnicity or language are potential sources of conflict; religious heterogeneity could increase social conflict (Collier & Hoeffler, 1998, 2002; Reynal-Querol, 2002). Montalvo & Reynal-Querol (2003) suggested that religious polarisation can be a deflator of a country's economic development. Costa and Kahn (2003) suggested that one of the reasons why public policies in fragmented communities have been less efficient was a lower level of social cohesion. Similar results were found in (Dincer, 2011; Knack & Keefer, 1997; Uslaner,

2002).

Outside Europe, the effect of heterogeneous society composition has been comprehensively investigated. In a review on over 90 recent publications on ethnic heterogeneity and social cohesion, Meer and Tolsma (2014) found consistent support for the spatial effect of social cohesion at the neighbourhood level. They also found that in the United States the effect of heterogeneity on social cohesion was stronger, with serious problems of greater segregation in the US urban areas. They concluded that as far as social cohesion is concerned, countries are not comparable. A similar conclusion was reached by Alesina & Glaeser (2005) and Alesina, Glaeser, & Sacerdote, (2006) who underlined that US and Europe have different institutional contexts and this must be considered in any analysis of the link between ethnic composition of societies, social cohesion and conflict.

The lack of social cohesion can lead to a series of consequences such as those reported above. Immigration leads to diversity, therefore it is a source of lack of social cohesion. Therefore it is potentially problematic. The only solution to immigration is the assimilation of immigrants.

1.11 Assimilation Theories

Brubaker (2001) started from the etymology of the word "assimilate", i.e., becoming similar. Here, the point is not the outcome but the process of assimilation itself.

It is worth noting that the literature on assimilation has most US origins. These origins found their justifications in the vast migration that targeted the USA throughout its history. The first assimilation theory was in Park & Burgess (1921), which formulated the classical structural theory of Chicago School's Assimilation theory (CS), Zeitgeist. CS considered incoming cultural traits as “inferior”, targeting the “superior” American White Anglo-Saxon Protestant (WASP) culture. The assumption was that a hosted group must integrate itself into a host country main group. The hosted group must also abandon its cultural models, institutional and language and dissolve into the host group. Park (1930) gave the best definition ‘the name was given to the processor processes by which peoples of diverse racial origins and different cultural heritages, occupying a common territory, achieve cultural solidarity sufficient at least to sustain a national existence’.

After WWII, Gordon further developed this theory by providing a systematic dissection of the concept (Gordon, 1964). He purposed a multistage model that starts with cultural assimilation followed by large-scale inter-ethnic marriage and ethnic identification with the host society. The Gordon's approach however was ambiguous. Gordon's theory refers to two possible groups and loses relevance when referring to many groups. Gordon model, as for all CS models, considered only macro aspects.

Lieberson, (1985) and Lieberson & Waters (1993) indicated that groups never abandoned their origins to embrace those of the new nation. In this way, Gordon bypassed the problems of a meso-social approach. Moreover, Portes and Rumbaut (1996) stressed the importance of a micro approach in a context of assimilation. Furthermore, Alba and Nee (2009) criticised Gordon for neglecting the micro-macro link. In their review, any serious theory of assimilation should consider macro-micro sequential processes to capture the emergence and persistence of institutional factors.

One of the other significant theories of assimilation has been the 'straight-line' assimilation popularised by Gans (1973). This theory has been a further development of Gordon's theory by assuming by-step dynamics in which each generation increased its integration (Lieberson, 1973). This theory assumed a linear growth of assimilation over time. It did not consider heterogeneity between ethnic groups and so it was criticised (e.g., Conzen, Gerber, & Morawska, 1992; Glazer & Moynihan, 1970; Yancey, Ericksen, & Juliani, 1976). Due to these criticisms, Gans (1992) reformulated it as a 'broken line theory'.

In 1965. a review of the existing immigration policies and new migration from Asia and South America was published. Results suggested that new migrants had a very different culture compared to old European immigrants. To account for this, Portes and Zhou (1993) formulated the so-called 'segmented assimilation theory', in which there was no longer a vision of integrative assimilation. Instead, they looked at which social segment immigrants were part of the process and which were not. They theorised the existence of certain structural barriers, which would trap immigrants in the lower stratus of the population. Such impairments could lead to stagnant or downward mobility (Portes, 1995). This kind of assimilation targeted only some ethnic groups, usually the poorest one. SG immigrants who suffered segmented assimilation were induced to believe in an insurmountable discrimination by the local majority. Social isolation and deprivation caused oppositions as a form of reaction to a perceived hostile reality.

Later, a new theory was developed by Alba and Nee (1997), which was called neo-assimilationist theory. This theory lost the Chicago School's assumption of irrational assimilation and tried to integrate micro factors with an institutional macro corollary. Unlike the segmented assimilation theory, these authors assumed that assimilation can take place even inter-generationally. This implies that in the second, third and fourth generations, "ethnic" aspects would be lost and differences in the labour market positions between migrants and natives would vanish. Moreover, migrants would blend in with natives by ceasing to have endogamous relationships. Brubaker (2001) pointed out that assimilation was an economic and cultural process and suggested that economically marginalised people could never become truly natives.

In the section the main theories are reported. These theories analyze long or very long time situations like three generations. They are strongly influenced by their formulation in American contexts where any group except the English one was segregated. However, the theories show that there is hope for an end to discrimination and to avoid problems of social conflict on an ethnic basis.

1.12 Discussion and Conclusions

Rent market discrimination was with high probability one of segregation determinants . It showed that not all landlords are available to rent to anyone. Although there was no experimental literature for all groups, it is likely that discrimination for all not-Europeans is worst then discrimination for Europeans or Westerners. Immigrant presence was a key variable of house value determination. Bosch, Carnero, & Farré (2010) noted that the presence of immigrants reduced discrimination against them. This practice might have an almost rational motivation; Accetturo et al. (2012) showed that from one hand, immigrant presence in the house proximity decreases its value. On the other hand, where there was a low immigrant presence in the area, there was an increase in prices. Segregation theories of North-American origin, were scarcely applicable to the European context, due to different implemented welfare systems and historical urbanisation differences. This principle opens the way to study different characteristics of welfare model also in Europe (Malheiros 2002; Arbaci 2008). Research shows that in Europe segregation was typical for non-European immigrants. Groups that typically face segregation are Turkish, South-Asians, i.e. Pakistanis, Bangladeshi, North Africans, Moroccans in particular and sub-Saharan Africans. Unlike other countries, e.g. Germany of the UK, in France, there ware no atypical mono-ethnic neighbourhoods (Pan Ké Shon, 2010). Literature about Centre-North Europe shows that is the public housing the leading cause of segregation (Verdugo, 2011; Pan Ké Shon and Verdugo, 2015; Musterd and Deurloo, 1997 and Musterd and Elorduy-Zapaterieche, 2008; Peach 1996, 2009). Unlike what happens in central and northern European countries, in southern European countries the welfare propensity to build rented social housing was low (Malheiros 2002; Arbaci 2008). In southern Europe, immigrants tended to live poor homes and in central areas, abandoned by natives or suburban areas. This tendency was linked to discrimination in the rental market. Suburban or old abandoned historic centres were areas where the rental market was usually low, and immigrants were more likely to be present. The presence of immigrants contracts the market and attracts other immigrants to the area because unlike the natives, the presence of immigrants was not a problem. The orientation of the Mediterranean welfare to property ownership had the effect that rented the houses were few. In this way, a complex and fragmented presence was more likely than in other European areas. Research has shown that networks effects affect the behaviour of actors in a vast number of decision about social and economic aspect of their lives. The literature showed how the neighbourhood determined the construction of the social network, and individuals weave social networks through proximity social contacts. In the case of job matching, in particular, the neighbourhood network effects play an influential role. Often the persistence of unemployment arises from a job-matching a failure. Moreover, immigrants usually suffer a penalisation, in fact that the human capital of immigrants was often non-transferable outside the country of origin. The education obtained in the country of origin was often invalid in host

countries. Linguistic barriers and unfamiliarity about the local labour market severely penalised them. Immigrants without local support could be in a state of need; therefore, immigrants were more likely to adopt survival-oriented work strategies. This means that even if qualified immigrants prefer less paid stable jobs. The literature showed a long series of field experiments on labour market discrimination. The groups with the lowest social status were those who suffer more discrimination. Existence of generalized ethnic penalties was country-specific because in every country the social status of the groups was different, e.g. in the UK, was south Asians (Heath, 2007), while in Germany, Austria, the lower social status was of the Turkish group (Herzog-Punzenberger, 2003), while in France was of north Africans (Lessard-Phillips et al., 2012) and in the Netherlands both (Crul et al. 2012; Crul and Mollenkopf, 2012). If the country's labour market was discriminating against immigrants, they had to rely on their social networks to get a job. The literature showed how networks were important in job-matching. Topa (2001) for example showed that some minority could have higher job opportunities thanks to preferential attachment via ethnically cohesive social networks; this allowed minority members to avoid labour market discrimination. Research in European contexts showed that in the presence of ethnic enclaves, neighbourhood social networks were for immigrants the primary source of information for work, but had deleterious effects on income in the long term. An ethnic social-network can be helpful when immigrants arrive by providing jobs, but they might in the following years lock them into a secondary labour market characterised by low-paying jobs with fewer career opportunities. Moreover, much research justified the poor performance of immigrants in the labour market due to the abuse of ethnic, social networks. However, as pointed out by Fernandez and Fernandez-Mateo (2006), this is possible only in the case of under-representation of immigrants in the recruitment processes. Besides, Granovetter (2017) pointed out suggested that network effects might significantly depend on context-specific conditions. People who live in the same area had similar behaviours and resulted due to social constraints that affected their decisions, in the same way, a contextual effect can occur (Manski, 1993;1995). However, without a correct explanation of social mechanism, these effects are hardly distinguishable. However, they can statistical bias estimations due correlation between the place of living and opportunities given by the context. Beyond this, there is a vision based on neighbourhood effects. The behaviours are affected by the environment in which people live; there is evidence for which even at the migratory level the segregated immigrants' live situations of social and informative penalties.

The discrimination on the labour market and the exploitation of ethnic social-networks to obtain it had as a consequence an immigrant income inequality. Historically the only solution to inequality was economic growth. However, in his seminal contribution, Kuznetz showed the presence of inverse U shaped relationship between growth and inequality; this means that growth by itself was not the solution to the inequality problem. In addition, the Skill-Biased technical change boosted inequality from the 70s this phenomenon based on education the most educated people and therefore with higher skills obtained

higher salaries. Therefore, after the 70s, education became a critical variable inequality reduction. Education was also one of the engines of economic growth, that although it was not the only solution to inequality remains of fundamental importance. In a migratory context, this raised the problem of the education of second-generation immigrants. The second generation lives in a sort of limbo; in fact, it has not the same social dignity as natives. However, second generations were not even wholly immigrants because it grew up in the destination country of the parents. At the same time, they did not choose unlike their parents, the country where they lived. Often the society of the host country continues to assign them the same low social status as the previous generation, even though they want the same rights and the same opportunities as the native peers. The research showed that the second generation of intra-European immigrants, with the exclusion of the Italian community in Germany, had similar results to the natives. In some rare cases such as those of the Chinese and Indian communities in the UK or Vietnamese in France, the second generations had better results than the natives. However, most of the second generations faced school segregation, usually school segregated groups where the same that faced residential segregation. The education of second generations becomes substantial in order not to create pockets of poverty and social exclusion. According to the literature it was, therefore, possible to see an association between segregation and inequality. This relationship became self-replicating.

Coming to the limitation of studies presented in this review, in section 1.2 there was a fundamental limitation. It was the absence of a third control variable of people that can be considered almost on the same social level of native, for example in Germany made a test with a Dutch-sounding name. Using this control group give us the possibility of a check if discrimination occurred due to ethnic group diversity or homophily. It seems that the experiments were intended to show the extreme differences. This type of study also does not give us information on the ethnicity of the landlord. Therefore, it is not possible to know if problems of discrimination give the refusal by the landlord. Moreover, since we do not have information on the landlord, we cannot know whether his/her actions were grounded on social prejudice or prejudice established on his/her experience.

In section 1.3 on the theoretical part, we have to underline that there is not a unified or at least an umbrella theory of segregation, in particular for European segregation. Besides, usually previous studies examined segregation almost in one dimension, evenness. However, evenness alone was not implying the presence of segregation directly, because segregation was a multidimensional phenomenon. Another limitation of the literature is its primary focus on Central and North Europe; while segregation of immigrants in Southern Europe is less studied or studied in an area with a low number of immigrants.

In section 1.6 this kind of study has the same problem of housing discrimination studies. Field experiments focus on one or two groups usually on the bottom of the social hierarchy. Moreover, they seem more like studies on ethnic stigmatised groups in the job market. There is never a control group with

similar characteristics to the natives that can underline if the effect is out-group discrimination or stigmatisation of a specific ethnic group. In another way, this kind of experiment does not take into account the cultural and linguistic differences between groups that in a strong determinant. These experiments have the problem of testing numerous variables and encapsulating them in ethnic prejudice only. In such an experiment it should be replicated on second generations. Having grown up in the same area, they have no language and cultural barriers.

In section 1.5 the research tends to be dated and focused with the United States or Central-Northern Europe where the segregation problems are different, there are no studies in areas where there is a heterogeneous foreign population often related to micro-segregation. Furthermore, the research shows only results based on prior division of space. In this way, he runs into the modifiable areal unit problem. This problem could bias significantly the estimations and have a significative impact on the results. In order to eliminate this problem, it is necessary to analyse neighbourhoods based around the subjects to be analysed, such as the egohood approach.

In section 1.9 research is missing in Southern Europe where the welfare state model is different. Research shows that inequality starts from secondary school and research almost ignored the primary school choice. Even though the primary school lays down the foundations for student learning and can have effects on long-term learning and skills, not to mention future school choices Furthermore, research had no attention for primary school choice; the little literature has its focus on North of Germany, the Netherlands and the US. The primary school lays down the foundations for student learning. This can have effects on long-term learning and skills, not to mention future school choices.

Chapter 2

Urban Spatial Segregation in Brescia

2.1 Introduction

Modern Italy from its foundation had a history of emigration country. In a century (1870-1970) more than eighteen million Italians left the country for France, Germany, and countries of the South and North America (Del Boca and Venturini 2005). With the economic boom of the 60s, there was a strong demand for internal labour, which promoted industrial development in southern European countries (Panichella, 2014; Greenwood, 1997). Therefore foreign-oriented migrations turned into internal migrations. Besides, it the country began to attract former emigrants, from the 80s onwards Italy became a destination country for migrations. With the ageing of the population and low demographic rates in Italy since the 1990s, it began to attract a growing number of immigrants. Until the early 90s only about 0.7 millions of inhabitants were foreigners, now 5.45 millions of resident were foreigner plus an estimated 9-10% of irregular immigrants and 1.2 millions of foreign-born that got citizenship by naturalisation. Immigration in Italy differs from that of other European countries both because it began in a period following the urban development of cities, and because of a different ethnic composition. In fact, despite other countries like former colonial empires such as the UK, France or the Netherlands migrations started from former colonies from the 50s (Hansen, 2003). Moreover, differently from Central and Northern European countries received many labourers immigrants mainly from southern European countries such as Italy, Spain, Greece, former Yugoslavia, as well as Asian countries such as Turkey and Africans like Morocco (Del Boca & Venturini, 2005; Herzog-Punzenberger, 2003; Hochstadt, 1999). Migrations in Italy were heterogeneous, with a prevalence of east Europeans over other groups. Until the first half of the 20th century, European cities were mainly mono-ethnic and people faced segregation according to the social class they belonged (Arbaci, 2007; Sako Musterd, 2005). Research about

immigration in Europe shows a tendency of the immigrant community to live in separated areas from natives. This usually happens in central and north European countries, such as the Netherlands, France, England or Germany, where migrations started decades ago (Musterd & Deurloo, 1997; Pan Ké Shon, 2010; Pan Ké Shon & Verdugo, 2015; Peach, 1996; Schönwälder, 2007; Verdugo, 2011). In Central and Northerner Europe, migrations that took place during the post-war reconstruction period, therefore the immigrants' settlements were merged into urban city structure. It was possible to see neighbourhoods populated by a majority of immigrant population, e.g. Rikenby in Stockholm or sub-urban zone in Paris or Molenbeek in Bruxelles. Segregation was typical of groups in the lower tier of social status hierarchies. In France, although there is a high heterogeneity, segregation was high for African groups, with no difference between the Maghreb and sub-Saharan Africa. These groups lived mainly in the social housing area (Pan Ké Shon, 2010; Verdugo 2011). This segregation becomes problematic especially in high urbanised areas (Rathelot & Safi, 2014). Pan Ké Shon and Verdugo (2015) highlighted that there is not a pattern of mono-ethnic ghettoisation; by contrast, many immigrants live in an area with high exposure to natives. Segregation differences were significant among groups, in fact as noted by Rathelot & Safi, (2014) European immigrants did not face segregation. Furthermore, Pan Ké Shon (2010) underlines that continuous migratory phenomena increase segregation. However, this is not typical only of France and can also be found in Britain (Simpson, 2004) and Sweden (Bråmå, 2006). Musterd and Deurloo (1997) and Musterd and Elorduy-Zapaterieche (2008) found higher segregation for people living in public social housing in the Netherlands, particularly for Turks, Moroccans and Surinamese. Similar results were also in Musterd & Ostendorf (2009). In the UK, there were vast areas populated by South Asians residents with a significant amount of urban segregation (Peach, 1996), the author confirmed results in a later work (Peach, 2009).

Segregation affects various aspects of the immigrants' life due to effect on social network creations, such as employability (Boeri, De Philippis, Patacchini, & Pellizzari, 2015), language proficiency (Danzer & Yaman, 2016), educational attainment (Danzer, Feuerbaum, Piopiunik, & Woessmann, 2018). A literature review on education and inequality in Europe by Heath, Rothon, & Kilpi (2008) showed that ethnic groups living in segregated areas suffer persistent inequality. Segregation may also affect immigrants' integration and therefore the assimilation of second generations. However, this depends on country-specific and ethnic-specific factors, such as employment and labour markets, the educational system, housing market, and social and cultural values, as suggested by Musterd (2003), Schönwälder (2007) and Bolt, Özüekren, & Phillips (2010). Although there is a link between employment segregation and integration or assimilation (Brubaker 2001), economically marginalised immigrants cannot effectively integrate into the host society. Except for outdated studies like Crosta, Mariotto, & Tosi, (2000) or Sristaldi (2002), in Italy, there are two main studies about segregation. Mudu (2013) made a study on segregation in Rome, he found that the most segregated communities were American and Bangladeshi, followed by France, Sinhalese and Chinese. The segregative presence of Ameri-

cans and French was a clear relationship of presence of Vatican State. Busetta, Mazza, & Stranges (2015) used a bootstrapped Dissimilarity index to measure ethnic residential segregation in Palermo. They found remarkable segregation for South Asians in particular Bangladeshi and Sinhalese, but the share of immigrants in Palermo was, and still is, tiny: at 1st of January 2015, they were 3.8% of the population. And both this two studies studied only a single dimension of segregation.

Chapter is structured as follows in section 2.2 we show segregation pattern of southern European segregation. In section 2.3 we show the context of analysis in particular we focus on the migratory context and city composition.

2.2 Segregation Patterns

Although there is a strong literature of US origin about the causes of segregation, as reported by Crosta, Mariotto, & Tosi (2000), a large share of this literature was outdated or strongly focused on the American context and its institutions. Segregation patterns were in fact influenced by country-specific, welfare systems. Differences in social welfare such as the presence of good quality and almost free public education in Europe, presence of almost free healthcare and poverty prevention policies, make the American and European system little comparable. Institutional factors, therefore, determine for instance the difference between segregation patterns in the US and Europe, making any comparison problematic (Kesteloot, Weesep, & White, 1997; Droogleever Fortuijn, Musterd, & Ostendorf, 1998; Van Kempen & Özüekren, 1998).

However, the European institutional contexts are different (Esping-Andersen, 1996). Ferrera, (1996) , differently from claimed by Esping-Andersen (1996), pointed out that there is a model of Mediterranean welfare different from the continental model where he placed the Mediterranean countries. These differences also influenced social housing policies. Malheiros (2002) discussed the differences of Mediterranean welfare model showing that: (1) Immigrants live in poorer housing condition. (2) There is a high level of informality in access to real estate market. (3) South European cities show lower levels of spatial segregation. (4) Non-European ethnic groups show high level of sub-urbanisation, in particular they live in ex labourer or former industrial areas.

These differences have been discussed by and further corroborated by a systematic review by Arbaci (2008), who underlined the differences in segregation patterns between the centre-north and the south European countries. Difference welfare regimes unemployment policies and social housing policies may have a very different outcome in segregation patterns. While Liberal, Continental and Nordic models have in common generous social housing policies, the Mediterranean model has almost no support to social housing policies (Allen, 2006; Castles & Ferrera, 1996). For example, Italy spends 0.9 % of welfare budget in social housing, Spain 1.5 %, Portugal 0.9 %, Greece 0.6% while the Netherlands spends 6 %, the UK 7%, France 5.5%, Sweden 4.9%, Denmark 7% (Eurostat data 2015). Besides this in Mediterranean countries houses are usually privately

owned (Delladetsima, 2006; Earley, 2004).

In addition, experimental research highlighted a strong presence of ethnic discrimination in the rental market. Housing discrimination is strictly linked to ethnic stratification. This kind of discrimination emerged by field experiment on house rent. People with an Arabian name, for example, face more problems in finding a house, as found in Sweden, by Ahmed & Hammarstedt (2008), in Spain by Bosch, Carnero, & Farré (2010) and in Italy by Baldini & Federici (2011). These experiments showed that landlords that advertise for apartment vacancies tend not to respond positively to people with Arabian sounding names, especially if males. In a qualitative analysis on housing policies in North of Italy in 2011,Ambrosini & Bonizzoni (2012) showed that 80% of interviewed people found it difficult to find a house, this percentage is lower for East Europeans (65%) and higher for Sub-Saharan Africans (97%).

The purpose of this chapter is to explore segregation in a Mediterranean context.

2.3 The context of analysis

In Italy, in the last decades, the stock of immigrant population grew exponentially and switched from a share of 0.5% in 1991 to a share of 8.1% in 2018 that grow up to around 10% if we consider also naturalised immigrants. The immigrant population lived mainly in the central and the northern part of the country with a share of approximately about 86% of the entire immigrant population. Centre and North Italian cities have a high share of the resident immigrant population. In Lombardy two of the main cities, Brescia and Milan, have an immigrant share of over 18%. A high share of the immigrant population can be found in other areas, such as Prato and Piacenza and 15% in Turin, Bologna and Florence. Furthermore, many villages in the Po Valley have an immigrant share of at least 12%. Figure 0.1 shows a spatial distribution of the immigrant settlement in Italy: the darkest blue represents the area in which Brescia (the red point) is embedded.

Figure 1:

We focused on the city of Brescia, one of the leading Italian manufacturing areas, fifth in Italy for GDP and forty-eighth in Europe. Brescia is the second city of Lombardy and seventeen in Italy with about 195000 inhabitants. Brescia is the centre of its province, an area characterised by a high industrial specialisation in manufacturing. The city and provincial area are characterised by a high diffusion of small and medium-sized enterprises; such small and medium-sized enterprises attract many immigrants to work in manufacturing. The area came to have a percentage of immigrants living in the city of just under 20% and the province of about 12%. It has the highest share of immigrants in Italy with a highly composed population. Describing the population with a Gini heterogeneity index (also known as the index of Blau, Herfindahl, Gini-Simpson), the population has a diversity index of 0.379, i.e. extracted two individuals at random there was 37.9% of probability that they belong to two different groups.

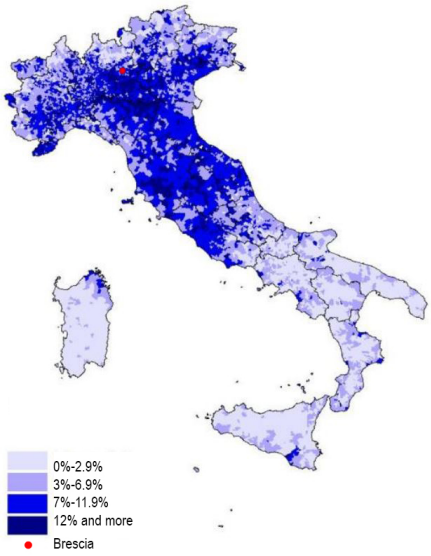


Figure 2.1: Italian spatial distribution of migrants on 31st December 2012. Source: Italian Institute of Statistics (ISTAT).

By excluding Italian from the analysis, the heterogeneity was 0.947; it means that extracted two individuals at random there was 94.7% of probability that they belong to two different groups. Immigration to Brescia began in the 80s. It was very different from the current one. At the time immigration was a residual phenomenon; the largest communities were the Egyptian, Moroccan, Chinese, Philippine and Senegalese; however, their number was less the 1% of the city population

The composition of today's population was utterly different from that of the past. After a first migration in the 90s characterised by numerous South Asian and Eastern European countries of Balkan origin (Albanians and ex-Yugoslavs), a substantial migration from Eastern Europe from 2000s mostly of Romanians, Moldovans and Ukrainians women working as carers for the old people.

Numerous small groups characterised the current ethnic composition of the city. The group with the maximum size is the Pakistani group which has about 4,000 members. The leading ethnic groups that populate the city are: Albanians, Bangladeshi, Chinese, Egyptians, Filipinos, Ghanaians, Indians, Moldovans, Nigerians, Sinhalese, Romanians, Pakistanis, Ukrainians.

As it was possible to see in the figure 2.2 ethnic heterogeneity in the neighbourhoods was very high. Many neighbourhoods were ethnic mosaics, and there was no mono-ethnic neighbourhood. In extreme cases, there were neighbourhoods in which there was a lack of natives, e.g. Fiumicello. The analysis, therefore, shows the groups in an aggregate way.

It was important to underline that considering previous migration patterns

of Italians and the frequency of returns of migrant Italian families after an extended period abroad, we classified any individual as being Italian who had Italian citizenship in 2012 and was born before 1971 from Argentina, Australia, Brazil, Switzerland, and Belgium. This also applied for all Italians who had been expelled by post-colonial regimes from former colonies, namely Libya, Eritrea and Ethiopia, and who were born before 1948 in Croatia, a country with some Italian ethnic enclaves who became part of Yugoslavia after WW2.

