

# **Poverty and Space: Patterns of Segregation in São Paulo**

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## **1. Introduction**

The results presented here are part of a research in progress that intends to analyze several social dynamics of the Metropolitan Area of São Paulo. This project led to the creation of the Center for Metropolitan Studies (CEM), which develops academic studies as well as policy-oriented initiatives in collaboration with local governments.<sup>1</sup> The present paper is part of this initiative, and involves the development of studies for the Secretariat for Social Services of the City of São Paulo. The focus of such studies is to help the government address the issue of where and how to act in different regions of the City. We have been involved in similar projects on education policies for the municipal governments of the cities of Mauá, Guarulhos, Embu and São Paulo, all within the metropolitan region of São Paulo, which explain the ongoing nature of this work.

The general scope of that initiative is to perform – for the 21,000 tracts of the Metropolitan Area of São Paulo (2000 Census) – factor and cluster analyses based on a Geographic Information System (GIS). The aim is to identify both poverty heterogeneity (to produce information for local action) and “hot spots” of super poverty, so as to guide urgent remediation action. Due to the lack of space and time, the data and results presented here refer only to the first part of this study, namely, the factor analysis.

We start this paper by presenting, in Section 2, a review of the literature on urban poverty in São Paulo, highlighting the most important elements of the debate from our perspective. First, we agree with the literature that poverty has a significant spatial component that can be characterized, in most cases, as a segregation process. Second, we focus such discussion on the role of the State, trying to identify some emerging elements in the debate, such as new spatial patterns of wealth distribution. Finally, we discuss the issue of how to measure poverty in a place like São Paulo, considering the multiple dimensions of the phenomenon.

However, we try to show that poverty and segregation are much more heterogeneous than generally considered by the literature. To that effect, in Section 3, we present the factor analysis. Such study

intents to explore poverty heterogeneity not only in their spatial aspects but also in their micro components associated with gender, lack of education, etc. In order to do that, we perform the factor analysis for the 21,000 census tracts of the Metropolitan Area of São Paulo. Through this exercise, we try to identify the most important poverty features, as well as its most important spatial aspects in a very detailed scale.

We also present, in Section 4, data on homicides and students scores for native language per quintile of the indicator derived from the factor analysis. Such data was not originally included as input for the factor model, and could only be organized here with the help of GIS techniques. This analysis indicates significant differences among levels of the indicator. It also shows, for instance, the existence of particular “hot spots” of high homicide rates, hinting at the existence of different levels of segregation even within the poorest areas.

## **2. The Urban Poverty Debate in Brazil**

Since the 70s, Brazilian sociology has intensely analyzed the urban poor. Urban spaces occupied by these social groups were characterized as “*periferias*” - socially homogeneous spaces, forgotten by State policies, and typically located in the fringes of the metropolitan area<sup>2</sup>. These spaces are predominantly produced by irregular or illegal parceling of large states by private land developers, who do not fulfill the necessary requirements for the approval of the settlement in the municipality. In such places, families are supposed to “own” the land, since they have paid the developer for it. Most of the houses located in those settlements are self-constructed.<sup>3</sup> Such housing solutions became predominant in São Paulo, although a more traditional housing solution for the poor - the squatter settlements, or “*favelas*” – are also present.<sup>4</sup>

The general urban configuration was supposed to be radial-concentric in its geometry (Abreu, 1987; Brasileiro, 1976), with a pronounced decline of land values, economic activities and living conditions from the center towards the outskirts of the city (Bonduki and Rolnik, 1982; Villaça, 1999 and Taschner and Bógus, 2000). In other words, it is possible to argue that this way of understanding the urban form is highly “dual”, strongly contrasting the wealthy center with the very poor *periferias*. However, such characteristics of homogeneity and location of the *periferias* have been challenged recently in different ways:

- a) The emergence of several rich, gated urban developments in the Western regions of the Metro Area, traditionally occupied by the poor (Caldeira, 2000). It breaks the radial-concentric geometry, and has significantly increased the social heterogeneity of that area, although the occupation of those settlements has tended to produce enclaves with very little contact between social groups;
- b) A process of dissemination of poverty and poor people all over the city. This process led to the development of a new wave of shantytowns, marked by scattered invasions of very small land portions not occupied by urbanization, such as tiny spaces between bridges and river banks, or railway tracks;<sup>5</sup>
- c) A new driver of change based on the State, which made itself increasingly present in the *periferias*. This led to a substantial increase in several social indicators, particularly those related to access to public services. This fact can be partially explained by the intense pressure of urban social movements during the process of political mobilization that marked Brazilian society in the 1980s.<sup>6</sup> However, those *periferias* were also the object of several State policies apparently motivated by the State apparatus during the 1980s and the 1990s, as shown by studies from Marques (2000) and Watson (1992).<sup>7</sup> Most probably, the two processes have reinforced each other (Marques and Bichir, 2001)

In terms of environmental indicators, this meant that water and garbage collection coverage became almost universal in 2000 in the most important Brazilian cities. However, it is not yet true for sewage collection. In other words, new urban developments and public policies introduced important transformations in *periferias*, making it necessary to revisit old analytical models that described and investigated them in the 1970s and 1980s. This intellectual task is still to be accomplished.

State investment and services, however, were not enough to raise the living conditions of low-income population to the standard of other parts of the cities (Marques and Bichir, 2001). This is partially due to the size of the deficit in terms of those conditions and true access to services and infrastructure, and also by the quality of the services and equipment recently delivered by the State to such areas. In the vast majority of such cases, the services introduced in those areas were (and still are) of lower quality. Along these lines, public works built in such areas were not completed and tended to deteriorate, since the systemic logic of the urban infrastructure was not respected. In

several aspects, these processes have contributed to the differentiation of the urban poor social groups and their territories, making *periferias* (as well as *favelas*) an increasingly heterogeneous phenomenon. We will further develop this issue in the present paper.

