Anderson Kazuo Nakano

Nexus between population redistribution and real estate residential production in districts of the municipality of São Paulo

Abstract

This article discusses the relationship between changes in the population spatial distribution and the production of high-rise residential buildings in the districts of São Paulo. To develop this discussion, census data from 1991, 2000, and 2010 was combined with data on the production and release of apartment buildings in the period between 1998 and 2008. These databases were the basis of a methodology used to formulate the Rate of Population Absorption by Apartment Buildings (RPAAB). The RPAAB attempts to estimate how much of the Population Growth (PG) of São Paulo districts between 2000 and 2010 was absorbed by the apartments released between 1998 and 2008 by the real estate market. To that end, the Potential Population Increments Promoted by Vertical Residential Real Estate Developments (PPIPVRRED) was estimated based on the number of residents per apartment extracted from the 2010 Census. It was concluded that, in fact, the segment of the real estate market aimed towards the production of apartment buildings heavily conditioned the population spatial distribution in the central districts of São Paulo that underwent the phenomenon of demographic inversion, going from population loss to population gain, during the years of transition from the 1990s to 2000s.Similar phenomenon was not observed in peripheral districts.

Keywords

Population spatial distribution. Real estate market production.

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NEXOS ENTRE REDISTRIBUCIÓN DE LA POBLACIÓN Y LA PRODUCCIÓN INMOBILIARIA RESIDENCIAL EN LOS DISTRITOS DE SÃO PAULO

Resumen

En este artículo se analiza la relación entre los cambios en la distribución espacial de la población y la producción de edificios residenciales verticales en los distritos de São Paulo. Para desarrollar este análisis, utilizamos los datos del censo de 1991, 2000 y 2010 articulados con datos sobre la producción de edificios nuevos de apartamentos colocados a la venta durante el período entre 1998 y 2008. Estas bases de datos fueron utilizadas para el desarrollo de una metodología que permitió la construcción de la Tasa de Absorción de la Población por la Producción de Apartamentos (TAPPA). El TAPPA intenta estimar cuánto del Crecimiento de la Población (CP) en los distritos de São Paulo ocurrido entre 2000 y 2010 fue absorbido en los apartamentos colocados a la venta entre 1998 y 2008 por agentes del mercado inmobiliario. Para calcular la TAPPA se calculó el Crecimiento de la Población Potencial que há sido Absorbida por la Producción de Apartamentos (CPPAPA), calculado en base al número de residentes por apartamento extraído del Censo de 2010. Se concluyó que, de hecho, el segmento de la producción de edificios de apartamentos condiciona en gran medida a la distribución espacial de la población de São Paulo en los distritos centrales que tenían una inversión demográfica de perdida para aumentos de población en la transición de los años 1990 a 2000. No se notó el mismo fenómeno en las periferias de la ciudad.

Palabras clave

Distribución espacial de la población. Producción de edificios de apartamentos.

NEXOS ENTRE A REDISTRIBUIÇÃO POPULACIONAL E A PRODUÇÃO IMOBILIÁRIA RESIDENCIAL NOS DISTRITOS DO MUNICÍPIO DE SÃO PAULO

Resumo

Este artigo discute a relação entre as mudanças na distribuição espacial da população e a produção de empreendimentos imobiliários residenciais verticais nos distritos do Município de São Paulo. Para desenvolver essa discussão, utilizam-se dados censitários de 1991, 2000 e 2010 articulados com dados relativos à produção de prédios de apartamentos lançados durante o período entre 1998 e 2008. Esses bancos de dados serviram como base para a elaboração de metodologia que permitiu a construção da Taxa de Absorção Populacional pela Produção Imobiliária (TAPPI). A TAPPI procura estimar o quanto do Incremento Populacional (IP) ocorrido nos distritos paulistanos entre 2000 e 2010 foi absorvido pelos apartamentos lançados pelos agentes do mercado de incorporação entre 1998 e 2008. Para isso estimou-se o Incremento Populacional Potencial Promovido pelos Empreendimentos Imobiliários Residenciais Verticais (IPPPEIRV) calculado com base no número de moradores por apartamento extraído do Censo Demográfico de 2010. Concluiu-se que, de fato, o segmento da produção imobiliária voltado para a construção de prédios de apartamentos condicionou fortemente a distribuição espacial da população paulistana nos distritos centrais que tiveram uma inversão demográfica de perda para ganhos populacionais na passagem da década de 1990 para a de 2000. Não se percebeu o mesmo fenômeno nos distritos periféricos.

Palavras-chave

Population spatial distribution. Real estate market production.

Introduction

In the first decade of the 21st century, with the Workers Party (PT) at Brazil's federal government, two important phenomena took place in the municipality of São Paulo.

The first phenomenon was of a demographic nature. Areas of the old and expanded city center, which had lost populations in the1980s and 1990s, began to gain new residents in the decade between the years 2000 and 2010, generating a new picture in the spatial distribution of the population of São Paulo.

The second phenomenon is related to real estate production. In the first decade of this century, along with spatial redistribution of the population of São Paulo, the so-called real estate boom took place. As Sígolo (2014) demonstrated, the real estate phenomenon was more intense in the second half of the 2000s. The increase of the real estate market was characterized by the rising of real estate prices and the construction of large number of developments of all kinds, notably vertical residential real estate developments, known as apartment buildings. For this expansion to be feasible, according Sígolo (2014) and other researchers[1], there was a need to establish "*a legal and institutional framework that guarantees legal and financial security to private developers, besides a housing finance system endowed with significant permanent resources able to improve the solvency of the demand*" (SÍGOLO, 2014, p. 59). This researcher refers, among other elements, to:

- The establishment of mechanisms that are part of the Real Estate Financing System (SFI), such as chattel mortgages (Federal Law 9.514 / 1997), and segregate estate (Federal Law 10.931 / 2004);

- The financialization of the real estate production through opening the capital of large real estate developers in the stock market, and the use of market financial instruments such as Real Estate Receivables Certificates (CRI), Real Estate Credit Notes (LCI), Real Estate Credit Bills (CCI), Debentures, Mortgage Notes, Bank Credit Notes (CCB), and Real Estate Investment Funds (FII). These instruments have mainly served to increase the amounts of resources to finance the real estate production;

- The increase in the amount of resources for real estate production and acquisition, mainly for Minha Casa Minha Vida Program (PMCMV), raised from the Government Severance Indemnity Fund (FGTS), the Brazilian Savings and Loans System (SBPE), and the Brazilian Government General Budget (OGU).

It is not part of the objectives of this article to analyze the political, economic, legal, corporate, and institutional processes that intensified the production of vertical residential real estate developments in the districts of São Paulo that underwent population reversal from loss to gain, in the transition from the 1990s to the 2000s. As already mentioned, these processes were described, analyzed and critically discussed in studies

[1] For a more in-depth understanding of the workings and influences of the real estate financing mechanisms, based on public and private resources, and operated both by public and private financial institutions, on the recent heating-up of the Brazilian real estate market, see Fix (2011), Rufino (2012), Shimbo (2012), and Royer (2014).

developed by Fix (2011), Rufino (2012), Shimbo (2012), and Royer (2014). This article focuses on the real estate products resulting from these processes, in order to examine the links between those vertical residential real estate developments and the population spatial redistribution in those districts. Thus, the discussion is mainly about the relations between the aforementioned demographic and real estate phenomena.

In the first part following this introduction, we will present the changes in the average annual growth rates of populations inhabiting the 96 districts[2] of São Paulo in the passage of the last decade of the 20th to the first decade of this century. In the turn of the century, four demographic trends can be identified in the districts of São Paulo:

- Persistent population loss;

- Reversal from population loss to gain;

- Persistent population gain;

- Reversal from population gain to loss.

These demographic trends served as criteria for defining groups of districts, based on which we have analyzed the production of vertical residential real estate developments.

In the second part, we give a general overview of the production of vertical residential real estate developments according to the groups of districts which underwent, on the one hand, reversal from population loss to gain, and on the other, persistent population gain. It is worth mentioning that this real estate production is embedded in a broader context of changes in the production of these types of real estate developments in the Greater São Paulo. Sígolo (2014) shows, based on database organized by the Brazilian Equity Studies Company (EMBRAESP) on real estate releases carried out by the real estate formal market, the "*progressive increase in the number of residential releases as of 2004, both in the state capital and in other municipalities of the region*" (SÍGOLO, 2014, p. 24). According to this author, "*between 2007 and 2010, the average annual (housing) units released (HUs) totaled 57,712, which almost doubled the average number of releases of the previous four years (2003-2006), which totaled 29,000 HUs (...).Only in 2010, there were 65,520 HUs released*" (SÍGOLO, 2014, p. 24).

