THE SOCIOECONOMIC SEGREGATION IN ITALIAN METROPOLITAN CITIES[1]

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1. Introduction

During the pandemic, the gap between center and periphery inequalities widened. Recent reports indicate a further deterioration in those areas where social marginality was already high, suggesting profound differences, not only in income, between the center and the periphery.

In 2016, the "Commissione Parlamentare d'Inchiesta sulle Periferie" had just opened the discussion on the precarious security conditions and the state of deterioration of the cities and their suburbs, raising the possibility of a possible phenomenon of socioeconomic stratification at the local level.

We develop our analysis in the framework of the economics branch concerning social interactions. In particular, that explores the degree of residential socioeconomic segregation to get the interdependencies between individuals where the preferences, beliefs, and constraints faced by a person are directly influenced by the characteristics and choices of others belonging to an environment where social interactions occur (i.e., neighborhood), where individuals spend their daily lives.

The following study offers new empirical evidence regarding the phenomenon of socioeconomic stratification in Italy. In particular, using the data of the Census (2011) of the main metropolitan cities of Northern and Southern Italy, we exploit the composition of the population of the neighborhoods (or census section) pre-covid to determine the residential segregation indices used in the social economy literature (Graham, 2018; Card and Rothstein, 2007: Cutler and Glaeser, 1995) to measure socioeconomic stratification at the territorial level.

The results show that upper-class individuals self-segregate in such a way as to reduce the likelihood of interaction with more deprived classes. The two metropolitan cities follow the same pattern in terms of residential segregation.

The article is organized as follows: Section 2 provides a background of the topic. Section 3 defines residential segregation; section 4 shows the results; Section 5 concludes.

Introduction and Section 2 were written by Cinquegrana G. Sections 3, 4 and Conclusion were written by Fosco G.

2. Background

2.1. "Commissione parlamentare d'inchiesta sulle periferie"

In 2016, the "Commissione Parlamentare d'inchiesta sulle periferie" had just opened the discussion on unstable social insurance conditions regarding metropolitan cities and their suburbs, highlighting a possible phenomenon of residential socioeconomic stratification (segregation).

Metropolitan suburbs are characterized by degradation and hardship in small and large municipalities, which grew up because of uncontrolled building development, generating suburban settlements wherein lack the supply of functional and institutional public services. Therefore, these dynamics have determined peripheral areas' residential mono-functionality (dormitory-suburbs), forcing residents, who are not always adequately supported by mobility infrastructures, to commute to work.

In Italy, most of the population lives and works in the suburbs. In 2017, residents in main towns amounted to 43% of the people residing in metropolitan areas, while the remaining population was in 1260 municipalities belonging to several metropolitan hinterlands.

Italian suburbs are featured by disadvantaged households and young people outside the education and employment environments. The 38% of residents in main metropolitan towns live in neighborhoods with deprived households, which amounts to 1% and 3%, while 15% and 25% in south Italian cities.

The suburbs represent the environment wherein social phenomena such as the aging of the population, the crisis of the middle class, multiculturism, and the youth social problems drift out.

The "Commissione Parlamentare d'inchiesta sulle periferie" highlighted several inequalities between peripherical and center areas, suggesting a likelihood phenomenon of residential socioeconomic stratification (segregation). This implies that deprived and affluent people are not homogeneously spatial distributed across neighborhoods.

2.2. The Index of "vulnerabilità sociale e materiale" (IVSM)

In 2015, ISTAT published the Index of "*vulnerabilità sociale e materiale"* (IVSM) to measure risk factors that threaten welfare stability intended as the system of social integration and resource allocation by population groups. The purpose of the Index is to provide a synthetic measure of the social and material vulnerability at the level of Italian municipalities.

ISTAT defines social and material vulnerability as the exposition of some population groups to economic and local social uncertainty. Therefore, it measures several degrees of the population exposition to vulnerability conditions, which do

not imply necessarily deprived situations. It takes into account five dimensions that are based on factors determining a state of vulnerability. Therefore, first, education attainment, namely the share of people who are illiterate and literate without graduation aged between 25-64. Second is the family structure, namely the share of households with six or more members, the share of single-parent families, and the share of households composed of older people (65 years and older) or with at least an octogenarian. Third, housing conditions are the percentage of people living in small houses with many members (40 sm and four members, 40-59 sm and five members, and 60-79 sm and six members or more). Fourth, labor market participation is the share of youths aged between 15-29 who are not employed and not enrolled in any education course. Fifth is the economic condition of households, the percentage of households with unemployed members and without none retired workers.

