THE MIDDLE CLASSES AND SOCIO-SPATIAL TRANSFORMATIONS IN THE METROPOLISES OF RIO DE JANEIRO AND SÃO PAULO: 2000-2010

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Abstract

The first decade of the 21st century was marked in Brazil by important economic, social and political changes: a significant reduction in income inequalities; important decrease in unemployment and the growth of formal employment; a fair portion of the population got out of poverty through social policies; the increase in investment in education, health, housing, urban infrastructure, culture, among others, which resulted in the reduction of inequalities in multiple dimensions. Against this background, and in view of the historical dual character of the Brazilian city, the question that the article seeks to answer is: has the multidimensional reduction of inequalities resulted in a reduction in segregation and urban inequalities? In view of the aforementioned changes, our hypothesis is that the answer is positive. To demonstrate this, the article makes use of data from the 2000 and 2010 demographic censuses, and compares the metropolitan regions of Rio de Janeiro and São Paulo, based on important methodological innovations in the way it constructs the categories of analysis, comparing to the existing studies on the subject.

Keywords

Middle Classes; Urban Segregation; Urban Inequalities; Rio de Janeiro; São Paulo.

AS CLASSES MÉDIAS E AS TRANSFORMAÇÕES SOCIOESPACIAIS DAS METRÓPOLES DO RIO DE JANEIRO E SÃO PAULO: 2000-2010

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Resumo

A primeira década do século XXI foi marcada, no Brasil, por importantes mudanças econômicas, sociais e políticas: redução significativa das desigualdades de rendimento; diminuição relevante do desemprego e crescimento do emprego formal; saída da miséria de parcela expressiva da população em decorrência de políticas sociais; aumento do investimento em educação, saúde, habitação, infraestrutura urbana, cultura, dentre outros, que resultaram na redução das desigualdades em múltiplas dimensões. Contra esse pano de fundo, e tendo em vista o histórico caráter dual da cidade brasileira, a pergunta a que o artigo procura responder é: a redução multidimensional das desigualdades diminuiu a segregação e as desigualdades urbanas? Diante das mudanças mencionadas, nossa hipótese é de que a resposta é positiva. Para demonstrá-lo, o artigo lança mão dos dados dos censos demográficos de 2000 e 2010 e compara as regiões metropolitanas do Rio de Janeiro e de São Paulo, utilizando como base inovações metodológicas importantes na forma de construção das categorias de análise, vis-à-vis os estudos existentes sobre o tema.

Palavras-chave

Classes Médias; Segregação Urbana; Desigualdades Urbanas; Rio de Janeiro; São Paulo.

MIDDLE CLASSES AND SOCIO-SPATIAL TRANSFORMATIONS IN THE METROPOLISES OF RIO DE JANEIRO AND SÃO PAULO: 2000-2010[1]

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1. Introduction

Brazilian metropolises have long been considered dual cities, in which the spaces of the upper and the lower classes stand in opposition, thereby reproducing in the capitalist urban space the historical contrast between the plantation house and the slave quarters. These cities are segregated by the social exclusivity of the two types of space; profoundly unequal cities due to the huge differences in the quality of housing and their urban environment. This "classic" urban dualism, a reflection of social inequalities in the urban space, was reinforced, in practice and in theoretical analysis, by the model of the global city (SASSEN, 1991), which on the one hand, highlighted the growth of economic inequalities resulting from financial globalization, and, on the other, the growth of exclusive forms of production and appropriation of the city, as opposed to the growing precariousness of the urban living conditions of the lower classes.

Since that time, the analysis of the accentuated income and wealth inequality resulting from financial globalization and neoliberal policies has broadened and become systematized. Piketty (2013) and researchers from his international network have accurately demonstrated this general trend of the capitalist world over recent

decades, albeit with considerable inequalities between countries. However, other aspects of Sassen's analysis (1991) have not been confirmed. Her thesis of social dualization due to a decline of the middle classes – which would have been the product of the Fordist mode of regulation and were doomed to disappear with it – has not materialized in many metropolises, including London (HAMNETT, 1994) and Paris (PRÉTECEILLE, 1995). Urban duality has also not revealed itself to be a systematic general trend, mainly because of the importance that public policies of urban welfare still acquire across several countries, and which regulate the capitalist production of the city and guarantee the supply of social housing and public services and infrastructure in low-income neighborhoods, as has been demonstrated in several studies that offer comparative analyzes on the evolution of urban segregation (KAZEPOV, 2005; MARCUSE; VAN KEMPEN, 2000; MALOUTAS; FUJITA, 2012).

The first decade of the twenty-first century in Brazil was marked by significant economic, social and political changes. Outstanding among these were: a substantial reduction in income inequalities (DEDECCA, 2015); a considerable decline in unemployment and rise in formal employment (KREIN; MANZANO, 2014; CARDOSO, 2015); social policies that lifted a sizable portion of the population out of poverty (MEDEIROS et al., 2014); and increased investments in education, health, housing, urban infrastructure, and culture, among others, all of which resulted in reducing inequalities on multiple levels (CAMPELLO et al., 2018). Against this background, and bearing in mind the historical dualization of the Brazilian city, the question we set out to answer is: has the multidimensional reduction of inequalities resulted in a decline in urban segregation and inequalities? In view of the broad extent of changes over the decade, our hypothesis is that the answer is positive. In order to investigate this, we have used data from the 2000 and 2010 demographic censuses (IBGE, 2002; 2012),[2] and draw a comparison of the metropolitan regions of Rio de Janeiro and São Paulo.

2. Categories

The model of the global city has highlighted a growth in the main professional categories linked to multinational finance and management, with a very high level of income, and in the precarious, lower class workers who provide the services consumed by the former. This development, in accordance with this model, has marked, with varying intensities, most of the large metropolises of the developed capitalist world, according to the greater or lesser centrality of each metropolis in

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2. The Brazilian Institute of Geography and Statistics (IBGE).

financial globalization. However, even in the case of the most central cities, such as London and New York, the number of people in the upper categories represents only a small part of the employed population. Moreover, if, in these metropolises, jobs directly related to industrial production have actually experienced a sharp drop, industrial transfers to other regions or countries have been accompanied by an intense growth in highly qualified or medium-skilled jobs in upstream production activities (research and development, design, marketing); production monitoring and governance (the organization of complex production chains across different locations, linkages with many subcontractors – even more important activities given that production is both dispersed and governed by just-in-time principles, a reduction of intermediate stocks and a search for the rapid adaptation of products to innovations); and, in downstream activities, in advertising, transportation, distribution, and delivery activities. These economic transformations of cities have been brought to light by many authors, from various angles, from the "learning economy" (STORPER, 1997) to the "hyper-industrial" society (VELTZ, 2017), and passing on through the "creative city" (FLORIDA, 2005).

All these activities have been developed in interaction with communication and information networks, with research centers and universities, with cultural industries, and have led to the growth of highly qualified or medium-skilled jobs that have also contributed to the growth of the new middle classes. Education, health, and culture services, as well as recreation services for the population, are also under development and have equally contributed to the growth of the salaried middle classes, often with a strong public sector component, frequently underestimated by the aforementioned authors.

São Paulo and Rio de Janeiro have also suffered a substantial reduction in industrial employment and growth in both upstream and downstream production services. In order to grasp the effects of these economic transformations on the social and spatial structure of cities, it is necessary to obtain social categorizations capable of detecting either new or expanding professional categories. Thus, in this research program, for the Brazilian case, we decided to adapt the *Catégories Socio-Professionnelles* (CS)[3] [Socio-Professional Categories (SPC)] defined in France by the Institut national de la statistique et des études économiques (Insee). Essential for our purposes, the CS have the advantage of offering a very detailed representation of the "intermediate" part of the social structure, as well as its limits, i.e., the

3. The French acronym (CS) will be maintained and used throughout the article.

boundary between the middle classes and the upper classes and between the middle classes and the lower classes.[4]

Two research efforts proposed similar approaches on the metropolises of Rio de Janeiro and São Paulo. The first was the work of Eduardo Marques and his team at the Center for Metropolitan Studies, at the University of São Paulo (CEM-USP), which used the Erikson-Goldthorpe-Portocarero, or EGP, categorization (ERIKSON; GOLDTHORPE, 1992) to construct the social classes. The EGP is widely used in international comparative analyzes on social mobility. However, for theoretical reasons related to the principles of its construction, and for practical reasons related to the small samples available to social mobility researchers, the EGP categories that apprehend the middle classes are much less detailed than those of the CS, which thereby leads to significant differences in results.[5]

The second research effort was coordinated by Luiz C. de Queiroz Ribeiro (2015) at the Observatório das Metrópoles, of the Research and Urban Planning Institute at the Universidade Federal do Rio de Janeiro (Ippur-UFRJ). This task was closer to ours because it also used an adaptation of the French CS, which they called "socio-occupational categories" (SOCs). This proximity is unsurprising, since the development of SOCs resulted, initially, from the joint work between Préteceille and Ribeiro (PRÉTECEILLE, 2002).

The project of comparing the two metropolises is taken up again by the two authors of the present article, who, unlike the previous experience, have been able to work directly with the IBGE microdata, which has enabled us to adapt the CS with more precision than in the first attempt. Further on, we will compare the two categorizations and the results they produced.