In the third and final part, we will analyze the links between elements described in parts 1 and 2. That is, the relationship between the demographic trends perceived in two groups of districts – one with population reversal from loss to gain, and the other with persistent population gain -, and the production of vertical residential real estate developments. To what extent did the production of these developments absorb the population gains of the central districts that underwent population reversal from loss to gain? To what extent did this real estate production absorb the persistent population gains in the peripheral districts?

[2] The 96 districts of the São Paulo municipality were instituted by the Municipal Law No. 11,220 / 1992. Making district boundaries official enabled the compliance with the limits of census sectors and areas of weighing defined by the IBGE for carrying out the Demographic Census. Such compatibility was first implemented in the execution of the Demographic Census of 1991. Thus, data of census sectors and areas of weighing may be aggregated according to the official districts. This has allowed important analysis of the municipality of São Paulo from different parts of its territory and intra-urban spaces.

Between depopulation and repopulation of São Paulo's central areas

The changes in population trends - from "depopulation" to "repopulation" - taking place in central districts of São Paulo can be perceived in the average annual growth rates of the 96 official districts calculated from census data from 1991 to 2000 and from 2000 to 2010.

São Paulo's depopulation in central areas and the peripheral growth that occurred in the 1980s and 1990s have been discussed by Januzzi and Januzzi (2002) concerning the municipality of São Paulo, and by Torres (2005), regarding the Greater São Paulo region. These authors showed that the low average rates of annual growth registered in the municipality of São Paulo and in the São Paulo Metropolitan Region[3] concealed the heterogeneity of demographic trends underway in different parts of these territories.

Figure 1 shows the depopulation that occurred in districts of the central and intermediate portions of São Paulo between 1991 and 2000, in contrast with the population growth in peripheral districts. It is worth mentioning that at that time, peripheral growth accounted for virtually all municipal growth.

These trends have changed significantly between 2000 and 2010, when there was a decrease in the rate of São Paulo population growth, with an average annual growth rate of 0.8% for the city as a whole. During this

[3] The geometric annual growth rates were: (i) São Paulo Municipality (SPM) - 1.2% in the 1980s and 0.9% in the 1990s; (ii) São Paulo Metropolitan Region (SPMR) - 1.9% in the 1980s and 1.6% in the 1990s. It is worth noting that the downward trend in these rates continued in the 2000s, when the SPM recorded a rate of 0.7%, and the SPMR, of 0.9%.

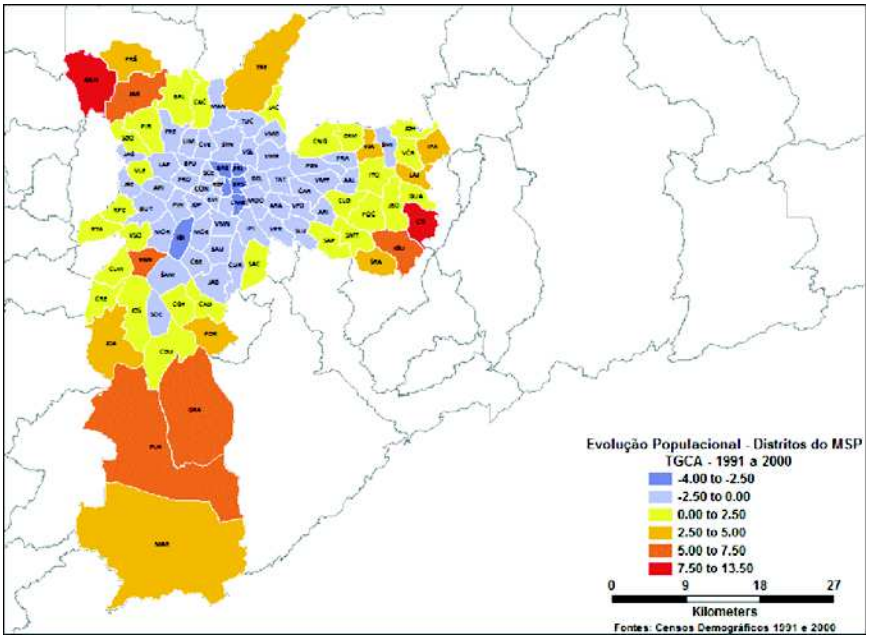

Figure 1: Geometric Annual Growth Rate in Districts of the Municipality of São Paulo - 1991 to 2000

Source: Anderson Kazuo Nakano's elaboration with data from IBGE demographic censuses of 1991 and 2000

period, of the 52 districts that lost population in the 1990s, 38 began to gain residents in the 2000s, as depicted in Figure 2. These are districts located in central and intermediate areas of the city which, in this way, recorded a demographic inversion that coexisted with the persistent growth observed in the periphery. Thus, unlike the 1990s, São Paulo's municipal growth in the 2000s was mainly due to residents' increase in both central and peripheral areas.

What is the relationship between such spatial redistribution of São Paulo's population and the production of apartment buildings in the municipality? To analyze this question we established groupings of districts based on the above-mentioned demographic trends. Such groupings serve as the basis for analyzing the relationship between São Paulo's population spatial redistribution and the production of vertical residential real estate developments in the first decade of this century. These groupings can be described as follows:

Group 1 - districts[4] that lost residents both in the 1990s and in the 2000s - termed persistent depopulation;

Group 2 - districts[5] that lost residents in the 1990s and began to gain in the 2000s - termed population reversal group;

Group 3 - districts[6] that gained residents both in the 1990s and in the 2000s - referred to as persistent "peripherization" group;

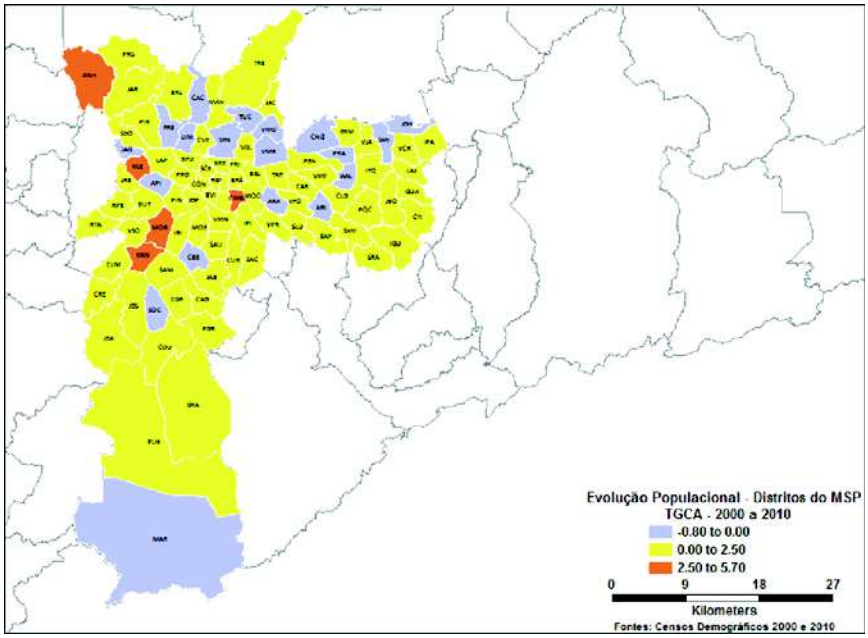

Figure 2: Geometric Annual Growth Rate in Districts of the Municipality of São Paulo - 2000 to 2010

Source: Anderson Kazuo Nakano's elaboration with data from IBGE demographic censuses of 2000 and 2010.

[4] Água Rasa, Alto de Pinheiros, Aricanduva, Artur Alvim, Campo Belo, Freguesia do Ó, Jaguaré, Limão, Ponte Rasa, Santana, São Miguel, Socorro, Tucuruvi and Vila Medeiros.

[5] Barra Funda, Bela Vista, Belém, Bom Retiro, Brás, Butantã, Cambuci, Carrão, Casa Verde, Consolação, Cursino, Ipiranga, Itaim Bibi, Jabaquara, Jaguaré, Jardim Paulista, Lapa, Liberdade, Mandaqui, Moema, Mooca, Morumbi, Pari, Penha, Perdizes, Pinheiros, República, Santa Cecília, Santo Amaro, São Lucas, Saúde, Sé, Tatuapé, Vila Formosa, Vila Guilherme, Vila Mariana, Vila Matilde and Vila Prudente.

