

To cite this article: Gripsiou, A., & Bergouignan, C. (2021). The internal socio-economic polarization of urban neighborhoods, the case of Marseille. *Investigaciones Geográficas*, in press. <https://doi.org/10.14198/INGEO.19432>

# The internal socio-economic polarization of urban neighborhoods, the case of Marseille

## *La polarización socioeconómica interna de barrios urbanos, el caso de Marsella*

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### Abstract

The socio-economic inequalities of the different metropolitan neighborhoods have been carefully documented and analyzed in the social science literature. Starting from this premise, this article focuses on the less common neighborhoods in which two extremes coexist: very low-income households and high-income households. The objective is to identify the neighborhoods with a high internal socio-economic polarization, geolocate them in the urban space, characterize their population and housing stock, and measure their recent evolutionary trends.

The empirical analysis focuses on the neighborhoods of Marseille (France), a city characterized by strong socio-spatial segregation between poor neighborhoods in the north and rich neighborhoods on the southern coast, and the presence of neighborhoods in which populations coexist with unequal resources. This empirical study is based on the fiscal and social data (Filosofi file) that allow knowing the income distribution and based on the census data to characterize the socio-demography and the type of housing of the population. In order to identify neighborhoods with intense internal socio-economic polarization and measure their evolution of income distribution, original poverty and wealth indexes have been developed, which synthesize the two extremes of this distribution. These neighborhoods with a high internal socio-economic polarization usually present certain distinctive aspects, such as their geographical location or a more or less rapid and intense gentrification process. However, some of them seem to escape this process, as evidenced by the contrasting trends in the recent evolution of income distribution and structural heterogeneity of the housing stock, in which small apartments and old buildings are very overrepresented.

**Keywords:** internal polarization; socio-spatial segregation; incomes; degraded buildings; gentrification; Marseille.

### Resumen

Las desigualdades socio-económicas de los distintos barrios metropolitanos han sido documentadas y analizadas acuradamente en el ámbito de las ciencias sociales. Partiendo de esta premisa, este artículo se centra en los barrios, poco frecuentes, en los que coexisten dos extremos: hogares con muy bajos ingresos y hogares con altos ingresos. El objetivo es identificar los barrios con una alta polarización socio-económica interna, geolocalizarlos en el espacio urbano, caracterizar su población y su parque de viviendas, así como medir sus tendencias evolutivas recientes.

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El análisis empírico se centra en los barrios de Marsella (Francia), una ciudad caracterizada por una fuerte segregación socio-espacial entre los barrios pobres del norte y los barrios ricos de la costa sur, además de la presencia de barrios en los que conviven poblaciones con recursos desiguales. Este estudio empírico se basa en los datos fiscales y sociales (fichero Filosofi), que permiten conocer la distribución de la renta, y en los datos censales, para caracterizar la socio-demografía y la tipología de vivienda de su población. Para identificar los barrios con una fuerte polarización socio-económica interna y medir su evolución de la distribución de la renta, se han desarrollado índices originales de pobreza y riqueza, que sintetizan los dos extremos de esta distribución. Estos barrios con una fuerte polarización socio-económica interna suelen presentar ciertos aspectos distintivos, como su ubicación geográfica o un proceso de gentrificación más o menos rápido e intenso. Sin embargo, algunos de ellos parecen escapar a ese proceso, como demuestran las tendencias contrastadas en la evolución reciente de la distribución de la renta y una heterogeneidad estructural del parque de viviendas, en la que los apartamentos pequeños y los edificios antiguos están sobrerrepresentados.

**Palabras clave:** polarización interna; segregación socio-espacial; ingresos; edificios degradados; gentrificación; Marsella.

## 1. Introduction

The city, as a privileged space for the manifestation of social inequalities, is often divided into neighborhoods that are very different according to the socio-economic resources of their inhabitants. This division of urban space according to these resources is frequently described in the social science literature as the social segregation of the city and is most often approached by measuring the differences between neighborhoods. Without ignoring this urban reality, this paper focuses on a few neighborhoods in Marseille where there are strong differences in income between residents, which we describe here as internal socioeconomic polarization. It is based on a methodological approach that defines the indexes that make it possible to identify these neighborhoods and on an analysis of the socio-demographic characteristics of these neighborhoods. These empirical elements serve as a basis for discussing the various hypotheses that could explain this internal socio-economic polarization. These hypotheses derive from the social science literature on socio-spatial segregation and gentrification, which considers these phenomena as the result of urban planning policies, the play of residential preferences and the initial structure of the housing stock.

### 1.1. Socio-spatial segregation: a reality structuring major cities

Generally accepted in a broad sense<sup>3</sup>, the socio-spatial segregation of large cities is widely documented in the literature. From the first works on the subject, carried out by the Chicago School in the 1920s, or, in the 1950s, those of factorial urban ecology (Shevky, Williams & Bell), to the most recent works, the unequal distribution of social groups within large urban areas is an important subject in the social sciences (Madoré, 2005).

In France, interest in the social division of the city emerged later, in the 1950s, notably the studies of Marcel Roncayolo, beginning in 1952, on the working-class suburbs of Marseille (Madoré, 2005).

Approaches to social segregation are linked to the context of each city and the socio-political history of each country (Oberti & Préteceille, 2016; Maloutas & Fujita, 2012). In the United States, research mainly analyzes ethno-racial differences in the occupation of urban space (Maloutas & Spyrellis, 2019). In France, for a long time, the approach to segregation was rather analyzed from the perspective of social classes (according to socio-professional categories) as a consequence of the virtual absence of publicly disseminated territorialized ethnic data (Safi, 2013, McAvay & Verdugo, 2021). However, in the mid-2000s, some studies attempted to address the ethno-racial dimension of socio-spatial segregation (Pan Ké Shon & Verdugo, 2015; McAvay & Verdugo, 2021; Préteceille, 2009; Safi, 2009).

<sup>3</sup> Initially, the term segregation, of Latin origin, meant “to separate from the herd” (Lehman-Frisch, 2009). The semiology of the term has expanded over time, from the physical distancing of a dominated group through direct intervention by dominant groups, as in South African apartheid, to a systematic distortion of the spatial distribution of social groups, sometimes without any deliberate action (Lehman-Frisch, 2009).

## **1.2. The internal socio-economic polarization of some central neighborhoods**

While the vision of a socially segmented urban space largely structures representations of the city as a privileged place for the territorial manifestation of social inequalities, housing transformations and population movements also create some spaces where very different social groups can cohabit for varying lengths of time. The purpose of this article is precisely to analyze the frequency of these atypical situations, which we will describe as internal socio-economic polarization of neighborhoods. This article will be based on the identification of this internal socio-economic polarization using original indexes that synthesize the distribution of incomes within the neighborhoods of Marseille.

### *1.2.1. Some situations of geographical coexistence of social groups*

Although socio-spatial segregation has been observed in many large French cities, it does not always manifest itself in the same way and is not limited to a center-periphery opposition. Indeed, central neighborhoods often present a great diversity of social composition (Oberti & Prêteceille, 2016; Prêteceille, 2006). Some of these central neighborhoods may concentrate low-income populations that seek proximity to service jobs, public services, and, sometimes, social solidarity networks. Other central neighbourhoods, on the other hand, tend to attract members of the wealthy classes who benefit from the proximity of their jobs in the higher functions of the urban economy and from access to a greater diversity of goods and services, particularly in cultural and social areas. This explains the very large differences in social status and income between the populations of the different central districts, sometimes with a very clear demarcation between these areas. Finally, there are neighborhoods, generally much fewer in number, where both low-income populations and materially well-off or even very well-off populations reside (Prêteceille, 2006; Oberti & Prêteceille, 2016; Authier, 2003). In the social science literature, these socially differentiated neighborhoods are often seen as resulting from residential practices associated with very distinct individual identities and trajectories. This co-presence may thus not lead to truly deep social relationships but to a rather passive cohabitation (Authier, 2008). Social hierarchies continue to exist reminding us of the absence of equivalence between social interaction and spatial proximity (Oberti & Prêteceille, 2016; Prêteceille, 2006; Audren, Baby-Collin & Dorier, 2016; Launay, 2016; Maloutas & Spyrellis, 2019). In 1992, Mike Davis had even evoked, on this subject a “segregative mix” in Los Angeles just as Marcel Roncayolo did in 2001 (Lehman-Frisch, 2009). We can speak of an imperfect mix of social groups that reflects the hierarchical and fragile nature of French society (Oberti & Prêteceille, 2004; Le Bras, 1994). However, it would be very simplistic to consider that these neighborhoods with internal socioeconomic polarization do not reflect any specificity in the urban organization and its evolution, or that this co-presence does not produce any particular economic and social dynamics. Indeed, quite frequently, the profiles of these socially polarized neighborhoods do not correspond to the typical model of the dualisation of the global city (Maloutas & Spyrellis, 2019; Oberti & Prêteceille, 2016).

### *1.2.2. Internal socio-economic polarization: assumptions and explanatory factors*

Several factors can explain the coexistence of different social groups observed in certain central neighborhoods.

Based on the idea that the internal socio-economic polarization of neighborhoods is not always a situation that is fixed in time but often an intermediate phase, it is sometimes considered as a transitional state during gentrification (Giroud & Ter Minassian, 2016; Oberti & Prêteceille, 2016; Authier, 2003; Bouzouina, 2007). The internal socioeconomic polarization of a neighborhood would then be a stage of gentrification and thus one of the components of the geographic dynamics of socio-spatial segregation.

According to a Marxist approach, this gentrification is the result of public and private interventions put in place to attract national and international investors (Harvey, 2000, 2009). These urban planning policies would ultimately promote the eviction of socially disadvantaged populations (Prêteceille, 1995; Lehman-Frisch, 2009). David Harvey thus highlights the correspondences between the urbanization of Paris by Haussmann, gentrification and suburbanization in the United States and urban development in China (Harvey, 2009).

Without explicitly rejecting the influence of these planning policies, other approaches would rather interpret the internal socio-economic polarization of neighborhoods as the stage of gentrification

resulting from the play of residential preferences. Based on the work of T.C. Schelling (1978) and J.M. Sakoda (1971) on the social stratification of urban space, these approaches show that these preferences are based on the search for the “entre soi” (Decamps, 2009), especially by the privileged classes (Pinçon & Pinçon-Charlot, 2014). The weight of the socio-economic and cultural identification of individuals corresponding to different urban lifestyles would weigh significantly on the choice of place of residence and, by extension, on residential co-presence relations (Oberti & Préteceille, 2016). These approaches thus allow for the addition of individual differential tastes and specific contexts in their analyses (Madoré, 2015; Lehman-Frisch, 2009; Oberti & Préteceille, 2016). Thus, during the first 2 decades of the 2000s, the greater attractiveness of the central parts of many large French cities, reflecting a change in the educational level of new generations and their preferences, was accompanied by tension in the real estate market. In these central neighborhoods, low-income households, which were sometimes initially very present, are now in increased competition with the wealthy for access to housing. In some of these neighborhoods, gentrification has been observed, which may initially have resulted in a polarization of income distribution, with high-income and low-income households coexisting in the same neighborhood. Often, the rise in housing costs resulting from this recent attractiveness to high-income populations has led to the eviction of low-income populations. The internal socioeconomic polarization of these neighborhoods will thus have been a transitional state in the transformation from a “poor” to a “rich” neighborhood.