The socio-professional categories of the employed people surveyed in the census sample allowed the socio-professional structure of the two metropolises to

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4. For a detailed discussion on the theoretical and methodological aspects of these categories and their adaptation, we refer the reader to Cardoso and Préteceille (2017), Préteceille and Cardoso (2019), Cardoso and Préteceille (2021). Page Pereira (2021) meticulously constructed the flowchart of our classification, which he compared with other Brazilian classifications, thereby providing a great service to the studies of the Brazilian social structure. PRÉTECEILLE, E.; CARDOSO. Comparer les structures sociales de Paris, Rio de Janeiro et São Paulo. In: AUTHIER, J-Y. et al. (org.). *D'une ville à l'autre. La comparaison internationale en sociologie urbaine.* Paris: La Découverte, 2019. p. 247-264. PAGE PEREIRA, L. *Anamorphose sociale. Classes sociales et inégalités sociales au Brésil au cours des années 2000.* Doctoral Thesis in Sociology, Université Paris-Saclay, Gif-sur-Yvette, 2021.

5. For example, based on the EGP, Scalon and Salata (2012) concluded that there was no growth of the middle classes between 2000 and 2010 in Brazil. But in Cardoso and Préteceille (2017), based on the CS, it was demonstrated that there was significant growth in all middle class segments. More information will be presented further on. SCALON, C.; SALATA, A. Uma nova classe média no Brasil da última década? O debate a partir da perspectiva sociológica [A new middle class in Brazil in the last decade? The debate from the sociological perspective]. *Revista Sociedade e Estado*, v. 27, n. 2, p. 387-407, 2012.

be constructed for the years 2000 and 2010, and a comparison of the number of employed people and the weights of the categories on those dates enables a detailed analysis of the transformations they experienced during this period.

However, this comparison is more difficult than it may seem, for one technical reason. During the numerous analyzes we conducted with the microdata from the 2010 census sample (IBGE, 2012) in order to rebuild the CS, and test the coherence of our classification, we discovered that the Brazilian Classification of Occupations (BCO), our starting point, had not been coded by the IBGE for 9.1% of those employed in the Metropolitan Region of Rio de Janeiro (MRRJ) and for 9.5% of those in the Metropolitan Region of São Paulo (MRSP). These percentages are much higher than those observed for the 2000 Census (IBGE, 2002): respectively, 1.4% for the MRRJ and 1.3% for the MRSP. We only managed to code the CS for a small portion of affected people, for whom other variables provided identification (military, business leaders), but there were still 8.1% of the active population in MRRJ with no CS for 2010 and 8.3% in the MRSP. There is, therefore, a considerable margin of uncertainty regarding the changes that we may have observed. Only the most pronounced variations may be considered significant.

CS		MRRJ		MRSP	
		2000	2010	2000	2010
CS10	Farmers	0.1%	0.0%	0.1%	0.0%
CS69	Agricultural Workers	0.4%	0.7%	0.4%	0.8%
Rural occupations		0.6%	0.7%	0.5%	0.8%
CS21	Artisans	7.8%	6.2%	7.0%	5.7%
CS22	Shopkeepers and similar	2.5%	2.4%	2.7%	2.2%
Urban petty bourgeoisie		10.3%	8.6%	9.7%	7.9%
CS23	Business owners (of more than five employees)	0.7%	0.3%	0.9%	0.3%
CS31	Liberal professionals	2.0%	3.0%	1.8%	2.8%
CS33	Senior civil servants	0.8%	1.4%	0.5%	0.6%
CS36	Executives	0.2%	0.2%	0.3%	0.3%
Urban upper classes		3.8%	4.9%	3.6%	4.1%
CS34	Teachers, professionals in scientific and literary activities	2.0%	1.9%	1.6%	1.4%
CS35	Information, arts and entertainment professions	1.3%	1.2%	1.1%	1.0%
CS37	Senior corporate administrative and commercial positions	2.2%	3.0%	2.9%	5.0%
CS38	Engineers and technical professionals in companies	2.0%	3.1%	2.3%	3.7%
Upper middle classes		7.6%	9.2%	7.9%	11.0%
CS42	Primary and secondary school teachers, instructors	3.4%	4.1%	2.7%	3.7%
CS43	Intermediate occupations in health and social work	2.0%	2.6%	1.6%	2.1%
CS44	Clergy and religious occupations	0.1%	0.1%	0.1%	0.1%
CS45	Intermediate administrative occupations in public administration	1.4%	1.8%	0.9%	0.5%

CS		MRRJ		MRSP	
		2000	2010	2000	2010
CS46	Intermediate corporate administrative and commercial occupations	4.1%	4.0%	5.1%	5.0%
CS47	Technicians	2.7%	2.4%	3.0%	2.7%
CS48	Foremen/women, work supervisors	0.4%	0.4%	0.5%	0.5%
Middle-middle classes		14.2%	15.4%	14.0%	14.6%
CS52	Salaried public administration civil service workers and agents	2.0%	1.5%	1.5%	1.0%
CS54	Corporate administrative employees	8.8%	9.8%	10.6%	11.7%
Lower middles classes		10.8%	11.3%	12.1%	12.7%
CS53	Police, surveillance agents and low-ranking military	5.2%	3.7%	3.5%	3.2%
CS55	Commercial employees	10.5%	9.7%	9.5%	8.6%
CS56	Personnel providing direct personal services	5.0%	4.3%	4.9%	3.7%
CS57	Domestic workers	8.8%	9.1%	7.2%	7.3%
Lower service classes		29.6%	26.9%	25.1%	22.8%
CS62	Formal manufacturing-type workers	4.0%	3.9%	8.2%	7.3%
CS63	Formal artisanal-type workers	5.9%	6.6%	5.8%	7.2%
CS64	Drivers	1.7%	1.3%	1.3%	1.0%
CS65	Maintenance, storage and transport workers	2.3%	2.8%	2.2%	2.7%
CS67	Informal manufacturing-type workers	2.2%	1.6%	3.3%	2.4%
CS68	Informal artisanal-type workers	7.1%	6.8%	6.3%	5.5%
Working Class		23.2%	23.0%	27.1%	26.1%
Total		100.0%	100.0%	100.0%	100.0%

Table 1. Detailed socio-professional categories. The metropolises of Rio de Janeiro and São Paulo (2000 and 2010)

Source: Own elaboration based on microdata from the 2000 and 2010 Demographic Censuses (IBGE, 2002; 2012).

Thus, with the categories we created, it is possible to verify that, in the two metropolises, around half of the employed people belonged to the group of manual workers (lower services workers and working class); and that, between 2000 and 2010, this weight decreased from 53% to 50% in Rio de Janeiro, and from 52% to 49% in São Paulo. This result clearly challenges the generalized image of dual metropolises inhabited by a large majority of working classes and a small minority of privileged people. If we considered the entire population, including those who were idle, the weight of the lower classes would undoubtedly be a little higher due to their demographic structure, although this would however, cast no doubts on the results.[6]

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6. In the MRRJ, for example, in 2010, urban lower class households reported an average of 3.8 members, and working class households 3.87, while upper middle class households had 3.23 members, according to the Demographic Census of IBGE (2012).

The previously published work of other authors, however, offers different results. For São Paulo, in 2010, Eduardo Marques (MARQUES, 2014) reported 41% of manual workers and 17% of low-level routine non-manual workers, forming a total of 58%. For the same metropolis in 2010, Bógus and Pasternak (2015, p. 118) described a total of 56% of members from the lower classes. Moreover, for Rio de Janeiro in 2010, Ribeiro (2015, p. 172) registered a total of 58% from the same classes. The difference between our measures probably stems from the fact that we classify in the urban petty bourgeoisie self-employed workers, who pay their own social security tax, and two categories of office workers in the lower middle classes, because of the relative stability of their status. The boundaries between classes are not always clear, but it seems to us that the choices we have made (CARDOSO; PRÉTECEILLE, 2017, p. 996) are sociologically relevant, in view of the criteria for defining the lower classes (SCHWARTZ, 2011).

Within the lower classes, the working class carried a slightly heavier weight in São Paulo than the lower service classes (a gap that increased between 2000 and 2010), while these were significantly more numerous in Rio de Janeiro (a gap that decreased in the period). The lower service classes decreased in both cities. The working class remained stable, although, observing with more detail, manufacturing workers, with both a formal and informal status, demonstrated a significant decline, offset by the growth of artisanal workers with a formal status and of maintenance, storage and transport workers.

The group of middle classes represented around one third of those in employment in 2000 in both metropolises. In general terms, there was a significant increase in both, although it was a little stronger in São Paulo, between 2000 and 2010 (particularly in the upper middle classes).

These results also differ from those previously published. Marques assessed the middle categories at 30% in 2000 in São Paulo (MARQUES, 2014; Graph 1, p. 683, EGP II + IIIa + V), with a moderate but significant decline in 2010. Bógus and Pasternak (2015, p. 118) also made an estimation of 30% in 2000 for São Paulo, again with a moderate but significant decline. Ribeiro (2015, p. 172), lastly, reported 27.9% in 2000 for Rio de Janeiro, once again with a moderate, although significant decline in 2010. The difference in the numbers is explained by the fact that, in the upper middle classes, we classified a part of what the three other authors had categorized as higher-level professionals, and in the lower middle classes a part of what they classified as routine non-manual workers. Here, it is reiterated, our choices seem more precise and more relevant (CARDOSO; PRÉTECEILLE, 2017, p. 993-996).

