

Social defragmentation and intergenerational transmission of educational inequalities on young people of Colombia

Desfragmentación social y transmisión intergeneracional de desigualdades educativas en jóvenes colombianos

Desintegração social e transmissão intergeracional das desigualdades educativas entre os jovens colombianos

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Abstract

Introduction: This article is a partial product of the research project "Education and Equality" of the PROCARIBE Research group, within the framework of the line of research called Economics of Education, and addresses the problem of educational inequality in Colombia. This is one of the main challenges for the National Development Plan 2018-2022, focused on peace, equity and education. **Objective:** Identify the challenges in terms of educational inequality that Colombia faces, especially among the young population and considering factors such as the intergenerational transmission of educational inequalities. **Methodology:** the article obeys a research carried out under the analytical empirical paradigm, a quantitative design and a type of explanatory research. The data were obtained from secondary information and collected by the National Department of Statistics, processed from the purification of the database and analyzed by using the Inequality Slope Index. **Results:** The general result indicates that the educational inequality gap between young people from different social strata has increased between 2011 and 2016, and that there is a positive correlation between the years of schooling of parents and their children, which validates the transmission hypothesis. intergenerational educational inequalities. In addition, it was possible to establish that young people who study in private institutions have a higher probability of completing ten years of schooling than those in official schools. **Conclusion:** In short, little progress has been made in terms of social defragmentation and better education can have a positive impact on future generations.

Key words: Educational inequality; Social gap; Intergenerational transmission; Schooling threshold.

Resumen

Introducción: Este artículo, es un producto parcial del proyecto de investigación "Educación e Igualdad" del grupo de Investigaciones PROCARIBE, en el marco de la línea de investigación denominada Economía de la Educación, y aborda el problema de la desigualdad educativa en Colombia. Este es uno de los principales retos para el Plan de Desarrollo Nacional 2018-2022, centrado en la paz, la equidad y la educación. **Objetivo:** Identificar los desafíos en términos de desigualdad educativa que enfrenta Colombia, especialmente entre la población joven y considerando factores como la transmisión intergeneracional de las desigualdades educativas. **Metodología:** el artículo obedece a una investigación realizada bajo el paradigma empírico analítico, un diseño cuantitativo y un tipo de investigación explicativa. Los datos fueron obtenidos a partir de información secundaria y recolectados por el Departamento Nacional de Estadística, procesados a partir de la depuración de la base de datos y analizados mediante el uso del Índice de Pendiente de Desigualdad. **Resultados:** La brecha de desigualdad educativa entre jóvenes de diferentes estratos sociales ha aumentado entre 2011 y 2016, y hay una correlación positiva entre los años de escolaridad de los padres y sus hijos, lo cual valida la hipótesis de la transmisión intergeneracional de las desigualdades educativas. Además, se pudo establecer que los jóvenes que estudian en instituciones privadas tienen una mayor probabilidad de completar diez años de escolaridad, que aquellos en escuelas oficiales. **Conclusión:** En síntesis, poco se ha avanzado en materia de desfragmentación social y una mejor educación puede tener un impacto positivo en las generaciones futuras.

Palabras clave: Desigualdad educativa; Brecha social; Transmisión intergeneracional; Umbral de escolaridad.

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Resumo

Introdução: Este artigo, é um produto parcial do projeto de pesquisa "Educação e Igualdade" do grupo de Pesquisa PROCARIBE, no âmbito da linha de pesquisa denominada Economía da Educação, e aborda o problema da desigualdade educacional na Colômbia. Este é um dos principais desafios do Plano Nacional de Desenvolvimento 2018-2022, centrado na paz, na equidade e na educação. **Objetivo:** identificar os desafios em termos de desigualdade educacional que a Colômbia enfrenta, especialmente entre a população jovem e considerando fatores como a transmissão intergeracional das desigualdades educacionais. **Metodologia:** o artigo baseia-se num paradigma empírico analítico, num desenho quantitativo e num tipo de investigação explicativa. Os dados foram obtidos a partir de informação secundária recolhida pelo Departamento Nacional de Estatística, tratados por depuração da base de dados e analisados com recurso ao Inequality Slope Index. **Resultados:** O fosso da desigualdade educacional entre jovens de diferentes estratos sociais aumentou entre 2011 e 2016, e que existe uma correlação positiva entre os anos de escolaridade dos pais e dos filhos, o que valida a hipótese de transmissão intergeracional das desigualdades educacionais. Além disso, foi possível constatar que os jovens que estudam em instituições privadas têm maior probabilidade de completar dez anos de escolaridade do que os de escolas oficiais. **Conclusão:** Em suma, os progressos registados em termos de desfragmentação social são escassos e uma melhor educação pode ter um impacto positivo nas gerações futuras.

