The Spatial Dimension of Educational Inequality in Mexico in the Beginning of the Twenty-First Century

Edith Yolanda Gutiérrez Vázquez, *El Colegio de México*, egutierrez@colmex.mx
Silvia Elena Giorguli Saucedo, *El Colegio de México*, sgiorguli@colmex.mx
Landy Sánchez Peña, *El Colegio de México*, lsanchez@colmex.mx

Educational inequality in Mexico has not only been marked by social inequality of opportunities to attain a certain schooling (linked to family background, for example), but has been accompanied and recreated by the distinct spatial distribution of resources devoted to education and of educational services. Furthermore, additional factors that influence the educational trajectories of the youth such as the labor market, migration patterns and the income distribution also have a geographical component. Clearly, the spatial dimension appears when we try to understand why disparities persist in education.

There have been a variety of studies centered on explaining the dynamic of educational inequality using different levels of analysis (states, municipalities, communities, households and individuals) and a diversity of indicators (school attendance, gross and refined ratios, average years of schooling achieved by a certain age, Gini indexes calculated for the distribution of years of schooling, among others).

Nevertheless, the spatial dimension -*where* inequalities are structured and reproduced—is usually overlooked or considered, at the most, as a control variable in the analysis of the educational inequality in Mexico. Based on the fact that the spatial differentiation of the processes enables us to understand "... how and why markers of stratification, such as economic well-being and access to resources as well as other inequalities related to race/ethnicity, class, gender, age or other statuses, vary and are intersect across territories"(Lobao, Hooks and Tickamyer, 2007: 3), in our paper we develop our analysis conceiving the process of reproduction of educational inequality from a spatial perspective.

The main goal of our paper is to analyze the spatial dimension in the relationship between the expected years of schooling for children living in Mexico who completed elementary

school and the dynamics of the labor markets, migration and the characteristics of the educational services available at the municipality level.

In addition, most of the indicators used to analyze the educational patterns in Mexico (either looking at the completion of certain levels or at school attendance) do not provide refined measures but cross-sectional information. Thus, they tend to underestimate or overestimate –depending of the indicator- educational achievement, school attendance or school dropout. In order to overcome that limitation and to offer an alternative approach, in our paper we use survival analysis and build tables for the expected years of schooling by grade completed, using information from the 2000 census. We construct school life tables at municipal level under the assumption of no mortality or migration within the municipality. Although working with closed populations may be a limitation, especially in terms of migration given the dynamic mobilization of young people within and outside the country, we further on add controls to account for this dimension.

Data and Models

In Maps 1, 2 and 3 we show preliminary results from our life tables. As we expected, there are clear patterns of educational inequalities. It can be seen that in ten of the thirty-two Mexican states, most of the children who are starting their education may not complete primary and secondary school (6 and 9 years of schooling respectively), which are pointed as mandatory according to the Mexican Law (see Map 1). Comparing the results of school life expectancy at the state level against the national results (see Table 1), we observe that in four states the expected years of schooling are below the mandatory education (up to ninth grade). Map 2 shows that, once elementary school is completed, the probabilities of finishing middle school increase and are more evenly distributed along the country. The pattern of inequality differs from the one shown in Map 1. There is also a different process of spatial inequality in the access to tertiary education as shown in Map 3.

For the spatial multivariate analysis, we are integrating the labor market dimension, the migration one, and the institutional structure of educational services. The indicators used for the labor market seek to capture the economic opportunities available to the youth in the municipality and refer mainly to the distribution of the labor force by activity, female

participation rates and unemployment rates in the municipality. This data also comes from the 2000 Census. For the type of educational services available and offered in the municipality we used administrative records from the Education Ministry (Secretaría de Educación Pública). The indicators selected measured the availability of general track middle and high schools in the municipality, the educational profile of the teachers and the proportion of students in middle school who attend long-distance educational facilities (*telesecundarias*).

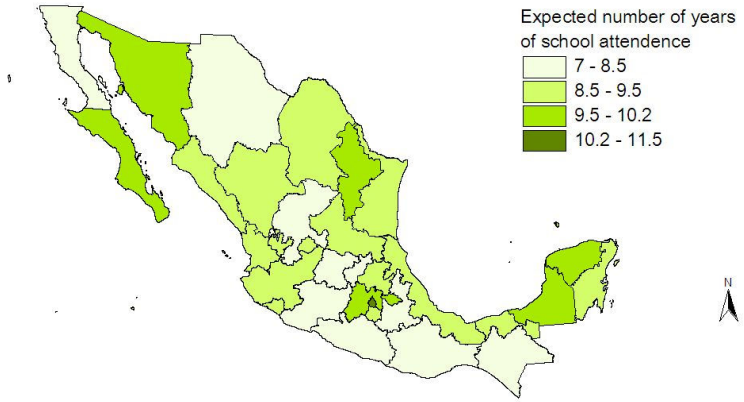
To understand the impact of the migration process, we are using two measures: one is for controlling internal migration and the other is to bring the international migration dimension into the analysis. For internal migration we are using inter-municipal migration rates that come from the Census data, and for international migration we are utilizing an intensity migration index which measures the prevalence of migration among the households of a municipality. With this information, we will estimate spatial models using the expected years of schooling as dependent variable.

