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Impacts of Academic Mobility on Scientific Production: Evidence from the Lattes Platform

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Abstract. Academic mobility has been a relevant phenomenon in Brazil, influencing the trajectory and scientific productivity of researchers. This study analyzes the relationship between academic mobility and scientific production of Brazilian PhDs, using data from the Lattes Platform processed by the LattesDataXplorer framework. The methodology involved the extraction and analysis of 381,462 CVs of PhDs, considering three groups: those who did not migrate, those who migrated nationally, and those who had international mobility. Publications in conference proceedings and journals classified by Qualis CAPES (2017-2020) were examined. The results indicate that academic migration positively impacts scientific productivity. The median number of publications in conference proceedings increased after migration, with a higher volume among those who migrated within Brazil. In journals, most publications are concentrated in higher strata of Qualis (A1 and A2), being more expressive among PhDs with international experience. It is concluded that academic mobility favors collaboration and research impact, but it is not the only determining factor of productivity. Mobility incentives, especially at the national level, can strengthen scientific networks and contribute to research excellence in Brazil.

Keywords: Academic mobility, Scientific production, Lattes Platform, Qualis CAPES and Brazilian doctors.

1 Introduction

Geographic mobility in Brazil has emerged as a significant influence in recent decades, especially regarding international migration driven by socioeconomic and educational factors. Studies show that, on average, between 10% and 30% of the population residing in Brazilian cities is made up of individuals who do not live in their home states (Almeida [2]). This population movement is largely driven by the search for better job opportunities and access to higher education, with a view to improving quality of life.

Among the main motivations for this mobility are the search for higher-quality higher education institutions in other states and the desire for enriching experiences in different regions of the country (Lombas [6]). In addition to international migration, there is also a significant flow of Brazilian students abroad, motivated by cultural exchange programs and academic opportunities, such as more advantageous research scholarships. Historically, this movement has been pejoratively labeled "brain drain" or, conversely, "brain gain" (Adams [1]). However, over time, this perspective has evolved into the concept of "brain circulation," which emphasizes academic nomadism and the benefits of internationalizing science through the strengthening of scientific collaboration networks (Meyer [6]).

From this new perspective, the international mobility of students and researchers has been beneficial not only to individuals but also to their home institutions. The return of these professionals to the country is often associated with greater scientific productivity, expanded networks, and the dissemination of knowledge (Lombas [6]).

In this context, this study aims to analyze the mobility patterns and academic output of Brazilian students who left their cities, states, or even their home countries in search of academic qualifications. To this end, the LattesDataXplorer framework (Dias [3]) was used, a tool designed for extracting and processing data from the Lattes Platform, which enabled mapping the academic trajectories of Brazilian PhDs. The platform, which has

approximately nine million registered CVs (as of March 2025), offers a robust and representative database, enabling comprehensive analyses of academic mobility and its impact on researchers' careers.

2 Related Works

Dubois et al. [4] conducted a study to analyze the productivity and academic mobility of a group of mathematicians spread across the world, totaling 32,574 active mathematicians from 1984 to 2006. Initially, to analyze mobility, the authors considered the mathematicians' affiliations to understand their academic mobility. For those without affiliations, they retrieved the country of their first publication. Regarding scientific production, they extracted authors who published in 98 of the most relevant journals in the field. The authors highlighted that the largest percentage of mathematicians tend to publish in the United States. Regarding mobility, the authors observed that the main countries attracting mathematicians for their first publications are Canada, Israel, and the United Kingdom. After analyzing the average number of mathematicians held different positions throughout the analysis—that is, based on data from the departments held by the mathematicians—the authors found that the average is 1.87. Based on analyses of university departments, comparing the economics of the field, the authors found that wealthier universities tend to attract better researchers. In conclusion, they emphasized that encouraging mobility appears to be a way to improve both the quality of a department where an individual is assigned and the scientific output of its members. On the other hand, encouraging department members to collaborate more does not appear to be effective unless the collaboration is with colleagues from different fields. They therefore suggest that reading groups or seminars bringing together mathematicians from different specialties may be a way to broaden their interests and improve their output.

Ferreira et al. [5] conducted a study to analyze researcher mobility and their academic production. Metadata was collected from two repositories of bibliographic information and recognized citations: Web of Science and Scopus. They selected researchers from 108 countries, totaling approximately 9.2 million published articles and representing approximately 4,000 institutions, for analysis of academic affiliation. The researchers classified the data by subfields of knowledge to identify migration patterns. They observed that areas such as Social Sciences, Humanities, Mathematics, and Computer Science have lower collaboration rates compared to Natural Sciences or Engineering. Furthermore, Ferreira et al. [5] analyzed the research lines of the selected researchers and found that newcomers tend to publish in the same research line as their colleagues at their current institution, especially at more prestigious institutions. However, researchers who leave the institution tend to have a profile more similar to the institution's native researchers, compared to newcomers. The authors also highlighted that, when hiring new collaborators, institutions tend to favor those with academic profiles more similar to the institution's native speakers. Therefore, they concluded that collaborations between foreign researchers tend to enrich academic research, as researchers combine their expertise to produce higher-quality academic work.