The results are also different in terms of evolution, since the three studies reported a decline in the middle classes between 2000 and 2010, whereas we

observed a significant increase in their weight in the economically active population (EAP), moving up from 32.6% to 35.8% % in Rio de Janeiro, and from 34% to 38.3% in São Paulo. Even excluding the upper middle classes, which grew sharply – as well as higher-level professionals in the classification of those authors –, we identified a significant progression of the middle-middle classes, and a moderate progression for the lower middle classes. As the original data used by all of us are the same, it would be necessary to compare the recoding algorithms employed by the teams to understand the origin of the divergences. Until the opposite is proved through such an analysis, our results are maintained: in both cities, the middle classes represented more than a third of the employed population – more than the working classes or the lower service classes, respectively – and throughout the decade, they continued to advance.

The upper classes increased significantly in Rio de Janeiro, since they went from 3.8% to 4.9%, due to the growth of senior positions in the civil service and liberal professions. In São Paulo also, they went from 3.6% to 4.1%, due to the growth of liberal professions. These results are more difficult to compare, since Bógus and Pasternak (2015), in addition to Ribeiro, adopted a more restrictive definition of leaders; Marques (2014), in turn, only classified employers in this category.

The urban petty bourgeoisie, made up of artisans and tradespeople, represented around 10% in the two metropolises in 2000, and the weight of this decreased significantly in both. Bógus and Pasternak, as well as Ribeiro, reported much less, around 2%. The difference probably results from the fact that in this category, we have included artisanal or commercial occupations working on a self-employed basis, although paying their own social security taxes.

In short, the structural evolution of occupations in Rio de Janeiro and São Paulo during the first decade of the twenty-first century was marked by a shift toward medium and high-skilled categories, a growth of the middle classes and a decline of the lower classes. This evolution clearly invalidates the hypothesis of dualization arising from the model of the global city, which assumes the growth of the upper and upper middle classes, the decline of the middle classes and a strong growth of the tertiary proletariat, capable of compensating for the decline in the manufacturing working class, the result of deindustrialization. The hypothesis under analysis was supported by Ribeiro, both in his 2000 article, co-authored with Lago, and in the 2015 book (p. 173), even in the face of evidence, present in the author's own categories, that the weight of the lower tertiary categories has not increased.

Marques (2014, p. 684), in turn, discarded the hypothesis of dualization and maintained that of professionalization as proposed by Hamnett (1994), while noting

that the weight of manufacturing workers remained high in São Paulo, despite a decline, a sign of the permanence of an important manufacturing activity in the metropolis.

Our results, however, have enabled us to include two relevant additions to the professionalization thesis. First, if it is true that, on the one hand, the growth of the upper middle classes is the strongest and if, within them, it is their participation as company managers and engineers that has grown the most, then on the other hand, the contribution of the most qualified categories of higher education teachers, research, and health and cultural activities is equally significant and requires a more complex reading than that of the productive restructuring of globalized capitalism. Second, the growth of the middle classes that we have highlighted demonstrates that not only the most qualified professionals are progressing. We also note, with Marques (2014), that a slight decrease in the weight of the manufacturing working class contrasts with a sharp decline in most of the large cities in the western capitalist world. For São Paulo, this certainly reflects the continued strength of manufacturing activity. For Rio de Janeiro, the small decline is mainly due to the growth of workers employed in the civil construction sector, which rose from 5.8% of the total employed in 2000 to 6.6% in 2010, due to the significant public investments in works for major sporting events held in the city (FIFA Confederations Cup in 2013, World Cup in 2014, Olympic Games in 2016), in addition to the Growth Acceleration Program (PAC), launched in 2007 and which included large infrastructure projects in Rio's favelas, along with other large-scale projects, such as the *Minha Casa Minha Vida* Program [My Home, My Life], in 2009. If we exclude this sector, the drop in the participation of workers in the groupings of other sectors is much more pronounced.

3. The general evolution of segregation

Having mapped the change in the socio-professional structure of the two metropolises, we move on to the study of their spatial segregation. The simplest way to measure the intensity and evolution of urban segregation is through synthetic indices. These measures depend on categories that describe/determine social reality; on the scale and form of spatial division in units of analysis; on the perimeter of the urban complex; and on the type of index used (OBERTI; PRÉTECEILLE, 2016).

We will use the French socio-professional categories and their aggregation into social classes, as discussed above.

For the choice of spatial units, it is appropriate to obtain as fine a division as possible to avoid the segregation becoming diluted by an averaging effect between

very contrasting social spaces included in the same unit – for example, the favelas of the South Zone of Rio adjacent to the wealthy neighborhoods of Copacabana, Ipanema, Gávea or São Conrado. The finest possible division is that of the weighted areas (WAs), the smallest spatial units defined by the IBGE in which data from the census sample are representative – an average size in 2000 of around 10,000 employed persons for the MRRJ, and 8,800 for the MRSP. The difficulty here lies in a change of the census sample rate (10% of the population in 2000, 5% in 2010), as well as in the weighted areas, which were about twice as numerous and twice as large in 2010. An assessment of the evolution of segregation, in order to be rigorous, must assume a constant division, for which there are three solutions:

1. Use a division which is less refined but stable over time, encompassing WAs, as is the case with districts. This was the choice made for 2010 by Bógus and Pasternak (2015) and by Ribeiro (2015); but it clearly weakens the measurement, due to the averaging effect, since the number of districts is five times less, therefore, five times larger than the WAs.
2. Use the 2010 WAs, projecting the 2000 Census data onto them. Here, some spatial subtlety is lost, albeit less than in the previous choice. The 2010 WAs are about twice as large as the 2000 WAs, a choice made by Eduardo Marques in his analysis of São Paulo. However, we were forced to reject this choice for Rio de Janeiro after noticing that the resizing of the WAs in 2010 by the IBGE fell short of what was acceptable for several municipalities in the MRRJ.
3. Use the 2000 WAs, projecting the 2010 Census data onto them. This was the option we decided upon, with the help and advice of the IBGE.[7] The advantage of this is better spatial subtlety. The restriction is that we are unable to use very detailed variables, for reasons of sample robustness.

For the perimeter, we decided to work with the metropolitan regions, the definition of which, although administrative, is relatively homogeneous in relation to the two cities and includes most of the population of their functional urban regions.

There are many segregation indices, which measure different aspects and different dimensions of segregation (MASSEY; DENTON, 1988). Here, we have

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7. The IBGE provided us with a correspondence file between the 2010 household numbers and the 2000 WAs, which contained, however, a certain number of errors and gaps. We therefore had to make corrections and additions by hand. We also needed to redo the 2000 WA digitalized map (shapefile), with the help of the Center for Metropolis Studies (CEM), in São Paulo.

retained the segregation index (S), which compares the distribution of a category in the spatial units with that of all the others, as well as the dissimilarity index (D), which compares the distribution of two categories.[8] We have calculated the first for the detailed CSs, and the second for the classes into which they are grouped, in order to obtain a more synthetic view of the proximities and distances between the categories.

Graph 1 presents the scores for the segregation index (S) of the two metropolises in 2000 and 2010. We observed several results that we had only established for the year 2000 (PRÉTECEILLE; CARDOSO, 2008). The first was that the strongest segregation was that of the urban upper classes (CS23, 36 and 31), followed, at a significantly lower level, by the upper middle classes (CS34, 35, 37 and 38, where CS33 takes on an intermediate position – see Graph 1). This is a classic result, present in all large capitalist cities where similar analyzes have been conducted, although, in the two Brazilian metropolises under study, the segregation of the upper class is particularly intense – around 0.5, a score that may be considered high, given that the WAs' scale of the was not so refined (compared to that of the census tracts of the censuses in the United States, for example, or even of the IRIS in the French censuses). This result reinforces that the most intense segregation is *voluntary*, produced by the categories that mostly choose their place of residence, while maintaining the others at a distance.

The working class (CS6x) follows next, however the segregation indexes that it presents were much less intense (between 0.20 and 0.25), which may be considered as moderate. CS48 – Foremen/women –, which is the middle-class profession closest to manual workers, presented a segregation index close to these.

The least segregated were the lower service classes (CS53, 55, 56 and 57), the lower middle class (CS52 and 54) and the middle-middle classes (CS4x, except the previously mentioned CS48, as well as CS45 – intermediate administrative professions of the civil service), with indices mostly below 0.20.

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8. We have not used the Moran index used by other colleagues, such as Marques (2014), which has the advantage of considering the strictly spatial dimension of grouping or excluding categories, but which, above all, serves to highlight more striking social and spatial contrasts. Instead, we have sought here to take into account all the local situations, contrasting or not, and social categories, strongly segregated or not. This is why we have not compared our results with those of Becceneri, Alves and Vazquez (2019), who only used the Moran index and for highly aggregated categories. BECCENERI, L.B.; ALVES, H. P. da F.; VAZQUEZ, D. A. Estratificação sócio-ocupacional e segregação espacial na metrópole de São Paulo nos anos 2000 [Socio-occupational stratification and spatial segregation in the metropolis of São Paulo in the 2000s]. *Revista Brasileira de Estudos Urbanos e Regionais*, v. 21, no. 1, p. 137-154, 2019.

