

#11

Documento de Trabajo del IPES
Monitor Social del Uruguay

Residential segregation in Montevideo:
Challenges to educational equality

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IPES


**Universidad
Católica**
DAMAZO A. LARRAÑAGA • URUGUAY



CDD 300
ISSN: 1510-5628

Serie Documentos de Trabajo del IPES / Colección Monitor Social N°11

Uruguay asiste a una radical transformación de su matriz social y de sus mecanismos de integración social. El Monitor Social del Uruguay recoge los aportes de los investigadores del IPES a la comprensión de dichas transformaciones y de la realidad actual del Uruguay social. Este Monitor pretende aportar información y análisis que permita el seguimiento de la situación social de los uruguayos. Mediante tales aportes se busca contribuir a modelar agendas sociales así como lograr una mejor comprensión de las dinámicas económicas y sociales que operan en la producción de desigualdad, pobreza y exclusión social del Uruguay.

Programa IPES
Facultad de Ciencias Humanas
Universidad Católica del Uruguay
Dep. Legal 326.861

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RESIDENTIAL SEGREGATION IN MONTEVIDEO: Challenges to educational equality¹

Ruben Kaztman and Alejandro Retamoso

¹ A preliminary version of this document was presented at the “Urban Governance and Intraurban Population Differentials in Latin American Metropolitan Areas” workshop. University of Texas at Austin, November 17-19, 2005.

INDEX

1. Introduction
2. Changes in the social morphology of the city during the last decades
 - a. Population movement in Montevideo.
 - b. Characteristics of sending and receiving neighborhoods.
 - c. Characteristics of neighborhoods with irregular settlements.
 - d. The generational unbalance as a characteristic of the age distribution of the population of Montevideo.
3. Residential segregation in Montevideo
 - a. Indicators used to analyze spatial segregation.
 - b. Measures of segregation.
 - c. Geographic scale.
 - d. How has spatial segregation in Montevideo evolved over the last two decades?
4. Residential segregation and educational services in Montevideo
 - a. Some background on the educational situation.
 - b. Challenges that the processes of residential segregation in Montevideo pose to educational policy at the elementary school level.
5. Policies intended to remedy inequality in schooling
 - a. Special schools.
 - b. The expansion of pre-school attendance.
 - c. School cafeterias.
6. Final considerations: an essay on examining segregation and educational services simultaneously

Bibliographic references

Appendix 1: Information sources.

Appendix 2: Comparison of the periphery of the department of Montevideo with the periphery of the metropolitan area (Canelones and San José), on the basis of household surveys.

Until the 1960's, Montevideo could have been conceived as a single territorial unit; compact and consolidated, with neighborhoods and zones defined by the centrality of a labor market structured around government employment and industrial production (Kaztman, Filgueira and Errandonea, 2005). The characteristics of this spatial profile sharpened during the economic hegemony of the import substitution model. The collapse of this model resulted in profound changes in both the labor force and the social morphology of the city.

The situation of the labor force was deeply affected by the decline of industrial and state employment and the weakening of workers ties with the labor market. Unable to cover the rents in the center of the city, unemployed and precarious workers were forced to move to the periphery, most of them finding new homes in irregular settlements. Thus, the main feature of recent processes of residential segregation in Montevideo is the high level of homogeneity in the social composition of poor neighborhoods. These transformations presented unexpected challenges to the governance of the city.

This chapter has two main purposes. First, to characterize the nature of the aforementioned social transformations. Second, to examine the ways through which those responsible for educational policy have confronted the threats posed by these transformations for the achievement of an egalitarian society². We plan to do that through the analysis of two phenomena: the recent trends in the distribution of the socio-educational groups in Montevideo, and the relationship between the social composition of neighborhoods and the provision of educational services.

But before entering that analysis a brief characterization of the socio-demographic profile of the city is in order.

² The reach of this description has been adjusted according to the guidelines outlined for the project "Urban governance and intra-urban population differentials in major metropolitan cities of Latin America," coordinated by the Population Research Center and the Urban Issues Program of the University of Texas at Austin.

CHANGES IN THE SOCIAL MORPHOLOGY OF THE CITY DURING THE LAST DECADES

2.

Compared with the experience of other Latin American large cities Montevideo's process of urbanization appears as an early and gradual phenomenon. By the middle of the last century, the country had a little more than 20 percent of its population in rural areas, while almost half of the Uruguayans were concentrated in Montevideo—thus comprising 57 percent of the urban population.

The primacy of the capital weakened in the last decades, even though it was ameliorated by the growth of the metropolitan population residing in departments adjacent to Montevideo. It is also important to note that a small part (4 percent) of the department of Montevideo continues to be considered rural³, and that a significant part of the urban expansion of the city was at the expense of these rural areas, particularly in the form of irregular settlements. As a result, in 2004 one out of every eight individuals (12.4 percent) in irregular settlements resided in rural areas.

Population movements in Montevideo

Uruguay is divided in 19 administrative units which are referred to as *departments*. The department of Montevideo, which encapsulates the capital, is physically the smallest, and is bordered by two other departments, Canelones and San José.

Between 1985 and 1996 Montevideo grew at a rate of 2.3 per 1,000 while the corresponding rates in the neighboring departments were of 18.5 and 6.9 per 1,000, respectively. These differences increased during the period 1996 to 2004. While Montevideo experienced a negative rate of 1.5 per 1,000, Canelones and San José grew at 11.5 and 8.0 per 1,000, respectively. Thus, the slight variations in the size of the Montevideo population between 1996 and 2004 hide two important movements: one within the department and the other towards adjacent departments.

A large part of the population growth of these two departments can be attributed to emigration from Montevideo⁴, which in the period from 1991 to 1996 displayed a cumulative net migration rate of -11.74 percent⁵. Montevideo's low growth between 1985 and 1996, and its negative growth between 1996 and 2004, was then counteracted by the phenomenon of metropolization⁶ spreading out from the aforementioned departments. Through the last 4 decades, the population in the periphery of the capital residing in those departments went from 10 to approximately 20 percent of the total of Greater Montevideo. In at least the case of Canelones, the

³ The definition of a territory as urban or rural depends on the attributes of the department, as defined in the Law of Populated Centers. Generally the definitions are based on aspects associated to the existence (or lack thereof) of parcelling of lands, of street routes and of public services.

⁴ In 1996, 14 percent of the population of Canelones were not residing in the department 5 years before the date of the census. Among them, 73 percent came from the department of Montevideo (Retamoso 1999).

⁵ More recent estimates do not exist.

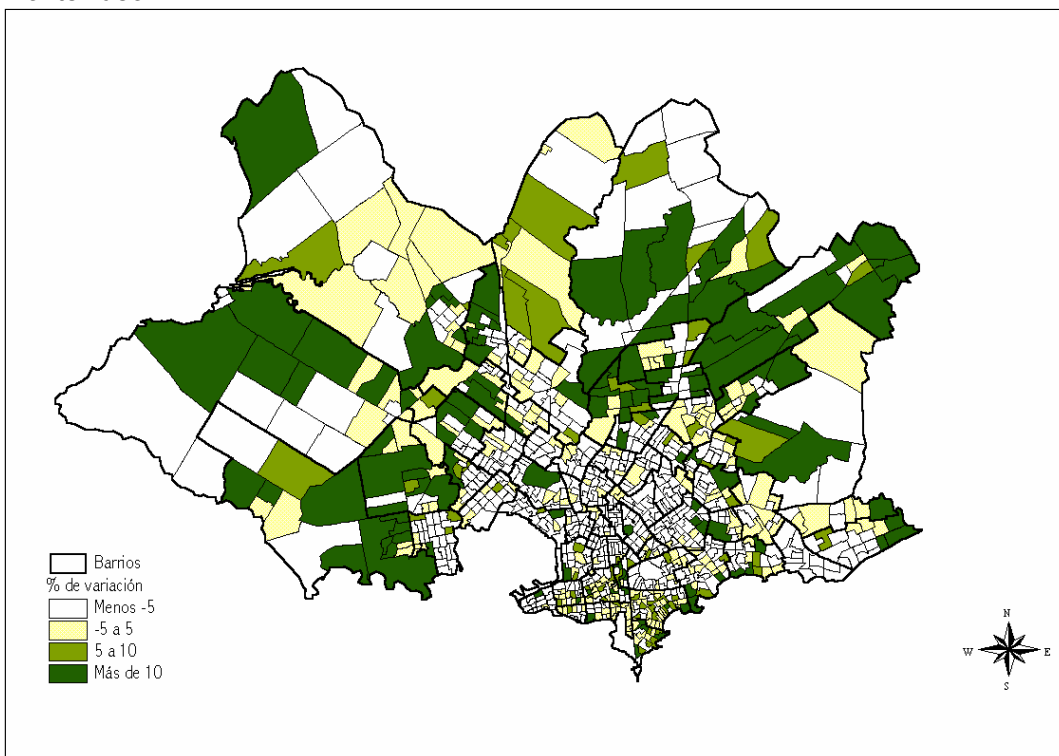
⁶ We use "metropolitan area" and "Greater Montevideo" interchangeably.

available beach resort infrastructure operated as an attraction pole for the middle and lower-middle classes.

The process of suburbanization within the department of Montevideo was very different, particularly in terms of infrastructure and land occupations. In essence, a large part of this population movement went in the direction of new urban parcellings in rural areas or urban zones with low population density. Upon these lands, occupied at the margin of legality, the so-called “irregular settlements” expanded rapidly.

Taken as a whole, from the movements described above it is clear that the apparent “quietness” of the inter-census population growth of Greater Montevideo hides important transformations in the manner in which social strata use urban space. Map 1 illustrates which census tracts grew and which shrunk in terms of population. Similarly, Table 1 provides a synthesis of the magnitude and direction of population movements, as well as some key aspects of the social composition of the neighborhoods which are losing or gaining population.

Map 1. Percentage of population growth between 1996 and 2004 by census tracts. Montevideo.



Source: Population census—INE, and Intendencia Municipal de Montevideo.

Characteristics of neighborhoods losing or gaining population

As can be observed in Table 1, neighborhoods growing during the last decade, the “new” ones, were characterized by poor households and irregular settlements, a relatively high proportion of children and adolescents, and a relatively low mean level of educational achievement among its economically active residents. Everything points out to an increase in the territorial concentration of young households with scarce human resources, as well as problems with housing and poverty.

Table 1: Neighborhoods of Montevideo by changes in population between 1996 and 2004, and their characteristics in 2004 (in percent).

Characteristics of the population of Montevideo	Neighborhoods by type of population change			Total
	Losing population	Stable	Gaining population	
Inter-census change 1996-2004 (%)*	-09.8	-01.1	19.1	-0.15
Inter-census change 0-17 years old (%) *	-16.6	-09.9	17.0	-06.1
Population 0-17 years old*	22.4	22.8	34.0	25.2
Population 25-59 with elementary school or less 2004 **	17.8	18.7	40.2	22.4
Population in poverty 2004 **	22.1	21.9	52.4	28.1
Indigent population 2004 **	01.9	02.3	08.3	03.4
Population in irregular settlements 2004 *	02.2	05.3	31.6	10.1
Population 0-17 years old in irregular settlements out of total population 0-17 years old *	04.4	10.1	39.2	17.0

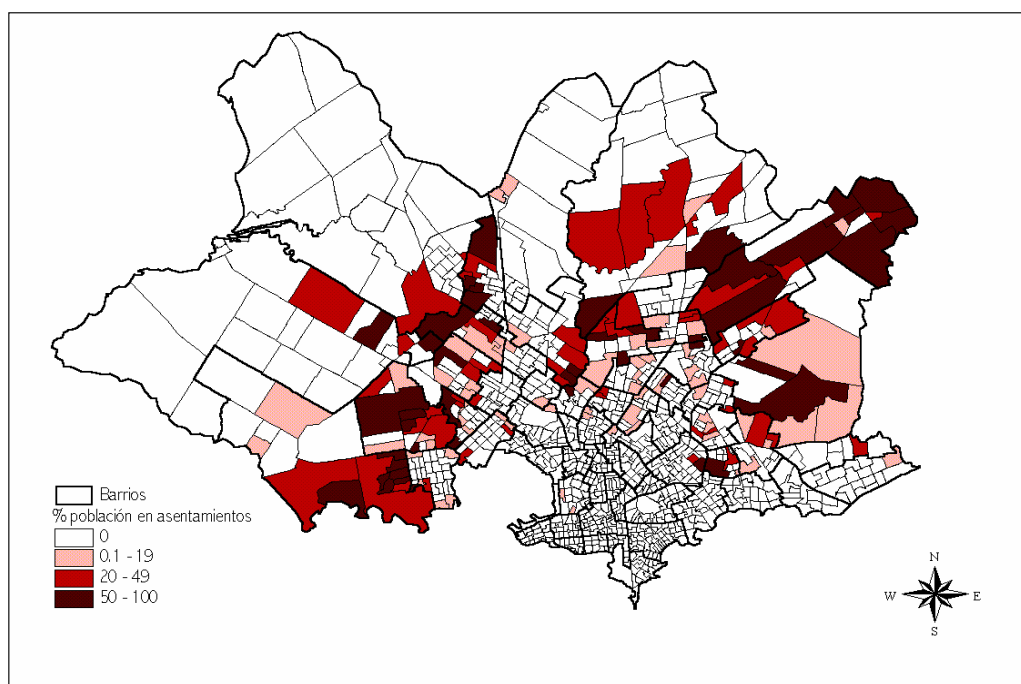
Note: Neighborhood classification is based on the inter-census variation rates from 1996-2004: Losing neighborhoods=less than -5%; Stable populations=between -5% and +5%; Gaining neighborhoods=more than +5%.

Sources: * 1996 and 2004 population censuses. **Continuing Survey of Households (ECH). Authors' own calculations based on the ECH data from the INE.

Cities can suffer significant transformations in the social composition of their neighborhoods due to social mobility, migration movements, or differential fertility rates. Unlike other cities in Latin America (and other periods in the history of this very city), the preceding evidence do not support the hypothesis that processes of upward mobility were relevant to explain recent changes in Montevideo's social morphology. Instead, the massive displacement of poor households towards the periphery, and the natural increase of those same households appear as main determinants of those changes.