3 Methodology

As a data source, we chose to use the Lattes Platform, as it is a repository that records the trajectory and scientific contribution of each registered Brazilian student, technician and researchers, and because it is an important source of science data. Brazilian.

Initially, the LattesDataXplorer framework Dias [3] was used to collect CVs from the Lattes Platform. Data extraction was carried out in April 2022, totaling 381,462 CVs of individuals with completed doctorates, considering all CVs, regardless of the doctorate completion date stated in the CVs. In Fig. 1 it is possible to find a general aspect of all the components used and developed to obtain the data to be analyzed. After collecting the CVs, steps such as selection, filtering and data processing were carried out. In the selection stage, it was possible to apply regular expressions, selecting the entire group of doctors registered on the Lattes Platform.

After selection, the “Data Filtering” module takes place, which is responsible for analyzing the CVs in XML format files in order to obtain information relevant to the research, which characterizes a formatted data extract. The CV information registered in the local repository includes: the individual's state and city of birth; postal code of the individual's current employment relationship, in addition to the identification code for each level of completed training, considering everything from graduation to professional activity and data related to the

individuals' scientific production.

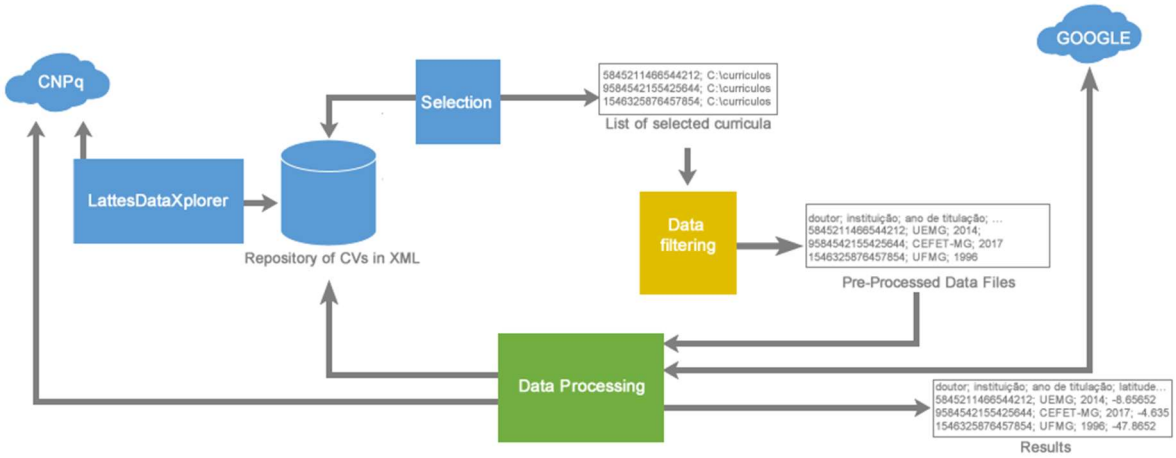


Figure 1. General appearance of the updated components. Source: Authors.

Afterwards, the formatted data extract is sent to the “Data processing” module, in which five steps are carried out: Obtaining the institution’s postal code from the Lattes Platform Institutions Directory; Extraction of the classification of periodicals from the Sucupira Platform, obtaining ISSN information and periodical classification for the four-year period 2017-2020; Search by geographic location obtaining the geographic location of the institution to which the individual qualified; Data cleaning and grouping and Data normalization to remove stopWorlds in city names; normalization to extract accented words, and replace them with their unaccented equivalent.

Subsequently, the "Results" file is generated, which contains all the specific data for carrying out the analyses. Therefore, after all the steps described above have been carried out, several metrics are applied to understand the influence of academic mobility of Brazilian doctors on their respective scientific productions, and the interconnections of Brazilian institutions in the face of mobility.

4 Results

We decided to analyze the number of articles published in journals by individuals (Fig. 2). This analysis examines the distribution of articles in journals classified by CAPES' Qualis system for the 2017-2020 four-year period, using data extracted from the Sucupira Platform.

Qualis is a scientific production evaluation system used by CAPES in Brazil. It classifies and classifies scientific journals in which researchers publish their work. Its main objective is to assist in the evaluation of Brazilian graduate programs by providing a benchmark for measuring the quality of scientific publications. Originally, Qualis journal classification was conducted in three-year periods, with the first evaluation covering the years 2010-2012. Subsequently, the system was adjusted to a four-year evaluation frequency. The first four-year reference for evaluating journals covered the years 2013 to 2016. The most recent reference used in this research considers the four-year period from 2017 to 2020. The Qualis Capes for journals is characterized and stratified in the following order: A1 (best classified), A2, A3, A4, B1, B2, B3, B4, C (lowest classified).