Ethnic composition was measured with the Gini Heterogeneity Index (also known as Gini-Simpson). neighbourhood with higher heterogeneity are Centro Storico Nord, Fiumicello, Quartiere Primo Maggio and Don Bosco. With some less heterogenous composition, it was possible to see Centro Storico Sud, Porta Milano and Chiesanuova, and peripheral neighbourhoods are usually less heterogeneous due to different urban structure and different market orientation.

As it was possible to see in figure 2.3, the dominant not Italian group in the whole city was the East European, with the only exception of Fiumicello that has a South Asian dominance and San Polo Parco that has a Middle Eastern and North African Dominance. If figure 2.4 it was possible to see the presence of not European ethnic groups in the city.

Visible differences in the presence of foreigners are only without considering the Europeans, because visibly similar to the natives. The predominant immigrant ethnic group is South Asia. It is followed by some areas namely the Prealpino Village and Mompiano and Sanpolino where the majority of non-European immigrants are African. In addition to the aforementioned San Polo Park, North Africans are the majority in Caionvico, Buffalora, Centro Storico Nord.

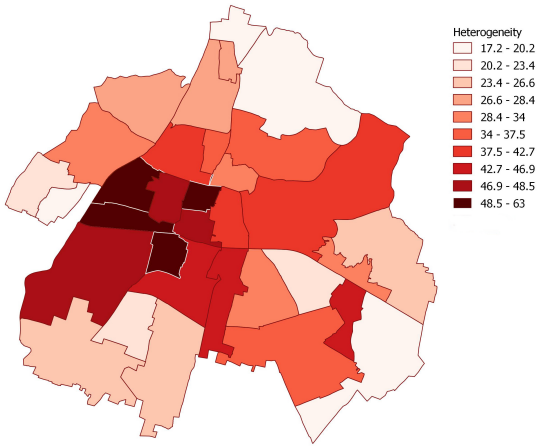


Figure 2.2: Ethnic heterogeneity by neighbourhood

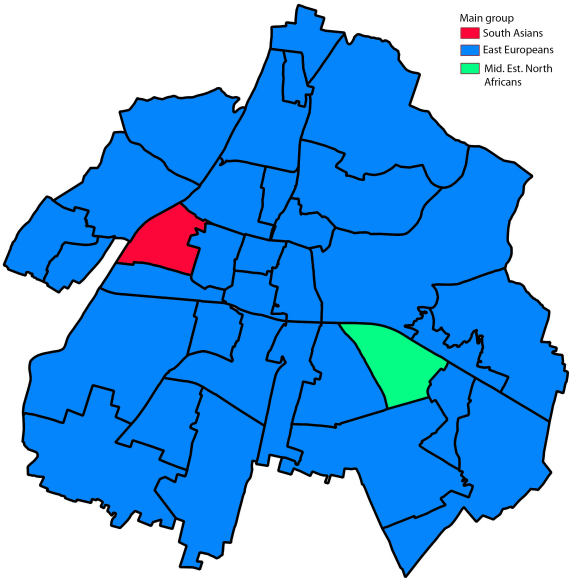


Figure 2.3: Immigrant dominance by neighbourhood

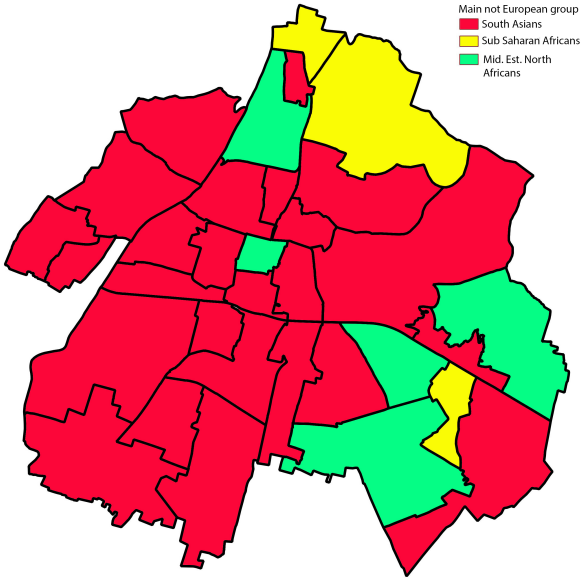


Figure 2.4: Not European immigrant dominance by neighbourhood

2.3.0.1 East Europeans

East Europeans (EAST_EU) are mainly members of four groups: Albanians, Moldovans, Romanians and Ukrainians, however, members of other groups are also present, as originating in the former Yugoslavia, Russians, Belorussians and to a much lesser extent others from Eastern Europe and the former Soviet bloc. There is differentiation within groups in the workplace. Ukrainians, Russians, Belarusians and Moldovans are oriented mostly towards caring for old people (Marchetti & Venturini, 2014). Albanians and former Yugoslavs work in the industry, and in construction, Romanians work in both the caring and industrial sectors. Differently, from Romanians, Moldovans and Ukrainians which are the result of somewhat recent migration, started massively at the beginning of the 2000s, Albanian migration began at the beginning of 90s. Albanian migrations in Italy started in 1991. The second immigration begins with the fall of the communist regime and is composed of three waves. The first with the fall of the communist regime in 1991, the second with the financial crisis of 1997 and the third with the Serbian-Kosovar war in 1999. The Albanians in the 90s were the most stigmatised ethnic group (Mai & King, 2009); today they represent paradoxically one of the most integrated ethnic groups (Baldassar, 2012).

2.3.0.2 South Asians

Immigration from South Asians (SAS) countries was composed mainly of four groups, Indians, Pakistanis, Bangladeshis and Sinhalese. The migration of the Bangladeshi in Italy began in the 80s, when immigration controls were deficient, initially concentrated in the Rome area (Knights, 1996) and it still continuously increased. One of the main groups is the Indian one, predominately coming from Punjab (Bertolani, 2012; Gallo, 2012; Sahai & LUM, 2013; Singh, 2006) like in Brescia. Also, Pakistanis population comes from the Punjab macro-region (Bonfanti, 2015; Bonizzoni & Marzorati, 2015). The first significant migratory phenomena from Sri Lanka to Italy were in the second half of the 70s (Roberts, 1978). They were predominantly Catholic women hired as domestic workers. Since the 80s immigration has begun an emigration driven by the civil war of Sri Lanka and is ethnically differentiated (Henayaka-Lochbihler & Lambusta, 2004). The Tamil populations emigrated to southern Italy (Henayaka-Lochbihler & Lambusta, 2004). Instead, the Singhalese populations emigrated mainly in the north of the country.

2.3.0.3 Chinese

With the modernisation policies of the 80s, the People's Republic of China (CHINA) opened the possibility for its citizens to migrate. The Chinese community comes from Wenzhou, a prefecture-city located in the south-eastern part of the Chinese province of Zhejiang (Ceccagno, 2007). It was present in Brescia since the 80s (Corsini & Zane, 2014). The Chinese community consists mainly of unskilled workers, who work mainly in textiles, catering and trade.

2.3.0.4 Middle Easterns and North Africans

Middle Easterns and North Africans (MENA) were in the city since the 80s main groups are Egyptians, Moroccans and Tunisian communities (Corsini & Zane, 2014). North African immigration is well established also for spatial proximity. Despite the religious denominations that emerged in recent years, the community is well established, in XVII legislature one of the elected deputies in Brescia area to Chamber of deputies was a second generation Egyptian. The Middle Eastern communities of both Arabs and Turks heritage, which tend to be poor, have therefore been aggregated to North Africans.

2.3.0.5 Sub Saharan Africans

Historically the largest community Sub Saharan African (SSA) in the city was the Senegalese one. The Senegalese immigrated at the beginning of the 80s to work in the numerous smelters in and around Brescia. Until 2008 the most extensive area occupied by the community was the Prealpino Residence on the border with the municipality of Bovezzo (Kaag, 2008). Other African communities are present in the city, like Ghanaians and Nigerians as well as much smaller communities such as Ivorians. The African communities tend to be less isolated from the working point of view, and often there are many specialised workers or people who have studied in Italy as the case of Cameroon and Ivorians (Grillo & Mazzucato, 2008; Riccio, 2008).

2.3.0.6 East and South East Asians

As East and South East Asia (ESEA), we refer to the Philippine community to which all the other communities of East Asia are aggregated except for the Chinese ones. The Filipino community started as a purely feminine community at the end of the 1970s. Filipino women immigrated to Italy as housemaids (Andall, 1992; Colombo & Sciortino, 2004; King, 1993; Pe-Pua, 2003), and then there was also male immigration always in domestic work.

2.3.0.7 South Americans

The South American (SAM) community is mainly composed of Argentineans and Brazilians, such communities have more cultural surroundings with Italy, given that 50% of the first and 30% of the second have Italian roots. There are also small communities of Bolivians and other Andean communities. However, among the macro communities present, the SAM one is the small with about 1500 members.

With such an analysis, it is essential to describe how the composition of the population in the various neighbourhoods was, in order to give a correct interpretation of the results. The heterogeneity index shows us how the population is divided, i.e. it explains how two randomly extracted individuals do not belong to the same ethnic group. The complexity of the population composition was

high, particularly in the popular neighbourhoods, a high composite population characterised them.

2.4 Methodology

There are two dimensions of segregation. The first is on the axis exposure-isolation. The second is on the axis evenness-clusterisation. Segregation must be evaluated in both dimensions.

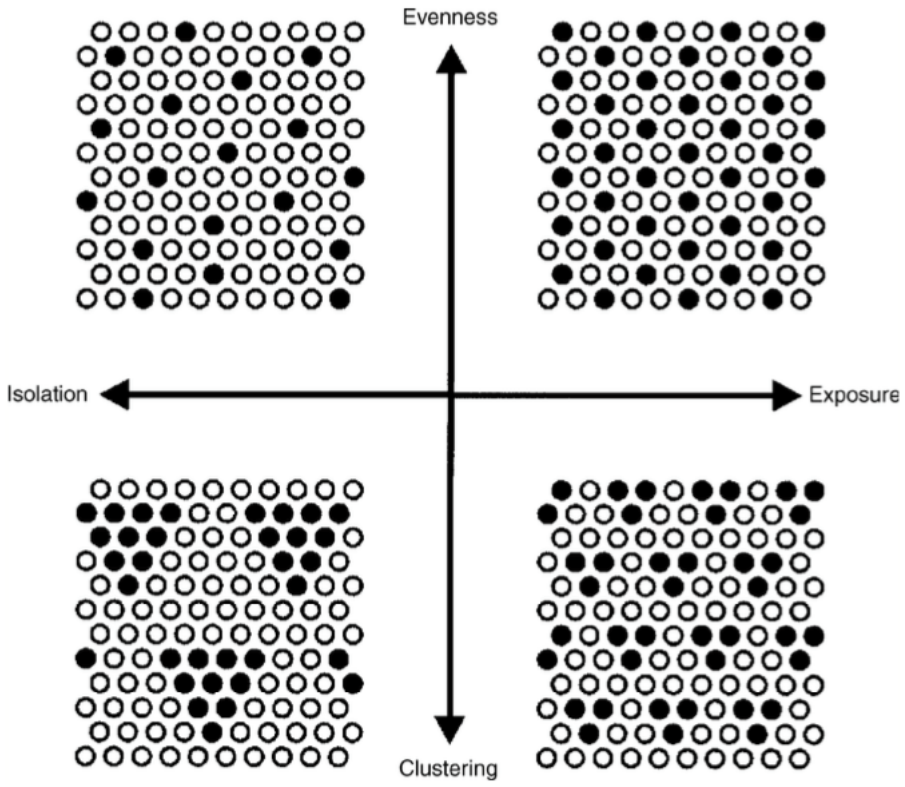


Figure 2.5: Dimension of residential segregation (Reardon & O'Sullivan, 2004)

To evaluate segregation, we used a multidimensional approach correctly. Segregation was assessed by isolation, exposure and evenness. In addition to these we used a local spatial clustering index graphically reported. Although the literature usually shows mono-dimensional analyses, in a highly heterogeneous setting it is necessary to isolate the cases of segregation from the cases in which individuals live isolated from their community. Classical clustering indices are excluded from the analysis. They show the presence of clustering, but not their position. Centralization indices are also excluded, since the irregular area of the

blocks and the presence of agricultural and extraction areas, in which people live, may limit the validity of the indices.

2.4.1 Indices of Evenness

2.4.1.1 Duncan and Duncan's Dissimilarity Index

The most common index of dissimilarity is Duncan and Duncan (1955) dissimilarity index; it is defined as follows:

$$IS = \frac{1}{2}\left|\frac{x_i}{X} - \frac{y_i}{Y}\right|,$$

where x_i and y_i are the population counts for the two subgroups in the area unit i, while X and Y are the total counts for the two groups in the city object of the study.

However, despite its popularity this index it shows has some certain weaknesses. More importantly, like all evenness indices, it this index depends is dependent on the way a given the geographical area of interest was is fractioned into sub-units. The the smaller the units, the higher the index value is (Carrington & Troske, 1997). Furthermore, It it also does not fully satisfy the PT which requires to reflect the index to be sensitive to all transfers of minority members over neighborhoods where they are differently represented (James & Taeuber, 1985). Considering that The the dissimilarity index explains depends on the difference that needs to be transferred to have obtain evenness, the index estimation can bias any segregation measure therefore in socio-geographical contexts characterized by a setting not presenting many only a few enclaves, such as the Southern European countries, it might lead to biased measures.

Index can be also Multi-group (Sakoda 1981), it was defined as follow:

$$IS_M = \frac{\sum_{m-1}^{M} \pi_m \sum_{j-1}^{J} \frac{t_j}{T^2}\left|\frac{\pi_{jm}}{\pi_m} - 1\right|}{2\left[\sum_{m-1}^{M} \pi_m(1-\pi_m)\right]}$$

where $\pi_m$is proportion of m group, t_j is total cases of area j, T is total cases in the area.

2.4.1.2 Gini index

Evenness indices usually adapted indices of income inequality, one of the most famous indices of income inequality is the Gini coefficient R[1] it is also used as segregation index. Indices of evenness are income inequality indices and as income inequality indices they are based on some axiomatic

First approach to inequality measurement were made by Max Lorenz with Lorenz Curve in 1905. Its curve is and its broken line are graphical technique of representing income inequality.

[1] Although it is often abbreviated as G, in the original Italian version it is abbreviated as R for reddito, that is "Income", the Italian word for Income.

In 1912 the Italian statistician Gini published its famous coefficient. This coefficient is derived from the concept of mean absolute difference Δ a measure of variability; i.e. a measure that highlights the inequality of data between them, regardless of any average value, introduced by Whilem Jordan fifty year before.

$$\Delta = \frac{\sum_i^n \sum_j^n |x_i - x_j|}{n(n-1)}$$

with $i \neq j$.

The Gini coefficient definition hold usually on Lorenz's curve. But it can be easily calculated with the definition of the mean absolute difference, in fact the Gini index is one half of Δ. That is equivalent to the definition based on Lorenz's curve (Gini, 1912). The Gini concentration index, R, is the ratio between the concentration area and the area of maximum concentration underlying the line of equation of the Lorenz curve. By dividing the area of concentration into trapezoids, after some steps it is possible to derive the following formula:

$$\mathrm{R} = \frac{\sum_i^n \sum_j^n |x_i - x_j|}{2n \sum_i^n x_i} = \frac{\Delta}{2\bar{x}}$$

The multinational version purposed by Reardon and Firebaug (2002) is defined as follows

$$R_M = \frac{\sum_{m-1}^{M} \pi_m \sum_{i-1}^{J} \sum_{j-1}^{J} \frac{t_i t_j}{T^2} \left| \frac{\pi_{im}}{\pi_m} - \frac{\pi_{jm}}{\pi_m} \right|}{2 \left[\sum_{m-1}^{M} \pi_m (1 - \pi_m) \right]}$$

where $\pi_m$is proportion of m group, t_j is total cases of area j, t_i is total cases of area i, T is total cases in the area.

2.4.2 Exposure

Exposure indices measure the degree of potential contacts with people of one group to one-other or members of two groups inside a spatial unit. Exposure could be measured as isolation, i.e. the probability to have contacts with members of the same group. Besides, it could be measured as interaction, i.e. the probability to have contacts with another group inside the spatial unit. Exposure indices measure the potential experience of segregation. The equidistribution measured by the indices of evenness does not imply that there is less potential contact between those living in a segregated area and the majority group.

2.4.2.1 Interaction index

Bell (1954) proposed the so-called "index of interaction", Massey and Denton (1988:288) describe it as "the minority-weighted average of each spatial unit's

majority proportion". Interaction index measures the extent to which a given group is exposed to another or relatively isolated in a given context.xPy measured the exposure of each minority group to natives as follows:

$$xPy = \sum_{i=1}^{N} \left(\frac{x_i}{X} \frac{y_i}{t_i} \right)$$

where X is the total population of ethnic group in the area, x_i is the population of the ethnic group in the tract, y_i is population of the natives in the tract, $t_i$is the total population of the tract.The index can be interpreted as the probability that two individuals randomly extracted from the population of two different groups can be in the same neighbourhood, thus in contact with each other.

2.4.2.2 Isolation index Eta^2

Moreover Bell (1954) proposed the so-called "index of isolation", which measures the extent to which a given group is exposed to itself or relatively isolated in a given context.xPx the ethnic isolation index measured the degree of each minority is isolated from other population $xPx = \sum_{i=1}^{N} \left(\frac{x_i}{X} \frac{x_i}{t_i} \right)$.

Isolation index could be very asymmetric, therefore Bell (1954) purposed an adjusted index of isolation that compensate for asymmetry, the correlation ratio, also known as eta-squared. Bell shows that eta^2 is just a standardized probability. It represents the probability standardised probability to meet co-ethnic: The index is defined as follow:

$$Eta^2 = \frac{\sum_{i=1}^{N} \left(\frac{x_i}{X} \frac{x_i}{t_i} \right) - \frac{X}{T}}{1 - \frac{X}{T}}$$

wherex_i was the number of co-ethnics in the area, X was the total number of co-ethnics, and t_i was the total population of the tract of interest, and T is total population. This allowed us to derive the expected probability that each individual has to interact with another one from the same ethnic group.

As evenness clustering is an important segregation dimension, spatial clustering indices have been widely employed as an indicator of spatial segregation. Occupation of adjacent spaces might form an ethnic enclave. Higher is the level of clustering, therefore, greater the segregation degree. The spatial association analyses allow eliminating the problem called modifiable areal unit problem. In which the geographic aggregation is to undermine the results of the analysis, in our case of segregation. Using an egohood approach also dampens the checkerboard problem. In this approach, segregation is therefore shown not as a single index but as a spatial dependence on the map, not limited to administrative neighbourhood. However, this type of analysis does not show the separation between the communities, but shows where the communities live. Instead other indices like Getis Ord G_i^*, or Anselin's Local Indicator of Spatial Association are able to spot were people are segregated.

2.4.3 Local Clustering : Local Indicator of Spatial Association (LISA)

There are in addition spatial distribution indices. On the opposite way of evenness, it is possible to see the clustering indices. LISA was the acronym of Local Indicator of Spatial Association Anselin (1995). It was a technique based on Moran's I index an indicator of spatial auto-correlation (Moran 1950). Spatial auto-correlation was as a proximity cluster of parameters with similar values. If the similar values of the parameters had a spatial localisation, positive spatial auto-correlation was present. On the other hand, spatial proximity of different values, which was not stable in space, indicates a negative spatial auto-correlation or spatial heterogeneity. Moran I is an index of spatial auto-correlation and it is comparable to index r of Pearson. Moran's I that is a global spatial auto-correlation index, i.e. measures the spatial auto-correlation on all location in a territory. Its definition is as follows:

$$I = \frac{N}{W} \frac{\sum_i^n \sum_j^n w_{ij}(x_i - \bar{x})(x_j - \bar{x})}{\sum_i (x_i - \bar{x})^2}$$

Where x_i is an attribute for feature i , $\bar{X}$ the mean of the corresponding attribute, $w_{i,j}$ is the spatial weight between feature i and j, n the total number of features and W is the sum of all $w_{i,j}$.

LISA is a local indicator, i.e. it measures the presence of similar values in the considered sub-area. Local Moran definition is:

$$I_i = \frac{x_i - \overline{X}}{\left[\frac{\sum_{j=1,j\neq i}^n w_{i,j}\left(x_j - \overline{X}\right)^2}{n-1}\right]^2} \cdot \sum_{j=1,j\neq i}^{n} w_{i,j}\left(x_j - \overline{X}\right)$$

Where x_i is an attribute for feature i , $\bar{X}$ the mean of the corresponding attribute, $w_{i,j}$ is the spatial weight between feature i and j, n the total number of features and W is the sum of all $w_{i,j}$.

To compute the LISA we need to generate z-score $Z\left(I_i^*\right)$ for each location:

$$Z_{I_i} = \frac{I_i - E\left[I_i\right]}{\sqrt{E\left[I_i^2\right] - E\left[I_i\right]^2}}$$

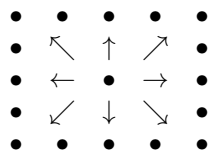
where $E\left[I_i\right]$ is the excepted value of I_i and it is defined as $E\left[I_i\right] = -\frac{\sum_{j=1,j\neq i}^n w_{i,j}}{n-1}$

A positive value of I indicates that a location has a neighbouring location with similar value, hence this feature is a part of a cluster. If their value is positive, we have a core of spatial cluster that can be characterized by high values High-High (HH) i.e, groups of features with high values or low values Low-Low (LL) i.e, groups of features with low values. On the other hand, a negative value for I indicates that a location has a neighbouring location with dissimilar value. If their value is negative, we have place of interest that can be characterized by high values High-Low (HL) i.e, dissimilarity outliers with an

high number of low values or Low-High (LH) i.e, dissimilarity outliers with an low number of high value. By comparison HH and LL are the core of a spatial cluster, instead HL and LH where we can see outlier values. Is mandatory remark that core HH and LL are the core of cluster and not cluster themselves, like an iceberg where only a small part emerges. Instead, HL and LH are like boats where all interesting part is emerged.

The presence of a hot spot, i.e. a point of a high clusterisation, means that the Z-value is higher than excepted. It means the presence of high segregation from a sociological point of view. Oppositely the presence of a cold spot, i.e. a point of a low clusterisation, means that the Z-value is lower than excepted. It means the presence of low value surrounded by other low values, so significantly low segregation. The absence of significance means that there is no segregation.

All spatial models are based on a spatial matrix that defined on a weighting matrix W. Each non-negative matrix $W = (w_{ij} : i, j = 1, \ldots, n)$, is a possible spatial weight matrix summarizing spatial relations between n spatial units. Therefore each spatial weight, w_{ij} , reflects its influence of unit j on unit i. For calculate W we used a spatial contiguity weights matrix. The simplest of these weights simply indicate whether spatial units share a boundary or not. The matrix considers all the boundaries from the polygon that forms the block as represented on the imagine as follows:



The matrix used, uses two levels of spatial correlation, then uses the boundary level with the block in question, the first circle of neighboring blocks and the second circle of neighboring blocks. About the z-values generation we bootstrapped indices for 99999 times and limited significativity to 0.0001 to avoid type-1 error, that is very common in this kind of analysis as alleged by Anselin (1995), with this kind of estimation we do not fall in type-2 error problem.

2.5 Results

2.5.1 City level segregation

The analysis of segregation in the city of Brescia begins with two indices of multinomial segregation, the dissimilarity index of Sakoda and the Gini multinomial index; these indices assume values of 0.4119 and 0.5556, respectively. This means that global segregation in Brescia was not particularly high. However, the multinomial indices do not explain who was segregated. To do this it is necessary to analyses the population with binomial indices, these indices explain the segregation of a group compared to the total population and to natives for exposure index.

As it was possible to see in table 2.1 segregation to the total population measured as evenness with both Gini and Dissimilarity index was high for Chinese and EAST EU, instead was low for SAM immigrants. Segregation measured as isolation was pretty high for South Asians, followed by EAST EU, it was instead very low for ESEA.

To better understand how people faced segregation we analyzed segregation at neighbourhood level, as before we started from multinomial indices and then we explored segregation for each neighbourhood. As it was possible to see in the table 2.2 multi-group segregation was high (highest then median, 0.5) in Brescia Antica, Centro Storico Sud, Chiesanuova, Fiumicello, Folzano, Porta Venezia, Sant'Eufemia, Sant'Eustacchio, San Polo Cimabue, San Rocchino, Urago Mella, Villaggio Prealpino, Villaggio Violino. These neighborhoods are both central, semi-peripheral and suburban, therefore segregation was not a problem of peripheralization, like for example happens in the UK, in Sweden, or in France.

By analyzing each neighbourhood, it was possible to better understand those which groups are more segregated and have a better idea of where they live. The neighbourhoods were presented for five geographical areas: Centre, North, South, East, West; each area corresponds to a table that shows segregation, for Evenness to whole population and Italians, Isolation and Exposition to Italians.

2.5.2 Centre

2.5.2.1 Brescia Antica

The neighbourhood of "Brescia Antica" represents the original city part of Gallo-Roman origin, and it was half of the city centre. It was a generally wealthy neighbourhood where the age of the inhabitants was generally high. The price of housing was medium-high. The district has some uninhabited areas such as the Castle, the Roman-Lombard complex, the former Military Hospital, a former barracks, a former hospital. Like other neighbourhoods of the historical centre, e.g. Centro Storico Sud and Centro Storico Nord, this neighbourhood was also mostly pedestrian (Corsini & Zane, 2014).

In this neighbourhood, as it was possible to see in table 2.3 segregation measured as evenness was pretty high for all groups except for Eastern Europeans. In a particular way, there was segregation for the Chinese community. Other segregation phenomena were for SSA with a mild degree of isolation, there was also for MENA. However, exposure to natives for all groups still pretty high.

In the northern area of Brescia Antica on the slopes of the castle, there was an LL cluster, i.e. a low amount of people surrounded by a low amount of people for Eastern Europeans, as it was possible to see in figure 2.7. A similar LL cluster is also present on the northern side of Piazza Arnaldo.

In the same area, there was a large Chinese LL cluster , as it was possible to see in figure 2.6. The Chinese present LL clusters in via Martiri di Belfiore, i.e. in the area behind the new Dome, near Piazza del Foro and Piazza Tebaldo Brusato, as it was possible to see in figure 2.6. It means that there is a little spread Chinese population around the city. a Furthermore, LL-type segregation

was present in the area rebuilt in the post-war era close to the local chamber of commerce. Besides, there were LH insulation clusters near the Milan-Venice railway line, the Court and the former fruit and vegetable market. The houses in which these clusters were located are of high-density housing. The spatial association analysis did not show other segregation areas for other ethnic groups.