No doubt, land occupations and the formation of irregular settlements, central features in these transformations, were concentrated in the capital of the country. Of every 10 uruguayans living in irregular settlements through the whole country nearly 8 lived in Montevideo.

Map 2. Percentage of the population in irregular settlements by census tracts, Montevideo 2004.

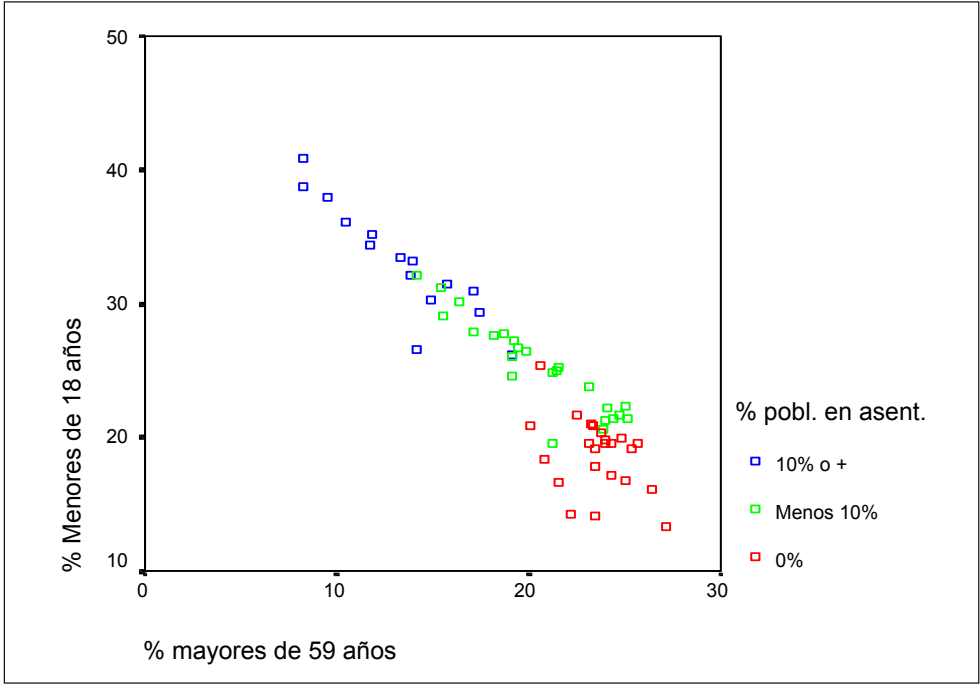


Source: INE, 2004 population census; Intendencia Municipal de Montevideo.

Characteristics of neighborhoods with irregular settlements

One notorious characteristic of neighborhoods with a high concentration of irregular settlements is their relatively high proportion of families in the first stages of their life cycle. This is corroborated by Diagram 1, which shows the age composition of the neighborhoods where irregular settlements concentrate. It is interesting to note that none of the neighborhoods with irregular settlements has more that 20 percent of its population aged 60 or older. Consequently, when examining the 62 neighborhoods in Montevideo, the Pearson's r correlation between the percentage of the population in irregular settlements and the percentage of children and adolescents is positive and statistically significant at 1 percent (0.767). In turn, the correlation between the percentage of the population in irregular settlements and the percentage of persons 60 years and older is also significant, but negative (-0.792).

Diagram 1. Population (%) in irregular settlements in neighborhoods by indicators of age structure. Montevideo 2004.



Source: 2004 population and housing census.

Generational unbalances in the spatial distribution of the population in Montevideo

Within Latin America, Uruguay stands out for its older age structure and a strong unbalance in the welfare of distinct generations. These differences are reflected in the profile of the Montevideo neighborhoods.

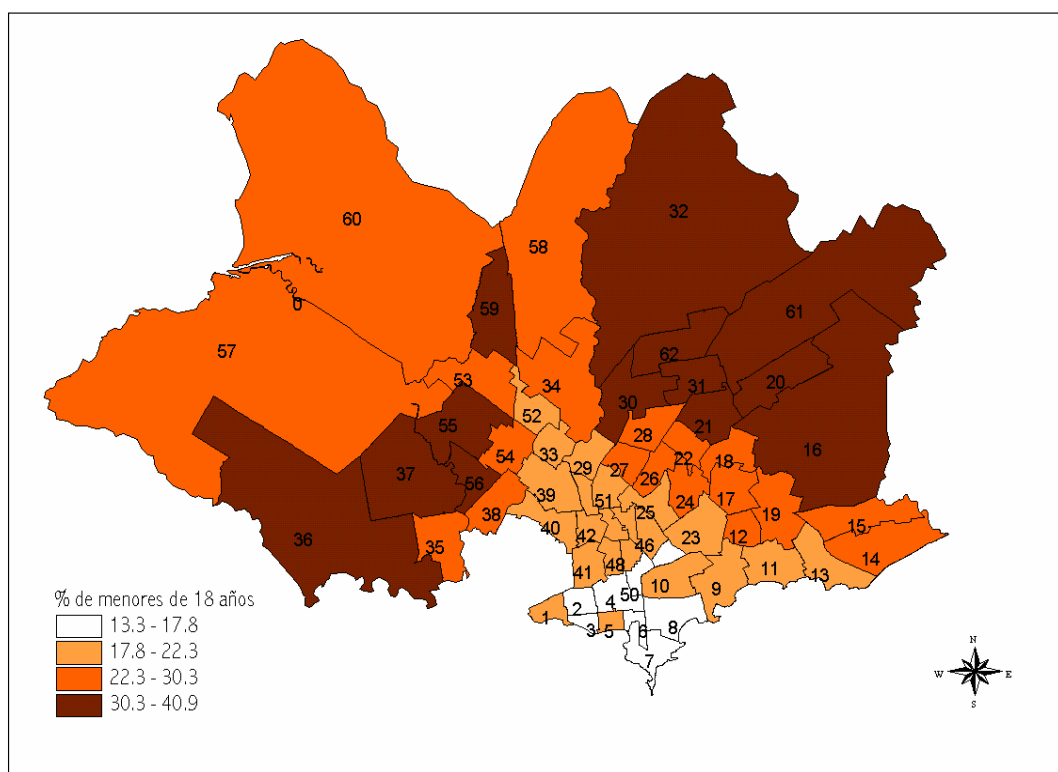
An indicator of the relative weight of older adults in the age structure is the percentage of people ages 65 and older as a total of the population. In Uruguay that figure was 13% in the year 2000, twice as much as the corresponding figure for the whole region. This feature is even more accentuated in Montevideo, with about 15 percent of its population in these ages.

The aging of the city's population was clear during the last decade. It is explained by a long term low fertility rate, an increase in international migration (which affects primarily the young population), and by the age structure of the population which emigrated to Montevideo from rural areas and small and large towns⁷.

As we have seen, the poorest and youngest families moved to the peripheral neighborhoods. Maps 3 and 4 illustrate the distribution of children and adolescents in the neighborhoods of the city, as well as the population of people 60 years old and older.

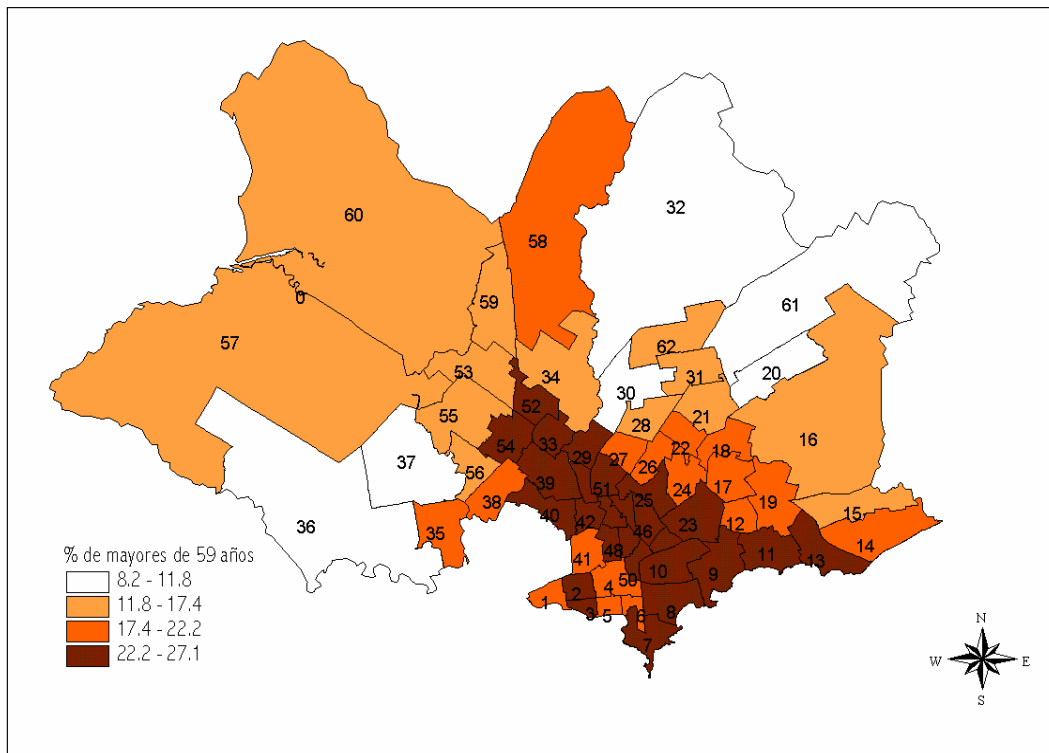
Map 3. Population ages 0 to 17 in the population of each neighborhood. (%). Montevideo 2004.

⁷ Between 1996 and 2004, 122,000 people emigrated from the country, a figure similar to that registered during the dictatorship period (1975-1985). 57 percent of these people were male, and 66 percent were between the ages of 20 and 39.



Source: 2004 population census, INE, and Intendencia Municipal de Montevideo.

Map 4. Population 60 years and older as a percent of total population, by neighborhood, Montevideo 2004.



Source: 2004 population census, INE, and Intendencia Municipal de Montevideo.

No doubt, the stage in the life cycle is a relevant aspect of the spatial distribution of the population in Montevideo. When comparing Maps 3 and 4 with Map 1, it is clear that neighborhoods grew with the incorporation of young families. The indicators comparing growing and declining neighborhoods with regard to educational levels of the adult population, indices of poverty, and presence of irregular settlements, presented in Table 1, support the idea that the generational unbalance is one of the primary axes ordering the social geography of the city.

The Uruguayan history of the last 50 or 60 years is congruent with that vision. Older households were the main beneficiaries of the inertia of the strong State's welfare institutions which were at their height in the middle of the last century. Today, they are in a clear decline, lacking the capacity to attend the new structures of risk faced by young families with relatively low skills⁸.

Some studies have already pointed out this national peculiarity. For instance, they show that, in the regional scenario, Uruguay has the largest imbalance between the general poverty index and the quotient between childhood poverty and general

⁸ The 1989 plebiscite, when retirement benefits and pensions were adjusted for inflation, are perhaps the clearest indicator of the success of the older generations efforts to retain the benefits of the old regime. Additionally, solidly established corporate arrangements allowed some senior adults to retain benefits acquired in the labor market. Their actions contributed to balkanize the market, preventing the access of new generations to protected and stable jobs.

poverty (Kaztman and Filgueira, 2003). Recent data from Montevideo indicates an increase in the city generational unbalance. In effect, from 1986-1988 the poverty index among children and adolescents between the ages of 0 to 17 years rose to 51.5 percent, while the overall poverty index was 34.5 percent, and the ratio between them 1.49. From 2002-2004, the corresponding figures were 48.2 and 28.1 respectively, and the ratio between the two rose to 1.71. Table 2 presents these changes and adds another interesting finding: in the period under consideration, overall poverty reduced about 6 percentage points. However, while childhood poverty decreased only 3 points, elderly poverty decreased by 13 points.

Table 2. Percentage of the population below the poverty line by selected ages, Montevideo.

	0 to 17 years	60 years and older	Total	Poor children/ total poor	Poor children/ poor elders
1986-88	51.5	23.1	34.5	1.49	2.2
2002-04	48.2	10.3	28.1	1.71	4.7

Source: Authors' own calculations based on ECH data from the INE.

The transformations just described are part of important processes of residential segregation in the last 20 years which changed the social morphology of the city. This section analyzes the characteristics of those processes.

Indicators used to analyze spatial segregation

Residential segregation will be examined on the basis of educational indicators. This choice has an important substantive support in the growing significance of knowledge for the new forms of material production and, therefore, the growing significance of educational attainments as determinants of differences in workers salaries and well-being (ECLAC, 2001-2; Kaztman, 2002).

Two educational indicators were chosen to analyze changes in spatial segregation. The first is an absolute measure, the percentage of people ages 25 to 59 years old with up to an elementary education. The second is a relative measure, the percentage of adults in this same age group whose education is below the department mean⁹. Table 3 presents the evolution of both indicators in the last decades.

Table 3. Educational indicators, department of Montevideo 1986-2004.

Educational indicators	1986-88	1995-97	2002-04
Percentage of 25 to 59 years old with up to an elementary education	42.3	28.1	22.4
Percentage of 29 to 59 years old with educational attainment below the department mean	51.8	49.0	50.9

Source: Authors' own calculations based on ECH data from the INE.

We chose the group 25 to 59 years old because the large majority of people in these ages are economically active and emancipated from their families of origin. Having formed their own families, most of them will be household heads or spouses. Thus, information on their spatial distribution will give us clues not only on the physical isolation of adults in different educational categories, but also on the conditions which favor the isolation of children and adolescents in those households¹⁰.

⁹ In Uruguay, elementary schooling consists of 6 years of schooling (first through sixth grades) and begins at age 6.

¹⁰ We excluded people 60 years and older because their inclusion may have complicated the interpretation of our results for two reasons: first, because this group has significantly more weight than other age groups in the central areas of the city, and second, because of the noteworthy expansion of education in the last decades implied an important widening of the educational gap between elder and younger adults.