Palavras chave: Desigualdade educacional, brechasocial, transmissão intergeracional, limiar de escolaridade



INTRODUCTION

Inequality is one of the issues that occupies the first places in global debates because it affects a large part of the world. Such is the case of Latin America, where inequality afflicts many of the countries that comprise it, including Colombia, which in 2013 had a Gini Coefficient of 0.5396, a select position. Many scientific papers associate a large part of social inequality - and poverty - to educational inequalities through poverty traps. For this reason, inequality has been one of the main problems to be addressed with economic and social policy; not in vain its opposite, equity, is part of the three pillars on which the National Development Plan 2014-2018 "All for a new country: Peace, Equity and Education" and the National Development Plan 2018-2022 "Pact for Colombia: Pact for Equity" are based. And in the most recent National Development Plan 2022 -2026 "Colombia world power of life". As can be seen in the above, in the three recent national development plans, education is also an issue of concern to governments both in terms of coverage and quality.

In relation to the above, it can be said that there are inequalities of many kinds. This paper deals with the study of educational inequality among young people, the consequences of the transfer of these inequalities to the next generations and of social inequalities.

Due to the relevance of these issues, Equality and Education, this paper presents a research related to both topics, where the purpose is: to identify the challenges in terms of educational inequality faced by Colombia from its regions, especially among the young population and considering factors such as the intergenerational transmission of educational inequalities.

In recent years, educational inequality indicators show that the youth population has improved its level of access to education, mainly due to the Colombian government's responsibility to comply with the Millennium Development Goals. This has resulted among others from the implementation of programs such as "De 0 a siempre", "Ser pilo paga", "Jóvenes en acción", "Todos a aprender", "Generación E", Colfuturo's scholarships for teachers and the implementation of single working days in official educational institutions (Presidencia de la República, 2015).

According to the Education Sector Plan (2010-2014), its primary purpose was to ensure that by 2016 education would be a fulfilled right for the entire population and a quality public good, guaranteed under conditions of equity and social inclusion by the State, with the co-responsible participation of society and the family in the education system (Rubio et al., 2014).

This condition of poverty from the approach of this research is based on the lack of equal opportunities, in this case, access to education (Cueto et al., 2019).

Considering the above, it can be said that there are still educational and other gaps at the interregional level that need to be bridged to make Colombia the most educated country in the world.

These two aspects, education and poverty, are important in that they pose a vicious relationship between poverty and education that leads to poverty traps, which can be solved through education.



In this sense, and considering that UNESCO establishes a threshold of 10 years of schooling for the transmission of educational inequalities and the synergy that conditions poverty traps, it is relevant to analyze access to schooling for young people.

In this work, the objective is to unveil the main persistent educational inequality gaps in some regions of Colombia, which will allow the identification of the factors that perpetuate these inequalities in future generations.

Methodologically, the article responds to an approach under the analytical empirical paradigm, a level of non-experimental explanatory research; as for the sources of information, secondary information obtained from the statistics of the National Department of Statistics (DANE) and ICFES was used. The main indicator used was the Inequality Slope Index constructed from a quantile regression applied mainly for the five main cities of the country.

FRAME OF REFERENCE

The literature on educational inequality relevant to the focus of this article has its genesis in the classics of the economics of education, such as Adam Smith (Olivares, 2022); according to him, in his position on the entrepreneur: inequality in the dimension of human capital theory, is initially manifested by the difference between the common worker and the entrepreneur; however, the emphasis on such inequality becomes more evident in Schumpeter when he conceives the innovative entrepreneur (Solis & Romero, 2021), who is the bearer of a higher level of qualification or because he is the bearer of a higher human capital, therefore a higher income.

In this position, the inequality of human capital and its effect on income is later developed by Galbraith, Kizner, Knight, Becker, Schultz (cited by Quintero, 2020) and is highlighted later when Friedman (1982) develops his totalizing theory on human capital in the "Theory of Prices".

The human capital theory is considered to be the beginning of the creation of various theories that would study educational inequalities, beyond income. Within these new theories we can consider the "segmentation theory" (Gómez, 1982), which studies inequalities from the perspective of social classes, opportunities for access to education and race, and their effects on the different segments of the labor market.

On the other hand, in addressing the issue of equality are the "Radical Theories" (Carrasco 2023), which establish the basic principles of equality of conditions. These principles apply to the four main problems of equality in education, and suggest that equality in education can only be achieved if we recognize the deeply integrated relationship that exists between education and the economic, political, socio-cultural and affective systems in society. Within this theory is the focus on the reproduction or transmission of inequalities in contexts of social segregation, which coincides with the results of the "Coleman report" in relation to social segregation (Coleman et al., 1966).

This approach, that of the transmission of educational inequalities, which is one of the pillars on which this research is based, considers that the empirical evidence does not prove the meritocratic hypothesis (different talents) or the distributive hypothesis (different resources), and postulates that the hierarchization that educational systems make of individual performance is based on criteria that systematically privilege the dominant social classes. In other words, educational inequality, which in the case of this research depends on the cultural capital or inheritance of the parents.

There are also alternative approaches, whose function is to interrelate variables in order to give a logical explanation to the educational process, for example, these approaches are reflected in the "queue model (Formichella & London, 2013)" which states that employers will "rank" workers according to certain characteristics, mainly the level of education. The most educated workers would be first in a queue and would be preferred.

The "Hypothesis of the hidden selection procedure" (Formichella & London, 2013): indicates that, in the absence of complete and perfect information, when it comes to knowing the productivity of job applicants, the academic level achieved by individuals is an effective way of detecting the most qualified workers.