2.5.2.2 Centro Storico Nord

The neighbourhood of "Centro Storico Nord" better known as Carmine represent almost a quarter of the city centre. From the nineteenth century it became the most impoverished neighbourhood, it hosts many waves of migration, first of the people from the valleys, then people of the Veneto, then immigrants from southern Italy and then foreigners (Scaglia, 2003).

In the 80s inhabitants of social houses were relocated to the new neighbourhood of San Polo, now San Polo Parco. In order to clean the neighbourhood by social disease. The reallocation had opposite effects. Lack of customers led to the closure of numerous shops and boosted the micro crime activity in the area. Strong micro-crime presence kept property and rent prices lower then other areas also with numerous empty houses. This favored the presence of immigrants who were looking for cheap houses. The narrow streets and the lack of parking make it unsuitable for cars. The buildings are old, and for decades they had little maintenance. The neighbourhood is almost wholly pedestrian. In the 2000s the municipality implemented a gentrification project aimed at restoring the neighbourhood and strongly reducing the micro-crime in the area Briata (2010;2013). The project succeeded by transforming the ill-fated neighbourhood in place of the nightlife. In the neighbourhood, due presence of a Muslim community there is a Mosque.

Centro Storico Nord, as it was possible to see in table 2.3, displayed an overall low level of segregation. The most segregated were EAST EU, but their isolation was tiny. South Asians displayed a conspicuous level of isolation although the segregation level is low. The low segregation in this neighbourhood can be explained as the effect of the high multi-ethnicity of the area; in fact, the exposure to Italians here was low.

The MENA community shows LL-type segregation in one of the most central area between the Italian Post Office and via X Giornate near Piazza della Loggia as it was possible to see in figure 2.9. The SAM showed an area of strong HH segregation in the area next to the former Randaccio barracks, as it was possible to see in figure2.10. The area was primarily miserable, and often there was much micro-crime. Two LL clusters were also present near this area.

Robust was the HH clustering of the ESEA, particularly of the Filipino community, as it was possible to see in figure 2.8, which was visible in the area due to the presence of ethnic shops. The concentration was highest in the area of the district near the church of San Faustino and the university departments of Economics and Law. The Filipino community was very present in the area due to close ties in the area. Many Filipinos work as household workers at wealthy homes in adjacent neighbourhoods.

2.5.2.3 Centro Storico Sud

Unlike the Centro Storico Nord neighbourhood, the Centro Storico Sud has been the subject of numerous urban redevelopments during the 20th century, even with large areas demolition. It is a neighbourhood that became gentrified in the post-war era, becoming a middle-class neighbourhood, also by the economic boom and the consequent increase of social status of original inhabitants. The neighbourhood also includes the railway station area. This area belongs to this neighbourhood even though it is separated by two avenues that make up the so-called Ring or the double ring road that runs around the historic centre (Corsini & Zane, 2014). Railway station displayed high traffic and high crime, two features that does not have a good impact on property values and related rent prices. Area is composed by high-density buildings built in the 60s.

As it was possible to see in table 2.3, this neighbourhood was pretty segregated in terms of evenness for all groups except SAM. The most segregated group was Chinese. The Chinese community was concentrated in the area to the west of the train station. In this small area, there is a little China Town. However as it was possible to see from spatial analysis the segregation for Chinese had a wider extension then what it was possible to see by urban observation as it was possible to see in figure 2.6. If we consider that the spatial matrix takes into consideration the block and the nearest blocks for two levels, it becomes evident that there was a strong cluster of segregation in the southern part of the neighborhood. The area was composed of buildings built at the end of the 60s with a high population density. Other segregated groups with a lower level of isolation are the SSA and the North African. Moreover it was possible to notate that ESEA community had HH clustering were present also in northern part of Centro Storico Sud for its proximity to Centro Storico Nord, as it was possible to see in figure 2.8. The spatial association analysis did not show other segregation areas for other ethnic groups.

2.5.2.4 Crocifissa di Rosa

The Crocifissa di Rosa neighbourhood of borders to the south with the Castle, to the west with Borgo Trento and to the east of San Rocchino. The neighbourhood has arisen in the 50s of the last centuries. Previously it was an industrial area and agricultural area (Corsini & Zane, 2014). The neighbourhood was oriented to services and commercial areas, and it was built with high density buildings that develop mainly in height. The relative proximity to the historical centre and the presence of hospitals that rise to the north certainly favored its growth. Like other residential areas where property prices were high, the penetration of immigrants was scarce. As it was possible to see in table 2.3, in Crocifissa di Rosa neighbourhood there was high segregation in terms of evenness, but poor isolation due to the lack of immigrant population in the area. It is possible that foreigners living here could afford to do so or they live in marginal areas. The spatial association analysis did not show any segregation areas any other ethnic group.

2.5.2.5 Porta Milano

The Porta Milano neighbourhood once known as Campo Fiera borders to the north with Sant'Eustacchio, to the east with the Centro Storico Nord and the Centro Storico Sud, to the south with Quartiere Primo Maggio and to the east with Fiumicello. This neighbourhood developed as an industrial area in the late nineteenth century, becoming one of the central working-class neighbourhood. In the southern part of the neighbourhood near the local police station, in the same area there are numerous social houses built at the beginning of the 20th century. In the on the opposite side to the Vantiniano monumental cemetery, there are social houses owned by a private foundation called the "Congrega della Carità Apostolica" (Corsini & Zane, 2014). The area consists of four buildings for a total of 80 apartments built in 1906, and still inhabited by both Italians and immigrants.

The Porta Milano neighbourhood, as it was possible to see in table 2.3, shows strong combined segregation for evenness and isolation for the Sub-Saharan African group. All other groups show a low level of both segregation as evenness and isolation. The spatial association analysis did not show any segregation or isolation clusters any other ethnic group.

2.5.2.6 Porta Venezia

Porta Venezia borders to the north with Mount Maddalena, the Mount was largely uninhabited except its southern part is part of the neighborhood .The district except for a small part to the south near the Milan-Venice railway is composed of villas populated by wealthy people; it is distributed in the hilly and foothills of the city (Corsini & Zane, 2014). Also this neighbourhood hosts a Mosque, in its southern side. As it was possible to see in table 2.3 Porta Venezia showed average segregation levels as evenness, with a low level of isolation. The only exception was the South Asian community which shows a medium level of segregation as evenness and a comparison with the others, greater isolation. Given the low-density urban structure except for the southern area between Viale Piave and Viale Venezia, it is likely that there is low spatial segregation in the hilly and elevated part in the southern part. Was in fact possible to see numerous LL type clusters on the hilly area. In particular, there is a presence of Chinese, EAST EU, MENA, SAS and SSA in the area near via Turati, as it was possible to see in figure 2.6, 2.7, 2.9,2.12 and 2.11. The area was composed of villas and populated by rich and often of high age people. Therefore, it was possible that space clusters are due to the presence of carers and domestic workers. In particular, we noted the presence of a strong HH segregation cluster with the presence of numerous LH isolation clusters for the East South East Asians area between viale Venezia and Viale Piave, as it was possible to see in figure 2.8. This area is characterised by large villas of the upper Brescia bourgeoisie.

2.5.3 North

2.5.3.1 Borgo Trento

The neighbourhood of Borgo Trento is a neighbourhood north of the historical centre (Corsini & Zane, 2014). In post-war development, Borgo Trento becomes a residential neighbourhood of a middle class, except for the northern part where there are many council houses. The presence of immigrants was limited; at the same time, the age of the neighbourhood was high. An ancient area characterises the urban structure of Borgo Trento made up of historical buildings with a low population density.

Moreover, a current area made up of modern high-density residential buildings. House prices in the area tend to be medium to high, especially in the historic area. Borgo Trento has excellent public transport connections by both Buses and Subway. Segregation in this neighbourhood was almost absent and the presence of migrants, as it was possible to see in table 2.5, almost null level of isolation compensated high level of evenness; moreover exposure to natives was high. Spatial analysis did not show any spatial association for any group in Borgo Trento.

2.5.3.2 Casazza

The neighbourhood of Casazza is a neighbourhood of the northern suburbs of the city. In 1967 there were the first residential settlements (Corsini & Zane, 2014). Casazza neighbourhood had mainly an urban structure based on large condominium complexes characterised by buildings that develop vertically usually of subsidised social housing. The neighbourhood has no great spatial barriers like railways or motorways, moreover has excellent public transport connections by both Buses and Subway. Segregation in this neighbourhood was almost absent, as it was possible to see in table 2.5, high rates of evenness indices were compensated by almost nil levels of isolation, moreover exposure to natives was high. Spatial analysis did not show any spatial association for any group in Casazza.

2.5.3.3 Mompiano

Mompiano, is a neighbourhood north of Brescia. It is about 2 km from the city centre, and borders to the north with municipalities of Bovezzo and Nave, to the east with the mountainous territory of Mount Maddalena, to the west with the neighbourhood of Casazza. It has its maximum development in the post-war period also and above all thanks to the central city hospital, to which is added in 1987 a second private hospital and the University from 1982 with faculties of Engineering and Medicine (Corsini & Zane, 2014). Mompiano is a bourgeois neighbourhood. Both Buses and Subway well serves the area.

Segregation in this neighbourhood was almost absent, high rates of evenness indices were compensated by almost nil levels of isolation, moreover exposure to natives was high, as it was possible to see in table 2.5. Spatial analysis shows only LL clusters for the Chinese community in the northern area of the

district as it was possible to see in figure 2.6. These areas are high income therefore justifies the scarce widespread presence of people of Chinese ethnicity. It is wrong to think that all immigrants are by definition poor and live in poor areas, some also live in rich areas.

2.5.3.4 San Rocchino

The toponym of San Rocchino identifies the district crossed in length by the homonymous street. The largest hospital in the city is located to the north west of the district; built after World War II and inaugurated at the end of 1950. This structure has certainly influenced the development of the district and its viability (Corsini & Zane, 2014). Here is one of the most popular subway stations. Costalunga is an area in Brescia belonging to the neighbourhood of San Rocchino, in the post-war period it has become a residential district with very high costs.

San Rocchino both in terms of evenness and isolation was strongly segregated for South Asians, as it was possible to see in table 2.5. A South Asian that live in has 10% of probability to meet another South Asian in the neighbourhood. For other groups segregation was mild for mostly all except Eastern Europeans, but isolation level was low. Chinese community, as it was possible to see in figure 2.6 showed both LH isolation cluster near Città di Brescia hospital and other LL clusters in Costa Lunga area. In the same area it was also possible to see some LL clusters for MENA and SSA as was respectively possible to see in figures 2.9 and 2.12.

2.5.3.5 San Bartolomeo

The S. Bartolomeo neighbourhood, except for a small sixteenth-century nucleus in Gabbiane area, has been built as a social housing unit since 1957 in order to accommodate the Istrian refugees (Corsini & Zane, 2014). Although the majority of the homes were initially rented, the tenants bought them when the social housing management company. The neighbourhood from the 80s changed its social status from a poor neighborhood to a middle-class neighborhood. Only a small part of the neighbourhood in the northern part remains a rented social housing area. The area is well served by Buses.

San Bartolomeo both in terms of evenness and isolation was strongly segregated for South Asians, as it was possible to see in table 2.5. A South Asian that live in has 29.39% of probability to meet another South Asian in the neighbourhood. For other groups segregation was mild for mostly all except Eastern Europeans, but isolation level was low. There were clusters of low segregation in the northern part of the district for the Chinese community as it was possible to see in figure 2.6 in the area of social housing that was established north of the neighbourhood. Spatial analysis did not show any other spatial association for any other group in San Bartolomeo.

2.5.3.6 Sant'Eustacchio

The neighbourhood of Sant'Eustacchio was founded as an industrial and military area, three-quarters of the neighbourhood is now occupied by industrial, former-military areas and the police academy. From the residential point of view, the Sant'Eustacchio was a public initiative. It was built in early XX century as social housing for workers of Brixia Züst plant (now IVECO) in the area of via Volturno, in addition in the area of via Montegrappa, other social houses were built in the 20s for post office workers (Corsini & Zane, 2014). Except the original area it is mostly made up of villas and buildings.

Sant'Eustacchio had consistent levels of segregation with evenness combined with isolation for North Africans and South Asians, as it was possible to see in table 2.5,, this segregation mainly derives from their presence in social housing of via Volturno and via Montegrappa. Other groups isolation was low despite level of segregation. The exposure to Italians was mainly high. There were clusters of high isolation in the northern part of the district for the Chinese community, as it was possible to see in figure 2.6, cluster is located in a tall building in via Randaccio, any other community had no significant spatial association in the neighbourhood.

2.5.3.7 Villaggio Prealpino

The district borders to the south with Mompiano and Casazza, to the west with Concesio, to the north with Bovezzo and to the east with Nave. Until the 50s area of Villaggio Prealpino was open countryside. Father Ottorino Marcolini founded the Prealpino village as other neighbourhoods. The village rises in the last part of the valley formed by the river Garza. The construction work began in Brescia in 1959 and ended definitively in 1973 (Corsini & Zane, 2014). The structure is the same as any other village built by Marcolini, semi-detached houses with gardens organised according to the Roman plan. The population is usually of high age, often belonging to the first generation who bought houses since 1973. Segregation in this neighbourhood was almost absent, high rates of evenness indices were compensated by almost nil levels of isolation, moreover exposure to natives was high, as it was possible to see in table 2.5,

Villaggio Prealpino shows numerous LL clusters for all communities except SSA, as it was possible to see in figures 2.6, 2.7,2.8,2.9,2.10,2.11, this kind of spatial association was particularly strong for Chinese that had diffusion in the whole neighbourhood, as it was possible to see in figure 2.6. Besides, Villaggio Prealpino displayed an isolation cluster HL for ESEA as it was possible to see in figure 2.8, the clustered area had no urban difference with the rest of the district.

2.5.4 South

2.5.4.1 Chiesanuova

The neighbourhood of Chiesanuova located southwest of the city is a popular neighbourhood, bordered to the north by the Milan-Venice railway. The neighbourhood is very heterogeneous from the urban point of view. There are areas of semi-detached houses built by the presbyter Ottorino Marcolini, and there are areas of council houses and above all large industrial areas that cover most of the area of the neighbourhood (Corsini & Zane, 2014). The main mosque of Brescia is in the neighbourhood Chiesanuova. The neighbourhood is heavily polluted. There are pollutants of organic origin generated by Caffaro Spa, in addition, there was heavy metal pollution (Turrio-Baldassarri et al., 2009). The northern part of the area is characterized by a large former ironworks plant and by numerous textile companies mainly belonging to the Chinese community. The central-western part of the district is characterized by numerous social housing. This part has numerous buildings that develop vertically with a strong population density. The population that inhabits them is of a medium-low class. The central part is characterized by numerous villas of the Marcolini type, i.e. semi-detached houses with gardens. The southern part of the district after a commercial area is characterized by a small settlement area of the Noce district and by a large industrial area, the largest in the city.

Chiesanuova was characterised by a strong segregation for South Asians, followed by North African and Middle Eastern and South Saharan Africa, as it was possible to see in table 2.7. These two effects might be justified by religious centres such the presence of the main Mosque of the city and numerous social housing in via Livorno area. Also remarkable is segregation for Chinese community with the same evenness and isolation combination of MENA. The southern area of Chiesanuova called Girelli showed a LL segregation cluster for the EAST EU, as it was possible to see in figure 2.7. Besides, there was a cluster of isolation for the SAM in the residential part of the industrial area, as it was possible to see in figure 2.10, where there is a large farmhouse of previous construction to the industrial area. Area does not show any kind of spatial association for any ethnic group.

2.5.4.2 Don Bosco

The Don Bosco neighbourhood was founded around 24 semi-detached houses built at the beginning of the 20th century by the railway worker's cooperative. In that years there is also an industrial growth generated by railway investments, such as the freights yard, general warehouses and railway service companies. In the early post-war period, the population grow-up exponentially. In the second post-war period neighbourhood grown in the majority with high-density vertical buildings, ten-folding the population. The neighbourhood borders to the north with the Milan-Venice railway, to the east with the neighbourhood of Lamarmora to the west with that of Chiesanuova and to the south with the motorway. The urban structure except for the original 24 semi-detached houses

is mostly composed of buildings with medium and high population density.

Due to an extensive multi-ethnic population of the neighbourhood, segregation Don Bosco neighbourhood was almost absent. High rates of evenness indices were compensated by almost null levels of isolation, moreover exposure to natives was high, as it was possible to see in table 2.7.

The Chinese were clustered throughout the district with the exception of the north-west, the proximity with the district "Centro Storico Sud" allowed them to be close to ethnic services as it was possible to see in figure2.6. The Eastern European countries were clustered throughout the district, with the exception of the northern part, as it was possible to see in figure 2.7. These areas are characterized by a high population density. North Africans live in the north-eastern part of the district in area proximate the train station, in the same area there is a segregated cluster of SAM and South Asians. There is no spatial association for other groups.

2.5.4.3 Folzano

Folzano until the 70s was a peripheral village of Brescia. It was an island outside the city, and also a forgotten neighbourhood whose streets were not paved until end of 70s. Now a neighbourhood of about 1500 people remains strongly detached from the city about 6km from the centre and despite the improved links remains an agricultural area. It borders to the west with the neighbourhood of Fornaci, to the north with the neighbourhood Villaggio Sereno and to the east with the municipality of San Zeno sul Naviglio. The urban structure consists mainly of cheap small houses.

Folzano compared to all other neighbourhoods of the city had a peculiar characteristic. It had a strong East European segregation in both evenness and isolation, as it was possible to see in table 2.7. Differently from all other neighbourhoods where EAST EU were less segregated and less isolated compared to all other groups, probably for the main presence of immigrants as caretakers. Folzano displayed also a pretty consistent segregation for MENA and SSA, both in terms of evenness and isolation. For all other groups although there was segregation in terms of evenness, but the degree of isolation was very low. Folzano showed an area of LL segregation for the Chinese communities near the Church as it was possible to see in figure2.6. It did not show other spatial associations relevant to other ethnic groups.

2.5.4.4 Fornaci

Fornaci is a vast neighbourhood of the city mainly oriented to agriculture and manufacturing. In the neighbourhood, there is the second city prison, Verziano. Fornaci borders with the municipalities of Castelmella and Flero. While it borders to the north with the village of Castelmella and neighbourhood of Villaggio Sereno. Besides, it show strong organic pollution like the neighbourhoods of Chiesanuova, Primo Maggio, and Fiumicello (Turrio-Baldassarri et al., 2009). The village of Fornaci, unlike the size of the neighbourhood is tiny, with a pop-

ulation of about 2600 inhabitants, although it is part of the urbanised area of the city maintains the distinctive features of a small country village.

Fornaci display segregation both as evenness and isolation for South Asian group, as it was possible to see in table 2.7. For all other groups although there was segregation, the degree of isolation was very low. It did not shows any segregation or isolation cluster.

2.5.4.5 Lamarmora

The neighbourhood of Lamarmora is built in the post-war period beginning in 1948. It was a labourer neighbourhood initially built with state-subsidised buildings (Zane, 2010). During the 70s it had an expansion with a large urban area partially residential and partially business oriented. The original population had mixed origins it was composed mainly by poor natives, immigrants from the countryside and southern Italy.

Lamarmora was the only neighbourhood with a considerable SAM segregation in both evenness and isolation , as it was possible to see in table 2.7, moreover it was possible to see that this segregation happened in the original area of the council houses built in the 40s, as it was possible to see in figure 2.10. Differently from all other neighbourhoods where SAM less segregated and less isolated than all other groups, with exception of EAST EU. However, there is also a mild level of segregation for South Asians. For all other groups, although there was segregation, the degree of isolation was meager. Lamarmora showed strong HH segregation for eastern Europeans in the central-northern area and LH-segregation North eastern area of Lamarmora, as it was possible to see in figure 2.7.

2.5.4.6 Porta Cremona

The Porta Cremona area is full of settlements built since the end of the 1920s after World War II. These settlements are built as suburban neighbourhoods to accommodate demographic expansion of the city. The first nucleus to rise in the area was the so called Leonessa district. The goal was to make a neighbourhood for white and blue collars with four stories houses with gardens, protected from the traffic. In 30s the industrialist Ferrari built 40 houses for workers employed in the nearby Calzificio Ferrari, but in 1954, the factory moved away, and the 40 houses were sold to the city bourgeoisie.

In Next to it, there is the Villaggio Sant'Antonio built in 1953 for the Istrian refugees, and the tenants subsequently bought houses. South of the Ferrari village, on the initiative of the Congrega di Carità Apostolica a charity foundation, houses are built for poor people, the area takes the name of Quartiere Bonoris (Zane, 2010). The last district is the Villaggio Verde, built for those who lost their homes during the massive bombing of WWII on the border with Brescia-Cremona and Brescia-Parma railway lines. In the southern part of the neighbourhood, there is a Mosque.

Porta Cremona neighbourhood was almost absent segregation as a combination of Evenness and isolation, as it was possible to see in table 2.7. Almost null levels of isolation compensated high rates of evenness indices, moreover, exposure to natives was high.

From spatial association point of view, it was possible to see an extensive Eastern European segregation cluster HH in the Ferrari Village area and the Bonoris district, as it was possible to see in figure 2.7. In addition there was a strong HH cluster in high destiny building in the southern part of the neighbourhood proximate to Volta Area. Furthermore, an isolation cluster was present in the area next to the Brescia-Cremona and Brescia-Parma railway tracks for the Chinese community, as it was possible to see in figure 2.6. This cluster connects to the segregation present in the railway station area.

2.5.4.7 Villaggio Sereno

The neighbourhood was built in large part by the presbyter Father Ottorino Marcolini in the 60s (Zane, 2010). The neighbourhood has the typical structure of the villages built by Marcolini, semi-detached houses with gardens, the houses are arranged with a Roman-style urban structure. The neighbourhood was created *ex-novo* and populated mainly by families of blue and white collars. The urban structure is the same as the other Marcolini villages, i.e. semi-detached houses with gardens. At the time of delivery in 1963, the village had 823 houses, but in the 70s it was expanded. The neighbourhood to the north borders the highway that restricts pedestrian accessibility.

Villaggio Sereno compared to all other neighbourhoods of the city had a peculiar characteristic. It was the only neighbourhood with a strong ESEA segregation in both evenness and isolation, and here isolation was tremendously high , as it was possible to see in table 2.7.Although there was no evidence from a spatial point of view.

The neighbourhood also displayed segregation both in terms of evenness and isolation pretty consistent for MENA, spatial analysis show an LL cluster in the southern part of the neighbourhood and an HL cluster in the area at the north of primary school, as it was possible to see in figure 2.9. Unlike the rest of the district dominated by semi-detached villas with gardens, in this area, there are high-density housing block. SAS also displayed a consistent segregation in terms of isolation and evenness, but without any evidence in terms of spatial clustering.

For all other groups, although there was segregation, the degree of isolation was meager. Villaggio Sereno displayed an extensive segregation isolation cluster HL in the southern part of the neighbourhood in low-density area for EAST_EU, as it was possible to see in figure 2.7.

2.5.5 East

2.5.5.1 Buffalora

Buffalora neighbourhood is a neighbourhood isolated in the countryside south-east of the city about 7km from the centre. The neighbourhood was built in large part by the presbyter Father Ottorino Marcolini and delivered in 1980 (Zane, 2010). The area is full of quarries and fields. The neighbourhood has the typical structure of the villages built by Marcolini, semi-detached houses with gardens, the houses are arranged with a Roman-style urban structure. In Buffalora segregation was particularly strong for South Asians, followed by East Asians and South East Asians, as it was possible to see in table 2.4. For all other groups, although there was segregation, the degree of isolation was tiny. The space association in Buffalora had not statistical significance for all groups.

2.5.5.2 Caionvico

Caionvico is a small neighbourhood on the eastern outskirts of the city, in the foothills area. It borders to the north with Mount Maddalena, to the south with San Polo Cimabue and the Milan-Venice train line, and to the east with the village of Botticino. For its position of proximity to the city, but also of separation from it is inhabited by the bourgeoisie.

In Caionvico segregation was unusually low for all groups, both in terms of evenness and in terms of isolation, exposure to natives was unusually high, as it was possible to see in table 2.4. The space association in Caionvico was absent for all groups.

2.5.5.3 Sant'Eufemia

Sant 'Eufemia is a neighbourhood of Brescia located to the east of the city, bordered to the east with Caionvico, to the north with Mount Maddalena, to the south by the Milan-Venice railway and to the west by the neighbourhood of Porta Venezia. Two parts compose Sant 'Eufemia; in the upper part is a village in the hills of Marcolini (Zane, 2010), a quiet area away from traffic. In the lower part is the ancient village of pre-industrial times. This area is much more exposed to traffic, and it was possible to get rented apartments. There are also limited parking facilities. At the time of construction considered economic houses for the working class, have now become medium-priced and challenging to rent homes because of the surface that inflates the cost. Sant'Eufemia it is a semi-peripheral area it borders to the south with a high traffic road and the north with Mount Maddalena, part of the neighbourhood is in a foothills area, to the west, it borders the district of Porta Venezia and to the east with the neighbourhood of Caionvico.

Sant 'Eufemia both in terms of evenness and isolation was strongly segregated for South Asians, as it was possible to see in table 2.4. For other groups, segregation was mild for mostly all except Chinese, but the isolation level was low. There was a cluster of LL segregation for Chinese in the central area of the

neighbourhood, as it was possible to see in figure 2.6. The area was made up of small semi-detached houses with a typical garden of the Marcolini villages.

2.5.5.4 San Polo

Until a few years ago the San Polo district was a unique neighbourhood. The district has been divided into four parts: San Polo Houses, Sanpolino, San Polo Park, San Polo Cimabue. The neighbourhood located southeast of the city. It had ancient origins, as evidenced by archaeological finds and buildings of medieval origin still present. However, until the 50s it was formed only by small groups of houses and some farms. Until a few years ago the San Polo neighbourhood was a unique neighbourhood. The neighbourhood was divided into four parts San Polo Houses (historical part), Sanpolino, San Polo Park, San Polo Cimabue. San Polo is a neighbourhood born from the experimental public initiative for the time. Designed in the seventies and built in the eighties, it has endowed the city with a large residential green neighbourhood of social housing, characterised by the presence of residential towers and terraced houses, and large parks.