Also during the first 2 decades of the 2000s, other forms of gentrification, related to tourism, have been observed (Lopez-Gay, Cocola-Gant, Russo, 2021). They correspond to a broader definition than the classical sense of the term such as “touristification” or transnational gentrification (Jover, Diaz-Parra, 2019). The latter is related to young immigrants from the middle and upper classes, mobile and highly educated. Their presence in the neighborhoods, known primarily for their touristic aspect, accelerates the social restructuring of the area. They are situated between visitors and residents (Lopez-Gay, Cocola-Gant & Russo, 2021). Their effects on urban processes are different from those of tourists because of their long-term settlement (Jover, Diaz-Parra, 2019). For them, moving to a central touristic neighborhood is a transitional step in their life course, as it is for many “gentrifiers” (Lopez-Gay, Cocola-Gant & Russo, 2021). These visitors and transnational immigrants coexist with long-time residents and pioneers of gentrification with a tendency to replace them. The decrease in the local population also means, in this case, a decrease in the proportion of occupied housing and the loss of neighborhood identity (Lopez-Gay, Cocola-Gant & Russo, 2021).

The composition of the built environment (age, quality, size of dwellings, ownership structures) can be a gas pedal or a brake on gentrification processes (Chabrol & Launay, 2016), especially when they are linked to housing programs. This is particularly the case when there is a large social housing stock and/or many run-down buildings scattered throughout the neighborhood. In this case, the internal socio-economic polarization of these neighborhoods could be maintained for a long time. To characterize situations of relatively permanent internal socioeconomic polarization in neighborhoods, some authors speak of sporadic or incomplete gentrification (Jourdan, 2008; Bacqué & Fijalkow, 2006), combining the installation of well-off households and the maintenance of poverty cells. Considering the internal socio-economic polarization of neighborhoods as a simple phase of a continuous gentrification process resulting in the eviction of the working classes and the massive installation of the privileged classes thus seems far too simplistic (Giroud & Ter Minassian, 2016; Oberti & Préteceille, 2016). The combination of this specificity of the built environment with cyclical shocks associated with serious macroeconomic crises (as in Greece) or more sectoral and geographically concentrated crises (as in certain French regions) could even make the internal socio-economic polarization of these neighborhoods a transitional stage towards their impoverishment.

Regardless of the effects of the economic and financial crisis and outside of neighborhoods affected by gentrification, the Greek example also shows how strong internal socio-economic polarizations of neighborhoods can be maintained in the long term. This can be explained by the high proportion of owner households and the desire for spatial proximity within family networks (Maloutas & Spyrellis, 2019). Thus, we observe in Athens a so-called vertical “segregation” (internal social stratification by floor in the same building). The structure of the built environment and the post-war housing production system played a major role in this type of spatial coexistence of social groups. Thus, the low level of social segregation in downtown Athens measured between neighborhoods corresponds to significant inequalities

within neighborhoods (Maloutas & Spyrellis, 2016, 2019). In France, the hyperspecialization of housing in certain central neighborhoods in very small flats often associated with a large student population, could explain that beyond students alone, the small surface dwellings of sometimes degraded buildings are occupied by low-income households. This could explain the coexistence in these neighborhoods of well-off owner-occupiers of the largest flats with students and low-income households renting small flats. The composition of the housing stock could therefore, according to different mechanisms in Greece as in France, have its own influence on the internal socio-economic polarization of neighborhoods.

These internally socially polarized neighborhoods remain marginally studied in the field of urban geography (Oberti & Prêteceille, 2016). Gentrification, used as a Trojan horse to interpret socio-urban change, has often monopolized interest without taking into account, for themselves, these situations of internal social polarization, whether they are transitory or lasting. Moreover, focusing on the opposition between “rich” and “poor” neighborhoods can have perverse effects on the understanding of the whole socio-urban fabric (Oberti & Prêteceille, 2016). This is why this article focuses not only on identifying the Marseilles neighborhoods where this internal socioeconomic polarization is observed, but also on analyzing their sociodemographic characteristics and the specificities of their housing stock.

### **1.3. The Marseille context**

In many ways, Marseille is a city particularly suited to the analysis of the internal socio-economic polarization of neighborhoods:

- the city has indeed undergone significant socio-demographic changes likely to promote the renewal of the population of the urban space,
- the level of poverty and inequalities are very high there, favoring socio-spatial segregation while making possible the co-occurrence of phenomena of gentrification and pauperization,
- the buildings are particularly degraded, which can more frequently result in an incomplete gentrification process.

#### **1.3.1. Major socio-demographic changes**

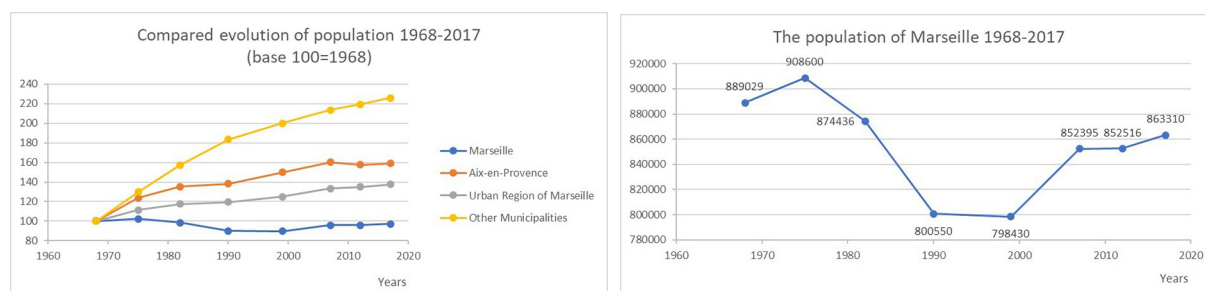
Marseille is located in the South-East of France, on the shores of the Mediterranean Sea. It is the second French urban region after the Paris and the third French urban area after Paris and Lyon. In 2017, the Aix-Marseille-Provence urban region brought together 92 municipalities for a population of 1,878,061 inhabitants and an area of 3,150 km<sup>2</sup>. Its polycentric urban structure is not limited to the city center/periphery diptych (AgAM, 2020), with, in particular, a polarizing effect of Aix-en-Provence (Godoye & Oliveau, 2019). It is a highly peri-urbanized area, in 2017, 54% of inhabitants and two-thirds of jobs are located outside of urban cores. It is sparsely populated (600 inhabitants/km<sup>2</sup>). Within urban region of Aix-Marseille-Provence, the municipalities of Marseille and Aix-en-Provence include more than half of the population (863,310 in Marseille for a density of 6,000 inhabitants/km<sup>2</sup>, and 142,482 in Aix-en-Provence), (AgAM, 2020).

Since the end of the 1960s, the different parts of the present Aix-Marseille-Provence metropolis have experienced different demographic developments (Figure 1). During the 1970s and 1980s, characterized by peri-urbanization, the municipality of Marseille lost more than 100,000 inhabitants while, at the same time, there was strong demographic growth in Aix-en-Provence, but, even more, in other municipalities, particularly peripheral to the metropolis. In the early 2000s, the city of Marseille experienced a population increase which did not completely compensate for the previous drop in the number of inhabitants, but which led to less heterogeneous demographic growth within the Aix-Marseille-Provence metropolitan area. Over the past decade (between 2007 and 2017), Marseille has seen its population grow more moderately, while that of Aix-en-Provence varied little and the other municipalities in the metropolis continued to grow moderately.

The composition of the population of the municipality of Marseille presents some peculiarities compared to other large French cities. These particularities come from the polycentric structure of the Aix-Marseille-Provence metropolis. Thus, compared to the central cities of other large provincial agglomerations, students and young adults are poorly represented in the municipality of Marseille, in particular because a large part of the university center is located in Aix-en-Provence. For this same reason,

executives and intellectual professions are less represented in the heart of the Marseille metropolis than in the central parts of many large French cities (AgAM, 2020).

Figure 1. General demographic trends of Marseille metropolitan area



Data source: Population Censuses, INSEE. Own elaboration

### 1.3.2. A high level of poverty

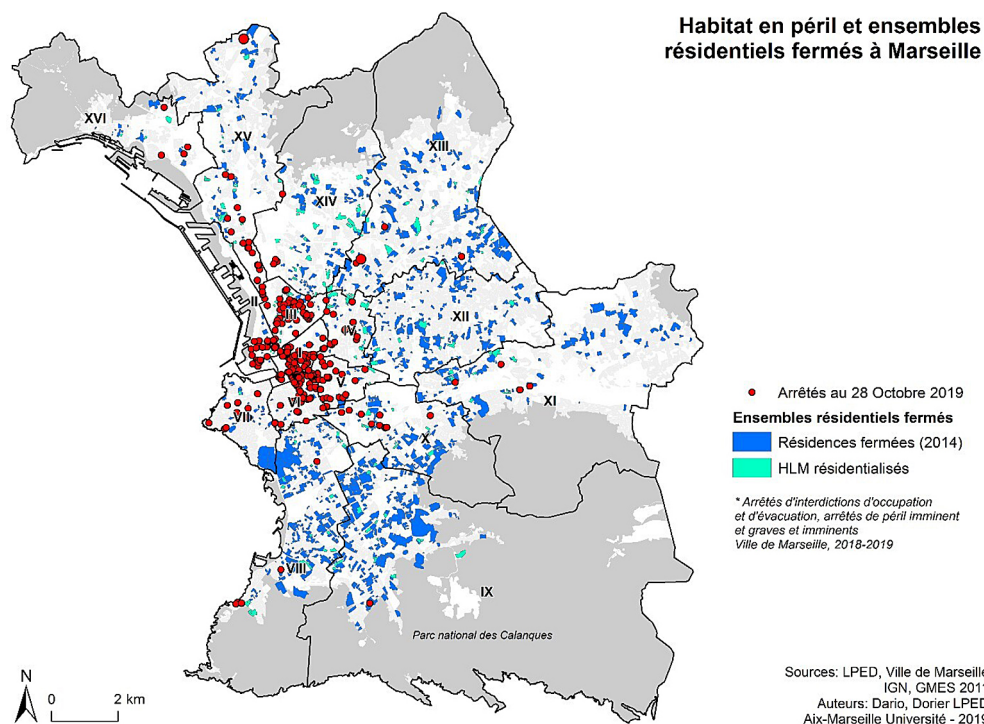
The economy of the Marseille agglomeration was based, like that of many other coastal towns, on port activities and associated industrial activities. In fact, the development of port activities and the installation of industrial companies around the Etang de Berre in the 1960s attracted working populations who settled nearby in the surrounding municipalities or in the north of the municipality of Marseille. In the 1980s, economic restructuring engendered the decline in industrial employment and was accompanied by strong growth in unemployment among the least qualified, particularly in the northern arrondissements of Marseille (Ronai, 2009; Donzel, 2005). Gradually, the increase in the share of services in employment, has, perhaps even more than in other large cities, favored a stagnation of the income of the less qualified people whose professional career passes through many periods of unemployment or through precarious work in these services (short contracts, interim, part-time not chosen, self-employment under constraint). On the contrary, this change in the economy has benefited to certain categories of graduates, leading, no doubt more than elsewhere, to strong inequalities within the working-age population. These inequalities, visible in the structure of the working-age population, are also visible in the urban geography, with, schematically, the “poor” neighborhoods in the North and the “rich” neighborhoods near the southern coast (Jourdan, 2008; Donzel, 2005; Ronai, 2009). In 2017, the 3rd Arrondissement of Marseille was the poorest administrative entity in metropolitan France with a poverty rate of 53%, versus 14.1% for France mainland and 18.2% for the whole of Aix-Marseille-Provence metropolitan area. The poor neighborhoods of Marseille are not only the poorest neighborhoods in France, but they are among the poorest neighborhoods in Europe (AGAM, 2020). This is nothing new, the Urban Audit of 2000 already asserted that in terms of urban inequalities, Marseille presented a situation comparable with the poor Italian and British cities. (Donzel, 2005).

