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ESTUDOS

Endogamy in the Brazilian Higher Education System: A descriptive analysis

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Abstract

This study analyzes how academic endogamy is characterized in the Brazilian higher education system. Employing a descriptive methodology, based on data collected by Capes, we define that a researcher is inbred if he works at the same institution where he obtained his doctorate degree. This article is the first to measure endogamy by higher education institution in Brazil, which makes its results relevant for policy makers and universities. Endogamy occurs on average in 23% of academic hiring positions across the country, however, the results show that the rate of endogamy differs significantly between different types of institutions, areas of knowledge, states and university classification levels. This analysis provides further evidence that endogamy is more likely to occur in established elite research institutions and geographically concentrated in the most populous and developed regions.

Keywords: Academic endogamy; inbreeding; higher education; academic job market; academic mobility.

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Resumo

Endogenia no sistema de ensino superior brasileiro: uma análise descritiva

Este estudo analisa como a endogenia acadêmica é caracterizada no sistema de ensino superior brasileiro. Utilizando-se de uma metodologia descritiva, e com base em dados da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, definimos que um pesquisador é endógeno se ele atua na mesma instituição pela qual obteve seu título de doutorado. Este artigo é o primeiro a medir a endogenia por instituição de ensino superior no Brasil, o que torna seus resultados relevantes para gestores de políticas e universidades. Esse fenômeno ocorre, em média, em 23% das contratações acadêmicas pelo País, contudo, os resultados mostram que a taxa de endogenia difere significativamente entre os distintos tipos de instituições, áreas do conhecimento, estados e níveis de classificação das universidades. Esta análise fornece mais evidências de que a endogenia é mais provável de ser encontrada em instituições de pesquisa de elite, estabelecidas e geograficamente concentradas nas regiões mais populosas e desenvolvidas.

Palavras-chave: endogenia acadêmica; endogenia; ensino superior; mercado de trabalho acadêmico; mobilidade acadêmica.

Resumen

Endogamia en el sistema de educación superior brasileño: un análisis descriptivo

Este estudio analiza cómo se caracteriza la endogeneidad académica en el sistema de educación superior brasileño. Utilizando una metodología descriptiva, y con base en datos de la Coordinación de Perfeccionamiento de Personal de Nivel Superior, definimos que un investigador es endógeno si trabaja en la misma institución en la que obtuvo su doctorado. Este artículo es el primero en medir la endogeneidad por institución de educación superior en Brasil, lo que hace que sus resultados sean relevantes para los gestores de políticas y las universidades. Este fenómeno ocurre, en promedio, en el 23% de las contrataciones académicas en todo el país, sin embargo, los resultados muestran que la tasa de endogamia difiere significativamente entre diferentes tipos de instituciones, áreas de conocimiento, entidades federativas y niveles de clasificación universitaria. Este análisis proporciona evidencia adicional de que es más probable que la endogeneidad se encuentre en instituciones de investigación establecidas y de élite que están geográficamente en las regiones más pobladas y desarrolladas.

Palabras clave: endogeneidad académica; endogamia; educación superior; mercado de trabajo académico; movilidad académica.

Introduction

Endogamy or academic inbreeding, that is, hiring your own alumni as faculty has long been discussed as it is a common phenomenon in many institutions (for example, Berelson, 1960). However, skepticism in relation to this practice is also prevalent, due to its potential negative effects on scientific productivity and the development of research networks (Gorelova; Yudkevich, 2015).

When the supply of well-trained PhD graduates is scarce, endogamy might be expected, as well-ranked universities aim to hire their own students. This might be the case of higher educational systems that are not completely mature yet (Berelson, 1960; Horta; Sato; Yonezawa, 2011; Kossinets; Watts, 2009). The Brazilian higher education system was established and expanded quite late in comparison to other countries, as were its graduate programs (Sucupira, 1980). This may affect the availability of job positions and candidates, which could be the result of structural constraints to the academic job market. Thus, the reasons for a limited pool of applicants to academic jobs might go beyond individual preferences for a specific job offer.

Although a majority of the prestigious research institutions adopt public open contests for selecting professors, in accordance with Law 12,863 (Brasil, 2013), Brazil displays signs of academic endogamy among a substantial number of institutions. Balbachevsky (2016), for example, suggested that informal rules benefit alumni candidates in hiring processes. This may have impacts for the internationalization and the expansion of the Brazilian higher education. After all, non-alumni scholars could help establish new contacts and bolster networks both among distinct fields and among institutions.

In order to contribute to a better understanding of where endogamy takes place, this paper describes endogamy in the Brazilian higher education system, using information between 2007 and 2016 from graduate programs regulated by Capes. This study has been structured in three sections. Section one discusses the literature. Section two explains our method and shows our results. Lastly, section three contains our final remarks and comments.

Literature Review

There is some dispute on what academic endogamy consists of. Some researchers understand that endogamy happens whenever faculty members have received all or part of their education at the university where they currently work (Blau, 1973; Dutton, 1980; Hargens; Farr, 1973; McGee, 1960; Smyth; Mishra, 2014); others believe endogamy only occurs when a faculty member works on the same institution where they were granted their last or final degree, ignoring previous academic degrees (Berelson, 1960; Cruz-Castro; Sanz-Menéndez, 2010; Eisenberg; Wells, 2000; Horta; Veloso; Grediaga, 2010; Inanc; Tuncer, 2011; Wells; Hassler; Sellinger, 1979; Wyer; Conrad, 1984).