San Polo Case The core of San Polo Case was created as a construction cooperative in the context of the Christian-Social, such as the cooperative "La Famiglia" of the presbyter Ottorino Marcolini (Zane, 2010). Semi-detached houses with a garden characterise its structure. It is close to large and polluting industrial plants and coasts to the north with the Milan-Venice motorway.

San Polo Case both in terms of evenness and isolation was strongly segregated for South Asians and EAST EU, as it was possible to see in table 2.4. The last group in particular despite low segregation had a substantial rate of isolation. An east European that lives here has at least 26.2% of probability to meet a co-ethnic. For other groups, segregation was mild for mostly all except ESEA, but the isolation level was low.

Sanpolino The Sanpolino neighbourhood is proposed in 1998 and built in the following decade. It is located between the neighbourhoods of San Polo and Sant'Eufemia. The neighbourhood was created to respond to a request for housing in particular of a social type. The building types range from multi-store houses in line to terraced houses and tower houses, however, with a maximum height of seven floors, to two-family villas. The Municipality owns a quarter of the houses. The remaining three quarters are rented through Cooperatives or sold.

Sanpolino had a robust level of segregation for SSA, as it was possible to see in table 2.4, and this derives from its strong social housing orientation. For other groups, segregation was mild with low isolation level. Sanpolino shows big HH clusters for sub-Saharan Africans, as it was possible to see in figure 2.12; this was a result of the actively social vocation of the area.

San Polo Cimabue The San Polo Cimabue district is the part closest to the city centre of the area, of San Polo, its area extends from the Milan-Venice railway to the outer tracks of the subway. It consists of small houses all owned, in the district, there are also many industries, and there is the headquarters of the city police. It is a middle-class neighbourhood (Zane, 2010).

San Polo Cimabue had a robust level of segregation for SSA, as it was possible to see in table 2.4. For other groups, segregation was mild with low isolation level.

There is an extensive segregation area of strong HH space association for sub-Saharan Africans in the southern area of the district, as it was possible to see in figure 2.12. This was the main area where African groups live. However, given the segregation indices, it was not configurable as a ghetto.

San Polo Parco This area consists of two types of houses, small houses similar to the one that can be found in San Polo Cimabue and five large buildings, visible from any area of the neighbourhood because of their height called Tiziano, Raphael, Michelangelo, Tintoretto and Cimabue (Zane, 2010), from the name of the streets where these buildings are located. They were built in the eighties and are buildings of public housing, intended to house the residences of the less well-off families of the city. In particular, the two most eastern towers (Tintoretto and Cimabue) mostly host very low-income families. These families originally populated the Centro Storico Nord neighbourhood. They were transferred there with the purpose of giving a quiet home that could improve their living conditions. However, with the transfer, the municipality also transferred the crime that infested the historic neighbourhood of the centre.

San Polo Cimabue had a robust level of segregation for South Asians, as it was possible to see in table 2.4. This derives from its strong social housing orientation. For other groups, segregation was mild with low isolation level. There is a HH segregated cluster for MENA in the southern area of the neighbourhood next to the large steelworks company, as it was possible to see in figure 2.9. In the same area, there is a segregated cluster for sub-Saharan Africans, as it was possible to see in figure 2.12. No other spatial association was present.

2.5.6 West

2.5.6.1 Chiusure

Bordered to the east by the river Mella. The neighbourhood borders to the north with Urago Mella and the south with Strada Padana Superiore (the upper Po Valley road), to the west it borders the Villaggio Badia. Chiusure neighbourhood was initially built as a little shantytown in early 30s for 250 evicted families due to demolition of part of Centro Storico Sud neighbourhood. At the end of the 30s public housing was built, however they were not assigned to those who lived in the slum, their situation was solved only after the war by the presbyter G. Vender. (Zane 2010).

The neighbourhood had a substantial development in the post-war period, in the southern part the villas are dominant; instead in the northern part, the buildings are dominant. South western area was called Sant'Anna, where there are many social subsidised houses built in the 50s. near them there were many semi-detached and single-family houses.

A strong Chinese segregation characterises the area both in terms of evenness and isolation, as it was possible to see in table 2.6. Besides, spatial analysis showed three areas of HL segregation for the Chinese, one in the Sant'Anna area in a low-density housing area, one in the low-density area of Viale Colombo and one in the high-density residential houses of Torricella, as it was possible to see in figure 2.6 . Moreover, it is possible to see a strong South Asian segregation both in terms of evenness and isolation,but much lower than the Chinese one. For other groups, segregation was mild with low isolation level. The Chiusure neighbourhood shows an LL cluster for ESEA, in a low-density area, as it was possible to see in figure 2.8. There were also areas with low LL clustering in areas of low population density in the area near Viale Colombo. The other ethnic groups did not present statistically significant spatial segregation.

2.5.6.2 Fiumicello

The neighbourhood of Fiumicello includes the area that goes from the western border of Porta Milano to the river Mella. The neighbourhood began to grow in the second part of the 19th century with the opening of numerous factories such as the Sant'Eustacchio foundry, the Brixia-Züst (now IVECO) car factory, the Caffaro electrochemical company, the Ideal Standard, the Breda arms (now Leonardo Finmeccanica) and many other industries that unfortunately heavily damages the area from an environmental point (Turrio-Baldassarri et al., 2009). The urban structure is characterised mainly by multi-story buildings; there is a large part of the neighbourhood next to via Milan characterised by ancient and characterised by poor maintenance houses. In the 70s there was a robust urban development in the northern area of the neighbourhood characterised by high density buildings (Zane, 2010).

In Fiumicello, segregation was not mostly high for any group, except for the South Asian group that was strongly segregated in the area, as it was possible to see in table 2.6. That was also confirmed by spatial association analysis. SAS and MENA were mainly concentrated in this area, as it was possible to see in figures 2.11 and 2.9. In the northern side of the neighbourhood, there were two HH clusters for EAST EU,as it was possible to see in figure 2.7. The neighbourhood showed particularity of having for each ethnic group little exposure to Italians compared to any other neighbourhood in the city.

2.5.6.3 Quartiere Primo Maggio

The Quartiere Primo Maggio neighbourhood was born as a pure labourer district. The name recalls the 1st of May on the day of the Labour Day. The neighbourhood is bordered to the south by the Milan-Venice railway, to the

north by the neighbourhood of Fiumicello, to the west by the river Mella and the west by the Centro Storico Sud. The neighbourhood is built entirely in the 50s-60s, except for a large social housing complex located near the railroad built in the 90s (Zane, 2010). The area of the neighbourhood is characterised by a strong industrial presence, in Defense, Chemical and Mechanical fields. The proximity with the area of the former chemical industry Caffaro makes it the area with the highest organic pollution in Italy (Turrio-Baldassarri et al., 2009). The inhabited part of the neighbourhood is near the railway station, that is close to the Centro Storico Sud neighbourhood. In Quartiere Primo Maggio, segregation was not unusually high for any group, except for the South Asian group that was segregated in the area, as it was possible to see in table 2.6. The neighbourhood had no statistically significant spatial segregation for any group.

2.5.6.4 Urago Mella

Urago Mella was practically depopulated, as the whole area of the Oltremella (area beyond Mella river in the west of the city, like Chiusure, Villaggio Badia), until the end of WWII the area remains for agricultural use, characterised by farms and manor houses. From the late 60s to the late 70s there was a quick transformation of the neighbourhood; population changed from 1500 to 10000 inhabitants. In the Pendolina district, several social houses were built, it was characterised by high vertical buildings (Zane, 2010). The Torricella district located on the border with the municipality of Cellatica was born as a district of subsidised public housing. The Cesare Abba district was a bourgeois area located between the two previous ones. The neighbourhood borders to the east with the river Mella and the north with the municipality of Collebeato, besides at west it has a border with the municipality of Cellatica. In Urago Mella, segregation was not unusually high for any group, except for the South Asian group that was segregated in the area, as it was possible to see in table 2.6. The district showed numerous LL clusters in the northern are for Chinese community as it was possible to see in figure 2.6 , higher population density was probably the cause of segregation.

2.5.6.5 Villaggio Badia

Father Ottorino Marcolini and his cooperative La Famiglia built here the second village of the cheap building that influenced the urban development of the city. At the village of Badia, father Marcolini made his own entirely and on a large-scale starting intuition (Zane, 2010). Unlike the first village that was intended for the workers, the village of Badia was a large-scale operation aimed at young couples and families with children. In 1958 350 houses were delivered in semi-detached houses with gardens, in the following decade, new houses were built up to over 500 houses. The neighbourhood was primarily inhabited by the first or second generation of owners and is, therefore, one of the oldest neighbourhoods in the city. Segregation in this neighbourhood was almost absent, almost nil levels of isolation compensated high rates of evenness indices; more-

over, exposure to natives was high, as it was possible to see in table 2.6. For the EAST EU, there was an HL-type isolation segregation cluster in the Badia area, as it was possible to see in figure 2.7. This area was built more recently at the beginning of the 2000s. It was made up of high-density residential buildings. For the ESEA, there was an isolation-type cluster HL in the Badia area, as it was possible to see in figure 2.8. This area consisted of small semi-detached or terraced houses.

2.5.6.6 Villaggio Violino

Father Ottorino Marcolini and his cooperative La Famiglia built here the first village cheap building that influenced the urban development of the city (Zane, 2010). In 1955 they inaugurated 126 semi-detached houses with a garden for the workers of the OM (now IVECO), the houses are arranged with a Roman-style urban structure. In 1993 the neighbourhood expanded with further new 134 housing units. The neighbourhood is isolated from urban traffic and is bordered to the north to the south by two railway lines and the east by the river Mella. These barriers limit Villaggio Violino expansion. The neighbourhood is one of the neighbourhoods with the oldest population. Villaggio Violino shows a high level of segregation combined to isolation only for South Asians, as it was possible to see in table 2.6. For all other groups although there was a typical high level of segregation, they displayed low levels of isolation and extensive exposition to natives. Villaggio Violino displayed a segregation LL cluster for SAM, as it was possible to see in figure 2.10, this was the only cluster in the area, without any urban difference with other areas of the village.

2.6 Discussion and Conclusions

This chapter aimed to explore segregation in a Mediterranean welfare context. We have therefore analysed segregation in a medium-sized Italian city with a share of the immigrant population and highly composite population. This city is Brescia, and it is embedded within a large area with a high presence of immigrants. We carried out the analysis on four dimensions of segregation, or evenness, isolation, exposition and clustering. Besides, we performed the analysis on several levels of spatial aggregation, from a global segregation context to a segregate context for the thirty-three neighbourhoods of Brescia. Besides, an advanced spatial analysis methodology was used to assess the presence of clusters of spatial association without neighbourhood constraints.

The global analysis at both the multinomial and binomial level shows segregation levels measured as evenness, which is generally low for all communities with the exclusion of the Chinese and East and South East Asian communities. EAST EU community differently from all others was characterised by high exposure and low isolation and middle evenness. This exceptionalism derives mainly from caregiver effect. A large part of EAST EU immigrants, especially Ukrainian, Romanian and Moldovan women, work as caregivers and live in

homes with their employers or people that they assist. Moreover as shown by Baldini and Federici (2011), EAST EU was less subject to discrimination in the rental market. Besides, the long term presence of some EAST EU groups like Albanian and former Yugoslavian has allowed them to buy houses and quit from the discriminatory rental market. MENA groups, despite the discrimination suffered in the experimental literature, does not achieve levels of segregation measured in terms of evenness, such as the other groups. ESEA and CHINA show worrying segregation levels in terms of evenness, and CHINA is also worrying in term of isolation. CHINA community always tend to auto-segregate mainly for linguistic and cultural barriers as pointed out by Rose-Redwood and Rose-Redwood (2013). ESEA people that mostly are Filipinos. SAM shows a mild level in terms of evenness and low levels in terms of isolation and high levels in term of exposure. SAM is the less isolated and highly exposed to Italians ethnic group. This might be justified by the low social distance between Italian and SAM as in Mancini and Panari (2010). SAS shows worrying levels of Isolation and lower level to exposure to Italians, despite their segregation level as evenness was not the higher. Poulsen and Johnston (2006) and Peach (1996), showed similar segregation levels for South Asian communities, in the UK. From the analysis of neighbourhoods globally with a multinomial approach, it was possible to see that segregation is on average low. However, if we analyse the segregation differentiated by groups in each neighbourhood, the thing changes clearly. The analysis by neighbourhoods clearly shows the presence of segregation for all groups when measured in terms of evenness. However, there is very little isolation for Eastern European and South American groups, and explanations are the same as those given above. In terms of isolation, it is only high in some areas and for certain groups. The SAS and the CHINA groups tend towards greater isolation. In particular, the South Asian group presents strong isolation segregation in almost all the neighbourhoods in which there is significant segregation, with isolation rates higher than 5%. In neighbourhoods such as Fornaci, Chiesanuova, Sant'Eufemia, San Polo Case, Buffalora, San Bartolomeo, San Rocchino, Fiumicello and Villaggio Violino this isolation is more than 10%. The group presents isolation in suburban neighbourhoods and neighbourhoods close to the centre. Except for the district of Fiumicello where the South Asian presence is maximum, in the other districts, this group tends to live in the areas with the highest population density. Results confirm what found by Busetta, Mazza, & Stranges (2015) in Palermo. The Chinese group shows high levels of isolation in the neighbourhoods of Centro Storico Sud, Brescia Antica and Chiusure. All these areas are of high population density. Except for the Chiusure district, they live in the degraded areas of the neighbourhoods, from which the natives prefer to stay away. Isolation segregation areas are also present for North Africans and sub-Saharan Africans, in the San Polo wide area. San Polo, generally speaking, is a cheap neighbourhood for the real estate market, given the presence of areas populated by poor people, social housing and a multi-ethnic composition, besides there is a strong penetration of micro-crime. The East and South East Asian group shows high levels of isolation only in the Villaggio Sereno area. Although at the global level as evenness segregation is in

Index	SSA	MENA	ESEA	CHINA	EAST_EU	SAM	SAS
Gini	0.6918	0.6539	0.8299	0.8166	0.4266	0.6615	0.6834
Dissimilarity	0.5237	0.4937	0.6725	0.6616	0.3043	0.49	0.5192
Isolation	0.0576	0.0524	0.0575	0.0811	0.0495	0.0272	0.1069
Exposure	0.67	0.6679	0.6977	0.6756	0.722	0.7374	0.6334

Table 2.1: Global segregation by macro-ethnic group

line with the values found in other European countries. At the neighbourhood level, there are micro-segregation phenomena for all groups and strong segregation for the South Asians and the Chinese. The spatial association analysis also confirms this strong segregation. Immigrants tend to populate areas that are poorly considered by the natives, such as former industrial areas that are polluted, or peripheral parts of neighborhoods with some desiderable characteristic that tend to be characterized by the presence high density building.

neighbourhood	Multigroup Dissimilarity	Multigroup Gini
BORGO TRENTO	0.2983	0.4138
BRESCIA ANTICA	0.3977	0.5262
BUFFALORA	0.5084	0.6198
CAIONVICO	0.3565	0.462
CASAZZA	0.3912	0.4861
CENTRO STORICO NORD	0.3125	0.4286
CENTRO STORICO SUD	0.4433	0.5815
CHIESANUOVA	0.422	0.5627
CHIUSURE	0.3539	0.4881
CROCIFISSA DI ROSA	0.291	0.3967
DON BOSCO	0.1989	0.2759
FIUMICELLO	0.3791	0.5019
FOLZANO	0.5542	0.6684
FORNACI	0.355	0.4785
LAMARMORA	0.2845	0.3972
MOMPIANO	0.429	0.56
PORTA CREMONA	0.2885	0.3958
PORTA MILANO	0.3067	0.4133
PORTA VENEZIA	0.3873	0.5038
PRIMO MAGGIO	0.3178	0.4253
S. BARTOLOMEO	0.339	0.4762
S. EUFEMIA	0.4136	0.5321
S. EUSTACCHIO	0.3856	0.5171
S. POLO CASE	0.3692	0.5159
S. POLO CIMABUE	0.5375	0.6707
S. POLO PARCO	0.3461	0.4581
S. ROCCHINO	0.4335	0.5663
SANPOLINO	0.441	0.5392
URAGO MELLA	0.3979	0.5183
VILLAGGIO BADIA	0.3926	0.5113
VILLAGGIO PREALPINO	0.4149	0.5499
VILLAGGIO SERENO	0.3528	0.4698
VILLAGGIO VIOLINO	0.5499	0.6543

Table 2.2: neighbourhood Multi Group Dissimilarity

neighbourhood	Index	SSA	MENA	ESEA	CHINA	EAST_EU	SAM	SAS
BRESCIA ANTICA	Gini	0.7672	0.7171	0.6459	0.9266	0.4447	0.6735	0.634
BRESCIA ANTICA	Dissimilarity	0.5994	0.5557	0.482	0.8511	0.3185	0.5218	0.4926
BRESCIA ANTICA	Exposure	0.6624	0.6588	0.77	0.7189	0.7176	0.7654	0.6892
BRESCIA ANTICA	Isolation	0.0765	0.0682	0.0593	0.0678	0.0456	0.0326	0.0787
CENTRO STORICO NORD	Gini	0.5466	0.4515	0.5856	0.6442	0.3024	0.5948	0.4941
CENTRO STORICO NORD	Dissimilarity	0.3905	0.3287	0.4399	0.5152	0.2157	0.4455	0.3639
CENTRO STORICO NORD	Exposure	0.5556	0.5705	0.567	0.5855	0.6047	0.6231	0.5313
CENTRO STORICO NORD	Isolation	0.0544	0.0347	0.0561	0.0189	0.0233	0.0275	0.093
CENTRO STORICO SUD	Gini	0.7367	0.7267	0.7542	0.8231	0.3806	0.7143	0.6571
CENTRO STORICO SUD	Dissimilarity	0.5648	0.5628	0.6168	0.6686	0.2691	0.535	0.4986
CENTRO STORICO SUD	Exposure	0.5744	0.5539	0.7038	0.4622	0.6764	0.6528	0.6184
CENTRO STORICO SUD	Isolation	0.075	0.0732	0.0626	0.2353	0.0454	0.03	0.0667
CROCIFISSA DI ROSA	Gini	0.6399	0.6643	0.694	0.7745	0.3063	0.698	0.5527
CROCIFISSA DI ROSA	Dissimilarity	0.4627	0.5098	0.5592	0.7162	0.2114	0.5232	0.4005
CROCIFISSA DI ROSA	Exposure	0.7959	0.7952	0.8054	0.7732	0.7965	0.7709	0.7768
CROCIFISSA DI ROSA	Isolation	0.0341	0.0232	0.0258	0.0297	0.0254	0.0285	0.0298
PORTA MILANO	Gini	0.7179	0.4598	0.6286	0.7626	0.289	0.5015	0.5047
PORTA MILANO	Dissimilarity	0.5379	0.3382	0.5067	0.6196	0.2075	0.3758	0.3727
PORTA MILANO	Exposure	0.5742	0.667	0.7174	0.6749	0.6907	0.6766	0.6578
PORTA MILANO	Isolation	0.1137	0.0287	0.0125	0.0317	0.0261	0.0087	0.0586
PORTA VENEZIA	Gini	0.645	0.6003	0.5699	0.7849	0.3934	0.6412	0.5846
PORTA VENEZIA	Dissimilarity	0.5056	0.4757	0.4531	0.6619	0.2754	0.4995	0.4453
PORTA VENEZIA	Exposure	0.6419	0.6623	0.7447	0.5858	0.7043	0.7088	0.6441
PORTA VENEZIA	Isolation	0.0346	0.0278	0.032	0.0217	0.0386	0.0408	0.081

Table 2.3: Segregation in Central area

neighbourhood	Index	SSA	MENA	ESEA	CHINA	EAST_EU	SAM	SAS
BUFFALORA	Gini	0.8654	0.8028	0.9795	0.7889	0.5439	0.7881	0.9111
BUFFALORA	Dissimilarity	0.8103	0.6472	0.966	0.7381	0.4004	0.6645	0.7986
BUFFALORA	Exposure	0.7768	0.8022	0.5667	0.8764	0.8272	0.9198	0.7097
BUFFALORA	Isolation	0.0558	0.0675	0.0994	0.0356	0.0679	0.0106	0.154
CAIONVICO	Gini	0.5993	0.4767	0.6711	0.7547	0.4408	0.4407	0.538
CAIONVICO	Dissimilarity	0.4874	0.3022	0.5837	0.6279	0.322	0.3588	0.4807
CAIONVICO	Exposure	0.8258	0.8517	0.798	0.8217	0.8084	0.8457	0.8162
CAIONVICO	Isolation	0.0151	0.0298	0.0119	0.0136	0.0576	0.0034	0.0214
SAN POLO CASE	Gini	0.645	0.4515	0.761	0.6768	0.5689	0.7223	0.7157
SAN POLO CASE	Dissimilarity	0.5023	0.3216	0.67	0.5507	0.3999	0.5566	0.5376
SAN POLO CASE	Exposure	0.7822	0.7927	0.8584	0.8092	0.5847	0.7797	0.6819
SAN POLO CASE	Isolation	0.0413	0.0274	0.0057	0.0268	0.2623	0.0269	0.1124
SAN POLO CIMABUE	Gini	0.793	0.6865	0.657	0.753	0.5758	0.5316	0.7558
SAN POLO CIMABUE	Dissimilarity	0.6706	0.5429	0.5161	0.588	0.4411	0.3913	0.6117
SAN POLO CIMABUE	Exposure	0.624	0.6682	0.8223	0.9221	0.7102	0.8246	0.6343
SAN POLO CIMABUE	Isolation	0.1249	0.05	0.0028	0.0228	0.062	0.0067	0.0399
SAN POLO PARCO	Gini	0.5491	0.572	0.8266	0.6843	0.344	0.4824	0.6479
SAN POLO PARCO	Dissimilarity	0.4666	0.4574	0.7556	0.5172	0.2448	0.3659	0.4703
SAN POLO PARCO	Exposure	0.817	0.7624	0.7838	0.8516	0.8084	0.8434	0.7192
SAN POLO PARCO	Isolation	0.0275	0.0308	0.0075	0.0418	0.0212	0.0074	0.0958
SANPOLINO	Gini	0.6638	0.5286	0.7325	0.8549	0.4294	0.7059	0.5859
SANPOLINO	Dissimilarity	0.5854	0.4676	0.6429	0.7079	0.3116	0.5353	0.4646
SANPOLINO	Exposure	0.569	0.5938	0.5409	0.7525	0.685	0.7691	0.6046
SANPOLINO	Isolation	0.1103	0.0468	0.0128	0.0342	0.0405	0.0477	0.046
SANT' EUFEMIA	Gini	0.743	0.6658	0.7227	0.8458	0.43	0.6671	0.7794
SANT' EUFEMIA	Dissimilarity	0.6088	0.5207	0.5878	0.7966	0.3151	0.5228	0.619
SANT' EUFEMIA	Exposure	0.7591	0.7971	0.7939	0.743	0.7959	0.796	0.7078
SANT' EUFEMIA	Isolation	0.0477	0.0347	0.0605	0.0171	0.0429	0.0279	0.1357

Table 2.4: Segregation in the Eastern Area

neighbourhood	Index	SSA	MENA	ESEA	CHINA	EAST_EU	SAM	SAS
BORGO TRENTO	Gini	0.5737	0.5638	0.8362	0.8021	0.3283	0.6448	0.5362
BORGO TRENTO	Dissimilarity	0.4471	0.424	0.7545	0.7464	0.2259	0.4849	0.3947
BORGO TRENTO	Exposure	0.7565	0.7314	0.7744	0.7423	0.7694	0.7661	0.7328
BORGO TRENTO	Isolation	0.0192	0.0289	0.0165	0.0258	0.0324	0.0194	0.0447
CASAZZA	Gini	0.5394	0.5325	0.6843	0.9693	0.297	0.5554	0.6821
CASAZZA	Dissimilarity	0.4192	0.397	0.6587	0.9693	0.2386	0.4495	0.5766
CASAZZA	Exposure	0.7603	0.7944	0.9335	0.9348	0.8146	0.7893	0.7308
CASAZZA	Isolation	0.0323	0.0231	0.0027	0.0105	0.0121	0.0105	0.0698
MOMPIANO	Gini	0.752	0.803	0.9169	0.8942	0.4756	0.7482	0.7839
MOMPIANO	Dissimilarity	0.599	0.68	0.8212	0.8518	0.3358	0.6113	0.6947
MOMPIANO	Exposure	0.804	0.7766	0.8929	0.9288	0.8355	0.8611	0.7971
MOMPIANO	Isolation	0.0465	0.0601	0.0604	0.0142	0.0477	0.0203	0.04
SAN BARTOLOMEO	Gini	0.5034	0.5898	0.7056	0.6975	0.3999	0.5849	0.8242
SAN BARTOLOMEO	Dissimilarity	0.3632	0.4008	0.6019	0.5987	0.2907	0.4375	0.611
SAN BARTOLOMEO	Exposure	0.846	0.7155	0.8833	0.819	0.8213	0.8276	0.5017
SAN BARTOLOMEO	Isolation	0.0142	0.0535	0.0079	0.0073	0.0418	0.013	0.2939
SAN ROCCHINO	Gini	0.769	0.7129	0.7496	0.868	0.4265	0.6274	0.7366
SAN ROCCHINO	Dissimilarity	0.6197	0.5664	0.5618	0.7886	0.3214	0.4738	0.5701
SAN ROCCHINO	Exposure	0.6437	0.6891	0.7131	0.7185	0.7331	0.7459	0.6278
SAN ROCCHINO	Isolation	0.0524	0.0469	0.084	0.0226	0.0492	0.0171	0.1
SANT' EUSTACCHIO	Gini	0.6679	0.683	0.869	0.7867	0.3982	0.5984	0.6338
SANT' EUSTACCHIO	Dissimilarity	0.5242	0.5365	0.7446	0.6872	0.2825	0.4336	0.4891
SANT' EUSTACCHIO	Exposure	0.6854	0.6721	0.6555	0.7188	0.7286	0.7798	0.6615
SANT' EUSTACCHIO	Isolation	0.0375	0.0798	0.0453	0.0171	0.0462	0.0208	0.0743
VILLAGGIO PREALPINO	Gini	0.8233	0.7753	0.9505	0.8299	0.4753	0.7174	0.6187
VILLAGGIO PREALPINO	Dissimilarity	0.7534	0.6109	0.93	0.747	0.3437	0.585	0.4551
VILLAGGIO PREALPINO	Exposure	0.8406	0.7804	0.824	0.8569	0.8601	0.8786	0.8326
VILLAGGIO PREALPINO	Isolation	0.0245	0.0642	0.0527	0.057	0.0323	0.0243	0.0477