[6] Anhanguera, Brasilândia, Campo Grande, Campo Limpo, Capão Redondo, Cidade Ademar, Cidade Dutra, Cidade Líder, Cidade Tiradentes, Ermelino Matarazzo, Grajaú, Guaianases, Iguatemi, Itaim Paulista, Itaquera, Jaçanã, Jaraguá, Jardim Ângela, Jardim São Luís, José Bonifácio, Lajeado, Parelheiros, Parque do Carmo, Pedreira, Perus, Pirituba, Raposo Tavares, Rio Pequeno, Sacomã, São Domingos, São Mateus, São Rafael, Sapopemba, Tremembé, Vila Andrade, Vila Curuçá, Vila Jacuí, Vila Leopoldina and Vila Sônia.

Group 4 - districts[7] that gained residents in the 1990s, and start losing in the 2000s - termed peripheral depopulation.

Prior to characterizing and quantifying the demographic trends identified in these groupings of districts, it is important to clarify some aspects of Group 3 designation of "persistent peripherization". This designation does not strictly use the term "periphery" as it has been used in studies by different researchers over the 1970s and 1980s in order to describe the social, political, economic, and territorial processes involved in the production of peripheral urban areas, especially in the context of large Brazilian cities. The designation of Group 3 as "persistent peripherization" is simply based on the continuity of population growth during the transition from the 1990s to the 2000s, in urban areas mostly located in districts of Group 3 and which have been produced according to the so-called "peripheral pattern of urbanization". The characteristics of this pattern were analyzed in detail and critically in urban studies elaborated by authors such as Camargo et all (1975), Maricato (1982), Bonduki and Rolnik (1982), Kowarick (1993), among others. In these studies, similarities and differences in the definitions of the term "periphery" are noted.

[7] Cachoeirinha, Cangaiba, Jardim Helena and Marsilac.

According to Camargo, et al (1975), "*the expression 'periphery', that is used to describe off-center neighborhoods, has become, in some ways, synonymous with the notion of marginalization and social exclusion*" (CAMARGO et al 1975, p. 23). In the work entitled "São Paulo 1975: crescimento e pobreza", those researchers used the term "periphery" to designate "clusters, illegal or not, lacking in infrastructure, where dwells the labor needed for production growth" (CAMARGO et al, 1975, p. 25).

To Ermínia Maricato (1982), "urban periphery" is also "*the residential space of the working and lower classes*" (MARICATO, 1982, p. 82). In this sense, it is the "*space that spans vast areas populated by small houses on small lots, where trade and private services are also insignificant as form of land use*" (MARICATO, 1982, p. 82-83).

In a study on processes and agents involved in the production and occupation of five lower-income housing developments in the city of Osasco, district sited in the western portion of the Greater São Paulo, Bonduki and Rolnik (1982), in dialogue with previously presented statements by Camargo, et al (1975) and Maricato (1982), recognize that "*the definition of periphery is used indiscriminately to designate, from a geographical point of view, spaces which are distant from the metropolitan center, located at the outer edge of the urbanized area, and from a sociological standpoint, places where labor force is reproduced in very poor housing conditions*" (BONDUKI; ROLNIK, 1982, p. 147). Based on this recognition, Bonduki and Rolnik (1982) state that "*such indiscriminate use of the term ("periphery") leads to a number of inaccuracies in its use*" (BONDUKI; ROLNIK, 1982, p. 147). Therefor those authors prefer to "*define periphery as 'parts of the territory of the city which have low differential rent', because, in this way, the concept becomes more precise and binds, concrete and objectively,*

the occupation of urban territory to social stratification" (BONDUKI; ROLNIK, 1982, p 147).

Group 3 includes some districts whose continuing population growth, in the turn of the 1990s to 2000s, is not related to the reproduction of peripheral urban areas in the terms presented in the preceding paragraphs. These districts are mainly Vila Andrade and Vila Leopoldina, located by the Pinheiros River, in the western region of São Paulo. Despite the population growth of Paraisópolis, shanty town located in Vila Andrade district, it can be said that the continuing population growth in the district in the years between 2000 and 2010 is strongly related to the intense production of residential real estate developments, promoted by the real estate market. As will be shown later in this article, Vila Andrade was the district of Group 3 with the largest number of vertical residential real estate developments released between 1998 and 2008. These developments aimed mainly at middle and high-income buyers.

In Vila Leopoldina, the continued population growth was also associated with an intense real estate production, driven by the heating-up of the real estate market. The urban areas of Vila Leopoldina district were primarily formed from the creation of industrial areas during the 1970s and 1980s. These industrial areas are currently being rapidly dismantled and undergoing a conversion of use. Some of these areas have recently been replaced by medium and high-standard apartment buildings.

Both in Vila Andrade and in Vila Leopoldina, the continuing population growth was linked to the expansion of high-income residential areas, historically structured in the west and southwest vectors of the city. This expansion took place in areas which provide spatial continuity of the expanded city center which, according to Villaça (2001), structured itself from residential quarters of high-income populations associated with major central urban functions related to trade and the provision of services. The São Paulo expanded center has concentrated a wide range of jobs offerings and the main government institutions.

Thus, the transformation of the urban areas of Vila Andrade and Vila Leopoldina districts, related to continuous population growth, is less associated with the reproduction of a "peripheral pattern of urbanization" and more with the "dominant spatial pattern of segregation", as analyzed by Villaça (2001), according to which "*higher income populations control the urban space production (mainly its residential neighborhoods), by controlling three mechanisms: the first of an economic nature - market, in this case, mainly the real estate market; the second, of a political nature: state control, and finally, through ideology*" (VILLAÇA, 2001, p 335).

Back to the demographic trends detected in the groups of districts, we will start with Group 1 of persistent depopulation, composed of 14 districts (15.6% of total). In the 1990s, this group of districts lost 119,848 inhabitants, and in the 2000s, 48,165. Over these two decades, Group 1 lost a total of 168,013 inhabitants.

Group 2, of demographic inversion, includes 38 districts (39.6% of total). In the 1990s, this group lost 342,541 inhabitants, and in the 2000s, it gained 243,922 inhabitants. The difference, between the losses and gains, was of 98,619 inhabitants. Therefore, although important, the demographic reversal that occurred in the 2000s was still not enough to recover the population level those districts had in late 1990s.

Group 3, of "persistent peripherization" is composed of 39 districts (40.6% of total). In the 1990s, the districts of this group gained 1,184,444 inhabitants, and in the 2000s they received over 631,354 inhabitants. Therefore, in these two decades, Group 3 accumulated a population gain of 1,815,798 inhabitants. The deceleration in population gains in those intermediate and peripheral districts in the passage from the 1990s to the 2000s is noteworthy.

Group 4, of peripheral depopulation, is composed of only 4 districts (4.2% of the total). The districts of this small group gained 67,306 inhabitants in the 1990s, and lost 9,154 residents in the 2000s. Between population gains and losses, this Group still kept a positive balance of 58,152 inhabitants.

The map in Figure 3 shows the location of each district of each of these groups. It can be clearly noted the predominance of Groups 2 and 3, which concentrated all the population gains in the 2000s, and which together encompassed 77 districts (80.2% of the total 96 districts of São Paulo), and cover most of the urbanized area of Sao Paulo. It is also evident that Group 2 includes districts located in the central portions and in parts of the

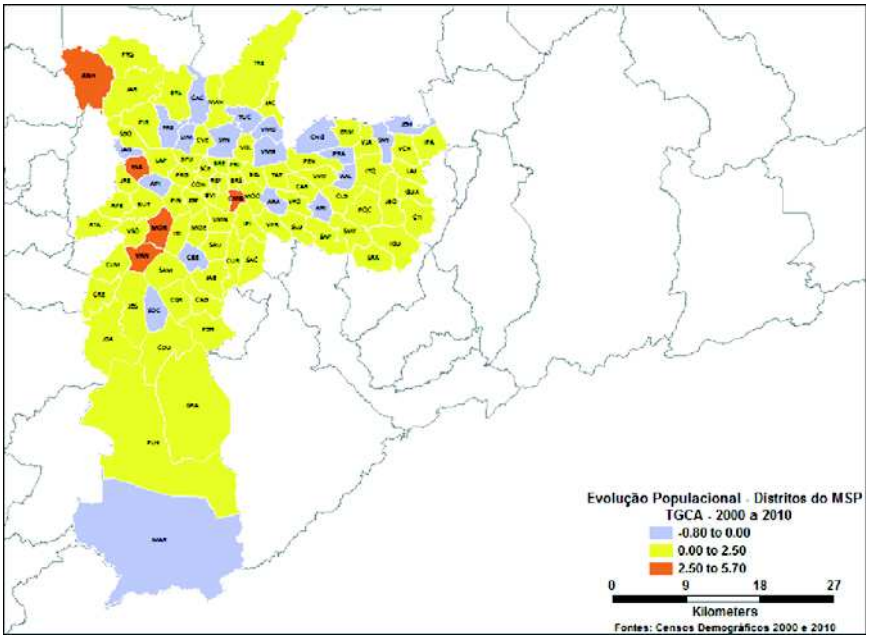

Figure 3 – Groups Distribution 1, 2, 3 e 4

Source: Anderson Kazuo Nakano's elaboration with data from the IBGE demographic censuses in 1999, 2000 and 2010.