Endogamy can happen due to peculiarities of the hiring institution, such as administrative and bureaucratic convenience (McGee, 1960), compatible views and the institution and advisors' own academic benefit (Eisenberg; Wells, 2000), social connections (Eisenberg; Wells, 2000; Godechot; Louvet, 2008), and lower hiring uncertainty (Blau, 1973; Gouldner, 1957; Majcher, 2005). It can also be due to institutional aspects of the higher educational system as whole (Altbach; Yudkevich; Rumbley, 2015), such as the stage of maturity of a higher education

system (Berelson, 1960; Horta; Sato; Yonezawa, 2011), the prestige of the university, as the best students frequently come from elite institutions and these institutions want to retain their best candidates (Berelson, 1960; Eisenberg; Wells, 2000; Horta; Sato; Yonezawa, 2011; Wells; Hassler; Sellinger, 1979; Diramio; Theroux; Guarino, 2009; Young; Blackburn; Conrad, 1987), geographic isolation or limited selection processes, and budget constraints (Camacho, 2001; McGee, 1960; Horta Sato; Yonezawa, 2011). Some of these factors may apply to the case of Brazil.

As mentioned before, endogamy is feared due to its potential negative effects on scientific production (Dutton, 1980; Eisenberg; Wells, 2000; Hargens; Farr, 1973; Horta, 2013; Horta; Veloso; Grediaga, 2010; Inanc; Tuncer, 2011; Yudkevich; Sivak, 2012). However, there is some dispute that, in fact, there are significant differences in productivity among scholars (Clark; Larson, 1972; Cruz-Castro; Sanz-Menéndez, 2010; McGee, 1960; Wells; Hassler; Sellinger, 1979; Wyer; Conrad, 1984). Either way, studying the phenomenon and quantifying is a step forward in analyzing its effects in Brazil.

Hence, a variety of factors could be conjointly influencing the level of endogamy in the Brazilian higher education system, so it is important to properly describe the phenomenon and quantify its extension on the system as whole.

This paper contributes to the relevant literature on academic endogamy as such an extensive endeavor was never performed. The literature on academic endogamy is still scarce and it is usually limited to individual institutions or knowledge fields. Therefore, we fill an important gap that can also help institutions reflect on their current job selection process and, consequently, hire better candidates.

In Brazil, most analysis focus on specific knowledge fields (Cabello, 2018; Costa, 2020; Varella, 2015; Barbosa *et al.*, 2018; Velho; Krige, 1984, Braga; Venturini, 2013; for a few examples). Grochocki and Cabello (2022), Borenstein, Perlin and Imasato (2022), Pelegrini and França (2020), and Balbachevsky (2016) are exceptions, with more comprehensive analysis, yet not very descriptive. Our paper complements their discussion, fulfilling this gap and using a more comprehensive database as well.

Method and Results

Our main hypothesis is that the rate of academic endogamy in Brazilian institutions is high, but it varies in magnitude among institutions. This study defines endogamy as the employment of students as scholars by the institution where they obtained their final degree (PhD), right after or up to 10 years from attaining that degree. This concept was adopted due to how influential the final degree of a scholar is in attaining the first academic position.

Our data comes from the Capes' database[1] (Coleta Capes and Plataforma Sucupira). The database is based on scholars that were active in graduate programs in Brazil between 2007 and 2016 and the information is provided by the graduate programs for official evaluation purposes. It is self-reported by all higher education institutions registered and authorized to offer graduate programs in the Brazilian higher education system.

[1] Our database was obtained through a formal request to Capes. However, it is currently publicly available at https://dadosabertos.capes.gov.br/

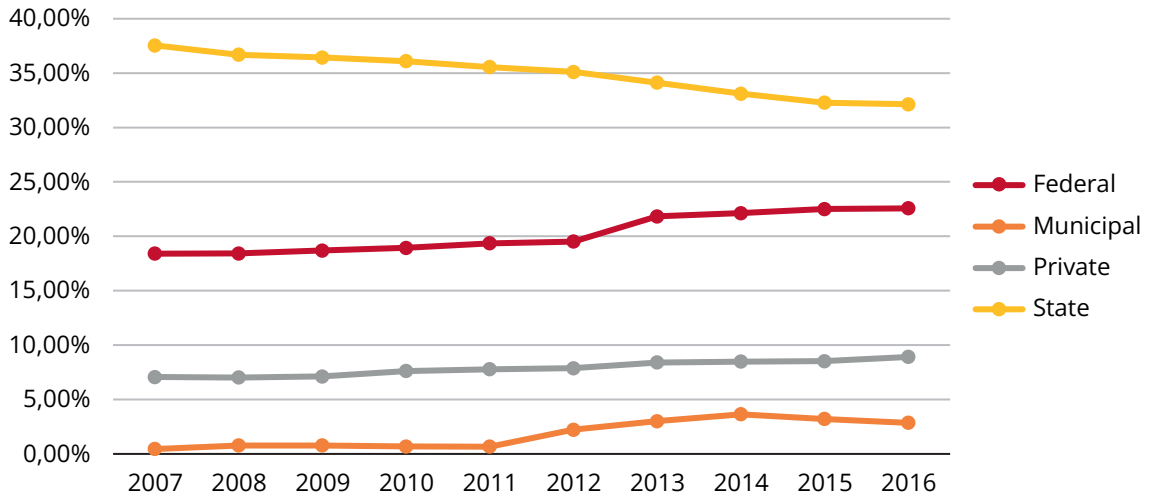
For this research, endogamy is identified when students are employed as scholars by the institution where they attained their final degree (PhD). Our variable of interest, therefore, is a binary variable that assumes value 1 when PhD institution = Institution where scholar currently works as faculty and 0 when this is not the case. Each institution then had its percentage of inbred scholars calculated according to this variable.