The measures of segregation

The literature has produced a multitude of indices to measure residential segregation. Each of them emphasizes different aspects of the phenomenon, such as the uniformity in how groups are distributed across territories (e.g., the dissimilarity index, analyses of variance or entropy, the Gini index, etc.); the level of potential exposure to other groups in the same territorial unit (the exposure or isolation index); the level of concentration of a group in particular parts of the city; or the level of proximity between territorial units where populations with similar characteristics reside (e.g., absolute or relative measures of clustering, the index of spatial proximity, and local indicators of spatial autocorrelation such as the Moran's I).

With regard to these measures, it is suffice to say that the appropriateness of each should be evaluated by two criteria: the characteristics of the social categories whose spatial segregation you are interested in capturing, and the analytical aims orienting your inquiry¹¹. With that in mind, we selected four segregation indices: the Duncan's index of dissimilarity, the residential segregation index based on variance (when dealing with interval level variables), the exposure index, and the indices of clustering, local and global Moran's I.

Geographic scale

This work concentrates on the department of Montevideo and its 62 neighborhoods, though in some cases we also work with census tracts¹².

Both solutions are far from satisfactory. The meaning of different levels of territorial aggregation is intimately related to the phenomenon under study. Therefore, it is useless to debate the level of aggregation most appropriate to a study without having clarified its object of analysis. For instance, the significance of territorial limits are different for children, adolescents or adults, what indicates the need to consider stages in the life cycle as one of the criteria to define the adequate level of geographic aggregation.

Another problem related to the appropriate level of scale is that for many analytical purposes the relevance of community context for the formation of habits, expectations and behaviors is mediated by the level of susceptibility of actors to surrounding influences. Reasonably, this susceptibility will be directly proportional to the importance of a person's surroundings as a source of social capital. Along this line of reasoning, you would expect people with stable employment and/or participation in community organizations such as unions, churches, political parties,

¹¹ For example, if we want to test the hypothesis that certain ethnic minorities exhibit a larger or smaller propensity to aggregate than others, we would want to compare the dissimilarity index for each of these groups in the city. On the other hand if we are interested in exploring whether disadvantaged urban groups are spatially isolated from people who participate in the main social and economic spheres of society, we would apply an index that reveals the degree of physical proximity between the two categories, assuming that physical proximity is a good proxy for potential interaction.

¹² The census tract is only one of the relevant geostatistical divisions. The hierarchical order is Department—Census Section—Census tract—and Zone (in urban areas this coincides with the manzana). On average, a census tract in an urban area contains approximately 10 manzanas.

sports clubs, etc., to be more receptive to the normal and valorized patterns of these institutions than to those predominating in their neighborhoods. Conversely, those with unstable ties to the labor force and with scarce or no participation in community organizations will be more susceptible to the influence of forces in the area surrounding their places of residence.

When our interest centers on the level of well-being of residents, we will be interested in geographic boundaries that establish the relevant parameters of the life conditions that people share. A flood zone, for example, defines a neighborhood where a calamity affects all of its residents. The same can be said of borders that circumscribe shared problems of neighborhood infrastructure, of local employment opportunities, of levels of insecurity, or of insufficient transportation or services.

In the case of Montevideo, the first point to underscore in relation to scale is that both neighborhoods and census tracts are relevant to understand the behavior of their residents. Many studies corroborate the importance of these geographical units to predict social situations and risk behaviors associated with enduring poverty and the mechanisms of intergenerational transmission of poverty (Kaztman 1999, Kaztman and Retamoso 2005, Cervini and Gallo 2001, Macadar, Calvo, Pellegrino and Vigorito 2002)¹³.

How has spatial segregation in Montevideo evolved in the last two decades?

The Duncan index of dissimilarity and the analysis of variance.

As previously mentioned, neighborhoods were characterized by two educational indicators. Table 4 illustrates the results of the Duncan index of dissimilarity, which in both cases varies between 0 and 100. Values closer to 0 indicate that the distribution of the population with a determined attribute in the subunits of a territory is similar to its distribution in the entire territory. Values closer to 100 indicate situations of maximum segregation. Table 4 shows that between 1986 and 2004 there was an increasing dissimilarity in the distribution of the population of Montevideo calculated on either an absolute or a relative measure of educational attainments. As such, in order to reach an egalitarian distribution of the population with low educational attainment, in the period 2002-2004 it would have been necessary to redistribute about 41 percent of the population in the department.

Table 4. Duncan Index of Dissimilarity, 62 neighborhoods of Montevideo, 1986-2004.

Percentage of population:	1986-88	1995-97	2002-04	percentage variation 2002-04 / 1986-88
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¹³ The studies just cited used data from censuses and household surveys. While the first instrument allows using data at both the neighborhood and census tract level, neighborhoods are the lowest statistically meaningful level of aggregation in surveys. While at that level of aggregation surveys are weaker than censuses in terms of statistical representativeness, the reverse is true in terms of analytical potential and timely information¹³. As it is described in detail in Appendix 1 in some cases we used both sources of data as a way to re-test conclusions based on each one of them.

25 to 59 years old with education below the mean	31.7	37.0	41.5	30.9
25 a 59 years old with elementary school or less	30.5	34.1	37.3	22.1

Source: Authors' own calculations based on ECH data from the INE.

Table 5 shows the evolution of residential segregation on the basis of an analysis of variance. The total variance of the variable in question is decomposed into two parts: between neighborhoods and within neighborhoods. The indicator illustrates the percentage of the total variance for years of schooling for the population residing in the 62 neighborhoods of Montevideo that is explained by differences in the mean education levels of the neighborhoods. The larger the proportion of total variance explained by the variance between subunits, the higher the homogeneity within, and the heterogeneity between, neighborhoods. According to this data, in the last two decades the homogeneity in the socio-educational composition within neighborhoods increased, as did the heterogeneity between neighborhoods. Thus, there is a trend for lower and higher educated populations to reside in different areas of the city.

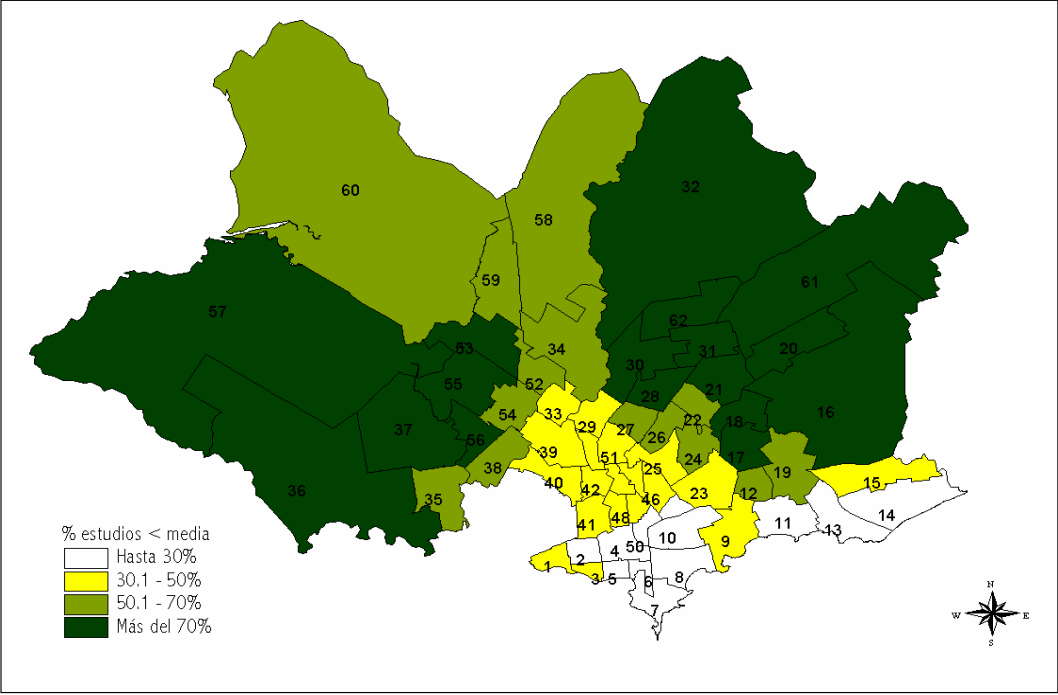
Table 5. Percentage of total variance explained by the variance between neighborhoods, 62 neighborhoods of Montevideo, 1986-2004.

Indicator	1986-88	1995-97	2002-04	Percentage variation 2002-04 / 1986-88
Average years of schooling for the population 25 to 59 years old	17.5	22.6	26.7	52.6

Source: Authors' own calculations based on ECH data from the INE.

Map 5 illustrates that in the last of these three periods, the 62 neighborhoods in the department were distributed according to three highly differentiated areas: one located in the southeast coast of the city with high levels of education, another with low levels of education in the peripheral areas of the department (in particular in the neighborhoods located in the northeast and west), and a third area with intermediate levels of education in the central zone of the city. This picture coincides with many characteristics of the dynamics of its urban transformation, with growth in the periphery clearly led by low income populations, and a concentration of the most affluent population at the east of the department.

Map 5. Percent of people 25 to 59 years old with years of education below the department mean, Montevideo 2002-04.



Source: 2004 population census from the INE, and the Intendencia Municipal de Montevideo.

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The exposure index (Bell, 1954)

To complement the preceding analysis, Table 6 presents the exposure index. This indicator measures the degree in which the members of group X are exposed to those in group Y in different territorial subunits. In other words, it measures the probability that an individual shares their neighborhood with a different individual. Its interpretation indicates, for example, that, if in an area where a member of group X resides its value is 0.2, on average two of every ten residents will be of group Y. Consequently, the value of this index will be very small in cases of high segregation (Martori and Hoberg 2004). As changes in the values of the index depend on changes in the relative size of the social category under consideration, we seek to minimize these effects by working with the percentage of the population ages 25 to 59 with educational attainment below the department mean which, as can be observed in Table 3, does not significantly vary between the two three-year periods used in this study.

Table 6. Exposure index for people ages 25 to 59 with educational attainment below and above the department mean. Neighborhoods of Montevideo.

Indicator in percentage of people	1986-88	1995-97	2002-04	variation 2002-04/1986-88
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25 a 59 years old with education below the mean	0.42	0.42	0.38	-10.5 %
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Source: Authors' own calculations based on ECH data from the INE.

Even though the decrease in the interaction between people with low and high qualifications in the neighborhoods of Montevideo is consistent with the increase in the homogeneity in their social composition previously documented, these figures attract attention because the weak decline in the index doesn't appear to reflect, as do the previous indicators, neither the severity of the processes of residential segregation nor the rhythm in which the occupation of land and the establishment of irregular settlements grew during the period considered.

A possible interpretation is that the educational threshold required for stable and protected jobs grew faster than the mean educational levels¹⁴. Thus, the opportunities for interaction between people below and above the educational attainment mean may not reflect the opportunities for interaction between the poor and non-poor. This happens particularly within neighborhoods receiving mostly young families who, by virtue of the age of their adult members, may show average academic achievements significantly higher than those of previous generations at similar socioeconomic statuses.

Indices of spatial contiguity

With respect to the indexes of spatial contiguity of geographic units with similar values on a given variable, our analysis shows that in the period from 1986 to 2004 the territorial area covering neighborhoods with similar socio-educational composition grew in size. It appears reasonable to assume that if significant effects of the homogeneity of the social composition of territorial units on the material situation and mental contents of residents is supported by empirical evidence, these effects would be more accentuated the larger the territorial area with the same social composition. To measure the relative frequency to which neighborhoods are or are not adjacent to others with the same social composition we use two indexes: the local and global Moran's I.

The Moran's I indicates whether the distribution of data in space is auto correlated, that is, if they show some non-randomly distributed pattern. It allows us to know if the values of a variable under study in a determined territorial unit tend to be close to values in adjacent units. A positive correlation reveals the existence of spatially contiguous units with similar values. A negative correlation indicates that high (low) values in a subunit neighbor low (high) values in another. At zero, spatial correlation does not exist and the values of the variable are randomly distributed in the units. It is important to remember that the Moran's I characterizes a city globally, and as such allows for comparison with other cities or with the same city in different periods.

¹⁴ This is reflected, among other things, in the high levels of formal training (high school education or more) required for performing relatively simple tasks, such as those demanded for jobs in supermarkets or at gas stations (Kaztman 1997).

Table 7. Global Moran's I by neighborhoods. Montevideo 1986-2004.

Percentage of the population 25 to 59 years old	1986-88	1995-97	2002-04
With education below the department mean	0.76	0.78	0.80
With up to an elementary education	0.78	0.79	0.79

Source: Authors' own calculations using GeoDA based on ECH data from the INE and maps from the IMM.

Note: Calculations using rook contiguity.

As can be observed in Table 7, there is no indication of significant changes in the isolation of people who reside in these territorial units with respect to those residing in neighborhoods with higher levels of education. Comparing the data with those from the 1996 census we find that, for neighborhoods, the results from the census coincide with those from survey data for 1995-1997 (0.78 and 0.79, respectively), while for census tracts the autocorrelation is higher (0.87)¹⁵.

Unlike the summary description gained by using the **global** Moran's I, the **local** Moran's I (a Local Indicator of Spatial Autocorrelation—LISA) indicates the autocorrelation of geographic subunits in the local field, which permits detection of local patterns in these groupings and the correlation between neighboring subunits. Both the global and local Moran's I incorporate the notion of "vicinity" by means of tests of autocorrelation¹⁶.