intermediate ring[8] of the city (around the so-called expanded center, contained in the enclosed area of rivers Tietê, Pinheiros and Tamanduateí), and one single relatively peripheral district (Mandaqui). Now, Group 3 districts are located in parts of the intermediate ring, [9] and in practically the entire periphery of São Paulo.[10]

Still in Figure 3, it can be noticed that virtually all Group 1 districts are located in the intermediate ring of the city, exception made to São Miguel and Socorro, districts located in the eastern and southern periphery of São Paulo, respectively.

It is worth noting that the four districts that make up Group 4 are located in urban edges. Cangaiba and Jardim Helena are on the northern edge of São Paulo East Zone, next to the depopulated and swampy area of Tietê Ecological State Park, on the border between the municipalities of São Paulo and Guarulhos. Cachoeirinha is on the edge of the North Zone, by the large depopulated area of Cantareira State Park. Marsilac is on the edge of the South Zone, near the border of Serra do Mar State Park.

In the transition from the 1990s to the 2000s, along with the spatial redistribution of the population living in São Paulo districts, there was an intense real estate production, mainly of vertical residential developments. This real estate production had typological, marketing and geographic nuances, which are not detailed in the scope of this article, but that deserve more specific detailed studies. The approach adopted here emphasizes the relationship between this vertical residential real estate production and the reversal from population loss to gain in the central and intermediate districts, and the persistent population gains in the intermediate and peripheral districts. For the development of this analysis, it is important to have a quantitative picture of the vertical residential real estate developments launched between 1998 and 2008 and delivered during the period between the censuses of 2000 to 2010. This picture is presented next.

RESIDENTIAL VERTICAL REAL ESTATE PRODUCTION IN THE CONTEXTS OF POPULATION REVERSAL IN GROUP 2 AND PERSISTENT "PERIPHERIZATION" IN GROUP 3

According to the statement made in the introduction of this article, the production of vertical residential real estate developments that occurred in the context of population reversal and of persistent "peripherization" is part of a broader context marked by the expansion of the real estate production frontiers towards the municipalities of the metropolitan region of São Paulo (MRSP), located around the state capital (municipality of São Paulo). According to Sígolo (2014), the participation of the state capital in the total number of housing units launched in the metropolis between 2004 and 2010 "*fell from 83% to 55%*" (SÍGOLO, 2014, p. 25). According to the researcher, "*municipalities like Guarulhos, in the east sub-region, São Bernardo, Santo André, Diadema and Mauá, in the southeast, Osasco, in the west, Taboão da Serra and Cotia, in the southwest regained part of the prominence they had in the previous period (second half of the 1990s) in the total number of releases in the region*" (SÍGOLO, 2014, p. 26). Also according to the researcher, "*besides the*

[8] Group 2 districts that were considered part of the city's intermediate ring are: Belém, Butantã, Carrão, Casa Verde, Jaguaré, Mooca, Morumbi, Penha, Santo Amaro, São Lucas, Tatuapé, Vila Formosa, Vila Guilherme, Vila Matilde, and Vila Prudente.

[9] Group 3 districts that were considered part of the city's intermediate ring are: Campo Grande, Cidade Ademar, Cidade Líder, Ermelino Matarazzo, Itaquera, Parque do Carmo, Pedreira, Pirituba, Rio Pequeno, São Domingos, São Mateus, Sapopemba, Vila Andrade, Vila Jacuí and Vila Sônia.

[10] The spatial distribution of recent demographic trends in intra-urban spaces in São Paulo confirm the findings of studies conducted by Suzana Pasternak and Lucia Bógus (2000) which show, based on different socio-demographic indicators, mainly those related to socio-occupational categories, the "city ??of the rings".

municipalities mentioned above, also Mogi das Cruzes, Suzano, Ferraz de Vasconcelos and Itaquaquecetuba, in the east sub-region, Barueri, Carapicuíba and Santana do Parnaíba, in the west, and Cajamar, in the north, which, unlike the previous, did not have significant participation in the second half of the 1990s, and, since 2007, they began to more substantially account for releases in the SPMR" (SÍGOLO, 2014, p. 27).

In São Paulo, the production of vertical residential real estate developments that occurred in the years 2000s must have been linked, in whole or in part, to the districts' population growths between the years 2000 and 2010. On the one hand, important part of population gains that occurred in the population reversal of Group 2 must have been absorbed by the vertical residential developments produced by the formal real estate market. On the other hand, a smaller proportion of the population gains that occurred in the context of the persistent "peripherization" of Group 3 have been absorbed by such developments.

To analyze the relationship between these population gains and the formal real estate market production, as well as its characteristics and spatial distributions we will use data on vertical residential real estate releases, from the Brazilian Company of Real Property Studies (EMBRAESP) for the period between 1998 and 2008, and provided by the Center for Metropolitan Studies (CEM). [11]

We chose to work with data on releases of vertical residential real estate developments between 1998 and 2008, taking into account the indication made by Aranha and Torres (2014) in a report by the Seade Foundation (State System of Data Analysis) linking population growth with real estate production in the districts of São Paulo. Such indication was based on a study conducted by EMBRAESP (Brazilian Company of Real Property Studies), according to which "*in over 60% of new properties, the delivery times are longer than 24 months*" (EMBREAESP, 2013 apud ARANHA & TORRES, 2014: 7). Based on this finding, these authors adopted a time frame between years 1998 and 2007. In the present study we chose a time frame slightly different, between 1998 and 2008, since with the intense heat of the real estate market in the second half of the 2000s, the residential real estate developments launched by 2008 might have been delivered up to 2010.

Districts of Group 2 increased by 41.7% the total number of households in apartments between 2000 and 2010. These districts, which accounted for 56.9% of this type of household in the municipality of São Paulo in 2000, in 2010, accounted for 59.0 %. In Group 3, the increase of households in apartments between 2000 and 2010 was of 33.2%. Despite this increase, households in apartments in Group 3, which accounted for 30.1% of the total of this type of households in São Paulo, dropped to 29.3%.

Certainly, the increases in households in apartments in Groups 2 and 3 are largely due to real estate developments between years 1998 and 2008. In this period, in Group 2, 2,712 vertical residential real estate developments were launched, [12] accounting for 165,596 apartments, and in Group 3, 882 new developments were registered, corresponding to 78,073 apartments. It is noteworthy that the demographic reversal spurred verticalization in the occupation of intra-urban spaces in Group 2 more than the persistent "peripherization" of Group 3.

[11] Data obtained from the website of the Center for Metropolitan Studies (CEM) at http://www.fflch.usp.br/centrodametropole/716, consulted on 24th, December, 2014.

[12] Vertical residential real estate developments are those with four or more floors.

As Chart 1 shows, Vila Mariana district stands out in Group 2, with 227 vertical residential real estate developments launched between 1998 and 2008. Next comes Itaim Bibi and Moema districts, with 223 and 200 developments, respectively. The remaining districts of Group 2 had less than 200 developments each. The districts of Perdizes, Saúde, Jardim Paulista and Tatuapé had between 100 and 200 developments (196, 166, 139 and 121 developments, respectively). Regarding the district of Brás, even though it is part of the old city center, there was not much action by real estate investors and developers, with hardly any development launched during the period analyzed. Of the districts of the old city center, Sé had one development launched, Pari, three, Bom Retiro, 9, República, 22, and Cambuci, 24. Still situated in the old city center, Bela Vista and Mooca districts stand out with 48 and 90 developments released in the period respectively.

