Short abstract

This paper examines whether internal migration affects the educational trajectories of students in Brazil, given the high educational, social, and regional inequalities. We approach this question from three specific angles: (1) Selection: Is migration selective in terms of educational trajectory in the municipalities of origin?; (2) Assimilation or segregation: Are young migrants more (or less) prone to failure along educational trajectories in destination municipalities?; and (3) Education gain or education drain: After migration, do migrants improve their educational trajectories compared to their former schoolmates who stayed in the municipalities of origin? From the INEP Longitudinal Database, 2,934,859 students were selected from 2008 to 2019 who were enrolled in regular education and were six or seven years old on March 31, 2008. We follow the migrant students (426,576) belonging to 5,570 cohorts from each municipality and compare them with the non-migrant counterparts (2,047,702), both in origin and destination, before and after the migration. We use a sequence analysis technique, and map eight trajectory typologies, as well as origin and destination migration flows. The comprehensive approach of this study reveals the diverse and nuanced educational situations that could inform the development of more context-specific educational policies for a population on the move.

Extended Abstract

Title: SPATIAL NETWORK OF INTERNAL MIGRATION AND EDUCATIONAL TRAJECTORIES IN BRAZIL, 2008-2019

The topic and theoretical focus

The study of the relationship between migration and educational trajectories, with a particular focus on the experiences of children of internal migrants, is a relatively under-researched area, in part because of limitations in the availability of population censuses and surveys (the primary sources for studying internal migration) in low- and middle-income countries (*1-3*). In most cases, migration has been shown to have a negative impact on school performance (*4-7*).

The educational conditions of migrant youth in high-income countries have been of critical importance to policymakers and international organizations. However, our understanding of the relationship between migrant youth and education in middle-income countries is limited. Our goal is to fill this knowledge gap by examining whether internal migration affects the educational trajectories of students in contemporary Brazil, given its high educational, social, and regional inequalities. We approach this question from three specific angles:

1) Selection: Is migration selective in terms of educational trajectory in the municipalities of origin?
2) Assimilation or segregation: Are young migrants more (or less) prone to failure along educational trajectories in destination municipalities?
3) Education gain or education drain: After migration, do migrants improve their educational trajectories compared to their former schoolmates who stayed in the municipalities of origin?

The literature has shown that countries with more educated populations were less positively selected (likely a ceiling effect) and vice versa, suggesting that migrants from lower-income countries are more motivated and have sufficient resources (*8*). Within countries, the costs of migration may be lower than migrating to another country, but there is also evidence of positive selection in the sending areas (*9*).

Although the educational level of migrants may influence segregation or assimilation in the host regions, the relationship is complex and varies by context. More educated migrants may perceive more discrimination and less respect for minorities (*10*), but also higher socioeconomic status may also promote integration or reduce segregation (*11*). Furthermore, high levels of social inequality may also be a factor in the segregation of schools for migrants in the host regions, as in Latin American countries (*12*).

Individual and macro characteristics explain most of the differences in educational attainment between similar groups of countries. However, these differences are also influenced by the characteristics of the education system in both the sending and receiving areas, as well as by the average level of educational attainment in the origin (*12*). The complex interactions among family socioeconomic background, geographic context, and school systems may have implications for sustainable human development in both sending and receiving regions.

In general, immigrants have a higher level of education than the average of their sending community (*9*), i.e., a positive selection (*13*) – the so-called “brain drain”. However, the issue of brain drain has gained attention in recent years as a dynamic and evolving phenomenon, giving rise to a more complex situation known as “brain circulation”. From a cohort perspective, however, even a brain drain can be a gain if the migrants are better off in the new destination. To the best of our knowledge, no studies have been conducted on the phenomenon of brain gain for young migrants living in poor and middle-income countries. Given our focus on the educational performance of cohorts of migrant children in Brazil, we will refer to this condition as "educational gain". Conversely, if students in a new school are worse off than their former peers, we will refer to this situation as "educational drain". Thus, the concepts of educational gain and educational drain aim to encompass the contexts of origin and destination that are linked by the educational trajectories of young migrant cohorts, before and after their move.