Appendix Table 1 ranks institutions by their percentage of endogamy among active tenured professors in 2016. Only institutions with a faculty body larger than 49 scholars are ranked to both prioritize larger institutions and avoid discrepancies due to small sample sizes. The degree of endogamy nationwide is 23%. This might not seem too high; however, it is still significant when compared to Germany (1%), though not as high as Mexico (53%). At first glance, it could be said it is closer to what was detected in France (30%) (Godechot; Louvet, 2008; Padilla, 2008).

According to Appendix Table 1, academic institutions only get close to the national average (23%) around the 40th place. For example, in 2016, the main campus of the University of São Paulo had 70% of its scholars hired from within. Both campuses of the University of Campinas also have high levels of alumni faculty with 68.7% in Piracicaba and 55.3% in Campinas. The Federal University of Rio de Janeiro and the State University of São Paulo – campus São José dos Campos – are also within the margin of 50%. Since most of these universities are top-ranked[2] both in Brazil and Latin America, it would be interesting to understand how productivity is affected by endogamy and how these organizations behave in such a homogeneous environment.

Notwithstanding, as shown previously, the Brazilian system was established and expanded at a later stage which would result in a large number of young universities with a full body of scholars hired from other institutions. This should decrease the system's average when including both young and established institutions. Therefore, breaking these numbers down into categories is necessary for a proper understanding of this phenomenon, as well as looking at individual universities themselves.

Graph 1 shows the level of inbred scholars – or academic endogamy – by type of institution.



Graph 1 – Inbred scholars by Higher Education Institution type

Source: Composed by the authors.

[2] For example, in international rankings such as Times Higher Education.

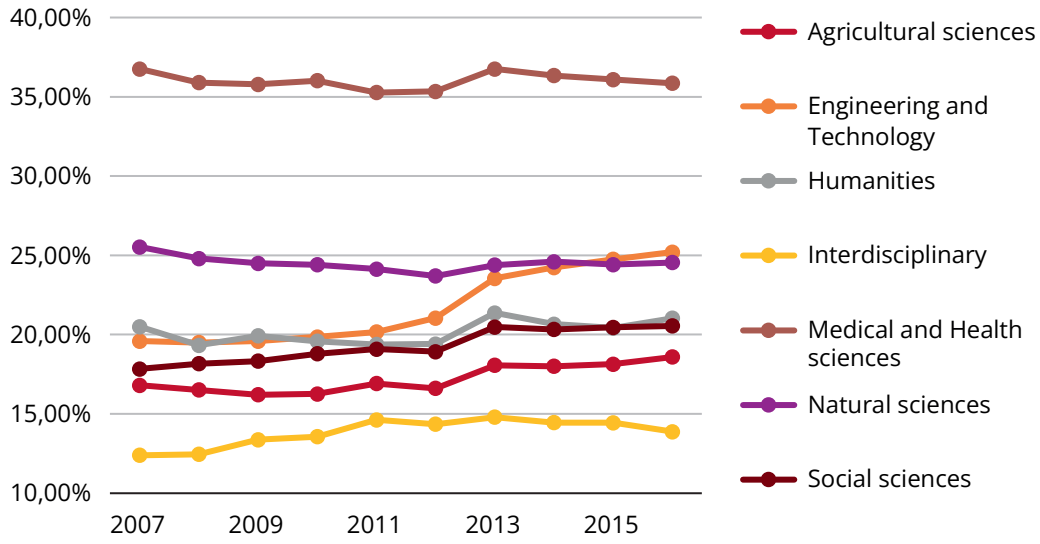
Our database was obtained through a formal request to Capes. Graph 1 demonstrates that state and federal universities exhibit higher endogamy in comparison to private and municipal ones. In Brazil, these two types of public institutions are the ones with the highest number of graduate programs and students. This characteristic is in accordance with what was found previously, where institutions that are relevant trainers of PhD students have additional external reasons to hire their own graduates (Berelson, 1960; Eisenberg; Wells, 2000; Horta; Sato; Yonezawa, 2011; Wells; Hassler; Sellinger, 1979).

Over time, endogamy seems to be rising among federal, private and municipal institutions, while decreasing for state institutions. This may be related to the development of other more recent institutions, the expansion of universities in Brazil in general and of graduate studies as well. The increase in the number of federal and private institutions in the last few years was remarkable and this may have diversified the pool of candidates from which institutions can hire their faculty.

State institutions may be driven by the University of São Paulo (USP) and the State University of Campinas (Unicamp). It is interesting that this group shows the highest level of endogamy of all other groups. There is a curious increment between 2012 and 2013 for federal universities that could perhaps be explained by the federal initiative Reuni (Program for the Support of the Restructuring and Expansion Plans of Federal Universities), which created 18 new universities (total of 63 in 2015) and 173 new campuses (total of 321 in 2015) between 2003-2014, and 21,786 new job positions between 2008-2012 (Brasil. MEC, 2012).

Private institutions display a much lower number of inbred scholars, however, most graduate programs linked to these institutions were established quite recently. Thus, these institutions only had the option to hire faculty among graduates from other institutions, resulting in a group of scholars from a much more diverse academic background. Municipal universities are in a similar situation, where most of their programs are recent and small. Therefore, hiring from outside seems to be the most viable option.