As shown in Chart 2, Vila Andrade was the district of Group 3 with the largest number of residential real estate developments launched between

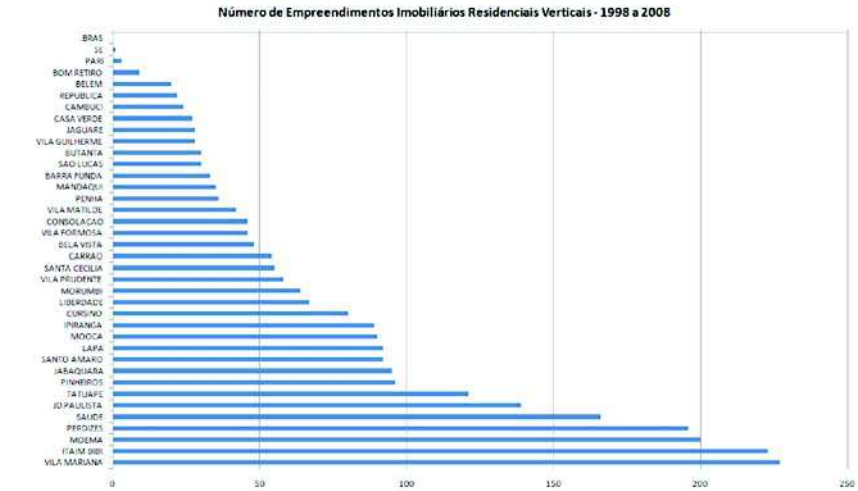

Chart 1: Number of Vertical Residential Real Estate Developments Launched in Districts of Group 2 in the Municipality of São Paulo – 1998 to 2008

Source: Anderson Kazuo Nakano's elaboration with data from the Brazilian Company of Real Property Studies, EMBRAESP, from 1998 to 2008.

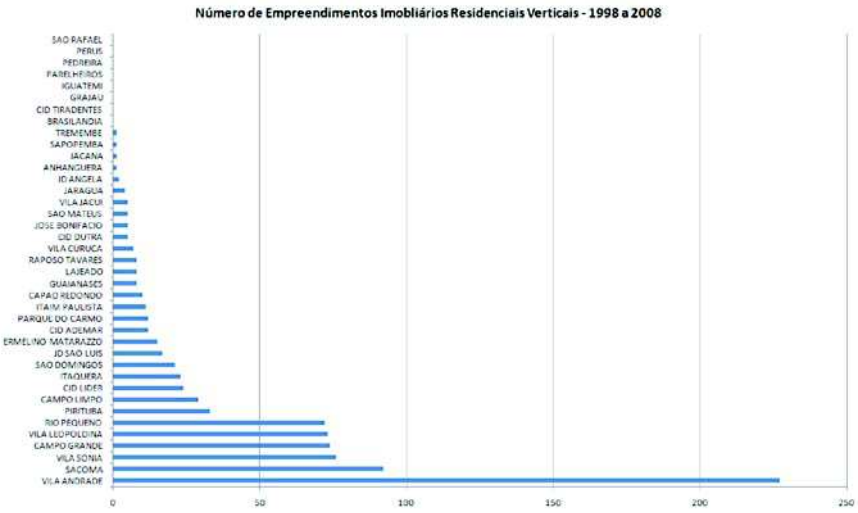

Chart 2: Number of Vertical Residential Real Estate Developments Launched in Districts of Group 3 in the Municipality of São Paulo – 1998 to 2008

Source: Anderson Kazuo Nakano's elaboration with data from the Brazilian Company of Real Property Studies, EMBRAESP, from 1998 to 2008.

1998 and 2008, with 227 developments. Thus, Vila Andrade equates with Vila Mariana, the latter pertaining of Group 2, in the number of developments launched in the period. At this point, it is worth remembering the above-mentioned differences between Vila Andrade's recent urbanization, based on a significant real estate production, and the persistent "peripherization" of most part of Group 3 districts. In this Group, after Vila Andrade, comes Sacomã district, with 92 vertical residential real estate developments launched in the period. Except for Vila Andrade, all other districts of Group 3 launched less than 100 developments in the period.

Besides Sacomã, the districts of Vila Sonia, Campo Grande, Vila Leopoldina and Rio Pequeno launched between 50 and 100 developments (76, 74, 73 and 72 developments respectively). It is also worth noting that eight districts in Group 3 did not launch any vertical residential real estate development between 1998 and 2008: those are Brasilândia, Cidade Tiradentes, Grajaú, Iguatemi, Parelheiros, Pedreira, Perus and São Rafael.

It is plausible to think of a possible association between formal residential real estate production and the population reversal of Group 2, since significant portion of real estate developers sought to implement their developments, targeted at medium and high-income segments of society, in areas with good supply of infrastructure for basic sanitation, telecommunications and electricity, and in the vicinity of structural roads, [13] lines and subway stations, [14] parks, museums, cultural centers, universities, shopping centers, and other large equipment. In the municipality of São Paulo, neighborhoods with such traits are predominantly located in the old and expanded city center, inserted in Group 2. However, it is worth questioning how the association between formal residential real estate production and demographic inversion varied among central districts of Group 2.

Furthermore, we may consider the fact that the promotion of vertical residential real estate developments associated with persistent "peripherization" of Group 3 generated the phenomenon known as "peripheral verticalization". It is worth analyzing how formal residential real estate production did occur in the context of persistent "peripherization" of the districts of Group 3. How did this real estate production enter urban areas mainly composed of slums and informal settlements, occupied by low-income populations (such as irregular settlements, occupations and shanty towns)? Answering to that question is not part of the scope of this article. However, it is worth signaling its importance for future research.

It is worth examining the spatial distribution of formal residential real estate developments launched in districts of Groups 2 and 3 in order to understand the relationship between real estate production and the demographic trends. Aranha and Torres (2014) analyzed this ratio "*in an attempt to identify the locations in which the new dynamics of the real estate market influenced, or not, the population growth, in the different districts of the state capital*" (ARANHA; TORRES, 2014, p. 6).

[13] By structural pathways, it is understood the avenues and highways that exists in the intra-urban spaces promoting the interconnection both between different metropolitan municipalities and between neighborhoods, as well as main centers and sub-centers of the same municipality.

[14] Recently, the newspaper *O Estado de São Paulo* (09/14/2014) published an article about the release of real estate residential and non-residential developments, which sought places nearby locations to lines and subway stations. According to the article, "the São Paulo real estate market migrated to the surroundings of the subway lines." From a survey conducted by *Lopes* real estate Company, 66.2% of future real estate releases in São Paulo (404 of a total of 610) will be up to one kilometer from rail and subway stations, either existings, under construction, or yet in the design stage. The residential real estate developments include compact units such as studios of 25 m², as well as 2 and 3 bedrooms apartments with areas around 55 and 76 m² respectively. Pinheiros, Vila Madalena, Pompéia, Perdizes, old city center, Conceição, Brooklyn, Aclimação, Paraíso, Vila Mariana, Santo Amaro and Vila Prudente are identified as locations of interest by investors because of the existing or planned subway systems.

In order to do that, the authors developed a simple indicator, which they named rate of real estate releases (RRER) "*to evaluate the extent to which the volume of real estate releases between 1998 and 2007 contributed to the expansion of the existing stock of homes in the period", and also "to assess the likely impact of residential releases on the population growth of a given district*" (ARANHA; TORRES, 2014, p. 8).

Based on the RRERs and on the annual population growth rates in the São Paulo districts, Aranha and Torres (2014) built "*a typology that comprises areas with high concentrations of real estate developments associated with population growth; areas with the same characteristics but with lower growth intensity; areas with real estate developments, which did not translate into population growth; areas with few real estate releases and population growth about the average of São Paulo; and areas that still reproduce the traditional peripheral growth pattern*" (ARANHA; TORRES, 2014 p . 9).

These criteria have defined seven districts groups in which variations in the associations between RRERs and the intensities of population growth were verified. However, the method of stratification of RRERs in association with rates of population growth, from which the ranking from highest to lowest for the association between the real estate and the demographics dynamics of these groups of districts was drawn up, was not entirely clear in the work of the authors.

In this article, we analyze the relationships between real estate production and the demographic trends in São Paulo districts focusing on the districts of Group 2 and Group 3. With this, we intend to detect the role of vertical residential real estate development production in the occurrences of demographic inversion (Group 2), and persistent "peripherization" (Group 3). But unlike Aranha and Torres (2014), we worked with the rate of population absorption by apartment buildings (RPAAB), which we will discuss next.