## 2.1. Social Segregation

In the case of São Paulo, the question of urban poverty is not only a matter of level, or amount, but also of social and spatial concentration, involving both inequality and segregation. This problem is also connected to the public policies that should be designed to improve their situation. This problem is neither new, nor absent from North American and European cities. The literature on social sciences has accumulated considerable knowledge about not only the old processes of segregation that marked cities such as New York and Detroit, but also the dynamics of new forms of segregation and urban poverty (Harloe et al. 1992; Marcuse, 1996; Logan et al., 1992),<sup>8</sup> that have led to new forms of urban protest (Jencks, 1993).<sup>9</sup> Broadly speaking, the question of segregation in Brazilian cities is similar, with poverty tending to be highly concentrated in spatial terms. However, it seems to be much more difficult to fight poverty through public policies in Brazil, since the stock of poverty accumulated is huge and the processes through which poverty is reproduced are mingled with several aspects of social reproduction.<sup>10</sup>

One important social consequence of the merge of inequality and segregation is the strong cumulative effect of social and environmental risks in some places, which we called *hiper-periferias* (Torres and Marques, 2001). In fact, the level of social and environmental problems of certain areas is really impressive, spatially (and socially) superposing the worst socioeconomic indicators with flooding and land sliding risks, heavily polluted environment and, when present, extremely inefficient social services (Torres, 1997).<sup>11</sup>

If the presence of poor people in *periferias* and *favelas* is not under discussion, the causes of their spatial concentration are the object of fierce debate. The Brazilian literature usually points out to three different groups of causes for this pattern of urbanization:

- a) *The labor market and the social structure.* For part of the literature, urban segregation is a by-product of the labor market (Valladares and Coelho, 1987). For these authors, the nature of the Brazilian social structure and its labor market, as well as their recent transformation, would explain the patterns of high segregation and very low living

conditions in *periferias*. They sustained that urban poverty in Brazil was not a mere problem of integration in modern industrial society, but a structural trace of the capitalist economy in developing countries;<sup>12</sup>

b) *The dynamics of land markets and housing production.* Some authors emphasize the developers and their strategies. According to this line of reasoning, urban structure would be explained in great part by such actors, who would control the best locations, speculate with empty land, and profit with changes in the land use of estates and neighborhoods (Ribeiro, 1997).<sup>13</sup> Others focus on the way the land market allocates social groups and economic activities through the microeconomic mechanisms of land value. These elements promote segregation of the poorer through the competition for land use (Smolka, 1987 and Abramo, 1994).

c) *State policies.* A first group of authors focuses in the regulatory power of the State over the territory. According to such analyses, the State may maintain privileges and exclude a significant part of the city from the benefits of urbanization through building and land use legislation (Rolnik, 1997; Neri, 2002). One central element here would be zoning, which would “freeze” the benefits of urbanization in certain parts of the city inhabited by the wealthiest groups, while allowing several kinds of uses and construction patterns in the rest of the city. Another group points out to very strong evidence on segregation patterns promoted or enhanced by direct State action (Fix, 2001; Marques and Bichir, 2001; Vetter, 1975; Vetter et al., 1981). This could be caused by the increase in land value in certain parts of the city, as a result of either public investments or public works, which may expel some social groups and substitute them by others (Vetter, 1975 and Vetter et al., 1981).<sup>14</sup>

Most likely, all the three processes described above have their share of responsibility in the promotion and reproduction of urban inequalities and segregation. It is true that if families are located in the bottom of the social structure, they tend to live in poorer conditions, and to have very limited choices, especially in Brazilian society, where upward social mobility is limited. But it is also true that the land market is structured around bids for use and location, and that if the majority of the population can offer almost nothing for their location, they will be pushed to places with no facilities and almost no differential land rent. Nevertheless, it is also true that the State may enhance these processes, or even cause and multiply processes of segregation and inequality production.

## 2.2. Measuring Poverty

One of the main problems to be solved when studying social inequalities is the definition of what is poverty and how to measure it. The most common way of addressing this issue is adopting a poverty line. Poverty lines are generally considered as the minimum income necessary for the family survival, or refer to a broader definition of poverty, normally associated with some specific welfare program (Mingione, 1999). Although very helpful in terms of international comparisons, poverty lines are controversial. For instance, national poverty lines may undermine the situation of the urban poor due to the fact that rents are higher in the largest urban centers. They also do not consider non-monetary incomes common in rural areas and poor communities. Finally, poverty lines do not necessarily capture the so-called “multiple dimensions of poverty”. The idea behind this concept is that poverty cannot be defined only in terms of material level of survival, but has to consider those individuals and families that – although surviving – are not included in the most important benefits of urban societies such as education, sanitation, health, culture and social integration (Mingione, 1999). This concept seems to be particularly important for urban areas in developing countries because welfare and social services are not universal, as we have pointed before.<sup>15</sup> Therefore, although being above the poverty line in certain moments of their existence, many families become extremely fragile, for instance, when any significant sickness or death happens in the family.<sup>16</sup>

Furthermore, in a large metropolitan area such as São Paulo, with 18 million people in 2000, the problem of poverty location is not a simple one. Although poverty reduction policies are targeted to these social groups, there is a tendency of not investing in the less “visible” regions, those in which the extremely poor live, when resources are scarce. These areas are less visible because administrative routines do not include them, as we have pointed out, but also because, in political terms, such social groups are usually less informed and organized.

Another very important dynamics that must be highlighted is that the existence of large extensions of territory occupied almost exclusively by very poor people tends to reduce the possibilities of social mobility for such groups. The characteristics of the poor population in a particular area in terms of age and family structure can also have significant impact on the kind of social policy that will be appropriate. Some poor areas present high concentrations of old people, while others have larger proportions of newborns and single mothers. Those particular features demand specific policy strategies (Torres, 2002).

Considering those elements, the empirical strategy developed in this study was based on the following elements:

- a) Data must be strongly de-aggregated, in order to guarantee the observation of where poor people live and what are their socioeconomic characteristics. To accomplish this, we have used GIS for the 21,000 census tracts of the Metro Area of São Paulo (2000);
- b) The issue of multiple dimension of poverty should be considered. As a consequence, instead of adopting a single line of poverty, or of using only income distribution, we have built a deprivation indicator based on the data of average income,<sup>17</sup> number of families below the poverty line, education, gender, and size of the family. The unit of analysis was the census tract of the Brazilian census of 2000, and the building of this indicator was based on a factor analysis (component analysis);<sup>18</sup>
- c) It is also important to assess how different social indicators not included in the model - such as homicide rates – correlate with the factors produced by the statistical model. This association is possible due to GIS resources, such as “address matching”, which allows the placement of each death as a point in the map.<sup>19</sup>

The combination of such techniques have allowed, on the one hand, for a strong data de-aggregation and, on the other, for the manipulation of a large amount of data within the context of a relative simple statistical model. The final result is a detailed description of the spatial distribution of poverty. This strategy may be very useful in helping national and local governments address public resources for the most needed, as well as contribute for a deeper understanding of urban poverty in São Paulo. The main results of this exercise are detailed below.