The difference should be emphasized between the intensity of segregation of the working categories and that of the lower service classes because, although this was moderate, it demonstrates an internal contrast within the lower classes, against the idea of undifferentiated lower classes often presented for Brazilian metropolises.[9]
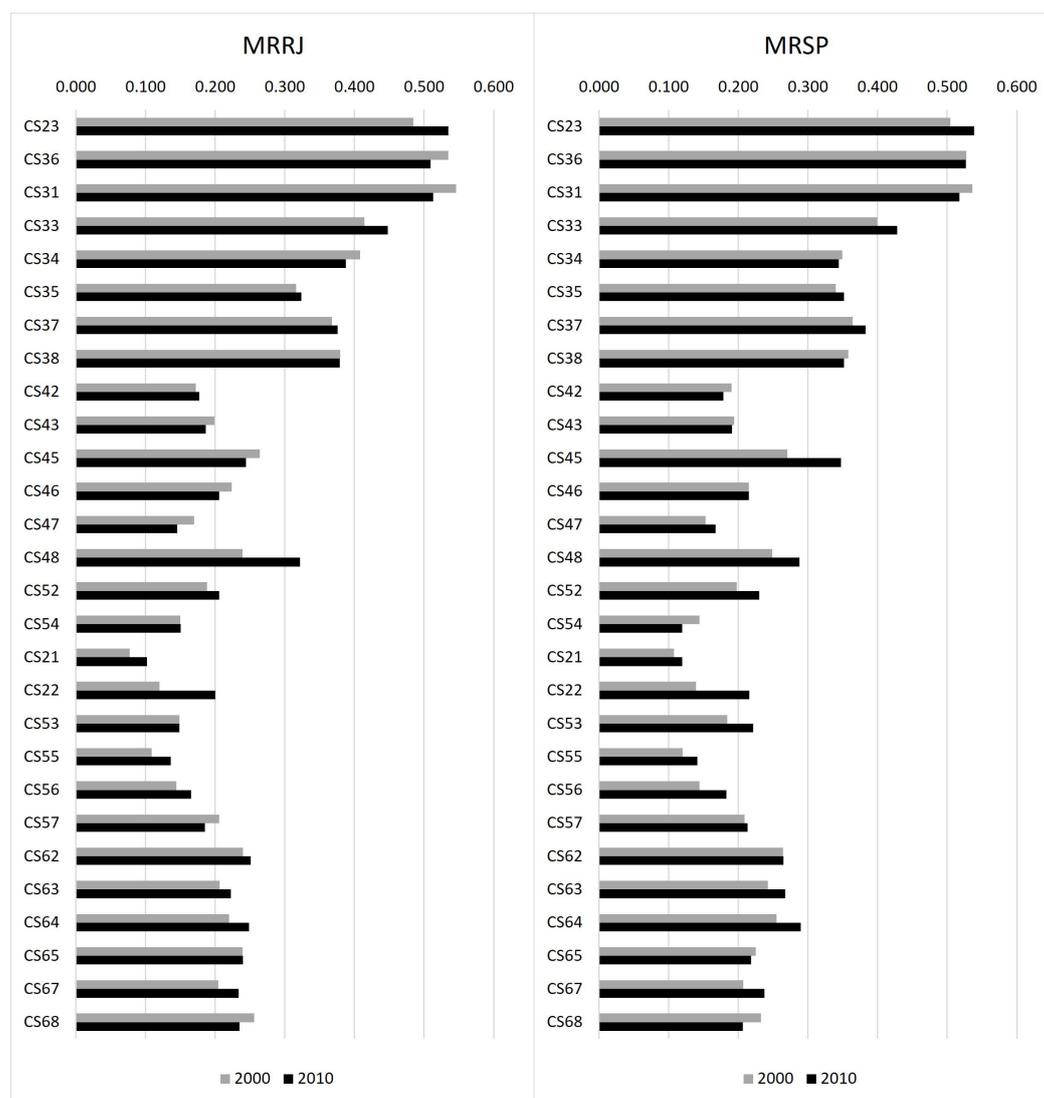
Graph 1. The CS segregation index in 2000 and 2010

Note: See Table 1 for the complete CS names. We have omitted the rural categories, CS10 and CS69, and the religious category, CS44, which have very specific spatial distributions. We used the software Geo-Segregation Analyzer by P. Apparicio.

Source: IBGE, 2000 and 2010 censuses (IBGE, 2002; 2012), CS recoding and calculations by the authors.

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9. See for example, Machado da Silva (2020). MACHADO DA SILVA, L. A. F*azendo a cidade: trabalho, moradia e vida local entre as camadas populares urbanas* [Making the city: work, housing and local life among urban lower layers]. Rio de Janeiro: Mórula, 2020.

The low levels of segregation in the middle-middle and lower middle classes are also a result that deserves attention. Although classic, it reveals that these social categories have become more mixed with the others, contrary to many discourses that, based on the analysis of gentrification, consider the middle classes as the central actors in the intensification of segregation (LEE; SLATER; WYLY, 2010; CLERVAL, 2013; DONZELOT, 2004). This finding thus underlines the importance of distinguishing the different components of the middle classes, whereby the upper middle classes are in fact very segregated, while the middle and lower segments are not.

The intensity of segregation measured by this S-index is very similar between the two cities; indeed, the two graphs are practically superimposable. However, there are differences in their temporal evolution.

In both cases, the general trend was toward a rise in the segregation index: 17 out of 28 in São Paulo, and 16 out of 28 in Rio de Janeiro. However, growth was mostly low to moderate.

In the upper classes, the segregation index grew in the case of business owners (CS23) and senior civil servants (CS33), both in Rio de Janeiro and São Paulo. However, it decreased in both cities for liberal professions (CS31), and in Rio for private company executives (CS36), which remained stable in São Paulo.

In the upper middle classes, in both metropolises, the segregation index either slightly decreased or remained stable for teachers and literary and scientific professions (CS34) and engineers (CS38). It increased slightly for occupations in information, arts, and entertainment (CS35) and for administrative and commercial executives (CS37).

In the middle-middle classes, segregation decreased in Rio de Janeiro for all the CS, except for teachers (CS42) – with a small increase – and foremen/women (CS48) – with a strong growth. In São Paulo, there was also a strong growth for foremen/women (CS48) and for intermediate administrative (CS45) and technical (CS47) positions, with a slight decrease or stability for the others.

With regard to the lower middle classes, segregation grew in Rio de Janeiro and São Paulo in the case of civil servants (CS52). However, in the case of corporate administrative employees (CS54), it remained stable in Rio and fell sharply in São Paulo.

For the urban petty bourgeoisie, artisans (CS21) and tradespeople (CS22), the segregation index increased sharply in both metropolises, especially for tradespeople – remaining, however, at a very low level.

In relation to the lower services categories, the trend in both cities was a very significant increase in the segregation index, except for domestic workers, which decreased in Rio de Janeiro.

With regard to the working class, the general trend was also toward an increase in the segregation index, except for informal artisan-type workers

(CS68), in relation to which there was a decline. For maintenance, storage and transport workers (CS65), a slight decline was detected in São Paulo, but for formal manufacturing workers in São Paulo, the index remained stable.

The following two graphs summarize the results for the aggregated classes. The overall structure of segregation may be clearly observed: strong for the upper classes, significantly less for the upper middle classes; then moderately strong for the working class; then low for the middle-middle and lower middle classes, the urban petty bourgeoisie and the lower service classes.
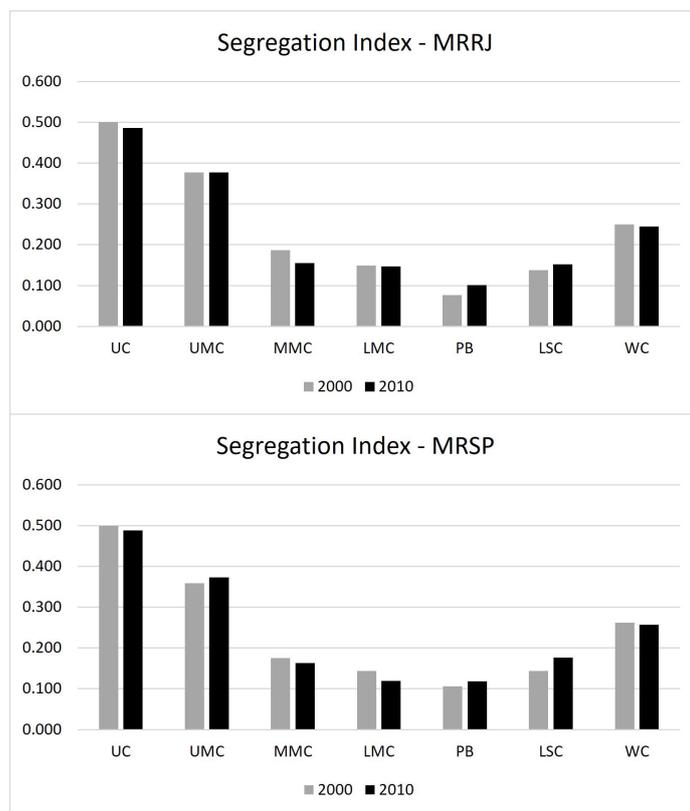
Graph 2. Evolution of the segregation index (S), per social class, in MRRJ and MRSP (2000-2010)
Source: Own elaboration based on microdata from the 2000 and 2010 Demographic Censuses (IBGE, 2002; 2012).

Here, our results converge with those of Marques (2014, p. 685), differing in that we observed a greater intensity of segregation in all classes, mainly at the two extremes: almost 0.5 for the upper classes, where Marques reported around 0.4, and around 0.25 for the working class, where Marques reported 0.15. These differences may be explained, first, by the better selectivity of our categories, but also, and chiefly, by the more refined scale used here, since, as previously stated, Marques used the division in the WAs of 2010, on average twice as large as that of 2000.