[15] The potential population increment by vertical residential real estate development (PPIPVRRED) was obtained from the number of residents per apartment calculated for each district, based on census data from the IBGE. Then the number of residents per apartment was multiplied by the total units produced in the vertical residential real estate developments launched between 1998 and 2008. Thus, for each district, the potential increments of residents associated with the production of apartments in these developments was obtained.

Rate of population absorption by apartment buildings in the contexts of population reversal in group 2 and persistent "peripherization" in group 3

From the differentials between population increments (PI) for districts of Groups 2 and 3 calculated from census data from 2000 and 2010, and the potential population increments promoted by vertical residential real estate developments (PPIPVRRED), [15] launched between 1998 and 2008, as presented in Charts 3 and 4**,** we have determined the rate of population absorption by apartment buildings (RPAAB).

The potential population increments promoted by vertical residential real estate developments (PPIPVRRED) was calculated from the number of residents that could possibly occupy the apartments of these developments. This estimate was based on the number of residents per apartment in each district obtained from census data from 2010, according to the spreadsheets attached.

Chart 3 shows that the PPIPVRRED surpassed the PI in most districts of Group 2. Before jumping to conclusions, we need to consider the following possibilities:

- Part of the vertical residential real estate developments launched between 1998 and 2008 may not have been executed and marketed;

- Part of the apartments delivered may not have been effectively occupied, perhaps because buyers have bought them as investment or to rent;

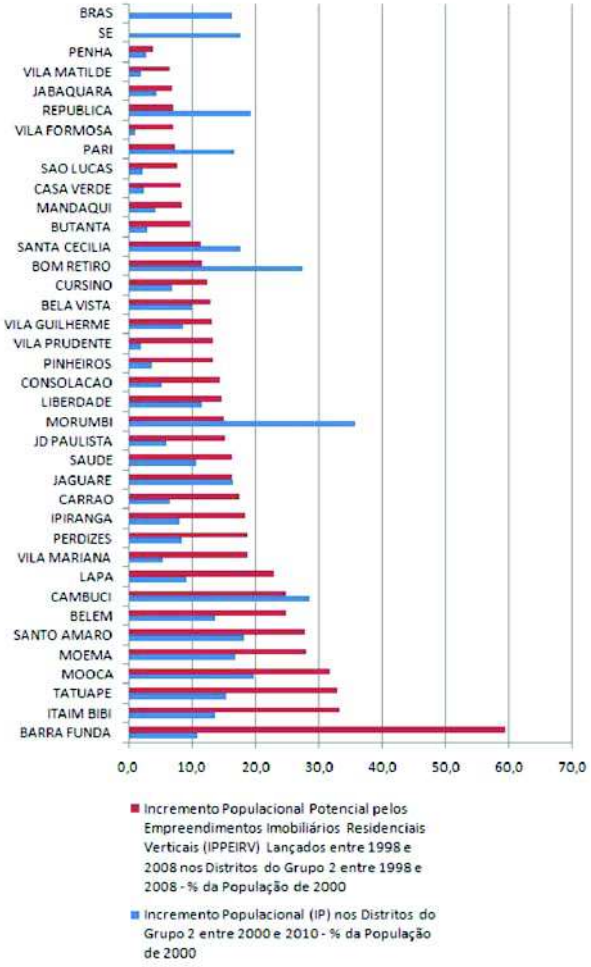

Chart 3: Population Increments (PI) between 2000 and 2010 and Potential Population Increments Promoted by Vertical Residential Real Estate Developments (PPIPVRRED) Launched between 1998 and 2008 in the Districts of Group 2 in the Municipality of São Paulo

Source: Anderson Kazuo Nakano's elaboration with data from the Brazilian Company of Real Property Studies, EMBRAESP, from 1998 to 2008, and IBGE demographic censuses data from 1991 and 2000.

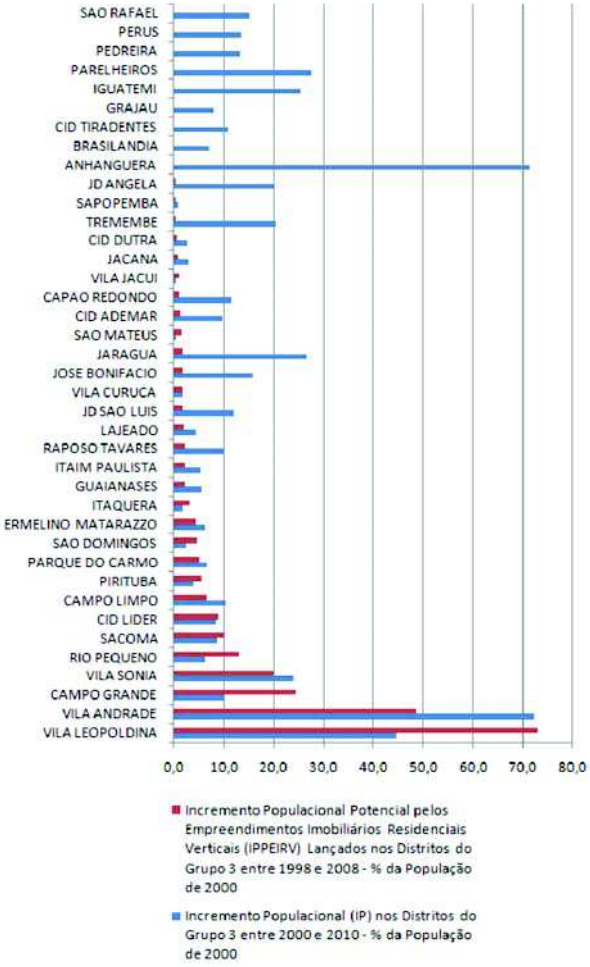

Chart 4: Population Increments (PI) between 2000 and 2010 and the Potential Population Increments Promoted by Vertical Residential Real Estate Developments (PPIPVRRED) Launched between 1998 and 2008 in the Districts of Group 3 in the Municipality of São Paulo

Source: Anderson Kazuo Nakano's elaboration with data from the Brazilian Company of Real Property Studies, EMBRAESP, from 1998 to 2008, and the IBGE demographic censuses data from 2000 and 2010.

- Part of the apartments may have been acquired by people already living in the district. [16]

Even in the face of these possibilities, we can say that in districts where the PPIPVRRED far exceeds the IP, there is a good chance that the real estate production was more closely associated with the population gains brought about by the demographic reversal that occurred in Group 2.

In other words, we can say that in districts of Group 2 where the PPIPVRRED surpassed the IP, the 165,596 apartments launched between 1998 and 2008 may have absorbed most of the population growth that occurred from 2000 to 2010. Those were different types of apartments, whose average useful areas ranged from 47.6 m², in developments in the district of Bom Retiro, to 233.9 m², in developments of Morumbi district; and the average number of bedrooms per apartment ranged from 1.4, in developments of República district, to 3.4 bedrooms, in developments of Morumbi and Vila Formosa districts.

The occupation of part of the vacant homes could have also absorbed a portion of this population increase. Between 2000 and 2010 there was a reduction of 40,314 in vacant dwellings (corresponding to 24.2% of the total of apartments launched in Group 2 districts), comprised both of houses and apartments. This reduction in -24.5% in the number of vacant homes in districts that are part of Group 2 was more noticeable in Jardim Paulista, Santa Cecilia and República districts, with a reduction of over 3,000 vacant homes. São Lucas, Jabaquara, Liberdade and Tatuapé districts also stand out for their reductions of over 2,000 vacant households.

As shown in Chart 4, the overcoming of the PI by PPIPVRRED did not occur in the majority of Group 3 districts, whose continuous population gains arising from persistent "peripherization" may have been associated with real estate dynamics of other land market segments, aimed at lower-income populations. These segments are different from those normally activated by vertical residential real estate developments investors and developers, mainly geared towards buyers with higher purchasing power.

The 78,073 apartments launched between 1998 and 2008 in Group 3 districts were not enough to absorb the population increment (PI) of the period between the censuses of 2000 and 2010. Most of these districts had a PI higher than the PPIPVRRED. The apartments launched in Group 3 districts also presented variations in their average useful areas and in average number of rooms The average useful area of the apartments launched in these districts ranged from 44.5 m², in developments of Lajeado district, to 158.6 m², in developments of Vila Andrade district (the average useful area of apartments launched in Vila Leopoldina district equaled 114.4 m²). The average numbers of bedrooms of those apartments ranged from 2 bedrooms in developments of Capão Redondo district to 3.3 bedrooms in developments of district Vila Leopoldina (the average number of bedrooms in the apartments launched in Vila Andrade equaled 3.2).