### **3. Factor analysis**

The use of factor analysis enabled us to identify - for a concrete group of regions - which variables in terms of education, housing conditions, etc. are correlated to high levels of poverty, leading to the development of a “deprivation indicator” that helps us capture the multiple dimensions of poverty. Another advantage of this technique is to reduce the problems associated with the information on income, which tends to be under-registered in Brazil. A similar procedure was used, for instance, by

Conapo in Mexico, when defining the targets for the compensatory program called Progresa (Rubalcava and Ordaz, 1999).

We indicate, in Table 1, the variables that fitted the model. Eleven variables were combined to form two different factors. Those variables that did not fit were the ones that do not show significant variation across the different census tracts. For instance, most housing indicators (such as water coverage - 98%, garbage collection - 97%, and households with bathroom - 99%) do not vary because they now represent a virtually universal coverage. This might be due to the nature of the variables, or may be caused by State actions that reached most *periferias* in the 1980s and 90s, as we have already stressed before. For the moment, we do not have enough information so as to determine which of these processes are most relevant. Also, we were unfortunately unable to work with the variable of sewage collection (88% of coverage) due to problems in the original database provided by the Brazilian Statistical Bureau (IBGE). Other variables, such as the condition of land property, are also problematic because there is a large variation in the reporting of land use status in invaded areas. We further discuss below the major factor formed by this analysis (factor 1).

**Table 1: Variables Used in the Factor Analysis.**

<b>Variables considered in the analysis</b>	<b>Variables that fitted the model.<sup>20</sup></b>
<b>Education</b>	
Proportion of literate head of households (%)	Factor 2
Proportion of head of households with primary education (%)	Factor 1
Average number of years of schooling of head of household (%)	Factor 1
<b>Income</b>	
Average income of head of household (Reais of 2000)	Factor 1
Proportion of head of households with average income of less than 3 minimum wages	Factor 1
<b>Housing conditions</b>	
Proportion of households (in the track) without garbage collection (%)	
Proportion of households without piped water (%)	
Proportion of households without bathroom (%)	
Proportion of rented households (%)	
Proportion of invaded households (%)	
Average number of inhabitants per bathroom in the census tract	
Proportion of households established in a single room (%)	
<b>Age and family structure</b>	
Proportion of head of households from 10 to 29 years old (%)	Factor 2
Average age of head of household	Factor 2
Average number of inhabitants per household	Factor 2
Proportion of children from 0 to 4 years old in the total population (%)	Factor 2
Proportion of teenagers from 15 to 19 years old in the total population (%)	Factor 2
Proportion of young adults from 20 to 24 years old in the total population (%)	
<b>Gender</b>	
Proportion of women with primary education, or less, as head of household (%)	Factor 1

The two factors were able to explain 76.70% of the total variance.<sup>21</sup> The first factor developed in this analysis was named “Deprivation Dimension” because of the variables that are among its components. For instance, it is positively correlated with high levels of low education, low income, and presence of low-educated women as head of households. Of course, the name given to a factor ends up representing a certain affiliation in terms of theoretical perspectives on poverty. We could have named it “risk factor”, “exclusion factor”, or even “marginality factor”, but we have opted for a denomination of deprivation that has been used in the literature since the 70s to address the issue of multiple dimensions of poverty (Mingione, 1999).

The tracts with higher levels of the deprivation indicator tend to concentrate the most “fragile” population in the short and/or long run. Those tracts present, at the same time, lower average income and education levels, higher proportion of very poor families, higher average number of inhabitants per household, higher proportion of low-educated women as head of household, and higher proportion of teenagers. These families are in socially vulnerable situations because:

- a) Lower education means reduced ability to get a new job or income in case of unemployment;
- b) Families headed by low-educated women indicate lower family income both because of the discrimination of the women in the labor market and because this typically means a single source of family income;
- c) Higher housing density means the need of sharing common resources among a larger number of people, with consequences for nutrition, health and education. Although the role of family size in poverty has long been controversial, recent research indicates that they indeed have a complex, but positive relation (Merrick, 2002);
- d) Lower income also means worse housing and nutritional conditions, implying higher probability of sickness by infectious and respiratory diseases. Sickness may cause a significant impact for family income due to the interruption of work – which is a big problem for self-employed and non-registered workers – and to the cost of treatment.<sup>22</sup>

Most of these correlations are well discussed in the literature (Mingione, 1999), albeit not necessarily obvious. The only possible surprise here is the fact that the proportion of teenagers is

correlated with poverty, since it more often appears correlated with the presence of small children. However, this relationship reflects a particular condition of the age structure of São Paulo, which has experienced an important fertility decline since the 80s (Bercovich, Madeira e Torres, 1998).

In Table 2, we show several descriptive variables considering the distribution of the Deprivation Index. As we can see, the 5<sup>th</sup> quintile can be considered the worst of all the variables considered. They are problematic not only in terms of the socioeconomic conditions that form factor 1, but also because they present higher proportions of children and low-educated women as head of household. Most shantytowns of the city are also present in this quintile of the distribution. In other words, precarious socioeconomic conditions have a particular impact on some specific social groups, which is significant to guide specific policy strategies in areas such as education and health.

**Table 2 – Average distribution of different socioeconomic variables according to the quintiles of the Deprivation Indicator. Census tracts of the Metropolitan Area of São Paulo, 2000.**

Quintile	Average age of head of household	% of head of household between 10 and 29 years old	% of female heads of household with less than 8 years of schooling	% of head of households with income of less than 3 minimum wages	Average income of the head of household (in Reais)	% of literate heads of households	% of heads of household with at least primary education	% of children between 0 and 4 years old	% of tracts defined as subnormal (shantytowns)
1 <sup>st</sup>	46.6	12.0	10.1	17.7	2,784.1	98.4	77.4	6.7	2.2
2 <sup>nd</sup>	44.1	16.8	16.0	41.4	952.8	94.1	47.7	9.1	6.7
3 <sup>rd</sup>	44.2	16.8	18.5	47.3	742.2	92.9	41.2	9.2	6.0
4 <sup>th</sup>	44.3	16.5	20.8	51.6	659.0	91.7	37.3	9.3	8.2
5 <sup>th</sup>	43.4	17.2	26.0	59.7	529.2	89.1	31.6	9.9	24.3
MRSP	44.5	15.9	18.2	43.6	1,116.5	93.2	46.8	9.0	9.5