### 1.3.3. A lot of very degraded old buildings

In the 1970s and 1980s, peri-urbanization encouraged the decline in the residential function of the municipality of Marseille, which helped accelerate the degradation of degraded buildings in its historic center (Maurin & Mazery, 2014; Audren et al., 2016). Thus, between 1975 and 1999, the urban center of Marseille lost 12% of its inhabitants, resulting in around 35,000 dilapidated vacant dwellings located in the city center (Ronai, 2009). If these evolutions have also been observed in other cities, according to Roncayolo, the singularity of the Marseille situation reflects the political “laissez-faire” of an urban management based mainly on the private production of housing (Roncayolo, 1996; Dorier & Dario, 2018; Figure 2). The city center of Marseille is characterized by a severe deterioration of the private rental stock despite the few actions to fight substandard housing carried out over the past 20 years. Thus, with a view to economic attractiveness and positioning in the Mediterranean area, the city of Marseille is developing urban projects and programs, such as Euro-Mediterranean which, since 2001, has been working for the rehabilitation of the center and the operation “Grand Centre-Ville”. However, the degradation of the housing of the city center has only slightly decreased and the logic of private urbanization of this part of the urban space continues to prevail (Dorier, Berry-Chikhaoui & Bridier, 2012; Dorier & Dario, 2018;

Nicol, 2015). According to the report for the requalification of the private real estate stock in Marseille, insalubrity concerns 13% of main residences in Marseille and more than 35% of those in the private stock in the central arrondissements (Nicol, 2015).

Figure 2. Localisation of degraded buildings (2019 ; red points) and gated communities (2014 ; in blue) in Marseille



Source: Dario, Dorier, Urbanicités, 2019. <https://urbanicites.hypotheses.org/author/urbanicites>

Thus, it appears that the production of social housing is too low to welcome low-income populations to the city and the urban region scale. These populations therefore are inclined to settle in the unsafe/unhealthy housing in the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> arrondissements. Financial and social toughness that encounter the population living condition in the unworthy housing accommodation in the historical center, dispatched in small co-ownerships, make revalorization of housing complex and pricy, as for its urban environment (Nicol & al., 2015). This aspect of commodity, its inhabitants and property structures can curb the gentrification's completion, where it started and contribute in the internal socio-economic polarization of some of the central neighborhoods.

## 2. Methodology

### 2.1. The neighborhood level apprehended by IRIS INSEE<sup>4</sup>

Territorial scales play a very important role in interpreting social segregation, the extent of which can vary depending on the scale of analysis. Social segregation as well as polarization are associated with the spatial proximity of social groups and their social interactions (Fowler, 2016). The neighborhood level allows us to distinguish units of social polarization and units of social proximity. It is at this micro-local level that one can examine the residential preferences of households. In this article, the geographic mesh used to understand the district is IRIS. The IRIS (Îlots Regroupés pour l'Information Statistique<sup>5</sup>), are the result of sub-municipal divisions, set up by INSEE for the 1999 census and respecting geographic and demographic criteria. It is a division of municipalities with at least 5,000 inhabitants into entities of 2,000 to 5,000 inhabitants. They consist of areas that are assumed to be homogeneous in terms of housing and population size. However, this division does not always guarantee internal social homogeneity (François

<sup>4</sup> French statistical office.

<sup>5</sup> Urban blocks grouped for Statistical Information.

et al., 2012), which this article illustrates for Marseille. Thus, the division into IRIS makes it possible to carry out an analysis on a fairly fine scale to verify our hypothesis of socio-economic polarization within the neighborhoods.

For reasons of statistical validity and interpretation of the data, only the residential IRIS for which the INSEE does not mention any particular precaution<sup>6</sup>, are retained in the analysis, the IRIS of business and miscellaneous not corresponding to the objective of this analysis.

## 2.2. An analysis of income distribution

### 2.2.1. Income rather than PSCs

In France, most analyzes of socio-spatial fragmentation are based on the study of the spatial distribution of urban populations according to their profession or socio-professional category (PSC). However, these PSCs present a certain internal heterogeneity, in particular linked to the differences in income between generations but also due to the development of new forms of work (self-employed persons associated with order platforms) which are booming, particularly in large cities. Even when the PSCs are available in a very detailed way (PSC in 40 groups), not all of these distinctions can be implemented. However, at the level of the IRIS, for reasons of statistical confidentiality, only very grouped PSCs (in 8 groups) are available, which in particular do not allow to know the previous PSC of retired people, which is even more problematic. Although they have other limitations (in particular their one-dimensional character ignoring cultural preferences and their opacity with regard to informal intra-family transfers), the estimates of disposable income allow us to better consider these differences in living conditions (linked to the wage differences between generations within the same profession, linked to the remuneration of the different forms of work, linked to the differences in the previous professional career of retirees). Above all, since the cost of housing constitutes an essential element in the processes of social segmentation of space, it is essential to consider the resource that allows one to overcome this cost and not a variable indirectly correlated with this resource (Piketty, 2015 ; Ribardi re, 2018 and 2019 ; Labrador, 2013). Without always acting as the ability to pay a «price» for access to housing in the private market, income also plays a role in benefiting from social housing (Fran ois & al., 2012 ; Dabet & Floch, 2014). The income-based approach, proposed here, therefore constitutes a necessary complement to the previous approaches based on PSCs.

### 2.2.2. Income data at the IRIS level

To study segregative phenomena and internal socio-economic polarization, it is necessary to take into account elements describing the social position and the resources of the resident populations. Here, it is based on the disposable income per consumption unit<sup>7</sup> of resident households which most accurately reflects the standard of living of the inhabitants at fine geographic scales. This is the income that households have available to consume and save. Thus, disposable income includes earned income (net of social contributions and direct taxes), income from assets, transfers from other households and social benefits (including social minima), including retirement pensions and unemployment benefits.

The data come from the device on localized social and fiscal income, FiLoSoFi. This system replaced Localized Tax Revenues (RFL) and Localized Disposable Revenues (RDL). It was implemented to disseminate indicators on declared and available income from 2012 for Metropolitan France. This localized social and fiscal file (FiLoSoFi) is the result of the matching of exhaustive tax data from the General Directorate of Public Finance and data on social benefits from the main institutes managing these services (National Family Allowance Fund , National old-age insurance fund, Central fund for agricultural social mutuality). It includes all ordinary taxable households, but not people who are homeless or living in institutions (retirement homes, collective accommodations, etc.) (Aerts et al., 2015).

6 The precautions surrounding the use of the data correspond, according to the INSEE, to difficulties in interpreting the changes observed, either due to a strong variation in the number of dwellings possibly associated with large-scale real estate operations, or due to problems that arose during the data consistency check.

7 Consumption units: The first adult in the household counts for 1 consumption unit, other adults and children over 14 years old for 0.5 consumption unit and children under 14 years old for 0.3 consumption unit.



At the level of each IRIS belonging to a municipality of at least 10,000 inhabitants, the data in the FiLoSoFi file include the poverty rate and the distribution deciles of the household population according to the disposable income of these households per consumption unit. It is in particular from these income distribution deciles that we can build summary indicators from which to assess the internal heterogeneity of urban areas and to trace the socio-economic profiles of the districts but above all to identify situations of neighborhoods internal polarization.

We will not use the distributions of income provided at the IRIS scale for the periods prior to 2012. Unlike the data from the FiLoSoFi system for 2012 and 2017, the data from the previous systems do not correspond to disposable income but to declared income. The declared income is made up of the accumulation of income from salaried or self-employed activity, unemployment benefits, sickness benefits, invalidity or retirement pensions, as well as part of the income from assets net of social contributions and the generalized social contribution (CSG). On the other hand, it does not take into account the social benefits received by households. This restriction tends to underestimate the resources of people with the lowest incomes. This is the reason why we will not analyze variations over time, prior to 2012.

### 2.2.3. Indicators summarizing the ends of the income distribution

To synthesize the low end of the income distribution, we often use the poverty rate (the proportion of the population belonging to households whose income is less than or equal to 60% of the national median income per unit of consumption). The idea being here, also, to synthesize the high end of the income distribution, it would be necessary to be able to construct a complementary index which would correspond to a “wealth rate” according to the same type of approach (estimation of the proportion of the population belonging to households whose income is equal to or greater than 167%<sup>8</sup> of the national median income per unit of consumption). In absolute terms, micro-data from fiscal and social sources would make it possible to construct this type of indicator. However, being provided in an aggregated mode, the accessible data is limited to the proposed indicators (such as the poverty rate or the income distribution quantiles), which prevents the construction of such a “wealth rate” which could be compared with the poverty rate then to combine the two ends of the income distribution. In addition, in some IRIS, the “poverty rate” is not provided while the income distribution quantiles are<sup>9</sup>. This is why we propose here to construct original indexes of wealth and poverty based on the proportional difference between the deciles of the ends of the income distribution of each IRIS with the corresponding deciles for the whole of metropolitan France.

From a practical point of view, these poverty and wealth indexes are constructed as follows.

Regarding the poverty index, we calculate the weighted sum of the negative relative differences between the first 3 deciles ( $D1_z$ ,  $D2_z$  and  $D3_z$ ) of each IRIS  $z$ , with the corresponding deciles for the whole of metropolitan France ( $D1_{FM}$ ,  $D2_{FM}$  and  $D3_{FM}$ )<sup>10</sup>. The weighting coefficients decrease over the deciles in order to weight more the differences associated with the lowest incomes.

$$IPoverty_z = 0.4 \frac{|D1_z - D1_{FM}|}{D1_{FM}} + 0.35 \frac{|D2_z - D2_{FM}|}{D2_{FM}} + 0.25 \frac{|D3_z - D3_{FM}|}{D3_{FM}}$$

Regarding the wealth index, we calculate the weighted sum of the positive relative differences between the last 3 deciles ( $D7_z$ ,  $D8_z$  and  $D9_z$ ) of each IRIS  $z$ , with the corresponding deciles for the whole of metropolitan France ( $D7_{FM}$ ,  $D8_{FM}$  and  $D9_{FM}$ )<sup>11</sup>. The weighting coefficients increase over the deciles in order to weight more the differences associated with the highest incomes.

8 166.6% being the mathematical inverse of 60%.

9 For the year 2017, we have the income distribution quantiles for 11,972 IRIS corresponding to neighborhoods of municipalities with more than 10,000 inhabitants, while we only have the poverty rate for 9,079 of these IRIS.

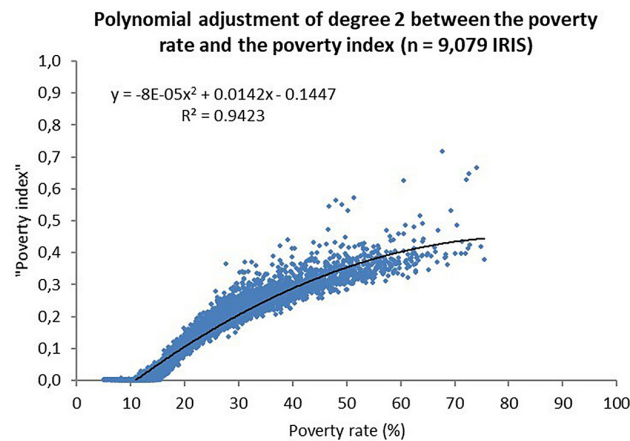
10 In other words, a difference between the income decile  $Di_z$  of an IRIS  $z$  and the corresponding income decile  $Di_{FM}$  of metropolitan France is taken into account in the poverty index  $IPoverty_z$  only for the first 3 deciles (therefore for  $i < 4$ ) and only if this difference is negative (therefore for  $Di_z - Di_{FM} < 0$ ).

