

From island to island: Sri Lankans' settlement model(s) in the main urban contexts of Sicily (Southern Italy)¹

Abstract: The so-called “Sri Lankan Diaspora in Italy” is the result of a migratory flow historically linking Italy and Sri Lanka. Indeed, Sri Lankans constitute one of the oldest foreign communities in Italy, which is strongly localised in the South of Italy and on the island of Sicily in particular. Being the large cities the Sri Lankans' preferred location to settle, a comparative geographic study of Sri Lankans' settlement patterns in three main cities of Sicily (Palermo, Messina, and Catania) is performed in the present work.

The purpose of the work is twofold. First, it attempts to compare the settlement patterns of Sri Lankans across different urban contexts to assess whether specificities prevail over macro-level similarities. Second, it aims to detect the possible spatial polarisation of Sri Lankans at the intra-urban level and to verify spatial correlation with other variables proxies of socioeconomic inequalities in urban neighbourhoods.

Multiple linear models have been run to assess the global variation in the Sri Lankans' concentration when related to several socioeconomic predictors. Further, geographically weighted regressions are implemented to explicitly model spatial dependence between Sri Lankans' location quotients and the predictors. All the considered variables have been referred to a single geographic reference grid, allowing to homogenise different areal unit arrangements and to propose comparisons across space.

Despite moderate overall segregation, Sri Lankans tend to concentrate in central affluent areas, revealing complex social polarization processes. Influenced by socioeconomic and demographic dynamics, their distribution reflects ethnic and migratory dimensions. While Sri Lankans gravitate towards wealthier Italian households, they also settle where foreign presence rises, indicating evolving ethnic segregation dynamics possibly influenced by gentrification and demographic shifts.

Keywords: South Europe; Sicily; Sri Lankans; Segregation; Local-scale analysis; Divided cities

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1. Introduction

Today, urban socioeconomic segregation and inequality have become matters of international concern (van Ham 2021). These processes are significantly shaped by migration, which plays a pivotal role in moulding the socio-spatial structures of today's urban and metropolitan landscapes. It also influences the configuration of urban spaces and has far-reaching effects on the demographic composition of host societies (Benassi et al. 2020a; Portes 2000; Strozza et al. 2016). Over the past three decades, Europe has witnessed a notable increase in immigration flows, particularly in its southern regions. These demographic shifts, coupled with escalating social and economic disparities exacerbated by the 2008 financial crisis and the ongoing pandemic, have solidified patterns of social, economic, and residential segregation in European cities (Allen et al. 2004; Musterd et al. 2017; Tammaru et al. 2016). These dynamics are particularly pronounced in Italian metropolitan areas, defined as regions comprising densely populated urban cores and their less-populated peripheries. Here, demographic transformations and real estate speculation have fuelled gentrification and accelerated the suburbanization of poverty, leading to widespread class segregation (Hochstenbach & Musterd, 2018). As highlighted in the "Divided cities" report by the OECD, cities are recognized as hubs of opportunity and key drivers of economic development (OECD, 2018a). Regrettably, not all cities have managed to grow inclusively, and they continue to harbour spaces where poverty remains concentrated. These disparities undermine overall quality of life by exacerbating existing social inequalities (OECD, 2018a).

In contemporary society, inequalities, particularly disparities in socioeconomic conditions within urban areas, are closely linked to migrant populations and their integration into local communities. This connection exists because migrants often initially gravitate toward major cities and metropolitan regions (Vaughan and Arbaci 2011; Williamson 1988; Yap 1977). Due to various factors, such as the challenges of assimilation into host communities, religious beliefs, and language barriers, migrant populations are considered one of the most economically vulnerable segments of urban societies. Consequently, they are more susceptible to enduring inequalities and marginalization, which are already prevalent in urban areas and large cities (Dangschat 2009). In Europe, especially in its southern regions, there is evidence of an inverse relationship between levels of residential segregation and economic conditions, such as labour markets, wealth, and productivity. Specifically, weaker economic conditions in Europe's southern areas coincide with higher levels of residential segregation (e.g., Benassi et al., 2020a; Benassi et al., 2020b). Information regarding residential segregation and spatial inequalities at the local level is instrumental in addressing disparities, marginalization, and social disruptions. This is particularly relevant when considering the geographic distribution of social groups, such as migrant populations, to tackle intra-urban inequalities (OECD, 2018b).

While studies on this topic in Italy are growing, there is a scarcity of comparative analyses among southern cities, particularly with a focus on specific immigrant communities. This is surprising because Italy hosts foreign communities, like Sri Lankans, who are not only concentrated in major northern cities but also in the southern part of the country, particularly in certain urban areas (Henayaka-Lochbihler and Lambusta 2004; Strozza et al. 2016). The connections between Sri Lanka and Italy primarily revolved around religion, with the initial wave of migration in the late 1970s consisting mainly of Catholic women relocating to Italy to work in elderly care households. Over time, Sri Lankans have established robust social networks at the local level, which have come to characterise entire urban areas (Henayaka-Lochbihler and Lambusta 2004; Pathiraga and Collyer 2011).

This paper extends a previous work conducted by the authors (Benassi et al., 2023) with the scope of providing a general understanding of Sri Lankans' settlement model in Southern Italian. Here the investigation is focussed on their allocation in the island of Sicily (i.e. in the three metropolitan areas of Palermo, Messina and Catania) and considers several explanatory variables and spatial statistical methods to provide a clearer snapshot of the actual residential distribution of the considered group. The article is organised as follows: the next section describes the history and the geography of Sri Lankan immigration flow towards Italy; the third section illustrates the available data and the methodology applied; the fourth presents and discusses the main findings, respectively; the fifth and last section summarizes and concludes the work.