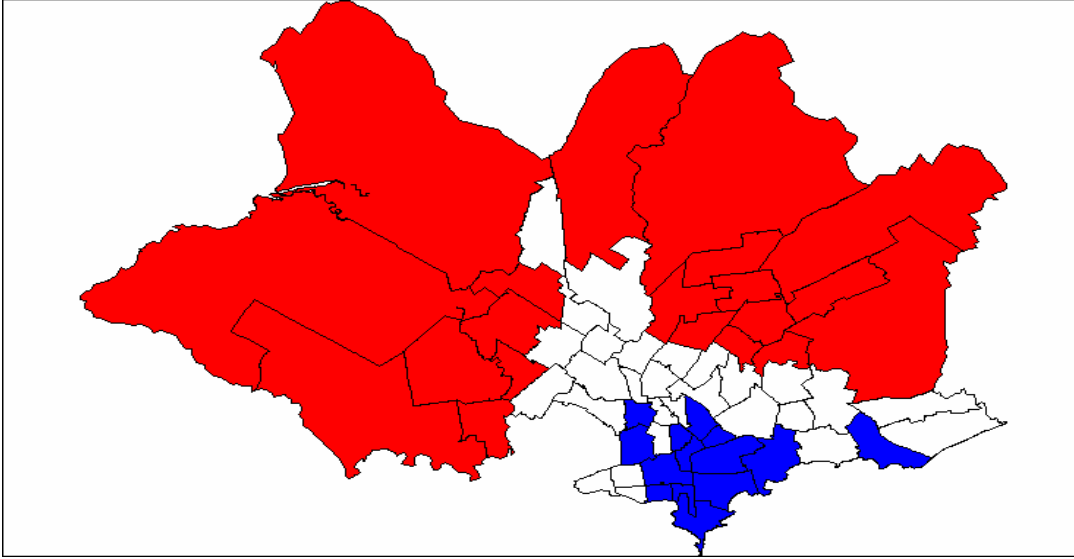
As can be observed in Map 6, the application of local Moran's I shows spatial autocorrelation among those neighborhoods with low educational attainment located in the periphery of the department, as well as a geographic concentration of high levels of education in the central zone. Between 1986-1988 and 2002-2004, the variations in the indicator are slight.

¹⁵ The high values for the Moran's I indicate that the mean education in a neighborhood is strongly correlated with the mean education in neighboring neighborhoods. The significance of these results was not lost to on the authors, seeding doubt as to the appropriateness idealness of the educational indicators employed to measure these types of groupings in cities that, as in Montevideo, show demonstrate a strong concentration in the middle of mean educational strata. Using low income as an indicator, Carolina Flores finds for Santiago—a city that traditionally has been much more segmented than Montevideo—a Moran's I far below that of Montevideo, 0.34. The counter intuitive character of is crude comparison points out to the convenience benefit of broadening the analysis by using the same indicators for the two several cities (Flores, C. 2005).

¹⁶ This statistic illustrates five types of geographic subunits:

- High values on a variable, surrounded by other subunits also with high variables (High-High, in red)
- High values neighbored by low values (High-Low, in pink).
- Low values neighbored by high values (Low-High, in light blue).
- Low values surrounded by similar values (Low-Low, in dark blue).
- Not included in any of the above groupings, marked as subunits with no significant clustering by the chosen indicator (Not Significant, in white).

Map 6. Local Moran's I for the percentage of people 25 to 59 years old with educational attainment below the mean for the department. Montevideo's

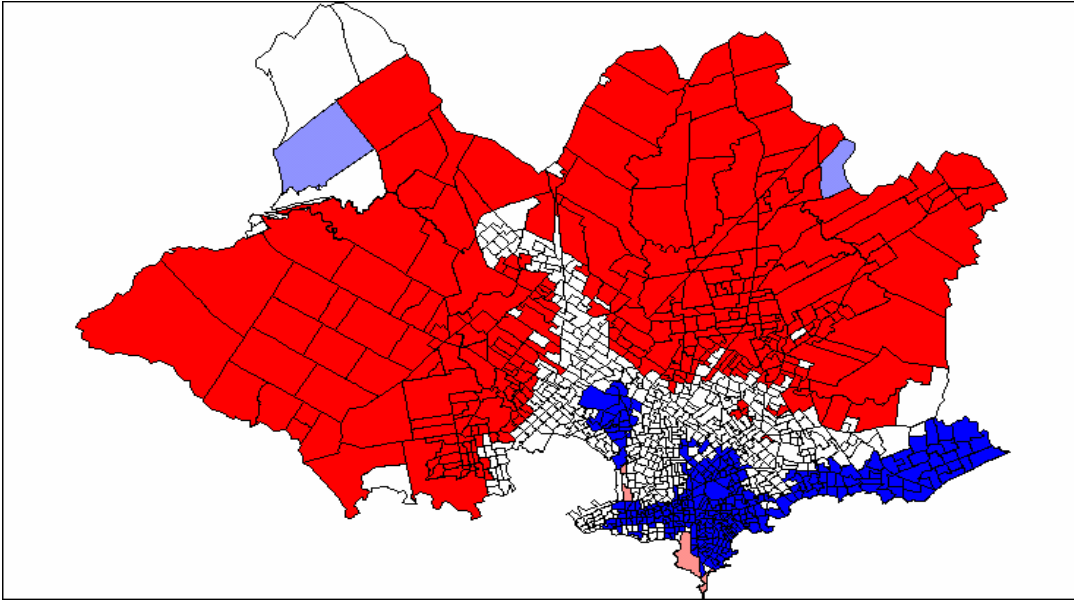


Neighborhoods, 2002-2004.

Source: Author's own calculations using GeoDA, with ECH data from the INE and maps from the IMM.

It should be noted that, at this level of aggregation, the index does not reflect autocorrelation in the neighborhoods located in the department's eastern costal zone, whose relatively high educational levels are apparent in Map 5. But, as can be observed in Map 7, this result is due to the geographic scale in use. In effect, when the same indicator is estimated using census tracts from the 1996 Census, the spatial autocorrelation increases markedly, creating a geographic continuity between the tracts with high educational levels located in the south (the center of the city) and the southeast of the department. At this level of aggregation there is also a notorious concentration of the population with the lowest levels of educational attainment in the periphery.

Map 7. Local Moran's I for the percentage of people 25 to 59 years old with educational attainment below the mean of the population, Census 1996, census tracts of Montevideo.



Source: Author's own calculations using GeoDA, with ECH data from the INE and maps from the IMM.

a. Some background on Antecedents to the educational situation

Public education played a central role in the high levels of social integration in Uruguayan society. Both, the quality of the system of public education and its capacity to congregate in the same classrooms students from different social backgrounds contributed to the strength of the social tissue. This was particularly true of elementary schools. Through the daily construction of common codes, solidarity ties, and the empathy developed through primary informal interactions with children from different social origins, many poor students had their first experiences of being part of a single society¹⁷.

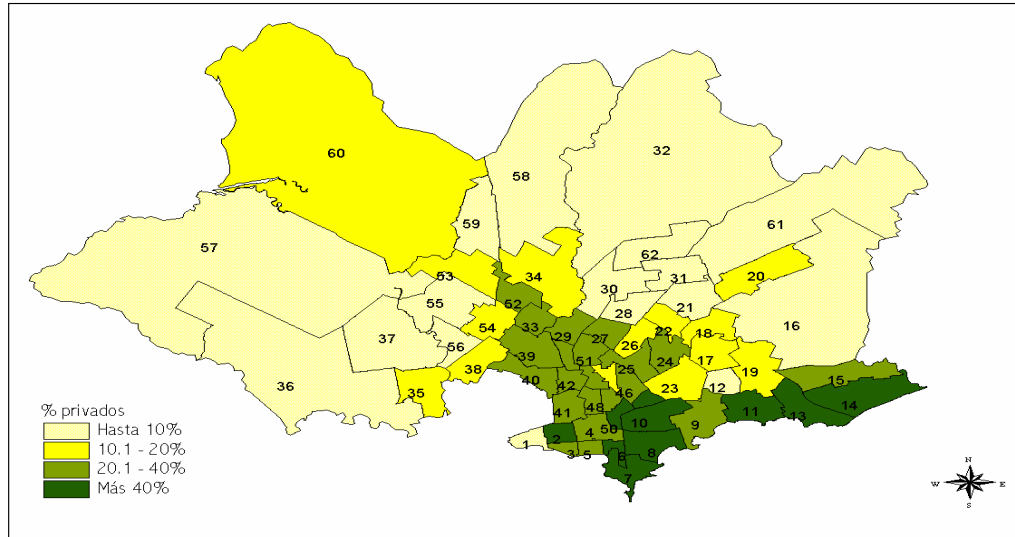
At least three factors should be mentioned as possible causal forces in the deterioration of the integrative nature of public elementary schools: the reduction in public spending on education, the segmentation of schooling, and the infantilization of poverty.

To understand the reduction in spending on education in relation to the rest of public spending we have to take into account that the prolonged economic slowdown that the country experienced since the 1970's occurred in a society that was already afflicted by the financial burden required to cover old age benefits. The population at retirement ages, who enjoyed the most extensive coverage in the region, demonstrated a higher capacity than other social categories to maintain their real income levels in spite of the ups and downs of the economy. Under these circumstances, a meager fiscal budget increasingly weighed down by old age benefits, was additionally burdened by the payment of interest on the debt accumulated by a country that spent more than it produced.

The consequent sharpening of the generational imbalance in public spending took place during a critical time for the educational system. Having achieved complete enrollment of the school age population, this sector faced the challenge of maintaining educational quality while teaching the basic skills, necessary for an increasingly competitive world, to more poorly socialized generations of students.

This situation suffered modifications after the return of democracy in 1985 when the proportion of the gross domestic product dedicated to education increased until 1989. Further on that proportion stagnated until the middle of the nineties, only to increase again in 1995 as educational reforms intensified. But even in the best year (2.72 percent in 2002), the levels of educational investment have been always significantly lower than the average OECD countries (around 4.7 percent), or that of other countries in the region, such as Mexico, who already in 1994 devoted 4.5

¹⁷ Although this image probably has certain idealized elements with regards to the role that education had in strengthening the social fabric of Uruguayan society, what is known is that, at least when considering the country in comparison to others of Latin America, this image is congruent with both the early spread of literacy in the country and the relatively low dispersion in years of education completed by the population.



percent of its GDP to education (ANEP-CODICEN, 2005). This situation motivated middle and high-class parents to seek in private education a better fit between the instruction available and the knowledge demanded by a rapidly changing labor market. Thus, a second factor that affected the integrative ability of Uruguayan schooling was increasing social segmentation among schools, which was reflected both in the public-private divide as well as in divisions within the public school system itself.

Beginning in the middle of the eighties, the quantity of children enrolled in private schools in Montevideo swelled. Between 1984 and 1994, said increase was around 50 percent. At the beginning of the period, one out of every two children of school age from the highest income brackets, and one out of every five children from middle income brackets, attended private establishments. Ten years later, the ratios were 3 out of every four children from high income households and more than 2 out of every 5 children from middle income households¹⁸. This proportion remained constant among the high classes but diminished in the middle classes, a proportion of whose parents, more vulnerable to the economic crises at the end of the last century, returned their children to free public schools¹⁹. In all cases, in the long run educational segmentation increased, thus contributing to reduce the opportunities for children from poorer households to interact with their more affluent peers. Map 8 illustrates the distribution of the percentage of children who attended private schools in the neighborhoods of Montevideo for the period 2002 - 2004.

Map 8. Percentage of children 6 to 12 years old attending private schools by neighborhoods. Montevideo, 2002-2004.

Source: Author's own calculations using ECH data from the INE and IMM.

It is important to reiterate that educational segmentation resulted not only from the growing privatization of school attendance. In Montevideo, students at the public primary school system are likely to attend establishments close to their homes, what

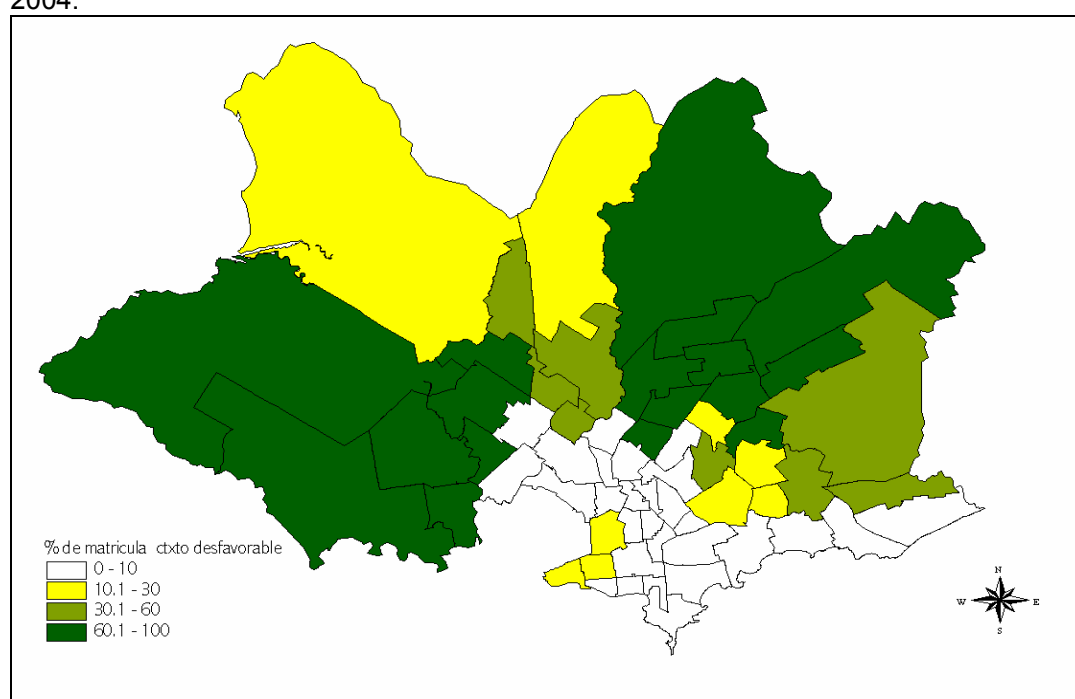
¹⁸ Here, high income households correspond to a per capita income of the top three deciles in the country. The next four deciles comprise the middle income households.

