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Entrenched Disadvantage and the Internationalization of Education: A Review of the Science without Border Program in Brazil

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Abstract: Brazil has focused on internationalization of the higher education sector, in response to trends across the globe. The main program for promoting internationalization was the Science without Borders program. The paper analyses Brazilian international mobility from a regional perspective, particularly reviewing how inequality affected access to fellowships. The Northeast Region, which historically records higher poverty indicators than the South and Southeast regions, showed average growth statistically equal to the Southeast Region. By comparing access to scholarships and fellowships between the two largest regions of Brazil, this paper sought to analyze any structural change between the Southeast region and the Northeast. The Science without Borders (*Ciência sem Fronteira*, in Portuguese) program has achieved considerable results. In the first four years

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of the program, completed student exchange programs increased by 1,620% (i.e., 2011-2014). Despite this, the structure of unequal regional access remained. Using the hypothesis test methodology T for means with different variances, it was possible to evaluate at a significance level of 95%. The two largest regions in Brazil maintained the unequal profile of access to the program. The conclusion is that the growth in the offer of scholarships for internationalization between 2010 and 2019 has not changed the unequal regional profile of access to public education services in Brazil.
Keywords: Brazilian education policy; public investment; internationalization; higher education

Desventaja atrincherada e internacionalización de la educación: Una revisión del Programa Ciencia sin Fronteras en Brasil

Resumen: Brasil se ha centrado en la internacionalización del sector de la educación superior en respuesta a las tendencias a nivel global. El principal programa de promoción de la internacionalización fue el programa Ciencia sin Fronteras. El artículo analiza la movilidad internacional brasileña desde una perspectiva regional, particularmente revisando cómo la desigualdad afectó el acceso a las becas. La Región Nordeste, que históricamente registra indicadores de pobreza más altos que las regiones Sur y Sudeste, presentó un crecimiento promedio estadísticamente igual al de la Región Sudeste. Al comparar el acceso a becas e intercambios entre las dos regiones más grandes de Brasil, este artículo buscó analizar cualquier cambio estructural entre la región Sudeste y el Nordeste. El programa Ciencia sin Fronteras (Ciência sem Fronteira, en portugués) ha alcanzado resultados considerables. En los primeros cuatro años del programa, la iniciativa de intercambio de estudiantes logró aumentar en un 1,620% (2011-2014). A pesar de ello, se mantuvo la estructura de acceso regional desigual. Utilizando la metodología de Prueba de Hipótesis T para medias con diferentes varianzas, se logró evaluar a un nivel de significancia del 95%. Las dos mayores regiones de Brasil mantuvieron el perfil desigual de acceso al programa. La conclusión es que el crecimiento en la oferta de becas para la internacionalización entre 2010 y 2019 no modificó el perfil regional de desigualdad en el acceso a los servicios de educación pública en Brasil.
Palabras clave: política educativa brasileña; inversión pública; internacionalización; educación superior

A desvatagem arraigada e a internacionalização da educação: Uma revisão do Programa Ciência sem Fronteiras no Brasil

Resumo: O Brasil tem focado na internacionalização do setor de ensino superior, em resposta às tendências em todo o mundo. O principal programa de promoção da internacionalização foi o programa Ciência sem Fronteiras. O artigo analisa a mobilidade internacional brasileira a partir de uma perspectiva regional, especialmente analisando como a desigualdade afetou o acesso às bolsas. A Região Nordeste, que historicamente registra indicadores de pobreza mais elevados do que as regiões Sul e Sudeste, apresentou crescimento médio estatisticamente igual ao da Região Sudeste. Ao comparar o acesso a bolsas de mobilidade de estudantes e professores entre as duas maiores regiões do Brasil, este artigo buscou analisar qualquer mudança estrutural entre a região Sudeste e Nordeste. O programa Ciência sem Fronteira alcançou resultados consideráveis. Nos primeiros quatro anos do programa, o intercâmbio de estudantes aumentaram 1.620% (ou seja, 2011-2014). Apesar disso, a estrutura de acesso regional permaneceu desigual. Utilizando a metodologia de teste de hipótese T para médias com diferentes variâncias, foi possível avaliar o nível de significância de 95%. As duas maiores regiões do Brasil mantiveram o perfil desigual de acesso ao programa. A conclusão é que o crescimento da oferta de bolsas para internacionalização entre 2010 e 2019 não alterou o perfil regional desigual de acesso aos serviços públicos de educação no Brasil.

Palavras-chave: política educacional brasileira; investimento público; internacionalização; educação superior

Entrenched Disadvantage and the Internationalization of Education: A Review of the Science without Border Program in Brazil

Internationalization in higher education (HE) is becoming more prominent (de Wit, 2002; 2011), though the term itself remains contested (Green, 2019), there is acknowledgement that HE needs to prepare graduates for a globalized world (Robles & Bhandari, 2017). Ambitious and competitive internationalization trends across the globe (De Wit, 2002; Naidoo & Jameison, 2005; Van Gaalen, 2010) have arisen from misconceptions about internationalization, many of which have political and economic dimensions (Jones et al., 2015). Studies of higher education internationalization processes and goals (HEI) show varied perceptions and agendas (Archanjo, 2017; Lucchesi, 2002; Lucchesi & Malanga, 2010; Scott, 2005). Internationalization does have its merits; Patel (2017) suggests that transnational collaboration can support intercultural learning and enhance an effective way through which to integrate the local and global. Understanding the cultures, knowledges and ethos of others across the globe is important today, not only because lack of awareness increases conflict and problematizes shared experiences; but also, positive outcomes could pave the way for better transnational collaborations that solve global challenges. Critical internationalization (Stein, 2019) can overcome the nefarious challenges associated with superficial forms of internationalization, by ethically and radically supporting meaningful processes of exchange and collaboration. These need to be depoliticized and radical, ensuring that students and staff engage with the ontological and epistemological challenges of our complex globalized world (Khoo, 2011).

Theoretical Background

Brazil is a country with deep inequalities. In 2019, 0.1% of richest have consolidated 28.3% of the country's total income, according to the human development index (United Nations, 2019). The inequality is also reflected in groups who have had access to education and where. The percentage of children aged 7 to 14 enrolled in public schools decreases as household per capita income increases: for the first quintile household per capita income distribution is 97% and for the fifth quintile it is only 38% (Bursztyn, 2016). Educational inequalities also have socioeconomic, racial, gendered, and territorial markers.

Brazil has also invested during the Labor Party government in access to education and experienced an increase in the number of years of schooling from 7.2 in 2011 to 9.3 in 2018 (Instituto Brasileiro de Geografia e Estatística, 2019) and an increase in the education index (average years of schooling and estimate of the number of years children will remain in school) from 0.486 to 0.765 (1990 to 2020).