Data

The INEP (Anísio Teixeira National Institute of Educational Research - *Instituto Nacional de Pesquisas Educacionais Anísio Teixeira*) is responsible for collecting data from all Brazilian schools and students. To follow students longitudinally, the censuses were treated by INEP in four main stages: (1) deduplication of records; (2) standardization of the variables and categories collected; (3) treatment of inconsistent cases; and (4) imputation of values. In this paper, the data cover students' academic trajectories, including promotion, repetition, dropout, re-entry, and school transfers over a 12-year period (2008-2019).

From the INEP Longitudinal Database (ILDB), a total of 2,934,859 students were selected who were alive between 2008 and 2019, who were in the second grade of primary school in the regular education system, and who were six or seven years old on March 31, 2008, i.e. the data cover enough time to follow a cohort through the whole of basic education. This study follows the first movement of migrant students (426,576)[1] belonging to 5,570 cohorts from each municipality and compares them with their non-migrant counterparts (2,047,702), both in origin and destination, before and after the migratory movement. Non-migrants are those who never changed the municipality in which they started their studies in 2008 (although changes within the same municipality are possible), otherwise they form the migrant group. The ratio of the average years of schooling completed by migrants to non-migrants

[1] Given the considerable size and complexity of migration matrices and grade transition per year, it would be impractical to attempt to accommodate all potential migrations. Consequently, we have elected to focus our analysis on the initial migration.

provides a single indicator for assessing the relative academic trajectories of the cohorts in each municipality, both before and after the first migration.

Research methods

To address the cohort grade transitions by year in relation to annual municipal migration from 2008 to 2019, a sequence analysis technique (*14*) was employed due to the complex temporal and spatial ordering of both phenomena (*15*). We construct a comprehensive measure of migration and grade transitions, identifying sequences of consecutive promotions for each individual, corresponding to the number of grades successfully completed by a regular student (concluded years of schooling). The mean years of schooling completed (MYS) is the proportion of the municipality cohort that has successfully completed grades in successive years.

The timing of the migration and the origins and destinations are taken into account to measure the trajectories of migration-to-education, in line with the theoretical review. The combination of three indicators allows the classification of the cohorts. Table 1 provides an overview of the eight possible migration-to-education trajectories. The origin indicator (id_Origin) represents the ratio between the years of study of future outmigrants prior to migration and the non-migrant cohorts up to that point. The destination columns refer to comparisons between migrant and non-migrant cohorts after the migration. The column "id_Destination1" compares migrants with non-migrants who have ever lived in the destination municipalities (new peers), while the column "id_Destination2" compares the situation of migrants with non-migrants who have ever lived in the municipalities of origin (former peers).

Table 1 – Cohorts Typology according to educational achievement before and after migration

id_Origin	id_Destination1	id_Destination2	Typology	Trajectory
>= 1	>= 1	>= 1	1	Advantaged
< 1	>= 1	>= 1	2	Education gain
< 1	>= 1	< 1	3	Assimilation
< 1	< 1	>= 1	4	Segregation with circulation gain
>= 1	>= 1	< 1	5	Assimilation with circulation drain
>= 1	< 1	>= 1	6	Segregation
>= 1	< 1	< 1	7	Education drain
< 1	< 1	< 1	8	Vulnerable

Source: elaborated by the authors.

An example is provided to illustrate the methodology:

Advantaged and Vulnerable students: Typologies 1 and 8 represent two opposite trajectories, advantaged and vulnerable students, respectively. In the first category, migrants outperform both their native peers before migration and their new peers in the destination municipalities after migration. Furthermore, they continue to outperform their former peers who remained in their original municipalities. In typology 8, migrants show a comparative disadvantage with respect to both their native counterparts before migration and their new peers in the destination municipalities after migration, as well as their former peers who have remained in their municipalities of origin. The other typologies follow the same reasoning.