Considering the large variety of knowledge fields that are covered in graduate programs, Capes groups distinct topics by broad fields of knowledge, according to the classification of the Organization for the Economic Cooperation and Development (OECD). Graph 2 shows the level of inbred faculty by knowledge field.

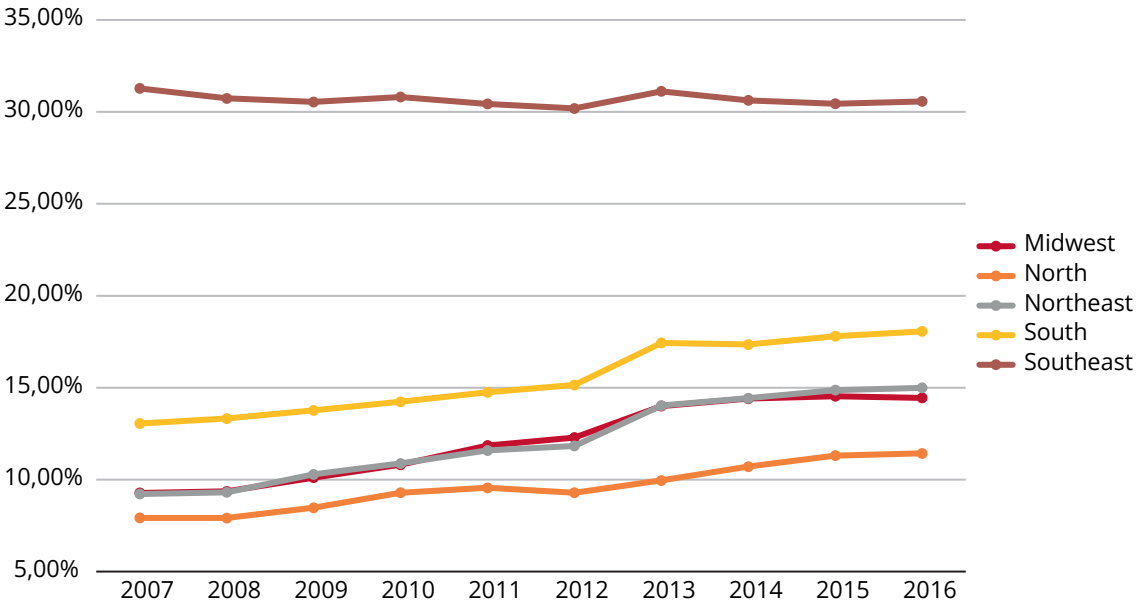


Graph 2 – Inbred scholars by knowledge field

Source: Composed by the authors.

Graph 2 summarizes the results for the six broad knowledge fields plus an interdisciplinary one that was added to address multifaceted courses. It is intriguing that the fields in Science, Technology, Engineering and Math (STEM), such as Medical and Health Sciences, Engineering and Technology, and the Natural Sciences seem to have a higher concentration of endogamy in comparison to the social sciences and humanities. Regarding the interdisciplinary category, a lower percentage was already expected as these fields bring together faculty from different areas of knowledge, making it less likely for alumni to be selected. Besides, interdisciplinarity is a recent approach in academia, which might explain why there are fewer inbred scholars in that category. However, there seems to be a tendency for growth in most fields, especially after 2012, which again may relate to the expansion of higher education and of graduate studies in Brazil in the last two decades.

Graph 3 shows the level of inbred scholars by region. In Graph 3, it is possible to identify that endogamy is concentrated in the most populous and richest regions of the country, where São Paulo and Rio de Janeiro – the two largest cities by population – are located, and lowest in the regions that are further away from this area. Hence, geographical location might be playing a role in Brazil (Camacho, 2001; McGee, 1960). In addition, many academic training and job opportunities are offered in the Southeast, South, and Northeast regions. However, considering the large number of institutions available in those regions, it would be likely for their alumni to be more spread and distributed among universities, instead of being so concentrated in their own Alma Mater, which would drag down endogamy indicators.



Graph 3 – Inbred scholars by region

Source: Composed by the authors.

Finally, as described previously, the best ranked graduate programs in Brazil are concentrated in the Southeast and South regions. Despite being an additional stimulus for alumni to apply as faculty in their home institutions, competition for those job opportunities would be expected to be higher, which could diminish endogamy. However, it seems the

potential of a competitive market is not enough to significantly impact endogamy in those regions. Perhaps, it is the case of internal markets, where candidates looking for prestigious research track positions are prioritizing these regions and top research universities are focusing on avoiding the risk of hiring external unknown applicants.

The reasons why regions have such distribution of scholars might be better understood when looking at the percentage of endogamy per state in Table 1.

Table 1 – Average Endogamy Percentage by State – 2007-2016

State	Average Endogamy Percentage – 2007-2016
AC	0,19%
AL	8,34%
AM	8,52%
AP	1,64%
BA	14,29%
CE	14,61%
DF	23,69%
ES	6,26%
GO	6,43%
MA	2,00%
MG	16,19%
MS	2,73%
MT	1,50%
PA	14,63%
PB	9,35%
PE	17,42%
PI	0,01%
PR	9,06%
RJ	24,71%
RN	11,71%
RO	3,27%
RR	0,50%
RS	20,40%
SC	15,84%
SE	3,32%
SP	39,56%
TO	2,44%

Source: Composed by the authors.