The reduction of 48,636 vacant homes in the period between censuses might have certainly been absorbed by part of that population increase. This

[16] In São Paulo, it is common to see residents of single-storey houses or two-storey houses located in the old and expanded city center and in the intermediate portions of the city inserted in Group 2 districts choosing to live in apartments in search of greater safety and convenience. They are usually middle and high income residents who have purchasing power to buy such apartments and to maintain a costly way of life in a vertical apartment building.

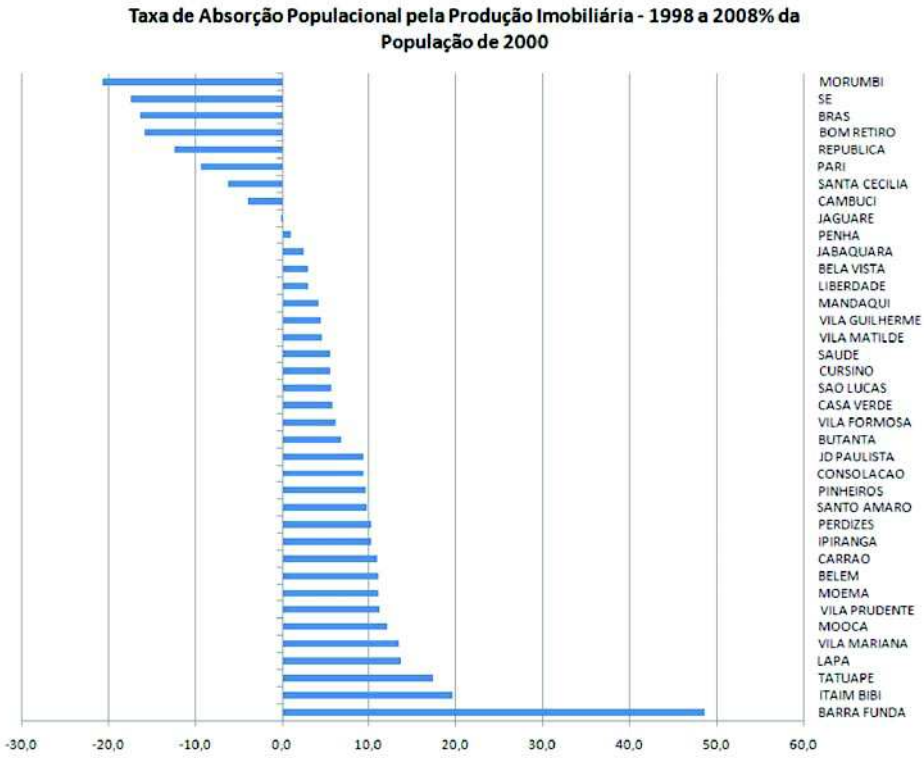

Chart 5: Rate of Population Absorption by Apartment Buildings (RPAAB) in Vertical Residential Real Estate Developments Launched in the Districts of Group 2 – 1998 to 2008

Source: Anderson Kazuo Nakano's elaboration with data from the Brazilian Company of Real Property Studies, EMBRAESP, from 1998 to 2008

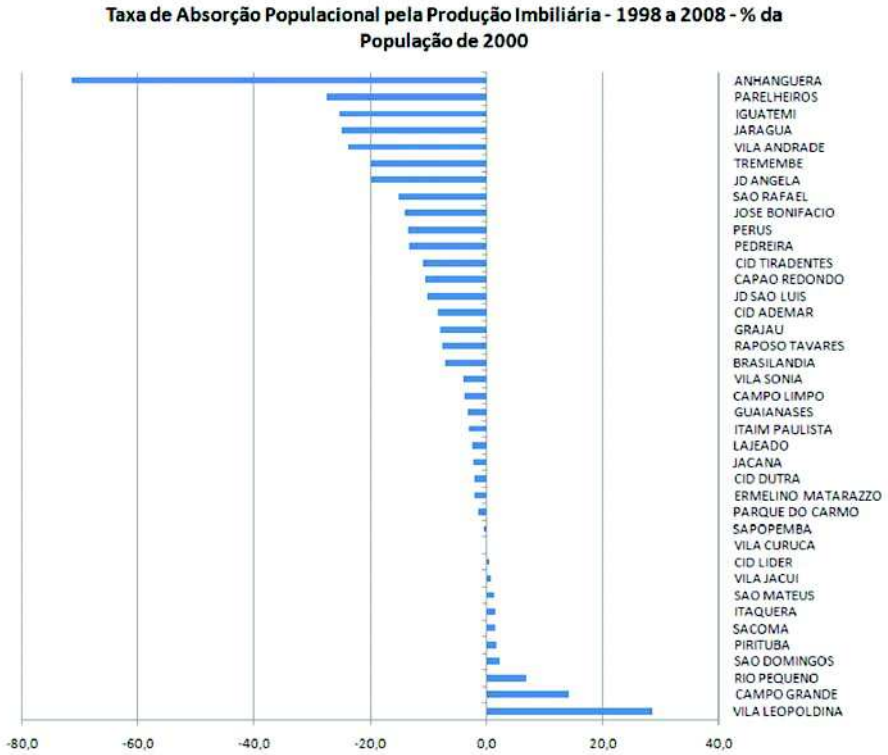

Chart 6: Rate of Population Absorption by Apartment Buildings Production (RPAAB) in Vertical Residential Real Estate Developments Launched in the Districts of Group 3 – 1998 to 2008

Source: Anderson Kazuo Nakano's elaboration with data from the Brazilian Company of Real Property Studies, EMBRAESP, from 1998 to 2008

decrease of - 27.9% in the number of vacant homes corresponds to 69.3% of the apartments launched between 1998 and 2008 in Group 3 districts of persistent "peripherization". Noteworthy are Jardim Sao Luis and Capão Redondo districts that had a reduction higher than 5,000 vacant homes each. Sapopemba and Cidade Ademar had a reduction higher than 4,000 vacant homes. Itaim Paulista, Brasilândia, and Campo Limpo, recorded a decrease higher than 3,000 vacant homes.

In contrast to these districts that had the number of vacant homes reduced, districts of Jaraguá, Cidade Tiradentes and Parelheiros had an increase of more than 1,000 in the number of vacant homes between 2000 and 2010. It is worth noting that the last two districts had no release of vertical residential real estate developments promoted by the real estate development market players.

The rate of population absorption by apartment buildings (RPAAB) reflects the differences between population growth (PI) and the potential population increment promoted by vertical residential real estate developments (PPIPVRRED).[17] A negative RPAAB indicates that the PI was higher than the absorption capacity of vertical residential real estate developments launched between 1998 and 2008, generators of the PPIPVRRED. In such cases, these developments had no significant role in the district's population growth between 2000 and 2010. The positive RPAAB indicates otherwise and the higher its value, the greater the possibility that the population growth of the districts has been absorbed by the vertical residential real estate developments.

[17] To calculate the RPAAB the following formula was used: RPAAB = (PI - PPIPVRRED) x -1

In Chart 5, concerning RPAABs of districts of Group 2, it is noted that most of these districts recorded the possibility of greater population increment promoted by the vertical residential real estate developments (PPIPVRRED) launched between 1998 and 2008 in comparison with the population growth (PI) based on census data between 2000 and 2010.

Of the 38 districts of Group 2 of demographic reversal, only 9 reported RPAABs with negative values, meaning an insufficient quantity of apartments to absorb the population increment (PI) between 2000 and 2010. Of these 9 districts with negative RPAABs, 7 are in the old center of the city (Bom Retiro, Brás, Cambuci, Pari, República, Santa Cecilia and Sé), and 2 in the intermediate portions of the city (Jaguaré and Morumbi). In the remaining 29 districts of Group 2, all of them located in the expanded city center encircled by the rivers Tietê, Pinheiros and Tamanduateí, population gains from demographic reversal may have been absorbed by the production of vertical residential real estate developments launched between 1998 and 2008. It is worth highlighting Barra Funda and Itaim Bibi districts with the highest positive RPAABs of Group 2, 48.6% and 19.6% respectively (in relation to their respective populations obtained from demographic census data of 2000).

According to Chart 6, the districts of Group 3 of persistent "peripherization" were in the opposite situation to that of Group 2 districts. Of the 39 districts of Group 3, only 11 recorded positive RPAABs, which indicate that

vertical residential real estate projects launched in these districts between 1998 and 2008 could absorb the population growth that occurred between 2000 and 2010. These districts are: Campo Grande, Cidade Líder, Itaquera, Pirituba, Rio Pequeno, Sacomã, Santo Domingo, São Mateus, Vila Curuçá, Jacuí and Vila Leopoldina. Among these districts Vila Leopoldina and Campo Grande stand out with the highest positive RPAABs, 28.6% and 14.2% respectively (in relation to their respective populations obtained from demographic census data of 2000).