2. The Sri Lankans' presence in Italy

Sri Lankan immigration to Italy began in the 1970s but significantly increased in the 1980s (Henayaka-Lochbihler & Lambusta, 2004). Data from residence permits indicated that more than 12,000 Sri Lankans were legally present in Italy by the end of 1991, with 69% of them being males. Notably, during the early 1990s, many Sri Lankans resided in Italy illegally, often entering through the Balkan route (Morlicchio, 1992). By the 2001 census, the number of Sri Lankan citizens living in Italy had exceeded 26,000. Subsequently, from 2002 to 2019, immigration reached significant levels, with over 88,000 arrivals and fewer than 7,000 departures recorded. The gender composition of the Sri Lankan community in Italy has undergone fluctuations over time. Initially, there was a female majority in the 1970s, followed by a strong male presence in the 1990s. However, in recent years, a more balanced gender distribution has emerged, although both males and females predominantly work as domestic workers (Näre, 2012). As stated by Benassi and colleagues (2023), the spatial distribution of Sri Lankans across Italy exhibits a unique dual characteristic. To begin with, Sri Lankans display a preference for establishing themselves in major urban centres, where nearly 55% of the total Sri Lankan population in Italy resided at the start of 2021 (Table 1). Additionally, Sri Lankans tend to cluster in the southern cities, such as Messina, Palermo, and Catania in Sicily, a trend seldom observed among other foreign communities settling in Italy's primary municipalities (see bold figures in the fourth and eighth columns of Table 1).

Table 1 Sri-Lankans residing in the main Italian municipalities, years 2012-2021.

Municipality (2012)	Sri Lankan residents (000)	%	% of foreigners	Municipality (2021)	Sri Lankan residents (000)	%	% of foreigners
Milan	11.1	15.5	6.3	Milan	16.1	14.8	6.3
Naples	7.2	10.1	22.9	Naples	15.3	14.1	26.3
Verona	5.2	7.3	17.4	Rome	9.1	8.4	2.7
Rome	4.9	6.8	2.2	Verona	7.4	6.8	20.1
Messina	3.6	5.0	32.1	Messina	3.8	3.5	32.2
Palermo	3.3	4.6	16.7	Palermo	3.1	2.9	13.1
Florence	1.6	2.2	3.7	Catania	2.4	2.2	18.3
Catania	1.4	2.0	20.8	Florence	2.1	1.9	4.2
Total	38.3	53.5		Total	59.3	54.6	

Source: own elaboration on Istat data (Demographic Census and Municipal Population Registers)

3. Materials and methods

Population data on Italians and Sri Lankans² come from the 2011 Italian General Population Census. It is important to bear in mind that according to the 2012 Post Enumeration Survey, the 2011 census data are affected by under-coverage problems: 1.07% for the whole population and 11.07% for foreigners at the national level (Istat, 2015). For the implementation of the statistical analyses, other geographically referenced variables have been used to delineate the socioeconomic conditions of the different urban areas where Sri Lankans reside. The main sources for these data, as listed in Table 2, are the 2011 General Population Census and the Italian Revenue Agency (OMI database). The latter database was exploited to retrieve the mean rent cost per square meter for private residential properties in 2011. All the elaborations are implemented in the R software environment (R Core Team, 2021).

² The data on Sri Lankans analyzed in the present work were made available within the scope of the 'Caratteristiche, comportamenti e condizioni di vita degli immigrati di prima e di seconda generazione secondo le principali fonti disponibili' research agreement between the Italian National Institute for Statistics (Istat), the National Research Centre (CNR) and six Italian universities.

Table 2 Selected variables and data sources.

Variable	Source
Sri Lankans' location quotients	Italian General Population Census 2011
Percentage of large households (5+)	Italian General Population Census 2011
Foreigners' proportions	Italian General Population Census 2001
Foreigners' mean growth rate (2001-2011)	Italian General Population Census 2001-2011
Italians' mean growth rate (2001-2011)	Italian General Population Census 2001-2011
Low educational attainment	Italian General Population Census 2011
Unemployment rate	Italian General Population Census 2011
Proportion of households living on rental	Italian General Population Census 2011
Proportion of buildings in poor conditions	Italian General Population Census 2011
Mean rent cost per m ² for private properties	OMI database 2011

The data analysed in the following application refer to specific geographic units, such as census tracts or OMI zones, that are different one from each other because were built for different purposes. To address the modifiable areal unit problem (Openshaw 1984; Openshaw and Taylor 1979) due to the dependence of spatial analysis results on the scales and methods used to create the areal units, we adopt an areal weighted interpolation method. This technique, commonly used for analysing socioeconomic data, involves transferring data from one set of reporting zones (referred to as "source") to another independent set (referred to as "target") (Goodchild et al. 1993). Specifically, we redistribute the data from census tracts and OMI zones to a uniform spatial grid composed of 100 by 100 meter cells using the *aw_interpolate()* function from the "areal" R package (Prenner & Revord, 2019). The choice of a 100-meter grid cell size, while arbitrary like any other cell size, has become a standard in recent literature focusing on residential segregation and settlement patterns of migrant populations. This standardization is exemplified by the D4I Data Challenge on "Integration of Migrants in Cities" sponsored by the European Commission-Joint Research Centre (JRC), which provided global grids of population distribution in 100-meter grid cells for cities in eight EU Member States³. Numerous research studies have effectively leveraged the D4I dataset to offer comparable insights into migrant settlement patterns across diverse urban contexts (Benassi 2020a; Benassi 2020b; Marcińczak et al. 2021; Olteanu et al. 2020).

To first assess the degree of global Sri Lankan segregation in the three considered urban areas, we compute the corrected version of the dissimilarity index (DI) (Mazza & Punzo, 2015). A general rule of thumb suggests that DI taking values less than 0.30 indicates low segregation, 0.30–0.60 indicates moderate segregation, and values over 0.60 indicate high segregation. Of course, this varies between national and local contexts (Massey & Denton, 1993). Then, to uncover possible local unevenness in Sri Lankans' spatial distribution, we map their location quotients (LQs) (Haig, 1926).