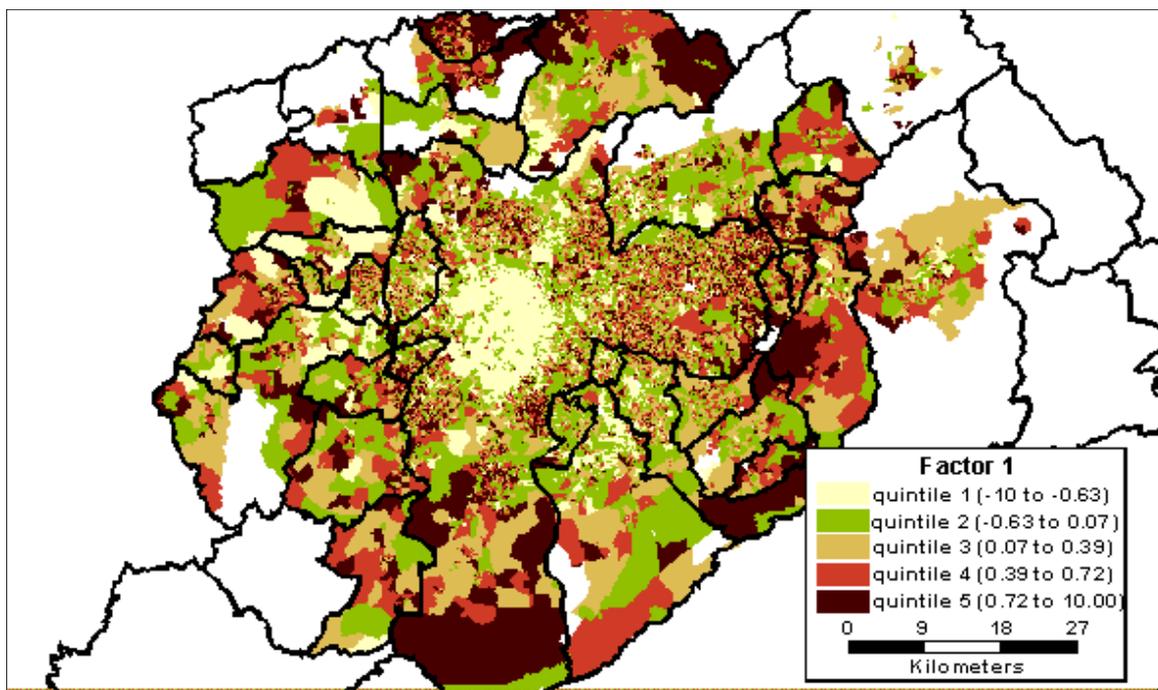
Source: IBGE.

However, the main difference in the indicators is located between the first and the second quintile. For the variable “average income of head of household”, for example, the value of the first quintile is almost three times that of the second. In a preliminary interpretation, this data seems to reinforce a “dualistic” perspective on spatial and social differentiation of São Paulo’s Metropolitan Area.<sup>23</sup> However, we have to be careful with this kind of interpretation.

In order to discuss this issue, we present in Map 1 the distribution of the deprivation indicator along the spatial dimension. It is possible to notice that higher levels of deprivation are present in farther suburbs, particularly in the Northern, Eastern and Southern portions of the Metro Area, while the wealthiest groups are highly concentrated in the central area of São Paulo (the central city in the

map). Shantytowns are also clearly identifiable in this map, being mainly represented by the small dots of brown color spread all over the Eastern, Southern, and Northern portions of the Metro Region. By observing this map and considering the size of the poor population, it is possible to argue that the most important segregation pattern in São Paulo involves segregation from wealthy families, historically clustered in the center of the Metropolitan Area to have better access to the scarce infrastructure services. However, some concentrated development projects have created important clusters of wealthy families around new centralities. This is the case of the Western suburbs of the metropolis. These are the gated communities described and discussed by Caldeira (2000). In general terms, except for this portion of the metropolis, deprivation tends to decline as one approaches the “center” of the city, which would be consistent with the *periferia* model discussed in Section 2.

**Map 1**  
**Spatial Distribution of the Deprivation Indicator. Census Tracts of The Metropolitan Region of São Paulo, 2000**



In fact, the aggregate data available confirms that the population of very far *periferias* is, on average, much more deprived than that of the center of the city and of intermediary areas (2-10 km of the center) (Table 3). However, the significant increase in the standard deviation of the

deprivation index, as someone goes from the center to the *periferias*, shows a shows a substantial heterogeneity within each of the “rings” of distance. In fact, as we can see in Map 1, the spatial distribution of social groups presents many discontinuities and inversions, suggesting that the concentric model is a rough simplification of the urban form. In urban terms, these are related with several important subcenters previously existent, new rich neighborhoods built recently by the development industry, as well as shantytowns. (Marques and Bitar, 2002). The problems of the center-periphery structure become visible also when we consider distances of more than 30 kilometers (Table 3). As we will see in Section 4, the radial-concentric model hides important differences among the *periferias*.

**Table 3**  
**Education, Income, and the Deprivation Indicator According to Average Distance of the Census Tract to the Center of the City, 2000**

Distance from the center (*)	Average number of years of schooling of head of household		Average Income of head of the household (Reais of 2000)		Deprivation Indicator	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
0 to 2 km	12.75	1.31	4760.35	2593.11	-2.03	0.83
2 to 5 km	11.74	2.03	3275.00	1923.60	-1.64	0.93
5 to 10 km	8.62	2.45	1585.56	1263.06	-0.26	1.07
10 to 15 km	6.94	1.98	951.49	759.55	0.24	0.83
15 to 20 km	6.94	1.91	937.35	830.54	0.18	0.79
20 to 25 km	6.44	1.70	754.33	639.24	0.19	0.75
25 to 30 km	5.76	1.14	570.50	353.42	0.40	0.56
30 to 35 km	5.58	1.23	529.05	252.15	0.42	0.55
More than 35 km	6.23	1.99	753.32	671.94	0.27	0.67
Total	7.36	2.54	1168.90	1278.79	0.00	1.00

(\*) We have considered “Shopping Iguatemi” as the “center of the city”. It is the oldest and most important shopping center in the country. It is also in the core of the wealthiest area of São Paulo of recent times (Frugoli, 1998). The distances were calculated by the GIS.

It is also interesting to notice, in Table 3, that segregation seems to be much stronger in terms of education than in terms of income (see standard deviation). It reveals some interesting features of the segregation dynamics in São Paulo: considering different rings of the center of the city, people tend to be closer to people with the same level of education. It is possible to find places of higher income levels in suburbs far from the center - although not very high levels of education, as in the districts of Santana and Tatuapé, as well as in the cities of São Caetano and Santo André in the Southeastern portion of the Metro Area.