Table 2.5: Segregation in the Northern Area

neighbourhood	Index	SSA	MENA	ESEA	CHINA	EAST_EU	SAM	SAS
CHIUSURE	Gini	0.6798	0.7027	0.8145	0.9798	0.3943	0.5834	0.6003
CHIUSURE	Dissimilarity	0.503	0.523	0.6824	0.9615	0.2738	0.4541	0.4421
CHIUSURE	Exposure	0.7594	0.7264	0.8197	0.6829	0.762	0.7824	0.7117
CHIUSURE	Isolation	0.0465	0.0613	0.0226	0.1048	0.0376	0.0135	0.0853
FIUMICELLO	Gini	0.493	0.5536	0.6887	0.6406	0.2564	0.5178	0.5951
FIUMICELLO	Dissimilarity	0.3977	0.4031	0.6139	0.474	0.186	0.362	0.4444
FIUMICELLO	Exposure	0.4758	0.453	0.4546	0.521	0.5805	0.5065	0.423
FIUMICELLO	Isolation	0.0245	0.0667	0.0102	0.0297	0.0212	0.0182	0.1656
PRIMO MAGGIO	Gini	0.6043	0.4931	0.4679	0.403	0.3361	0.5738	0.5291
PRIMO MAGGIO	Dissimilarity	0.5321	0.394	0.36	0.2748	0.2173	0.4299	0.3576
PRIMO MAGGIO	Exposure	0.6427	0.6297	0.7254	0.7127	0.6722	0.689	0.641
PRIMO MAGGIO	Isolation	0.0547	0.0395	0.0091	0.0137	0.0304	0.0313	0.0747
URAGO	Gini	0.7026	0.6694	0.8435	0.8947	0.4009	0.686	0.7745
URAGO	Dissimilarity	0.5557	0.5174	0.7297	0.8629	0.3023	0.5335	0.6263
URAGO	Exposure	0.769	0.8179	0.8641	0.7635	0.8019	0.8425	0.7265
URAGO	Isolation	0.0269	0.0327	0.0123	0.0158	0.0419	0.0215	0.0977
VILLAGGIO BADIA	Gini	0.8343	0.7256		0.9592	0.4873	0.8489	0.767
VILLAGGIO BADIA	Dissimilarity	0.6938	0.636		0.9348	0.3508	0.7233	0.6312
VILLAGGIO BADIA	Exposure	0.7917	0.8776		0.8586	0.8406	0.8131	0.8276
VILLAGGIO BADIA	Isolation	0.0789	0.0196		0.0374	0.0575	0.0225	0.0249
VILLAGGIO VIOLINO	Gini	0.8823	0.8784	0.8611	0.8762	0.567	0.9116	0.8904
VILLAGGIO VIOLINO	Dissimilarity	0.8396	0.7781	0.7716	0.8027	0.4268	0.8925	0.7997
VILLAGGIO VIOLINO	Exposure	0.8042	0.86	0.853	0.8565	0.8424	0.9468	0.793
VILLAGGIO VIOLINO	Isolation	0.0482	0.0656	0.0318	0.0526	0.0563	0.0089	0.1253

Table 2.6: Segregation in the Western area

neighbourhood	Index	SSA	MENA	ESEA	CHINA	EAST_EU	SAM	SAS
CHIESANUOVA	Gini	0.7008	0.6805	0.747	0.6351	0.4534	0.795	0.6996
CHIESANUOVA	Dissimilarity	0.5549	0.525	0.6146	0.4894	0.3324	0.6431	0.5255
CHIESANUOVA	Exposure	0.5847	0.5878	0.6502	0.6598	0.6621	0.7161	0.5563
CHIESANUOVA	Isolation	0.0817	0.074	0.0172	0.0792	0.0651	0.0406	0.1402
DON BOSCO	Gini	0.3241	0.3588	0.6464	0.4761	0.1954	0.4803	0.3214
DON BOSCO	Dissimilarity	0.2181	0.2641	0.4836	0.3349	0.1349	0.3393	0.2241
DON BOSCO	Exposure	0.6861	0.6669	0.6393	0.6221	0.686	0.6944	0.6627
DON BOSCO	Isolation	0.0081	0.0151	0.0207	0.0371	0.0129	0.0095	0.0286
FOLZANO	Gini	0.8233	0.7432	0.9576	0.9246	0.6883	0.4286	0.7264
FOLZANO	Dissimilarity	0.6962	0.6208	0.9576	0.9246	0.5469	0.294	0.6594
FOLZANO	Exposure	0.7219	0.7293	0.8056	0.5231	0.6837	0.7959	0.7294
FOLZANO	Isolation	0.0303	0.0912	0.0133	0.0284	0.1131	0.011	0.0809
FORNACI	Gini	0.6746	0.3596	0.8762	0.7453	0.4004	0.7025	0.7675
FORNACI	Dissimilarity	0.4887	0.2475	0.8308	0.5748	0.2936	0.5977	0.5906
FORNACI	Exposure	0.694	0.8266	0.8353	0.846	0.7957	0.8845	0.6377
FORNACI	Isolation	0.0403	0.0179	0.0096	0.041	0.0544	0.0105	0.1713
LAMARMORA	Gini	0.5908	0.5505	0.8576	0.7254	0.288	0.5505	0.5384
LAMARMORA	Dissimilarity	0.4269	0.3933	0.685	0.5484	0.1926	0.37	0.4159
LAMARMORA	Exposure	0.707	0.6916	0.6645	0.6936	0.73	0.6939	0.6774
LAMARMORA	Isolation	0.0427	0.0484	0.0481	0.0376	0.0273	0.0716	0.0615
PORTA CREMONA	Gini	0.4909	0.5082	0.7727	0.6203	0.3001	0.6172	0.4849
PORTA CREMONA	Dissimilarity	0.3612	0.3858	0.5937	0.469	0.2161	0.4675	0.35
PORTA CREMONA	Exposure	0.667	0.6667	0.681	0.6728	0.6953	0.6929	0.6686
PORTA CREMONA	Isolation	0.0258	0.0308	0.0418	0.0249	0.0279	0.0166	0.0506
VILLAGGIO SERENO	Gini	0.8307	0.8363	0.9249	0.6222	0.4777	0.7182	0.629
VILLAGGIO SERENO	Dissimilarity	0.6774	0.7198	0.8097	0.4658	0.3554	0.5742	0.5014
VILLAGGIO SERENO	Exposure	0.821	0.8224	0.4086	0.8521	0.8591	0.8606	0.8499
VILLAGGIO SERENO	Isolation	0.0437	0.0432	0.5015	0.0495	0.0315	0.02	0.0322

Table 2.7: Segregation in the Southern area

2.7 Appendix

Tables

Maps

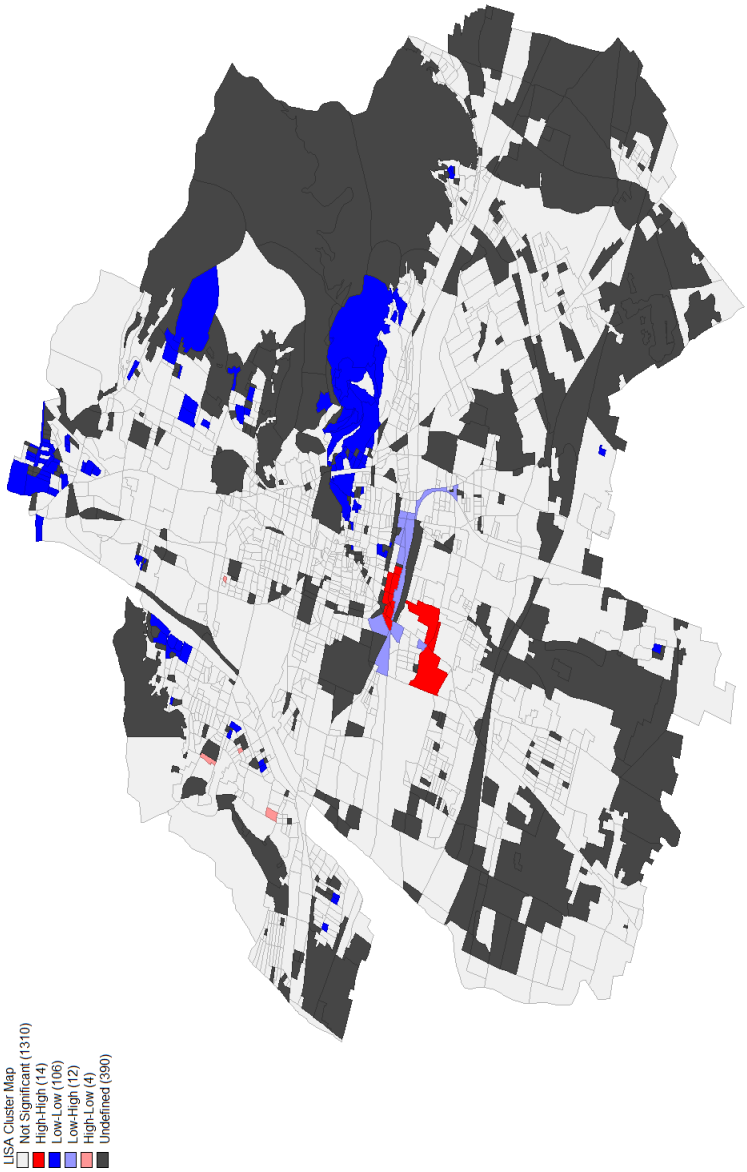


Figure 2.6: Chinese spatial association

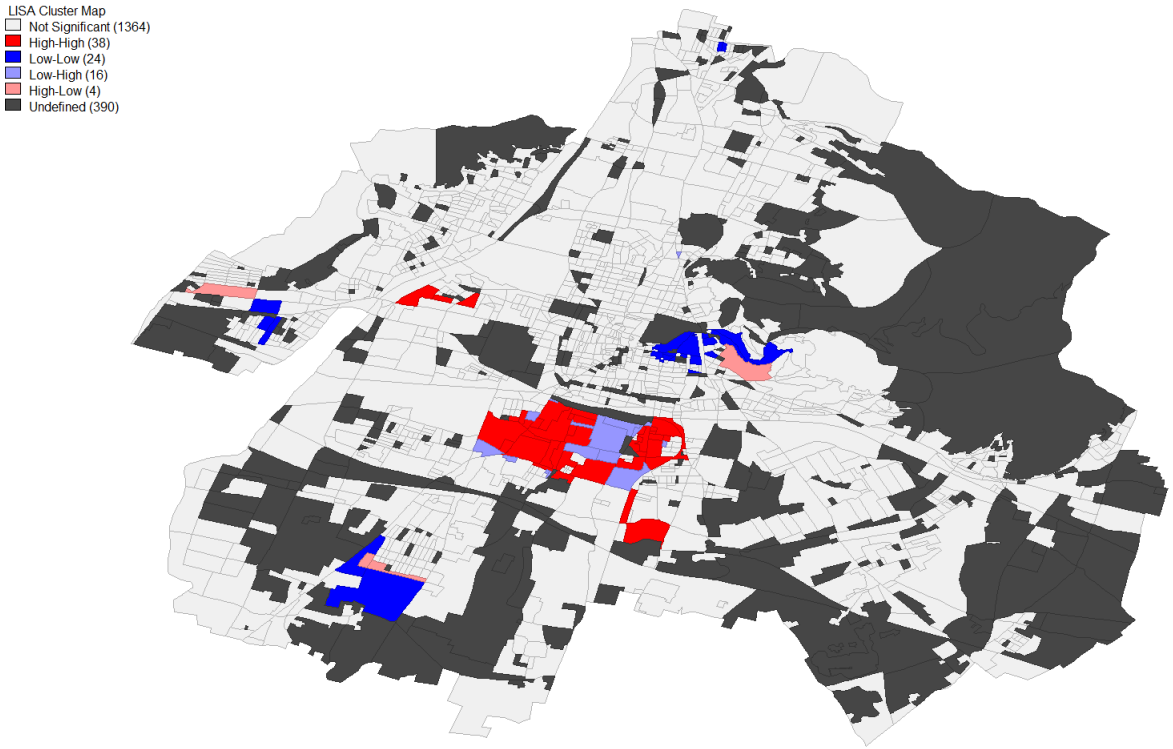


Figure 2.7: East European spatial association

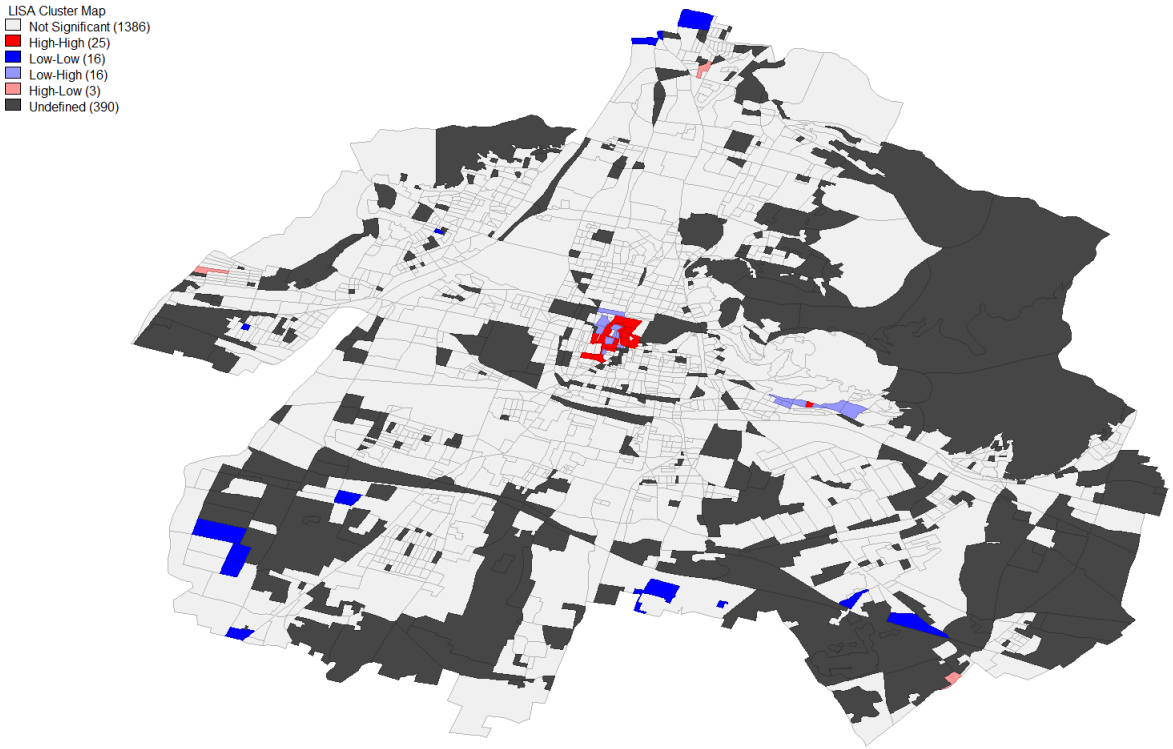


Figure 2.8: East and South East Asians

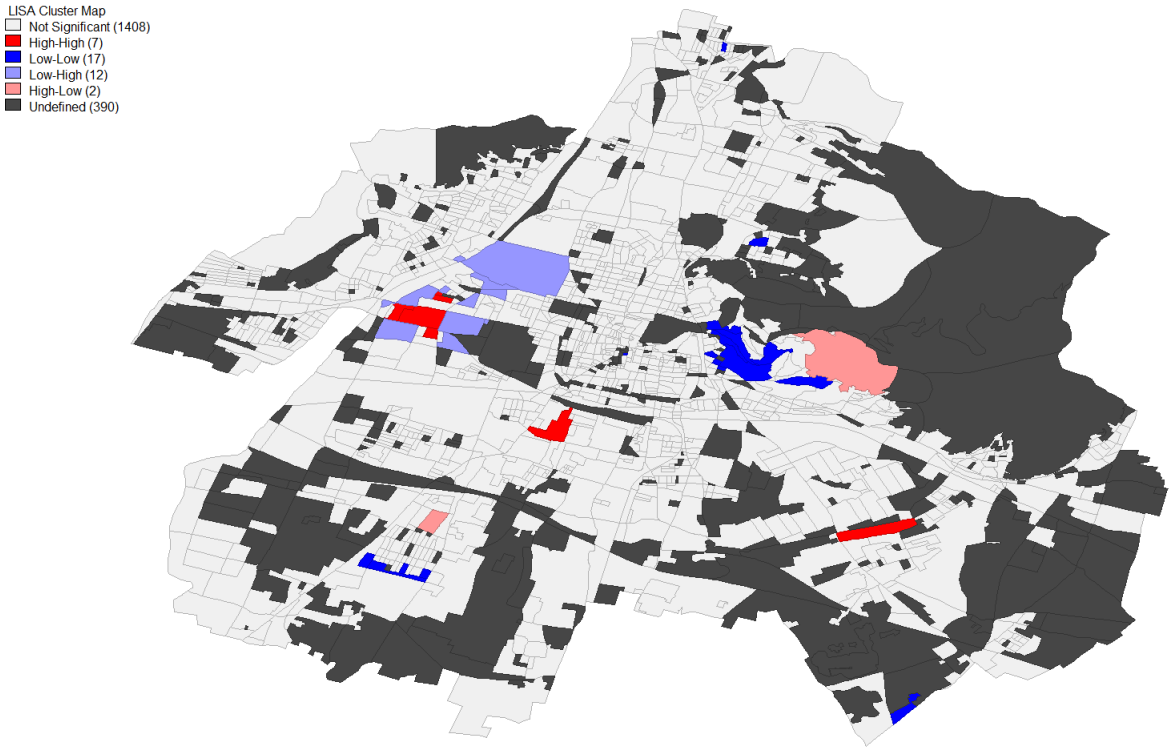


Figure 2.9: Middle Eastern and North Africans spatial association

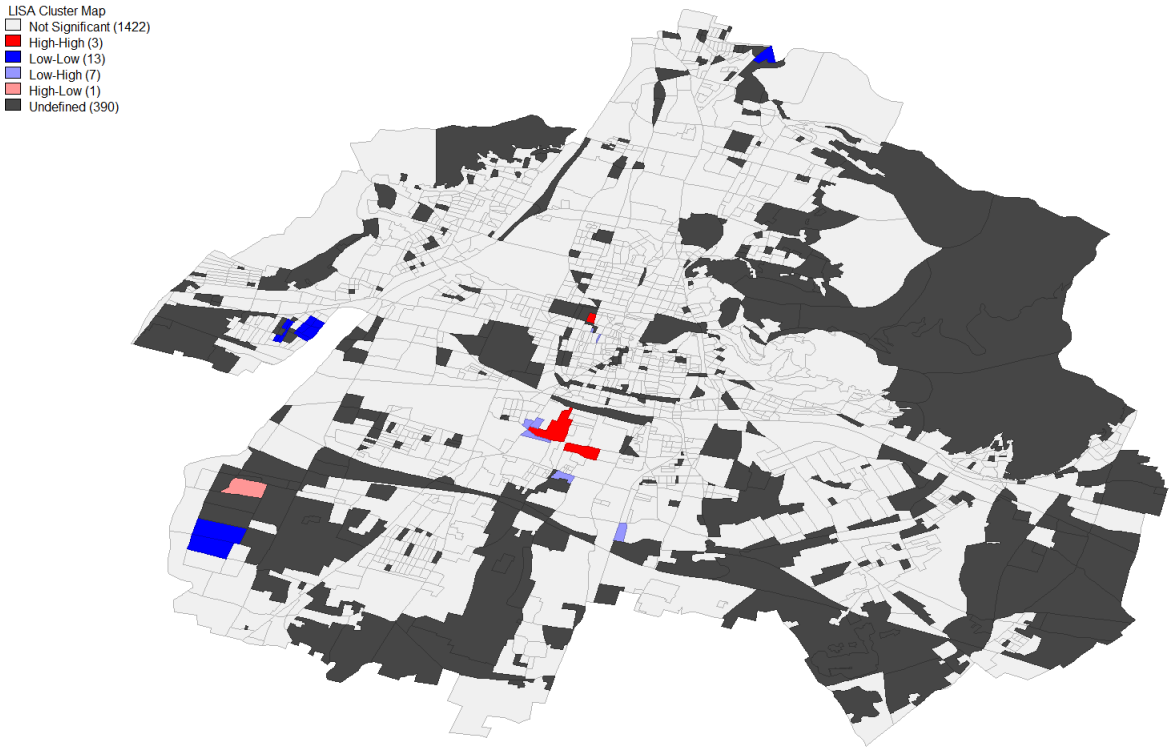


Figure 2.10: South American spatial association

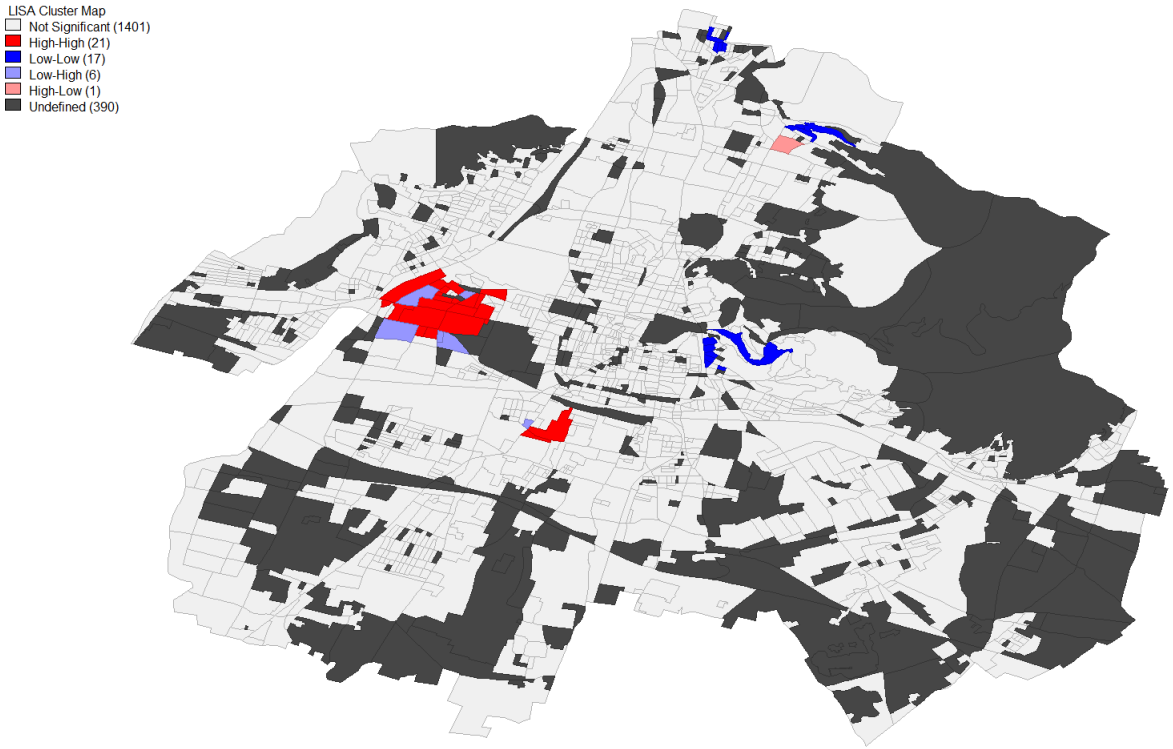


Figure 2.11: South Asian spatial association

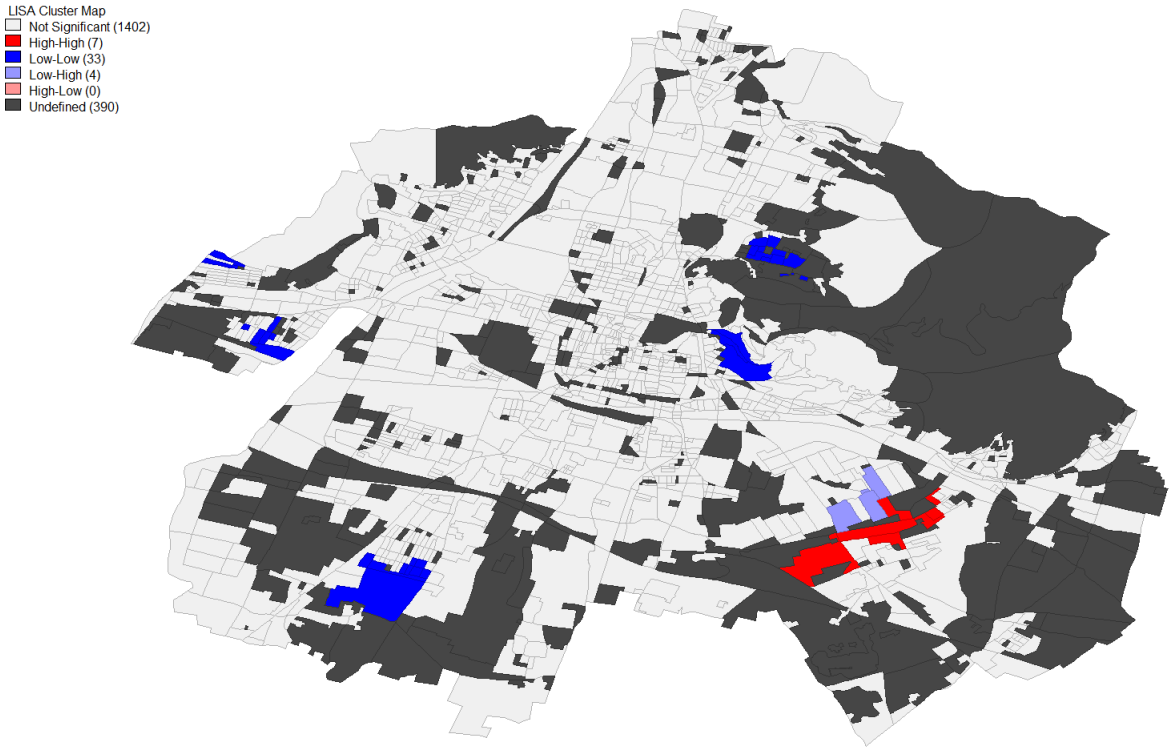


Figure 2.12: Sub Saharan Africans spatial association

Chapter 3

Egohoods that segregate. Immigrants, social contexts and income penalties

3.1 Introduction

People from Northern, Western Europe, and the Americas have always migrated in Southern European countries. However, since the '80s the improvement of economic conditions of these countries has also attracted migrants from post-communist Eastern Europe, Africa, Asia, and Latin America developing countries. For instance, in Italy foreigners increased from 1% of the population in 1991 to 8.4% in 2018, mostly in Northern regions, where industries and job opportunities are concentrated. While the effect of such a fast demographic change on the quality of interethnic relations is controversial (McMahon, 2018), it is worth noting that migrations are now at the center of debate for institutions and the public in Italy and elsewhere in Europe, especially after the recent financial crisis. Today, hard lines against migration have also widespread political support. Not only did concerns increase as regards to the social exclusion of migrants and its possible negative consequences on the social fabric of hosting countries; the residential segregation of migrants in some urban areas has been highlighted by the media as one of the most critical factors nurturing criminality and ethnic conflict (Body-Gendrot & Martiniello, 2016).