Finally, the IVSM does not consider how the population is distributed at the residential level according to their socioeconomic status (i.e., the degree of socioeconomic residential segregation), which contributes to several social risk factors related to social interactions and local inequalities reinforcement (e.g., ghettoization). In the next section, we broadly discuss residential socioeconomic segregation and its consequences.

3. Residential segregation

3.1. What is the residential segregation

Segregation refers both to a separated environment and the action of isolating. Social scientists usually define situations in which groups experience separated environments (neighborhoods, schools, firms, offices, etc.) as the phenomenon of segregation. Nevertheless, completely segregated situations are not frequent, and the term usually refers to a heterogeneous environment.

The separation between individuals has been investigated in several research frameworks, mainly residential mobility, school enrolment, and its implications in the policy design.

Our field of research addresses segregation as the uneven or non-random distribution of individuals who have in common some characteristics (income, social status, sex, and ethnicity) in a given environment. Therefore, residential segregation can be defined as the extent to which individuals who belong to different groups live in different areas (neighborhoods) characterized by different group compositions (Reardon and O'Sullivan, 2004). For example, suppose residents of city A are divided into white and blue collars. If the majority of white collars live in

neighborhoods whose population consists mainly of blue collars, then we can conclude that city A is characterized by residential segregation.

3.2. Potential consequences

There are many mechanisms through which residential segregation might affect individual outcomes. The quality of public goods and local institutions is usually based on local tax burdens and community involvement in maintaining public resources. Thus, if upper-class households place within a small number of neighborhoods, they are able to generate resources that better their outcomes.

Further, residential segregation may be self-reinforcing since lower-class households are often unable to perform enough resources to disincentivize upper-class households to self-segregate.

Moreover, the ability of upper-class households to self-segregate does not affect only the current welfare and opportunities of lower-class households but also affects the opportunities for future generations (intergenerational mobility) through investment in locally financed institutions that serve children (e.g., schools).

Conversely, if high socioeconomic households are not clustered, they may help fund social services and institutions that serve lower socioeconomic populations.

3.3. How to measure segregation

A measure of residential segregation requires defining the environments within which individuals live (e.g., neighborhood, school, etc.) and dividing the reference population based on characteristics of interest (e.g., social class) in such a way to quantify the extent to which the distribution of the attribute of interest varies across neighborhoods (Reardon and O'Sullivan, 2004).

In this section, we discuss the two most relevant indices of segregation: the dissimilarity index (Duncan and Duncan, 1955) and the exposure index (Lieberson, 1981). We use the methodological notion suggested by Reardon and Firebough (2002) to operationalize the measure of segregation. Consider a region *R* populated by *M* subgroups indexed by *m*. The region of interest is divided into *r*-subregions, and π is the population proportions.

T = the total population in the area R.
t_r = the total population in the r-subarea
t_{rm} = the absolute frequency of the group m in subarea r.
π_{m} = relative frequency of group m on total population.
π_{rm} = relative frequency of group m in subarea r.

The most popular segregation extant is the Dissimilarity index (D), which can be interpreted as the proportion of minority members who should change their tract of residence to have the same minority proportion in all tracts. It is between [0,1], where [1] is the maximum segregation.

$$D = \frac{1}{2}\sum_{r\in R}\frac{t_{\mathrm{r}}|\pi_{\mathrm{rm}} - \pi_{\mathrm{m}}|}{T\pi_{\mathrm{m}}(1-\pi_{\mathrm{m}})}.$$

A different concept that measures segregation is exposure, which means the average degree members of a group are exposed to members of other groups in a neighborhood. The exposure index can be interpreted as the likelihood of interaction among individuals of different groups. It ranges between [0,1], where [1] is the full exposition (integrated neighborhood).

$${}_mP_n^* = \sum_{r\in R}\frac{t_{\mathrm{rm}}}{T_{\mathrm{m}}}\pi_{\mathrm{rn}}.$$

It is worth noting that the exposure index is not asymmetric. Thus, exposure of group *M* to group *N* is not complementary to exposure of group *N* to *M*.

3.4. Socioeconomic segregation in cities

How to sort individuals according to their socioeconomic status (SES) is as long as the history of urbanization (Nightingale, 2012). The pioneering study of Booth (1888) started the era of systematic research on intraurban socio-spatial division.

The present study is related to Chicago school studies, which used the biology analogy of invasion and succession to explain the residential segregation paths.

Duncan and Duncan (1955) introduced the widely used dissimilarity index claiming that higher socioeconomic groups (e.g., white collars) were most segregated from the remainder of the population.