The general structure is also convergent with that reported by Ribeiro (2015) for Rio in 2010, with index values close to those of Marques (2014) for the middle and lower categories – which is logical, since his analysis was made on the same scale as the 2010 WAs (CHÉTRY, 2015, p. 193). On the other hand, they reported index levels even significantly higher than ours for the upper classes and senior professionals – the definition of which seems close to that of our upper middle classes. In the case regarding their category of leaders, the result is undoubtedly due to a more restrictive definition of this category, which, in their analysis, represented less than 1% of the active population, whereas our upper classes represent around 5%. On the other hand, their senior professional category (12.3% of the active population) is less selective than our upper-middle classes (9.2%). However, it is likely to mainly include the upper categories, which the authors did not classify in the upper classes, and which logically causes their index to increase. Nevertheless, it is surprising that this slightly higher selectivity more than compensates for the expected drop in the index due to the less refined scale. The difference between the Ribeiro and Marques results for unskilled workers in the tertiary sector is also surprising. Marques reported, as did we, a significantly lower index than that of the working class, while Ribeiro revealed, for São Paulo, an index which was close to that of the workers.

In terms of the evolution of the segregation indices, it should be noted, first, that the indices for the aggregated classes demonstrated either stability or a slight decrease. The only cases of increase – moderate – were those of the urban petty bourgeoisie and the lower service categories, and, in São Paulo, only the upper middle classes.

This result differs slightly from that previously presented for the detailed categories, in which we noticed an increase of a small majority of the categories in the segregation index. Aggregating categories into classes slightly reverses the overall trend by averaging the different changes within each class.

The evolutions illustrated by our graph for São Paulo differ slightly from those observed by Marques (2014) for the EGP classes. He reported a strong growth for the index of owners and employers, and low for that of low-level professionals, while we came across a slight drop both for the index of the upper classes and for the middle-middle classes. Marques indicated a slight growth for the index of routine non-manual workers, a low level, where we identified a more sustained growth for the index of lower service classes. A priori, the difference in scale does not affect changes in time. It is, therefore, mainly due to the differences in defining the categories that we must attribute these (moderate) divergences in results. It is not possible to make comparisons with the analyzes by Ribeiro (2015) at this point, since only the segregation indexes for 2010 are present in the publication.

To complete the analysis on segregation by indices, the most useful is the index of dissimilarity between categories. It would be interesting to consider it for the detailed categories – we have already seen that these obviously allow a more refined reading –, although the size of the tables and the extension of the analysis of the results would exceed the limits of this article. Therefore, we remain with the index of dissimilarity between the aggregated classes.

For the MRRJ, in 2000, Table 2 emphasizes the extent to which the social hierarchy, deeply marked between classes, something we have identified in different cumulative dimensions (CARDOSO; PRÉTECEILLE, 2021, chap. 2), is also presented in the proximity and distances in the residential space.

MRRJ 2000	UC	UMC	MMC	LMC	PB	LSC	WC
UC		0.17	0.40	0.47	0.49	0.56	0.65
UMC	0.17		0.25	0.32	0.36	0.44	0.53
MMC	0.40	0.25		0.11	0.16	0.25	0.35
LMC	0.47	0.32	0.11		0.13	0.20	0.30
PB	0.49	0.36	0.16	0.13		0.12	0.21
LSC	0.56	0.44	0.25	0.20	0.12		0.12
WC	0.65	0.53	0.35	0.30	0.21	0.12	
MRRJ 2010	UC	UMC	MMC	LMC	PB	LSC	WC
UC		0.16	0.41	0.48	0.50	0.55	0.63
UMC	0.16		0.29	0.36	0.38	0.44	0.52
MMC	0.41	0.29		0.13	0.16	0.23	0.31
LMC	0.48	0.36	0.13		0.14	0.19	0.26
PB	0.50	0.38	0.16	0.14		0.13	0.20
LSC	0.55	0.44	0.23	0.19	0.13		0.12
WC	0.63	0.52	0.31	0.26	0.20	0.12	
MRRJ Δ*	UC	UMC	MMC	LMC	PB	LSC	WC
UC		−0.01	0.01	0.01	0.00	−0.01	−0.02
UMC	−0.01		0.04	0.03	0.02	0.00	−0.01
MMC	0.01	0.04		0.02	0.00	−0.02	−0.04
LMC	0.01	0.03	0.02		0.00	−0.01	−0.04
PB	0.00	0.02	0.00	0.00		0.01	−0.01
LSC	−0.01	0.00	−0.02	−0.01	0.01		0.00
WC	−0.02	−0.01	−0.04	−0.04	−0.01	0.00	

Table 2. The dissimilarity index between the classes – MRRJ[10]
Legend: *The third part of the tables presents the differences between the indices from 2010 and 2000.
Source: Own elaboration based on microdata from the 2000 and 2010 censuses (IBGE, 2002; 2012).

10. In both tables, to simplify the reading, we have excluded non-urban classes (rural landowners and rural workers), who have residual participation among the employed in the metropolises.

Thus, the upper classes are especially close to the upper middle classes, very far from the middle and lower middle classes and the urban petty bourgeoisie, and exceedingly far from the lower service categories and even more so from the workers.

We identified the same hierarchy, although with attenuated distances, for the upper middle classes, which moderately approach the middle and lower middle classes and the urban petty bourgeoisie, while distancing themselves from the lower service categories and even more from the working class, albeit less than the upper classes.

For these two classes, the results explain the high score of their segregation index: it results most notably from their intense segregation from the working class.

The middle-middle classes are very close to the lower middle classes and the urban petty bourgeoisie, moderately close to the upper middle classes and the lower service classes, moderately distant from the working class and, lastly, more distinctly distant from the upper classes.

It should be highlighted that the lower middle classes have approximately the same proximity as before, although they have become very slightly closer to the working class and somewhat further away from the upper classes.

The urban petty bourgeoisie, in turn, is very close to the middle-middle, and lower middle classes and to the lower service classes, moderately close to the working class, moderately distant from the upper middle classes and distinctly distant from the upper classes.

For these three classes (middle-middle, lower middle and urban petty bourgeoisie), the results also explain the low score of the dissimilarity index. This is generally due to their proximity to one another and to the relative proximity to the two lower classes.

The lower service classes are very close to the urban petty bourgeoisie and the working class, moderately close to the middle and lower middle classes, and distinctly distant from the upper middle classes and even more so from the upper classes.

The working class, lastly, is very close to the lower service classes, especially close to the urban petty bourgeoisie, moderately distant from the middle and lower middle classes, and strongly distant from the upper middle classes and especially from the upper classes.

For the MRSP (Table 3), in 2000, we essentially came across the same results (Table 2). There is only one notable difference in relation to Rio de Janeiro, which concerns the urban petty bourgeoisie. In São Paulo, this class is a little less distant from the upper and upper middle classes than the lower middle classes, even

closer to the middle and lower middle classes and visibly less close to the lower service categories and the working class. In terms of socio-spatial hierarchy, the petty bourgeoisie ranks slightly above the lower middle classes.

MRSP 2000	UC	UMC	MMC	LMC	PB	LSC	WC
UC		0,21	0,40	0,48	0,44	0,56	0,64
UMC	0,21		0,23	0,31	0,29	0,42	0,51
MMC	0,40	0,23		0,13	0,11	0,25	0,33
LMC	0,48	0,31	0,13		0,11	0,19	0,28
PB	0,44	0,29	0,11	0,11		0,18	0,27
LSC	0,56	0,42	0,25	0,19	0,18		0,14
WC	0,64	0,51	0,33	0,28	0,27	0,14	
MRSP 2010	UC	UMC	MMC	LMC	PB	LSC	WC
UC		0,20	0,40	0,51	0,45	0,57	0,63
UMC	0,20		0,24	0,37	0,31	0,44	0,51
MMC	0,40	0,24		0,16	0,13	0,26	0,32
LMC	0,51	0,37	0,16		0,15	0,16	0,21
PB	0,45	0,31	0,13	0,15		0,20	0,26
LSC	0,57	0,44	0,26	0,16	0,20		0,16
WC	0,63	0,51	0,32	0,21	0,26	0,16	
MRSP Δ*	UC	UMC	MMC	LMC	PB	LSC	WC
UC		−0,01	0,00	0,03	0,00	0,01	−0,01
UMC	−0,01		0,01	0,06	0,02	0,02	0,00
MMC	0,00	0,01		0,03	0,02	0,01	−0,01
LMC	0,03	0,06	0,03		0,03	−0,03	−0,07
PB	0,00	0,02	0,02	0,03		0,02	−0,01
LSC	0,01	0,02	0,01	−0,03	0,02		0,02
WC	−0,01	0,00	−0,01	−0,07	−0,01	0,02	

Table 3. The dissimilarity index between the classes – MRSP
Legend: *The third part of the tables presents the differences between the indices from 2010 and 2000.
Source: Own elaboration based on microdata from the 2000 and 2010 censuses (IBGE, 2002; 2012).

In general, both in Rio de Janeiro and São Paulo, the structure of proximity and distance between classes has remained considerably stable, as demonstrated by the small variations registered in the third part of the two tables (Tables 2 and 3).

In Rio de Janeiro, the only significant changes were related to the middle classes. These, as well as the lower middle classes, distanced themselves a little from the upper middle classes and became slightly closer to the lower classes, mainly the working class.

In São Paulo, the most notable change was related to the lower middle classes, which have moved significantly away from the upper classes, upper middle classes, middle-middle classes and the urban petty bourgeoisie, and rather pointedly have

moved closer to the lower service classes and the working class. This evolution confirms, in 2010, the hierarchical inversion partially observed in 2000 between the lower middle classes and the urban petty bourgeoisie.