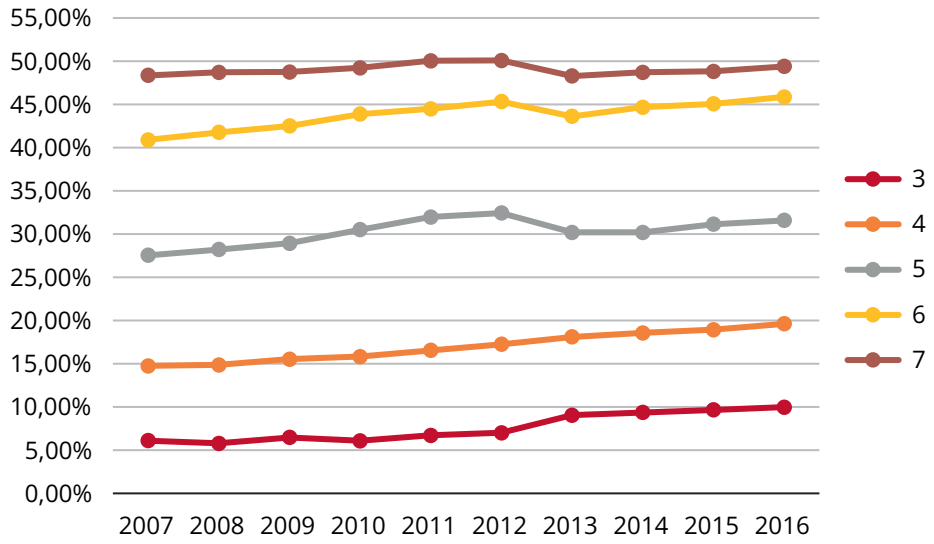
It seems that the states of São Paulo (SP) and Rio de Janeiro (RJ) highly impact the concentration of inbred faculty in the Southeast region. As the most populous state in Brazil, São Paulo also has the highest concentration of master's and PhD programs and three of the best ranked universities in the country (USP, Unicamp and Unesp).

The University of São Paulo (USP) and the State University of São Paulo (Unesp) are two of the public universities with the most students (97,982 and 53,988) in the nation. Being such large producers of students could be why endogamy ensues. This study controls for specific campuses when measuring such a practice, so that if a graduate of one campus was hired by another, it would not count. However, even after controlling for specific campuses, in 2016, the state of São Paulo still presented an impressive percentage of 37% of inbred scholars in its universities.

In the South region, the state of Rio Grande do Sul (RS) drives the level of endogamy up, while in the Midwest region, this is also the case of the Federal District (DF). That is, geography and socioeconomic factors seem to be some of the main determinants of academic endogamy in Brazil.

In Table 1, in the North and Northeast regions, Pará (PA) and Amazonas (AM) and Ceará (CE) and Bahia (BA) also push the percentage of their regions up. However, although a higher concentration is still found in the most populous states, the Northeast region has a somehow more balanced level of academic endogamy across its states (AL, BA, CE, MA, PB, PE, RN, and SE). Most states seem to be increasing their numbers, São Paulo is an exception, but it is still far from the average of others.

Graph 4 shows inbred scholars by graduate program tier, as evaluated by Capes.



Graph 4 – Inbred scholars by graduate program tier

Source: Composed by the authors.

Finally, as observed in Figure 1, when analyzing the degree of endogamy by graduate program tier, the two top ranked groups present the highest concentration. According to Capes' graduate evaluation criteria, programs ranked 6 and 7 are considered "international level". On average, they are supposed to be the ones with the best students and core faculty and, consequently, the highest academic production in their fields.

It is also noteworthy that programs on average display an increase in the degree of endogamy as their ranks go up. This intense level of endogamy with high quality of scientific production is likely due to hiring their best students, who could also be the best candidates in the market (Horta; Sato; Yonezawa, 2011; Padilla, 2008).

Another appealing way of visualizing the Brazilian higher education system is to observe how concentrated it is in the most populous and developed states of the country. Figure 1 exhibits four maps of Brazil with the national distribution of academic endogamy, scholars' job positions, alma mater, and ranking tiers.