11 In other words, a difference between the income decile  $Di_z$  of an IRIS  $z$  and the corresponding income decile  $Di_{FM}$  of metropolitan France is taken into account in the wealth index  $IWealth_z$  only for the last 3 deciles (therefore for  $i > 6$ ) and only if this difference is positive (therefore for  $Di_z - Di_{FM} > 0$ ).

$$I\text{Wealth}_z = 0.25 \frac{|D7_z - D7_{FM}|}{D7_{FM}} + 0.35 \frac{|D8_z - D8_{FM}|}{D8_{FM}} + 0.4 \frac{|D9_z - D9_{FM}|}{D9_{FM}}$$

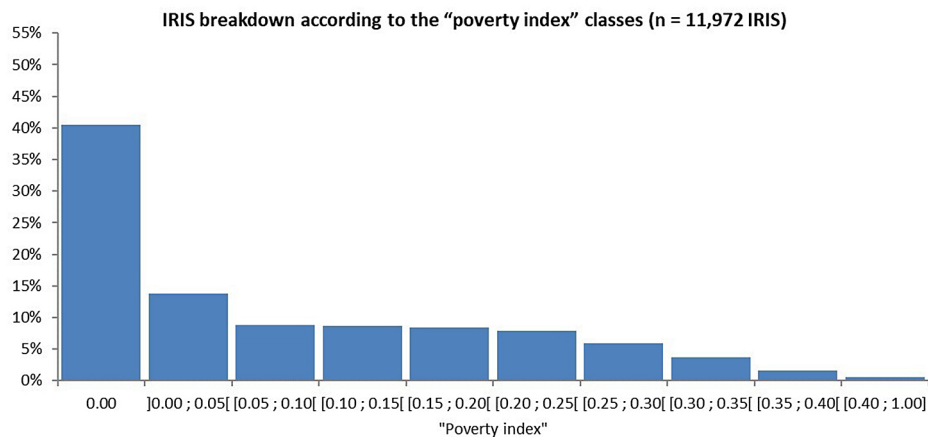
To check the ability of the poverty index to account for the differences in poverty between the IRIS, we can measure its correlation with the poverty rate at the scale of the 9,079 IRIS of France mainland for which we have the 2 information in 2017. Thus, in 2017, at the scale of the 9,079 IRIS for which an estimate of the poverty rate is available, the correlation between the poverty index proposed here and the poverty rate is very high ( $R^2 = 92.2\%$  linearly correlated and even  $R^2 = 94.2\%$  with a polynomial fit of degree 2, Figure 3).

Figure 3. Scatter plot of 9,079 French IRIS according to poverty rate and poverty index



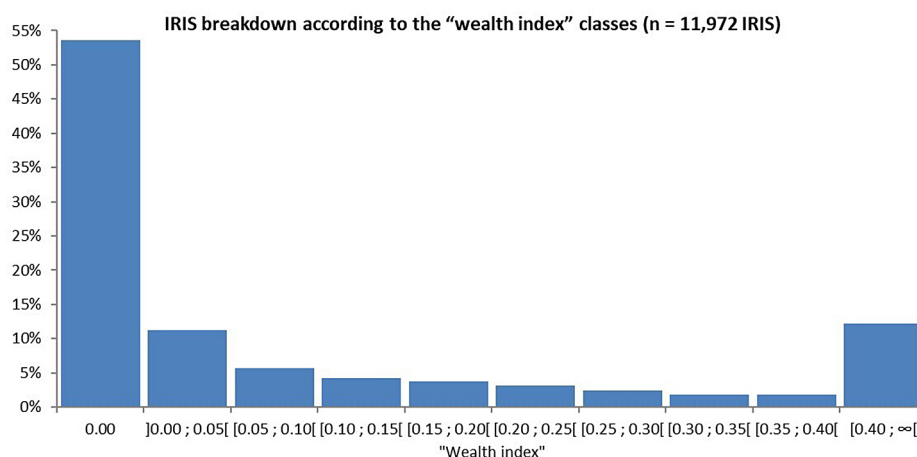
The distribution, according to the poverty index, of the 11,972 IRIS in mainland France for which quantiles of the distribution of household income are available, shows a very strong asymmetry, with 40% of IRIS whose poverty index is equal to 0 (Figure 4). The proportions of IRIS then decrease with the increase in the poverty index, which exceeds 0.25 in less than 12% of IRIS.

Figure 4. Distribution of 11,972 French IRIS according to poverty index



The distribution, according to the wealth index, of the 11,972 IRIS in mainland France for which quantiles of the distribution of household income are available, shows a very strong asymmetry, with more than 50% of IRIS whose index of wealth is equal to 0 (Figure 5). The proportions of IRIS then decrease with the increase in the wealth index, with, however, a not insignificant proportion (12%) of IRIS whose wealth index exceeds 0.4 and 18% of IRIS whose wealth index exceeds 0.25.

Figure 5. Distribution of 11,972 French IRIS according to wealth index



Data sources: Filosofi file, INSEE. Own elaboration

These poverty and wealth indexes thus show a geographic concentration of poverty and wealth, but it is higher for wealth. However, we notice a difference between the distributions of IRIS according to the 2 indexes, with a greater frequency of IRIS presenting a very high wealth index. This illustrates the existence of neighborhoods where very wealthy households are grouped together. This also illustrates a structural dimension of the distribution of household income which is mechanically bounded downwards but not upwards. Thus, the poverty index cannot exceed 1 (which would require that at least 30% of the population belong to households with zero income). On the contrary, the wealth index can exceed 1 (in 2017, nearly 2.5% of IRIS had a wealth index greater than or equal to 1, meaning that, in these IRIS, the highest incomes are, on average, more than twice the income corresponding to the top 3 deciles of the distribution for the whole of France mainland). The use of these 2 indexes synthesizing the 2 ends of the income distribution obviously does not exclude the use of the poverty rate, for some IRIS for which it is provided (its frequent use facilitating an easy representation of its range). This will broaden the perspective of interpreting the situation in certain neighborhoods.

#### 2.2.4. Classify IRIS according to the ends of the income distribution of the resident households

From the poverty and wealth indexes, it is possible to classify IRIS into 3 categories (poor IRIS, rich IRIS and internally polarized IRIS), to which a residual category is added. The following table shows this categorization. The categorization threshold of 0.04 is obtained from the poverty rate for France mainland (14.1%) and the adjustment by a degree 2 polynomial of the relationship between the poverty rate (PR) and the poverty index (PI) for the 9,079 IRIS for which the poverty rate is available. This 0.04 threshold will also be used for the wealth index (Table 1).

$$PI = -0.00008PR^2 + 0.0142PR - 0.1447 + \epsilon$$

$$\text{then } -0.00008(14.1)^2 + 0.0142(14.1) - 0.1447 \approx 0.04$$

Table 1. Categorization thresholds of IRIS

		Wealth Index	
		≥ 0.04	< 0.04
Poverty Index	≥ 0.04	« polarized » IRIS	« poor » IRIS
	< 0.04	« rich » IRIS	Other IRIS

Own elaboration

IRIS whose poverty index is greater than or equal to 0.04 and whose wealth index is less than 0.04 are considered “poor”, i.e., in 2017, 5,204 IRIS out of 11,979 (therefore 43.4% of IRIS in mainland France).

IRIS whose poverty index is less than 0.04 and whose wealth index is greater than or equal to 0.04 are considered “rich”, i.e., in 2017, 3,869 IRIS out of 11,979 (therefore 32.3% of IRIS in mainland France).

IRIS whose poverty index is greater than or equal to 0.04 and whose wealth index is greater than or equal to 0.04 are considered to be internally “polarized”<sup>12</sup>, i.e., in 2017, 506 IRIS out of 11,979 (therefore 4.2% of IRIS in mainland France).

The other IRIS whose poverty index is less than 0.04 and whose wealth index is less than 0.04, i.e., in 2017, 2,400 IRIS out of 11,979 (therefore 20.0% of IRIS in mainland France) are :

- IRIS whose income distribution differs only very little from that of mainland France as a whole,
- or IRIS whose lowest income deciles (D1, D2, D3) are higher than the corresponding deciles of the income distribution of mainland France and whose highest income deciles (D7, D8, D9) are lower than the corresponding deciles of the income distribution of mainland France. It is therefore about IRIS whose income distribution is concentrated around central values, thus referring to greater socio-economic homogeneity of residents. The analysis here focusing on areas characterized by their internal socio-economic polarization, IRIS characterized by greater socio-economic homogeneity, are not, despite the general interest they may arouse, the object of a separate category.

### 2.3. Identify the characteristics of the population and the housing stock associated with a strong internal socio-economic polarization of the neighborhoods

Beyond the only distribution of income, the internal socio-economic polarization of neighborhoods is likely to be associated with other characteristics of the population and with particularities of housing<sup>13</sup>. These additional characteristics of polarized neighborhoods constitute both possible factors of this internal polarization (notably the age and specialization of the housing stock), but also elements making it possible to specify the socio-demographic form that this internal polarization of income takes. The absence of an a priori causal structure of the link between these characteristics and the intensity of this polarization of income within the neighborhoods, implies resorting to a method that does not mobilize this type of causal model. A principal component analysis therefore seems particularly suitable for synthesizing all the correlations between the income distribution indicators of the neighborhoods (making it possible to identify their internal socio-economic polarization) and the characteristics of the population and housing in these neighborhoods.

More specifically, the following table (Table 2) gives the list of variables used in this principal component analysis whose statistical individuals will be the 309 IRIS of the municipality of Marseille for which we have income distribution data<sup>14</sup>.

Table 2. Variables taken into account in the Principal Components Analysis

Categories of variables	- List of variables used
Income distribution	- Poverty Index (IndPov) - Wealth Index (IndWeal)
Age distribution	- Proportion under 18 years old (-18yold) - Proportion of 18-24 years old (18-24yold) - Proportion of 25-39 years old (25-39yold) - Proportion of 40-64 years old (40-64yold) - Proportion of 65 years old and over (65+yold)
International immigration	- Proportion of immigrants (Immig)

<sup>12</sup> Here, the term polarized IRIS expresses a socio-economic polarization within the IRIS.

<sup>13</sup> These characteristics are measured here with data from the 2017 summary of the renovated population census.

<sup>14</sup> The municipality of Marseille has 340 residential IRIS and 53 other IRIS (including 31 business IRIS). For 31 residential IRIS in the municipality of Marseille, there is no information on the distribution of income due to too few tax households or no census information. According to the tax authorities, a too small number of tax households does not guarantee the impossibility of an indirect identification of taxpayers.