In our analysis, we first use a Geographically Weighted Regression model (GWR) to explore whether and how the relationship between expected years of schooling and labor market, migration, and institutional structure of educational services varies across the space and, therefore, to better describe the non-stationary spatial process of educational inequality. Second, based on the GWR results and tests for spatial dependency, we define a spatial regimes model that attempts to accounts for regional variations in the relationship between expected schooling and its regressors.

References:

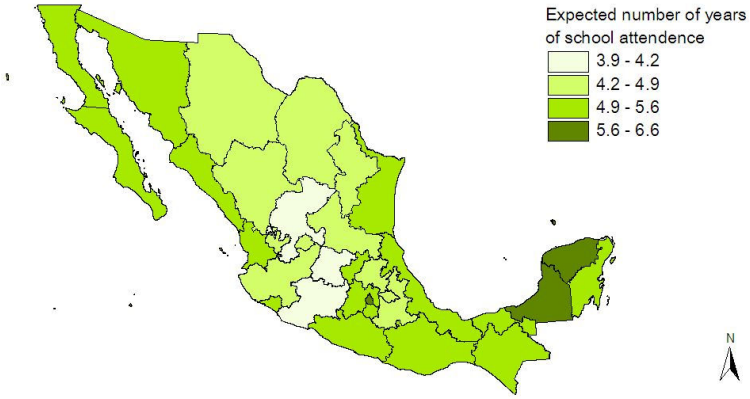
Lobao, L., Hooks, G. y Tickamyer, A. (Eds.) (2007). *The sociology of spatial inequality.* Suny Press, 274 p.

Map 1. Mexico, 2000.
Expected years of schooling at the beginning of elementary education



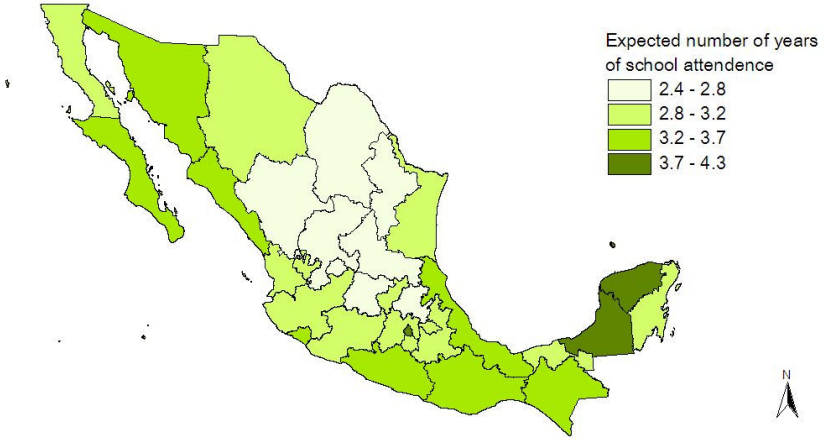
Source: Authors' calculation based on data from XII Censo General de Población y Vivienda 2000 (INEGI, 2000)

Map 2. Mexico, 2000.
Expected years of schooling at the end of elementary education



Source: Authors' calculation based on data from XII Censo General de Población y Vivienda 2000 (INEGI, 2000)

Map 3. Mexico, 2000.
Expected years of schooling at the end of middle education



Source: Authors' calculation based on data from XII Censo General de Población y Vivienda 2000 (INEGI, 2000)

Table 1. Mexico, 2000.
Expected years of schooling at the beginning of children's school life

Aguascalientes +	9.4	Morelos +	9.2
Baja California -	8.3	Nayarit +	9.4
Baja California Sur +	9.9	Nuevo León +	9.6
Campeche +	9.8	Oaxaca -	8.4
Coahuila +	9.5	Puebla -	8.5
Colima +	9.5	Querétaro -	8.3
Chiapas -	7.0	Quintana Roo +	9.3
Chihuahua -	8.5	San Luis Potosí +	9.2
Distrito Federal +	11.5	Sinaloa +	9.3
Durango -	8.9	Sonora +	9.8
Guanajuato -	8.5	Tabasco +	9.5
Guerrero -	8.3	Tamaulipas +	9.4
Hidalgo +	9.5	Tlaxcala +	9.6
Jalisco -	9.0	Veracruz	9.1
Estado de Mexico -	9.7	Yucatán +	10.2
Michoacán -	8.0	Zacatecas -	8.4
Mexico	**9.1**		

Source: Authors' calculations based on data from XII Censo general de población y vivienda en México 2000 (INEGI, 2000)