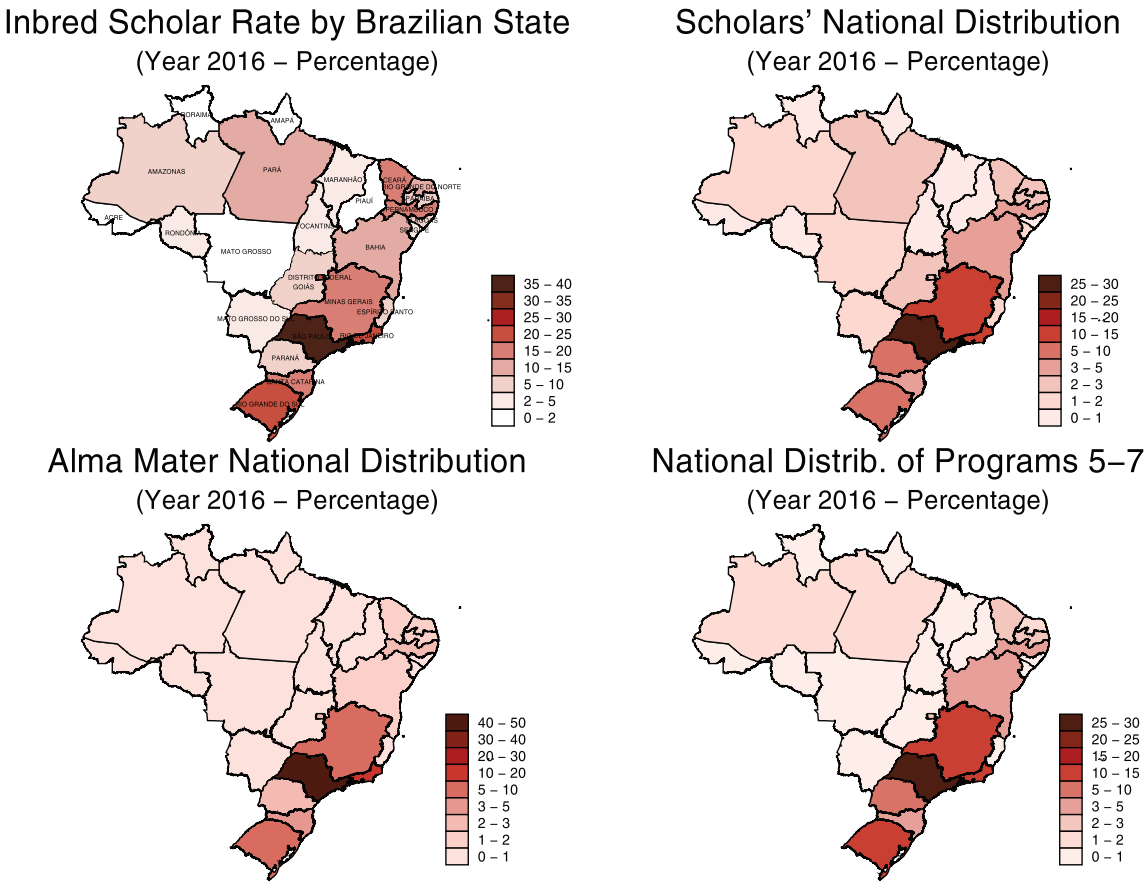


Figure 1 – Maps of the Brazilian Higher Education system

Source: Composed by the authors.

São Paulo and other states in the Southeast region of Brazil are highly influential in Brazilian academia, as they are main providers of highly trained scholars. In 2016, out of those who studied in a Brazilian university, 49% of the permanent scholars attained their final degree at an institution in the state of São Paulo; Rio de Janeiro comes second with 15%; Minas Gerais and Rio Grande do Sul are third with 8% each. In terms of scholars' job positions, due to the number of universities and students, states in the South and Southeast regions also concentrate the most opportunities. Finally, once again, when looking at the distribution of programs ranked 5 through 7, it is found that they are similarly concentrated in the South and Southeast regions. This should reinforce the idea that competition for a faculty position

in these states would be higher. However, as shown in the map, those states have the highest percentage of endogamy. Hence, it seems that institutions which are relevant trainers of PhD students have additional internal reasons to hire their own graduates and that a combination of geographical, academic, and economic characteristics are influencing candidates to remain at the states where they attained their PhD.

Conclusion

The goal of this paper was to analyze how academic endogamy is characterized in the Brazilian higher education system. For that, defined that a researcher is inbred if they work at the same institution where they obtained their doctorate degree. We used a descriptive methodology, and based on data from Capes, we revealed that the Brazilian higher education system has a high percentage of academic endogamy.

Endogamy occurs on average in 23% of academic hiring across the country, however, the results reveal that the rate of endogamy differs significantly between different types of institutions, areas of knowledge, states and university classification levels. This analysis provides further evidence that endogamy is more likely to be identified in established elite research institutions and geographically concentrated in the most populous and developed regions. If not as substantial as expected nationwide, it is when looking within fields, states, and tier ranking. This is especially true when analyzing elite graduate programs in the STEM fields in the South and Southeast regions of Brazil.

This article is the first to measure endogamy by higher education institution in Brazil, so it makes a clear contribution to the literature. It also makes its results relevant for policy makers and universities, especially when it comes to hiring policies.

These results seem to be in accordance with what was discovered in studies in other countries, in which two factors may be at play: the practice of “academic nepotism”, that is, the adoption of directed public calls which purposely limit the pool of candidates. Additionally, even applicants themselves could be avoiding running for positions at different institutions/cities for the lack of incentives or job market mobility culture. These two characteristics would partially explain the push towards establishing an internal market in academia.

While it is possible that this could be the case of Brazil, at the level that it was found at elite universities, it is also likely that structural constraints in the system are impacting how homogeneous the supply of qualified candidates is. Perhaps, new policies should be tested to promote the exchange of young graduates and scholars among national institutions by offering additional wage or research benefits. Moreover, programs could be launched or reinforced to facilitate the return of Brazilian graduate students and scholars who are studying or working abroad to help diversify and enhance research networks throughout the country.

Moreover, the highly concentrated graduate system in the South and Southeast regions supports endogamy in elite programs, which despite any formal benefit for those schools, could also be keeping qualified scholars from being redistributed to other regions in Brazil, making it harder for programs to improve their quality. Brazil has promoted decentralization and diversification policies in its higher education recently, but it seems like they were not enough to break these enduring patterns.

Having really robust graduate programs in specific universities is strategic, but having all of them in a limited number of institutions and states may not be the best policy for developing a national education system. Perhaps, the establishment and strengthening of programs in specific fields, where states have a geographic advantage, could be a way of better sharing the quality of scholars and graduate programs throughout the nation.