Researchers tend to publish in journals classified as A1, the pinnacle of CAPES's evaluation. This preference is presumably driven by the recognition and renown attributed to these journals, factors that impact CAPES's evaluation of graduate programs. Also noteworthy is the tendency for lower production in journals classified as B4 and C, which are lower in classification, as expected.

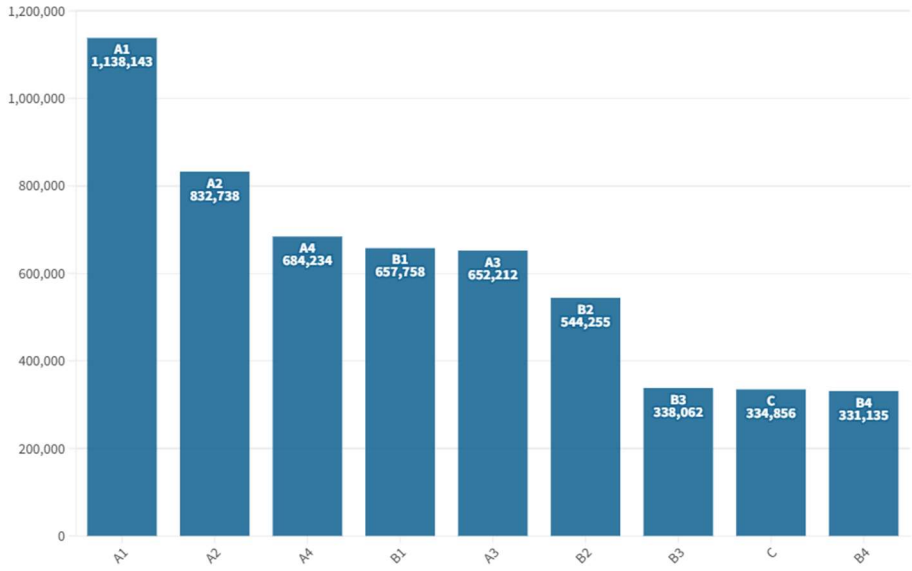


Figure 2. Qualis of journals published by Brazilian doctors. Source: Authors.

Therefore, after identifying the distribution of CAPES Qualis classifications, we decided to conduct an analysis to understand the distribution of Qualis classifications of articles in journals published by the group of individuals analyzed in this research, stratifying the group of individuals into three distinct groups: individuals who migrated nationally (Fig. 3a), individuals who migrated internationally (Fig. 3b), and individuals who did not migrate (Fig. 3c).

It is possible to observe that the majority of journal publications come from the group of PhDs who migrated nationally. This indicates that these individuals have been active in scientific production and have contributed significantly to the advancement of knowledge in their respective research areas. One possible explanation for this predominance is the fact that the group of PhDs who migrated nationally tends to be numerically larger, especially compared to PhDs who migrated internationally.

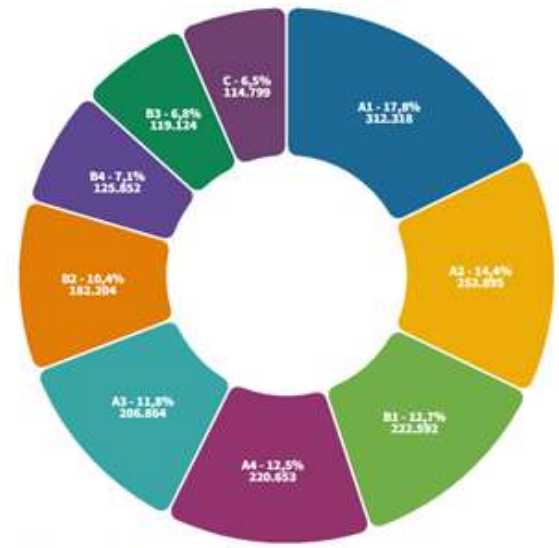
It is observed that in all cases, the lowest number of publications is present in journals classified with the lowest Qualis ratings, specifically in categories C and B4. This suggests that PhDs have directed their efforts to publishing in journals with greater prestige and impact on the scientific community.

It is also observed that the largest volumes of publications are concentrated in journals with the best Qualis ratings, especially in categories A1 and A2. These categories represent a considerable portion, corresponding to 32% of the total articles published in journals by individuals with national migration, 37% of publications by individuals without migration, and 52% of publications by individuals with international migration. This predominance of articles in high-Qualis journals suggests that researchers sought recognition and visibility in their fields, prioritizing publication in journals with the highest Qualis ratings.