In this situation, reconstructing the economic and social nexus of immigrant segregation is key to provide an informed, evidence-based analysis of immigration, economic penalties, and social cohesion. However, this requires reconstructing complex geographical and social processes by integrating different administrative data sources, which are often not available. Our research has been based on rich geo-localized micro-census data, which permitted us to examine the causal effect of residential segregation on the income of immigrants in

the manufacturing city of Brescia, located in eastern Lombardy, Northern Italy. To our knowledge, this is the first study on residential segregation of immigrants in a Southern European context, which considered multiple dimensions. Moreover, we used a relatively novel empirical approach, by linking spatial-demographic migration patterns to socio-economic characteristics of migrants through "egohoods." This implied to reconstruct all individuals living in each migrant's spatial proximity, as his/her potential contacts. This procedure allowed us examine certain individual factors and their effects, without assuming population homogeneity due to administrative neighborhood boundaries.

Note that measuring segregation by means of egohoods is even more relevant when studying a Southern European context. Previous research has indicated that migrants' residential patterns in these contexts greatly differ from those observed in either Northern America or Central and Northern Europe as migrants are spread across urban contexts and less concentrated in ethnic enclaves (Arbaci, 2008; Arbaci & Malheiros, 2010; Malheiros, 2002). This suggests the need for exploring heterogeneous measurements of migrants' residential segregation, which is what egohoods permitted us to do.

The rest of the paper is structured as follows: In the second section, we review research on the link between segregation and immigrants' income in Europe, while in the third we discuss the definition of neighborhood and present our egohood approach. Our segregation measures are presented in the fourth section, and the fifth illustrates the empirical context of our analysis, our dataset, and indices while the sixth presents our modeling strategy, including our 2 Stages Least Square (2SLS) estimator. The seventh section presents the results, and finally, in the last one the findings and limitations of the study are discussed.

3.2 Immigrants' residential segregation and income

Research has generally shown that immigrant residence and income are negatively associated[1] . Indeed, settling in an ethnic clustered area may be disadvantageous for immigrants both socially and economically. For instance, in a pioneering study on neighborhood effects in the U.S., Wilson (1987) showed that living in a poor or segregated neighborhood penalized minorities, who subsequently reinforced attitudes and behavior, for instance, adopting different work ethics or being negatively considered by natives. In a study on the Boston area, Case and Katz (1991) showed that living in a low-income neighborhood increased the likelihood of adopting negative behavior, such as committing crime, drug and alcohol abuse, and reduced school attendance. Similar social patterns are often responsible for locking immigrants into poverty traps (Durlauf 2004, 2006). In a systematic review of 515 studies, Pettigrew and Tropp (2006) showed that residential segregation could also stimulate inter-ethnic prejudices,

[1]Note that we defined "migrants" as persons coming from countries poorer than Italy, in particular from Eastern Europe, Africa, Asia and Latin America (for detail, see Section 5).

with significant implications on the persistence of poverty traps.

Several studies have suggested that social networks as key for these complex outcomes: given that many resources relevant for getting a job come from networks of acquaintances, it is likely that migrants whose contacts are disproportionally among similar co-ethnics cannot access them. For instance, poor contacts with natives and lack of language proficiency mean losing information and advice on job openings and recommendations to possible employers. As suggested by Granovetter (1973) for getting a job, ego's contacts must be non-redundant, i.e., composed by individuals with higher professional status and a different position in the social structure (Granovetter 2017). Moreover, networks do not only convey resources and information, they also shape attitudes and motivations, as suggested by the peer effects on education (Durlauf, 2004). For instance, if most ego's contacts are unemployed, they will be hardly useful for information or direct job opportunities. However, the fact that these unemployed contacts are investing in their own job search could influence ego's efforts in searching his/her.

Evidence suggests that these network-based mechanisms are key also in the European contexts to explain systematic patterns of ethnic disadvantage. For instance, Clark and Drinkwater (2002) found that in England and Wales, individuals living close to a relatively high share of co-ethnics were more likely to be unemployed or self-occupied. In the UK, Frijters et al. (2005) showed the importance of local social networks to account for immigrants' weak performance in job matching. Similarly, Battu et al. (2005) found that Pakistani and Bangladeshi in the UK tend to overuse their social networks to find a job, which penalizes them significantly. By using 'bespoke neighborhoods' (Buck 2001; Johnston et al. 2000), Bolster et al. (2007) analyzed the wage dynamics of immigrants residing in a segregated micro-areas in Britain. They found that segregation contributed to an immigrant wage gap. In a recent study, Zuccotti and Platt (2017) found that high co-ethnic concentration penalized immigrants' labor market participation in England and Wales, especially in the case of Pakistani and Bangladeshi women involved in caregiving.

However, when considering the self-selection of migrants into ethnic enclaves, the effect of living "segregated" with many co-ethnics could also have positive implications on income (Borjas, 1995). This seems to depend on certain group specificities and especially on migrant skills and education (Lalonde & Topel, 1997). For instance, Topa (2001) showed that certain minority communities could have higher job opportunities thanks to preferential attachment via ethnically cohesive social networks. In a study on Boston, Bayer et al. (2008) showed that co-ethnics residing in the same block had a 33% probability of having a job in the same location due to referrals via social networks, similar results were also in Boeri et al. (2015).

It is worth noting that similar patterns have been also found in European contexts. For instance, a natural experiment on immigrants in Sweden suggested that while poor-skilled migrants would have better income when living segregated, high-skilled migrants earned less (Edin et al. 2003). Similarly, in a study conducted in Denmark, Damm (2009) found that the size of the eth-

nic enclave in which immigrants resided had a positive effect on their income. However, note that these studies referred to immigrant refugees, who have a special status and peculiar conditions. Indeed, Musterd et al. (2008)'s longitudinal analysis on the migrant population of the three larger metropolitan areas in Sweden indicated that concentration in ethnic enclaves could have negative effects on migrant income when longer temporal dimensions are considered.

However, as pointed out by Fernandez and Fernandez-Mateo (2006), explanations in terms of "wrong networks" are consistent only if minorities are underrepresented in each step of the recruitment process. This is the case of Italy, where migrant employers are rare and migrants are mostly hired by local firms or households (Chiesi et al. 2011; Reyneri, 2007). This would suggest that (either positive or negative) network effects are important determinants of immigrant occupations and income. The very same ethnic social network, which can be helpful when immigrants arrive by providing jobs in ethnic enclaves and firms, might in the following years lock them into a secondary labor market characterized by low-paying jobs with fewer career opportunities. This is typical of the ethnic economies in the metropolitan areas (Portes & Landolt, 1996; Portes & Zhou, 1993) and led Reardon et al. (2000) to consider ethnic networks as sources of inadequate social capital because immigrants can benefit from connections with local natives more than from contacts with co-ethnics.

To sum up, previous research suggests that social contexts matter for the social and economic condition of immigrants. The labor market achievements of migrants greatly depend on a complex link between individual and household characteristics and their social connections when entering the destination country (Portes & Zhou, 1993). Here, Granovetter (2017) suggested that network effects can greatly depend on context-specific conditions. Indeed, similar social contacts could have different occupational or income effects on individuals depending on the spatial, urban characteristics of the context in which they are socially and geographically embedded.

However, a consensus on these findings has not been reached also due to methodological and data constraints of empirical research. First, experimental studies preferably examined certain immigrant groups, in particular refugees, who have a special status and can be examined more easily however, this limited findings generalizability. Secondly, examining residential segregation requires fine-grained data on important geographical dimensions, which in turn have important implications on segregation measures.

3.3 The definition of neighborhood

Since the Chicago School, neighborhoods have been a matter of significant concern for sociologist (Park & Burgess, 1921): indeed, even if people behave rationally and respond predictably to cost-benefit evaluations, the contexts in which they are embedded (Granovetter, 1985) might profoundly influence their occupational choices and related outcomes. Indeed, information (or the lack of) and peer pressure influence attitudes and behaviors.

Given that we were interested to look at the effect of segregation as the prevalence of co-ethnics in one's social network, we defined neighborhoods at the individual level and not according to administrative units. Research on segregation has followed standard geographical definitions of neighborhood, as circumscribed areas of a city with fixed not-overlapping borders. This type of neighborhood definition is key as it is instrumental to organize a variety of social, economic, and political activities, e.g., running political elections, providing social services, etc. However, space is not a mere "container," whose aggregate properties might be attributed in the same way to each individual inhabitant and/or household (Batty 2013).

By following administrative definitions of neighborhoods, the heterogeneity of individual and household conditions would be underestimated. This could be reasonable if neighborhoods are expected to have the same effect on all individuals. For instance, this can happen in the case of a strong stigma related to a given neighborhood or geographical area. However, if aggregate outcomes depend on social contexts or networks, assuming that all residents in a neighborhood share the same social contacts and are exposed homogeneously to context effects can lead to misplaced attributions. For instance, in a study on the effect of minorities' social networks on their labor market outcome in England, Patacchini and Zenou (2012) found that social network effects are relevant only for people living nearby. Indeed, social contexts typically include families, friends or peers whose connections do not respect fixed, aggregate geographical boundaries (Diez Roux, 2001). Indeed, networks are irrespective of any administrative boundaries (Kwan 2009; Chaix 2009; Matthews 2008). On the one hand, any administrative unit has a different size; on the other hand, the ethnic composition of adjacent neighborhoods is often more relevant than the administrative boundary of a neighborhood (Lee et al. 2008).

In order to fill this gap and map each individual's spatial and social embeddedness, we defined a different neighborhood for each individual, as a set of egohoods with overlapping geographical borders. This means that individuals can be part of various social spaces, which can, in turn, have different population density and composition. This was initially suggested by Lee et al. (2008), who proposed to use circular spatial buffers to overcome the checkerboard problem in measuring micro-segregation. More importantly, the idea of egohoods is consistent with the fact that each perceives him or herself as the center of his/her neighborhood or social network (Kwan, 2012).

It is important to note that egohood applications are still in their infancy. For instance, in a criminological study on nine U.S. cities, Hipp and Boessen (2013) used the egohoods to explain the variation of crime in the social environment and claimed that this ensured better measures than traditional, more aggregate methods. In an epidemiological study on tobacco diffusion in the Boston Area, Duncan et al. (2014) showed that ego-based neighborhood definitions were crucial to measure tobacco diffusion, whereas analyzing the same diffusion process via traditional large administrative neighborhoods would bias any conclusion.

These early applications testify to the fact that this approach can improve

the analysis of the spatial dimension of complex social processes. First, it avoids adopting a rigid definition of space, which conflates aggregate properties with specific contexts and households, thus potentially biasing segregation measures. Second, a more in-depth and precise definition of neighborhood could permit to trace the empirical effects of segregation better.

Obviously, the definition of the size of the egohood is to some extent arbitrary, and each egohood could be measured differently. In one of the early egohood applications, Hipp and Boessen (2013) studied crime in nine US cities using egohoods with different sizes (see also Gatens 2016 and Collins and Guidry 2018). Dinesen and Sønderskov (2015) studied ethnic diversity and trust relationship in egohoods with a radius of 250m, while replicating the analysis with narrower egohoods, with a radius of 80 m. Sluiter et al. (2015) studied similar effects in the Netherlands by using various size egohoods (200-400m radius). Recently, Tolsma and van der Meer (2017) studied trust formation in egohoods of various sizes until 4 km. In these studies on trust, which are conceptually similar to ours, findings showed that effects were relevant when egohood radii were between 250 and 500m, peaking at 400-500m, to evaporate at wider distances.

3.4 Segregation measures

Residential segregation is "the degree to which two or more groups live separately one from another, in different parts of the urban environment" (Massey and Denton 1988: 282). Research on the effect of neighborhoods has mostly used the simple share of immigrants in the neighborhood as segregation proxy. However, this absolute measure does not measure segregation, which requires a comparison between (at least) two groups. In our case, we followed relative measures in order to relate the variation of migrants' income to the ethnic composition of people living in their respective proximity.

A relative measure of segregation is the dissimilarity index. Introduced by Duncan and Duncan (1955), this has been the most popular segregation measure for at least three decades (Massey and Denton 1988). However, it has certain weaknesses. First, the dissimilarity index is an index of evenness rather than segregation, and this makes its interpretation not intuitive (Cortese, Falk, & Cohen, 1976). More importantly, like all evenness indices, this index depends on the way a given geographical area is fractioned into sub-units: the smaller the units, the higher the index value is (Carrington & Troske, 1997). Furthermore, it does not fully satisfy the so-called "transfer principle," which requires to reflect all transfers of minority members over neighborhoods where they are differently represented (James & Taeuber, 1985). Considering that the dissimilarity index depends on the difference that needs to be transferred to obtain evenness, the index estimation can bias any segregation measure in socio-geographical contexts characterized by only a few enclaves, such as the Southern European countries.

Given that we aimed to examine how inter-ethnic contacts and intra-ethnic contacts could influence immigrants' income, we considered segregation indices

that reflected the expected probability for any immigrant to be in contact with co-ethnics or natives. Here, we followed Bell (1954) who proposed the so-called "index of exposure" (henceforth EXP), which measures the extent to which a given group is exposed to another or relatively isolated in a given context.

In our case, EXP measured the exposure of each minority group to natives as follows:

$$EXP = \sum_{i=1}^{N} \left(\frac{x_i}{X} \frac{y_i}{t_i} \right)$$

where X is the total population of ethnic group in the area, x_i is the population of the ethnic group in the tract, y_i is population of the natives in the tract, $t_i$is the total population of the tract.The index can be interpreted as the probability that two individuals randomly extracted from the population of two different groups can be in the same egohood, thus in contact with each other.

The index can be interpreted as the probability that two individuals randomly extracted from the population of two different groups can be in the same egohood, thus in contact with each other.

We then built an index of "ethnic isolation" (henceforth ETH) as follows:

$$ETH = \sum_{i=1}^{N} \left(\frac{x_i}{X} \frac{x_i}{t_i} \right)$$

wherex_i was the number of co-ethnics in the area, X was the total number of co-ethnics, and t_i was the total population of the tract of interest. This allowed us to derive the expected probability that each individual has to interact with another one from the same ethnic group. This allowed us to derive the expected probability that each individual has to interact with another one from the same ethnic group. Note that for the sake of readability, we multiplied both indices by 100. Considering the explorative nature of our study, we calculated these indices for each egohood exploring two different radii, 250 and 500 meters from the targeted individual respectively.

Table 3.1 shows the correlations between our two indices. Besides the positive correlation between the same measures with different radii, it is worth noting that the EXP and ETH were positively correlated, yet only weakly. This probably reflects certain context-specific characteristics, such as the lack of ethnic enclaves mentioned above, which is a typical residential pattern of migrants in Southern European urban areas.

3.5 The context and the data

With about 195,000 inhabitants, the urban core of a highly productive, labor-intensive, export-oriented manufacturing area, Brescia is an Italian city with one of the more composite ethnic population. On February the 5th, 2018, *Le Monde* featured Brescia as one of the most brilliant examples of a multicultural

EXP250	ETH250	EXP500	ETH 500	
1.0000	0.0435	0.7969	0.0707	EXP250
	1.0000	0.0967	0.9840	ETH 250
		1.0000	0.1027	EXP500
			1.0000	ETH 500

Table 3.1: Correlation indices between segregation indices measured as exposure (EXP) and isolation (ETH).

urban context in Europe. Migrants grew from about 1% in 1990 to over 18% in 2018, and the city now has an immigrant density similar to many Northern European cities. Furthermore, Brescia developed a unique residential pattern, with immigrants concentrated both in city center (as in most Southern European cities) and in the suburbs (as in most Northern European cities). The city has a varied ethnic composition of immigrants, including Africans, Asians, and Eastern Europeans.

3.5.1 Data

Our data were extracted from Archimede, an ISTAT (Italian National Statistics Institute) register-type dataset linking a number of administrative sources to provide individual-level economic and demographic data for the entire Brescia population for the year 2012. First, we geo-localized the social, economic and demographic data for Census Micro-zones (CM), which reproduce (often irregular) administrative blocks.

Starting from these micro-areas, we created egohoods by imposing buffer circles of predefined diameter (250 or 500 m) around the spatial location of individuals, using Quantum GIS. Using these egohoods as the spatial area of reference, we calculated our segregation indices as well as the instruments used in the statistical analysis (see below). Figure 1 shows an example of egohoods representing the small community of Poles in Brescia (a), with a zoom on its city center (b), with a radius of 250m.

The dataset included information concerning the individual place of birth and citizenship, in a population of 195,387 inhabitants, 42,363 of them with an immigrant background from 141 different national/ethnic groups. Italians were defined as those individuals who both have Italian citizenship and were born in Italy.

Considering previous migration patterns of Italians and the frequency of returns of migrant Italian families after an extended period abroad, we classified any individual as being Italian who had Italian citizenship in 2012 and was born before 1971 from Argentina, Australia, Brazil, Switzerland, and Belgium. This also applied for all Italians who had been expelled by post-colonial regimes from former colonies, namely Libya, Eritrea and Ethiopia, and who were born before 1948 in Croatia, a country with some Italian ethnic enclaves who became part of Yugoslavia after WW2.

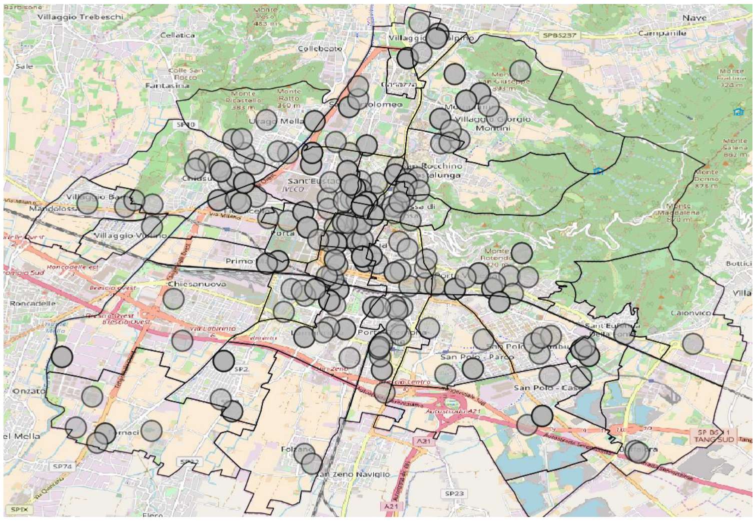


Figure 3.1: Egohoods of 250m with the distribution of Polish immigrants in the whole city. (Our elaboration on Google images maps)

Figure 3.2: Egohoods of 250m with the distribution of Polish immigrants with a zoom in the city centre.(Our elaboration on Google images maps)

After calculating our indices, we dropped from the dataset all Italians, Western Europeans and citizens of wealthy countries, defined as countries whose GDP per capita in purchase power parity was at least equal to Italians. Such migrants settle down in Italy following a totally different selection and choice process, and their integration into Italian society is hardly a problem: given the substantive interest of this paper, we excluded them from the definition of migrant, as it is often the case in European migration research. For the same reason, we also cut off all wealthy foreigners with yearly income higher than €150000. We then removed any subject aged less than 16 and more than 65. After this procedure, we are left with an analytical sample of 28,706 migrants.

3.5.1.1 Dependent variable

Our dependent variable was individual income, which was defined as the total income including earnings from self-employment, employment and public transfers (maternity allowance, income subsidies), earnings from collaborations and shareholding (either from partnerships or limited companies). As a robustness check, we also considered each individual's household total income, adjusted according to the OECD income equivalence scale. Note that results were qualitatively similar but less statistically robust (available from the corresponding author upon request).

3.5.1.2 Independent variables

Our key independent variables were EXP and EHT, i.e., the two segregation measures described above. They represented each immigrant's probability to meet a co-ethnic or an Italian in his/her egohoods. As said, we calculated outcomes within radii of 250 and 500m from the targeted individual.

Education. Considering the importance of education for labor market achievements, we measured the number of years of education spent by each immigrant by considering the amount of time usually required to fulfill each level of the Italian education system ("pseudo-years of education"). The variable included seven levels, from "not educated" (0) to "university master's degree" (18). Note that data were partially self-reported in the 2011 Census, and were completed using available data from the Italian Minister of Education register.

Job-stability. Considering the variety of unstable, flexible, and temporary jobs characterizing the Italian labor market, we calculated the job stability as one minus the annual proportion of months in which the migrant officially worked multiplied by 12, such that any marginal loss of a working month was considered.

Naturalized. Considering the significant advantage that citizenship has on the job market, we added a dummy variable indicated if the foreign-born individual had obtained Italian citizenship, and so had a long permanence in Italy.

Variable	Obs.	Mean	Std. Dev.	Min	Max
EARNINGS	28,822	8290.153	9689.464	0	129036
MALE	28,822	0.484665	0.499773	0	1
NATUR	28,822	0.074943	0.263304	0	1
EDU	28,822	10.41382	3.986939	0	18
JOB INSTABILITY	28,822	6.266942	5.293866	0	12
ETH250	28,772	10.97142	19.94783	0.078989	100
ETH500	28,789	11.11127	20.06466	0.078989	100
EXP250	28,822	67.68126	16.65084	0	99.17355
EXP500	28,789	66.85439	17.01287	0	99.17355
AVERAGE_RENT	28,706	6.094574	1.455208	4.5	10.9
EMPLOYMENT PROBABILITY500	28,821	0.096596	0.043078	0.038372	0.679389
EMPLOYMENT PROBABILITY1000	28,821	0.097558	0.02518	0.059398	0.382514
DISCRIMINATION	28,805	0.12466	0.092844	0	1
URBAN DEGRADE	28,822	783.3064	602.5778	4	4748

Table 3.2: Variables and Instruments descriptive statistics.

Male. This was a dummy variable indicating migrant's gender. Table 2 shows descriptive statistics.

3.6 Models

Estimating the effect of residence on income requires to consider possible simultaneous effects. For instance, the possibility of renting or buying a home depends on the family's capacity to pay. This implies that low-income families have fewer opportunities to afford a house in a "good" location. This constraint could determine endogeneity problems and might bias our estimations by correlating our dependent variable with the regression residuals.

To deal with any possible correlations between independent variables and residuals and control for endogeneity effects, we used a 2 Stages Least Square (2SLS) regression model (Basmann, 1957) with Instrumental Variables (IV), a technique increasingly used in similar sociological studies. While the first-stage regression is reported in Appendix (see Table A1), Table 3 includes the estimates of a set of Ordinary OLS and IV models, one for each of the segregation indicators presented above.

3.6.1 Instruments

Our analysis aimed to look at the effect of egohoods composition on immigrants' income, thereby making the estimated composition of any egohood of paramount importance. To do so, we considered the possible estimation bias due to simultaneity and unobserved variables, which could influence both housing decision

and labor market achievements. For instance, our sample included immigrant workers and their families, which usually could not afford a house in a high or middle-class area. This can create a downward distortion in the classical linear models making the estimation of any egohood composition effect on labor achievements problematic. To deal with these potential sources of endogeneity, we used a 2SLS regression model (Basmann, 1957), whose consistency depends on statistical testing and instrument persuasiveness. This was key to explore causal relationships.

We then identified our instruments following previous research on neighborhoods and segregation. First, research on housing market discrimination showed that the name of the potential renter often predicts the probability of closing a contract. Note that immigrants cannot afford to buy a house and so depend more on the local rental market, which in Southern European countries has typically a rigid supply (Accetturo et al. 2012). Experimental research showed that house-owners are less likely to rent to immigrants (Ahmed and Hammarstedt 2008; Bosch et al. 2010; Baldini and Federici 2011). Boeri et al. (2015) found that the owners of the oldest buildings (over ten years old) were likely to discriminate more. In their intentions, avoiding interactions with strangers is a means to minimize the risk of decreasing their house prices due to immigrants' presence. This led us to choose discrimination as the first instrument, which we proxied by considering the average age of buildings in each block. Secondly, we followed Boeri et al. (2015)'s suggestion to use the share of commercial buildings in each block as a proxy of employment probability. Given that most immigrant workers in Brescia work in the manufacturing or commercial sector, we measured the local share of buildings devoted to these economic activities and extended each egohood radius respectively to 500 and 1000 meter to capture the access to potential resources better.

Our third instrument was the average rent price by square meter for an economic house. Here, we followed the neoclassical theory of segregation, according to which property buyers or rentier would choose their houses depending on their individual willingness to pay for specific characteristics of buildings and areas (Bayer et al. 2004; Wong 2013). Although prices could be influenced by the share of migrants, the willingness to pay would consider other characteristics of the area, such as the provision of public or private services, traffic or pollution.

Finally, our fourth instrument was urban degradation proximity. Here, we followed Cristaldi (2002) and Mudu (2006), who studied segregation in Rome and found that immigrants are segregated in the most degraded urban areas. We measured this variable by calculating the minimum distance of each egohood center from the closer abandoned industrial area, a good measure of proximity to urban degradation and marginality. In order to do so, we had to map and to geo-localize all abandoned manufacturing and military facilities in Brescia. According to the tests reported in the lower panel of table 3, no instrument is weak, and the over-identification condition is satisfied for all models. We move now to our results.

3.7 Results

Our hypothesis was that the ethnic composition of egohoods could have an effect on immigrant income. Table 3 confirmed that the presence of co-ethnics in individual egohoods had an adverse effect on immigrant income. According to our IV estimates, any marginal percentage increment of our ETH segregation index determined an individual annual income loss of 83.4€ and 133.3€ in 250m and 500m radii, respectively (see Models 5 and 6). As expected, larger egohoods revealed more pronounced statistical effects. These differences, however, were not proportional to a similar increase of the egohood size. This probably reflects the simple fact that smaller egohoods make higher levels of segregation statistically more probable.