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Appendix

Table 1 – University ranking by endogamy level 2016

Rank	University	Region	State	Institution Type	Sample size	Inbred Scholars	Endogamy
1	Universidade de São Paulo - main campus	Southeast	SP	State university	4,482	3,138	70.0%
2	Universidade Estadual de Campinas - Piracicaba	Southeast	SP	State university	115	79	68.7%
3	Universidade Estadual de Campinas - main campus	Southeast	SP	State university	1,993	1,103	55.3%
4	Universidade Federal do Rio de Janeiro	Southeast	RJ	Federal university	2,545	1,314	51.6%
5	Universidade Estadual Paulista Júlio de Mesquita Filho - São José dos Campos	Southeast	SP	State university	70	35	50.0%
6	Universidade de São Paulo - Ribeirão Preto	Southeast	SP	State university	873	432	49.5%
7	Universidade Federal do Rio Grande do Sul	South	RS	Federal university	1,864	900	48.3%
8	Universidade Federal de São Paulo	Southeast	SP	Federal university	1,219	552	45.3%
9	Universidade Federal de Minas Gerais	Southeast	MG	Federal university	2,067	928	44.9%
10	Universidade Estadual Paulista Júlio de Mesquita Filho - Botucatu	Southeast	SP	State university	512	226	44.1%
11	Pontifícia Universidade Católica de São Paulo	Southeast	SP	Private university	443	192	43.3%
12	Centro Brasileiro de Pesquisas Físicas	Southeast	RJ	Federal research center	62	26	41.9%
13	Universidade de São Paulo - Escola Superior de Agricultura Luiz de Queiroz	Southeast	SP	State university	235	87	37.0%
14	Instituto Nacional de Pesquisas Espaciais	Southeast	SP	Federal research center	189	67	35.4%
15	Fundação Oswaldo Cruz - São Paulo	Southeast	SP	Federal research center	837	283	33.8%
16	Fundação Getúlio Vargas - São Paulo	Southeast	SP	Private university	132	44	33.3%
17	Universidade de São Paulo - Bauru	Southeast	SP	State university	87	29	33.3%
18	Instituto Tecnológico de Aeronáutica	Southeast	SP	Federal university	180	59	32.8%
19	Universidade de Brasília	Midwest	DF	Federal university	1,683	550	32.7%
20	Universidade Federal de Pernambuco	Northeast	PE	Federal university	1,361	442	32.5%

Table 1 (Cont.)

Rank	University	Region	State	Institution Type	Sample size	Inbred Scholars	Endogamy
21	Universidade Federal de Santa Catarina	South	SC	Federal university	1,525	485	31.8%
22	Instituto Nacional de Matemática Pura e Aplicada	Southeast	RJ	Federal research center	71	22	31.0%
23	Universidade Federal da Bahia	Northeast	BA	Federal university	1,407	433	30.8%
24	Universidade Estadual Paulista Júlio de Mesquita Filho - Franca	Southeast	SP	State university	98	30	30.6%
25	Faculdade de Ciências Médicas da Santa Casa de São Paulo	Southeast	SP	Private university	96	29	30.2%
26	Universidade Federal do Ceará	Northeast	CE	Federal university	1,092	315	28.8%
27	Universidade Estadual Paulista Júlio de Mesquita Filho - Araraquara	Southeast	SP	State university	361	102	28.3%
28	Pontifícia Universidade Católica do Rio de Janeiro	Southeast	RJ	Private university	499	139	27.9%
29	Faculdade de Medicina de São José do Rio Preto	Southeast	SP	State university	72	20	27.8%
30	Universidade de São Paulo - São Carlos	Southeast	SP	State university	605	164	27.1%
31	Universidade Federal de Viçosa	Southeast	MG	Federal university	629	169	26.9%
32	Universidade Federal do Paraná	South	PR	Federal university	1,379	368	26.7%
33	Universidade Federal do Pará	North	PA	Federal university	998	262	26.3%
34	Universidade Estadual Paulista Júlio de Mesquita Filho - Jaboticabal	Southeast	SP	State university	234	60	25.6%
35	Universidade Federal de Lavras	Southeast	MG	Federal university	387	98	25.3%
36	Universidade Estadual Paulista Júlio de Mesquita Filho - Araçatuba	Southeast	SP	State university	86	21	24.4%
37	Instituto Nacional de Pesquisas da Amazônia	North	AM	Federal research center	140	34	24.3%
38	Universidade Estadual Paulista Júlio de Mesquita Filho - Rio Claro	Southeast	SP	State university	296	66	22.3%
39	Pontifícia Universidade Católica do Rio Grande do Sul	South	RS	Private university	390	81	20.8%
40	Universidade Federal do Rio Grande do Norte	Northeast	RN	Federal university	1,135	230	20.3%
41	Universidade Estadual do Norte Fluminense	Southeast	RJ	State university	262	53	20.2%

Table 1 (Cont.)