Earlier studies have underscored the phenomenon of ethnic occupational specialization in Palermo (Busetta et al. 2015), Messina (Bitonti et al., 2023) and Catania (Mazza & Punzo, 2016), with a predominant focus on household work within Italian households. This specialization has led to different neighbourhoods within these cities exhibiting varying levels of attractiveness to Sri Lankans,

³ The European Commission's Knowledge Centre on Migration and Demography recently released the Data for Integration (D4I) dataset. This dataset has been obtained through a spatial disaggregation of statistics of the 2011 Census, collected from national statistical institutes. The spatial processing of the original data resulted in a uniform grid showing the concentration of migrants in cells of 100 by 100 meters in all cities of eight European countries (France, Germany, Ireland, Italy, Netherlands, Portugal, Spain, the United Kingdom).

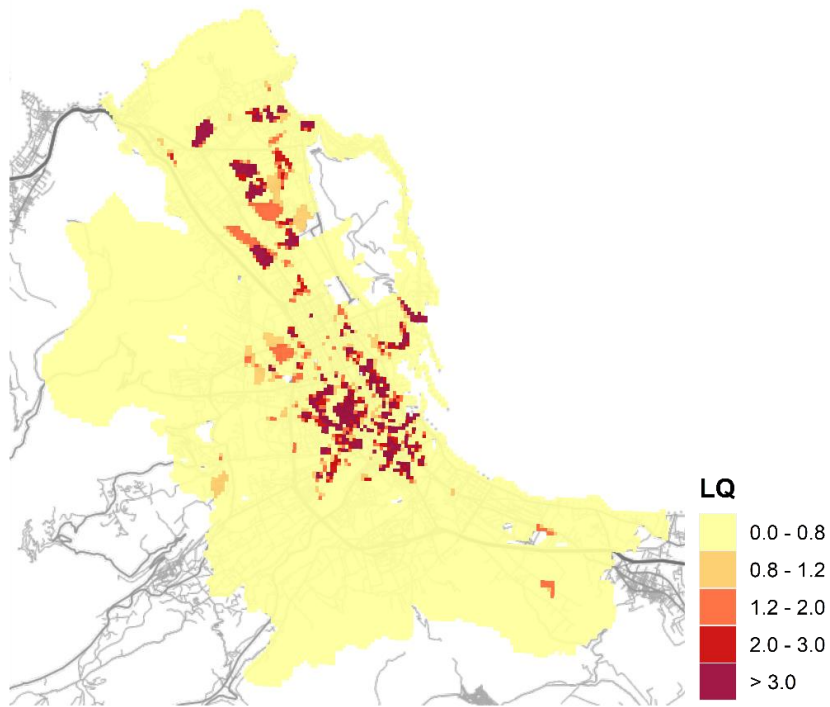
primarily driven by the availability of job opportunities. For this reason, we run different global and local regression analyses including several socioeconomic variables as possible contextual predictors for Sri Lankans' residential choices. First, in order to comprehensively and initially examine how Sri Lankans allocate, we conducted multiple linear regressions (OLS) for each city. Then, to accurately capture the variations in the data at a local level and explicitly incorporate the spatial relationships within Sri Lankans' distribution, we employed geographically weighted regressions (GWRs) as described by Fotheringham et al. (2002). GWR techniques serve for analyzing data that exhibits spatial heterogeneity, offering valuable insights into the specific associations between dependent and independent variables, as outlined in prior studies by Brunson et al. (1998, 1999) and Fotheringham et al. (2002). In traditional regression analysis (OLS), a single model is applied to the entire dataset, assuming that the relationships between variables remain constant across all geographic locations. However, this assumption may not be valid in many real-world scenarios, particularly when observations are dispersed across various geographic regions. GWR methodologies address this challenge by estimating individual regression models for each observation, taking into consideration its local spatial context, often referred to as the bandwidth. This approach allows us to detect spatially varying relationships between variables and uncover local patterns and trends that may not be discernible through a global analysis. Moreover, GWR models allow to map the local parameters (local beta coefficients) and this is the major advantage of local regression approaches (Matthews & Yang, 2012).