From the above, we can deduce different aspects of educational inequality, which can be summarized as follows: the first is inequality in access; second, inequality in permanence, which is based on educational effectiveness or success; third, inequality in learning, which is related to efficiency; and finally, inequality of opportunities in the labor market, which is related to efficiency. This research will address the approach to inequality in permanence, focusing on inequality coefficients.

Within these different educational theories, we have decided to work from the perspective of educational development in two dimensions: one is the theory of human capital, which establishes that the educational level of young people depends to a great extent on the human capital or cultural capital of their parents, and the other is the radical approach of the intergenerational transmission of educational inequalities.

METHODOLOGY

Research approach and type of research

In relation to the approach, this research is covered by the analytical empirical paradigm, because its object of study, educational schooling, is an objectifiable, predictable and experiential phenomenon; it is also measurable or easily measurable, that is why it is a research with a quantitative design, and not experimental to the extent that not all the conditions of this socio-educational reality could be controlled.

Finally, it can be said that the scope of the research is explanatory, to the extent that it seeks to establish the driving factors of young people's schooling but also the limitations imposed by the context.



Population, sample and unit of analysis

The population universe used in the study was all young people and their parents or guardians, and the study population represented by the residents of the five cities currently most outstanding in terms of economic and social development (Bogota, Medellin, Cali, Barranquilla and Bucaramanga) of the Republic of Colombia. In order to be consistent with the study, those persons between 18 and 24 years of age were chosen. The accompanying adults had to be over 25 years of age.

Type of research

Given the nature of the problem, the object of study requires a transversal research, since two moments in time were compared, in this case the year 2011 and 2016. The data are quantitative; the variables to be considered are (see Table 1):

Tabla 1

Variables utilizadas en la investigación

Variables	Descripción
Variable dependiente Años escolaridad 18 a 24	Indica cuantos años de estudio lleva un joven de 18 a 24 años, incluyendo el hecho de que haya cursado uno o más grados
Variables independientes Años escolaridad +25	Indica cuantos años de estudio lleva en promedio los padres o el acudiente responsable que vive con al menos un joven en su hogar.

Nota: Información obtenida de Pereyra (s.f.).

The level of deepening of the object of study, in this case, is of an explanatory nature, since the causes and consequences that cause this phenomenon, in this case, educational inequalities, are explored.

Data collection techniques and instruments

The data obtained come from the Ministry of Education (MEN) databases, in collaboration with the annual sociodemographic survey conducted by ICFES, to determine the current situation of young people taking the SABER tests for the different levels of study established in Colombia.

In the case of adults' years of schooling, these are averaged, generally between the years of schooling of the mother and father, or of the guardians or persons in charge of the household where the young person lives. The databases used correspond to the first semester of 2011 and the first semester of 2016. Both databases contain the cities mentioned above.

Organization and systematization of information

A systematic random sampling was used to select the population. In this case, the following formula was used to calculate the representative sample:



$$n = \frac{z^2 (pq)}{e^2 + \frac{z^2 (pq)}{N}}$$

Where "z" is the confidence level (95%), "p" and "q" the success or failure of the proportion of the population with the desired characteristic, respectively, and "e" the level of error willing to commit (3%). In this way we were able to calculate the amount of data for each city; remember that the population density in these cities is different and therefore the samples vary from one to another (see Table 2).

Tabla 2.

Tamaño muestral de las ciudades cabeceras en años 2011 y 2016

CIUDAD Y AÑO	TOTAL
Barranquilla 2016	1019
Barranquilla 2011	936
Bogotá 2016	5696
Bogotá 2011	5545
Bucaramanga 2016	1411
Bucaramanga 2011	1365
Cali 2016	2422
Cali 2011	2228
Medellín 2016	1005
Medellín 2011	961
total 2016	11553
total 2011	11035

Nota: (MEN, 2022)

In total, 11,553 data were used for the 2016 analysis and 11,035 for 2011. The reference group chosen for obviousness is the urban category.

RESULTS

The most important results of the research are presented below, organized in three sections: the first presents descriptive findings on the degree of unschooling of young people in five cities in Colombia; the second, seeks to relate the degree of schooling of young people with that of their parents in order to demonstrate a possible relationship of association; finally, an econometric model is used that accounts for the behavior of inequality gaps between 2011 and 2016, by using the inequality slope index.

It is necessary to highlight that these dates 2011 to 2016, cover the course of the Ten-Year Education Plan, therefore, it serves as a baseline to evaluate, in the future, the results of the educational policies of the following Ten-Year Plan 2016 - 2025.