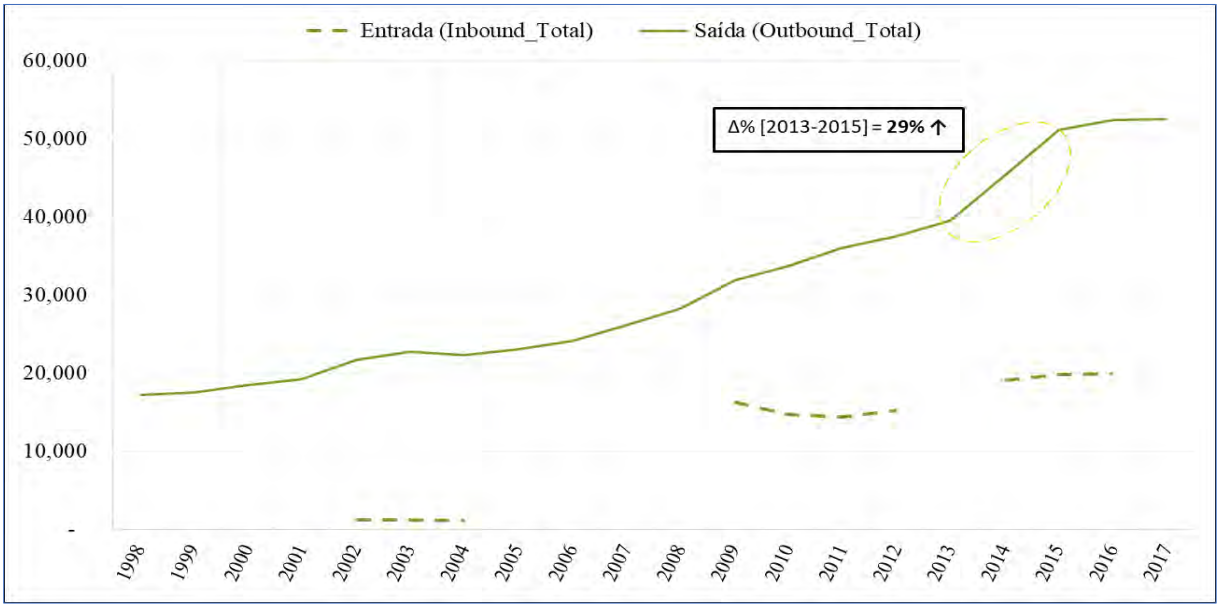
Another crucial element in the country's recent developments has been a strong investment in the higher education system and increasing and diversifying access to higher education. In 2012, a quota system was introduced: 50% of places in public universities (59 federal universities and 38 institutes of education, science and technology recognized by the ministry of Education) have to be allocated to students coming from public schools (split between low income – corresponding to one minimum wage and a half or less – and higher income – above one minimum wage and a half – and taking into account the "racial" composition in the state). Simultaneously, several programs were implemented to expand access to higher education.

At the same time Brazil has also become a player in the internationalization of higher education, mostly as an origin country of international students. Waters (2012), has argued that the evidence, to date, suggests that international education entrenches (and in some cases, particularly within emerging economies, indeed actively creates) social inequalities (p. 123).

Globalization has had a direct influence on HE policy, resulting in a marked increase in international exchange programs, student mobility and students moving to other countries to study. Policy changes around internationalization in HE have modelled systems and mechanisms used in the west, though this do not often translate seamlessly due to cultural, economic, and political differences (Berger et al., 2013). Internationalization is systematically used as a model for stimulating innovative learning environments, epistemic diversity, and transnational collaborative enquiry (Bernasconi & Celis, 2017). Musselin & Teixeira (2014), make the argument that policy reforms in Latin America are designed to improve organizations and provide structural investments which enable healthy competition and contribution from academia in the region. However, instructional practices are not always aligned to holistic policy reforms, truncating opportunities for the policies to contribute to improvement in access to education, student retention and attainment. Brunner & Villalobos (2014) contend that initiatives often reinforce established approaches and frameworks, though they report a small number of cases where public mechanisms are initiated to enhance systemic change. This had led to well established investment in academic institutions and research in the region over the last 15–20 years, though this change is sometimes introduced by agitation for inclusion and political change by student movements (Bernasconi & Celis, 2017). Sustained investment is therefore a crucial element of progress. It is important to evaluate how policy reforms support or hinder positive change. It is also pertinent to demonstrate how implementation of policy may be complemented by other broader policy matters. One key policy driver has been mobility to support internationalization in Brazil.

Figure 1

Brazilian Internationalization Students



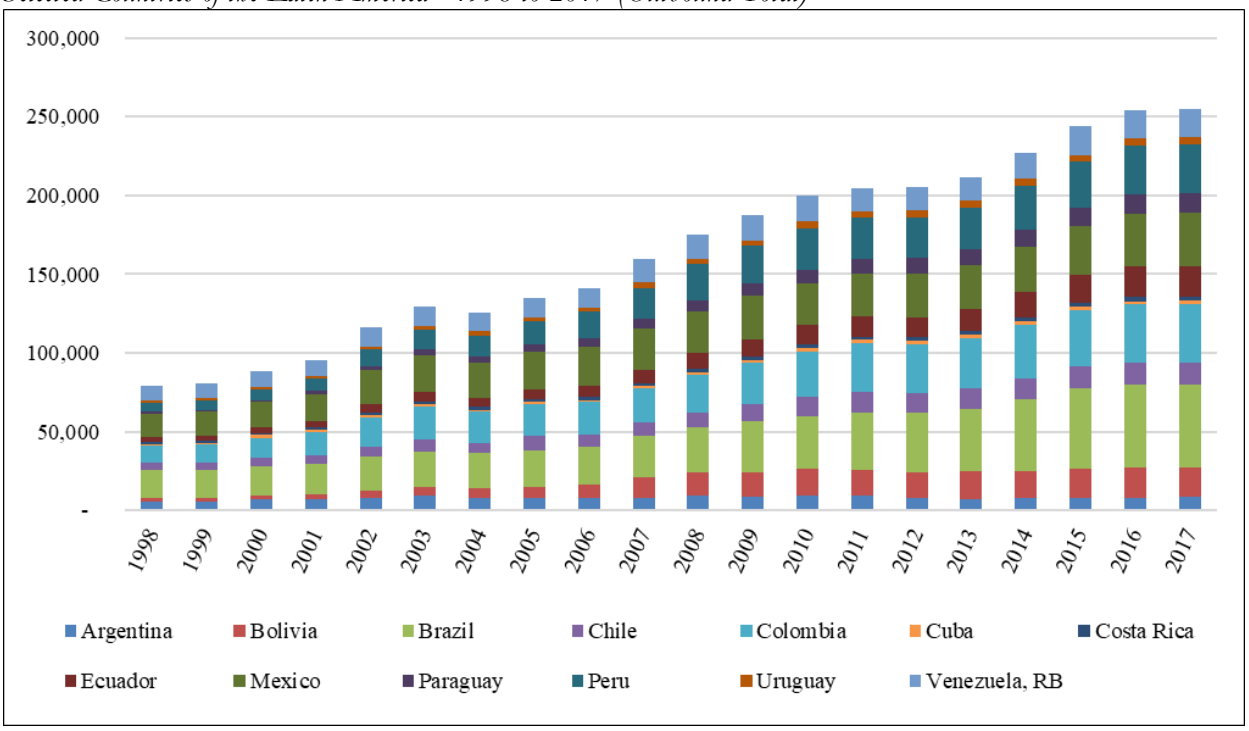
Note: Education statistics from the World Bank and Institute for Statistics from UNESCO. Elaboration by authors.

Brazil sent more than half a million students abroad, while receiving 123,000 between 1998 - 2017 (Figure 1). The importance of data is central to development of Brazilian HE, as it provides context for understanding knowledge exchange with other countries. High income countries similarly use data to strategically plan programs and promote knowledge exchange with specific countries. Brazil sought to reactivate relationships between Portuguese-speaking countries mostly in Africa. It is important to note the historical significance as Brazil was built with African labor, and secondly, greater proximity to the southern axis of the globe improves the quality of relations between countries. "Lula (past president) construed internationalization of higher education as a form of reparation (if only symbolically) for the historical debt Brazil accrued from slavery, and as a form to recognize Afro-Brazilian's role in building the nation" (Cesarino, 2017; Majee & Ress, 2018).

In Latin America, data in most cases is unavailable for inbound student numbers, this may be because the numbers are so low or unregistered. However, outbound student data indicates significant numbers seeking study abroad. In the period under consideration, three countries expanded outbound student number. Brazil, Colombia, and Peru increased 35.2 thousand, 25.8 thousand and 24.7 thousand, respectively. The largest relative expansion was in Paraguay, Bolivia, and Ecuador with increase of the 1,124%, 710% and 470%, respectively (See Figure 2).