4. Results

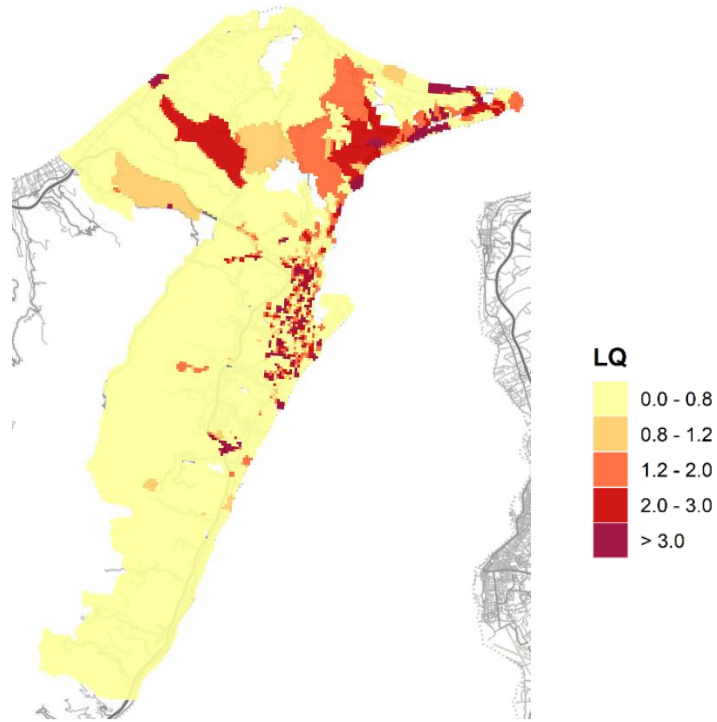
Our first aim is to assess whether there are distinctive patterns of segregation for the three municipalities analysed. The bias-corrected DI values recorded for the three cities in 2011 indicate the degree of residential segregation among the Sri Lankan population in each municipality. Palermo has a relatively high DI of 0.66, suggesting a significant level of residential segregation among Sri Lankans in this city. This value indicates that a substantial portion of the Sri Lankan population is concentrated in specific neighborhoods or areas, leading to a notable separation from the Italians (that represent the group of reference). Messina's DI of 0.32 is notably lower than Palermo's, indicating a lower level of residential segregation. This suggests that the Sri Lankan population in Messina is distributed in a way that is more balanced with the Italian population, with less pronounced concentration in specific areas. Catania falls in between Palermo and Messina in terms of DI, with a value of 0.50. This moderate level of residential segregation could indicate some degree of concentration in certain areas, but not as pronounced as in Palermo. Given that the global index (namely the DI) detects different levels of residential segregation at the urban level, we are interested in whether Sri Lankans' spatial allocation also shows local heterogeneities across the three municipalities. Indeed, it is important to use both global and local indexes when measuring the settlement models of specific population groups (Brown & Chung, 2006). To examine this, Figure 1 shows the LQs for Sri Lankans in the considered urban areas. Initially, when examining the residential patterns within each municipality, a striking similarity emerges. Sri Lankans appear to be concentrated in specific central areas of the urban landscape. Notably, in all three cases, the neighbourhoods accommodating the majority of Sri Lankans align with the historical city centres and certain areas associated with affluent socio-economic profiles. To some extent Messina presents a slightly larger areas of concentration up North. This intriguing observation warrants further exploration in the subsequent section of this paper. The uniformity in the distribution of Sri Lankans across these municipalities naturally leads the consideration on the potential socioeconomic spatial factors that contribute to the observed variations in residential patterns within these municipalities.

To assess which and how socioeconomic and demographic dynamics influence the spatial distribution of Sri Lankans a non-spatial global multiple regression (OLS) and a spatial local multiple regression (GWR) have been carried out for each city. The results of the global models run for each city, as illustrated in Table 3, highlight three different types of relations between the dependent variable (Sri Lankans' location quotients) and the covariates. While the households on rent, the foreigners' proportion in 2001, and the foreigners' mean growth rate exhibit a positive association with LQs, the unemployment rate, the proportion of large households, the proportion of individuals with a low

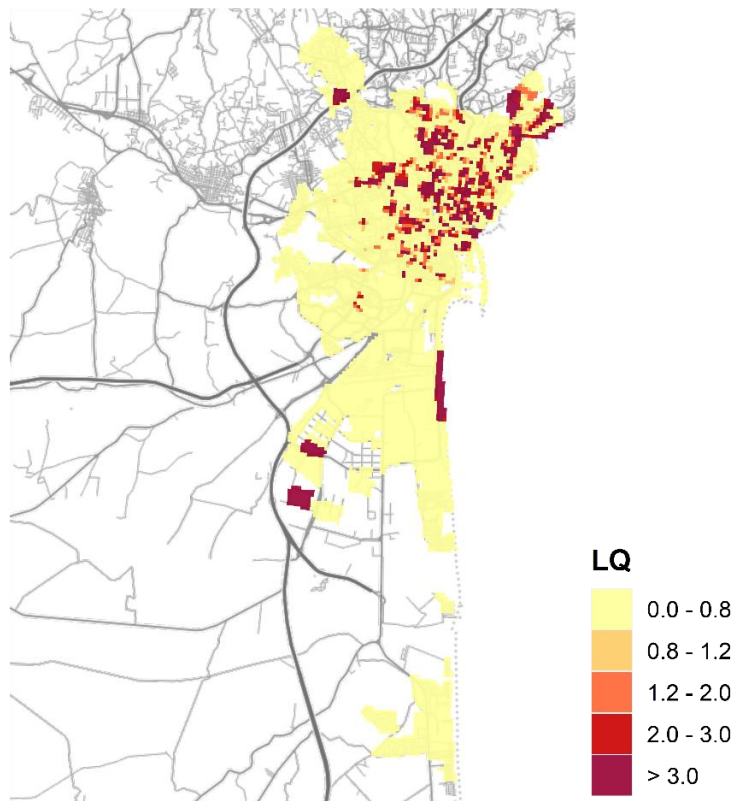
educational attainment and the Italians' mean growth rate are negatively associated with the dependent variable in all the three cities. Conversely, the effect of the proportion of buildings in poor state of maintenance and the mean rent cost varies according to the urban context. Despite the statistical significance of these results, the overall performance of the global models proves to be very poor, as indicated by the low levels of the adjusted R^2 . This could indicate the presence of heterogeneities in the local relation between dependent and independent variables which are not captured by the models implemented. Indeed, the spatial variations in some of the selected covariates illustrated in Figure 2 show the presence of intra-urban variations in the socioeconomic conditions that could be accounted for implementing local analyses.