Morgan (1975, 1980), on socioeconomic segregation in cities in England and Wales, confirmed segregation profiles toward higher socioeconomic groups. A similar trend characterizes income segregation in urban regions of the United States (Reardon and Bischoff, 2011). Our study aims to provide for the first time evidence on the socioeconomic segregation in Italian metropolitan areas, collocating on this strand of literature.

4. Socioeconomic segregation in Italian Metropolitan cities

How should quantify socioeconomic residential segregation in a metropolitan area? In this section, we measure residential socioeconomic segregation. We focus on the two main metropolitan areas in terms of the population size of North and South Italy: Milan and Naples. The sample choice is motivated by the aim of

comparing different and distant realities, avoiding potential spillovers between nearby cities.

To extant socioeconomic segregation in a Metropolitan area, we use Census (2011) data, which provides detailed microdata at the local level. Therefore, we define the "sezione censuaria" as the environment where individuals live and interact to construct residential segregation indices.

We cluster the population in four socioeconomic classes (upper, middle, lower, and excluded) based on the European socioeconomic classification (ESEC, Harrison and Rose, 2006) through census variables "attività lavorativa svolta" and "condizione di lavoro classificazione Italia."

To provide a clear description of the socioeconomic segregation phenomenon in Metropolitan areas, we estimate dissimilarity and exposure indices by most populated municipalities (above 40000) and rings (distance in kilometers from the Metropolitan capital) of Metropolitan cities, which are based on information provided by the "Dossier delle aree Metropolitane."

4.1. Residential socioeconomic segregation in Naples

The metropolitan city of Naples is one of the most populated with a high population density in the European Union, and it is the third most populated metropolitan city in Italy. Its extension is on a surface of 1171 square kilometers and includes 92 municipalities.

The metropolitan city of Naples has particularities that characterize it from other metropolitan Italian towns: its territory occupies just 8.6% of the Campania area, and more than half of the entire regional population is located there. This phenomenon of overcrowding has created a strong demographic and territorial imbalance with other areas of the region, which are more extensive and less populated.

Table 1 – *Residential socioeconomic segretation by rings: Dissimilarity index.*

	D_{upper}	D_{middle}	D_{lower}	$D_{excluded}$
Core	.34	.14	.21	.14
Ring 1	.14	.09	.12	.1
Ring 2	.17	.15	.09	.13
Ring 3	.14	.11	.1	.13

Source: authors'elaboration on ISTAT Census (2011).

Table 1 shows the dissimilarity socioeconomic index for two groups at once by Metropolitan rings. It represents the proportion of individuals belonging to a given group who should change their "sezione censuria" of residence to have the same proportion in all "sezione." In the first column, it is reported the dissimilarity index for the upper class than the rest. In this way, it also reported for the other: middle, lower, and excluded groups. Instead, Table 2 shows, in the first three columns, the

exposure of the upper to the other group, while in the last three, the exposition of the other classes to the upper one.

Table 2 – *Residential socioeconomic segretation by rings: Exposure index.*

	$P_{up\|mid}$	$P_{up\|low}$	$P_{up\|ex}$	$P_{mid\|uo}$	$P_{low\|up}$	$P_{ex\|up}$
Core	.52	.37	.88	.36	.39	.07
Ring 1	.69	.63	.94	.3	.32	.06
Ring 2	.69	.67	.93	.29	.27	.06
Ring 3	.65	.66	.9	.34	.32	.07

Source: authors'elaboration on ISTAT Census (2011).

The dissimilarity indices by rings of Naples metropolitan area point out a higher segregation profile for upper class (.34) and lower class (.21) located in the core than the middle class and excluded, which share more neighborhoods in the core. Both the two kinds of index highlights that a possible social phenomenon of upperclass self-segregation is relevant in the Metropolitan city.

Table 3 – *Residential socioeconomic segretation by Municipalities: Dissimilarity index.*

	D_{upper}	D_{middle}	D_{lower}	$D_{excluded}$
Acerra	.31	.24	.2	.2
Afragola	.37	.27	.19	.2
Casalnuovo di Napoli	.18	.17	.18	.16
Casoria	.25	.16	.16	.17
Castellamare di Stabia	.31	.15	.19	.12
Ercolano	.3	.21	.17	.16
Giugliano in Campania	.3	.31	.16	.27
Marano di Napoli	.23	.19	.25	.2
Napoli	.34	.14	.21	.14
Portici	.23	.14	.2	.13
Pozzuoli	.39	.21	.22	.2
Torre del Greco	.21	.11	.13	.09
Others	.13	.09	.08	.12

Source: authors'elaboration on ISTAT Census (2011).