On the other hand, unlike our expectations, our regression results also showed that the presence of Italians in individual egohoods did not affect immigrant income. Indeed, the OLS estimates indicate that the presence of Italians had only a weakly positive effect (see Models 3 and 4). Note that in the 2SLS estimates the effect is still positive but small and statistically non-significant (see Models 7 and 8)[2] . The fact that the presence of co-ethnics had a negative effect could be due to the fact that migrants are more likely to interact with their co-ethnics in their local surroundings, whereas they do seldom develop relationships with Italians, though this could be instrumental to their occupation and income. However, it must be said that here we estimated only average effects on a migrant population that is potentially heterogeneous in terms of ethnic segregation and exposure to Italians, depending on their group characteristics.

To disentangle these effects, we performed different regressions for each subsample of immigrant macro-group in the two measured radii. For the sake of readability, Table 4 reports only the second-stage 2SLS estimates of ETH and EXP parameters[3].

Results showed that EXP was positive and significant in case of Eastern Europeans, who had an income increment of more than 17€ per percentage point. This is understanding when considering that many Eastern European immigrants work as caregivers and typically exploit contacts with natives to find a job. Furthermore, they are religiously, culturally and linguistically more similar to natives than other ethnic groups. This could have positive implications on potential network formation. Interestingly, we found similar effects also in case of Northern Africans and Middle Eastern migrants, which are the ethnic groups having the most significant historical presence in Brescia, especially with Egyptians and Moroccans pioneering migrations according to historical records (Corsini & Zane, 2014). We found a positive value of EXP also in case of Sub Saharan Africans, who benefitted from exposure to Italians, albeit significant only for a 500m radius, and in case of Eastern Asians, but only in case of a 250m radius.

[2]Note that these models are identical to 7 and 8 except that ETH was sensitive to endogeneity. However, it is worth noting that the magnitude of EXP estimates are similar. All models are available upon request from the corresponding author.

[3]All estimates are available upon request from the corresponding author.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	OLS	OLS	2SLS	2SLS	2SLS	2SLS
EDU	98.27***	96.98***	97.20***	96.41***	91.92***	88.41***	91.82***	88.06***
	(8.90)	(8.80)	(8.82)	(8.76)	(8.16)	(7.63)	(8.15)	(7.58)
NATUR	3710.5***	4804.9***	2927.2***	4198.0***	9167.6***	13246.8***	8968.2***	12725.2***
	(8.13)	(8.58)	(5.82)	(6.83)	(4.76)	(4.12)	(4.49)	(3.90)
MALE	2296.6***	2310.4***	2333.6***	2331.1***	2351.0***	2391.7***	2356.7***	2406.4***
	(29.11)	(29.27)	(29.25)	(29.29)	(28.43)	(27.52)	(27.74)	(26.90)
JOB INSTABILITY	-1288.8***	-1288.7***	-1287.6***	-1288.1***	-1287.2***	-1287.1***	-1287.0***	-1286.7***
	(-165.70)	(-165.92)	(-165.80)	(-165.95)	(-163.43)	(-162.93)	(-162.77)	(-162.24)
ETH250	-9.941*		-0.600		-85.91***		-83.40***	
	(-1.65)		(-0.09)		(-3.21)		(-3.03)	
ETH500		-24.62***		-17.59**		-139.5***		-133.3***
		(-3.40)		(-2.23)		(-3.18)		(-3.01)
EXP250			11.94***				2.052	
			(4.78)				(0.35)	
EXP500				7.243***				5.418
				(3.05)				(0.81)
Constant	14064.4***	14152.4***	13197.1***	13627.8***	14518.0***	14835.3***	14363.6***	14437.6***
	(96.46)	(96.35)	(54.11)	(58.29)	(70.14)	(51.07)	(29.52)	(25.75)
N	28773	28790	28773	28790	28690	28690	28690	28690
R^2	0.546	0.546	0.546	0.546	0.544	0.542	0.544	0.543
idstat					202.3	163.1	184.2	138.0
idp					1.21e-42	3.23e-34	1.08e-39	1.03e-29
cdstat					423.698	227.124	417.08	226.932
s-y cv (5%)				16.85	16.85	11.04	11.04	
iddf					4	4	3	3
j					1.736	0.798	1.591	0.119
jp					0.629	0.850	0.451	0.942
jdf					3	3	2	2

* p<0.10, ** p<0.05, *** p<0.01; t statistics in parentheses for models (1);(2);(3);(4) and z statistics in parentheses for models (5);(6);(7);(8).
Legend: Idstat is LM Underidentification rk statistics of Kleibergen-Paap; Idp is Idstat p-value; Iddf is Idstat degrees of fredom;
cdstat is Craig-donald wald F statistics for weak instruments; sy-cv(5%) is Stock and Yogo critical value at 5% for Craig-donald wald F statistics;
J is Hansen statistics for over identification; JP is Hansen statistic p-value and JDF is related p value.

Table 3.3: Second stage regression results

Macro Group	Absolute n°	Share n°
East Europe	10969	38.05%
North Africans and Mid. Easterns (MENA)	3621	12.56%
South Asia	6868	23.82%
Latin America	1729	5.99%
East Asian	2855	9.90%
Sub Saharan Africans (SSA)	2784	9.65%
Total	28826	100%

Table 3.4: Immigrants macro-groups.

More importantly, Southern Asians were those penalized by both ETH and EXP effects the most. In case of these immigrants, living in a highly co-ethnically concentrated egohood determined an income loss of more than 100€ yearly for any ETH additional percentage point. Note that we did not find any significant effects in case of Southern Americans, while in case of Southern and Eastern Asians our models were limited by the lack of over-identification.

As regards to our control variables, we found a significant effect of education on immigrant income (see Table 3). For instance, eighteen years of education increased immigrant annual income by at least 1,584€ compared to the expected income by illiterate migrants. The fact that these differences were minimal could be due to the propensity of immigrants to seek a secure stable (even unskilled) job rather than waiting for a better-paid job (Dustmann 2000; Kogan & Kalter 2005). Note that this tendency has been confirmed by previous research on immigrants also in Italy by Fellini (2018) and Fellini & Guetto (2018).

We also found that being naturalized had a prominent effect on income, with a premium of about at least 9,167€ in annual earnings. Note that except when an immigrant is married to an Italian, the Italian law requires at least ten years of residence and a stable level of income for any citizenship application. On the other hand, a prolonged permanence in Italy allows immigrants to improve their knowledge of the local labor market, increase their contacts with natives and improve language proficiency, thereby minimizing their exposure to discriminative practices (Friedberg, 2000).

Furthermore, we found that job instability penalizes immigrant income, as expected. We found a monthly marginal loss of 1,287€, which means a loss of 15,444€ yearly from unemployment. Note that these penalties were gender related. We found a difference of at least 2,391€ per year in favor of male immigrants. This is because either immigrant women especially from underdeveloped countries are mostly housewives and do not work (Bono & Vuri, 2006) or work as caregivers or domestic workers, especially those coming from the Philippines, Moldova, and Ukraine (Marchetti & Venturini, 2014). Indeed, caregivers and domestic workers usually live in the same employer or assisted person's house and so could accept lower paid jobs.

3.8 Conclusions

Our paper aimed to explore the relationship between residential segregation of migrants coming from high migratory pressure countries and their income in Brescia, a wealthy industrial Northern Italian town, where immigrants currently make up almost one-fifth of the population. We used an ego-centered empirical definition of neighborhood ("egohood"), which allowed us to avoid certain biases connected to the standard use of administrative units to define the neighborhood of residence of each individual and its population characteristics. As we have suggested above, this approach permitted us to reflect certain context-specific features of Southern European urban areas, where migrants are not typically concentrated in ethnic enclaves such as in Western Europe and

	East Europe	MENA	SSA	Latino America	South Asia	East Asia
EXP250	17.82*	30.07*	17.47	-69.59	-35.30***	35.02**
	(1.72)	(1.74)	(0.81)	(-0.54)	(-2.75)	(2.38)
ETH250	-56.79	-62.08	-3.575	43.80	-130.6***	9.510
	(-1.18)	(-0.28)	(-0.04)	(0.11)	(-3.31)	(0.17)
EXP500	22.62*	31.47*	31.28*	25.00	-29.04**	16.46
	(1.81)	(1.70)	(1.66)	(0.17)	(-2.12)	(0.95)
ETH500	-68.69	20.30	-16.71	-226.2	-112.8**	68.01
	(-0.84)	(0.07)	(-0.16)	(-0.53)	(-2.08)	(0.56)
N	10908	3599	2782	1703	6852	2846
* p<0.10, ** p<0.05, *** p<0.01 - z statistics in parentheses. parameter estimates from 2LS IV models identical to models (6) and (8) presented in table 3. Full models available on request from the authors.						

Table 3.5: Effects of ethnic segregation (ETH) and exposure to Italians (EXP), by macro-area of origin.

Northern America.

In particular, we wanted to check whether a high number of co-ethnics in one's egohood decreased income, with an inverse relationship between density of immigrant networks and their income well documented by previous research. Moreover, we measured the income-effects of natives in immigrant egohoods. We used different sizes of egohood, for a better understanding of the mechanisms underlying its effect.

Estimating a set of OLS and 2SLS models, the latter robust to endogeneity, we found that the presence of co-ethnics determines a decrease of immigrant earnings, though with varying conditions among certain ethnic groups. The presence of natives in the same area did not have any significant effect on immigrants' income, except for certain ethnic groups, such as the Eastern Europeans and North Africans, who greatly benefitted from potential contacts with natives.

Although residential segregation, be it on a socioeconomic or an ethnic base, is relatively weak in Italy (Barbagli & Pisati, 2012; Mingione, 2009), in line with other Southern European countries (Arbaci and Malheiros 2010), we found it had a not-negligible effect on immigrants' household income. Our evidence, therefore confirms the importance of social networks based on residential proximity as a form of social capital: the local availability of individuals belonging to different groups structures an immigrant's access to knowledge, information, trust, and other occupationally relevant resources. Moreover, networks expose immigrants to peer effects which can have a significant effect on their attitudes and motivations towards work.

Unlike our original expectations, we did not find any robust positive effect of social contacts with natives, except for certain groups. We expected that ties with natives could help immigrants to access relevant information to find a job, giving them the opportunity to, directly and indirectly, inform prospective employers about their skills and capabilities. The weak effect of potential contacts with natives could be explained by fact that migrants settled down only recently in Brescia, thus having insufficient time to build effective contacts with natives. Perhaps, contacts with natives would require linguistic proficiency that most immigrants do not have, or even are difficult due to purposive or "statistical" discrimination (Takács et al. 2018).

Here, the positive effect of the exposure to natives on Eastern European immigrants probably reflects the fact that they mainly work as caregivers and typically exploit contacts with natives to find a job. Furthermore, they are religiously, culturally and linguistically more similar to natives than other ethnic groups, with probable positive implications on potential network formation.

Coherently with our expectations, we found that ethnic concentration could reduce the availability of occupationally relevant resources. Since migrants and their co-ethnics are less embedded than natives in the local context, and most of their occupationally relevant networks include ties with their co-ethnics employed in the secondary labor market, most have low-paying jobs. The more ethnic-based social networks are the primary source of job information, the more this mechanism can lead to severe difficulties in the labor market. Here, the fact that the opposite was not true requires further examination.

When considering the concentration of co-ethnics, we found that changing the radius of the egohood has some impact on estimated statistical effects, notably increasing its magnitude (although disproportional to the increase in the size of the area). This is consistent with previous research on egohoods and would confirm our explanation regarding network mechanisms conveying labor market information and peer effects. The more individuals included in the egohood's spatial radius, the more prominent is the effect of the spatial concentration of such individuals on ego's income. However, in the case of the exposure to natives, the magnitude of the egohood does not have any relevant implication.

Although we believe that we have provided a promising approach to residential segregation, our study has certain limitations. First, although our empirical findings emphasize the importance of the social network process, we did not have any data on the actual social networks of immigrants. We assumed that people's co-location in the same space implies the probability of social ties and relationships, via ethnic homophily. However, research suggests that there is a difference between potential and actual ties, as networks are not static but dynamic and ties can convey both positive and negative resources to individuals. This would require direct empirical network measures (Bravo et al. 2012; Vacca et al. 2017; Bianchi et al. 2018). Indeed, some network characteristics, such as network closure and openness, and the structural position of individuals in more complex networks, could have a significant influence on labor market achievements.

Secondly, by linking ethnicity to citizenship, we reduced the heterogeneity of conditions among individuals. Immigrants with the same citizenship might have different cultural attitudes and beliefs, different religious preferences and language, which could all influence economic opportunities and social connections as well as residential choices. The larger and more heterogeneous the population of the country of origin, the weaker the role of a common citizenship to establish social contacts.

Third, our segregation measures were somehow "a-spatial," since the definition of each individual egohood actually splits the remaining population in two, i.e., those inside and those outside the egohood, regardless of the actual distance between ego and each alter. Considering a more detail definition of geographical and social space as an endogenous force of segregation might be the next step of our work (Leszczensky et al. 2016).

Finally, our empirical design was motivated by the idea that income effects of segregation were due to certain social network-induced mechanisms. However, there are other mechanisms that could determine income effects of residential segregation. For instance, living in certain urban areas that are stigmatized due to their low prestige could influence segregation and its income effects. Theoretically, a distinction should be made between segregation mechanisms based on homophily, i.e., attitudes and beliefs driven by a "taste for the similar" (McPherson et al. 2001; Merton & Lazarsfeld, 1954), and those based on "opportunity hoarding" (Tilly, 1998), i.e., attitudes and beliefs based on social closure by a majority against minorities. We believe that future research on residential

segregation and its effects should try to measure both types of mechanisms in order to assess their explanatory relevance on the economic and social nexus of segregation.

Appendix

	(1)	(2)	(3)	(4)
	ETH250	EXP250	ETH500	EXP500
MALE	0.723***	-2.749***	0.757***	-2.850***
	(9.66)	(-15.65)	(11.90)	(-15.33)
NATUR	71.72***	8.617***	73.39***	11.56***
	(513.97)	(26.32)	(618.81)	(33.36)
EDU	-0.0846***	0.118***	-0.0773***	0.130***
	(-9.14)	(5.42)	(-9.82)	(5.65)
JOB INSTABILITY	0.0311***	-0.0830***	0.0206***	-0.0690***
	(4.41)	(-5.01)	(3.44)	(-3.94)
AVERAGE RENT	-0.0491*	1.676***	-0.0509**	1.139***
	(-1.88)	(27.37)	(-2.15)	(16.50)
DISCRIMINATION	12.56***	3.973***	9.464***	-7.303***
	(30.15)	(4.06)	(26.68)	(-7.04)
URBAN DEGRADE	-0.00113***	0.0112***	-0.000791***	0.0117***
	(-16.23)	(68.53)	(-11.35)	(57.69)
EMPLOYMENT PROBABILITY500	26.27***	-90.62***		
	(26.77)	(-39.35)		
EMPLOYMENT PROBABILITY1000			20.38***	-96.72***
			(11.58)	(-18.79)
Constant	2.966***	57.09***	3.644***	60.69***
	(12.82)	(105.18)	(14.00)	(79.73)
R^2	0.903	0.209	0.931	0.173
N	28773	28773	28773	28773
* p<0.10, ** p<0.05, *** p<0.01 - t statistics in parentheses.				

Table 3.6: First stage regression results.

Chapter 4

Is Ethnic Educational Inequality a Matter of Choice? A Study on the Immigrant Population in Brescia, Italy

4.1 Introduction

This chapter investigates ethnic differentials in primary school choices as future determinants of education inequality. Not only do relevant technological changes in post-industrial societies have made education a key factor for social mobility and professional carriers; school choices by families are critical for social inclusion of immigrants. It is relevant mainly for the second generation of immigrants. Indeed, while first-generation immigrants faced labour market penalties due to low standards of education received in their country of origin, in case of the second generation, these gaps could persist due to the inequality of educational opportunities in the receiving countries (e.g. Heath, Rothon, & Kilpi, 2008). Understanding the socio-economic determinants of sub-optimal educational choices by migrants is essential to avoid social exclusion and stimulate social mobility (Shavit & Blossfeld, 1993).

In this chapter, we wanted to investigate primary school choices by migrant families. Usually, research on ethnic education inequality has focused on the secondary or tertiary education, because their outcomes have a direct effect on occupations and the job market. Findings suggest that certain ethnic groups are short-sighted in their educational choices (e.g. Silberman & Fournier 2009; Herzog-Punzenberger 2003), thus reproducing social inequality patterns.

However, considering the cumulative nature of learning, examining primary school choices is vital to understand the formation of cognitive skills and the origin of certain educational traps that can have severe consequences for migrants. Here, research has suggested that achievements during primary schools tend to amplify eventually shaping secondary school achievements (Heyneman & Loxley (1983), Sammons et al. (1995) and Goldstein & Sammons (1997)). Moreover, primary schools have a significant impact on pupil's life, considering that pupils spend much of their time in class with schoolmates. The class is where they socialise, build social networks outside relatives, learn role-models and incorporate social norms and identities. Primary school choices have a direct effect on socialisation and assimilation (Portes & Zhou, 1993). Considering these critical initial steps is therefore essential to explore the roots of certain penalties that might lead to educational inequality choices.

Schools are even more important in countries which have high migration rates. It is the case, for instance, of Italy, which increased ten times its immigrants share in the last thirty years; it occurred primarily in Northern cities such as Brescia, a middle-sized city of about 195.000 inhabitants reaching an immigrant share of 19% of the whole population which. Indeed, it is now the Italian city with the higher immigrant density with Milan. 24.8% of children under ten years old in Brescia come from an immigrant family and have in their educational investments the only chance to improve their social and economic condition. Sub-optimal school choices can perpetuate social and economic inequality.

It is important to remember that compulsory education in Italy has been divided into primary and secondary education for total training of ten years in three cycles. Half of this period includes the primary school, with subsequent secondary education divided into two cycles. In each cycle, pupils have the same classmates and usually the same teachers. Italian school system grants parents the freedom to chose whether to enroll children in school, upon the availability of places and teachers. It makes choices strategic, considering that private schools are expensive for families.

Understanding factors that determine these strategic choices have long-time consequences especially for migrants; we used an original micro data-set from the public register from the year 2012, which was built by ISTAT (Italian Statistical Institute) by integrating different data sources. Through GPS individual coordinates, we were able to geo-locate households at each block level. Note that the full representation of the entire population allowed us to avoid some typical issues of data surveys, such as sample selection, unbalanced sample and over or under-representation of certain ethnic groups. This type of data allows us to understand how the embeddedness of citizens in the geographical-social context in which they live can affect their educational choices.

Considering that families can freely choose among forty-nine primary schools located in Brescia, reconstructing their choices via geolocalization helped us to understand the role played by certain factors, such as the school quality, the home-school geographical distance, the effect of the ethnic composition of the neighbourhood as well as its diversity and co-ethnic share. Note that the

neighbourhood is a nexus of social networks which could affect school choices. To map these effects in due detail, we built egohoods (Sluiter, Tolsma, & Scheepers, 2015), i.e., egocentric neighbourhoods with a circular radius buffer of 500m around each block. It could be considered as social spaces in which households have exposure to more proximate social influence pressures.

While research on ethnic education inequality in Italy found an ethnic, educational gap between natives and immigrants in cognitive tests in primary schools (e.g. Ballarino et al. 2014; Contini 2013), previous studies in other contexts have suggested that neighbourhood effects can be crucial role in educational choices (e.g., Sykes & Musterd 2011; Böhlmark et al. 2016). Furthermore, it is probable that also homogamy could influence these choices (e.g., Bifulco & Ladd, 2007; Kristen, Reimer, & Kogan, 2008; Saporito, 2003; Saporito & Lareau, 1999).

Our aim was, considering these studies, to understand if (1) the ethnic composition of schools and neighbourhoods could predict primary school decisions by recent migrants and if (2) these effects were sensitive to the ethnicity of the households. Although it is difficult to quantify the link between primary school choices and following occupations, we hypothesised that certain socio-geographic context-specific factors leading to school choices could have a long-term effect on economic conditions via learning skills and social capital. Indeed, the Italian context is interesting here because unlike Centre-Northern European countries, the country attracted a variety of migrants from different ethnicity, which is typical of recent migration trends.

The rest of the chapter is structured as follows: In the 4.2 section, we show the theoretical background and formulate our hypotheses. In the 4.3, we show the Italian education context, moreover in the section4.4 we show the case of Brescia, the city of which we have analyzed the data.4.5 illustrates our data-set, variables that we used and conditional logit statistical methods. The 4.8 section presents our results, and finally in the last one we discuss these findings and limitations of our study.

4.2 Theoretical Background

Considering school choices, we can assume households are rational and maximise their utility functions under given financial and information constraints (Erikson & Jonsson 1996; Breen & Goldthorpe 1997; Glazerman 1998). . In the literature about school choice, we can focus on some factors that were usually determinant of parent choice regardless of their embeddedness. These factors were also an influencer of social mechanism as quality, distance, school composition, school fees.

Among the factors that could influence these decisions, we could consider the school quality and the social status of schoolmates as predictors of student's expected gains (e.g., via learning, social contacts and social capital), whereas costs related to home-school distance and student enrollment fees could be considered as financial constraints. It is likely that given a set of alternatives,

parents choose the school that fits their preferences the most.

However, the reality is more complicated. Decision makers are embedded in a complex social context (Coleman 1988) in which family bonds, social networks, peer effects and asymmetric information can be instrumental for these decisions. Literature about primary school choice was very tiny, due to absence of direct measurable outcome of school quality. Despite it, we added to theoretical review some relevant literature about also secondary school choice.

4.2.1 Hypotheses

In a study in Charlotte-Mecklenburg, North Carolina (USA), Hastings et al. (2009) found that academic quality was the critical driver of school choices. In a study on the school district of Wuppertal (Germany), Riedel, Schneider, Schuchart, & Weishaupt (2010) found less robust effects of school quality, but it still an important determinant of school choice. These findings have been confirmed by Borghans, Golsteyn, & Zölitz (2015) in a study on 15000 Dutch schools. Indeed every one want to have a good quality education. This determinant seems obvious, but the quality was not a purely objective parameter. Some households might evaluate quality not as pure educational quality, but as a quality of social relationships.

School composition was an active school choice determinant, mainly in a period of migrations. It is possible to see ethnic composition as Socio-Economic Status and Ethnic Composition. Kristen (2008) in a study on the North Rhine Westphalen Region in Germany, showed that Turkish households were more likely to enroll their children in schools with a high number of foreigners. Riedel et al. (2010), in an analysis about school choices in Wuppertal (Germany), found that the ethnic composition school was a strong determinant of school choices on both Turkish and German sides. While Germans enrolled their children to tendentially mono-ethnic schools, Turkish enrolled their children in more multi-ethnic schools. Note that Schneider et al. (2012) found similar evidence for non-primary school choices in the same city. Burgess et al. (2015) also had similar results in a sample study on English families; they showed how native households chose schools with more homogeneous ethnic composition. In the US in an analysis of school choices in the Philadelphia metropolitan area in Pennsylvania (USA), Saporito & Lareau (1999) showed that school composition strongly matters in households school choice. The composition effects were persistent independently from the school quality, lower safety schools or higher poverty rates (see also Saporito 2003 and Bifulco and Ladd 2007).

(H1): households prefer to enroll their children in schools with a high share of co-ethnics.

The Socio-Economic Status could influence the fact that households prefer schools with a disproportionate rate of similar ethnic groups. Middle or upper-class majorities do not tend to enroll their children in schools attended by minority pupils. Lankford and Wyckoff (2001) in a study about primary and secondary school in the US about school moving. In the US where there is no free choice

for public school, the School Socio-Economic status has a determinant link with the status of the neighbourhood where households live. Therefore, households bought houses and preselect the Socio-Economic status of the schoolmates as alleged by Holme (2002).

(H2): households prefer to enroll their children in school with a high share of high socioeconomic status pupils.

Finally, it is probable that home-school distance constraints household choices.Kristen (2008) in a study on primary school choices in North Rhine Westphalen Region (Germany) found that distance was a determinant of school choice. Similar findings were also in non-primary school (e.g. Karsten *et al.*, 2003; Saporito, 2003; Schneider *et al.*, 2012). In a study on 36 households in Detroit, Michigan (USA) by Bell (2009), in which she found that distances could also influence the community switching. Denessen et al. (2016) in an analisys of school choices of 10000 Dutch families found that home school distance distance was a school choice. Östh, Andersson & Malmberg (2013) in a research about school choice in Sweden underlined the importance of home school distanced in the household school choice, similar findings also in Bunar (2010). Distance was a transaction cost that households have to pay in terms of time and money as alleged by Lang, Collins & Kearns (2011).

Although existing literature in school choice and neighbourhood effects, this kind of literature has its focus on secondary school. It also often focused on segregation and school performances. Sykes and Musterd (2011), for example, had analysed 9897 secondary school students in the Dutch context; they found a significant and robust association between Neighbourhood and School choices, this segregation also hinders immigrants performances. Similar results were also in Böhlmark, Holmlund and Lindahl (2016) in an analysis of high school choice in Sweden found that neighbourhood segregation affects school choice.

(H3): Households choice is related to geographical preferences.

In this work, we aim to fill the research gap by analysing how the spatial distribution of immigrants leads immigrants to had different school choices in primary school.

In particular, we hypothesise that immigrants had little confidence in natives community (Stolle, Soroka, & Johnston, 2008). According to Holme (2002) and Sikkink & Emerson (2008) school choice happen through social network information. Actors, therefore, had information on which school was appropriate to send their children from their network of contacts, and educational social-network had a robust racial determinant as argued by Schneider et al. (1997). Moreover, the neighbourhood is not context-free, their social status and income determine the place where people live. Even without considering economic factors, people tend to live close to their peers and having relationships with them is more comfortable especially in migration contexts, among them there is the absence of linguistic and cultural barriers. According to Yoon & Gulson (2010) language, based networks in the multi-ethnic neighbourhood affect school choice

in urban contexts. It was appropriate to think that the natives had a more extensive social and information network and were, therefore, able to assess the quality of schooling better. Ethnic-based mistrust generates an asymmetrical information penalty that is paid by some ethnic group.

4.3 The Italian Context

Like other south European countries, Italy has shifted from a mono-ethnic to a multi-ethnic country since the early 90s, with an immigration rate increasing ten times in the last thirty years. The immigrant's distribution has been asymmetric, with a concentration in the Northern regions (57.8%, in 2017), which are the richest ones. It is worth noting that the second immigration occurred in a period of low economic growth compared to the favourable conditions benefitting earlier migrants. Furthermore, the transaction from an industrial to a post-industrial economy hurt the welfare systems, while globalisation and international trade reshaped the international division of labour, with increasing rates of unskilled migrants (Atkinson 2003). Also, Italy faced some structural issues, such as economic stagnation and a big sovereign debitor crisis, which exacerbated social inequality (e.g. Atkinson & Brandolini, 2001).