The only possible point of comparison here is with Marques (2014). The general structure of the segregation described by the dissimilarity indices (ibid., Tables 2 and 3) is somewhat similar. In our case, we observed a more intense segregation at higher indices, which is particularly explained by the more refined scale used herein. We detected a more marked hierarchy between the classes, which must be attributed to the improved sociological quality of our classes in relation to the EGP classes.

With regard to the change over time, the main disagreement with Marques (2014) concerns the segregation of owners and employers, whose dissimilarity rates increase in relation to all other categories, while in our analysis these rates have remained stable. The explanation for this discrepancy is undoubtedly due to the more restrictive definition of this upper category in the EGP nomenclature, which signifies that it represents only about 2% of the total number of those in employment, compared to the 4% to 5% in our upper classes.

Two other divergences are related to the middle classes. Marques (2014) noted an approximation between professionals with higher education and professionals of a lower level, while we observed a slightly increasing distance between the upper middle classes, on the one hand, and the middle-middle and lower middle classes on the other. With regard to the growing mixture that he noted between the working and the middle classes, we only observed this with the middle and lower middle classes in Rio de Janeiro, and only with the lower middle classes in São Paulo. Once again, we consider our results to be more robust given the more accurate categorization we have constructed for the middle classes.

If the two metropolises are highly segregated due to the strong difference in the spatial distribution of the upper and upper middle classes, on the one hand, and the lower classes, on the other, then it is necessary to take into account, however, the very different numerical composition of these classes, in order to avoid caricatured readings (see Table 1).

Thus, considering the dissimilarity index, the upper classes are more separated from the lower classes than in many metropolises of the developed capitalist world. However, as they have a smaller weight in Rio de Janeiro and São Paulo, they are less prevalent in privileged spaces. Table 4 explains this apparent paradox in the case of Rio, and the results for São Paulo are very similar.

MRRJ 2010	UC	UMC	MMC	LMC	PB	LSC	WC
UC	0.13	0.20	0.18	0.10	0.08	0.19	0.12
UMC	0.11	0.17	0.18	0.11	0.08	0.21	0.15
MMC	0.06	0.11	0.17	0.12	0.09	0.25	0.21
LMC	0.04	0.09	0.16	0.12	0.09	0.27	0.22
PB	0.04	0.08	0.15	0.11	0.09	0.27	0.23
LSC	0.03	0.07	0.14	0.11	0.09	0.29	0.25
WC	0.03	0.06	0.14	0.11	0.09	0.29	0.28

Table 4. The xPy interaction index – Rio de Janeiro (2010).
Source: Own elaboration based on microdata from the 2000 and 2010 censuses (IBGE, 2002; 2012).

The xPy index measures the probability of members from a category x (in the row) having members from category y (in the column).as neighbors in the spatial units studied (herein, the weighted areas). The value on the diagonal is xPx, called the isolation index.

We observed that, in the metropolis of Rio de Janeiro in 2010, those in the upper classes presented a 13% probability of having neighbors from the same class, and 20% in having neighbors from the upper middle class. However, among these neighbors, 36% were members of the other middle classes and the petty bourgeoisie, as well as 31% from the lower classes. The values are of the same order for the upper middle classes, the second most self-segregated class.

On the other hand, for members of the two lower classes (working and services), which are much greater in terms of number, the probability of having neighbors from the same two classes is very high (57% for the working class, 54% for the lower services class), while having neighbors from the two highest classes is much lower (9% and 10%, respectively).

The middle and lower middle classes and the urban petty bourgeoisie are the three classifications for which the percentage of neighbors from one of these classes varies little from one class to another. We now resume the discussion by analyzing the profiles of different types of spaces and their evolution.

4. Socio-spatial structures and their transformations

In order to avoid reducing segregation just to the most striking contrasts, it is necessary to understand the social composition of different spaces in the city. This is essential to understand both the different types of urban inequalities resulting from segregation, and the different types of social relations that may take place in residential spaces.

Thus, we have constructed a socio-professional typology of the local spaces of the two metropolitan regions, using, regarding the calculation of the segregation indices, our detailed socio-professional categories (CS) and the division of space

into the WAs of 2000. The statistical procedure[11] was the same for both cities: binary correspondence analysis (CBA) on the data contingency table (number of people per CS per WA), followed by an ascending hierarchical classification (AHC) on the main factors of CBA and consolidation of the typology, reassigning the WAs to the type they are closest to in terms of the Euclidean metric on differences in a socio-professional profile.

The Tables 5 and 6 provide a summarized characterization of the types using aggregated classes.[12]

Class/Types	UPP1	UPP2	UPMID	LOWMID	LOW1	LOW2	LOWPER	Total
% Column								
UC	19.4%	11.3%	4.6%	2.5%	1.4%	0.8%	0.7%	3.7%
UMC	26.2%	19.4%	10.9%	6.6%	4.6%	2.9%	2.3%	7.6%
MMC	18.9%	19.8%	20.7%	17.6%	13.8%	10.0%	7.6%	14.3%
LMC	8.6%	11.3%	15.4%	14.0%	11.6%	8.7%	6.2%	10.8%
PB	8.1%	9.8%	11.1%	11.2%	10.7%	10.0%	9.7%	10.3%
LSC	15.1%	20.5%	25.0%	29.8%	33.7%	36.8%	39.2%	31.2%
WC	3.3%	7.6%	12.0%	18.0%	24.0%	30.1%	32.8%	21.5%
RP	0.1%	0.1%	0.0%	0.0%	0.1%	0.2%	0.4%	0.1%
RW	0.2%	0.2%	0.1%	0.2%	0.3%	0.5%	1.2%	0.4%
Total	100%	100%	100%	100%	100%	100%	100%	100%
% Row								
UC	33.5%	26.0%	15.7%	11.2%	5.7%	5.5%	2.5%	100%
UMC	22.0%	21.8%	18.2%	14.5%	9.3%	10.3%	3.9%	100%
MMC	8.5%	11.9%	18.4%	20.7%	15.0%	18.6%	6.9%	100%
LMC	5.1%	8.9%	18.2%	21.9%	16.6%	21.7%	7.5%	100%
PB	5.1%	8.2%	13.8%	18.3%	16.2%	26.2%	12.3%	100%
LSC	3.1%	5.6%	10.2%	16.1%	16.8%	31.6%	16.5%	100%
WC	1.0%	3.0%	7.1%	14.1%	17.3%	37.5%	20.0%	100%
RP	5.2%	4.3%	2.6%	2.4%	7.0%	34.2%	44.4%	100%
RW	3.2%	4.5%	3.5%	8.7%	10.5%	32.7%	36.9%	100%
Total	6.4%	8.6%	12.7%	16.8%	15.5%	26.8%	13.1%	100%

Table 5. Profile of the socio-professional types – MRRJ (2010)

Source: Own elaboration based on microdata from the 2000 and 2010 censuses (IBGE, 2002; 2012).

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11. For a detailed presentation of the method, initially developed for the case of the Parisian metropolis, cf. Préteceille (2003, chap.1 and appendix III). PRÉTECEILLE, E. *La Division sociale de l'espace francilien. Typologie socioprofessionnelle 1999 et transformations de l'espace résidentiel 1990-99* [The social division of the French space The socio-professional typology 1999 and transformations of residential space 1990-99]. Paris: Observatoire Sociologique du Changement FNSP-CNRS, 2003.

12. We have revised the typology previously presented in Préteceille and Cardoso (2008; 2020), to take into account the methodological improvements in the construction of the CS introduced during the analysis of the 2010 data. The results are only slightly different, and the general structure has not changed. PRÉTECEILLE, E.; CARDOSO, A. Socioeconomic segregation and the middle classes in Paris, Rio de Janeiro and São Paulo: a comparative perspective. In: SAKO, M. (org.). *Handbook on urban segregation.* Cheltenham: Edward Elgar Publishing, 2020. p. 270-288.

Class/Types	UPP1	UPP2	UPMID	LOWMID	LOW1	LOW2	LOWPER	Total
% Column								
UC	18.5%	9.1%	4.0%	2.0%	1.3%	0.8%	0.7%	3.6%
UMC	25.0%	17.5%	10.6%	6.9%	4.3%	2.5%	2.9%	7.9%
MMC	18.4%	20.4%	19.1%	15.3%	12.4%	8.9%	8.6%	14.0%
LMC	8.7%	13.8%	15.8%	15.4%	11.6%	8.4%	9.3%	12.1%
PB	9.8%	12.0%	11.9%	10.3%	9.2%	7.6%	8.0%	9.7%
LSC	15.2%	17.1%	20.0%	25.9%	27.2%	26.6%	33.8%	25.1%
WC	4.1%	9.9%	18.4%	24.0%	33.5%	44.7%	35.1%	27.1%
RP	0.2%	0.1%	0.0%	0.0%	0.1%	0.1%	0.3%	0.1%
RW	0.1%	0.1%	0.1%	0.1%	0.4%	0.4%	1.3%	0.4%
Total	100%	100%	100%	100%	100%	100%	100%	100%
% Row								
UC	34.8%	26.4%	15.4%	9.9%	7.1%	3.1%	3.5%	100%
UMC	21.3%	22.9%	18.7%	15.6%	10.8%	4.3%	6.3%	100%
MMC	8.9%	15.1%	19.2%	19.6%	17.9%	8.8%	10.4%	100%
LMC	4.9%	11.9%	18.3%	22.9%	19.4%	9.6%	13.0%	100%
PB	6.8%	12.9%	17.3%	19.1%	19.1%	10.9%	14.0%	100%
LSC	4.1%	7.1%	11.2%	18.5%	21.8%	14.7%	22.8%	100%
WC	1.0%	3.8%	9.5%	15.9%	24.9%	22.9%	22.0%	100%
RP	10.0%	6.4%	3.1%	3.9%	16.5%	9.3%	50.7%	100%
RW	1.5%	2.8%	4.9%	6.2%	18.5%	14.8%	51.4%	100%
Total	6.8%	10.4%	14.0%	17.9%	20.1%	13.9%	16.9%	100%

Table 6. Profile of the socio-professional types – MRSP (2010)
Source: Own elaboration based on microdata form the 2000 and 2010 censuses (IBGE, 2002; 2012).