(a) Palermo



(b) Messina



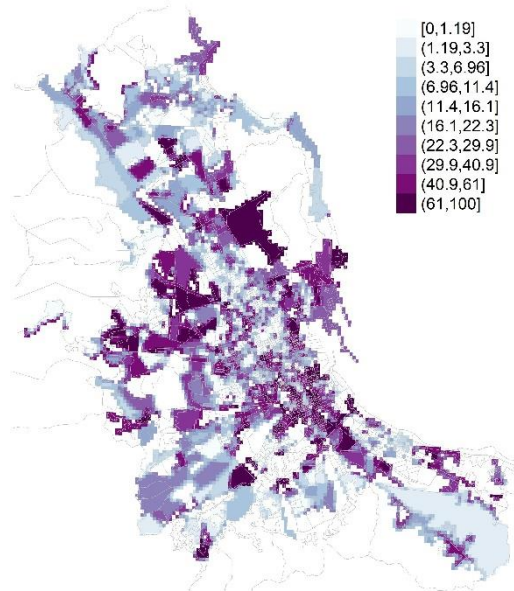
(c) Catania

Figure 1 Location quotients of Sri Lankans (ref. group: total resident population). Main municipalities of Sicily, 2011. Spatial grid with 100 x 100 m cells. Source: own elaboration on Istat data (Demographic Census and Municipal Population Registers).

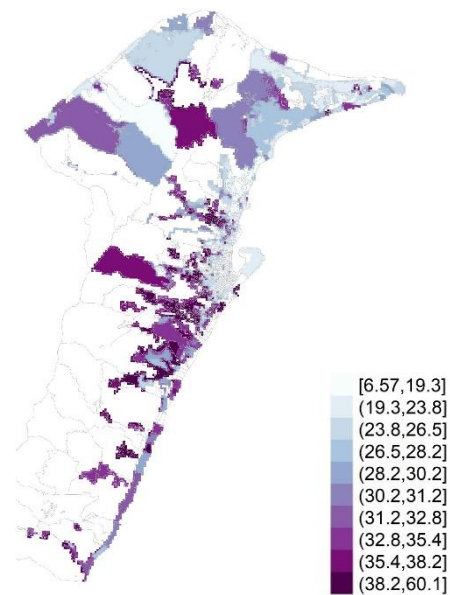
Table 3 OLS coefficients and significance for three main municipalities of Sicily, 2011, computed on 100 by 100 m cells (* p-value < 0.05; ** p-value < 0.01; *** p-value < 0.001).

Covariate	Palermo	Messina	Catania
(Intercept)	-0.080	1.672***	0.601**
Unemployment	-0.022***	-0.018***	-0.011
Large households	-0.052***	-0.036***	-0.023*
Households (rent)	0.049***	0.025***	0.012***
Low education	0.006 .	-0.027***	-0.030***
Foreign. prop. (2001)	2.043***	13.404***	40.312***
Buildings (bad conditions)	-0.004***	-0.006***	0.009***
Mean rent cost	-0.022*	-0.098***	0.106***
Italians' growth rate	0.001	-0.003***	-0.004***
Foreigners' growth rate	0.001***	0.003***	0.003***
N° of cells	8,065	8,912	3,098
Adj. R ²	0.081	0.237	0.220

a) Buildings in poor conditions (Palermo)



b) Low educational attainment (Messina)



c) Unemployment rate (Catania)

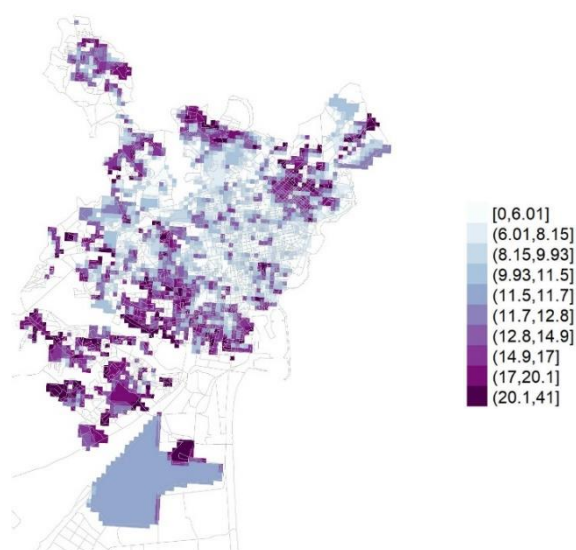


Figure 2 Spatial distribution for selected covariates in the three cities of Palermo, Messina and Catania. Time period: 2011. Source: own elaboration on Istat data (Demographic Census and Municipal Population Registers).

As predicted, the implementation of a GWR for each city has widely improved the performance of the model with respect to the global analyses (see the AIC and adjusted R^2 values reported in Table 4 which are, the first lower and the second considerably higher for GWR as compared to OLS). The variability of the phenomenon under investigation is also well captured, as demonstrated by the absence of spatial structure in the residuals of the GWRs in Table 5, as opposed to the one detected under the OLS models. Specifically, the Moran's I test assessing the presence of (global) spatial autocorrelation in the residuals of the model shows significant values very close to zero or non-significant values for the GWR residuals in both of the two selected neighbour configurations. Conversely, the OLS residuals appear to be positively and significantly correlated in all the cases considered.

Table 4 OLS and GWR model performance for the three selected cities.

Municipality	AIC		Adjusted R^2	
	OLS	GWR	OLS	GWR
Palermo	32794.74	18824.14	0.08	0.83
Messina	27146.9	12223.42	0.24	0.85
Catania	14178.24	11692.5	0.22	0.63

Table 5 Moran's I test for residual autocorrelation under different neighbours structure for OLS and GWR models (* p-value < 0.05; ** p-value < 0.01; *** p-value < 0.001).