To identify and assess the impact of migration on education, we map the eight typologies and the migratory flows of origin and destination.

Preliminary findings

The literature on the impact of migration on education reveals a spectrum of outcomes, depending on the context under consideration and the characteristics of the individuals. A number of studies have shown that migration has a negative impact on academic performance (7-10). In addition, international research supports evidence of a positive selection in poor countries (*8*). However, our preliminary data show that the Brazilian internal migration challenges a general global pattern.

Table 2 – Typology of cohorts' educational trajectories by number of out-migrants, municipalities of origin and origin x destination flows

Typology		Outmigrants	Outmigrants (%)	Origins	Flows from origin
1	Advantaged	29,343	6.9	581	8,810
2	Education gain	169,486	39.8	1,194	44,138
3	Assimilation	11,156	2.6	176	3,795
4	Segregation with circulation gain	24,391	5.7	295	8,457
5	Assimilation with circulation drain	4,190	1.0	82	1,338
6	Segregation	8,124	1.9	157	2,457
7	Education drain	58,696	13.7	1,159	18,003
8	Vulnerable	120,748	28.3	1,836	39,730
	Total	426,134	100.0	5,480	126,728

Source: elaborated by the authors.

It is noteworthy that all typologies are represented, demonstrating the diversity of the relationship between migration and education. Although some typologies have a limited number of municipalities of origin and a smaller number of migrants (Table 2), such as "assimilation", "segregation with circulation gain", "assimilation with circulation drain", and "segregation", the consequences for the local community can be significant.

In the majority of municipalities of origin, migrants were in a less favorable educational situation than non-migrants (76.5% out of 426,134, corresponding to typologies 2, 3, 4 and 8). Despite the fact that 28.3% of the students remained in a disadvantaged situation compared to both their new and former classmates after migrating (typology 8), the most common pattern observed was that of migrants improving in their status compared to both their new and former peers. Typology 2 alone accounted for almost 40% of all migrants, a finding that contrasts with the general literature on the subject. It is noteworthy that this typology represents virtually all the state capitals, especially as municipalities of origin - the exceptions being municipalities in the Center-West dynamized by the agribusiness, or more recently urbanized areas in the North.

Prior to migration, students in a better condition than their peers (23.5% of the total, corresponding to typologies 1, 5, 6 and 7) were particularly prevalent in the municipalities of the interior of the North and Northeast regions, although they were also present in the interior of São Paulo. It is a matter of concern that a number of impoverished regions are experiencing a loss of their more regular students, which has the potential to negatively affect the local human capital formation. Of particular concern is the observation that 13.5% of migrant students were in an "educational drain" situation (typology 7). This phenomenon occurred in regions characterized by fragile socio-environmental conditions, such as the western Amazon and the state of Piauí. However, even the wealthiest state, São Paulo, shows this pattern throughout its entire territory. In general, this phenomenon is characterized by short-distance movements. The situation is aggravated by the fact that a significant number of students (28,3%) were already disadvantaged before they migrated, and continue to have lower educational achievements than

their new classmates at the destination, as well as their former classmates who remained in the municipalities of origin (typology 8).

It is possible for the same municipality to be the source of one typology and the destination of another. Thus, municipalities that receive students in vulnerable educational situations who are subjected to segregation can also be the origin of students with low educational performance, but who show improvement in their school performance in other, more distant municipalities. For example, São Paulo is the destination of vulnerable students from the Northeast, but it is also the origin of low-achieving students for its own state and other regions. In the destinations, these students improve their educational performance.

It is clear that following twelve annual migratory and educational transitions for a multitude of cohorts dispersed across a vast and unequal country like Brazil produces a variety of complex and intertwined outcomes. Educational disadvantage and advantage coexist and overlap, creating a complex landscape of educational outcomes. This landscape is shaped by the role of place, whether as origin or destination. The comprehensive approach of this study reveals the diverse and nuanced educational situations that could inform the development of more context-specific educational policies for a population on the move.

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