It is worth highlighting the case of Vila Andrade district, which, despite having the largest number of vertical residential developments of the districts of Group 3, recorded a negative RPAAB. It is quite possible that this has occurred because of the presence of the Paraisópolis shanty town in the district. Known as the largest slum area in São Paulo, Paraisópolis must have absorbed much of the PI observed in Vila Andrade between 2000 and 2010.

In line with the expectations, the other 28 districts of Group 3 which had negative RPAABs, may have had their population gains that occurred with the persistent "peripherization", absorbed by the real estate production based on other segments of the land market driven by:

- Small property owners;

- Players involved in the production and sale of low-income housing developments or precarious and informal settlements (slums, illegal land occupation, illegal land subdivisions);

- Producers of small horizontal housing developments targeted at lower and medium-income segments of society;

- Government agencies responsible for the promotion of social housing intended for low-income populations.

The production of horizontal residential housing developments launched in the Group 3 districts between 1998 and 2008 was not very significant. In this period 439 horizontal residential real estate developments with 10,002 housing units were launched. Recalling that in that same period, there were 882 vertical residential real estate developments with 78,073 housing units launched in districts of Group 3, which was not enough to absorb the population increment (PI) in the period between 2000 and 2010.

Finally, we may conclude that, in fact, the population gains that occurred with the demographic reversal in Group 2 districts and the persistent "peripherization" in Group 3 districts may have been connected with the production of vertical residential real estate developments launched between 1998 and 2008. This influence may have occurred mainly in the districts of Groups 2 and 3 that presented positive RPAABs.

Final remarks

In the cities, the different segments of the real estate production strongly affect the spatial distribution of the populations. The existing socioeconomic stratification between those segments that divide the real estate and land market in urban areas determines the socioeconomic stratification between rich and poor neighborhoods.

In the municipality of São Paulo, during the 2000s, the heating of the real estate market in the segment responsible for the production of apartment buildings affected mainly districts of the old and expanded city center, supplying primarily those with greater purchasing power. These apartment buildings of different types, as well as the occupation of vacant homes, have absorbed, in varying degrees, the population gains verified in these central districts, which having lost residents in the 1990s, began to gain them again in the 2000s. Thus, the real estate market segment responsible for the production of vertical residential real estate developments aimed at middle and upper classes drove the changes in the spatial distribution of the high-income São Paulo's population.

In peripheral districts was a different story. In these districts, population gains caused by persistent "peripherization" exceeded the capacities of accommodation of new residents in the vertical and horizontal residential real estate developments launched in the market, which generated the phenomenon of "peripheral verticalization". This "peripheral verticalization", which produces apartments for middle-income buyers, introduces new processes and features in peripheral urban spaces, no longer restricted to low-income housing developments populated by collective self-constructed homes for the low-income populations.

However, the real estate development market segment responsible for this "peripheral verticalization" did not have enough intensity to generate significant changes in the spatial distribution of those low-income populations. The small horizontal residential developments also did not have enough strength to do so. The real estate market segments that exercised this role in the São Paulo peripheries continued to be those driven by small property owners, promoters of low-income housing, illegal developments, illegal land occupation agents, government companies and agencies responsible for promoting social housing, among others. The occupation of vacant homes, to absorb some of the new residents of peripheral and intermediate districts, has also influenced the changes in spatial distribution of the low-income populations.

With these statements, this article comes to a conclusion. In it, one may realizes that changes in the urban forms of the residential real estate developments define the geometry of spatial distribution of urban populations. And this geometry is constantly crossed by social, political, economic, and cultural forces.

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Attachment

Estimate of Residents in the Apartments Launched between 1998 and 2008 in Group 2 Districts

Districts - Group 2	Total number of apartments launched 1998 to 2008	Number of residents per apartment - 2010	Residents of the apartments launched - 1998 to 2008
BARRA FUNDA	3.198	2,4	7.717
BELA VISTA	3.790	2,2	8.194
BELEM	3.518	2,8	9.813
BOM RETIRO	1.075	2,9	3.100
BRAS	0	2,9	0
BUTANTA	2.074	2,5	5.146
CAMBUCI	2.809	2,5	7.101
CARRAO	4.840	2,8	13.625
CASA VERDE	2.436	2,8	6.851
CONSOLACAO	3.705	2,1	7.922
CURSINO	4.729	2,7	12.646
IPIRANGA	6.731	2,7	18.181
ITAIM BIBI	12.237	2,2	27.091
JABAQUARA	6.031	2,5	14.948
JAGUARE	2.587	2,7	6.946
JD PAULISTA	5.870	2,2	12.806
LAPA	5.560	2,5	13.836
LIBERDADE	4.031	2,3	9.117
MANDAQUI	3.244	2,7	8.785
MOEMA	8.557	2,3	19.981
MOOCA	7.541	2,7	20.112
MORUMBI	1.968	2,7	5.227
PARI	356	3,0	1.079
PENHA	1.812	2,7	4.900
PERDIZES	7.982	2,4	19.202
PINHEIROS	3.723	2,3	8.407
REPUBLICA	1.587	2,1	3.368
SANTA CECILIA	3.569	2,3	8.120
SANTO AMARO	6.561	2,6	16.881
SAO LUCAS	3.852	2,8	10.808
SAUDE	7.899	2,4	19.201
SE	12	2,6	31
TATUAPE	9.640	2,7	26.109
VILA FORMOSA	2.338	2,9	6.757
VILA GUILHERME	2.496	2,6	6.611
VILA MARIANA	9.820	2,4	23.344
VILA MATILDE	2.477	2,7	6.729
VILA PRUDENTE	4.941	2,7	13.520
TOTAL	**165.596**	**2,4**	**414.211**

Source: Author's elaboration with data from the Brazilian Company of Real Property Studies, EMBRAESP, from 1998 to 2008, and the IBGE demographic census data from 2010.

Estimativa de Moradores dos Apartamentos Lançados Entre 1998 e 2008 nos Distritos do Grupo 3

Distritos - Grupo 3	Total number of apartments launched 1998 to 2008	Number of residents per apartment - 2010	Residents of the apartments launched - 1998 to 2008
ANHANGUERA	64	0,0	0
BRASILANDIA	0	2,9	0
CAMPO GRANDE	7994	2,8	22.272
CAMPO LIMPO	4398	2,9	12.633
CAPAO REDONDO	843	3,1	2.586
CID ADEMAR	1037	2,8	2.932
CID DUTRA	352	3,1	1.095
CID LIDER	3667	2,8	10.443
CID TIRADENTES	0	3,2	0
ERMELINO MATARAZZO	1552	3,0	4.621
GRAJAU	0	2,9	0
GUAIANASES	709	3,1	2.185
IGUATEMI	0	3,3	0
ITAIM PAULISTA	1410	3,3	4.630
ITAQUERA	2078	3,0	6.258
JACANA	224	3,3	740
JARAGUA	720	3,4	2.417
JD ANGELA	288	2,9	831
JD SAO LUIS	1482	2,9	4.358
JOSE BONIFACIO	583	3,1	1.829
LAJEADO	958	3,1	2.985
PARELHEIROS	0	0,0	0
PARQUE DO CARMO	1144	2,9	3.301
PEDREIRA	0	2,7	0
PERUS	0	3,3	0
PIRITUBA	3417	2,6	8.916
RAPOSO TAVARES	637	3,0	1.940
RIO PEQUENO	5433	2,7	14.586
SACOMA	8022	2,9	23.082
SAO DOMINGOS	1539	2,5	3.869
SAO MATEUS	696	3,1	2.181
SAO RAFAEL	0	3,6	0
SAPOPEMBA	324	3,1	1.020
TREMEMBE	216	2,9	635
VILA ANDRADE	13050	2,7	35.793
VILA CURUCA	848	3,1	2.631
VILA JACUI	429	3,2	1.352
VILA LEOPOLDINA	7584	2,6	19.983
VILA SONIA	6375	2,7	17.491
TOTAL	**78.073**	**3,0**	**219.591**

Source: Author's elaboration with data from the Brazilian Company of Real Property Studies, EMBRAESP, from 1998 to 2008, and the IBGE demographic census data from 2010.

Author's note
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