¹⁹ Although this is the most plausible hypothesis, it is also possible that the push in pre-school education in the public sector produced a "dragging effect", in that the children who attended public schools from a young age later continued in them, a phenomenon not present in years prior because of the scarce offering of schooling (see the following section). It is also possible that the middle classes of the population who were willing to bet on the public sector were attracted by improvements in schooling after the Educational Reform. Still, neither of these two arguments conflicts with the sharpening of educational segmentation.

favors a strong association between the social composition of neighborhoods and schools. Thus, as spatial segregation worsened, the traditional role of public schools as a privileged field for the social integration of children, declined.

The dragging effect of residential segregation on educational segmentation is reflected in Map 10, which illustrates neighborhoods by the percentage of children enrolled in schools with an unfavorable socio-cultural context^{20, 21}.

Map 10. Percentage of enrollment in schools with unfavorable socio-economic profiles as a total of enrollment in public schools in each neighborhood, Montevideo 2004.



²⁰ This demarcation, used by school officials to identify different types of schools, actually indicates the social composition of the schools, since it is based on an index that combines students' mothers' educational levels with the level of comfort of the households in which they reside.

²¹ A better approximation would be an index of homogeneity-heterogeneity based on the social composition of public schools in each neighborhood. The utilization of this measure could be used to test, for example, whether the increasing homogeneity in the social composition of neighborhoods is associated with increasing homogeneity in the social composition of schools. Furthermore, it would allow for the identification and examination of cases deviated from the general pattern, thus opening a source of useful clues for policies addressing social segregation in schools. Although it was not possible to use such an indicator in this study, the authors consider it an important empirical improvement to clarify these social relationships.

Source: Authors' own calculations based on data from the Monitor Educativo de Educación Primaria (ANEP.CODICEN—CEP) and maps from the IMM.

The third phenomenon affecting the provision of educational services is the infantilization of poverty (PNUD 1999), which also indicates the progressive displacement of the weight of biological and social reproduction on the poorest households (Kaztman and Filgueira 2001).

The State has not been indifferent to these challenges. At the start of the nineties, educational reforms sought to address the new risk structures. They did it by implementing different strategies to disassociate children's educational achievement from their original socio-economic disadvantages. But before examining the nature of those strategies it seems convenient to discuss a little further the possible implications of residential segregation on poor school age children.

b. Challenges posed by processes of residential segregation to educational policy at the elementary school level in Montevideo.

The preceding sections illustrated the alterations in the patterns and levels of residential segregation in the department. It has been shown that the most relevant characteristics of receiving neighborhoods were a rapid escalation in the number of irregular settlements; a predominance of families in the first stages of their life cycle; a relatively low level of educational attainment among adult residents; a low proportion of people with structured labor market trajectories and identities based on work experiences²²; and, unlike previous migratory processes, a majority of resident coming from central areas of the city rather than from other regions of the country.

The new components of the urban scenario posed important challenges to the educational system, in particular to elementary education. Among other things, the available information clearly indicated that many children have moved from areas where schools were relatively well equipped to areas with substantial deficit in school equipment and infrastructure. This recognition led to concentrate the educational efforts on problems of infrastructure.

However, it was also clear that the most important challenge was not the lack of physical infrastructure but the new conditions in which children were socialized. The alterations in the social profile of school children caused by the transformations of neighborhoods and families demanded changes in the design of the curricula, in the training of teachers and, especially, in the organization of the classroom activities now populated by students with a profile markedly different from those who attended public schools in previous years.

Although it is difficult to disentangle the intricacy of the problems that the spatial concentration of new forms of poverty poses to the educational authorities, it should be recognized that the quality of the relationships that schools maintain with families and neighborhoods is a strong determinant of the efficacy of their role in the learning

²² On the relationship between the process of residential segregation and the characteristics of insertion in the labor market, see a previous work written by the authors (Kaztman and Retamoso 2005).

process. That is, large part of the success of institutionalized education depends on the more or less harmonious way in which the efforts and influences of these three spheres interact.

From this perspective, the impediments facing families concentrated in disadvantaged areas to complement the school efforts become more relevant: too many children, scarce human resources, weak ties to the labor market, low expectations for social mobility, and poor housing infrastructure. Neighborhood effects on the socialization of school children also become relevant: the tone of neighbors sociability, the quality of communal institutions, or the scarcity of peers and adults in the vicinity who can act as role models with regard to habits, behaviors and expectations functional for school achievements. In sum, when families and neighborhoods fail to provide adequate support, it is more difficult for the educational system to develop its key role in the social integration process, namely, its ability to dissociate the educational achievements of poor children from their conditions of origin.

We will now turn to the reactions of the educational system to the new social reality defined by the concentration of poor families in disadvantaged neighborhoods.

POLICIES DESIGNED TO IMPROVE SCHOOL PERFORMANCES OF POOR CHILDREN. 5.

At the elementary school level, the Uruguayan educational system has responded to the worsening social situation of the school age population through a series of measures whose design and application were consolidated as of 1995. In this section, we address three of those measures: special schools, the increase in pre-school enrollment, and the provision of free lunches in schools.

a. Special schools²³

As previously mentioned, the provision of elementary public education expanded in the nineties. Beginning with a traditional model, one which only distinguished between urban and rural schools, a move was made to a model based on a diversity of options. The diversity sought to address, through alternative schooling formats and compensatory schemes, the growing heterogeneity in childhood experiences. The design of educational policies focused on the most vulnerable sectors through two special programs: the “Contexto Sociocultural Crítico” (Critical Sociocultural Context, from now on CSCC) schools and the “Tiempo Completo” (Complete time, from now on TC) schools.

On the basis of the transformation of public schools already existing in those areas, the TC schools began operating in the poorest geographic areas at the beginning of the nineties. In their first stages, their main contribution consisted solely of the extension of the school day. It is only in 1995 that these schools began to implement teaching programs specific to the institutions. After 1995, the rhythm in the

²³ Here we refer to CSCC and TC schools. This clarification is necessary due to the presence of schools attending disabled children which are also referred to as special schools.

construction of new classrooms and in the transformation of ordinary public schools to TC was increased, and the TC teachers received a differential bonus salary²⁴.

With respect to the CSCC, although they too are located in poor areas, they retain normal school hours and do not use a specific teaching program. To attract the most experienced teachers they rely on basic compensatory schemes. Table 11 illustrates the changes in the relative weight of school categories between 1995 and 2004. The figures indicate a slight increase in the proportion of critical socio-cultural context schools, and a much more significant increase, although from small initial figures, in the proportion of TC schools.

Table 11. Enrollment from first to sixth grade and variation by category of schools. Montevideo 1995 and 2004 (%).

School category	1995	2004	% variation
Common Public	76.5	71.1	-4.4
CSCC	21.4	22.3	7.1
TC	2.1	6.6	217.4
Total	100	100	2.8

1/ Includes "training" schools.

Source: Authors' own calculations based on the Monitor Educativo de Educación Primaria de ANEP-CODICEN.

Table 12 shows that in 1995 as in 2004, the distribution of schools was in line with the objective of the reform. On the one hand, the majority of institutions specifically designed to increase educational opportunities among disadvantaged children were located in places with unfavorable school and neighborhood contexts. On the other hand, throughout the period, the proportion of special schools (CSCC more than TC) grew in the areas in which their growth would be expected according to the goals of the reform. The strong increase of CSCC and TC in affluent neighborhoods reflects the fact that, in 1995, the number of public schools in these neighborhoods was significantly smaller than in poorer neighborhoods. In addition, we cannot reject the hypothesis that some affluent neighborhoods contain small homogeneously poor areas and that, in those cases, public schools, which most of the time recruit in areas smaller than a neighborhood, enrolls only children from those small areas.

Table 12. Number of CSCC and TC by socio-educational composition of neighborhoods and socio-cultural context of schools, as percentages of the total public schools in each cell, Montevideo 1995 and 2004.

Socio-cultural context of the school *	Socio-educational composition of the neighborhood (terciles of education in the years 2002 to 2004)							
	BAJO		MEDIO		ALTO		TOTAL	
	1995	2004	1995	2004	1995	2004	1995	2004
Unfavorable	53.8	54.6	36.0	54.2	33.4	80.0	48.6	55.6
Average	07.7	18.8	03.1	09.4	06.3	33.3	4.9	16.7
Favorable	00.0	00.0	00.0	00.0	00.0	02.5	0.0	1.3

²⁴ There were also clear advances in the definition of the criteria by which ordinary schools were selected to become TC schools, especially with regard to the identification of schools recruiting poor children and the selection of areas with large increases in their infant population. A more detailed description of the types of schools selected can be found in ANEP – CODICEN, 2004, and Clavijo, Francia and Retamoso, 2005).

TOTAL	46.3	47.7	10.6	18.0	4.4	15.8	22.2	30.0
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* The variable "socio-cultural context of the school" classifies all schools in the country according to an index that combines the educational level of the mothers of students with indicators of the level of comfort in the children's homes. The index classifies the schools in five categories ranging from very favorable to very unfavorable contexts²⁵.

Source: Authors' own calculations based on ECH data from the INE and ANEP-CODICEN, 2004.

Furthermore, Table 13 shows that enrollment in special schools is concentrated in the educational establishments with the most unfavorable socio-educational profiles. As could be expected from previous analytical results, the authors also found that the enrollment in those schools was higher in receiving neighborhoods (44.9 percent) than in sending neighborhoods (15.7 percent).

Table 13. Percentage of enrollment in first through sixth grades in special schools by socio-cultural context of schools, Montevideo 2004.

Type of schools	Very Favorable	Favorable	Average	Unfavorable	Very Unfavorable	Total
Special*	0,0	02,6	10.5	38.6	70.3	28.9

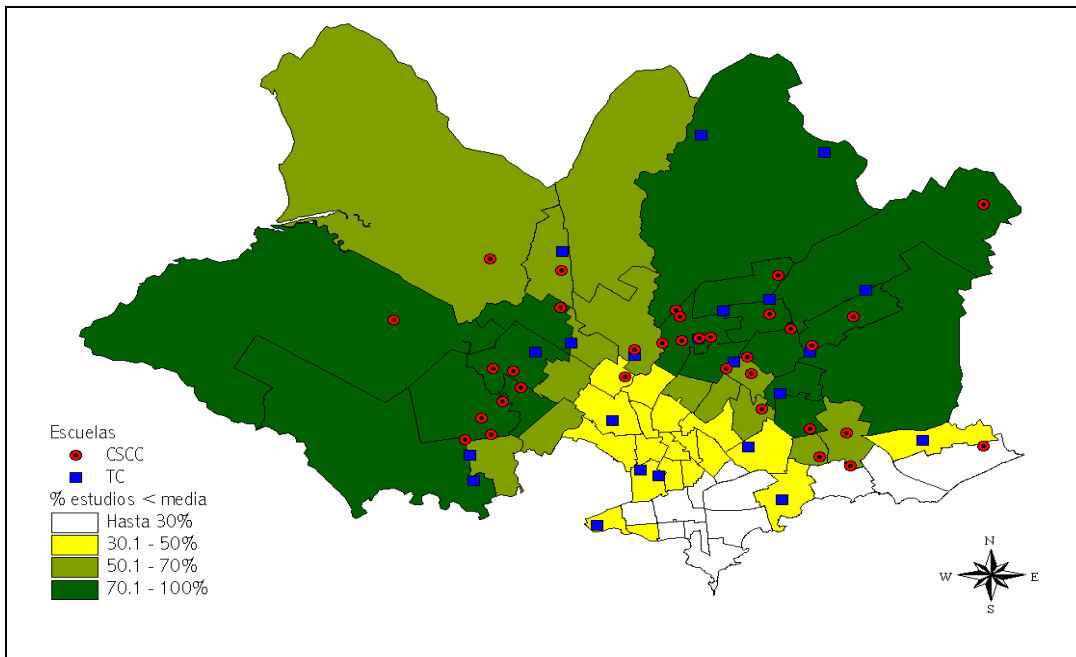
* Includes CSCC and TC schools.

Source: Authors' own calculations based on ECH data from the INE and ANEP-CODICEN, 2004.

Additionally, Map 11 shows the association between the location of special schools and the places where families with low average educational attainments reside. As can be observed, some TC schools are located at the edges of neighborhoods whose social composition is not "unfavorable", what possibly indicates concentrations of poor households in the vicinity of relatively affluent ones.

Map 11. Geographic location of CSCC and TC schools (2002) and percentage of people 25 to 59 years old with educational attainment below the department mean (2002-2004) by neighborhoods. Montevideo.

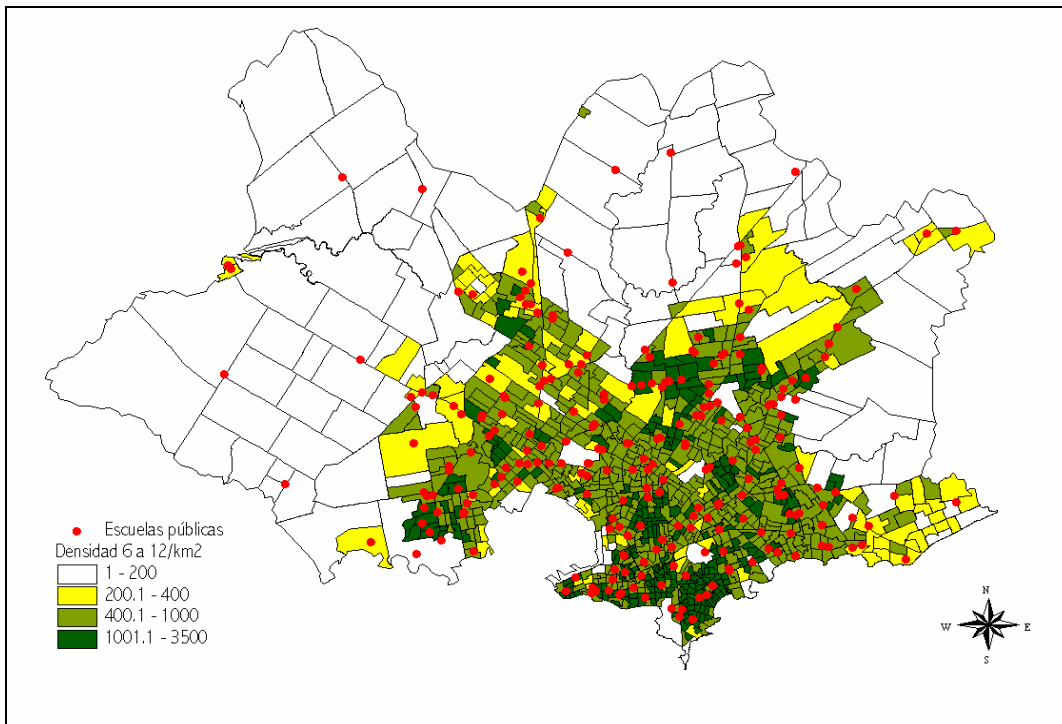
²⁵ For more information see ANEP-CODICEN, 2004.