Residential mobility	- Proportion of households settled for less than 5 years (Settl –5years)
Living arrangements and family structures	- Proportion of people living alone among 25-54 year olds (Alone) - Proportion of single-parent families among families with children (1parent) - Proportion of families with 4 or more children among families with children (4child)
Housing stock	- Proportion of vacant dwellings (Vac) - Proportion of second homes (Secon) - Proportion of flats (Flats) - Proportion of households occupying dwellings with less than 3 rooms (1-2_room) - Average number of rooms per flat (Nbroom_flat) - Proportion of flats belonging to buildings completed before 1945 (Oldflat) - Proportion of owner-occupant households (Owner) - Proportion of households renting in social housing (Socialhous) - Proportion of over-occupied dwellings (Overoccup)
Degrees and education	- Proportion of students in the population (Stud) - Proportion of tertiary graduates among those who have completed their education (Tertdegr) - Proportion of people without any degree among those who have completed their education (0degr)
Socio-professional structure	- Proportion of inactive among 25-54 year olds (Inact) - Proportion of unemployed among 25-54 year olds (Unempl) - Proportion of manual workers among the employed people (Manwor) - Proportion of executives and intellectual professions among the employed people (Exec) - Proportion of intermediate occupations among the employed people (Intocc) - Proportion of independent workers among the employed people (Ind) - Proportion of the employed people hired on precarious contracts (Prec) - Proportion of the employed people working part-time (PT)
Daily mobility	- Proportion of the employed people walking to work (Walk) - Proportion of the employed people commuting to work by bicycle (Bicyc) - Proportion of employed people commuting to work by public transport (PubTrans)

Source: Description of the sub-municipal census file, INSEE. Own elaboration.

## 2.4. Recent trends in the internal socio-economic polarization of neighborhoods

Beyond the identification of neighborhoods with strong internal socio-economic polarization, we seek to understand recent trends in the evolution of income distribution among their inhabitants. To account for these recent trends, we will measure the change in the poverty and wealth indexes between 2012 and 2017 in the “polarized” IRIS in 2017, but also in the “polarized” IRIS in 2012. Several hypotheses will be used to interpret these recent trends in the evolution of income distribution in “polarized” IRIS. The strong internal socio-economic polarization of a neighborhood can reveal a dynamic of gentrification (high-income populations gradually settling in a district initially occupied by low-income populations, some of whom still exist there). The strong internal socio-economic polarization of a neighborhood can also reveal a tendency towards the impoverishment of residents through the departure of part of the high-income populations. There may also be situations where the internal socio-economic polarization of a neighborhood is not of a transitory nature but persists over time, in particular due to the heterogeneity of buildings and the profile of housing.

## 3. Results

### 3.1. A city with strong disparities between neighborhoods

At the scale of the Aix-Marseille-Provence metropolitan area, we notice a fairly divided urban space between “poor” IRIS and “rich” IRIS, since the majority (77%) of IRIS in the metropolitan area belong

to the one or the other of these 2 categories. Less than 20% of IRIS in the Aix-Marseille-Provence metropolitan area are either IRIS whose income distribution is quite similar to that of mainland France, or IRIS whose income of resident households is more concentrated around central values.

Internally “polarized” IRIS are a small minority (around 3%) and their geographic extension is very limited since they are almost exclusively present in the heart of the city of Marseille and, to a much lesser degree, in the heart of the city of Aix-en-Provence.

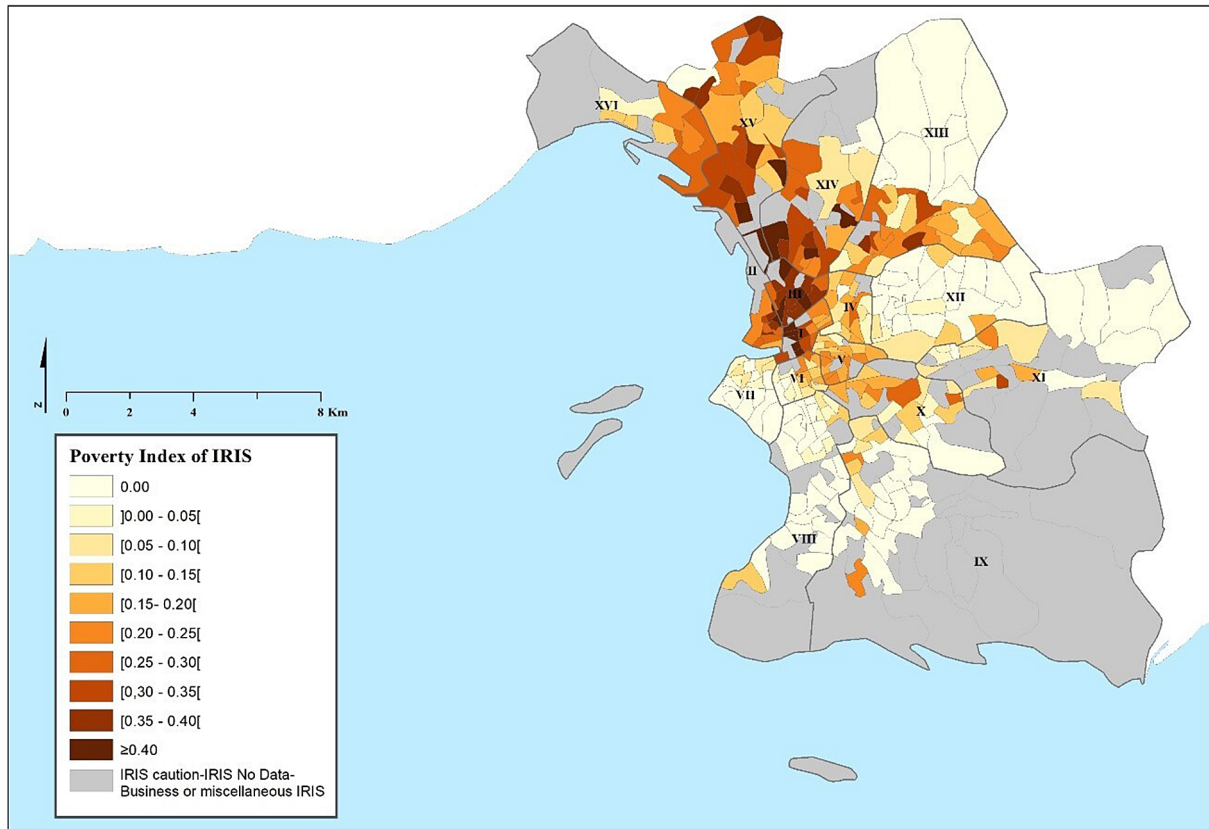
Although less concentrated in space, the very many “poor” IRIS (nearly half of the IRIS in the metropolitan area) are not widely dispersed geographically since they are mainly found in the municipality of Marseille in which they form a vast ensemble ranging from a portion of the hyper-center to the northern limits and certain eastern limits of the municipality. The other “poor” IRIS are found in small parts, often quite close to the center of other municipalities in the metropolitan area (especially in Aix-en-Provence).

The “rich” IRIS are quite widely dispersed in the Aix-Marseille-Provence metropolitan area. They are mainly found in peripheral areas of low density, but also in more central parts of the two main municipalities (Aix-en-Provence, but especially in the southern part of Marseille, between the Corniche, the basilica and the parks where the indexes of wealth reach very high levels).

The municipality of Marseille alone constitutes here our area of analysis since it concentrates almost all the IRIS concerned by internal socio-economic polarization (in 2017, 13 of the 17 in the metropolitan area). Despite their concentration in the municipality of Marseille, these “polarized” IRIS constitute a minority because if we consider the whole municipality of Marseille, we observe a space mainly split between “poor” IRIS and “rich” IRIS (nearly 86% of IRIS belonging to one of these 2 categories).

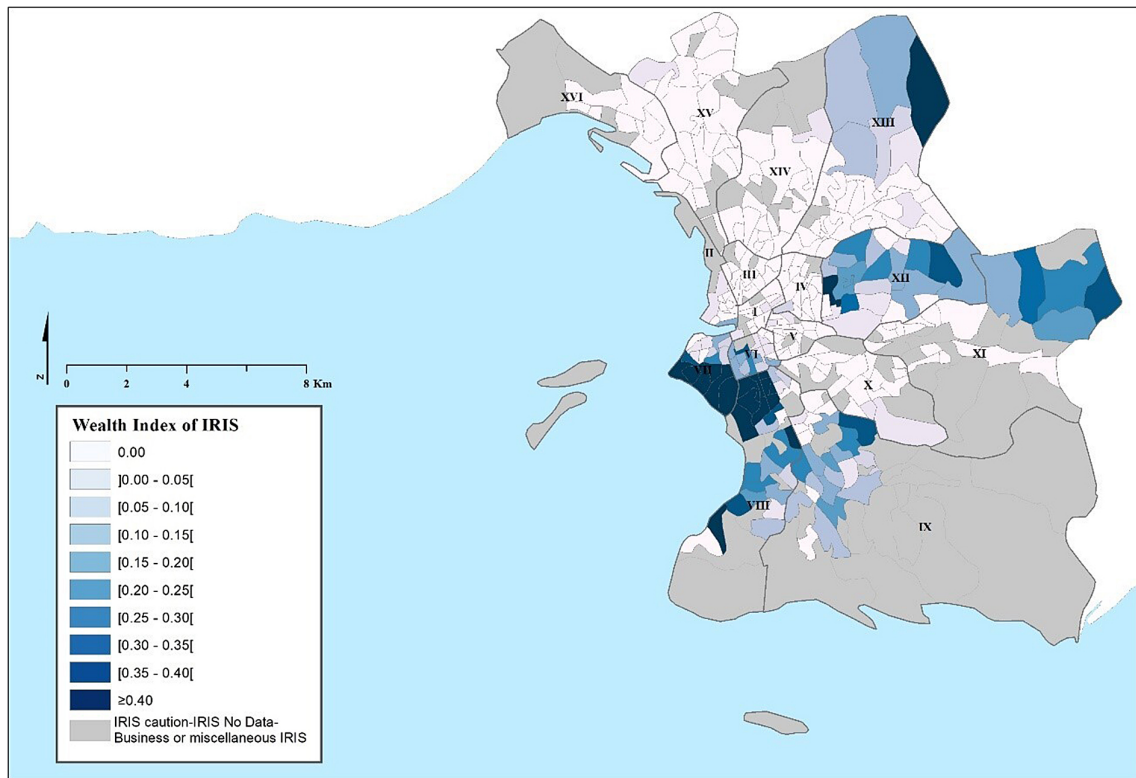
The mapping of the municipality of Marseille shows a particularly clear demarcation between “poor” IRIS (over 60% of IRIS) and “rich” IRIS (over 25% of IRIS), which, if not unique in the French urban space has an extreme form, drawing almost 2 distinct cities (Figures 6, 7 and 8).