One initial interesting result is the fact that the procedure produced very similar structures for the two metropolises. This signified that we were able to give the same names to the types, which have equivalent profiles: two upper types, UPP1 and UPP2, in which the upper classes are clearly overrepresented; two medium types, UPMID and LOWMID, whose profile is closer to the middle classes; two lower types, LOW1 and LOW2, in which the lower classes are strongly overrepresented and the upper classes are almost absent; and a lower-peripheral type, LOWPER, similar to the previous, but in which rural landowners and rural workers are heavily overrepresented.

In Tables 5 and 6, the types are ordered from left to right following the descending order of the first CBA factor, which may be considered a synthetic indicator of socio-spatial status. In the first part of the tables – this is the second important result to underline – it may be verified that the weight in the types of the upper and upper middle classes decreases monotonically from left to right, and that, symmetrically, the weight of the working classes increases from left to right in the same manner. It is this cross-distribution that reflects the high level of

dissimilarity between these two sets of categories. The strong segregation between the upper and upper middle classes, on the one hand, and the working classes, on the other, may be read into the oppositions of the well-marked profile between the types of upper spaces and lower spaces.

It is the working class, due to its overrepresentation in the lower types and its virtual absence in upper type 1, which most contributes to this opposition on the side of the lower classes. This is more distinct in São Paulo, where the working class is greater, although it is interesting to note that the situation is repeated in Rio de Janeiro, where the lower classes are, however, less working classes and more tertiary.

There is a considerable concentration of the upper classes in their privileged spaces: in Rio de Janeiro, 60% of those in the upper classes reside in WAs that make up the upper types 1 and 2; in São Paulo, this percentage is 61%. The presence of the upper middle classes is a little less pronounced in the upper types: 44%, both in Rio and São Paulo. The presence of these classes in the lower types is symmetrically very low, although with a non-negligible difference between the two cities: in Rio, we observed 8% of the upper classes and 14% of the upper middle classes in the three lower types (which, it should be noted, include more than half of the active population), against 14% and 21%, respectively, in São Paulo. The greater presence in São Paulo may be due to the presence of wealthier enclaves in lower class neighborhoods (such as the "fortified enclaves" studied by Caldeira, [2000]), something less likely in Rio de Janeiro.

The third striking result is that the upper and upper middle classes are far from being predominant in the upper spaces. Together, they represent 46% of the total labor force in upper type 1 in Rio de Janeiro and 44% in São Paulo, and only 31% in upper type 2 in the first metropolis and 27% in the second. Thus, the upper classes coexist, in these upper types, with an ensemble of middle and lower middle classes, a slightly lower number in type UPP1 and a significantly higher number in type UPP2, as well as with a non-negligible number from the working and lower services classes.

This result may seem surprising in view of the role of land and real estate markets in the segregation, which a priori excludes the lower and lower middle classes from the upscale neighborhoods. One initial explanation could refer to an effective social diversity in neighborhoods such as Copacabana, for example, where buildings on the seafront are highly valued and exclusive, but whose value decreases the further we move away from the beach. Here, more modest buildings may accommodate families from the middle and lower middle classes and also from the urban petty bourgeoisie. A second, perhaps more general, explanation is connected to the fact that numerically, the upper and upper middle classes are in the minority in the total labor force. As the reference taken by the statistical types

generated by the CBA is the more extensive, heterogeneous weighted areas – 26,000 inhabitants on average in Rio de Janeiro for the 2000 WAs –, it is unsurprising that some areas group neighborhoods together that have high status housing and favelas or poor neighborhoods. In Rio, there are many small favelas which border wealthier neighborhoods; only the very largest favelas are large enough to constitute one or more weighted areas in their own right. Something similar occurs in São Paulo, where the classic case of the Paraisópolis favela is nestled within the wealthy neighborhood of Morumbi.[13]

The fourth result to be highlighted is that, between the extreme types of social polarization, upper types on the one hand, lower types on the other, in the two middle types, we observe a set of urban situations characterized by mixtures of all categories, in variable proportions, but without a strong predominance of just one class. In these two types, the middle and lower middle classes were moderately overrepresented, and the working classes moderately underrepresented, while the upper and upper middle classes were slightly overrepresented in the UPMID type and slightly underrepresented in the LOWMID type.

These mixed middle types represented 29.5% of the active population in Rio de Janeiro in 2000 and 32% in São Paulo. This is much less than in Paris, for example, where the equivalent middle types represented 45% of the active population in 1999, due to the greater presence of the upper and upper middle classes in the total population and also to the greater refinement of the units of spatial analysis. However, the participation of mixed middle types is far from negligible in the two Brazilian metropolises under study. It should be mentioned that these are rarely studied modalities, although they have twice the weight of the upper types, which are much more systematically present in dualist readings of the Brazilian city.

In order to analyze the changes in the socio-spatial structure during the decade between 2000 and 2010, we decided to use the 2000 typology, presented above, as a reference and to classify the 2010 WAs into the types they most resemble in terms of the socio-professional profile. The advantage of this method is that it is based on a typology which we have characterized in detail. It was immediately

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13. This heterogeneity of the WAs could be controlled to a certain extent by crossing them, as Préteceille did in the 1991 census data (PRÉTECEILLE; VALLADARES, 2000a); (PRÉTECEILLE; VALLADARES, 2000b), with a typology of census sectors, which are much smaller, and therefore, a priori more homogeneous, with the income and education variables available on this scale. Although crude, they give an indication of socioeconomic status. PRÉTECEILLE, E.; VALLADARES, L. A desigualdade entre os pobres – favela, favelas [Inequality among the poor – favela, favelas]. In: HENRIQUES, R. (org.). *Desigualdade e pobreza no Brasil* [Inequality and poverty in Brazil]. Rio de Janeiro: IPEA, 2000a. p. 459-485. PRÉTECEILLE, E.; VALLADARES, L. Favela, favelas: unidade ou diversidade da favela carioca [Favela, favelas: unity or diversity of Rio's favelas]. In: RIBEIRO, L. C. Q. (org.). *O futuro das metrópoles: desigualdades e governabilidade* [The future of metropolises: inequalities and Governance]. Rio de Janeiro: Revan-FASE, 2000b. p. 375-403.

possible to verify, through a CBA on the 2010 data table, that the structure of the socio-spatial distribution was very similar to that of 2000, which enabled the 2000 typology to be a very reasonable descriptor of the 2010 structure.

Majority stability is the first result that emerges from the two tables: 69% of the WAs in the MRRJ were classified in 2010 in the same type as in 2000, as was the case for 64% in the MRSP.

The second result is that profile changes occur mainly due to becoming displaced to higher socio-spatial status types: this was the case of 27% of the WAs in the MRRJ and 31% of those in the MRSP. These changes occur mainly by shifting to the type immediately above (shifting one cell to the left of the diagonal in the Tables 5 and 6).[14] Changes in the opposite direction, of lower statuses, are few: 4% of the WAs in Rio, and 5% in São Paulo.

This change to a higher socio-spatial status reflects an increase in the weight of the upper classes and the three strata of the middle classes and a decline in the weight of the lower classes in the two metropolitan regions. It also indicates the fact that this progression spreads across a significant part of the types of space, and not just in some of them.

Due to the way they are constructed, the profiles of the types remained the same between the two dates. However, this was except for the extreme types of the social hierarchy: if a WA, which in 2000 belonged to the highest type, sees the weight of the higher categories increase significantly, there is no longer any higher type into which it may be reclassified. This also applies, symmetrically, to a WA of the lowest type, which would see the weight of lower classes increase. Therefore, it is necessary to look specifically at the evolution of these extreme types (Tables 7 and 8).

2000 Type/ 2010 Type	UP1	UP2	UPMID	LOWMID	LOW1	LOW2	LOWPER	Total 2000
UP1	17							17
UP2	12	14						26
UPMED		9	29	2				40
LOWMED		1	20	41	5			67
LOW1				7	54	2		63
LOW2		1		1	30	84	7	123
LOWPER					1	30	43	74
Total 2010	29	25	49	51	90	116	50	410

Table 7. Distribution of the WAs in the MRRJ by type in 2000 and 2010
Source: Own elaboration based on microdata from the 2000 and 2010 (IBGE, 2002; 2012).

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14. There are two exceptional cases: a WA in the MRRJ, which leapt from the most popular type, LOW2, to UP2. This was a WS in Niterói, in the Várzea das Moças neighborhood, in a mountainous area on the border with Maricá; and a WA in São Paulo, in the municipality of Santo André, which leapt from the LOW1 type to the UP2 type.