Municipality	N° of neighbours			
	30		50	
	OLS	GWR	OLS	GWR
Palermo	0.35***	-0.005	0.28***	-0.01***
Messina	0.41***	0.015***	0.36***	0.002
Catania	0.15***	0.009**	0.1***	-0.004

Considering the main summary statistics of the GWR coefficients for each of the three cities (Table 6), it is noticeable that the proportion of foreigners in 2001 consistently impacts Sri Lankans' LQs across cities. The variable exhibits high variability (in terms of standard deviation) and high proportions of significant coefficients in all the contexts analysed. Overall, the Sri Lankan presence seems to be affected by a demographic dynamics involving the residential choices of Italians and foreigners, as indicated by the high coefficients' standard deviations and significance of their mean growth rates. In terms of proportion of GWR significant coefficients, this influence seems to be stronger in Palermo and Catania than in Messina. Besides this similarity across cities, some peculiarity stands out: Palermo records a strong influence from mean rent cost, indicating potential housing challenges; in Messina the large standard deviation and the high proportion of significant GWR coefficients for the households living in rent, could indicate a rental dynamics; finally, Catania exhibits unique influences from mean rent cost, households in rentals and proportion of building in bad conditions, pointing to intricate housing and economic relationships.

Table 6 GWR coefficients' summary statistics for the three selected cities (statistical significance: $\alpha=0.05$).

Palermo					
Variable	Min	Max	Mean	Standard deviation	Significant coeffs. (%)
Intercept	-29.801	31.823	-0.544	2.71	20.547
Unemployment	-0.685	0.989	-0.010	0.12	18.537
Large households	-0.635	1.301	0.021	0.145	19.074
Households (rent)	-0.292	0.37	0.010	0.046	19.136
Low education	-0.412	0.451	0.006	0.072	17.476
Foreign. prop. (2001)	-252.625	310.788	32.261	65.782	33.729
Buildings (bad conditions)	-0.117	0.115	-0.001	0.017	16.003
Mean rent cost	-21.591	129893273843.393	16214364.992	1451253556.58	23.942
Italians' growth rate	-0.222	0.049	-0.005	0.019	15.004
Foreigners' growth rate	-0.012	0.02	0.001	0.003	20.821
Messina					
Variable	Min	Max	Mean	Standard deviation	Significant coeffs. (%)
Intercept	-22.678	64.342	1.853	8.929	41.309
Unemployment	-0.808	0.921	0.005	0.163	33.938
Large households	-3.848	5.247	0.007	0.273	40.322
Households (rent)	-7.899	2.263	-0.044	0.956	39.608
Low education	-2.183	1.052	-0.028	0.149	39.778
Foreign. prop. (2001)	-338.456	440.225	9.801	42.079	23.211
Buildings (bad conditions)	-0.716	0.512	-0.011	0.111	37.657
Mean rent cost	-5.581	1.133	-0.096	0.560	15.693
Italians' growth rate	-0.026	0.009	-0.001	0.003	19.957
Foreigners' growth rate	-0.007	0.019	0.001	0.002	21.148
Catania					
Variable	Min	Max	Mean	Standard deviation	Significant coeffs. (%)

Intercept	-16.275	30.507	0.459	4.677	27.726
Unemployment	-0.482	0.329	-0.023	0.096	26.399
Large households	-0.532	0.602	-0.037	0.132	28.761
Households (rent)	-0.085	0.297	0.039	0.071	35.62
Low education	-0.408	0.249	-0.010	0.08	25.137
Foreign. prop. (2001)	-13.155	176.477	39.124	42.933	49.757
Buildings (bad conditions)	-0.083	0.221	0.015	0.053	25.687
Mean rent cost	-8.557	2.215	-0.306	0.978	25.073
Italians' growth rate	-0.071	0.017	-0.007	0.012	28.049
Foreigners' growth rate	-0.001	0.017	0.004	0.004	44.969

Results from geographically weighted regressions show that the relationship between the location quotients of Sri Lankans and their correlates varies across the three municipalities studied. Some covariates influence the dependent variable (LQ) similarly across cities, while others have urban-specific effects.

For sake of brevity, Figures 3-4 show the local parameter estimates for some selected covariates that are significant at the 5% level. For the variables “buildings in poor conditions” and “mean rent cost”, the distribution of coefficients is considerably similar across cities. In particular, in all the cities a centre-periphery dichotomy emerges, where the situation in the urban cores appear more fragmented than in the peripheries. Catania stands out for a more marked and peculiar situation than the other two cities. Indeed, in the peripheral and wealthy areas up north the proportion of buildings in poor state of maintenance and the mean rent for private properties are positively and negatively correlated with the Sri Lankans’ LQs, respectively. This type of dynamics could alternatively suggest that in those neighbourhoods many Sri Lankans live within their employers’ household (as in the case of elderly assistance), or that they reside in some specific block generally inhabited by workers specialised in caregiving and housekeeping services usually requested by the Italian rich households, the latter implying some sort of ethnic separation. Observing the values of the GWR coefficients referring to the mean rent cost in Catania, a sharp centre-periphery dichotomy arises. Specifically the association between Sri Lankans’ LQs and the covariate changes from positive to negative along the centre-to-periphery direction. This situation seems to suggest that the Sri Lankans’ settlement model does not reflect the sole adaptation to the Italian employers’ needs as reflected by the effect of the proportion of buildings in bad conditions, at least in this city. Looking at the coefficients of the mean growth rates of Italians and foreigners between 2001 and 2011, we see that in all cities, Sri Lankans tend to reside in central areas where the proportion of foreigners has increased, and the proportion of Italians has decreased over time. This phenomenon may suggest a type of spatial segregation between foreigners (including Sri Lankans) and Italians, which prevails over local urban specificities.