Source: Authors' own calculation using ECH data from the INE and from the IMM (schools and maps).

In previous decades, Montevideo expanded in an ordered and planned form. The provision of services accompanied the territorial changes. This is still reflected in Map 12, which shows public schools located in the zones more densely populated and with the highest proportion of school aged children. The construction of schools in the past was dictated by at least three factors: financial resources which allowed for a high percentage of the GDP to be dedicated to educational services; predictable population movements, in the sense that new households tended to locate in central neighborhoods or in areas near employment opportunities; and universal services providing similar types and levels of services to the entire population. The three factors appear to have lost their importance in present day Montevideo.

Map 12. Geographic location of public schools* (2002) and density of residents ages 6 to 12 years old by km², by census tracts (2004), Montevideo.

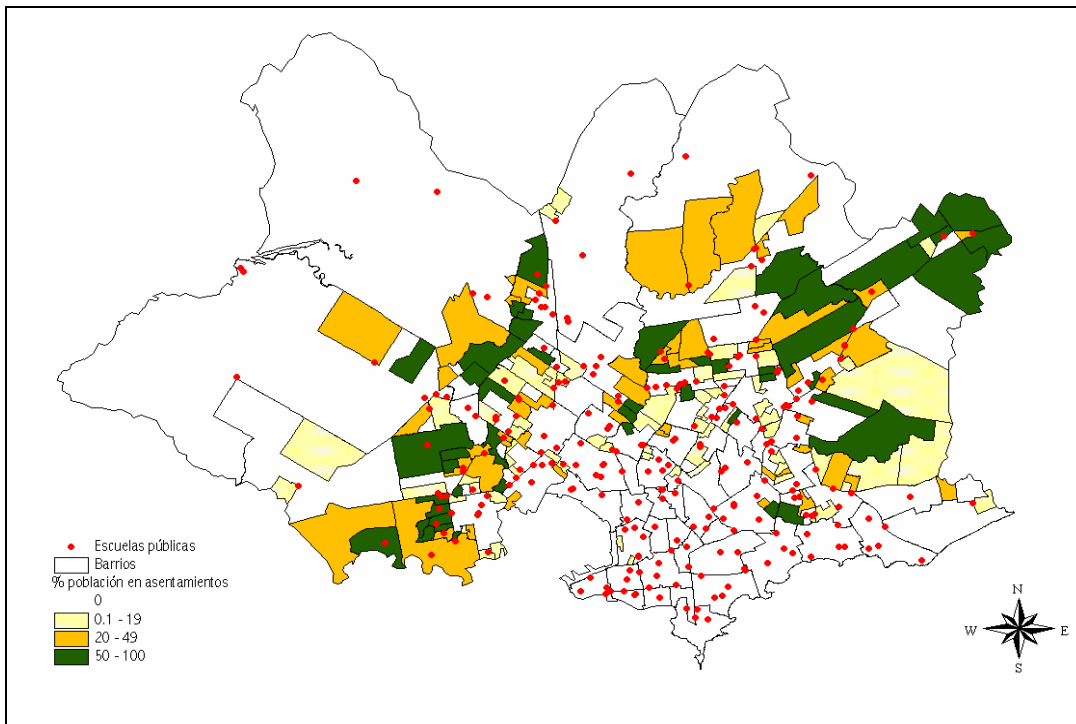


* Includes regular schools, kindergartens and schools for children with disabilities.

Source: Authors' own calculations with data from the Population Census 2004, and maps from the IMM.

In fact, as Map 13 illustrates, a large part of the problem of educational services—and this statement applies to the rest of public services as well—is related to the provision of services to the population which resides in the periphery of Montevideo. These areas are characterized by the most precarious social situations and by deficit in service networks and infrastructure.

Map 13. Geographic location of Public Schools* (2002) and percentage of the population residing in irregular settlements by census tracts (2004). Montevideo.



* Includes regular schools, kindergartens and schools for children with disabilities.

Source: Authors' own calculations with data from the Population Census 2004, and maps from the IMM.

b. pre-school education

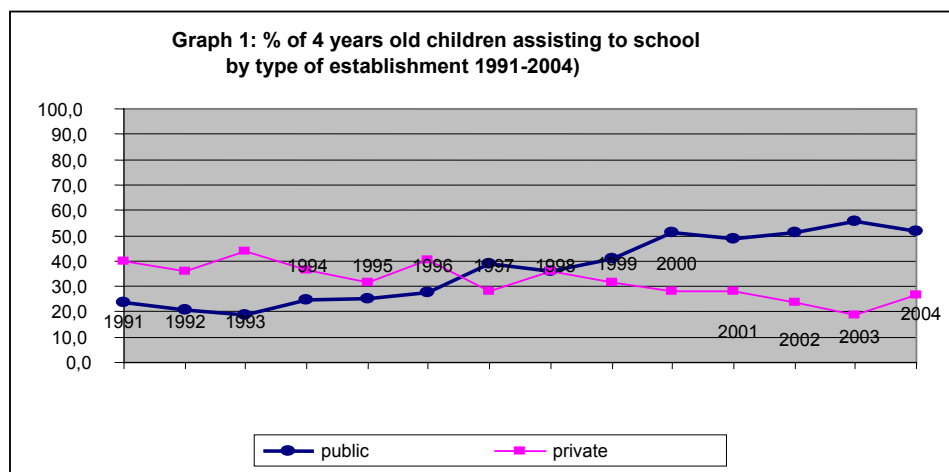
The expansion of public pre-school educational services -strengthened as of 1995- was an important initiative against the mechanisms behind the intergenerational reproduction of poverty and social exclusion²⁶.

The evidence recently accumulated on pre-school services in Uruguay indicates at least three regularities. First, it clearly indicates an expansion in the coverage of children ages 4 and 5. Second, it shows that pre-school attendance reduces the chances of repeating grades in elementary school. Third, it also shows that the expansion of coverage mainly benefited children from the poorest social strata. As a whole, these three tendencies indicate clear advances in social equity as a result of transformations in the educational system²⁷.

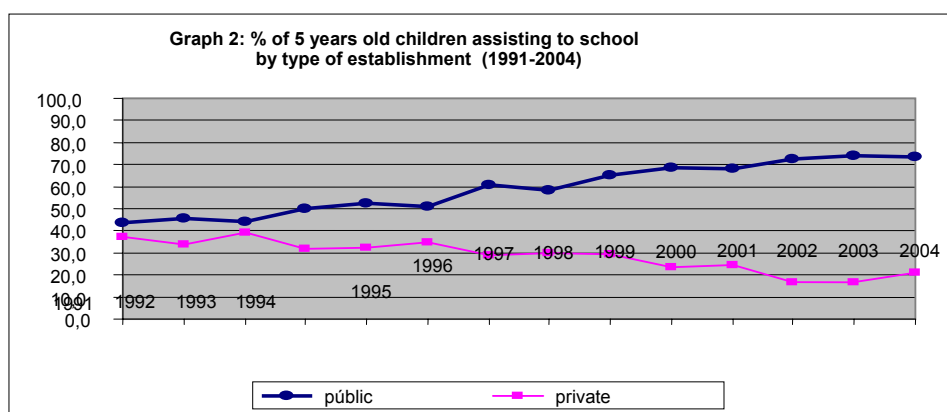
²⁶ Initiated in November 1998, Law 17.015 established pre school education as obligatory for all children at age 5. This law stipulated a maximum term of 4 years for the Administración Nacional de Educación Pública (ANEP) to provide the conditions necessary to enact the law. The measurement attempted, among other things, to foment the cognitive abilities and skills appropriate for a child's age, to promote motor-sensory development and socialization, and to help in the prevention of the negative effects that biological, nutritional, familial deficiencies, or other risk situations, have on a child's mental and physical development.

²⁷ Sufficient evidence exists to support these claims. For a good synthesis of the findings with regards to the relationship between pre school attendance and achievements in elementary school, see ANEP-CODICEN, 2002.

With regard to coverage, graphs 1 and 2 show the evolution of the rates of pre-school attendance for children ages 4 and 5 in Montevideo, from 1991 to 2004.



Source: Authors' own calculation based on ECH data from the INE.

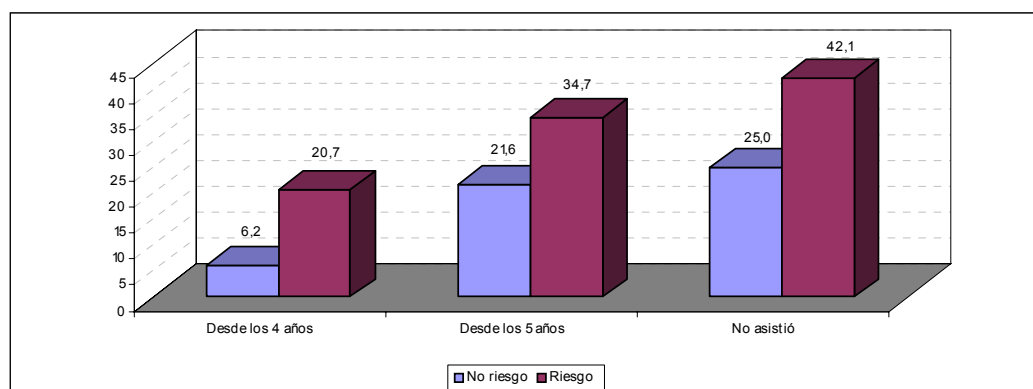


Source: Authors' own calculation based on ECH data from the INE.

The data presented in the graphs illustrates that, as a result of advances in pre-school education, in 2004 more than 9 out of every 10 children 5 years old, and more than 7 of every 10 children 4 years old, attended either public or private pre-school education. As can be observed in the graphs, the public sector exerted a clear leading role in the expansion of coverage.

The results of studies conducted by the Gerencia de Investigación y Evaluación de ANEP corroborate the importance of advances in pre-school education for further school achievements²⁸. Graph 3 reveals the association between the length of pre-school attendance and repetition of first grade for children who come from homes with differing levels of risk (as measured by mother's educational level). The results show that the levels of repetition for children in risk situations with no pre-school attendance, doubles those of children who attended pre-school since age 4, as well to those of children who attended pre-school from age 5 but do not come from disadvantaged families.

Graph 3. Percent of children who repeated first grade in 2001, by age of pre-school attendance and household risk level.



Source: Gerencia General de Planeamiento y Gestión Educativa de ANEP.

Finally, with respect to the impact of these advances on equality, Table 14 shows the growing presence of the public sector in providing pre-school education in poor neighborhoods, as well as the consequent reduction in the gaps in pre-school attendances among children residing in neighborhoods with different levels of disadvantages. Moreover, when controlling by the socio-economic level of children's households, the analysis shows that children coming from the most disadvantaged households practically doubled their enrollment during the period²⁹.

Table 14. Percentage of public school enrollment for children ages 4 and 5 years old by educational level of the neighborhood, Montevideo, 1995 and 2004.

²⁸ See, Panorama de la Educación en el Uruguay: Una década de transformaciones 1992-2004. ANEP, Montevideo, 2005.

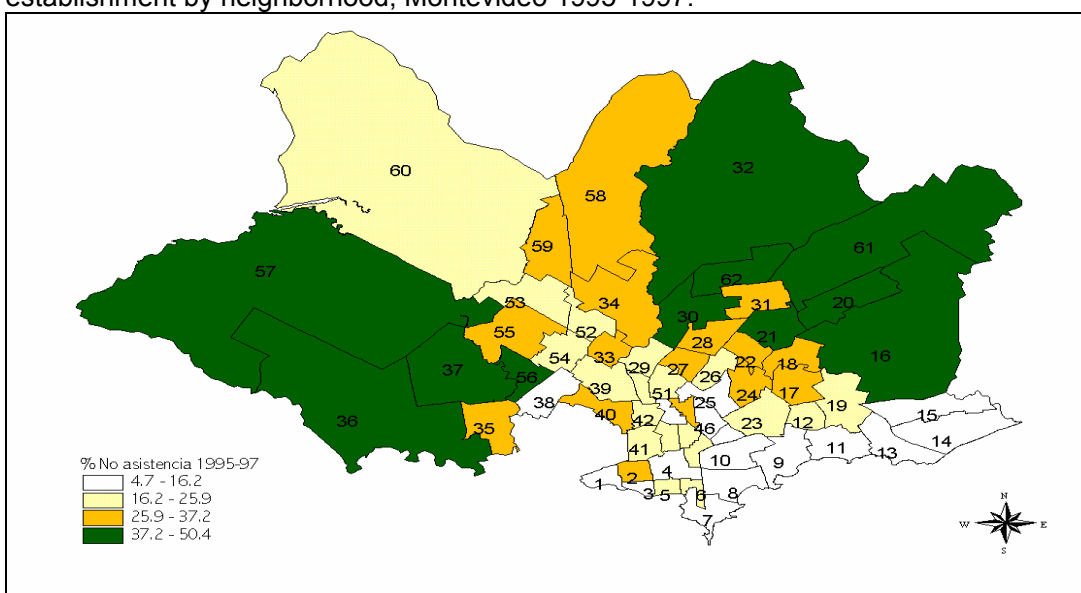
²⁹ See, ANEP/MECAEP/UNIVERSIDAD CATOLICA "Determinantes de la regularidad de la asistencia y de la deserción en la educación inicial uruguaya" Montevideo, 2003.