The number of immigrant pupils in Italian schools significantly grew in the last years. They were 200,000 in 2001 to reach 815,000 (9.2% of all pupils) in 2014. For instance, in many urban areas in Italy, there was a well documented "escape" of natives from public compulsory education in some area (e.g. Pacchi & Ranci, 2017; Barberis & Violante 2017). To limit this outcome, in 2009 the Ministry of Education of the Italian government imposed a ceiling of max 30% of non-Italian under-skilled students. This law, however, was often bypassed by certain schools because most students without Italian citizenship who were enrolled in the first year were born in Italy, and so had appropriate language skills.

Note that the Italian educational system has a structure divided into five cycles, ranging from kindergartens and primary schools to universities and art academies. The public school is financed entirely by the state. There are two kinds of private schools, Paritarie (equivalent) or Purely private. Paritarie school have financially supported by private individuals or local authorities, such as regions or municipalities, follow the same programs of state schools and give the same legal diploma of schools. The other private schools that are entirely financed by families and they do not give any legal diploma.

Although choices are in principle free, the households can select three schools in order of preference; pupils will be assigned to a school according to the availability of places and teachers. Unlike what happens in other European countries, from the 1977-78 school year (Law n. 517/1977), pupils with mental and physical disabilities receive special attention; they do not have to face discrimination, therefore, they should take part to regular classes often with dedicated assistance by individual support teachers.

4.4 The Case of Brescia

With about 195,000 inhabitants, the urban core of a highly productive, labour intensive, export-oriented manufacturing area, Brescia is an Italian city with one of the highest composite ethnic population. Migrants grew from about 1% in 1990 to about 20% in 2012, and the city now has an immigrant density similar to most North-European cities. At the same time the city is surrounded by a vast area with a high percentage of immigrants; this characteristic is typical of a large part of the Centre and North Italy.

Athough, Brescia has a Mediterranean segregation pattern, characterised by low segregation levels, high composite ethnic population Brescia has an immigrant population share of about 20% typical of Centre-North European countries, where immigration started decades before. If we focus to new generation, the city has almost a quarter of the population (24.8%) under age of ten that have both parent with an immigrant background. The main part of them were born in Italy, a minor part were born abroad and successively migrated with parents.

Projections indicate that these cohorts are key for the future of the city and this mostly depends on their education. Brescia has 49 primary schools, with 8 private equivalised institutes. We excluded from our analysis a temporary hospital school because its households could not have a choice here. All eight private schools in the sample were Catholic, while all public schools were organised in seven comprehensive institutes.

4.5 Data and Methods

Data come from an aggregation of different sources. First, we used Archimede, an ISTAT (Italian National Statistics Institute) data-set including individual-level economic and demographic data for the entire Brescia population in 2012. It included information concerning the individual place of birth and citizenship of 195,387 inhabitants, 19% of them immigrants belonging to 141 different national/ethnic groups.

The second source was Italian Ministry of Education and Research open data, for year 2010/2011 for class size data used as proxy of quality of public schools. The third source was the school's self-assessment reports for the year 2014-15, for class size data used as proxy of quality of public schools.

After considering all primary schools in Brescia and the entire population records available, excluding homeless family groups, we obtained a sample of 1598 school choices. We first considered all students having an Italian citizenship as "natives". Note that while Italian citizenship follows "*jus sanguinis*", a person can obtain citizenship after 18 if he/she was born in Italy from foreign parents who were legally resident. Another exception is for those ones having at least ten years of residency in the country of which at least the last three with a regular employment contract; in this case, even minor cohabiting children can receive their citizenship, with a reduction to 4 years for EU citizens.

In order to consider previous Italian migration patterns, we classified as Italian everyone who was born in Argentina, Australia, Brazil, Switzerland and Belgium but being living in Brescia since 1971. Considering previous migration patterns of Italians and the frequency of returns of migrant Italian families after an extended period abroad, we classified any individual as being Italian who had Italian citizenship in 2012 and was born before 1971 from Argentina, Australia, Brazil, Switzerland and Belgium. All others ethnic group were approximated by country of birth, although this classification was not precise it was useful because it reduced the already extremely high diversity.

4.5.1 Variables

The calculation of the attributes of the school is done on the sample of pupils that go from the second to the fifth year. The attributes of the school are the average attributes of the attending students, therefore including the students of the first years, would have created a problem of simultaneity.

For each student, we calculated all possible potential alternative schools that his/her parents could have chosen and assigned 1 for the for the school which was eventually chosen and 0 for all other possible alternatives.

We divided the independent variables in three groups, i.e., pure school attributes (e.g., school diversity, school quality), school attributes that depended both from certain individual or school attributes (e.g., home school distance) and individual variables (e.g., immigrant status or the ethnic composition of the neighbourhood).

4.5.1.1 School Attributes

***School Exposure*(SEXP).** This variable measured the share of natives Italian over the total population in the school. This indicates the native's propensity towards homogamy and reveals the propensity of immigrants to interact with natives.

***School Quality*(QUALITY).** In absence of trust-able, public available and accessible for families measure for school quality, a proxy of school quality was used. This proxy is class size. It was average class size of year 2010/2011 for public schools, for private school instead we used the average value of 5th class and 2nd class of first year available, i.e. 2014-15 school's self-assessment reports.

***School Socio-Economi Status* (SSES).** SSES measured the school's socioeconomic status by considering the average of the yearly Equivalent Family Income (EFI) of all families having children enrolled in it. EFI is the net disposable income of each family according to Eurostat criteria. It is calculated by weighing the net household income for 1 for the first adult, 0.5 for any other adult over 14 years and 0.3 for any child under 14 years in the family, it was expressed in thousand of Euro.

Variable	Obs	Mean	Std. Dev.	Min	Max
CHOICE	76,704	0.0208333	0.1428271	0	1
QUALITY	76,704	19.94401	2.185799	16	27
PRIVATE	76,704	0.1875	0.3903149	0	1
HSD	76,704	4.629777	2.570679	0.0355902	15.25483
SCE	76,704	55.72661	38.36007	0	99.32886
SEXP	76,704	78.64934	17.84255	20.17544	99.32886
NICES	76,704	0.1433489	0.7134819	0	10.21814
IMMIGRANT	76,704	0.2966208	0.4567709	0	1
GEN2	76,704	0.2315394	0.421819	0	1

Table 4.1: Descriptive statistics

***Private School* (Private).** This variable was a dummy variable taking one the school was private, zero if it was public. The choice of private school is economically onerous for the family, so it bound the school choice.

4.5.1.2 School and Individual Attributes

***Home School Distance* (HSD).** HSD measured the distance between home and schools for each family. Distances were calculated in meters by using a Quantum GIS software. It does not take into account the real routing distance travelled by parents to bring children to school which could be influenced by traffic regulations.

***School Co-Ethnics Share* (SCES).** This measured the share of co-ethnic students in each school.

4.5.1.3 Individual Attributes

***Neighbourhood Immigrant Co-Ethnic Share* (NICES).** This measured the percentage of non-natives co-ethnics in an egohood, i.e. an ego-centered neighbourghood, of 500m radius around the block where the households lives. We considered any value above the average, otherwise the assigned value was zero. It is calculated only for immigrants for separate the immigrants over Italian effects.

***Immigrant.* (IMMIGRANT)** This was a dummy variable that assumed the value of one in case the pupil was an immigrant, otherwise it was zero.

***Generation 2* (GEN2).** This was a dummy variable that assumed the value of one in case the pupil was an immigrant born in Italy, otherwise it was zero.

4.6 The space

To calculate the effect of the neighbourhood on school choice, rather than using the standard administrative definition of "neighbourhood", we built ego-centered neighbourhoods, called "egohoods" (Lee et al. 2008). By using geo-localised data from the Brescia Census microzones (CM), which represented (often irregular) administrative blocks, we created egohoods of 1 Km diameter around each household's spatial location using a Quantum GIS. We assumed this egohood dimension to represent ideally a minimum approximate social space in which it is probable that people socialise more (Hipp & Perrin 2009). This approach was followed by Dinesen & Sønderskov (2015) and Sluiter et al. (2015) who explored varying egohood radii to conclude that the most effective measures were between a diameter of 500m and 1km. Moreover, considering that the dimension of Brescia consists of 90.34 square km in total a diameter of 1km is to be considered appropriate to capture ego-centered neighbourhoods.

4.7 Statistical Modelling

School choice modelling is based on random utility models (Manski, 1975, 1977; McFadden, 1973). They followed McFadden (1973) in using a conditional logit estimator (e.g., Hastings et al. 2009; Glazerman 1998; Simon Burgess et al. 2015). In our case, we assumed that school choices depended primarily on the interaction between schools and households characteristics. and estimated our models with R, with the package Surv and procedure clogit. Additionally, to provide a robustness check, we estimated our models with Stata with the command clogit and asclogit.

4.8 Results

It is possible to see result in table 4.2. Models (1) and (2) tested the school choice without any interaction with individual variables, while Models (3) and (4) tested the school composition effect on school choice. Model (5) tested school composition about co-ethnics and related neighbourhood effects. Model (6) tested all main, variables interacting with immigrant status variables. Model (7) tested also the effect of begin a second generation migrants born in Italy.

Model (1) showed that there was a strong orientation to choose closer schools. Indeed, an increment of 1km of distance affected the odd of school choice of 0.23. Unlike previous research, here this was a strong determinant of school choice in all models. Secondly, we found that the presence of more Italian pupils was not influential on school choices. Note that private schools were chosen less frequently, which could be due to their limited places and some other constraints. In line with previous research, (e.g. Burgess et al., 2015), the school status had a positive effect. Quality measured by class size has a negative effect also if in table 4.2 is positive, because smaller class means better potential quality, but the odds was not too strong with a value of 1.07. This result was explainable

by the fact that schools were all financed in the same way and the teachers were all selected in the same way, with the exception of private schools, therefore the global expectation on school quality has a low impact.

Model (2) showed similar results regarding the home-school spatial proximity. Furthermore, households were less likely oriented to choose schools by socioeconomic status. The homophily variable SCE, which measured the effect of choices by natives and immigrants together, had a little positive correlation with an odd of 1.023 . Private schools were chosen less frequently, while school quality did not have any statistically significant effect.

Models (3) and (4) were similar and confirmed that the quality of schools influence households choices, where as socioeconomic status was more effective. When considering interactions between the condition of immigrant, the school native exposure and the school co-ethnic share, homophily had a significant influence. As did native preferably choose schools with higher share of natives, so did immigrants. They choose schools with more co-ethnics. More precisely, whole the odds of an ethnic-based school choice for a native was 1.022, those for an immigrant was 1.2259. Moreover, immigrant choose schools less attended by Italians. Here, socioeconomic status was still relevant like school quality.

In model (5), we tested the effect of the neighbourhood in which immigrants live by considering an equal exposure to natives locally. Results confirmed previous models. However, we did not find any association between the neighbourghood of residence and the degree of exposure to co-ethnics.

In model (6), we tested the interaction of the immigrant status with all determinant variables. Results confirmed the importance of the home-school distance, which is stronger immigrants than for natives. The presence of co-ethnics and the propensity of immigrants to choose schools with a lower socioeconomic status were confirmed. In this case, higher exposure to Italians was irrelevant.

Finally, in model (7), we looked at the difference between immigrants of second and first generations. Note that model 7 is equivalent to model 6 except the interaction variable GEN2. This variable allowed us to disentangle the effect of being born in Italy for minority people and so having enjoyed a higher exposure to linguistic and cultural standards of the country from later immigration. Moreover they have the possibility to have contact with Italian families during kindergarten, and therefore more information. For the sake of comparison, we assumed the mean of an immigrant of 1.5 generation, i.e. they were born abroad and immigrated with parents later. Immigrants of 1.5 Generation have lower probability to choose a private school, compared to immigrants of second generation, with an odd of 0.0178 compared to an odd of 0.044, private school was almost an Italian only choice with an odd of 0.3175. Families with children of 1.5 generation tend to choose schools closer on an odd 0.10, compared to the second generations that have a proximity odds of 0.13 and the natives who have one of 0.27. This means that families with children born abroad and enrolled in first grade tend to had more significant needs for savings in terms of time and means of transport and it was therefore probable that they are poorer. Families with 1.5-generation children chose schools with larger classes with an odds of 1.40, this choice was similar but much lower as odds for the second generation

1.10 immigrant families, the natives showing a lower propensity to choose large size with an odd of 1.05. This means that the second-generation information contact with the natives leads to basically similar choices, while the families with foreign-born children who probably have not attended kindergarten in the city have less access to information on schools. For immigrant families, exposure to Italians had very little value, tending to be irrelevant, but positive. On the contrary, the presence of co-ethnics was the greatest driver of choice after the distance both for families with children of 1.5 and second generation. This means that ethnic social information networks were important and that they were not embedded in the residential neighbourghoods.Social status was important for Italians only. Foreigners tended to choose low-status social schools, and this for the same presence of co-ethnic.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PRIVATE	-1.207***	-1.412***	-1.372***	-1.372***	-1.372***	-1.147***	-1.147***
	(-10.77)	(-12.29)	(-11.98)	(-11.98)	(-11.98)	(-9.46)	(-9.46)
HSD	-1.445***	-1.453***	-1.446***	-1.446***	-1.446***	-1.285***	-1.285***
	(-47.33)	(-46.74)	(-46.64)	(-46.64)	(-46.63)	(-39.12)	(-39.12)
SEXP	0.00374			0.0236***	0.0236***	0.0159***	0.0159***
	(1.24)			(6.72)	(6.73)	(4.40)	(4.40)
QUALITY	0.0722***	0.0768***	0.0731***	0.0731***	0.0733***	0.0521***	0.0521***
	(4.80)	(5.14)	(4.82)	(4.82)	(4.83)	(3.10)	(3.10)
SSES	0.355**	-0.290***	0.362***	0.362***	0.361***	0.561***	0.561***
	(2.54)	(-2.70)	(2.58)	(2.58)	(2.58)	(3.70)	(3.70)
SCE		0.0387***	0.0236***				
		(13.24)	(6.72)				
IMMIGRANT:SCE			0.183***	0.206***	0.211***	0.213***	0.139**
			(7.11)	(8.12)	(7.90)	(7.24)	(2.15)
IMMIGRANT:SEXP			-0.0114***	-0.0350***	-0.0350***	0.00345	0.00771
			(-2.81)	(-8.63)	(-8.63)	(0.40)	(0.42)
NICES:SCE					-0.00815		
					(-0.61)		
IMMIGRANT:PRIVATE						-2.147***	-2.889**
						(-4.20)	(-2.57)
IMMIGRANT:HSD						-0.774***	-0.924***
						(-8.54)	(-4.72)
IMMIGRANT:QUALITY						0.126***	0.285***
						(3.05)	(3.22)
IMMIGRANT:SSES						-1.597***	-2.005**
						(-3.77)	(-2.27)
GEN2:PRIVATE							-1.967***
							(-3.46)
GEN2:HSD							-0.747***
							(-7.42)
GEN2:SEXP							0.00236
							(0.25)
GEN2:SCE							0.230***
							(6.93)
GEN2:QUALITY							0.0896*
							(1.96)
GEN2:SSES							-1.523***
							(-3.24)
N	76704	76704	76704	76704	76704	76704	76704
LogLikelihood	-3392.6	-3296.6	-3253.3	-3253.3	-3253.1	-3181.1	-3178.0
Pseuso R^2	0.452	0.468	0.474	0.474	0.475	0.486	0.487
z statistics in parentheses; * p<0.10, ** p<0.05, *** p<0.01							

Table 4.2: Conditional logit regression estimations

4.9 Conclusions

In this chapter, we investigated ethnic differentials in primary school choices as future determinants of education inequality. We focused on Brescia, a wealthy industrial Northern Italian city, where immigrants currently make up about one-fifth of the population and immigrant pupils are almost a quarter of the primary school population. We started from certain hypotheses regarding household chooses, by considering three main factors: the quality of schools, the ethnic and status homophily tendency and certain geographical constraints, i.e., the home-school distance and the neighbourhood composition. Unlike other studies, we used an official register data, with higher informative value than standard surveys.

Our results show that even in the presence of free choice, school proximity was crucial for the school choice, this result was much stronger for immigrant families, these results were not going to confirm literature, in which distance was a marginal factor. Moreover, school composition is the primary determinant of school choice in particular for immigrants, that often choose a school with high share co-ethnics. It compared to the literature that shows us an attitude of exclusion by natives; our results show a critical attitude of self-exclusion by immigrants to select schools with high co-ethnic presence. Moreover, compared to what reported in the literature, the measured academic quality, was significant weak a determinant for natives, but but bad quality was a strong determinant for immigrants . School Socioeconomic status variable is a relevant variable almost only for an immigrant that tend to choose schools with lower socioeconomic status. Embeddedness of immigrants in communities with a high share of co-ethnics is a strong determinant of school choice.

We found that school was not the main predictor of household choices. Although there was a correlation between school quality and school ethnic composition, we found that choices reflected other factors. This provides a different picture of the problem compared to so not corroborating previous research (e.g. Hastings et al., 2009; Riedel, Schneider, Schuchart, & Weishaupt, 2010; Schneider et al., 2012; Borghans, Golsteyn, & Zölitz, 2015). The school quality is difficult to estimated by households; this could explain why quality has no effect on primary school choices. The availability of public schools with common teaching standards could induce immigrant households to believe that the quality is homogenously distributed among schools regardless other school attributes.

We found that when choosing schools, households are influenced by the certain school characteristics such as the share of co-ethnics (H1) and the school's status (H2). In line with previous research, we found that immigrants tend to prefer schools with a high share of co-ethnics. The same is true, though with a weakest intensity, for natives, (e.g. Kristen, 2008; Riedel, Schneider, Schuchart, & Weishaupt, 2010; Schneider et al., 2012). We also found that households consider the school's socioeconomic status even in primacy schools. This extends previous findings on secondary schools (e.g. Lankford and Wyckoff, 2001). Furthermore, in contrast with previous research, we found that the difference in school choices between natives and immigrants is lower when con-

sidering second generation immigrants, i.e., children who were born in Italy by immigrant parents. In particular, we found that 1.5 generation parents tend to choose schools preferably with a lower socioeconomic status, more proximate and school of lower quality.

We confirmed our hypothesis regarding spatial proximity (H3). Home-school distance is key for primary school choices, in line with previous research (e.g. Bell, 2009; Kristen, 2008 and Denessen et al., 2016), also we did not find any effect of neighbourhoods composition.

In general, H1 and H2 are fully confirmed. We found that immigrants approach school choice differently. Households with second generation children have a behaviour that tend to approximate natives choice. It confirm the literature about native behaviour (e.g. Kristen, 2008; Riedel, Schneider, Schuchart, & Weishaupt, 2010; Schneider et al., 2012). Instead, households in which children were born abroad have a preference for the closest school. In this case, this difference can be explained by the fact that second-generation children have attended a kindergarten with children from native families. So their educational orientation had influence from native's choice.

H3 is confirmed. We found that household chose the more proximate school, so neighbourghood of residence affects the households primary school choices for their children. School proximity effect are stronger for generation 1.5. Instead we cannot confirm that ethnic minority neighbourhood composition affects school choice, in other words the co-ethnic are not the main source of information in school choice. Besides, to be free to choose schools at a greater distance it is necessary to pay a cost in terms of time and transport, this can mean having a car available, which for immigrant families can be expensive, especially if they live in peripheral areas of the city. In addition it could be an effect of different kind of migrant segregation in southern European countries.

The generalization of our results refers to southern European states in which there is free or bounded free school choice, such as Spain or Portugal, due to similar welfare and segregation model. A limitation stems from the fact that all schools are available for family choice. However linear distances often clash with the presence of natural or artificial barriers, such as river, motorways, railways or orographic differences, these barriers limit the possibility of choice, or instead, they increase the costs of choosing differently.

Our findings corroborate here Barban & White (2011), who found that 1.5 generation immigrants have more penalties in the transition to secondary schools. Our study suggests that this disadvantage does not originate from the first level of secondary school, but probably even from the choice of primary schools. This suggests the need for measures to improve information and awareness of immigrant households concerning the importance of their school choice since from the primary level, especially if targeted to communities of new or recent immigration.

Chapter 5

Conclusions

This dissertation aimed to improve our understanding of the link between migrant ethnicity, space and socio-economic inequality. Our focus was mainly on socio-economic issues, such as immigrant segregation, immigrant earnings and immigrant education choices. We tried to consider the interplay of social and economic factors with attention to micro-processes. More specifically, we tried to explain how the social space, i.e., the community in which people are physically embedded, might influence immigrant behaviour. We focused on the city of Brescia, a wealthy industrial city in the North part of Italy. Our study has benefited from the ISTAT-ARCHIMEDE database, a rich data-set with census-like data. The possibility of using this database gave us an interesting opportunity to have an accurate representation of the behaviour of immigrants, which is impossible with survey-based data. The dissertation shows migration-related problematics in a South European context. It has its peculiar characteristics compared to Centre-North European given by welfare model differences. Firstly, we explored the presence of segregation by macro-groups in the city. Segregation was analysed by four dimensions, evenness, isolation, exposure and spatial clusterisation. We found that segregation was globally mild, but differentiated by groups some groups in particular Asiatic groups such Chinese, East and South East Asians and South Asians. Moreover, on the opposite side a low presence of segregation for South Americans and East Europeans. Despite the presence of segregation measured as evenness, the isolation of groups on a city scale is considered low, and exposure to Italians is high. Our analysis shows no hypersegregation or the presence of enclaves. From the results on a global level, there is a presence of microsegregation. By exploring segregation at the local level, in each of thirty-three neighbourhoods, it is possible to note that some groups, in particular, the South Asian and Chinese one, show higher levels of segregation as evenness and in relative terms higher levels of isolation compared to the other groups. South Asians have strong isolation tendencies in almost all the neighbourhoods where they live. Segregation of South Asians confirms study on segregation about the UK and Southern Italy (Peach 1996, 2009; Busetta et al., 2015). Except for Villaggio Violino and Fornaci, south Asian show segregation

in high-density areas, this might be explained by the greater likelihood of finding flat rentals in such areas. Particularly noteworthy is the presence of Chinese immigrants in the southern area of the historical centre, in the neighbourhoods of the Centro Storico Sud and Brescia Antica, remarkable is also their presence in the Northern side of Chiesanuova neighbourhood and Chiusure neighbourhood. Chinese segregation was usually a self-segregation due to linguistic and cultural barriers al explained by Rose-Redwood and Rose-Redwood (2013). Segregation for Chinese and South Asian Communities was also confirmed by spatial association analysis. Differently, East Europeans and South Americans have not the same segregation problems. Low segregation level of Eastern Europeans was mainly determined by the strong presence of caregivers especially by Ukrainian, Moldovan and Romanian ethnic groups; however, this corroborates the result of Pan Ké Son (2010) that found a low level of segregation for East Europeans. Secondly, we analysed the personal segregation effects on immigrants' earnings. For doing this, we linked socio-economic and spatial-demographic characteristics of immigrants by following an "egohood" approach, which jointly considers socialisation and proximity effects. Besides, we evaluated these effects through isolation index, i.e. the probability to meet co-ethnics and exposition, i.e. probability to meet natives. Estimating the model with an instrumental variable model we found a causal link, in a statistic sense, that shows the effect of egohood ethnic characteristics on immigrants' income. We, therefore, confirm the importance of social networks based on residential proximity as a form of social capital. Moreover, networks expose immigrants to peer effects which can have a significant effect on their attitudes and motivations towards work. Besides, we did not find any robust positive effect of social contacts with natives, except for certain groups. Eastern Europeans have a positive effect by exposure to natives. It probably reflects the fact that they mainly work as caregivers and typically exploit contacts with natives to find a job. Furthermore, they are culturally more similar to natives than other ethnic groups, with probable positive implications on potential network formation. Similarly happened for Middle Easterns and North Africans by their exposition to natives increased their income with no effects on ethnic segregation. The composition of the neighbourhood as egohood has a powerful negative impact on the incomes of South Asians. The South Asians have, as can be seen in the second chapter, a very high level of segregation. Above all, they are the groups with the least exposure to Italians and with the most significant exposure to co-ethnics. Thirdly, ethnic differentials in school choices in primary school as a determinant of education inequality. Education inequality becomes crucial in countries that receive migrations. We hypothesise that household choice is determined by homophily, in particular households prefer a school with a high share of co-ethnics, and households prefer schools with a high share of high socioeconomic status pupils. Moreover, we hypothesise that the household's choice is related to geographical preferences. We found that the household chooses a school by socioeconomic status, ethnic composition and home-school distance. Households of second-generation immigrants' children, i.e. born in Italy, have less difference from natives. Instead, the families of children born abroad make different choices. In this case, this difference can be

explained by the fact that second-generation children have probability attended a kindergarten with children from native families. Therefore, their educational choices were influenced by native's choice.

Coming to limitations the major limitation of the second chapter is that it shows aggregates and not national groups — aggregations where possible should be made from a linguistic rather than a geographical point of view, furthermore we consider nationalities as the ethnic group, but ethnic groups not always follows citizenship. In the second chapter and marginally in the third, we talk about social networks. However, we do not have any actual data on their presence. We can assume their existence based on the existing literature. The fourth chapter also has limitations. A limitation stems from the fact that all schools are available for family choice. However linear distances often clash with the presence of natural or artificial barriers, such as river, motorways, railways or orographic differences, these barriers limit the possibility of choice, or instead, they increase the costs of choosing differently. If we had available a dataset with also the municipality of the countryside, it would be possible to see how people move within and outside the municipality of residence in the school choices for their children. It would also be interesting to be able to replicate the study on other levels of the school, i.e. lower secondary and upper secondary schools. To conclude, we found that in Italy there is segregation, it is much less if compared to the Centre-North of Europe. Also, segregation has economic consequences; people who live in the segregated area have much fewer personal earnings due to peer effects and access to wrong networks. About the choice of the school, the presence in the district of residence of co-ethnic does not influence the choice of the school. Instead, measured quality does not matter in school choice, and the primary determinant of school choice is home-schooling distance. This is a fundamental finding because it shows that also in the presence of free choice households prefer the neighbourhood school. Therefore, the place of residence influences the family status and the future status of pupils.

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