Figure 2

Selected Countries of the Latin America– 1998 to 2017 (Outbound Total)

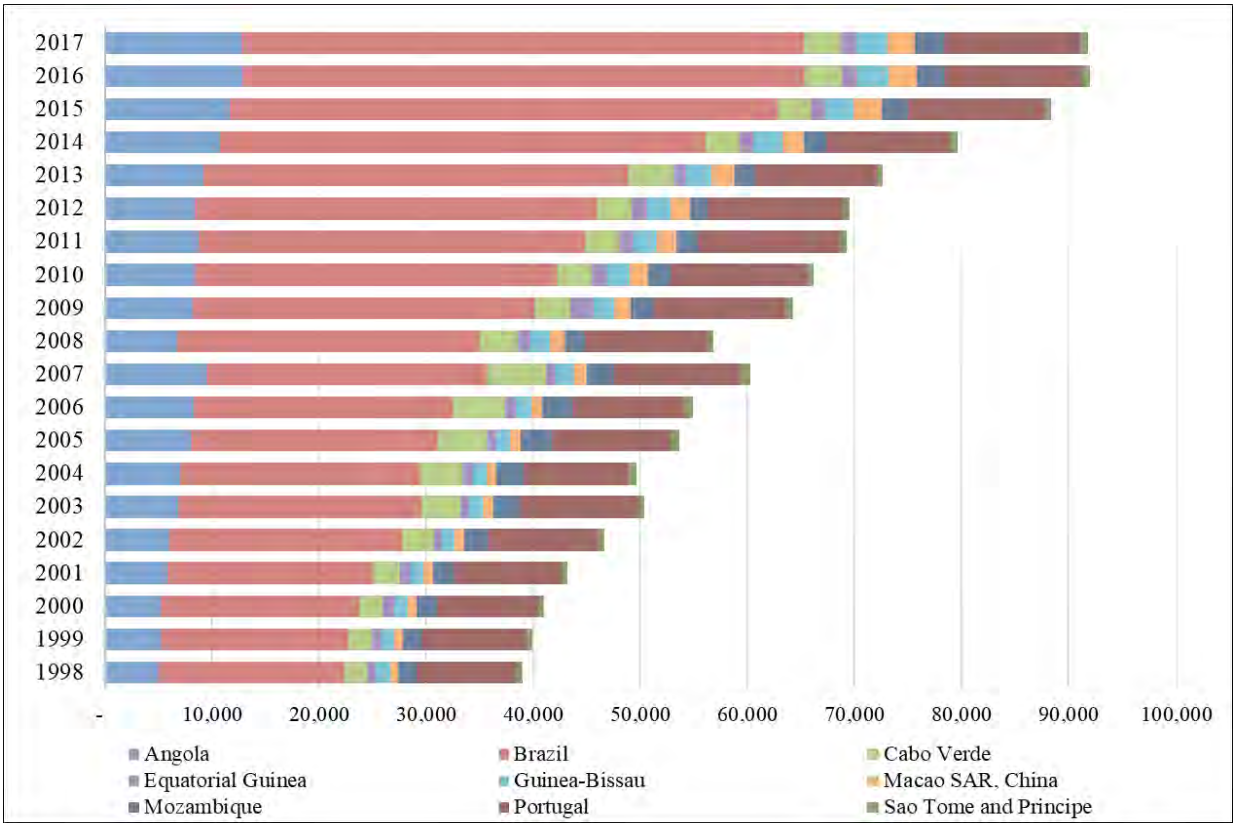


Note: Education statistics from World Bank and Institute for Statistics from UNESCO. Elaboration by authors.

Portuguese speaking countries, have a comparable situation, the number of outbound is significantly more than inbound, with exception in the case of Angola. In absolute and relative terms, Brazil, Angola and Macao SAR, China send more students with 35,200 (204% variation), 7,600 (151% variation) and 1,8000 (235% variation), respectively (See Figure 3).

Figure 3

Portuguese Speaking Countries – 1998 to 2017 (Outbound Total)



Note: Education statistics from the World Bank and Institute for Statistics from UNESCO. Elaboration by authors.

Overall, Brazil improved its participation in mobility of students, when compared to other Latin American and Portuguese speaking countries. One reason for that was the advent of the Science without Borders (SwB), as the only large-scale program of this nature designed specifically to accelerate academic excellence and internationalization in Brazil.

Brazil's Science without Borders Program

Science without Borders (SwB) was a response to a conversation in the Brazilian academic ecosystem about quality, effectiveness, and regional asymmetry with respect to educational attainment and access. In Brazil, the dialogue around the value and contribution of Brazilian academics and research when compared with other international institutions was difficult to assess; this was particularly important in the case of student mobility due to significant increase in student mobility over the last 30 years (Yaluk, 2018*)*. SwB was created to "[...] promote the consolidation, expansion, internationalization of science, technology, innovation and improve the Brazilian competitiveness through the exchange and international mobility" (Ministry of Education, 2011).

Acknowledging the low level of mobility and language barriers the government was keen to strengthen Brazil's position as an economic and political force (Ministry of Education, 2011). It is important to frame this policy in the context of the rapid economic growth of the period and the political expansion of the country amongst similar countries, the BRICS – Brazil, Russia, India,

China, and South Africa. Political scientists and economists (O'Brien and Williams, 2013; O'Neill, 2001; Wilson & Purushothaman, 2003) postulated that the development of the Brazilian economy had to be underpinned by the neoliberal principles and foundation elements of high-income countries. Particular significance was given to science, technology, and innovation as well as the accompanying research and academic substructure of educating competitive global citizens. Ideological considerations (Rivas & Mullet, 2016) purporting that it was essential for government to prepare future scientists and students for the globalized market and simultaneously expect a return in investment for the entire country were brought to the fore. Competitive graduates will contribute to innovation and development by creating knowledge that will ultimately benefit HE and make further education attractive and relevant for other young people (Maldonado-Maldonado & Reyes, 2017).

The internationalization process was promoted through mobility programs for students in higher education. Access to higher education was already developing exponentially. The Brazilian public university system grew over the past 15 years, creating new universities and institutions throughout the country (MacManus & Nobre, 2017). In 2003, Brazil had 169 public universities, increasing 75% to 296 in 2017 (Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira, 2018). This process created new undergraduate and graduate courses, increasingly the number of people with undergraduate degrees from 12% in 2012 to 16.5% (persons between 25-34 years) (Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira, 2018). However, most of the growth was concentrated in the South and Southeast regions, a consolidation of the skew of development and historical advantage for the more economically prosperous regions.

In addition, Brazil is rapidly expanding its graduate portfolio, graduating about 18, 000 PhDs and 55,000 masters students annually. In 2020, Brazil has an average of eight PhDs per thousand inhabitants (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, 2020), in high income countries, the current rate is between 5 and 20 PhDs per thousand inhabitants (MacManus & Nobre, 2017; OECD, 2019). At present, the percentage of masters and PhDs in Brazil's population is insignificant - around 2% of the population (across the OECD, 14% of adults hold a masters or doctoral degree; OECD, 2019).

The most significant indicator of the expansion of access to HE participation is revealed in evaluation of the bottom 70% of the Brazilian income distribution (per capita family income). Oliveira (2020) reports the increase was most significant between 2001 and 2015. The Black population, for example, increased participation "in higher education from 21.9% of students in 2001 to 43.5% of students in 2015". Unfortunately, race data relating to the internationalization of student s is not available. However, the analysis of regional access process may reveal the significance of specific indicators with respect to disadvantaged students' access to the program based on the numbers applying from economically disadvantaged region.