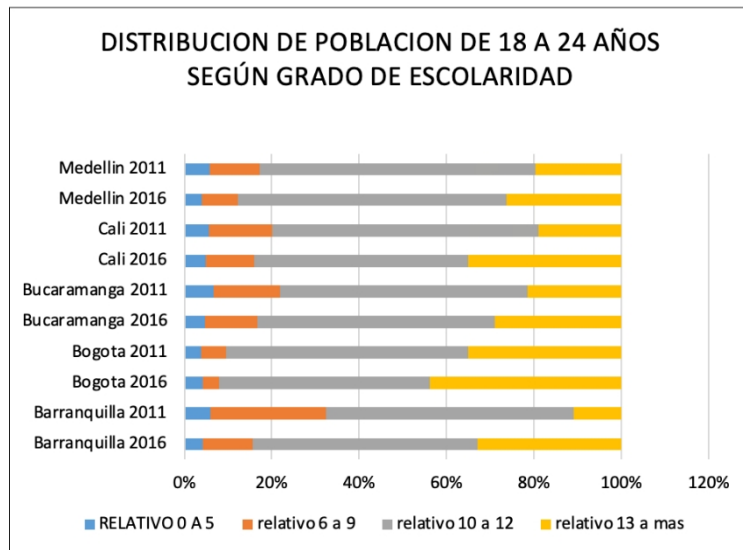
Young people under 10 years of age

This section presents the composition of the schooling structure of the general population in relation to the young population. In this way, it is specified what percentage of the young population exceeds the threshold of 10 years of schooling.

Figure 1 shows the level of education of young people aged 18 to 24 in five main cities in Colombia, in two different periods: 2011 and 2016.

Figura 1.

Distribución de la población de 18 a 24 años según años de escolaridad. Total del país 2011- 2016.



Fuente: (MEN, 2022)

As shown in Figure 1, in 2011, the largest range of schooling among young people was between 10 and 12 years of age, followed by 13 and over. However, given the final objective of the article it is convenient to examine the range of less than 10 years of schooling.

In this sense, most of the young population of the main Colombian cities, which did not exceed the threshold of 10 years of schooling, were Barranquilla and Bucaramanga (33% and 17% respectively); the best balance in schooling was presented by Bogotá, which presented 33% of its population above 13 years of schooling, a figure well above the other cities (Bucaramanga 22%, Medellin 20%, Cali 19%, Barranquilla 11%).

During 2016, the panorama changed substantially: the city of Barranquilla was the most benefited in its performance, lowering its gap of young people with less than 10 years of schooling from 33% to 17%; Bogotá and Medellin maintained a slight decrease.

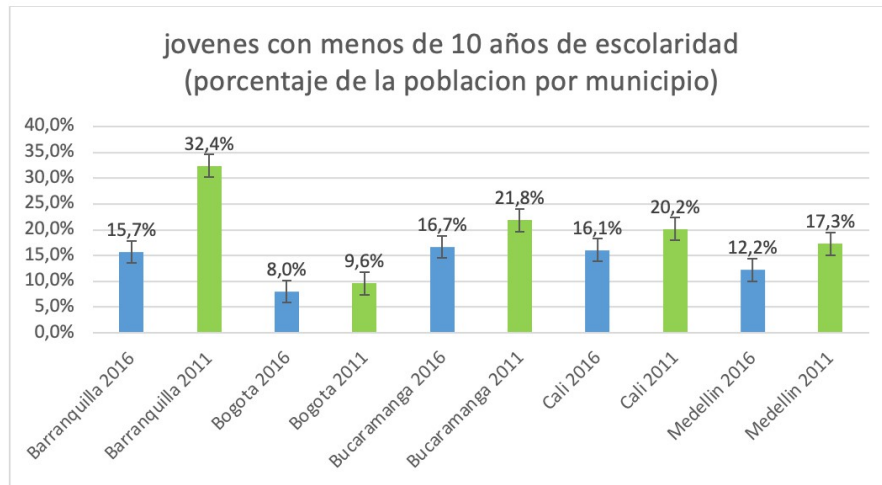
Given that Barranquilla and Bucaramanga decreased the population with low school dropout rates more rapidly than Bogotá and Medellin, the level of schooling in this period is more equitable or the inequality gap between the different cities of Colombia has been reduced.



Figure 2 shows the percentage of the population of young people below the threshold of 10 years of schooling, in each head city and in the reference periods (2011- 2016).

Figura 2.

Porcentaje de jóvenes de 18 a 24 años con menos de 10 años de escolaridad según área geográfica y brechas rural /urbano. 2011 2016



Fuente: (MEN, 2022)

During 2011, Bogota and Medellin showed one of the best figures for the lowest population of out-of-school youth among the five reference cities. In contrast, in 2011 Barranquilla and Bucaramanga fared the worst in terms of the size of their education gap, considering their low schooling as measured by the percentage of youth with less than 10 years of schooling.

For 2016 the situation does not change, although Cali manages to decrease the gap, it is almost at the same level of Bucaramanga (17%), which, in turn, showed the least progress in its educational development of the other cities, after 5 years, the opposite was evidenced for Bogota which showed the lowest percentage of young people below the threshold of 10 years of schooling (8%).

The fact that at the arrival of 2016 there are fewer young people below the threshold of 10 years of schooling and that the situation of each city analyzed has a positive performance, more equitable in terms of social defragmentation, has positive consequences on social cohesion according to the objectives and goals of the Colombian government's Education Sector Plan.

The relationship of schooling between youth and adults

In Table 3, we compare the evolution of the average years of schooling of young people with the average number of years of education that people over 25 and living with at least one young person have, between the years 2011 and 2016.