In summary, the deprivation dimension presented here seems to be a strong indicator of the social inequalities in the Metropolitan Area of São Paulo. Their components are consistent with the literature, correlating income, education, family size and families headed by women. Its spatial distribution is also consistent with the literature in terms of describing the spatial dimensions of urban inequalities in São Paulo and the presence of shantytowns. However, we could also see that its spatial distribution presents discontinuities, suggesting that the existence of a rich urban core is not enough to explain the different contexts of the *periferias*. Such areas are very large and tend to be heterogeneous, which demands a better understanding - from the part of the academic community and government - of what segregation really means. We further develop this argument below, and the future developments of this research project will explore these processes deeper.

#### 4. New Data on Segregation – Homicide Rates and Scores in Native Language

Violence and crime are emerging issues in almost all Latin American countries. In the Metropolitan Area of São Paulo, the death rate related to murders and other forms of violence has increased fast throughout the 90s, having been used as an important indicator of social crises and of the deterioration of social relations (Cardia, 1999 and 2000; ALESP, 2000). We present, in Table 4, the distribution of homicide rate, according to each quintile of census tracts developed in the factor analysis.

**Table 4**  
**Homicide Rate According to Quintiles of the Deprivation Indicator. Municipality of São Paulo, 2001.**

Quintiles	Homicides in 1998-2000	Homicide rate – total population (100,000 inhabitants)	Homicide rate – 15 to 29 years old (100,000 inhabitants)	Teenagers of 15 to 19 years old in the total population (%)
1	1354	21.70	44.90	7.8
2	2617	40.75	86.74	9.3
3	3022	49.20	103.73	9.9
4	3211	50.56	107.54	10.4
5	3469	56.66	119.43	11.3
<b>Total</b>	13673	43.71	94.80	9.8
Not located	351	-	-	-

Source: Seade Foundation.

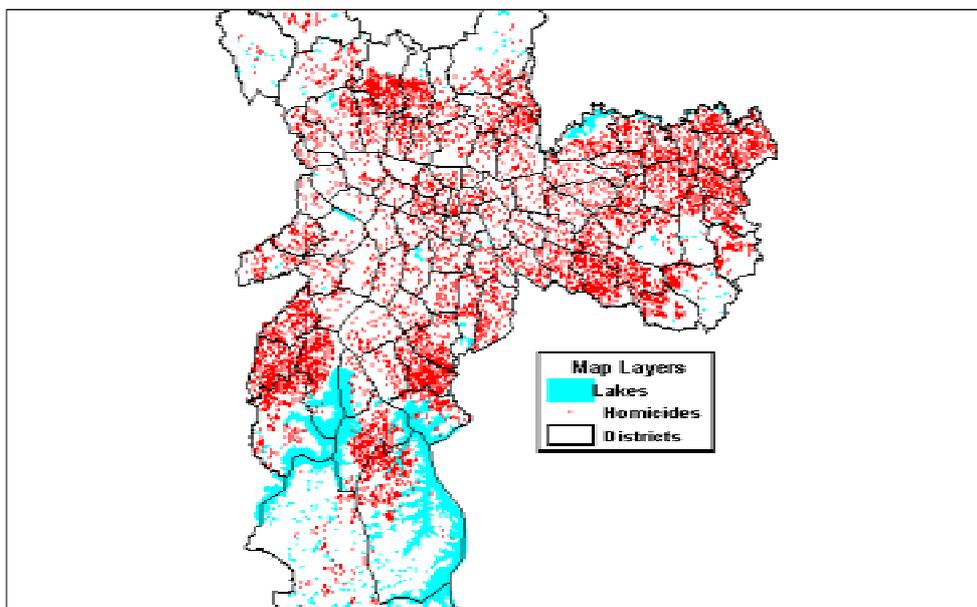
Note: The information on homicides is based on the civil register, which provides data on the location of residence of the dead person. The location of the data on homicides in each census tract was possible through the use of GIS techniques. See Maps 2 and 3.

It is interesting to notice that homicide rates vary significantly across different quintiles. Generally speaking, the least deprived area (quintile 1) also presents the lowest homicide rates, comparable with the figures for São Paulo in the 70s (ALESP, 2000). As someone moves down on the quintiles, homicide rates tend to increase, specially if we consider those homicide among young people (15 to 29 years of age). However, as we will see below, this aggregated pattern hides important differences among *periferias*.

In order to further discuss this problem, we present in Map 2 the distribution of homicides in the city of São Paulo. Again, in a first look, it seems that homicides have an obvious *periferia* effect, intuitively consistent with the “dualistic argument” of the literature describing those spaces.