The SwB program was created on 26 July 2011 and ended on 2 April 2017; it made laudable contributions to the Brazilian educational ecosystem. SwB had notable challenges, and a review in 2015 (Sá, 2016) highlighted three major ones: high demand beyond the capacity of the program leading to bureaucratic delays and poor quality of provision and transition for students; weak language skills, especially in English with many students needing extra language coaching to fulfil requirements in the destination HEIs. Finally, the program lacked strategic application in both design and consolidation; as it was not linked effectively to an industrial strategy or policies that will lead to significant, identifiable benefits with respect to growth (Palfreyman et al., 2017).

Furthermore, issues of poor funding, expansion, stratification, and inequity persistent in Brazilian HE was not sufficiently addressed by the development of the program (Maldonado-Maldonado & Reyes, 2017). It can be argued that in the first two years the SwB reproduced the inequalities dominant in the system by providing monies for the most privileged (Iorio &

Pereira, 2018). The economic downturn 2008, contributed to problems in the implementation and sustainability of SwB in the early years. Students who may have been able to apply for the programs had major financial pressures at home, they also needed language and important upskilling to participate in the exchange programs; it can be argued that this further tilted the accessibility towards the rich and privileged (Iorio & Pereira, 2018). However, it seems that a rapid expansion of the program around 2015 reversed this trend.

The exchange program enabled students to acknowledge the quality of their education (Périco & Gonçalves, 2018, p. 11). Notably, in a large study of 586 respondents about the student experience during SwB fellowships, Périco and Gonçalves (2018, p. 11) found that 87.2% Brazilian students expected their study abroad destination HEIs to be considerable better. However, after the exchange, only 40.1% of students said the study abroad experience met their expectations. Indeed, 88.5% of the dissatisfied students considered their Brazilian HEIs much better. This indicates a good positioning for Brazilian HEIs, since these students previously expected higher quality in foreign teaching and after the exchange improved their opinions about the quality of provision in their home institutions."

Nevertheless, students found the SwB beneficial. According to one assessment report presented to the Brazilian Senate (Senado Federal do Brasil, 2015), of the 14,627 students that responded to a survey, the experiences were evaluated as positive for 92% of the cases due to the opportunity to study abroad. In addition to positively evaluating the universities, 58% of the participants stated that, after the academic exchange period, they gained fluency in the language of the country of study.

From an economic perspective, SwB was considered expensive, particularly when analyzing cost/benefit and cost/effectiveness for the entire country (INEP, 2016). From this perspective, the per capita expenditure was five times more than student costs in a Brazilian public university (INEP, 2016). However, this argument ignores the economic and political crises that began in 2014; since then, the Brazilian government has cut spending dramatically and reduced funding for all social programs (Peres & Santos, 2020). Education has been particularly affected, as such the costs comparisons are unjustifiable since federal government investments in social policies have been so low (Amaral, 2017). The reduction in expenditure makes it difficult to reasonably evaluate the effectiveness of the SwB Program. It is important to consider the overall value of the SwB, incorporating benefits to the academic community, student experience, employability outcomes and benefits to industry, civic society and the third sector in the long term.

Brazil has several layers and inequity (Alvaredo et al., 2017), which manifest in different forms, this provides interesting angles for interrogating internationalization of Higher Education, specifically, examining how institutions access opportunities (students and staff mobility out) experiences and challenges over the period when there was a strategic internationalization push in from Brazil. The education policy of the Labor government (Lula and Dilma) between 2003-2016, was controversial and in some cases riddled with contradictions. Though the policies were quite radical, the implementations were not sufficiently robust. Policies were paper thin; they did not go far beyond simply making developmental statements. They failed to confront the complex social relationships dominant in the ecosystem which did not disrupt inequalities (Frigotto, 2010). This contradiction will be explored into the paper analyzing Science Without Borders Program. We will explore Science without Borders as a contradiction of dualistic politics – despite the social bias and alleged democratization, it serves selected groups historically benefited by educational policies, concentrated in the southeastern region of Brazil. For this, the paper examines the regional impact of SwB, highlighting the value of the program and significant economic and long-term benefits for some communities.

Methodology

Context

In Brazil, the database for compiling of information about inbound and outbound student experiences are weak, there is particularly poor record keeping around aspects relating to internationalization and student mobility. Surveys like the National Student Satisfaction (NSS) in the United Kingdom or Student Experience Survey (SES) in Australia are provided in some institutions, but they are ad hoc. There are, however, reports about the programs complied by various and sometimes disparate government ministries and agencies. The most recent official report. *Higher Education and Student Mobility: A Capacity Building Pilot Study in Brazil* (Robles & Bhandari, 2017), provides vital information about flow and net mobility in 158 Brazilian's institution of higher education for 2017. The report also provides information on the institution's budget and policy to promote internationalization. In addition, there is an online platform of SwB (*Ciência Sem Fronteria*) that reports outdated information. Nevertheless, this study used the data of World Bank, UNESCO, the report Higher Education and Student Mobility and platform online of SwB, with updates from The Electronic System of the Citizen Information Service (e-SIC) to support analysis.

Data Collection

Data was obtained from the databases of education statistics from the World Bank and UNESCO's Institute for Statistics, and The Electronic System of the Citizen Information Service (e-SIC) was used to collate data from the Brazilian Ministry of Education. All three sets of data were used to build a time series. Data was also extracted and cross referenced with various reports and agency information (See Table 1).

Table 1

Available and Unavailable features by country – 2000 to 2017

N	Variable	Absent data (unavailable)	Reported data	Source
1	Total inbound internationally mobile students, both sexes (number)	372	348	WB/UNESCO
2	Total outbound internationally mobile tertiary students studying abroad, all countries, both sexes (number) (Outbound_T)	-	720	WB/UNESCO
3	Destination of Brazil's International Students by Country	-	87	Education of Ministry (Brazil)
4	Origin of Brazil's International Students by Region and Municipality	1,323	997	Education of Ministry (Brazil)
5	Foreign Researcher by Brazilian Municipality	419	521	Education of Ministry (Brazil)

Note: Education statistics from the World Bank, Institute for Statistics from UNESCO and Education of Ministry (Brazil). Elaboration: by authors.

Analysis

The quantitative analysis focuses on disparity in access to the SwB fellowships and scholarships by examining differences in the two largest regions in Brazil (Southeast region and the Northeast region). For this, a *T* test for two samples with unequal variances was used to analyze the Science without Borders (SwB) data. All calculations were conducted using Stata, version 14 and excel. In general, the best variable of the series is "Total outbound internationally mobile HE students studying abroad." As continental country with varied types of inequality, the Brazilian process of internationalization of Higher Education provides a unique vanguard for assessing how access to funding opportunities could shape inequities.