Enrollment in <i>public pre-school education</i>	Neighborhood educational level (terciles of the average years of study for the population 25 to 59, between 2002-04)			
	Low	Medium	High	Total
1995	40.9	41.8	32.6	38.4
2004	69.6	66.3	44.0	62.3
% of variation 1995-2004	70.2	58.8	34.9	62.3
Enrollment in <i>public and private pre-school education.</i>				
1995	56.8	74.3	83.0	70.3
2004	80.5	88.4	93.8	90.2

Source: Authors' own calculation based on ECH data from the INE.

Three factors appear to be the most relevant in explaining these advancements: first, the notable expansion in public pre-school education; second, an increasing awareness among parents about the importance of early schooling for their children's later academic achievement; and third, the undeniable functions of pre-schooling as places where children are protected, cared for and fed, as a response to the deeply-felt necessities of the poorest urban families. Map 14 illustrates the distribution by neighborhood of children between ages 3 and 6 during the three year period of 1995 to 1997 who were not enrolled in schools in Montevideo.

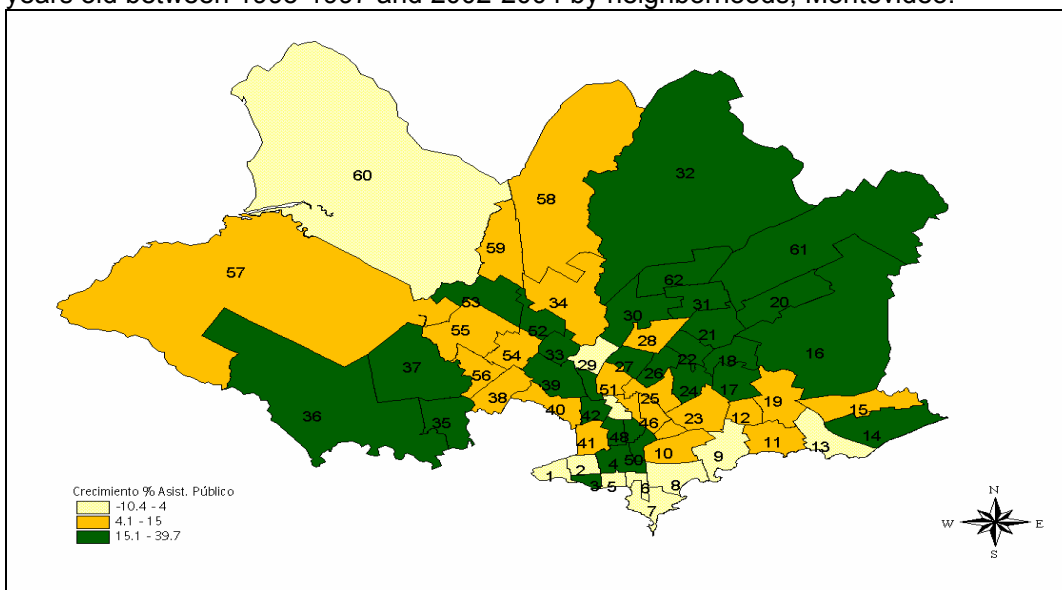
Map 14. Percentage of children ages 3 to 6 who did not attend an educational establishment by neighborhood, Montevideo 1995-1997.



Source: Authors' own calculations based on ECH data from the INE and IMM.

Map 15 shows where the public initiative for initial education took place between 1995 and 2004³⁰. Everything indicates an effort to reduce the gap between poor and nonpoor children in enrollment at this level of schooling.

Map 15. Percentage increase in enrollment in public education of children 3 to 6 years old between 1995-1997 and 2002-2004 by neighborhoods, Montevideo.



Source: Authors' own calculations based on ECH data from the INE and IMM.

c. Free lunch at schools

With the new characteristics of poverty in Montevideo, the need to feed children at schools became increasingly important. Evidence of malnutrition produced quick responses from educational authorities, not only driven by humanitarian concerns, but as recognition of the impact of nutrition on children's learning capacity. Existing programs of school meals were reinforced, and new models were introduced, as free lunches and the "Copa de Leche" system. These initiatives were part of the design of the new public protection nets aimed at counteracting the effects of a worsening social situation.

The nutritional policies implemented by the educational system receive strong financial backing from the "Impuesto de Primaria" (elementary education tax). Approved in 1986, but applied since 1990, this tax goes directly to finance a variety of areas (transportation, equipment, repairs, etc.), but the majority of the collected funds go to school nutritional programs³¹. Suffice to say, according to a survey

³⁰ Due to limitations related to the sample size of the household survey, here we use the population ages 3 to 6, and not the population of 4 and 5 year olds,. The number of cases in the latter group proved insufficient to characterize the situation of some neighborhoods.

³¹ Ley N° 15.809 (art. 636), Ley de Presupuesto Nacional de Recursos y Gastos de abril de 1986. It taxes urban, suburban and rural properties throughout the country on the basis of their declared values in the Dirección de Catastro Nacional.

conducted by the Institute of National Statistics (INE) in 2004, the school nutritional programs constitute the most extensive network of free meals in the country.

Tables 15 and 16 present the state of the situation in 2004. From them, it is clear that free lunches operate in schools located in the most disadvantaged neighborhoods. Furthermore, the proportion of students who eat lunch at school is directly proportional to the level of disadvantage of the school and its neighborhood.

Table 15. Percentage of elementary schools with free lunch systems, and percentage of children who eat lunch at them, by socio-educational composition of the neighborhood, Montevideo 2004.

Presence of free lunch system and % of students using it.	Socio-educational composition of the neighborhood (terciles of educational attainment in the period 2002-04)			
	Low	Average	High	Total
Presence	88.1	58.9	27.1	65.3
Students using it:				
Up to 49%	13.9	24.7	2.1	14.9
Between 50% to 74%	42.6	17.8	10.4	27.5
75% and more	31.7	16.4	14.6	23.0

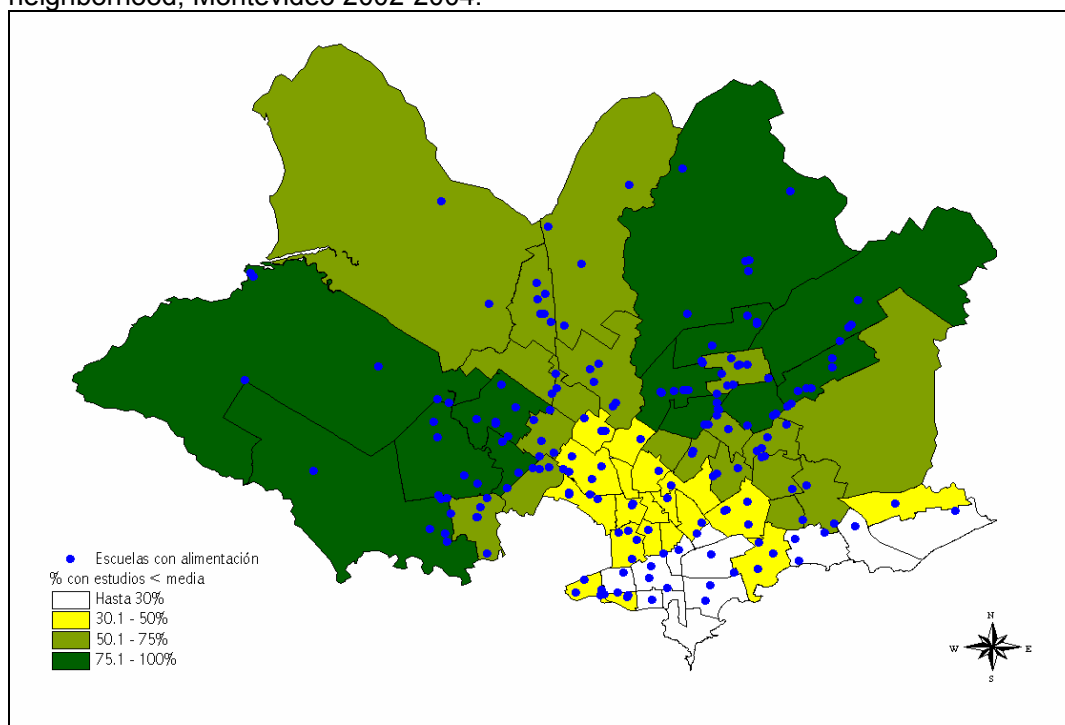
Source: Authors' own calculations based on ECH data from the INE and the Monitor Educativo de Educación Primaria del ANEP/CODICEN – CEP.

Table 16. Percentage of elementary schools with free lunch systems and children who use it by socio-cultural context of the school, Montevideo 2004.

Presence of free lunch system and % of students using it.	School socio-cultural context			
	Unfavorable	Average	Favorable	Total
Presence	90.9	56.6	25.4	65.3
Students using it:				
Up to 49%	13.6	17.0	15.3	14.9
Between 50% to 74%	38.2	26.4	8.5	27.5
75% and more	39.1	13.2	1.7	23.0

Source: Authors' own calculation based on the Monitor Educativo de Educación Primaria from the ANEP/CODICEN – CEP.

Map 16. Location of schools with free lunch systems and percentage of people 25 to 59 years old with educational achievement below the department mean, by neighborhood, Montevideo 2002-2004.



Source: Authors' own calculations based on ECH data from the INE and maps from the IMM.

In sum, by assuming an important role in an area that in the past were nearly exclusively reserved for families, the widely extended free lunch school network operated as another pillar of the public education system, particularly in neighborhoods of low socio-economic status.

FINAL CONSIDERATIONS: CHOOSING MEASURES TO NEUTRALIZE THE IMPACT OF RESIDENTIAL SEGREGATION ON THE ACADEMIC ACHIEVEMENT OF POOR CHILDREN. 6.

In the past two decades, Montevideo experienced an important acceleration in its socioeconomic residential segregation. Several factors were responsible for this dramatic increase in residential segregation, the main one being a continuous deterioration of income and social protection levels among low qualified urban workers. Thus, many young people, with little human capital and few stable and protected job opportunities, were expelled from central urban areas to the periphery of the city. As a result, most of the poor neighborhoods increased the homogeneity in their social composition

Higher socioeconomic homogeneity in residency caused homogeneity in the use of local services, especially in those services, such as elementary schools, health care centers, transportation and leisure, that usually recruit their users from the vicinities.

In this way, to their weak links to the labor market, workers in the poorest neighborhoods in Montevideo added a growing isolation from the societal mainstream.

These changes affected the profiles of households, neighborhoods and schools, the three most significant contexts for the socialization of children.

More households found troubles to design strategies to satisfy their members' basic needs. Maybe affected by a combination of their weak ties with the labor market, their declining expectations for social mobility and their growing isolation from the middle classes, poor urban families showed a trend toward unstable arrangements and single parenthood units, what implied a growing percentage of children cohabiting with only one of their biological parents. Under these circumstances, the pool of family resources for socialization—especially time availability- was affected, and parents found more difficulties to control their children, to support their daily academic activities and to complement the school efforts in the learning process.

Schools, in turn, find it increasingly more difficult to foster learning abilities in groups of homogeneously poor students. Many teachers and school authorities working in areas of highly concentrated poverty found themselves overwhelmed by the level of unsatisfied basic needs of their students, by the weak support they received from their families, and by a notorious deficit in the cognitive development and in the basic social skills that children bring to the classroom.

Beyond their own families and schools, poor children' neighborhoods comprise the next relevant human aggregate with which they interact and to whose behavior they are exposed. Neighbors may influence children attitudes and expectations through several paths. Peer groups in the vicinity will do it through mechanisms similar to those activated in schools, as mentioned further on. The possible influence of adults may take different routes. One is by serving as role models, as successful examples on the use of certain means to achieve certain ends. Another form is as actors who help to define and support the normative patterns that regulate the relations between neighbors and that establish the tone and level of sociability. A third form is as promoters of the positive or negative image that the neighborhood has in the rest of the city, images which may influence the formation of children's identities and their feelings of self-esteem. A final form is as builders and/or supporters of local institutions.

In this sense, some of the new characteristics of poor urban neighborhoods tend to impair, rather than to support, their socializing effect. The instability of the patterns of communal life, the scarcity and low quality of neighborhood institutions, and the shortage of adults who could function as role models and who could exert efficient informal social controls on child behavior, contribute to undermine the socializing force of the neighborhood or, at least, to detour it from the conventional paradigm that defines education as the principal path to social mobility and individual development.

Putting all this together, the type of changes affecting each one of these important socializing agents –family, schools and neighborhoods- have started a vicious cycle in no way beneficial to children's educational performances. During Montevideo's

integrated past, the more harmonious interaction between the three spheres—each one complementing and reinforcing the others—facilitated the functioning of the educational system. The new characteristics of urban poverty have modified this relationship. As families and neighborhoods failed to provide their expected complementary roles, schools found formidable barriers to develop their key role in the processes of social integration on the basis of equity, that is, their unique capacity to dissociate children academic achievements for their socio-economic background.

A study developed by the ECLALC office in Uruguay, helped educational authorities to start thinking on how to strengthen the capacity of schools to overcome the difficulties imposed by the socioeconomic background of neighborhoods and families. The study incorporated most of the problems addressed here, as well as a detailed description of the state of teaching and learning in the country. It provided critical information for the development of a proposal for the reform of the educational system oriented to disassociate children's educational achievement from their socio-economic backgrounds.

As described in the body of this article, the reform of the Uruguayan educational system paid special attention to the location of facilities. It placed new centers for initial education (kinder gardens), special schools, and free lunch school programs, in neighborhoods with the highest concentrations of poverty. Simply stated, the strategy consisted of focusing educational efforts in places where the risks for children to stay behind were higher³². However, in the design of the interventions there is no sign that those risk situations stemming from **the social composition of the schools or the social composition of the neighborhoods themselves were duly attended.** To what types of risk do we refer?