Figure 6. Poverty Index of the 309 IRIS of the municipality of Marseille



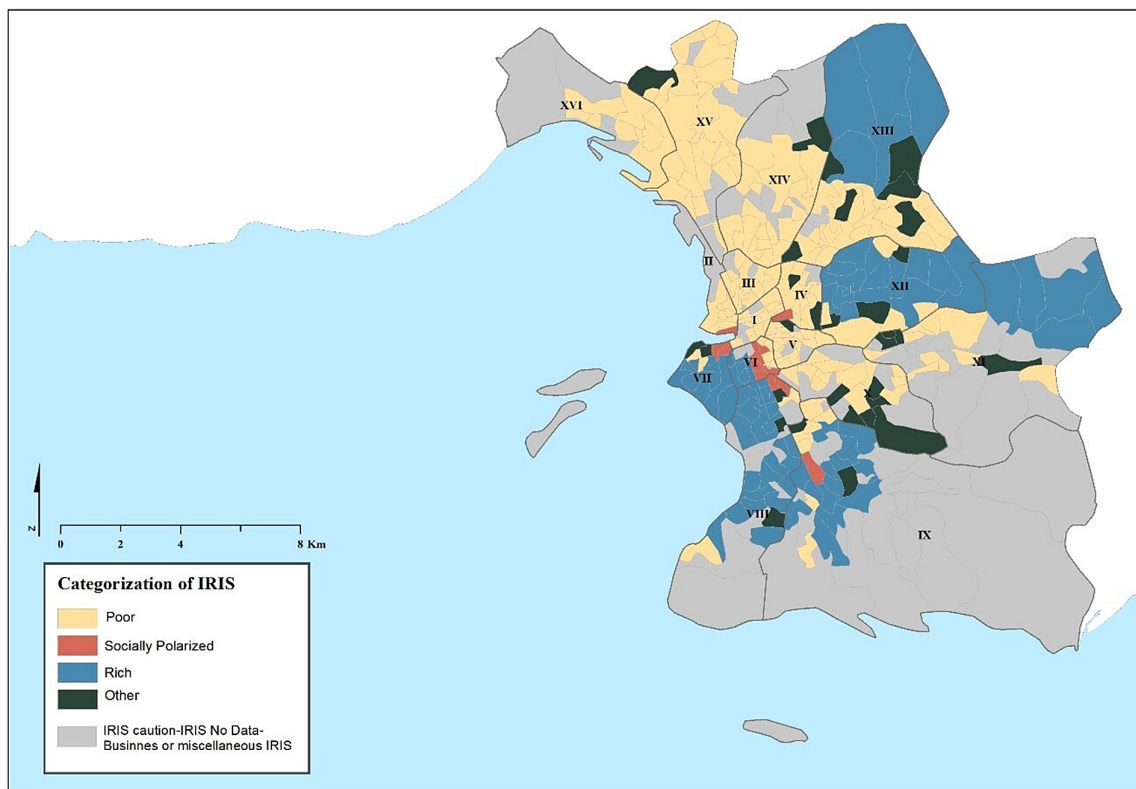
Data sources: Filosofi file, INSEE, IGN. Own elaboration

Figure 7. Wealth Index of the 309 IRIS of the municipality of Marseille



Data sources: Filosofi file, INSEE, IGN. Own elaboration

Figure 8. Categorization of the 309 IRIS of the municipality of Marseille.



Data sources: Filosofi file, INSEE, IGN. Own elaboration

### 3.2. Some neighborhoods with internal socio-economic polarization

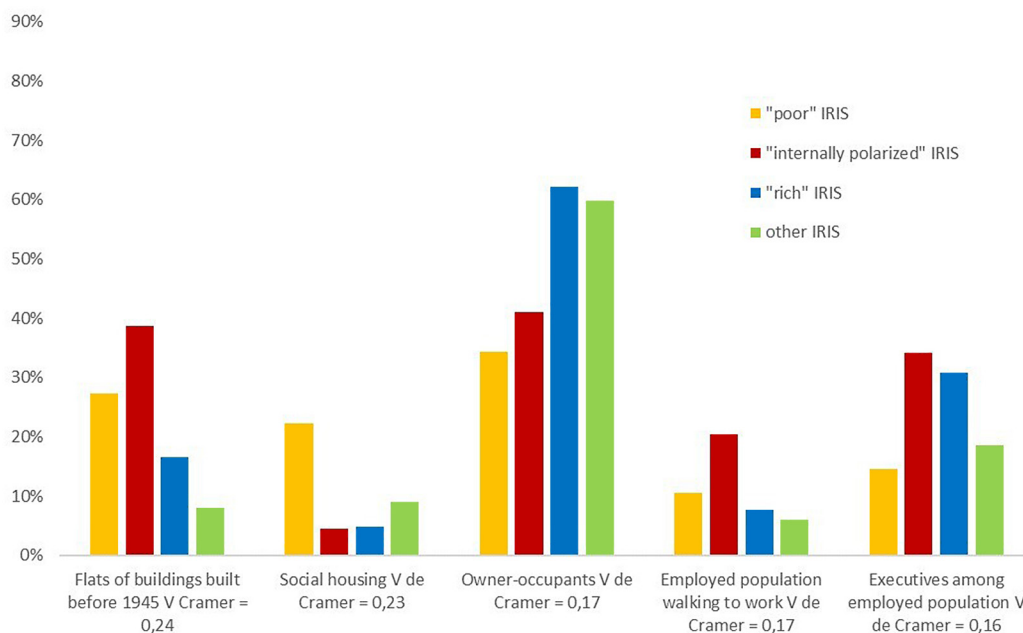
Although “polarized” IRIS are relatively rare, their geographical arrangement presents a very characteristic aspect. The geographical position of the 13 IRIS in which we observe an internal socio-economic polarization in 2017, seems to draw a “border” zone between rich neighborhoods and poor neighborhoods, with the exception of 2 of them which are surrounded by “poor” IRIS, although at a moderate distance from the parts of the city where the “rich” IRIS are concentrated. The existence of this “border” zone goes in the direction of gentrification with a gradual extension of neighborhoods with wealthy residents to neighborhoods inhabited by populations with more modest resources, without demonstrating this.

At the level of the 309 IRIS of the municipality of Marseille, certain characteristics of the housing stock and its inhabitants show a significant correlation with internal socio-economic polarization. In a bivariate form, this correlation can be measured by Cramer’s V<sup>15</sup>. For the municipality of Marseille, 5 proportions expressing binary qualitative variables are correlated with the 4 IRIS categories previously determined with a Cramer’s V greater than or equal to 0.15 (Figure 9). These are the proportions of :

- flats belonging to a building built before 1945,
- households residing in social housing,
- owner-occupants,
- employed population walking to work,
- executives among the employed population.

For 2 of these variables, these correlations express a fairly clear specificity of IRIS with strong internal socio-economic polarization (here called “polarized” IRIS). The “polarized” IRIS thus comprise, on average, higher proportions of flats belonging to relatively old buildings (built before 1945), with 12 percentage points above what is, on average, measured in the IRIS “Poor”, and between 20 and 30 percentage points above what is, on average, measured in the other 2 categories of IRIS. “Polarized” IRIS also include, on average, higher proportions of employed population walking to work, which indirectly expresses their greater centrality compared to the other 3 categories of IRIS.

Figure 9. Proportion of various characteristics according to IRIS categories, municipality of Marseille



Data sources: Filosifi file, Population Census, INSEE. Own elaboration

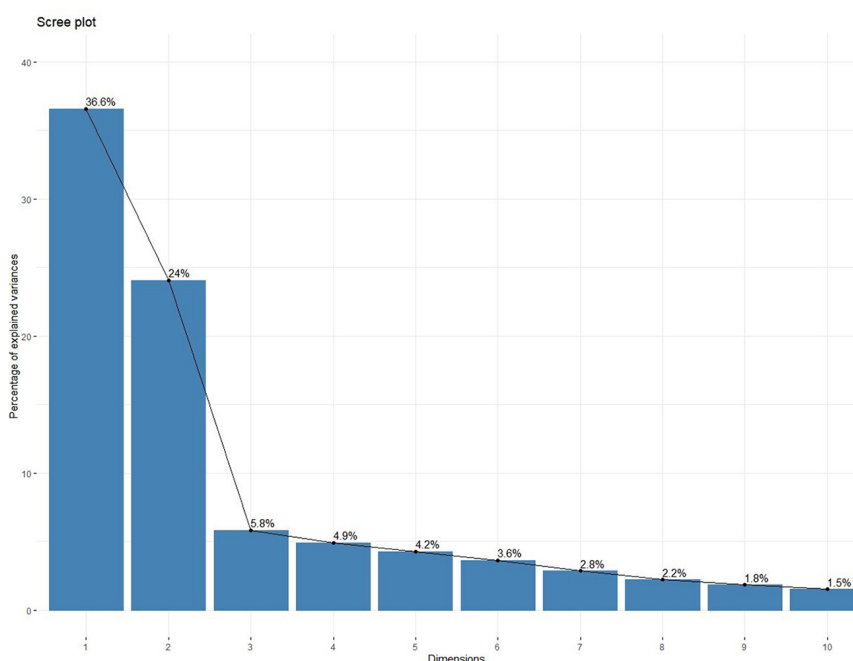
<sup>15</sup> Cramer’s V is a measure of the correlation between 2 qualitative variables. In the event of a total absence of correlation, the Cramer’s V will be equal to 0, in the event of absolute correlation, it will be equal to 1. It is generally considered that a Cramer’s V of less than 0.1 expresses a very weak correlation and a Cramer’s V greater than 0.3 expresses a strong correlation.



However, these correlations do not always express a specificity of “polarized” IRIS. Indeed, the proportions of households residing in social housing oppose the “poor” IRIS where this proportion is, on average, quite high, and the 3 other IRIS categories where it is very low. The proportions of executives among the employed population are very similar in the “polarized” IRIS and the “rich” IRIS and clearly higher than the average value of these proportions in the other 2 categories of IRIS. The proportions of owner-occupants are quite similar in the “poor” IRIS and the “polarized” IRIS and significantly lower than the average value of these proportions in the other 2 IRIS categories. It is interesting to note that the “polarized” IRIS are sometimes similar to the “poor” IRIS (with modest proportions of owner-occupants), sometimes similar to the “rich” IRIS (with relatively high proportions of executives among the employed population).

To better represent the correlations between the wealth and poverty indexes and the set of proportions used to express the characteristics of the IRIS population and their housing stock, a principal component analysis was carried out at the scale of the 309 IRIS exploitable from the municipality of Marseille. The first axes resulting from the analysis of principal components synthesize a significant part of the statistical information (more than 60% for the first 2 axes, Figure 10).

Figure 10. Percentage of explained variance by the dimensions of principal components analysis



Data sources : Filosofi file, Population Census, INSEE. Own elaboration

Schematically (Figure 11), the first factorial axis opposes:

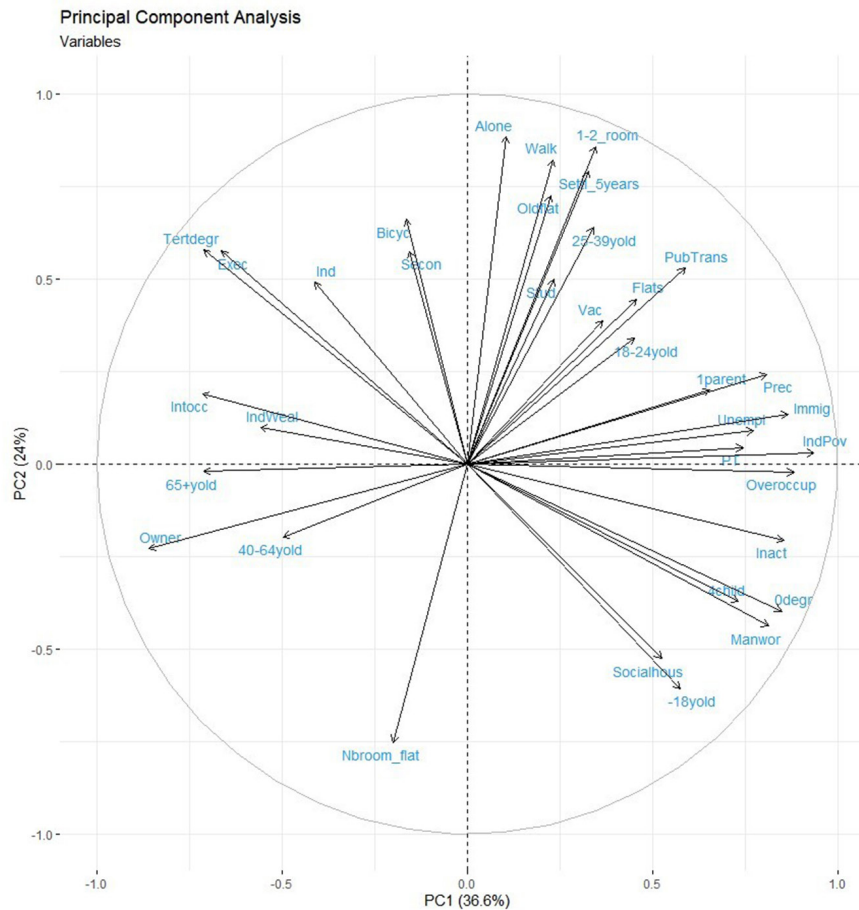
- very clearly (by its positive coordinates), the characteristics of IRIS associated with poverty (unemployment, precarious employment, strong immigrant presence, part-time work, over-occupation of housing, single-parent families, inactivity) and the poverty index himself,
- and, to a lesser extent (by its negative coordinates), the characteristics of IRIS associated with material wealth (elderly population, owners, strong presence of intermediate professions) and the wealth index itself.