The annual rate of SwB students per Brazilian regions across nine years was calculated. Following this the *T* test was applied to verify if there were any significant differences in the statistical average between numbers of SwB students from the Northeast and Southeast. The option for the *T* test was because the sample size per year was relatively small (N<30).

$$\begin{cases} H_0 : \mu_1 = \mu_2 = \ldots = \mu_k \\ H_1 : at\ least\ one\ average\ is\ different \end{cases}$$

H_0: *null hypothesis indicate that the mean between Northeast and Southeast are equal.*
H_1: *alternative hypothesis is the mean between Northeast and Southeast are different.*

Data and Results

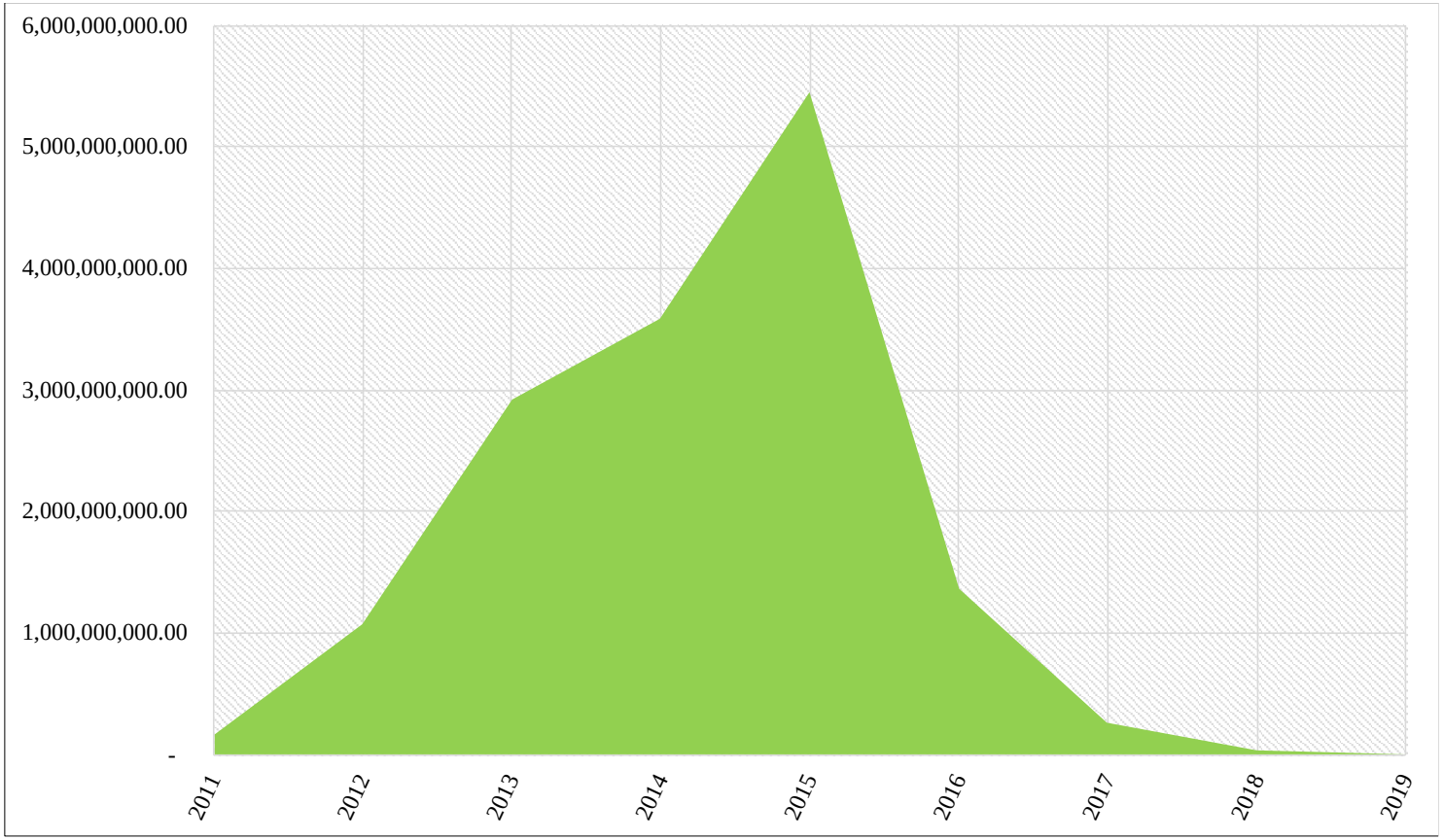
Science without Borders (*Ciência Sem Fronteira)*

The Ministry of Education spent more than R$ 14.8 billion (£ 2.9 billion or US$ 3.7 billion) between 2011 and 2019 (See Figure 4). The money paid for accommodation, tuition, living expenses and flights. The program planned to facilitate 95,000 student exchanges in total[1]; comprising undergraduate and PhD sandwich programs. It sent 53,000 undergraduate students and 24,000 PhDs on fellowships, respectively (See Table 2). It is difficult to fully understand why there was a short fall of 18,000 students and faculty. Evidence suggests the process was cumbersome; Granja & Carneiro (2021) noted that SwB presented difficulties through all phases, from conceptualization, based on the contemporary challenges in HE, through to formulation, implementation, and evaluation of the policy. To compound issues, over the same period significant cuts in research funding stalled motivation and opportunities for knowledge exchange (Brazil, 2021).

[1] Including data from the year 2010 because SwB was created in July 2011. The microdata from Electronic System of the Citizen Information Service (e-SIC).

Figure 4

Expenditure of Science without Borders (Ciência Sem Fronteira) – 2011 to 2019



Source: Portal Transparência. (http://www.portaltransparencia.gov.br/programas-de-governo/08-ciencia-sem-fronteiras?ano=2018) and evaluation report of the Science without Borders program by the Senate Federal, 2015 [Senado Federal do Brasil, 2015], with data from CAPES and CNPQ. Production: by the authors with use of the Brazil's Central Bank calculator (Bacen), 2019. Broad Consumer Price Index (IPCA) of the Instituto Brasileiro de Geografia e Estatística (IBGE), Constant Prices of September 2019 R$. * 25 September 2019.
OBS: The data available up to November 2019, is incomplete. Exchange rate: £ of 5.10 and US$ of 4.00.

Table 2

*Internationalization Students of Brazil - January 2010 to November 2019**

Local/Modalities	2010	2011	2012	2013	2014	2015	2016	2017	2018	Jan-Nov 2019	Total Yrs
ABROAD DESTINATION (outbound)	**2,837**	**3,633**	**8,992**	**18,269**	**27,165**	**13,420**	**1,724**	**6,073**	**4,183**	**3,201**	**89,497**
Undergraduate (sandwich degree)	978	1,205	5,026	13,468	20,726	8,709	783	742	855	607	53,099
Undergraduate (full)	2	2	6	11	19	0	0	0	0	0	40
Master (sandwich degree)	24	49	81	69	46	29	8	22	11	9	348
Master (full)	0	0	2	0	567	4	0	0	0	4	577
PhD (sandwich degree)	1,195	1,542	2,236	2,786	3,470	3,170	561	4,590	2,747	1,897	24,194
PhD (full)	102	110	270	753	1,058	384	10	81	114	22	2,904
Postdoctoral	394	525	509	789	797	552	158	322	221	133	4,400
Visiting Professor	133	85	179	315	394	529	115	239	229	477	2,695
Linguistic Improvement	0	0	537	0	0	0	0	0	0	0	537
Specialization	9	115	146	77	88	43	0	0	0	0	478
Capacitation	0	0	0	0	0	0	77	74	0	51	202
Chair	0	0	0	1	0	0	12	3	6	1	23
BRASIL DESTINATION (inbound)	**173**	**415**	**406**	**990**	**1,393**	**1,162**	**577**	**328**	**166**	**763**	**6,373**
Undergraduate (sandwich degree)	0	131	0	179	238	159	226	80	76	40	1,129
Undergraduate (full)	0	1	109	226	219	211	47	0	0	0	813
Master (sandwich degree)	0	0	6	17	16	4	0	1	1	0	45
Master (full)	9	10	9	11	1	1	0	1	0	0	42
PhD (sandwich degree)	33	28	66	80	63	30	18	17	15	1	351
PhD (full)	100	126	114	177	123	94	9	80	35	90	948
Postdoctoral	19	13	41	126	260	326	200	84	13	88	1,170
Visiting Professor	12	106	34	71	296	183	5	21	10	451	1,189
Invited Professor	0	0	0	0	0	0	1	30	14	68	113
Scientific/Technological Initiation	0	0	5	44	83	107	71	13	2	0	325
Talent Youth	0	0	22	59	94	47	0	1	0	25	248
Total	**3,010**	**4,048**	**9,398**	**19,259**	**28,558**	**14,582**	**2,301**	**6,401**	**4,349**	**3,964**	**95,870**

Note: Ministry of Education (Brazil) with support The Electronic System of the Citizen Information Service (e-SIC). Elaboration: by authors. OBS: The data available until November 2019, the data are incomplete for this year.