The table shows that:

The more years of schooling the parents of the young people have, the higher the grade their children attain (as long as the poverty trap threshold is exceeded), and as time goes by these differences diminish at a general level, which means that there is a high correlation between the years studied by the young people and their parents. Thus, it is shown that surpassing the threshold of ten years of schooling has an expansive effect on the schooling of the next generations (Pereyra, n.d.).

Tabla 3

Promedio de años de escolarización de los jóvenes de 18 a 24 en función de la población de 25 años y más que reside en hogares con al menos un joven según área geográfica. 2011 – 2016

CIUDAD	2011			2016		
	25 +	18 A 24	DIFERENCIA*	25 +	18 A 24	DIFERENCIA*
BARRANQUILLA	10	10,63	+0.63	12.36	12.22	-0.14
BOGOTÁ	11.23	12.29	+1.06	12.86	12.44	-0.42
BUCARAMANGA	10.21	11.15	+0.94	10.22	11.13	+0.91
CALI	9.96	11.06	+1.1	12.37	11.88	-0.49
MEDELLÍN	9.73	10.92	+1.19	10.75	11.35	-0.6

Fuente: (MEN, 2022)

From Table 3, it can be inferred that, in 2011, Barranquilla was one of the cities with the smallest difference in terms of schooling between young people and adults, followed by Bucaramanga; it can also be observed that Medellin and Bogota showed larger differences, despite their great efforts in the formulation of educational policy strategies to increase access.

Finally, it can be said that when the average age of parents reaches or exceeds ten years of schooling, it is most likely that the next generation will surpass their parents' years of schooling.

By 2016, i.e. after a five-year period, the years of schooling of young people increased with the exception of Bucaramanga; i.e. an increase in the schooling of the young population of the main urban centers of Colombia can be seen.

It is also observed that the years of schooling of people over 25 years of age increased in all cases.

As a final result for 2016, the differences between the average ages of youth and adults were negative for all urban centers except Bucaramanga. This means that young people did not manage to surpass the average schooling of adults.

This can be interpreted in two ways: in the five-year period under analysis, those over 25 years of age surpassed the previous generation, or else, the young generation did not grow as much as the older generation in terms of schooling.

sufficient with respect to the previous ones (Pereyra. n.d.). In this sense, it can be hypothesized that the poverty trap threshold in 2016, established by Unesco at 10 years of schooling, would be a hypothesis to demonstrate in a subsequent investigation and escapes the objectives of this article.

Another more substantial reading that can be made from the above is that, as the intergenerational gaps in schooling between young people and adults decrease, this dynamic shows a marginally decreasing increase in schooling. This is on the understanding that the increase of one year of schooling for parents would represent a less than proportional increase in the schooling of their children.

All this leads to the conclusion that:

- The increase in years of education of young people depends on the years of schooling attained by adults, considering a threshold of 10 years of schooling established by UNESCO (2005), but with some caveats in rural contexts.
- Despite the negative average differences between adults and young people, in some situations, the phenomenon does not diverge in the fact that, as one moves from one previous period to the next, the level of schooling continues to increase or maintains a positive difference, as is the case in the city of Bucaramanga.

Intergenerational transmission

Up to this point, we have analyzed how many young people are under the threshold of ten years of schooling and the average number of years of schooling attained by them, in terms of the average number of years of schooling of adults over 25 years of age (taken as a proxy for their parents). The question now arises:

Who were the young people who benefited the most or, if the existing differences in schooling were maintained, and, furthermore, if this process of convergence or divergence was homogeneous in the different cities taken as a reference in the country?

Figure 3 presents the average number of years of schooling of young people, divided according to the quintile of schooling to which those over 25 years of age, who live with at least one young person, belong. This figure presents a synthetic indicator called **the inequality slope index**, which, according to Pereyra (n.d.), is the slope of the regression line, and expresses how much the years of schooling of young people increase in absolute terms as they move from one quintile of adult schooling to the next.

This indicator can be used to argue the hypothesis of intergenerational transmission of educational inequalities. This hypothesis asserts that education systems have an equity threshold that becomes a limiting factor in the progress of young people's schooling, making it difficult for them to surpass the educational level of their parents.

According to UNESCO, in its study "The intergenerational transmission of educational inequalities" (Pereyra, n.d.), it establishes ten years of schooling as the threshold. In this sense, the probability that a student has of passing the educational level is greater when the student (the father) has more than ten years of schooling.



For the case that concerns this research, the DPI is calculated as follows:

Where g_i are the quintiles constructed according to the years of study of the population aged 25 and over.

eg: \bar{g}_i is the average number of years of study of young people in each quintile,

$Cov(g_i, \bar{g}_i)$: is the covariance between the educational ranking of adults and the years of study attained by young people,

$Var(g_i)$: is the variance of the educational ranking of adults,

\bar{g} : is the average of the ranking of the educational quintiles.

\bar{g}_y : is the average schooling rate of young people

The interpretation of this IPD indicator shows that the steeper the slope, the greater the educational inequality between young people and the years of study of the adults with whom they live, who are generally their parents; if it decreases, it means that inequality in terms of schooling also decreases.

In the article, the IPD during the five-year period 2011 - 2016 is expected to increase; this confirms that during the period young people obtained a higher degree of schooling than their parents, as is to be expected from the perspective of the theory of educational progress. In this case, there would be no transmission of educational inequalities between generations.