2000 Type/ 2010 Type	UP1	UP2	UPMID	LOWMID	LOW1	LOW2	LOWPER	Total 2000
UP1	55							55
UP2	28	53						81
UPMED		50	59	6				115
LOWMED		5	46	84	6		2	143
LOW1		1	5	56	82	3	10	157
LOW2				2	37	75	15	129
LOWPER				8	14	2	107	131
Total 2010	83	109	110	156	139	80	134	811

Tabela 8. Distribuição das APs da RMSP por tipo em 2000 e 2010

Source: Own elaboration based on microdata from the 2000 and 2010 (IBGE, 2002; 2012).

In the case of São Paulo, if we isolate the WAs that already belonged to the UP1 type in 2000, the weight of the upper classes went from 18.5% to 20.6% between 2000 and 2010, and that of the upper middle classes, from 25% to 34%. In Rio de Janeiro, for the same WAs of the UP1 type in 2000, the weight of the upper classes jumped from 18.5% to 25.1% between 2000 and 2010, and that of the upper middle classes, from 25% to 32.5 %. There is, therefore, in both metropolises, a very clear reinforcement of the upper profile of spaces that are already upper.

At the other extreme of the socio-spatial hierarchy, if we consider the WAs in São Paulo, which in 2000 belonged to the two lowest types, LOW2 and LOWPER, there was a moderate decline in the total weight of the working classes, from 71.3% to 67.8% and from 68.9% to 65.4%, respectively. In Rio de Janeiro, if we take into account the WAs that in 2000 belonged to the two lowest types, LOW2 and LOWPER, the total weight of the working class suffered a moderate drop, going from 66.9% to 65.7% and from 72% to 68.3%, respectively.

We may summarize all these results by stating that, in Rio de Janeiro, as in São Paulo, we have observed a clear shift in all types of spaces toward a higher status, particularly strong for upper and middle spaces, and less intense, but not negligible, for lower spaces. This displacement is accompanied by a greater polarization on the upper side, where the spaces that are already more upper accentuate their profile, while, on the contrary, we have not observed symmetrical polarization on the side of the lowest spaces, whose lower character, to the contrary, is moderately reduced.

If we compare these results with those of Marques (2014) for São Paulo, there is a considerable similarity in the observed configurations – a strong contrast between upper types and lower types, and middle types mixed in the intermediate position –, however there are differences in the weight of the various modalities. The two upper status types of Marques represented 16% of the active population in

2000 against 17% of our two upper status types – the difference is minimal (ibid., p. 692). It is most pronounced between his mixed middle type – 21.5% of the active population – and our two mixed middle types – 31.8%. Logically, the weight of his two lowest status types is greater. Such differences may have several causes. They may be due to the categories employed – we saw, for example, that the EGP categories underestimated the middle classes in relation to the CS used herein. They may result from a less refined scale – Marques used the 2010 WAs. They may also ultimately be provoked by Marques' classification of what for us are more middle spaces, in the mixed lower middle type spaces, in his classification. Since socio-spatial distributions are generally phenomena with variations in a continuum, there is always some arbitrariness in dividing them into different types of a continuous cloud of points. Even more so since Marques built a typology in five classes, which is consistent with a variable with a reduced number of modalities (EGP), while we however, built a typology with seven classes, based on our more detailed CS.

In order to analyze the changes, a comparison is more difficult because Marques used a different method to ours, by constructing a typology that is a kind of intermediate portrait between 2000 and 2010 of the socio-spatial structure and comparing the profiles of the types between these two dates. As in our case, he observed the growing presence of the upper middle categories – professionals in his nomenclature – in all types of spaces, with a particularly marked progression in the two upper types, and a decline in the lower classes everywhere, including in the lower types, accompanied by a greater relative weight of the lower service classes – non-routine manual workers – in relation to the working class – manual workers. On the other hand, it is not possible to see the progression of the middle and lower middle classes – poorly identified in his nomenclature. Moreover, the method used does not clearly identify the change in spatial profiles to higher statuses.

With regard to Ribeiro's (2015) analyses, the general structure built there of the socio-spatial typologies is quite similar to the one we have detailed, which is unsurprising, given the common origin of the categories and methodologies mentioned. On the other hand, his analysis of changes is more difficult to compare with ours because of the method he used, which consisted of comparing the typologies carried out for each census, examining the possible changes in the structure of the types and then assessing the changes in the types of spatial units between two censuses. Comparing the typologies for each census underestimates the changes, since each typology is constructed based on the relative positions of the spatial units in the general distribution, which may remain the same from one census to another – hence the stability of the typology –, although the profiles of all units change with the mean change, which may be noticeable but is masked by the method. On the other hand, Ribeiro used the districts as units resulting from a

stable spatial division between censuses. However, these districts are far fewer in number. The municipality of Rio de Janeiro, for example, has 33, while presenting 170 weighted areas (2000 definition) in 2010. The size of the districts is therefore around five times larger on average than that of the 2000 WAs. As a result, the socio-spatial analysis is inevitably less detailed, and the contrasts are ultimately masked by the averaging effect of the district, which groups heterogeneous neighborhoods. Despite this, there is nonetheless a convergence with our results on one point: the displacement of spatial units to upper statuses, particularly marked in the case of units of upper and middle types, identified by the idea of diversification of local social structures (RIBEIRO, 2015, p. 185), due to the growing presence of middle and upper categories in many spaces, including lower types – despite also claiming that lower peripheral spaces had become even lower (ibid., p. 185). This is in contradiction with our results, and we could not explore the difference in more detail due to the fact that their analysis lacks a systematic CS table by type, such as the one used herein. It should also be remembered that in our opinion, their categories underestimate the reduction in the weight of lower service categories.

5. Conclusion

The evolution of the social structure of the two main Brazilian metropolises during the first decade of the twenty-first century calls into question the long-prevailing dualistic viewpoint. The working classes as a whole saw their weight decrease, representing about half of the active population in 2010. It was the middle classes that made the most progress, surpassing a third of the population in 2010. Among these, the progression was strong for the upper middle classes and moderate, although significant, for the middle-middle and the lower middle classes. The upper classes also progressed, while the urban petty bourgeoisie visibly retreated.

The two metropolises are quite similar in their general social structure. The main differences are due to the greater weight of the public sector in the three components of the middle classes in Rio de Janeiro, while in São Paulo it is the business sector that is most outstanding. In the lower classes, manufacturing workers are more present in São Paulo, while in Rio de Janeiro this is the case with service workers. Their evolution over the period is also very similar, without, however, erasing the reported differences.

The anchoring of this social structure in the urban space results in a very strong segregation of the upper classes and a considerably strong segregation of the upper middle classes. It may be stated, in relation to both, that this is a *chosen* segregation, which enables the residential appropriation of the best urban spaces while maintaining the lower classes at a distance. The working class demonstrated a

moderate but significant segregation – for them it is mainly a *suffering* segregation, or the result of forces they are unable to control. The middle-middle classes, the lower middle classes, the urban petty bourgeoisie, and the lower service classes presented very low segregation. The spatial proximities and distances between them remained relatively stable throughout the decade, with changes that mainly concerned the middle classes. In Rio de Janeiro, the middle and lower middle classes moved slightly away from the upper middle class and a little closer to the lower classes, particularly the working class. In São Paulo, the lower middle classes significantly distanced themselves from the upper classes, the upper middle classes, the middle-middle classes, and the urban petty bourgeoisie and became very close to the lower classes and the working class.

If we examine the evolution of the social profiles of spatial units, using the typological analysis of weighted areas, it is possible to observe that the growth of the middle classes has spread across all socio-spatial types, leading to a displacement of a large number of units toward higher status profiles. This change is particularly marked for the spaces that already belonged to the mixed upper and middle types in 2000, but it may also be observed for a notable part of the working-class spaces. This development is common to both metropolises.

Our results on the most salient features of segregation in Rio de Janeiro and São Paulo largely converge with those of the main authors whose publications have addressed these issues, which demonstrates their robustness beyond differences in social and methodological categorizations. The most important divergence that should be highlighted however, concerns the middle classes. An emphasis on the growth in the weight of the different components of the middle classes, and their contribution to the evolution of spatialized social structures, seem to be very important results, which are a consequence of the methodological choice for a more refined analytical categorization of this intermediate part of the social space. We trust they have contributed to the debate on the middle classes and urban structures in Brazil, and extend beyond ideological positions and a priori classifications.

As always, these results open up new questions. For example, what is the explanation for some spaces sliding up to a higher status while others do not? Is the shift to a higher status a result of the arrival of middle classes from other neighborhoods, or the upward social mobility of already present populations? What are the local effects of these situations of greater social miscegenation, in the relationships between the different co-resident social categories, in the relationships with local schools and public services, in local politics?

It should also be mentioned that here, due to the restricted space, we have not addressed the issue of ethnic-racial differences. Even if they are strongly intertwined with socioeconomic differentiations (TELLES, 2003), they are not limited to that, and racial discrimination will probably have a specific contribution to urban segregation. We will address this issue in a future stage.

Lastly, we emphasize that our analyzes – published late in relation to the publication of the results of the 2010 Census due to the various institutional, personal and health difficulties that have delayed our work – refer to a decade marked by positive developments in the economy and job markets, by reducing poverty and by a slight reduction in inequalities. It remains for us to question the evolution of the two metropolises over the following decade, given the political and economic instability that followed, which was then coupled by the COVID-19 pandemic. We shall have to wait for the results of the new demographic census to be made available in order to attempt some answers, in the expectation that, despite the delay, they will have the necessary quality to provide a valid expansion of the analyses.

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