### Map 2

**Place of Residence of People Who Died By Homicide in the City of São Paulo. Seade Foundation, 1998-2000.**

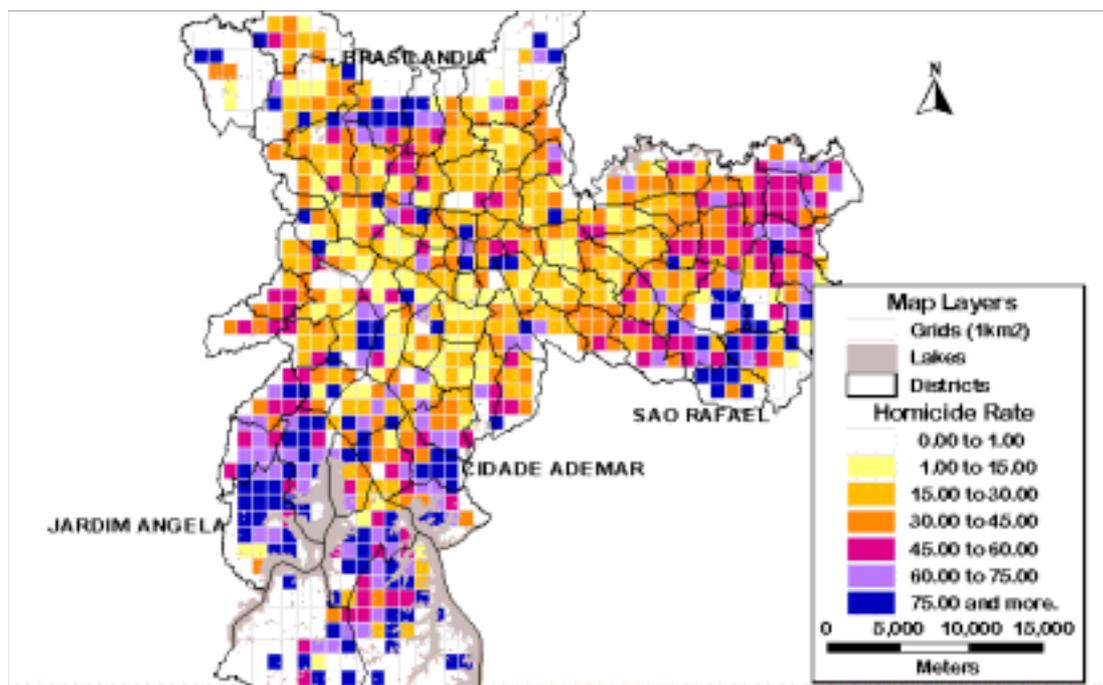


However, such data and map give a precarious indication on the distribution of the violence phenomena, since the size of the population also varies for different areas. Consequently we have also tried to produce a map representing the homicide rate per grid of 1 square kilometer of the city (Map 3).<sup>24</sup> The observation of this map, however makes unable to confirm that homicide is necessarily a *periferia* phenomenon, since it is highly concentrated in some particular districts such as Jardim Angela, Cidade Ademar, Brasilândia and São Rafael. There are other poor districts in the

Northeastern and Eastern portions of the city, in which the homicide rates are close or below the average of the Metro Area, indicating that the single consideration of deprivation (or of a *periferia* status) is not enough to explain the presence of high or low homicide rates.

### Map 3

**Place of Residence of People Who Died By Homicide in the City of São Paulo. Seade Foundation, 1998-2000.**



As a consequence, it is possible to argue that the distribution of homicide rates is far from “dual”, being concentrated in some particular “hot spots”. In other words, we cannot state for sure that homicides are perfectly correlated with income and education levels for different areas. Other elements must also be taken into account. For instance, 61% of all homicides that happened in São Paulo between 1998 and 2000 involved victims between 15 to 29 years old, suggesting that age structure is also important.<sup>25</sup> Most likely, other elements - such as the cultural *milieu* - have also to be considered when interpreting criminal data (Cardia, 2000).

Another area of public policy in which spatial distribution of the offer/demand is very important is basic education. This is because the cost (not only financial, but mainly social) of spatial dislocations tends to be very high for very young people, especially if they are poor. In Brazil, school districts are not in place. As a consequence, although the State is obliged by the Constitution to provide education to all children from 7 to 14 years of age, there are little legal or administrative

mechanisms that specify that public education facilities must be at a certain distance from the child’s home. In view of that, at least in large metropolitan areas such as São Paulo, where the policy is almost universal, school conditions and quality are the most important issues for the improvement of education.

Even in the context of public schools, educational indicators may vary significantly due to different dimensions, such as family education, income and school conditions. Although we do not have data to further develop this issue, we present, in Table 5 below, information on the average score in native language (Portuguese, 5<sup>th</sup> and 7<sup>th</sup> grades) according to the location of the schools in the different quintiles of the deprivation indicator developed in our study.

**Table 5**  
**Average Score in Portuguese Language According to the Location of the Primary School in Terms of Quintiles of the Deprivation Indicator. State Schools in the Municipality of São Paulo, 2001.**

Quintiles	5 <sup>th</sup> Grade	7 <sup>th</sup> Grade
1	48.9	47.3
2	44.6	44.7
3	44.2	44.3
4	43.8	43.8
5	42.9	43.4
Total	44.7	44.5

Source: Secretariat of Education of São Paulo (SARESP).

Note: The identification of how each school was located in each group of tracts was possible due to GIS. We did not include in this average the so-called “evening classes”.

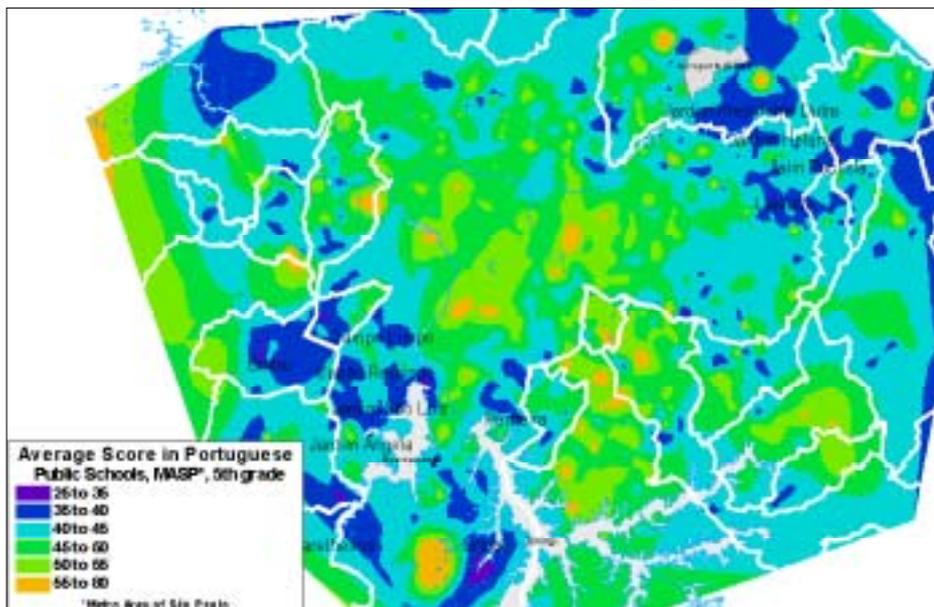
We can see that the best average scores are present in the schools located in quintile 1, while the worst are in quintile 5.<sup>26</sup> In general, this data seems to vary in similar ways of the data previously described, but the most important evidence shown in Table 5 is that the variation is quite moderate. This may be possibly due to the fact that wealthy families do not put their children in public schools. However, other elements related to the spatial patterns of distribution of scores in native language – similar to the ones observed for homicides – are also in place, highlighting again the danger of considering the center-periphery configuration.

As we can see in Map 4, below, the distribution of very low grades are not homogeneous across *periferias*.<sup>27</sup> We can notice again some important clusters of low scores in Portuguese language around the district of Jardim Angela (Southwest) as well as an important cluster located in the Eastern portion of the city of São Paulo (district of Itaim Paulista). It is also possible to notice some

poor districts (in the North) and suburban cities (in the Southeast) that present score levels close or above average.

#### Map 4

**Spatial Distribution of Scores in Native Language (5<sup>th</sup> grade) According to School Location. State Secretariat of Education, 2001.**



In other words, it seems quite clear that a dualistic center-periphery model cannot be used to explain the observed differences in the average score in Native Language in the *periferias*. Such results are quite similar to the ones presented before for homicide rates, although the locations do not perfectly coincide.<sup>28</sup> At present, we do not have enough data to interpret such phenomena, but it is possible to argue that segregation cannot be fully understood without the study of these specific “hot spots” of violence and/or very low student scores, or without the understanding the heterogeneous *periferia*.