Rank	University	Region	State	Institution Type	Sample size	Inbred Scholars	Endogamy
42	Universidade Federal de São Carlos	Southeast	SP	Federal university	948	190	20.0%
43	Universidade Federal Rural do Rio de Janeiro	Southeast	RJ	Federal university	502	99	19.7%
44	Universidade Federal de Campina Grande	Northeast	PB	Federal university	388	73	18.8%
45	Universidade Estadual Paulista Júlio de Mesquita Filho - Guaratingueta	Southeast	SP	State university	78	14	17.9%
46	Universidade Federal de Santa Maria	South	RS	Federal university	888	159	17.9%
47	Universidade do Estado do Rio de Janeiro	Southeast	RJ	State university	1,270	219	17.2%
48	Universidade Federal Fluminense	Southeast	RJ	Federal university	1,463	252	17.2%
49	Universidade Estadual Paulista Júlio de Mesquita Filho - Marilia	Southeast	SP	State university	163	28	17.2%
50	Universidade Metodista de Piracicaba	Southeast	SP	Private university	76	13	17.1%
51	Universidade Federal de Pelotas	South	RS	Federal university	635	101	15.9%
52	Universidade Federal da Paraíba - João Pessoa	Northeast	PB	Federal university	918	139	15.1%
53	Instituto Militar de Engenharia	Southeast	SP	Federal university	86	13	15.1%
54	Universidade Metodista de São Paulo	Southeast	SP	Private university	53	8	15.1%
55	Universidade Federal do Rio Grande	South	RS	Federal university	414	62	15.0%
56	Instituto de Medicina Integral Professor Fernando Figueira	Northeast	PE	Private university	82	11	13.4%
57	Universidade Estadual Paulista Júlio de Mesquita Filho - São José do Rio Preto	Southeast	SP	State university	232	31	13.4%
58	Fundação Getúlio Vargas - Rio de Janeiro	Southeast	RJ	Private university	120	16	13.3%
59	Universidade Federal de Goiás	Midwest	GO	Federal university	1,174	151	12.9%
60	Universidade Federal do Estado do Rio de Janeiro	Southeast	RJ	Federal university	416	51	12.3%
61	Universidade do Vale do Rio dos Sinos	South	RS	Private university	322	38	11.8%
62	Universidade Federal do Espírito Santo	Southeast	ES	Federal university	883	104	11.8%
63	Universidade Federal de Alagoas	Northeast	AL	Federal university	545	64	11.7%
64	Universidade Federal de Ciências da Saúde de Porto Alegre	South	RS	Federal university	128	15	11.7%

Table 1 (Cont.)

Rank	University	Region	State	Institution Type	Sample size	Inbred Scholars	Endogamy
65	Pontifícia Universidade Católica de Minas Gerais	Southeast	MG	Private university	255	28	11.0%
66	Universidade Federal de Itajubá	Southeast	MG	Federal university	184	20	10.9%
67	Pontifícia Universidade Católica do Paraná	South	PR	Private university	241	26	10.8%
68	Universidade Federal Rural de Pernambuco	Northeast	PE	Federal university	466	50	10.7%
69	Universidade Estadual de Maringá	South	PR	State university	683	71	10.4%
70	Universidade Estadual de Londrina	South	PR	State university	649	65	10.0%
71	Universidade Federal de Uberlândia	Southeast	MG	Federal university	787	77	9.8%
72	Universidade Federal do Triângulo Mineiro	Southeast	MG	Federal university	196	19	9.7%
73	Universidade do Extremo Sul Catarinense	South	SC	Private university	83	8	9.6%
74	Universidade Estadual Paulista Júlio de Mesquita Filho - Assis	Southeast	SP	State university	73	7	9.6%
75	Universidade do Vale do Itajaí	South	SC	Private university	141	13	9.2%
76	Universidade Federal do Amazonas	North	AM	Federal university	544	50	9.2%
77	Universidade Católica Dom Bosco	Midwest	MS	Private university	56	5	8.9%
78	Universidade de Pernambuco	Northeast	PE	State university	216	19	8.8%
79	Universidade Estadual Paulista Júlio de Mesquita Filho - São Paulo	Southeast	SP	State university	104	9	8.7%
80	Universidade Federal de Mato Grosso do Sul	Midwest	MS	Federal university	542	45	8.3%
81	Universidade Salvador	Northeast	BA	Private university	51	4	7.8%
82	Universidade do Vale do Paraíba	Southeast	SP	Private university	64	5	7.8%
83	Faculdade São Leopoldo Mandic	Southeast	SP	Private university	52	4	7.7%
84	Universidade Presbiteriana Mackenzie	Southeast	SP	Private university	185	14	7.6%
85	Universidade do Estado do Amazonas	North	AM	State university	139	10	7.2%
86	Universidade Federal de Ouro Preto	Southeast	MG	Federal university	391	27	6.9%
87	Universidade Estadual do Ceará	Northeast	CE	State university	388	26	6.7%

Table 1 (Cont.)

Rank	University	Region	State	Institution Type	Sample size	Inbred Scholars	Endogamy
88	Universidade de Fortaleza	Northeast	CE	Private university	152	10	6.6%
89	Universidade Federal de Sergipe	Northeast	SE	Federal university	675	44	6.5%
90	Universidade Estadual Paulista Júlio de Mesquita Filho - Ilha Solteira	Southeast	SP	State university	139	9	6.5%
91	Universidade do Estado da Bahia	Northeast	BA	State university	236	15	6.4%
92	Pontifícia Universidade Católica de Campinas	Southeast	SP	Private university	97	6	6.2%
93	Universidade Católica de Brasília	Midwest	DF	Private university	115	7	6.1%
94	Universidade Estadual Paulista Júlio de Mesquita Filho - Presidente Prudente	Southeast	SP	State university	116	7	6.0%
95	Universidade Estadual de Feira de Santana	Northeast	BA	State university	276	16	5.8%
96	Universidade Federal Rural da Amazônia	North	AM	Federal university	71	4	5.6%
97	Universidade Tuiuti do Paraná	South	PR	Private university	54	3	5.6%
98	Universidade Federal de Juiz de Fora	Southeast	RJ	Federal university	649	36	5.5%
99	Universidade Estadual Paulista Júlio de Mesquita Filho - Bauru	Southeast	SP	State university	210	11	5.2%
100	Universidade de Ribeirão Preto	Southeast	SP	Private university	59	3	5.1%

Source: Composed by the authors.

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