From 2010 to 2019, the program was able to attract 6,000 inbound students, talented youth, masters, postdocs, researchers, and professors. This was significantly below the 18,000 projected to engage at the start of the program. The major critique of the program was poor holistic oversight. SwB paid for accommodation and flights, however the living conditions and poor infrastructure and status of higher education institutions was not sufficiently attractive to international researchers. Only elite universities with large funding pots are routinely considered, leaving most public institutions unappealing. Though this is not a uniquely Brazilian challenge, it is common to facilitate exchange between institutions with high status and HE ranking; however, this is exacerbated in Brazil. For example, in the QS ranking, which is a rough and complicated guide for HE status, Brazil has seven universities in the top seven hundred (between 100 – 700). They are all located in the Southeast of Brazil, mostly in large: four in São Paulo, two in Rio de Janeiro and one in Minas Gerais state). Federal University of Pernambuco (in the Northeast) is the only exception and is between 801-1000 in the QS ranking.

Over the last 30 years, SwB has been the only extensive program promoting international mobility for Brazilian students. The entire policy for studying abroad was driven by the need to promote internationalization and knowledge exchange. Consequently, the decrease of expenditure indicates a downward trend of the process. Between the years 2015 to 2017 the reduction was of R$ 5.0 billion (£ 1.0 billion or US$ 1.4 billion) with a negative variation of 95%.

The SwB, reversed to a significant extent the history of regional inequality linked to access to mobility programs in HE. The Northeast region, with a population of 57 million (27% of entire country), for example, had more access at the undergraduate level to fellowships abroad. Traditionally, regional advantage has remained with the more affluent south. Table 2 shows that SwB sent 53,000 Brazilian students abroad.

The main destinations for Brazilian students were the USA, France, Germany, Portugal, Italy, and the United Kingdom (See Table 3). Students' desire to go to the USA and the UK can be explained by improved efficiency in English language and for the internal recognition of university centers in these countries (Finardi & Archanjo, 2018). Brazil has introduced policies to use English in HE (Martínez, 2016), and this is a major driver in this regard. Destinations such as Germany and Italy were preferred for cultural reasons given the link to historical migratory flow of peoples from these countries to Brazil after the Second World War. The sociocultural link between such countries remains strong. France was a major destination because of its investment on Brazilian HE at the beginning of the 20th century; the country had a strong influence on the formation of the Brazilian higher education system and development of faculty. Strong relationships remain between academics in the two countries. Finally, Portugal has always been a destination for Brazilian students due to the period of colonization and sociocultural ties.

Table 3

*Brazilian's Students by Destination Country (all modalities) - January 2010 to November 2019**

Position	Country	Outbound	Position	Country	Outbound
1	USA	31,509	45	LUXEMBOURG	12
2	FRANCE	13,462	46	SAO TOME AND	10
3	GERMANY	7,784	47	SINGAPORE	8
4	PORTUGAL	6.417	48	SURINAME	6
5	ITALY	4,397	49	ECUADOR	6
6	UK	3,825	50	VENEZUELA	6
7	CANADA	3,650	51	SLOVENIA	6
8	SPAIN	3,548	52	SOUTH KOREA	5

Position	Country	Outbound	Position	Country	Outbound
9	IRELAND	3,384	53	TURKEY	4
10	HUNGARY	2,140	54	SLOVAKIA	4
11	AUSTRALIA	2,034	55	HAITI	3
12	ARGENTINA	1,295	56	KENYA	3
13	NETHERLANDS	981	57	TAIWAN	2
14	SWEDEN	575	58	HONG KONG	2
15	JAPAN	534	59	SERBIA	2
16	MOZAMBIQUE	414	60	CROATIA	2
17	NORWAY	406	61	THAILAND	2
18	BELGIUM	383	62	ESTONIA	2
19	MEXICO	334	63	MONACO	2
20	CHINA	309	64	PHILIPPINES	2
21	DENMARK	290	65	GUINEA BISSAU	1
22	SWITZERLAND	265	66	LATVIA	1
23	AUSTRIA	188	67	MALTA	1
24	URUGUAY	167	68	MARTINIQUE	1
25	EAST TIMOR	148	69	PANAMA	1
26	CUBA	142	70	NICARAGUA	1
27	CHILE	127	71	TANZANIA	1
28	NEW ZEALAND	85	72	BULGARIA	1
29	COLOMBIA	83	73	GUADELOUPE	1
30	BOLIVIA	82	74	NIGERIA	1
31	CAPE GREEN	79	75	CAMBODIA	1
32	FINLAND	70	76	ZIMBABWE	1
33	SOUTH AFRICA	49	77	LEBANON	1
34	CZECH	41	78	FRENCH GUIANA	1
35	ANGOLA	25	79	EGYPT	1
36	PUERTO RICO	22	80	CAMEROON	1
37	ISRAEL	22	81	ARMENIA	1
38	INDIA	21	82	BENIN	1
39	POLAND	18	83	ICELAND	1
40	GREECE	18	84	SENEGAL	1
41	COSTA RICA	17	85	ROMANIA	1
42	PARAGUAY	17	86	SAUDI ARABIA	1
43	PERU	15	87	LITHUANIA	1
44	RUSSIA	13		TOTAL	**89,497**

Note: Ministry of Education (Brazil) with support The Electronic System of the Citizen Information Service (e-SIC). Elaboration: by authors. OBS: The data available until November 2019, the data are incomplete for this year.

It is important to point out that Argentina, a Latin American country, and Mozambique in Africa also had significant participation in SwB, receiving 1.2 thousand and 414 Brazilian students, respectively. Argentina is Brazil's main economic partner and geographically close, while Mozambique retains a close relationship between Latin America's only Portuguese speaking country and those on the African continent due to shared use of language and colonialization by Portugal. A