There are other applications of the concept of intergenerational transmission of inequalities, which is applied to the effects of labor dynamics, and is a measure of social mobility (Fachelli, 2020). Thus, once a threshold is crossed, a cycle of educational progress is projected in which greater labor mobility and social climbing is achieved.

Econometric model

Based on the construction of the econometric models for the different cities considered in this study for the years 2011 and 2016, Table 4 is prepared, from which the following can be inferred:

- All variables were significant at 99%, so the results of the coefficients, which represent the IPD index, are very reliable.
- The R^2 is at acceptable levels and is in a range between 44 and 80, which indicates that the variables considered in the model largely explain the variance of the IPD.
- The level of the coefficients, which measure the IPD, show an increase between 2011 and 2016 in all cases. This suggests that the slope of the regression line increased between the years considered and, therefore, *the educational progress measured by the higher level of schooling of the new generations with respect to their parents during the five-year reference period has improved.*



- It can also be deduced from the results of the regression elasticities presented by the IPD, that the schooling threshold in Colombia for the transmission of educational inequalities as of 2016 exceeded 12 years of schooling and that established by UNESCO, which was 10 years.

Tabla 4.

Resumen de Modelos Econométricos

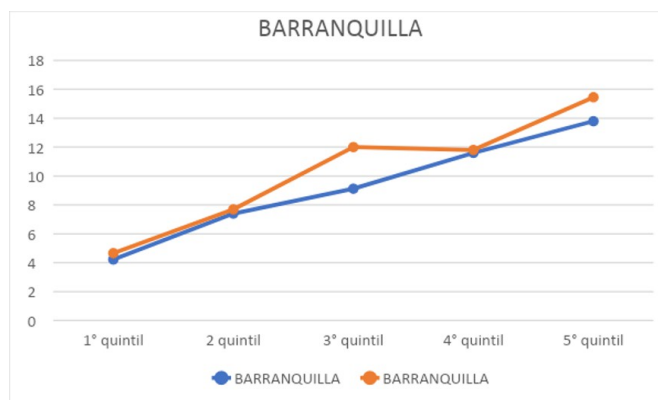
Method: Least Squares				
Variable	Coefficient	Adjusted R-squared	t-Statistic	Prob.
Barranquilla 2011	0.932377	0.523346	173.9911	0,001
Barranquilla 2016	1.022836	0.780993	215.7867	0,001
Bogotá 2011	0.920519	0.445504	263.0121	0,001
Bogotá 2016	1.049526	0.699229	405.6334	0,001
Bucaramanga 2011	0.916185	0.503318	151.2221	0,001
Bucaramanga 2016	0.937581	0.521116	130.0531	0,001
Cali 2011	0.908967	0.487515	183.2241	0,001
Cali 2016	1.053175	0.743015	295.0761	0,001
Medellín 2011	0.884337	0.474304	166.3369	0,001
Medellín 2016	0.965873	0.509168	106.2447	0,001

Fuente: (MEN, 2022).

In the case of Barranquilla, considering what is presented in Figure 3, the IPD went from 0.93 to 1.02, i.e. it becomes steeper or more elastic, which means that a change in the schooling of adults (proxy of parents) represented a greater marginal change in the average schooling achieved by young people: in 2011 it was from 1 to 0.93, while in 2016 it was from 1 to 1.02 (see graph presented below).

Figure 3.

Linear regression between years of schooling of 18 to 24 year-olds and years of schooling of adults over 18 years of age. Barranquilla 2011 and 2016.



IPD 2011	0.932377
IPD 2016	1.022836

Fuente: Encuesta anual socioeconómica. (MEN, 2022).

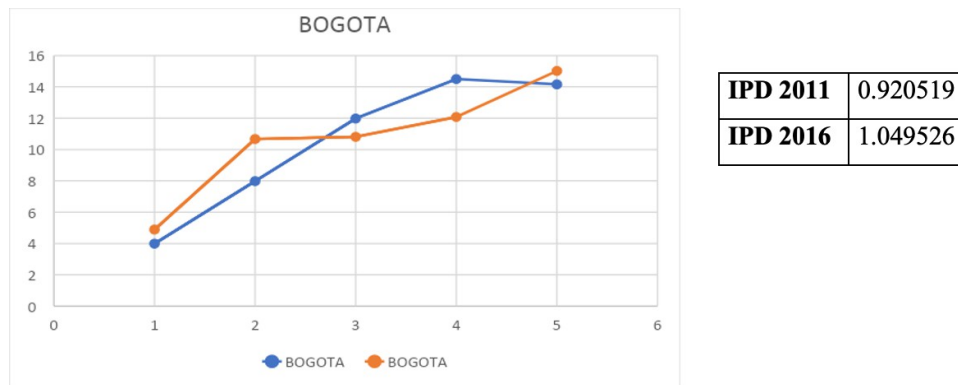
As can be inferred from the above, this change was qualitative, since it went from a decreasing relationship in 2011 to one of increasing returns to schooling, which means that in the five-year period 2011-2016, the threshold of intergenerational transmission of educational inequalities in terms of access to schooling was surpassed in Barranquilla.