Table 4 – *Residential socioeconomic segretation by Municipalities: Exposure index.*

	$P_{up\|mid}$	$P_{up\|low}$	$P_{up\|ex}$	$P_{mid\|uo}$	$P_{low\|up}$	$P_{ex\|up}$
Acerra	.64	.64	.93	.25	.2	.04
Afragola	.63	.63	.92	.26	.19	.03
Casalnuovo	.77	.74	.96	.2	.19	.03
Casoria	.72	.67	.94	.24	.25	.04
Castellamare	.59	.44	.92	.34	.31	.05
Ercolano	.6	.54	.94	.32	.27	.03
Giugliano	.66	.57	.88	.28	.29	.06
Marano di Napoli	.67	.57	.93	.28	.29	.05
Napoli	.52	.37	.88	.36	.39	.07
Portici	.59	.36	.9	.36	.47	.07
Pozzuoli	.6	.44	.89	.3	.27	.05
Torre del Greco	.7	.7	.95	.26	.23	.03
others	.67	.67	.91	.33	.32	.08

Source: authors'elaboration on ISTAT Census (2011).

Whereas Tables 3 and 4 propose the same indices as the previous two tables by the most populated municipalities (above 40000 inhabitants).

Socioeconomic segregation is related to municipality size, and instead, the most populated municipalities in the metropolitan area of Naples are more segregated from others. Also, in this case, the middle class and excluded share more areal units by municipalities. Comparing exposure of the upper group (most segregated) to other groups and vice-versa, we observe a higher probability that an individual belonging to the upper class met a member of different groups. In particular for the middle class and the excluded in all rings of the metropolitan area. In contrast, the exposure of other groups to the upper one is lower.

4.2. Residential socioeconomic segregation in Milan

The metropolitan city of Milan is the second most populated metropolitan city after Rome. It extends on a surface of 1575,65 square kilometers and includes 133 municipalities.The metropolitan city of Milan is one of the most important economic areas in Italy: it concentrates 42.3% of Lombardy companies and 6.6% of active Italian companies. This element allows it to generate a high productivity level since it alone concentrates the largest percentage of the national GDP and annually produces a wealth of more than 200 billion euros.

Table 5 – *Residential socioeconomic segretation by rings: Dissimilarity index.*

	D_{upper}	D_{middle}	D_{lower}	$D_{excluded}$
Core	.28	.16	.26	.16
Ring 1	.15	.12	.09	.13
Rng 2	.15	.11	.09	.13
Ring 3	.04	.04	.05	.06

Source: authors'elaboration on ISTAT Census (2011).

Table 6 – *Residential socioeconomic segretation by rings: Exposure index.*

	$P_{up\|mid}$	$P_{up\|low}$	$P_{up\|ex}$	$P_{mid\|uo}$	$P_{low\|up}$	$P_{ex\|up}$
Core	.51	.35	.81	.37	.44	.13
Ring 1	.72	.57	.86	.26	.38	.11
Ring 2	.74	.64	.87	.24	.32	.1
Ring 3	.75	.69	.84	.24	.3	.15

Source: authors'elaboration on ISTAT Census (2011).

Table 7 – *Residential socioeconomic segretation by Municipalities: Dissimilarity index.*

	D_{upper}	D_{middle}	D_{lower}	$D_{excluded}$
Abbiategrasso	.33	.27	.23	.27
Bollate	.16	.13	.12	.12
Bresso	.22	.12	.22	.13
Buccinasco	.24	.16	.21	.17
Cernusco sul Naviglio	.16	.22	.2	.24
Cinisello Balsamo	.28	.16	.21	.15
Cologno Monzese	.29	.16	.25	.16
Corsico	.33	.19	.21	.19
Garbagnate Milanese	.19	.14	.11	.13
Legnano	.17	.16	.13	.13
Milano	.28	.16	.26	.16
Paderno Dugnano	.32	.22	.23	.2
Parabiago	.14	.1	.13	.12
Pioltello	.39	.2	.23	.19
Rho	.25	.23	.21	.22
Rozzano	.45	.37	.19	.35
San Donato Milanese	.23	.24	.34	.24
San Giuliano Milanese	.36	.27	.18	.28
Segrate	.36	.2	.32	.31
Sesto San Giovanni	.26	.16	.21	.16
Others	.05	.04	.05	.04

Source: authors'elaboration on ISTAT Census (2011).