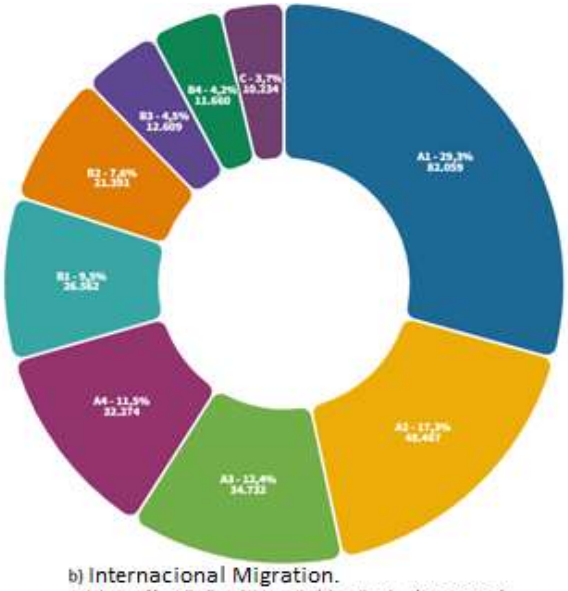
Figure 6b shows a predominance of publications with higher Qualis ratings. It is also worth noting that this order follows the Qualis classification criteria used by CAPES, ranging from the highest-ranked journal with the highest number of publications to the lowest-ranked journal (C), with the lowest number of publications, unlike the other analyses presented in Figure 6.

It is observed that the group of individuals without migration is more likely to publish in Qualis A4 journals compared to Qualis A3. This trend is repeated when comparing the choice of Qualis C journals versus Qualis B4, for both individuals without migration and those with national migration. This trend may be related to several factors, such as research area, availability of access to specific journals, or even individual preferences.

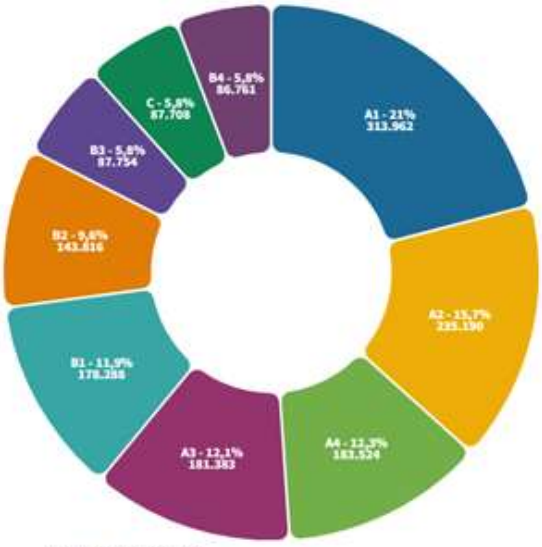
However, it is important to emphasize that focusing on high-Qualis journals should not be the sole criterion for evaluating researchers' scientific contributions. The quality and impact of the work should be considered in conjunction with other indicators, such as the number of citations, the journal's impact factor, and others.



a)National Migration.
Url: https://public.flourish.studio/visualisation/13462548/



b) Internacional Migration.
Url: https://public.flourish.studio/visualisation/13462556/



c) No Migration.
https://public.flourish.studio/visualisation/13462353/

5 Conclusions

The data analyzed in this study highlight the relevance of geographic mobility as a factor associated with the dynamics of scientific production among Brazilian PhDs. By exploring the Lattes Platform database, supported by the LattesDataXplorer framework, it was possible to identify that academic migration—both nationally and internationally—has a positive influence on the volume of publications in scientific conference proceedings. In general, individuals who migrated showed an increase in the median number of publications after migrating, suggesting that exposure to new academic contexts, collaboration networks, and research environments can enhance scientific productivity.

However, it was observed that PhDs who did not migrate also showed high levels of production, surpassed only by individuals who underwent mobility within the national scope. This result may be related to the consolidation of ties with local research groups and the continuity of institutional projects, factors that also favor academic productivity. Regarding publication in scientific journals, a strong concentration of articles was observed

in the upper bands of the CAPES Qualis (A1 and A2), regardless of mobility. This pattern reinforces researchers' pursuit of greater visibility and recognition in the scientific community. It is also noteworthy that PhDs who have undertaken international mobility concentrate a higher proportion of publications in high-tier journals, indicating a possible correlation between internationalization and the perceived quality of scientific production.

The data analysis suggests that, although academic mobility is not the sole determinant of productivity or publication quality, it is a relevant factor in strengthening academic trajectories. Therefore, public policies that encourage mobility—especially exchange and national cooperation programs—can significantly contribute to the country's scientific development, expanding collaborative networks, diversifying educational experiences, and fostering academic excellence.

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