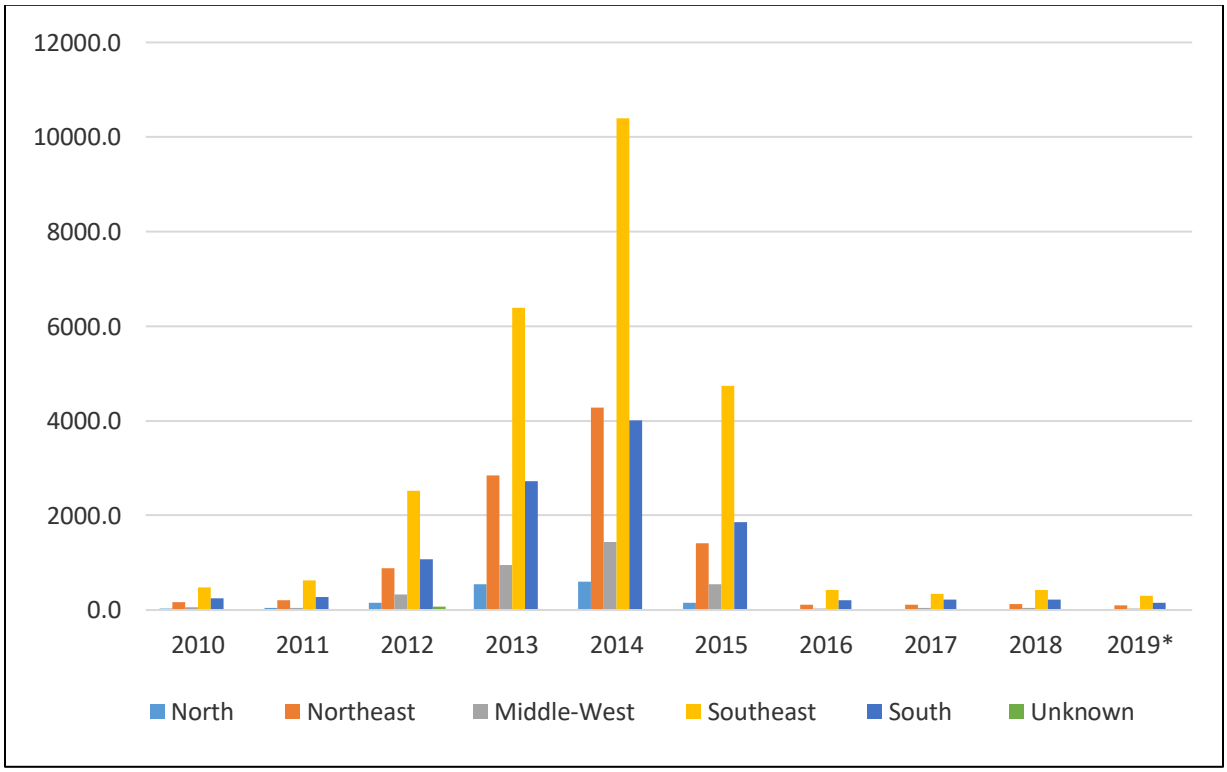
number of reports from the Coordination for the Improvement of Higher Education Personnel (CAPES) criticize this as the students involved in exchanges sometimes engage with countries that do not improve their English language skills which are essential goal of SwB. This argument precluded that SwB should exclude Portugal as a destination country for undergraduate students in 2013 (Portugal será excluído, 2013)

This process can also favor the maintenance and invisibility of social inequalities and the hegemony of the English language, in addition to the perpetuation of differences that favor higher education systems in high income countries, such as the USA. Proficiency in the English language as a selection criterion in the first phase of the program denotes the fragility of concepts of equity that anchor the CsF when you also consider variables such as race-ethnicity and social class (Borges, 2015).

The expansion of outbound numbers occurred between 2011 and 2015, this is when internally the Southeast region achieved an impressive peak of 10,000 outbound students, in just one year. Historically, the regions of Brazil that send more students abroad are the Southeast and South regions, and the data of 2010 shows that participation from these regions was 73% of total. The South region accounted for 1.5 times the number of outbound students when compared with the Northeast region (though population in the North is almost double that of the South region). After four years, by 2014, the Northeast was able to send more students than the South region with 2,848 outbound students; that is, 272 more engaging in mobility. (See Figure 5). The Northeast region increased more than the South region until 2014, after which a dramatic decrease was recorded.

Figure 5

Brazilian's Internationalization Students by Region of Origin (undergraduate) - January 2010 to November 2019



Note: Ministry of Education (Brazil) with support The Electronic System of the Citizen Information Service (e-SIC). Elaboration: by authors. * For 2019 those accounted for are from January to November 2019.

Brazil has 5,568 cities of 20,000 inhabitants or more representing 69% of the total. See Table 6 for categorization of cities. SwB, program engaged students from 231 cities. It is important to note that the data refers to the students' institutions, not their cities of origin. The data focuses more on institution than students' places of origin (See Table 6).

Table 5

Classification by Stratum

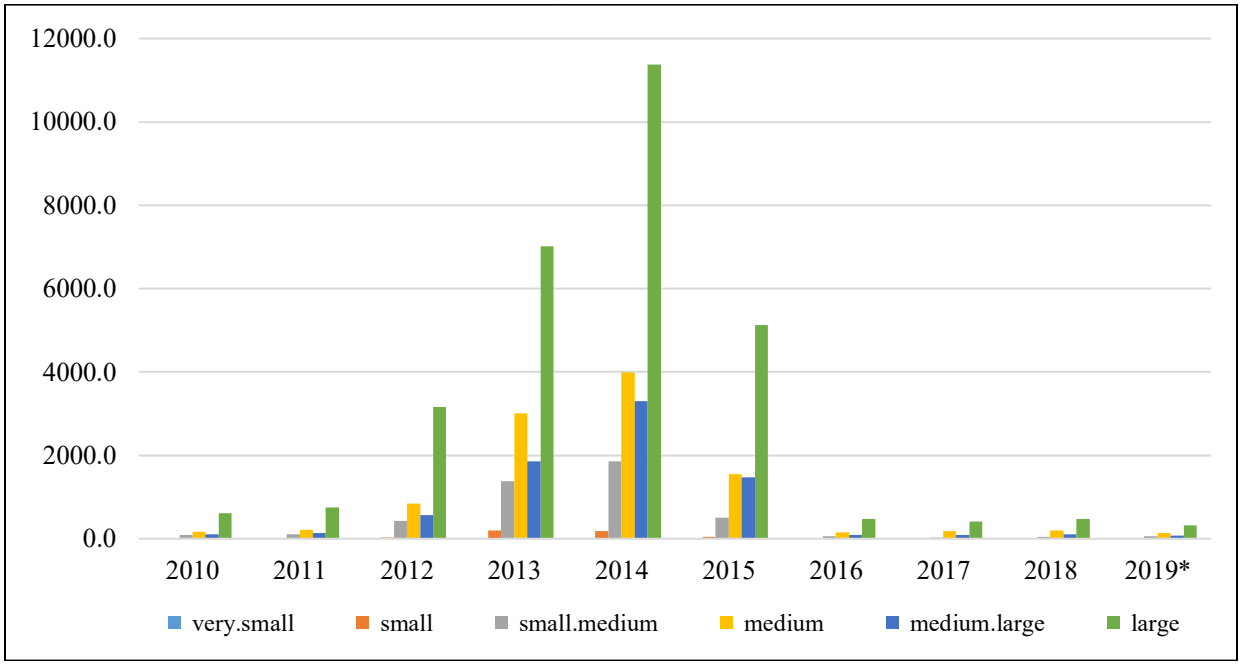
Classification	Stratum
Very.small	Pop. ≤20,000
Small	20,000 < pop. ≤50,000
Small.medium	50,000 < pop. ≤100,000
Medium	100,000 < pop. ≤500,000
Medium.large	500,000 < pop. ≤1 million
large	Pop. >1 million

Note: Elaboration by authors

The main cities that benefited from SwB program were medium and medium-large cities. This represented 53% (123 cities) and 11% (25 cities) of the number total (231 cities), respectively (See Figure 6). However, large cities have sent considerably more students for internationalization, during the period, the number was a total of 29,000. The program attracted 6,000 foreign academic staff to Brazil, including students, researchers, and visiting professors between 2012 and 2015. Medium and large cities were the principal destination of inbound students (See Table 8).

Figure 6

Brazilian's Internationalization Students by Municipality of Origin (undergraduate) - Jan 2010 to Nov 2019



Note: Ministry of Education (Brazil) with support The Electronic System of the Citizen Information Service (e-SIC). Elaboration: by authors. * For 2019 those accounted for are from January to November 2019. November. OBS: The data available until November 2019, the data incomplete for this year.

More than 80% of inbound scholars were received in medium-large and large cities as shown in Table 7. Despite this expansion, the regional profile of the public offering of internationalization scholarship holders did not change. The annual rate of SwB students (See Table 8) was statistically equal (See Tables 9 and 10). Results were similar for the Northeast and Southeast regions and in the North & Northeast groups in the South & Southeast, demonstrating that they were statistically equal. Northeast mean rate of SwB is not more than the Southeast mean rate. It means that the access of Undergraduate students to SwB program follows the historical difference between the regions.