The social composition of schools defines the groups of peers with which a child will have opportunities for daily interactions. Studies on academic achievement show the incidence of the characteristics of peer groups on at least four factors affecting differential school performances. First, a child's companions at school mold his or her expectations for academic achievement. Second, the more heterogeneous school peers are, the greater the variety of experiences and of problem solving practices to which a child is exposed, and the greater the opportunities to develop cognitive and social skills useful for both their school performance and their future insertion in the labor market (Betts J., Zau, A., and Rice, L. 2003). Third, similar positive effects on academic and labor attainments may be fostered by social networks based on heterogeneously constituted peer groups. Finally, among the most disadvantaged children, daily contact with their peers from other classes may create early feelings of sharing problems and destinies. Those feelings are important components of their general sense of belonging to a unique, single society, beyond present disparities in the material conditions of their families. One may assume that, for poor children, the relative importance of those early experiences of citizenship will be higher, the more the microcosmos of the classroom resemble the social composition of the whole society.

³² Paradoxically, the spatial concentration of the poor facilitated the implementation of focalized strategies of educational improvement.

Unlike the type of geographically targeted interventions implemented in Montevideo, a policy design based on the above findings and hypotheses should have focused more on the interaction between different social groups. This could be done, for instance, encouraging classroom heterogeneity through the localization of educational establishments on the boundaries between neighborhoods of differing social classes, or by making some minimum social heterogeneity mandatory for schools, by providing, at the same time, free transportation to facilitate student attendance to socially mixed educational centers, or by promoting housing policies and housing subsidies favoring mixed neighborhoods. .

The consideration of all these factors leads to policy interventions in urban planning which go far beyond interventions limited to the educational system. This way of thinking about public policy seems to have influenced some European cities, where initiatives to integrate foreign workers were implemented by defining the location of public housing construction, or by giving economic incentives to members of the middle classes to reside in previously homogenously poor areas, thus assuring a certain level of social mixing in new neighborhoods (Musterd and Ostendorf, 1998).

Having said this, we should consider that social mixing urban policies are not necessarily easy to implement, nor guarantee of direct reductions in social distances for all societies and all times³³. However, we dare to say they are the policies that better address the research results about educational achievements and residency. In this sense, they are more faithful to research results than the well known and commonly implemented territorially targeted educational policies. Moreover, the educational system cannot elude them without declining its key role in the construction of societies integrated on the basis of equity. To advance towards this goal, the medium and long-term fragmentations associated to the rising trend in both, educational segmentation and residential segregation of the new urban poor, cannot be ignored.

³³ This is especially true for highly stratified societies like the Latin American ones. In considering the relative costs of this type of policies, it should be taken into account that, in most societies, the present forms of class relationships are the final product of long processes of domination, negotiation and conflict resolution with deep historical roots. That means that social engineering aimed at modifying existing patterns of class relationships and social distances may be one of the hardest areas for social policies. In the case of education, the resistance to interventions of the types reviewed above arise from all sides, and are most fierce when the classes that circulate in the main social and economic city circles carry stereotypical images of those who have remained outside those circles; in those cases, the higher classes may perceive the promotion of social integration through schools as threats to both their expectations with regard to their own children educational advancements and the maintenance of their traditional social prerogatives.

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APENDIX 1: NOTES ON SOURCES OF DATA.

Data for this work come from the microdata from household surveys during the period 1986 to 2004, and the 1996 and 2004 national censuses.

For our purposes, household surveys present some advantages and disadvantages compared to census. One of the advantages is that surveys allow for the identification and description of neighborhoods with more precision and analytical detail than what would be possible with censuses³⁴. Generally, since surveys investigate the amount and sources of incomes for all members of the household—which the Uruguayan census does not—as well as the forms of respondents' insertion into the labor market, they are valuable instruments for investigating changes in poverty, income inequality, and social stratification. Specifically for this paper, the greater advantage of surveys over censuses is that the former allow for the study in changes in the social composition of the population of Montevideo during the last two decades. It is precisely since the second half of the nineties that important but poorly studied changes in the social, economic and geographic structure of the city occurred³⁵.

The greatest disadvantages in the use of surveys to examine the processes of residential segregation are two-fold. First, since the sampling frame does not incorporate neighborhoods as a criterion for the selection of sampling units, the data are not representative at the neighborhood level. In an attempt to fortify the statistical meaning of findings at the neighborhood level, we decided to work with three-year averages. Although this does not eliminate the risks in the interpretation of the results, it does reduce them. Each one of these three-year periods is associated with an important period of recent history. The first, the period of 1986 to 1988 corresponds to the Democratic Restoration. The second, 1995 to 1997, corresponds to the phase of economic opening that begins in the nineties and which produced important changes in the economic, productive and social structure of the country. The third period, 2002 to 2004, contains the effects of the worse economic crisis to hit Uruguay in recent decades, a crisis that began in 1999 and culminates with the “crack” of 2002.

The second disadvantage with respect to the surveys also has to do with the sampling frame. The sampling frame of the surveys is updated with data from the censuses. As these are carried out approximately every 10 years, the picture that emerges from survey data loses its relevance as we move further away from the date of the last census. The importance of this fact varies according to the sensitivity of the variable under study and the specific characteristics of the populations that fall outside of the sample. In our case, this sensitivity is high, inasmuch as we are studying processes of residential segregation that were strongly associated with the establishment of irregular settlements in zones that previously had a relatively low population density.

³⁴ The boundaries used to demarcate neighborhoods correspond to those utilized by the Instituto Nacional de Estadística for the study of Basic Unsatisfied Needs. .

³⁵ The 2004 census could have provided very useful data to explore these changes, but it was actually limited to a count of households, as well as the number of people by age and sex, which makes it useful only for very specific and limited purposes.

A last important note regarding the survey sample: in Montevideo, the survey is representative of the total population, while in the rest of the country it is only so for locations with 5,000 habitants or more. The survey design changed in 1998. After this year, the sample was based on the definition of 9 socioeconomic layers for in the entire country—four in Montevideo, one in the periphery of Montevideo (Canelones and San José)³⁶, and the rest in the other departments of the country. Among other things, this innovation sought to make the survey statistically representative of Greater Montevideo area. In spite of these advances, two problems prevented us to extend our investigation to the Greater Montevideo area. First, as of the time of this writing, digital maps of the metropolitan area as a whole were not available. Second, since it is a survey representative of the Greater Montevideo area, it is not possible to identify neighborhoods in the periphery of Montevideo which fall in the departments of Canelones and San José.

As a way to cushion the possible bias arising from the above described characteristics of the surveys, we established several controls. Where possible, we compared data from the 1996 census and the 2004 census count at both the neighborhood and census tract level. Additionally, we compared the profiles of the population residing in the periphery of the Greater Montevideo area with those of different strata of the Montevideo population using data from the household surveys prior to 1998 (see Appendix 2). Lastly, we compared results from studies conducted during the period from 1985 to 1996 with information from the corresponding censuses (Macadar and others 2002).

To analyze the provision of educational services in the city we obtained databases from the administrative records for elementary schools at the level of the school³⁷.

Classification of neighborhoods in Montevideo

Based on the results of the 1985 population census, the Instituto Nacional de Estadística (INE) published a study on unsatisfied basic needs in Uruguay (INE 1990). As part of this study, the INE subdivided the department of Montevideo in 62 units, called neighborhoods or groups of neighborhoods. The INE did so by applying two basic criteria. One the one hand, the aggregated units had to contain a certain degree of homogeneity in terms of socio-economic characteristics of its residents. On the other hand, through information provided by key informants, the INE considered the communal or neighborhood identities of the population residing in distinct geographical units.

³⁶The metropolitan area includes a periphery comprised of cities located in a 30 kilometer radius around the limits of the department of Montevideo, reaching into the departments of Canelones and San José. In the case of Canelones, the following places are included: Ciudad de la Costa (which on its own is comprised by 17 different localities), Las Piedras, Pando, La Paz, Progreso, Juan Antonio Artigas, Paso de Carrasco, Fraccionamiento Camino Maldonado, Villa Crespo, Fraccionamiento Camino del Andaluz, Colonia Nicolich, Joaquín Suárez, Toldo, Villa Aeroparque, Olmos y Aeropuerto Internacional de Carrasco. For the case of the department of San José, only the localities of Delta de Tigre and Playa Pascual are included. San José only represents 7 percent of the periphery, such that Canelones contains the remaining 93 percent. Furthermore, not all of Canelones and San José form part of the periphery on Montevideo. What is not in this stratum is integrated into the south stratum of the country (together with Colonia and Maldonado).

³⁷ Monitor Educativa de Educación Primaria, ANEP/CODICEN/CEP, 1991 -2004. This database does not identify educational establishments but the neighborhood where they are located.

APPENDIX 2. COMPARISON OF THE PERIPHERY OF THE DEPARTMENT OF MONTEVIDEO WITH THE PERIPHERY OF THE METROPOLITAN AREA (CANELONES AND SAN JOSÉ), ON THE BASIS OF HOUSEHOLD SURVEYS.

In Montevideo the survey is representative of the total population, as it is of the localities with 5,000 or more inhabitants. The sample design was modified in 1998. As of that year the sample was based on 9 socio-economic strata for the entire country: four in Montevideo, one in the periphery of Montevideo (Canelones and San José), and the rest in the other departments in the country. Among other things, this innovation sought to make the survey statistically representative of Greater Montevideo area.

In order to reach a better understanding of the population residing in the area which is today the periphery of the Greater Montevideo area, we are interested in comparing the characteristics of this population with those of the neighborhoods of Montevideo³⁸. For this comparison we use two criteria. The first (Table A3.1) divides Montevideo neighborhoods into receiving, stable and sending neighborhoods, taking into account population variation occurring between 1996 and 2004. The variables analyzed come from the household survey for the three year period 2002 to 2004.

Table A3.1. Comparison of population characteristics in Montevideo neighborhoods classified by population variation between 1996 and 2004, with the characteristics of the periphery, Greater Montevideo 2004.

VARIABLES	Neighborhoods according to population variance			Periphery	Greater Montevideo
	Sending	Stable	Receiving		
Age structure					
0-17	22.3	22.4	32.3	30.3	25.3
18-59	54.0	54.2	52.2	51.8	53.4
60 and older	23.7	23.4	15.5	17.9	21.3
Average years of education for the population 25-29 years old	11.1	11.1	08.7	08.6	10.4
Population in poverty(%)	22.1	21.9	52.4	24.8(39.7)	27.6
Indigent population(%)	01.9	02.3	08.3	02.0(03.2)	03.1
Per capita household income (\$ Ur. Pesos)	7301.10	9591.60	5241.40	4903.20	7231.90

³⁸ Although the following comparative exercise considers the area of the periphery like a whole, it goes without mention that there is high variance in the central characteristics between populations like those of Pando, Las Piedras, and the southern zone of the Ciudad de la Costa de Oro.

Source: Authors' own calculations based on the population censuses from 1996 and 2004, and ECH data from the INE.

As is shown in the table, the population residing in the periphery of the city is more similar to the receiving neighborhoods of Montevideo. Nevertheless, although per capita income and average years of study are the lowest of any type of neighborhood grouping, the indicators for poverty and indigence in the periphery are much lower than that of receiving neighborhoods. With regards to income and education, part of the inconsistency is due to the inclusion of Punta Carretas among the receiving neighborhoods. This neighborhood has a very high relative income, and between 1996 and 2004 its population grew at more than 5 percent. When excluded from the rest of the receiving neighborhoods, the income in receiving neighborhoods drops to 3734 Uruguayan pesos per capita, and the average educational achievement of the population 25 to 59 years old decreases to 8.1 years of schooling. Both figures are significantly lower than the corresponding indicators in the periphery.

Even with these corrections, there is still a clear inconsistency between the values of income and education in the periphery and its relatively low indexes of poverty and indigence. In this case, the answer lies in the calculation of these indexes. Since the periphery is located outside of the department of Montevideo, to calculate these indexes in this area the INE applies the value of the basic food basket which prevails in the rest of the country, the value of which is significantly lower than the basic food basket used for Montevideo. Applying a factor of correction in order to equate the costs of both food baskets, the percentage of the population in the periphery living in poverty would rise to 39.7, and the percent of the indigent population would increase to 3.2 (within parenthesis in Tables A3.1 and A3.2).

The second criterion used to describe the population of the periphery of Greater Montevideo was to compare its characteristics to those of the bottom three socioeconomic strata defined in 1998 for the household survey sampling frame (that is, the lower, lower middle, and upper middle classes). The strata were constructed based on the socio-economic status of each of the census tracts in the department. As can be seen in Table A3.2, the values for the periphery show a socio-economic profile closer to the lower middle class neighborhoods than the lower class neighborhoods of Montevideo.

Table A3.2. Comparison of the characteristics of the Montevideo population classified by the socio-economic strata of the neighborhood where they reside, with the characteristics of the periphery in Canelones and San José, Greater Montevideo 2004.

VARIABLES	Neighborhood socioeconomic strata*			Periphery in Canelones and S. José.	Greater Montevideo
	Lower	Lower middle	Upper middle		
Age structure					
0-17	33.4	25.9	21.2	30.3	25.3
18-59	51.8	52.8	54.8	51.8	53.4

<i>60 and older</i>	14.8	21.3	24.0	17.9	21.3
Average years of schooling of population aged 25-29	07.9	09.6	11.4	08.6	10.4
Population in poverty (%)	58.5	36.1	18.2	24.8(39.7)	27.6
Indigent population (%)	09.8	03.7	01.2	02.0(03.2)	03.1
Per capita household income (\$ Ur. pesos)	3734.00	5358.10	7682.20	4903.20	7231.90

* Strata used in the ECH for the department of Montevideo

Source: Authors' calculations based on the 2004 population census and ECH data from the INE.

In summary, these quick comparisons show that the population expansion in the periphery of Montevideo seems to have been driven by the incorporation of households with socio-economic profiles slightly different from those of the lower classes that reside in the city. Although it shares with the lower class neighborhoods of Montevideo a high proportion of households at the beginning stages of their family life cycle, in the periphery there is a lower proportion of infants and children, higher educational achievement among the population ages 25 to 59, higher per capita income, and consequently, lower indices of poverty and indigence.