Another appreciation of educational inequality in Barranquilla is present in the graph when looking at the results by schooling quintiles. The population groups where the inequality gap widens are those in the third and fifth quintiles.

In Bogota, as shown in Figure 4, the IPD increases in the reference period (2011-2016) going from 0.92 to 1.04 and, therefore, there is evidence of a marginal increase in schooling in young people with respect to adults (proxy of their parents), and with this it is confirmed that they exceed the schooling trap threshold and young people are surpassing the educational level of their parents.

Figure 4.

Linear regression between years of schooling of 18 to 24 year-olds and years of schooling of adults over 18 years of age. Bogotá 2011 and 2016.



Fuente: Encuesta anual socioeconómica. (MEN, 2022).

The steepest slope is seen in quintiles 1 and 2, which means that the defragmentation in the intergenerational transmission of inequality in schooling is seen in younger age quintiles among adults.

This means that the gap in the IPD can be interpreted as meaning that the increase in the prosperity of younger parents (represented in quintiles 1 and 2) has meant a marginal growth, of greater magnitude, in the schooling of young people.

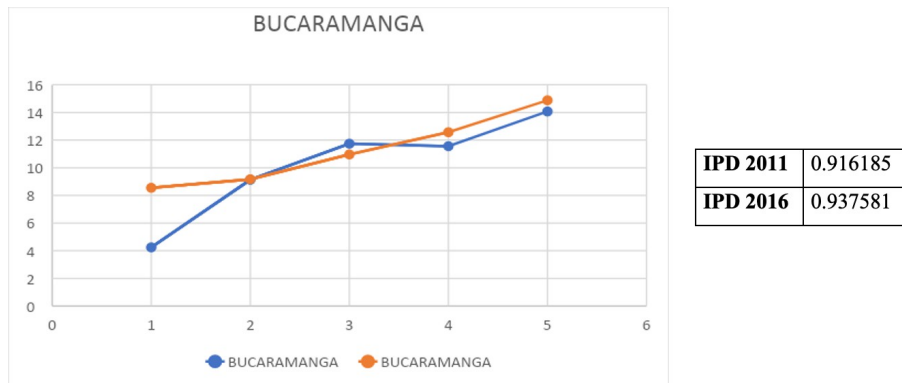
The IPD in Bucaramanga, presented in Figure 5, shows a slight increase between 2011 and 2016, which signifies a subtle improvement in schooling performance mainly with respect to the first schooling quintile of adults. But it is also observed that the index is less than one (1), which means that in that city the threshold of intergenerational transmission of inequality in schooling has not been reached.

This means that, in Bucaramanga, an increase in parents' schooling has a marginally smaller effect on the increase in children's schooling.



Figure 5.

Linear regression between years of schooling of 18 to 24 year-olds and years of schooling of adults over 18 years of age. Bucaramanga 2011 and 2016.

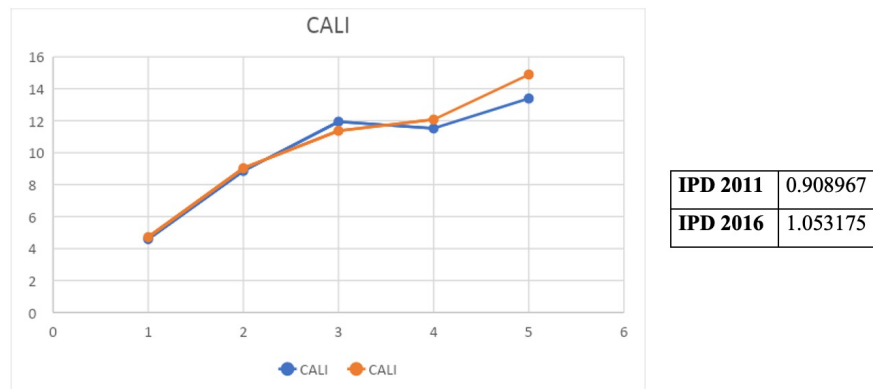


Fuente: Encuesta anual socioeconómica. (MEN, 2022).

For Cali, the IPD presented a qualitative leap in terms of intergenerational transmission of educational inequalities, at least in schooling, it is more than a mere educational transition (Tarabini, 2020), as shown in Figure 6.

Figure 6.

Linear regression between years of schooling of 18 to 24 year-olds and years of schooling of adults over 18 years of age. Cali 2011 and 2016.



Fuente: Encuesta anual socioeconómica. (MEN, 2022).