Figure 3 Results from geographically weighted regressions: significant local parameter estimates for buildings in poor state of maintenance and mean rent cost per square meter for residential property in the three Sicilian metropolitan areas of Palermo, Messina and Catania (significance level: 5%; not comparable geographical scales)

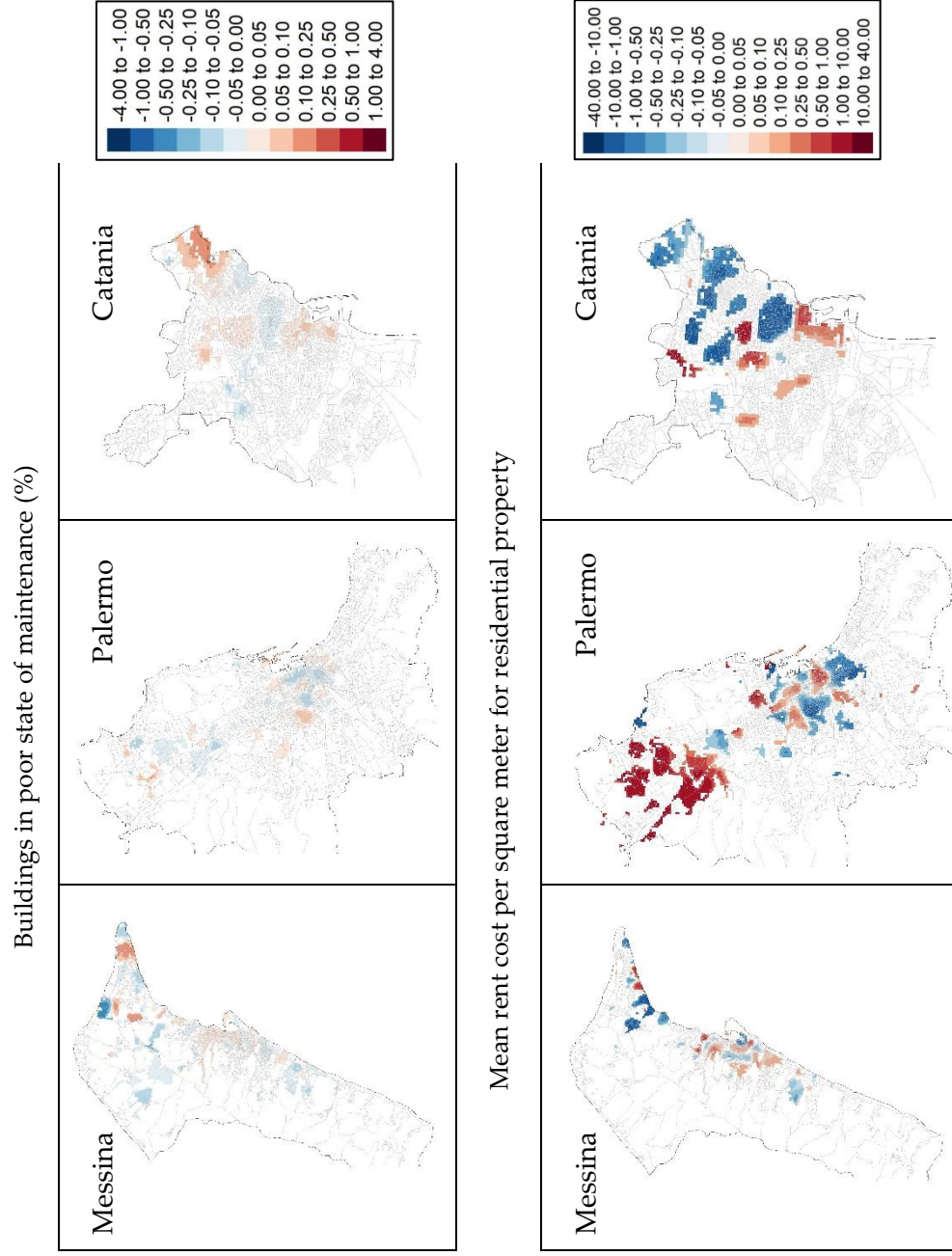
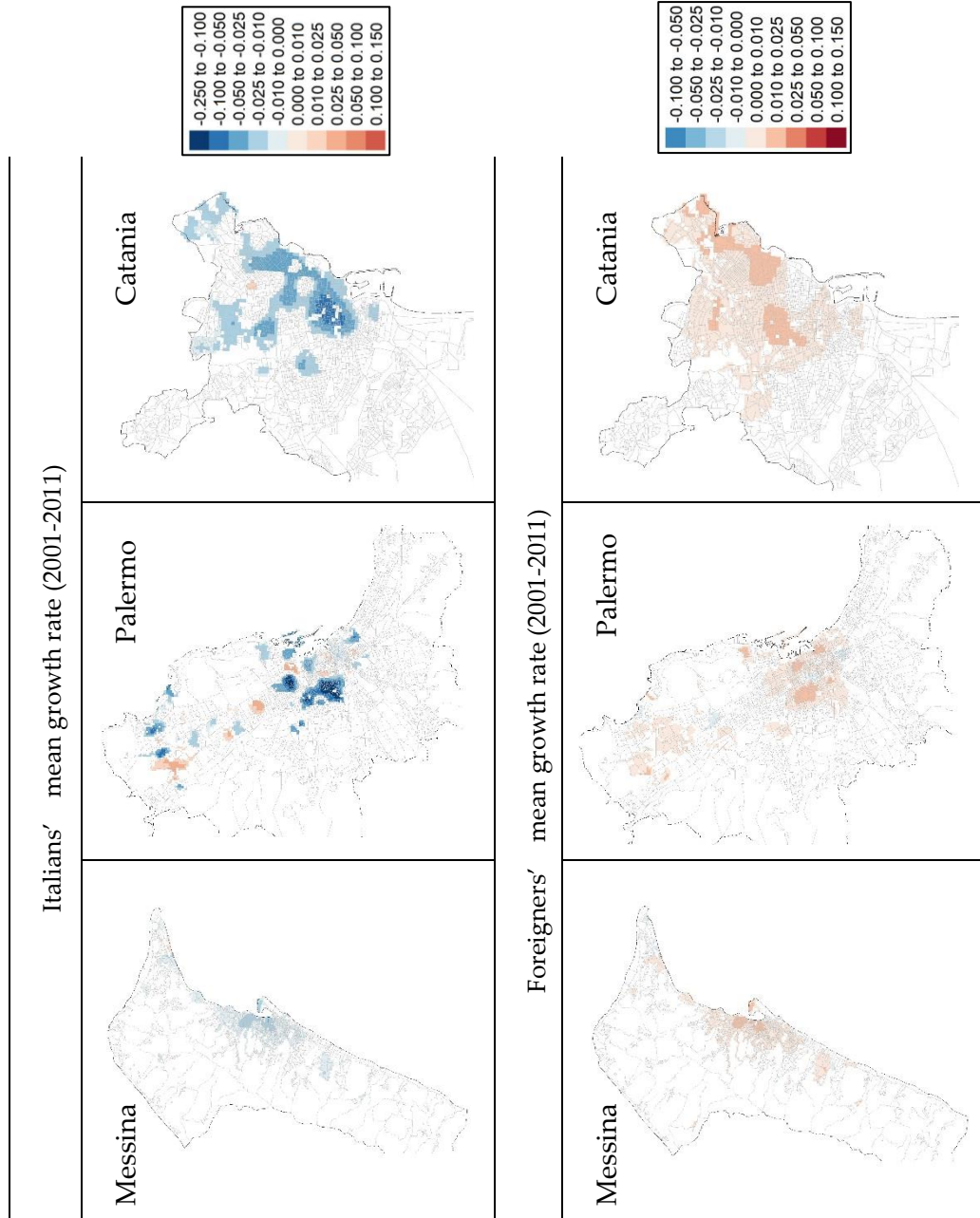