## 5. Conclusion

In this article we have presented the results of a work in progress that involves the delimitation of vulnerable social groups and incorporates the multiple dimensions of poverty. We have developed a factor analysis using as input social indicators of the 2000 Census per census tracts. The analysis has indicated the existence of two different factors, which we have interpreted as a deprivation index and as a family cycle index.

The distribution of the deprivation index in space showed a rough center-periphery structure, with a negative slope of social indicators as someone moves from the center to the *periferias*. However, the analysis of the distribution of the index in space, as well as the use of indicators related to other social dynamics, such as homicides and school grades, showed a significant heterogeneity in the spatial configuration of the metropolis. The Maps show the existence of some important sub-centers of wealthy social groups located outside the traditional core of the metropolis.

On the other hand, we have also found a significant diversity within the *periferias*, in which different groups are subjected to very different living conditions, for example homicide rates and school performance. In some *periferia* spaces, we have found an intense concentration of negative indicators, suggesting the existence of “hot spots” of precarious social conditions. All this data indicates that the distribution of social groups in the metropolis is much more complex and mosaic than what is generally considered by the literature, which tends to homogenize the *periferias*, with important consequences to public policies.

It is very important to understand that, if segregation may be derived from State action, it is also true that the State may also mitigate such effects, producing policies of spatial and social integration. Apparently, there are two different ways of confronting the problem. The first would be to mix people up, forcing poorer and richer social groups to live and interact more intensely (Briggs, 2001). The second would be to improve urban conditions of poorer areas, raising their living conditions to a pattern closer to that experienced by the better-off. Obviously, the two strategies may be associated. Considering such strategies, we could classify State policies that impact urban space in two main groups:

- a) *State policies over the built environment*. In this group we include the policies of urban regulation, as well as State investments in the parts of the city inhabited by the poor. Urban regulation policies may create incentives to processes of spatial mobility that operate in the opposite direction of segregation patterns (mixing people up). They may also direct future State action to certain parts of the cities considered as social priorities, improving the conditions of *periferias*, *favelas* and *cortiços* (reducing the difference between social groups) (Fernandes, 1998);<sup>29</sup>
- b) *“Spatially organized” social policies*. State policies may also mitigate urban segregation through the traditional group of social policies focused on poverty reduction. This set of

public policies includes, at least, education, health, social services, sports, culture and leisure. All these policies create and transform social space, since the location of their equipment (and their different characteristics over space) defines access conditions of the various social groups that inhabit the city.

This is especially important due to the invisibility of poorest among the poor (Torres, 2001), not only because they have greater problems organizing themselves, but because administrative routines of State agencies almost never consider them distinctively. This may be due to social prejudice from technicians (Marques, 2000), but in most cases, reasons are related to the implementation of the public policies themselves, since even the information on who is and who is not the demand is influenced by a previous definition of what the demand should be. Solving all these problems depends heavily on the knowledge of the exact distribution of service offers, and of its relation with the demand for those services. Such knowledge, in a large urban area, can be available through GIS and similar technologies.

In the next phase of the project, we intend to incorporate information on other public policies, such as health, education, social assistance and sports, as well as other aspects of the built environment, such as property and land development legal status (*favelas* and illegal settlements) and urban legislation.

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<sup>1</sup> See, [www.centrodametropole.org.br](http://www.centrodametropole.org.br).

<sup>2</sup> The notion of *periferia*, therefore, opposes sociologically (and also geographically) the American suburbs produced since the 1940s, but might be equivalent to them in their geometry vis-à-vis the urban form.

<sup>3</sup> The references about these settlements are vast. See, for example, Chinneli (1980), Santos (1982a and 1982b) and Bonduki and Rolnik (1982). About self-help in housing construction, see Maricato (1982).

<sup>4</sup> The main differential of the *favelas* is that they can sometimes be geographically closer to rich neighborhoods. Also, the land in which the settlement is located does not belong to its inhabitants, involving always some form of land invasion. In Rio de Janeiro, Salvador and Recife, this kind of housing solution was predominant before 1950 (Brandrão, 1978 and Egler, 1986) and continued to be important, in both absolute and relative terms, although the irregular settlements became more and more significant (Santos, 1975). In São Paulo, the predominant housing solution for the poor before 1950 was the “*cortiços*” - slum tenements - usually old and decayed houses occupied collectively by several families, in which the “wet rooms” – bathroom and kitchen – are used collectively (Kowarick and Ant, 1988). After that, irregular settlements became highly predominant (Sampaio, 1994), and very recently, *favelas* have begun to increase their presence.

<sup>5</sup> At the same time, the *cortiços* apparently returned. Both processes contributed to spread the presence of poverty groups in different parts of cities, increasing the heterogeneity of spaces (Kowarick, 2002).

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<sup>6</sup> From the end of the 1970s to the beginning of the 1990s, Brazilian cities were very dynamic political arenas, in which several movements, the great majority of them by poor people, made themselves organized around demands for better State services and equipment. See, for example, several articles in Kowarick (1988).

<sup>7</sup> In Brazil, the institutional apparatus built by the military regime in the 1960s and 1970s left a strong legacy. New national agencies per sector of public policy were established during the regime and several new state agencies were attached to federal agencies that established financing arrangements and administrative routines (Draibe, 1989, Fagnani, 1997). Although these systems were transformed by the extinction of federal agencies or financial equations responsible by these systems in the 90s (Arretche, 2000), local agencies continued to exist. As a consequence, the spread of the services to the *periferia* went on, even if sometimes following a different path and rationale. This idea of institutional inertia is intensely developed by the new institutionalism in political science. See, for example, Skocpol (1992).

<sup>8</sup> The main difference between old and new patterns of urban poverty in these cities seems to be the degree of segregation and the very low chances of social mobility experienced by social groups of the most severely segregated areas (Wilson, 1990).

<sup>9</sup> It is interesting to point out that the consequences of segregation are not necessarily considered by the literature as negative, even in regard to ethnic segregation. Portes and Stepick (1993) show that the transformation of Miami in recent decades, as well as of the social position of some Latin American communities within the city (mainly Cuban), were made possible by separation and internal cohesion. This leads us to the debate on the production of social capital in urban communities. As noted by Briggs (2001), isolation may forge cooperation, but it might also generate political corruption, crime and violence.