Schematically (Figure 11), the second factorial axis opposes:

- by its positive coordinates, the characteristics of IRIS associated with centrality (going to work on foot or by bike, flats in old buildings, small housing, student presence, population of young adults, high residential mobility, people living alone), as well as other characteristics such as the presence of occasional or secondary residences,
- by its negative coordinates, the characteristics of IRIS associated with family life (under 18 years old persons, large flats, social housing).

Other characteristics, very well represented in the first factorial plane, have both relatively high coordinates (in absolute value) on the first axis and on the second axis. First, these are characteristics that seem to be associated with both poverty and centrality (high proportion of flats, use of public transport to get to work). These are also characteristics that seem to be associated with both material wealth and centrality (higher education graduates, managers and intellectual professions). Finally, these are characteristics that seem to be associated both with poverty and with family life (manual workers, lack of qualifications, families with 4 or more children).

Figure 11. Correlation circle of the principal components analysis (first factorial plane)



Data sources: Filosofi file, Population Census, INSEE. Own elaboration

The position of the 309 IRIS of the municipality of Marseille for which we have a complete set of data (Figure 12), shows, quite logically, that the “poor” IRIS form a vast “cloud” going from the center of the first factorial plane to the part of the plane corresponding to the positive coordinates of the first axis. Likewise, the “rich” IRIS form a narrower “cloud” located in the part of the first factorial plane corresponding to the negative coordinates of the first axis. “Polarized” IRIS and other IRIS form a narrow “band” between “poor” IRIS and “rich” IRIS. Polarized IRIS constitute the part of this narrow “band” which almost always corresponds to the positive coordinates of the second axis. The other IRIS rather constitute the part of this narrow “band” corresponding to the negative coordinates of the second axis. This relatively distinct arrangement of the different IRIS categories on the first factorial plane confirms the consistency of all the socio-demographic characteristics here measured with the poverty and wealth indexes used to construct these categories.

If we examine more precisely the position of the “polarized” IRIS on the first factorial plane, we observe a relatively concentrated “cloud” indicating a strong correlation with the characteristics associated with centrality (old buildings, small dwellings, people living alone, “soft” home-work mobility, high residential mobility, and, to a lesser extent, students and second homes). Other characteristics of

“polarized” IRISs seem to be shared with “rich” IRIS (executives and higher education graduates) or with “poor” IRISs (flats, using public transport to get to work).

Beyond this observation of the relative coherence of the “polarized” IRIS group with regard to the socio-demographic characteristics analyzed here, we notice 3 IRIS whose position on the first factorial plane differs significantly from that of the other “polarized” IRIS. It’s about :

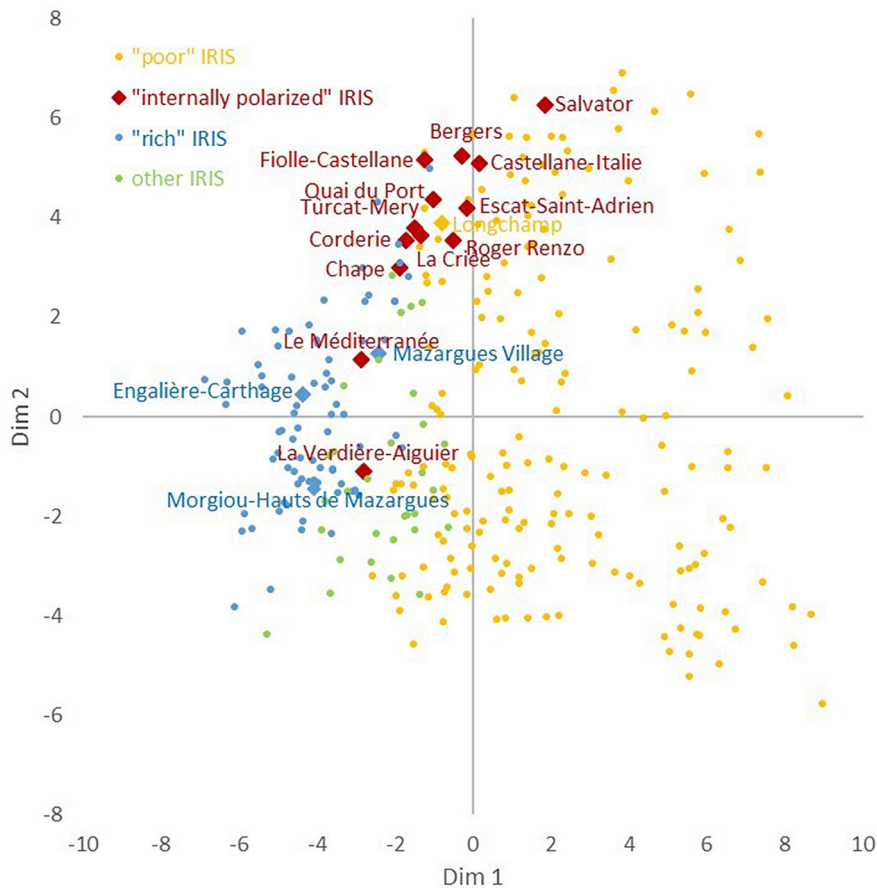
- IRIS “Salvator” whose poverty index is particularly high,
- and the IRIS “Le Méditerranée” and “La Verdrière-Aiguier”, whose “wealth” indexes are very high compared to what is observed for most “polarized” IRIS.

On the other hand, it is less clear to associate a position of the IRIS polarized on the first factorial plane with the trends of the poverty and wealth indexes indicating that the internal socio-economic polarization could be:

- a transitional step of a possible gentrification, we would then have, in recent years, an increase in the wealth index and a decrease in the poverty index,
- a transitional step of possible impoverishment, we would then have, in recent years, a decrease in the wealth index and an increase in the poverty index,
- a more permanent state, with, in recent years, little variation in the poverty and wealth indexes or even an increase in the wealth index and, jointly, an increase in the poverty index.

In other words, the trends in the wealth and poverty indexes over the past few years measured in the polarized IRIS of Marseille seem to be moderately correlated with their socio-demographic characteristics. We can, however, identify a few regularities associating socio-demographic characteristics and trends in the wealth and poverty indexes.

Figure 12. Principal component analysis. Representation of the 309 IRIS of the municipality of Marseille on the first factorial plane



Data sources: Filosofi file, Population Census, INSEE. Own elaboration

### 3.3. Recent trends in income distribution in socially polarized neighborhoods

By examining the recent trends of IRIS in which we observe an internal socio-economic polarization, we observe both a possible gentrification dynamic in a large number of neighborhoods, but also other evolutions: poorer residents or lasting maintenance of internal disparities in income. To interpret these recent changes in the income distribution of “polarized” IRIS, we analyze their socio-demographic characteristics and the evolution of this distribution, not only for IRIS exhibiting internal socio-economic polarization in 2017, but also for IRIS presenting this internal polarization in 2012. In this perspective, we can distinguish different situations among the “polarized” IRIS in 2017 and / or among those that were polarized in 2012.

#### 3.3.1. A possible gentrification which reinforces the geographical concentration of wealth

In 10 IRIS in Marseille, the evolution over time of the distribution of disposable income is in line with the hypothesis according to which the coexistence, in the same neighborhood, of very low-income households with high-income households, or even very high, is a transitional stage in the gentrification process. In these neighborhoods that are socially polarized or have been recently, we observe, between 2012 and 2017, a drop in the poverty index and / or an increase in the wealth index. Almost all belonging to the 6th, 7th, 8th and 9th arrondissements, their development would strengthen the separation of the city between the part comprising the poorest populations (mainly in the North) and the part comprising the richest populations (mainly in the South).

For 7 IRIS of Marseille (Chape, La Criée, Corderie, Escat-Saint Adrien, Mazargues-Village, Morgiou-Hauts de Mazargues and Roger-Renzo), the income distribution in 2017 shows a moderate decrease in the poverty index and a slight to moderate increase in the wealth index, compared to what they were in 2012. In terms of the characteristics of the population and the housing stock 5 of these 7 IRIS present fairly similar situations (Chape, La Criée, Corderie, Escat-Saint Adrien and Roger-Renzo), as evidenced by their relative concentration within the “cloud” of “polarized” IRIS in the first factorial plane of the PCA. Within these 5 IRIS, the overrepresentation of small apartments is even more marked than within all of the “polarized” IRIS, where it is already higher than in the other IRIS categories. The proportion of households installed for less than 5 years is also higher there than it is in all of the polarized IRISs, where it is already also higher than in the other categories of IRIS. For the other 2 of these 7 IRIS (Mazargues-Village, Morgiou-Hauts de Mazargues), the poverty index, already moderate in 2012, fell to zero in 2017, so that belonging to the category of “polarized” IRIS in 2012 they pass into the category of “rich” IRIS in 2017. This change of category is in the direction of rapid gentrification and these 2 IRIS are therefore quite far from the “cloud” of “polarized” IRIS. In 2017, these two formerly “polarized” and recently “rich” IRISs are characterized by fewer small old rental apartments and by fewer people living alone than in the “polarized” IRIS where these characteristics are very over-represented. Still in comparison with the “polarized” IRIS, these 2 IRIS which have become “rich” have a lower proportion of households settled for less than 5 years, undoubtedly illustrating the lower residential mobility logically associated with the lower presence of tenants.

In 1 IRIS in Marseille (Engalière-Carthage) also moved from the “polarized” to “rich” category, the very strong increase in the wealth index and the very sharp decrease in the poverty index between 2012 and 2017 goes into the meaning of an even faster gentrification process (with a poverty rate dropping from 22.3% in 2012 to 9.4% in 2017). Even more than in Morgiou-Hauts de Mazargues and Marzagues-Village, Engalière-Carthage is characterized by fewer small old apartments for rent than in the «polarized» IRIS where these characteristics are very over-represented. Again in comparison with the “polarized” IRIS, this IRIS which has become “rich” has an even lower proportion of households settled for less than 5 years, again illustrating the lower residential mobility associated with the lower presence of tenants.