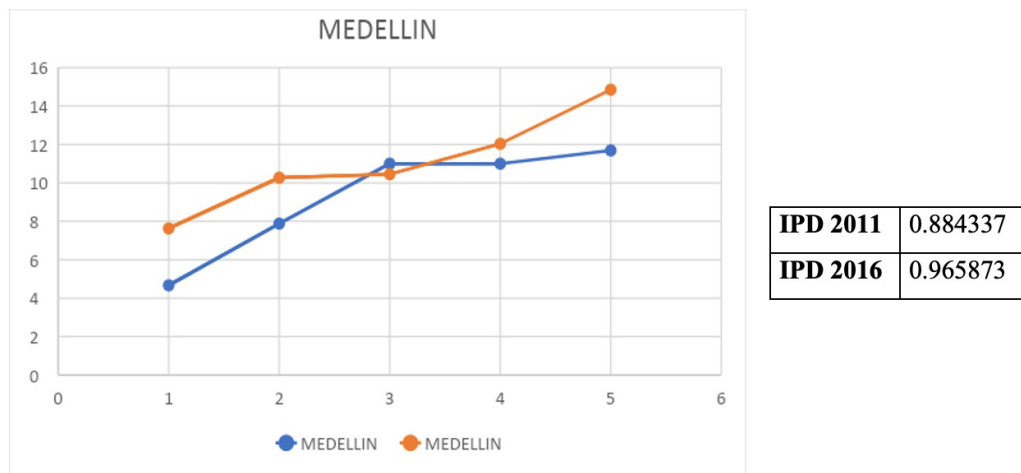
The IPD in 2016 was higher than in 2011 (1.05 versus 0.91), which represents the overcoming of the threshold that slows the momentum of schooling, (which remember is estimated at the 12th year of schooling). Quintile 5 is the quintile that shows the best performance in schooling, which reverses the 2011 trend, as can be seen in the following illustration.

Figure 7 shows the case of Medellin, where the behavior of the IPD was higher in 2016 than in 2011 indicating that the marginal growth in the schooling of young people increased with respect to that of 2011. However, given that said indicator did not exceed the value of one (1) in the last year, an increase in the average schooling of parents will have a proportionally lower growth in the schooling of young people.



Figure 7.

Linear regression between years of schooling of 18 to 24 year-olds and years of schooling of adults over 18 years of age. Medellín 2011 and 2016.



Fuente: Encuesta anual socioeconómica. (MEN, 2022).

DISCUSSION

By comparing the findings presented in the results with the state of the art, it is possible to highlight that the hypothesis of intergenerational transmission of educational inequalities is validated for the four most important cities in Colombia. In this sense, points of convergence were found with Pereyra's research (s.f).

In another sense, it can be said that no evidence was found of the greater influence of the father's education than that of the mother on the schooling of their children, as was the case in Gaviria's study (2006).

Unlike in the United States and Europe, in Colombia, as in the rest of Latin America, there is evidence of a greater influence of education on social mobility (Gaviria 2006).

The empirical evidence, based on MEN data, indicates that unlike the UNESCO (2005), UNDP (2000 and 2010) and ECLAC (2004) studies, which establish the poverty trap threshold at ten years of schooling, in the case of Colombia it exceeds 12 years, according to the present study.

Regarding the educational intergenerational inequality gaps, in all urban centers considered and therefore at the national level, they have increased favorably between the five-year reference period (2011-2016), as is the case in the Latin American context.

On the other hand, this article is novel in the sense that there is no previous documentation on the use of the slope of inequality index (IPD) for the case of intergenerational mobility in Colombia.



CONCLUSIONS

From the analysis of the descriptive part it can be highlighted that, with reference to the Unesco report on the threshold of 10 years of schooling as a condition to break the schooling and poverty trap, it is concluded that the data analyzed that, Barranquilla was the city that gained the most in terms of schooling given that between 2011 and 2016, the schooling gap among young people dropped from 33% to 17%; while in Bogota it remained constant and the other cities there were no significant changes either.

Continuing with the descriptive results, it can be seen that in all the cities considered in this study, in relation to the intergenerational transmission of educational inequalities and specifically of school dropout, the more years of schooling the parents had, the higher the grade their children reached, and as time goes by, these differences diminish at the general level, which means that there is a high positive correlation between the years studied by the young people and their parents.

It has also been shown that exceeding the threshold of ten years of schooling had an expansive effect on the schooling of the next generations, in certain contexts. This situation has changed in the last five years, when perhaps due to the impact of ICTs (Guimaraes, 2022) and digital illiteracy, the threshold has risen above 12 years.

In general terms, we can conclude the increase in the IPD in all urban centers during the five-year period 2011-2016, which indicates that the schooling levels of young people have improved; it was also found that only Medellin and Bucaramanga failed to reach the threshold of 10 years of schooling, which would allow them to break the cycle of reproduction of the intergenerational transmission of inequalities in schooling.

The city that achieved the best performance in terms of IPD during the five-year period was Cali, followed by Bogota, and Barranquilla; in all of them the threshold of transmission of educational inequalities was surpassed and any increase in the education of these generations will have a relative increase in the level of schooling of the next generations.

In short, little progress has been made in terms of social defragmentation and better education can have a positive impact on future generations.

Pending tasks for other research include an analysis of the intergenerational transmission of educational inequalities considering the variables of gender, ethnicity, social strata or income level, especially in rural areas; likewise, this analysis can be deepened by addressing other types of inequality gaps in access, with other statistical tools, which have been little considered in the documentary sources. However, it is fundamentally necessary to carry out studies on quality gaps, about which only one study is known since COVID-19 (Ballesteros-Alfonso & Gómez-Velasco, 2022).

Conflicts of interest

The authors declare the non-existence of possible conflicts of interest that may arise in relation to the article submitted for publication and that may involve third parties.



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