<sup>10</sup> For some authors (Santos and Bronstein, 1978), this would be the reproduction, in space, of the very highly concentrated Brazilian income distribution, leading to various social problems, including violence (Ferreira, 2002 and Maricato, 1996).

<sup>11</sup> Although very important, these phenomena have not been properly considered by the literature, partly due to methodological problems. The core of the problem rests on the heterogeneity of *periferias*, reinforced by recent transformation processes. In fact, State action has improved average social indicators of these regions of the city. Therefore, the visibility of both the different patterns of poverty and of the *hiper-periferia* depends on the possibility of developing very detailed analyses such as the one available through GIS.

<sup>12</sup> In such countries, the economy would have to be organized, for structural reasons, around very low wages (Maricato, 1987) and lack of public services, leading to the emergence of processes of urban “*espoliation*” (Kowarick, 1979, Kowarick and Campanário, 1988). This tradition has continued recently with works such as Kowarick (2002), Taschner (2000), Ribeiro and Telles (2000), and Lago (2000).

<sup>13</sup> The influence of the analyses of the French urban sociology of authors such as Topalov (1974) and Lipietz (1974) is explicit in this case.

<sup>14</sup> This mechanism, at least in Brazil, seems to be more common in right wing governments than in left wing administrations (Marques and Bichir, 2002). A second mechanism, much more straightforward, would be the expulsion of low-income social groups from some parts of the city by the State. This happens regularly in the most important Brazilian cities through processes of *favela* removal (Valladares, 1978 and Fix, 2001), and sometimes for the development of public works (i.e., major infrastructure projects) (Santos, 1981 and Fix, 2001). In São Paulo, the building of roads along river banks is a very powerful eviction mechanism, since many *favelas* are located in such areas. Two of the most important roads built in São Paulo in the last decade (Águas Espraiadas and Jacu-Pêssego) are significant examples of this process (Fix, 2001 and Marques and Bichir, 2002).

<sup>15</sup> There is also a second necessary dimension for addressing the issue of poverty: to understand how different public policies address the poor in the urban landscape and how poverty is segregated in space. Poor people have more problems in accessing social services for different reasons. On the one hand, they usually live in segregated neighborhoods, which are traditionally ill equipped in countries such as Brazil, as we have seen before. On the other, the government has problems in offering such services in shanty-towns and poor irregular settlements both because of legal problems in the settlement which may turn public policies irregular or even illegal, and because of prejudice of bureaucrats, teachers, and health care workers who do not want to work in such places (Marques, 2000; Torres, 2002).

<sup>16</sup> The Index of Human Development (IHD) can be considered one strategy to address this problem in terms of international comparisons on poverty. See Nussbaun and Sen (1998) and UNDP (2000).

<sup>17</sup> The questionnaire for the census universe only brings information on income and education for the head of the household.

<sup>18</sup> The factor analysis also indicated the presence of a family-cycle indicator, but in this article we will present only the results of the deprivation indicator. Besides that, the different census tracts were grouped and classified according to their social demographic characteristics, in order to allow a comprehensive understanding of the urban landscape and in terms of definition of priorities for the public action on poverty alleviation. To do that we adopted a cluster analysis

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model in which we have been able to identify – based on the previous factor analysis – areas with particular characteristics such as high concentration of old couples and high level of poverty. Those results are not presented in the present article.

<sup>19</sup> See section 4.

<sup>20</sup> The exclusion of variables was due to its low “communality” (below 0.40) and to its low contribution to the increase of the explanation of the overall variance of these data set (Dillon and Goldstein, 1984).

<sup>21</sup> After the VARIMAX transformation, we found that factor 1 (deprivation dimension) explains 39.7% of such variance and factor 2 (family cycle dimension) explains 37,0%. The “Measure of Sampling Adequacy (MSA)” of the model was 0.869, indicating that such analysis is adequate to explain and quantify the degree of inter correlations among the variables (Hair, 1998). We also performed a factor analysis for the Municipality of São Paulo alone (13 thousand tracts) and the results were the same.

<sup>22</sup> In Brazil, the public health care services, although providing medical consults and hospital procedures, many times do not provide the required medicine for people treatment.

<sup>23</sup> It is no coincidence that those groups - called in the market research literature as classes A and B - are the primary targets for national and multinational companies in Brazil. They represent more than 55% of all the consumer expenditure in Brazil (Fauze, 2001).

<sup>24</sup> The homicide rate per grid was produced by the overlay of homicide points (numerator) and the overlay of population data from census tracts (denominator). The overlay technique used here is the one available in the software Maptitude, 4.5. Most likely, the figures presented here are under-registered due to the existence of death certificates without addresses, as well as to possible non-registered deaths. Furthermore, we were not able to find the address for other 351 death certificates with address declaration. The average homicide rate we were able to find was of 43.7 per 100,000 (1998/2000) while the official figures from the Secretariat for Public Security points at rates of 51.2 in 2000 (see [www.seguranca.sp.gov.br](http://www.seguranca.sp.gov.br)). Most likely, the bias produced by these problems will imply a higher underestimation of the homicide rate among the poorest social groups and areas. If this is the case, it will not affect the interpretation provided here, only reinforcing the patterns highlighted.

<sup>25</sup> Although it is not the case of producing here a full interpretation on the causes of variation of the homicide rate across the various areas of the city, it is possible to argue that other variables such as the proportion of teenagers in the total population may also impact this variable (see Table 4). Quintile 5, which presents the highest homicide rate, is also one of the poorest and the one that presents the highest proportion of teenagers in the total population.

<sup>26</sup> Some methodological problems arise here. Since there are no school districts in Brazil, we cannot assume that the children necessarily study in the same place that they live. Furthermore, the wealthiest families do not put their children in public basic schools, which means that those families do not necessarily use public schools located in the wealthiest areas. Even taking into account such problems, score differentials for each quintile are moderately significant, particularly for the 5<sup>th</sup> grade.

<sup>27</sup> This map is an attempt to represent the information on scores in native language as a topographic map. Each state school (1,175 with information on scores) is supposed to represent a point in a sample of “altitudes” that is usually used to produce a topography map.

<sup>28</sup> For example in the East part of the Municipality of São Paulo homicides tend to be higher in the southern part of the region, while lower grades tend to be more present in the northern part of the region.

<sup>29</sup> State investments in *periferias* and in areas inhabited by poor people have the obvious effect of improving the living conditions in these areas, therefore reducing social differences. In all cases, however, there is a risk of triggering processes of spatial mobility that operate in the same direction of segregation, since the increase on land values caused by the improvements may result on the expulsion of poor people, and on their replacement by richer social groups.