2 IRIS of Marseille with high poverty indices in 2012 as in 2017 (Castellane-Italy and Salvator), could experience the start of gentrification with, between 2012 and 2017, a slight decrease in their poverty index (the remaining poverty rate still close to 25%) or a moderate increase in their wealth index. As a result of this slight increase in the wealth index between 2012 and 2017, IRIS Castellane-Italy went from the category of “poor” IRIS in 2012 to the category of “polarized” IRIS in 2017. These 2 IRIS may experience the start of gentrification, are characterized by their attributes of centrality as evidenced by their position in the first factorial plane of the PCA. We can thus observe in these 2 IRIS an over-

representation of people walking to their work and an over-representation of small old apartments still much more marked than within the whole of the “polarized” IRIS where they are already higher than in the other IRIS categories. The proportion of households settled for less than 5 years is also higher there than it is in the set of “polarized” IRIS where it is already higher than in the other categories of IRIS, a logical consequence of the low proportion of households owning their home.

### *3.3.2. A recent trend of household impoverishment*

In 5 IRIS of Marseille (Bergers, La Verdrière-Aiguier, Le Méditerranée, Longchamp, Turcat-Mery), internal socio-economic polarization does not seem to constitute a step towards gentrification, but on the contrary a step in a trend towards an over-representation more pronounced of low-income households.

These may be IRIS where a gentrification process seems to have been interrupted to evolve either towards a situation of rather marked poverty already observed in the past (Longchamp), or towards an internal social polarization where poverty is more present than wealth (Bergers). Within these 2 IRIS, the overrepresentation of small older rental apartments is even more marked than within all of the “polarized” IRIS, where it is already higher than in the other IRIS categories.

It can also be IRIS categorized as “rich” in 2012 and that became “polarized” in 2017 (Le Méditerranée, Turcat Mery and La Verdrière-Aiguier). In these 3 IRIS, between 2012 and 2017, the frequency of low-income households increased (with, in 2017, poverty rates reaching over 17%), at the same time as that of high-income households decreased, although it remains quite important. With regard to all the “polarized” IRIS, these 3 recently “polarized” IRIS are characterized by an over-representation of relatively recent large dwellings partly belonging to the social housing stock. This is all the more noticeable as, in most of the other “polarized” IRIS, social housing remains very rare and old housing is very over-represented.

### *3.3.3. Persistent internal socio-economic polarization*

In 2 IRIS of Marseille (Fiolle-Castellane, Quai du Port), internal socio-economic polarization varies very little, and it is above all very marked<sup>16</sup>. In terms of the characteristics of the population and the housing stock, these 2 IRIS present situations that exacerbate that of all “polarized” IRIS, as evidenced by their fairly central position within the “cloud” of “polarized” IRIS in the first factorial plane of the PCA. Compared to the average of all the “polarized” IRIS, we can thus observe an even clearer over-representation of people living alone and of small rental flats, knowing that in relation to all the IRIS of Marseille, these characteristics are already very over-represented in “polarized” IRIS.

## **4. Discussion**

The example of the city of Marseilles confirms the existence of neighborhoods characterized by large differences in income among their inhabitants. Although these neighborhoods remain a very small minority in a city where the social segmentation of the area is very marked, with well-defined groups of very rich and very poor neighborhoods, they are nonetheless a clear reality. Thus, in several neighborhoods, we observe the residential coexistence of populations with very low resources (with poverty rates often higher than 20%) and very well-to-do households (with incomes often between 15% and 30% higher than those of equivalent households in metropolitan France).

This coexistence of populations with very different income levels, especially when it is transitory, does not mean a great social mix (Chabrol & Launay, 2016). Even within small entities such as the IRIS, which are used here to statistically understand the notion of neighborhood, people can live in the same area without very frequently sharing the space. Indeed, it is often within the same street, or even the same building, that neighborhood relations are organized. Several studies have shown that spatial proximity does not necessarily lead to social proximity but, on the contrary, encourages the development of separatist practices, particularly in school choices (Maurin, 2004; Audren, Baby-Collin & Dorier, 2016;

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<sup>16</sup> with low-income households poorer than elsewhere (in 2017, D1 and D2 are more than 12% lower than the corresponding national deciles, the 2 poverty rates exceeding 20%) and with well-to-do households much richer than elsewhere (in 2017, D8 and D9 are more than 17% higher than the corresponding national deciles).

Launay, 2016). Socioeconomically endowed classes practice a “controlled” mix in a logic of protection and social differentiation even though social diversity of the neighborhood is appreciated (Oberti, Prêteceille, 2016; Launay, 2016; Tissot, 2011). Indeed, although there are fairly strict residency criteria for children’s schooling, recourse to private education can make it possible to circumvent them. As for associative activities, they generally do not involve residence criteria, even at the municipal level. Travel for shopping or other daily activities due to the inadequacy of the neighborhood’s supply to meet the daily needs of some residents reflects the different modes of appropriation of neighborhood life (Chabrol & Launay, 2016). Also in Athens, the socioeconomic inequalities increased by the 2009 crisis are not only manifested by differences between neighborhoods but also within the same neighborhood with a strong distance between inhabitants (Maloutas, Spyrellis, 2019). As a result, internal social polarization can result in an artificial social mix and micro-fragmentations within neighborhoods. Despite these possible limits to social mixing in neighborhoods with strong internal socioeconomic polarization, there are still spaces (local shops, traffic lanes, etc.) where different populations are likely to cross paths quite frequently. In some cases, physical proximity has generated positive effects for the social life of the neighborhood (Oberti, Prêteceille, 2016; Pinçon, Pinçon-Charlot, 2014). This is therefore very different from the situation in some neighborhoods in the north of Marseille, where almost all of the inhabitants live in households with incomes below the median income for all of metropolitan France. It is also very different from some neighborhoods in southwestern Marseille where not only do almost all of the inhabitants live in households with incomes above the median income for metropolitan France as a whole, but also some of the roads are privatized outside of any legal framework (Dorier & Dario, 2018; Dorier, Dario, Rouquier & Bridier, 2014).

Unlike other large provincial cities, such as the Mediterranean city of Montpellier, whose center includes a fairly large number of ‘polarized’ IRIS, student overrepresentation (Dasré, 2009; Kersuzan, Caillet & Bergouignan, 2009) does not seem to have any impact on the internal socio-economic polarization of Marseille’s neighborhoods. Not only is the student population only marginally overrepresented in the municipality of Marseilles as a whole, but student overrepresentation in the socially polarized neighborhoods of Marseilles is quite minimal. The absence of a very marked over-representation of students in neighborhoods with strong internal socioeconomic polarization does not, however, prevent a form of specialization of their housing stock towards very small flats. This specialization towards small flats can also be observed in certain “poor” neighborhoods.

In a city such as Marseilles, which is very marked by the social delimitation of housing, the persistence of old degraded buildings in the central parts of the city would explain both the maintenance of a very high level of poverty in the heart of the city and the existence of neighborhoods with a high degree of internal socio-economic polarisation in this heart of the city. Indeed, the over-representation of flats located in old buildings appears to be the main characteristic of neighborhoods with high internal socioeconomic polarization compared to other parts of the municipality of Marseille. The influence of building heterogeneity on socio-spatial inequalities and/or social mix is moreover evoked by some studies on large cities, in the French context (Lévy-Vroélant, 2001; Chabrol & Giroud, 2016), but also in other Mediterranean countries (Maloutas & Spyrellis, 2019). Recent trends in income distribution within some of these socially polarized neighborhoods in Marseille thus seem to correspond to a fairly advanced gentrification dynamic, or simply the beginning of such a process. However, micro-data associating income and residential mobility would be needed to analyze in greater depth the gentrification processes that may affect these neighborhoods. For obvious reasons of confidentiality, the Filosofi file does not offer extractions of such micro-data. The only mobility data available at the neighborhood level are the proportions of recently settled households (for less than five years), provided by the renovated population census. These proportions of recently settled households do not appear to be correlated with trends in income distribution within socially polarized neighborhoods, and thus with possible gentrification processes. These proportions of recently settled households seem to be more closely associated with the share of renting households, whose residential mobility is, as is often the case, greater than that of homeowners. Interpreting these proportions of recently settled households is, moreover, made tricky because it is not possible to know whether these households have moved from another address in the neighborhood or whether they come from another part of the city. The existence of neighborhoods with strong internal socioeconomic polarization in which the poverty index has recently risen or remained high suggests, moreover, that the coexistence of rich and very poor households in the same neighborhood is not necessarily the result of ongoing gentrification.

Since the reference period of the data used here (2017), the reality of the presence of very degraded buildings in Marseille has been tragically confirmed with the collapse of buildings in the Rue d'Aubagne in 2018. The dilapidated private housing stock in the city center was then affected by peril orders with numerous evacuations and rehousing (Dorier & Dario, 2018; AgAM, 2020). Following these evacuations, several urban areas were recovered by the Metropolis and the City for the renovation of buildings or their demolition. This recent, but apparently proactive, policy could, in the future, have a very significant impact on the internal socio-economic polarization of Marseille's neighborhoods. On the one hand, it could, through the renovation of buildings, attract higher-income populations to "poor" neighborhoods where they are, for the moment, very rare, thus creating new neighborhoods affected by internal socioeconomic polarization. Depending on whether these urban renovations include a significant social housing component or whether they are carried out according to a logic based mainly on private development, the internal social polarization of these currently "poor" neighborhoods will be permanent or transitory and will lead to gentrification. Although the evacuations of buildings and the renovation policies planned since 2019 do not affect the majority of the neighborhoods identified here as "polarized", they are nevertheless concerned in a significant way and they could contribute to accentuating their internal social polarization or to accelerating gentrifications that are already underway or re-launching gentrifications that have stopped.

It is always difficult to determine in advance the extent and social consequences of a housing policy. This is particularly true in a city such as Marseille, where dilapidated buildings and poverty are widespread and make the objectives difficult to achieve, while future economic and social uncertainties, following the current health crisis, may further complicate their realization. The attractiveness of the Marseilles real estate market for wealthy populations from outside the city and the region is another uncertainty regarding future socio-spatial dynamics.

## 5. Conclusions

The dualism of Marseille, between the southern and northern neighborhoods has been noted by numerous works (Donzel, 2005; Roncayolo, 1996; Dorier and Dario, 2018, 2020, Audren et al., 2016). Analysis of income distribution within neighborhoods (captured by INSEE IRIS) confirms this dichotomy of the city. Nevertheless, we can identify neighborhoods with a strong internal socioeconomic polarization associating overrepresentation of high-income households and very low-income households. From a methodological point of view, the poverty and wealth indexes developed here to characterize Marseille's neighborhoods and, therefore, to identify these neighborhoods with strong internal socioeconomic polarization, can be used to analyze other cities and lead to comparative studies. From the point of view of the analysis of socio-spatial inequalities, this observation makes it possible to nuance a perception of urban space that is most often characterized only by the differences between neighborhoods presenting a relative internal social homogeneity. Thus, neighborhoods of Marseille with strong internal socioeconomic polarization have specific characteristics in terms of population, but especially housing, with a particularly old housing stock. From the point of view of the transformation trajectories of these neighborhoods with strong internal socioeconomic polarization, we note a relative diversity of recent developments (gentrification, impoverishment, or maintenance of significant income differences between inhabitants). The limited residential mobility data available at the neighborhood level does not, however, allow for a complete analysis of these dynamic trajectories resulting from population renewal.

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