Table 8 – *Residential socioeconomic segretation by Municipalities: Exposure index.*

	$P_{up\|mid}$	$P_{up\|low}$	$P_{up\|ex}$	$P_{mid\|uo}$	$P_{low\|up}$	$P_{ex\|up}$
Abbiategrasso	.68	.56	.85	.25	.26	.08
Bollate	.74	.63	.92	.23	.32	.06
Bresso	.69	.54	.92	.25	.31	.06
Buccinasco	.67	.43	.85	.28	.41	.11
Cernusco sul Naviglio	.65	.4	.79	.33	.53	.14
Cinisello Balsamo	.74	.63	.92	.18	.2	.05
Cologno Monzese	.73	.6	.92	.2	.19	.05
Corsico	.74	.59	.91	.18	.2	.04
Garbagnate Milanese	.74	.63	.91	.24	.29	.07
Legnano	.64	.51	.88	.32	.4	.1
Milano	.51	.35	.81	.37	.44	.13
Paderno Dugnano	.7	.56	.86	.22	.25	.06
Parabiago	.74	.65	.9	.25	.31	.07
Pioltello	.67	.56	.78	.2	.16	.06
Rho	.68	.54	.88	.25	.32	.08
Rozzano	.75	.59	.81	.17	.21	.05
San Donato Milanese	.55	.31	.8	.35	.44	.13
San Giuliano Milanese	.74	.59	.81	.21	.25	.08
Segrate	.54	.3	.71	.33	.41	.14
Sesto San Giovanni	.69	.52	.9	.24	.31	.06
Others	.75	.67	.83	.24	.32	.16

Tables 5, 6, 7, and 8 are organized as follows: Dissimilarity and Exposure indices by rings and Dissimilarity and Exposure indices by the most populated municipalities (above 40000 inhabitants).

The socioeconomic segregation profile for the Milan metropolitan area follows the same pattern as the Naples metropolitan area if we consider the socioeconomic group distribution by rings and most populated municipalities, even if segregation is lower in the core than in the Naples core. The exposure of other socioeconomic groups to the upper class is higher than Naples metropolitan area, and lower group members are more likely to meet upper members. However, the exposure of the excluded group to the upper group is, in any case, low for both metropolitan areas. The main difference between the two metropolitan areas is that upper members share more areal units (neighborhoods) in Milan than in Naples.

5. Conclusion

Socioeconomic residential segregation is relevant in the main metropolitan areas (Naples and Milan). It points out that social classes with wide inequalities are less likely to interact at the local level.

The Metropolitan areas of Naples and Milan present the same pattern of socioeconomic residential segregation (how socioeconomic groups are distributed) by Rings and most populated municipalities. In particular, the indices show the likely self-segregation phenomenon of the upper class. The results for Naples are worse than Milan.

Socioeconomic segregation should be considered a social risk factor that increases social marginality. Potential consequences concerning the low quality of public goods and negative social spillovers produce worsened individual outcomes. Hence, the place may matter because expenditure per pupil, teacher quality, access to good hospitals, and proximity to well-paying jobs vary across neighborhoods. In principle, these types of neighborhood inequalities can be ameliorated by transferring resources across space. Second place may matter because the characteristics and behaviors of our neighbors directly influence key life outcomes. If employment depends partly on information and referrals from friends and neighbors, then living in a segregated city, where few people are stably employed, acquiring a job is much more challenging. If learning depends partly on being surrounded by the socioeconomic status of peers, then a child in a classroom of advantaged children should learn more quickly than the same child in a classroom of disadvantaged children. This source of inequality can not be ameliorated by transferring financial resources across space. Therefore, reducing peer group inequality requires people to move across areas (i.e., social housing policies).

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SUMMARY

During the pandemic, the gap between center and periphery inequalities widened. Recent reports indicate a further deterioration in those areas where social marginality was already high, suggesting large differences between the center and the periphery. The Parliamentary Committee of Inquiry into the Peripheries, set up in 2016, has already put on the table the precarious security conditions and the state of deterioration of the cities and their suburbs, raising the possibility of a possible phenomenon of socioeconomic stratification at the local level which has contributed to generating different inequalities in educational levels.
The analysis we are developing is part of the social economy. This type of framework focuses on social interactions, understood as the interdependencies between individuals where the preferences, beliefs, and constraints faced by a person are directly influenced by the characteristics and choices of others belonging to a set, intended as an environment in which social interactions take place, i.e., the neighborhood place where individuals live. The following study offers new empirical evidence regarding the phenomenon of socioeconomic stratification in Italy. Using the data of the Census (2011) of the main metropolitan cities of Northern and Southern Italy, we exploit the composition of the population of the neighborhoods (or census section) pre-covid to determine the residential segregation indices used to measure socioeconomic stratification. The results show that the gap between North and South is also relevant concerning this new component.

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