Figure 4 Results from geographically weighted regressions: significant local parameter estimates for Italians' and foreigners' mean growth rate between 2001 and 2011 in the three Sicilian metropolitan areas of Palermo, Messina and Catania (significance level: 5%; not comparable geographical scales)



5. Discussion and conclusions

Southern European countries have experienced a shift in their migration dynamics since the late 1970s, transitioning from being traditionally labour-exporting nations to becoming destinations for significant international migratory flows (Collinson 1993; de Haas et al. 2020). Additionally, cities in Southern Europe tend to be more compact compared to their Northern counterparts (Kasanko et al., 2006), and the housing context is characterized by a substantial prevalence of owner-occupied houses and a strong reliance on family assets within the housing supply system (Arbaci 2019; Leal 2004). These factors, combined with a historically lower foreign population presence compared to Northern Europe, have contributed to Southern cities' greater intra-urban spatial heterogeneity (Arbaci 2008; Barbieri et al. 2018; Malheiros 2002). As highlighted by Malheiros (2002), in the European metropolises poor living conditions (resulting in reduced inequality between natives and foreigners due to lower average wealth), a highly informal real estate market, and a complex geographic distribution of the population lead to lower residential segregation and a higher level of suburbanization. Moreover, in the case of

Italy, the poorly regulated urban development during the expansive phase of the second post-war period may have contributed to the complexity of urban residential patterns.

Although our study is primarily exploratory in nature, its findings provide a fresh perspective on certain claims commonly found in the existing literature concerning Southern Europe, residential segregation, and socio-economic disparities. Notably, the employment of geographies that are entirely comparable through a standardized grid enables us to conduct comparisons while mitigating the influence of varying aggregation units. The study conducted attempts to analyse a single ethnic community, namely Sri Lankans, at the suburban level in three substantially different urban contexts, even though all belonging to Sicily. Overall, the results of global indices and regressions have highlighted a moderate level of segregation of Sri Lankans with respect to the Italian population, with Messina showing the lowest value. On the other end, the local analyses have shown a complex spatial configuration in the Sri Lankans' allocation with respect to some contextual covariates, although the overall pattern seems to be similar for all the cities considered. While the unique characteristics of local residential markets can pose challenges in establishing overarching patterns on a metropolitan or regional scale (Panori et al. 2019), the strong concentration of Sri Lankans in the central and notably affluent areas of the municipalities underscores the presence of social polarization processes. These processes, as observed in other European cities (Haandrikman et al. 2021; Martín-Legendre et al. 2021; Porcel and Antón-Alonso 2021), carry a significant ethnic and migratory dimension (Boterman et al. 2021; Demireva and Zwysen 2021). In the case of the main Sicilian cities, a double dynamics seems to affect the localisation of Sri Lankans: on the one hand Sri Lankans converge in the wealthiest urban contexts mostly inhabited by rich Italian households, on the other they seem also to live in those neighbourhoods where the foreign presence has increased and the Italian one has decreased over time. In an attempt to interpret and synthesise these two influencing factors, one socioeconomic and one demographical, some considerations arise. According to the prevalence of one dynamics over the other, the effect on ethnic segregation in terms of repulsion/attraction between Italians and Sri Lankans could be heterogeneous over time. Moreover, the possible occurrence of some underlying gentrification processes or changes in the ethnic composition of neighbourhoods could shape urban-specific configurations, as have already partially emerged in Catania. In this sense, the findings yielded by the current application have posed the ground for future extensions of the work aimed at broadly assessing the validity of such arguments and considerations.

Understanding the spatial distribution of migrant populations like the Sri Lankan community is essential for policymakers. The results of this study can inform policy decisions related to housing, employment, education, and social integration. Policymakers can use this information to develop targeted strategies to enhance the well-being and integration of Sri Lankan migrants in these cities.

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Data Availability Statement: General population data analysed in this study were obtained from the Istat online repository and are available at: <https://www.istat.it/it/archivio/104317>. Data about the mean rent cost were retrieved from the online OMI repository and are available at: <https://www1.agenziaentrate.gov.it/servizi/Consultazione/ricerca.htm>.

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