Table 7

Attraction of Foreign Researchers by Municipality of Brazil (all modalities) – January 2010 to November 2019

	very.small	small	small.medium	medium	medium.large	large	Total
2010	0	0	14	36	13	110	**173**
2011	0	0	31	108	49	227	**415**
2012	0	0	39	69	26	272	**406**
2013	0	0	63	208	95	624	**990**
2014	0	2	84	270	171	866	**1,393**
2015	0	1	89	210	164	698	**1,162**
2016	0	5	35	115	83	339	**577**
2017	0	0	23	79	43	183	**328**
2018	0	3	12	46	13	92	**166**
2019*	0	1	18	90	96	558	**763**
Total	**0**	**12**	**408**	**1231**	**753**	**3969**	**6,373**

Note: Ministry of Education (Brazil) with support The Electronic System of the Citizen Information Service (e-SIC). Elaboration: by authors. *For 2019 those accounted for are from January to November 2019. November. OBS: The data available until November 2019, the data incomplete for this year.

Table 8

Annual Rate of SwB Students – January 2010 to November 2019

Region	Northeast	Southeast	North & Northeast	South & Southeast
2011	0.2744	0.3083	0.3490	0.2452
2012	3.2249	3.0191	2.9961	2.9956
2013	2.2254	1.5329	2.2744	1.5365
2014	0.5028	0.6268	0.4391	0.5814
2015	-0.6710	-0.5438	-0.6793	-0.5423
2016	-0.9247	-0.9117	-0.9239	-0.9043
2017	0.0377	-0.1766	0.0756	-0.1030
2018	0.1909	0.2348	0.1875	0.1360
2019*	-0.2137	-0.2958	-0.2105	-0.3048

Note: Ministry of Education (Brazil) with support The Electronic System of the Citizen Information Service (e-SIC). Elaboration: by authors. * For 2019 those accounted for are from January to November 2019. November. OBS: The data available until November 2019, the data incomplete for this year.

The annual rate of the SwB student exchange between regions North and Southeast was analyzed using one-tailed and two-tailed *T* tests. The results showed *p*-value higher than 5%, being 43.87% for one-tailed and 87.75% two-tailed (see Table 9). The same pattern was identified when we analyzed the results of the regions North-Northeast in relation with the South-Southeast. The *p*-values were 43.62% for one-tailed and 87.23% for two-tailed (see Table 9).

Table 9

T test for two samples with unequal variances by Northeast and Southeast

	Northeast	Southeast
Mean	0,5163	0,4216
Variance	1,8338	1,4568
Comments	9	9
Mean difference hypothesis	0	
Gl	16	
t Stat	0,1567	
P(T<=t) one-tailed	0,4387	
one-tailed critical t	1,7459	
P(T<=t) two-tailed	0,8775	
two-tailed critical t	2,1199	

Table 10

T test for two samples with unequal variances by Regions

	North & Northeast	South & Southeast
Mean	0,5009	0,4045
variance	1,7008	1,4367
Comments	9	9
Mean difference hypothesis	0	
Gl	16	
t Stat	0,1633	
P(T<=t) one-tailed	0,4362	
one-tailed critical t	1,7459	
P(T<=t) two-tailed	0,8723	
two-tailed critical t	2,1199	

Note: Ministry of Education (Brazil) with support The Electronic System of the Citizen Information Service (e-SIC). Ninety-five percent confidence interval. Elaboration: by authors.

It is important to emphasize that the end of the program represented a loss for all Brazilian regions. However, states in the Southeast continue to have access to other funds (such as Fapesp in São Paulo) that support the internationalization process. So, the impact is still varied for different regions. On the one hand, the SwB is associated with the expansion of higher education programs in Brazil. The percentage of student registrations grew by 94% in the Northeast, corresponding to double that recorded for the Southeast and more than triple that recorded in the Southern region. The Northern region had the second highest rate of growth (76%) among the regions of the country (Ministry of Education, 2015). The creation of 18 new universities (during Lula's government in Brazil) was crucial to doubling the number of enrollments in the network of federal public

universities. This is unprecedented in the history of higher education in the country (Ministry of Education, 2015).

Discussion

The SwB Borders Program has unprecedented contributions, in terms of volume, in the history of the country. The last 30 years of internationalization and mobility programs for students in Brazil has created a sea change not seen before in academia. Over 53,000 undergraduate students had the opportunity to work and learn new knowledge and to develop confidence to improve their skills and build research and social networks across the globe.

The SwB program had several challenges, such as poor administration and support for students trying to access to the fellowship, little or poor preparation given the language barrier; inadequate quality control, evaluation, and assessment to track student satisfaction and weak and inefficient data collection and indicators. The benefits of the program as shown by the metrics are significant, improved mobility and valuable knowledge exchange and capability development. The advantages of intercultural skills through the experience of living and networking abroad as well as opportunities to develop skills and competencies are also highlighted in some studies (Feltrin et al., 2021; Saldanha et al., 2019)

On the one hand, the SwB maintained the asymmetry between the southeast and south to the rest of the country; on the other hand, the program gave opportunity for some of the students that were involved to gain experience and learn of a second language. However, the Brazilian government has not adequately evaluated the impact of the program for all universities. For example, SwB obligated universities to organize their internationalization offices and increase different English language courses especially for young undergraduate students (Finardi & Archanjo, 2018). The impact of this internationalization at home is considerable, given the wide range of collaborative papers, joint projects, English language publications, and extensive partnerships over the last 10 years (Iorio & Pereira, 2018). This analysis is not critically integrated into government reports and evaluation about SwB or is there data about the impact of the internationalization on the Brazilian regions (Iorio & Pereira, 2018; Oliveira, 2020).

The termination of the program comes at a time where there are no activities, policy, or mechanisms for strategically improving internationalization in HE 2020; there will be limited opportunities for collaborative academic engagement and strategic internationalization programs in a world where competition continues to grow. Few opportunities to build upon the internationalization structure and networks exist for many Brazilian students. The positive relationships built in the seven years of existence of the SwB may be wasted. Though the high demand of young undergraduates who wish to have academic exchange remains. There is a clear loss of momentum with respect to internationalization and the specific policy to buttress and improve knowledge exchange and English language skills. As there is no program similar to the SwB, there will be a loss of qualifications, networks, and skills with respect to the next generation of professionals, researchers, and academics.

Internationalization in HE has numerous challenges; De Wit (2002) and Rajani & Jamieson (2005) discuss the issues of commodification and quality, which may at time be counterproductive in the race to "internationalize." The debate around Brazil's contribution to knowledge which preceded the SwB, highlights essential outputs that need to be constantly reviewed – contribution to knowledge exchange, collaborative projects, overcoming the language barrier – so knowledge can be shared beyond Portuguese speaking audience (Lucchesi, 2002; McManus & Nobre, 2017). This analysis shows how important it is for the HE sector in Brazil to focus on internationalization and programs that integrate Brazilian HE with the world.

On the one hand, SwB aimed to expand Brazilian science and promote competitiveness and Brazilian science exchange for students and professors. Nevertheless, the discussion about mobility of undergraduate students as we proposed in this paper requires a recognition that the process needs holistic actions and policies to be effective in reducing historical inequalities entrenched across Brazilian regions. This was starkly represented by different social status between universities, budgets, and social issues by region. Different realities should require different actions. To offer the same actions for different regions maintains inequalities that already exist.

The huge demand for education in Brazil is central to the argument made in this paper. Improvements in education conditions for less favored regions are essential. The increase in resources and educational capacity made through new universities is a fundamental first step, but more need to be done to rapidly accelerate the funding and capabilities in these new universities. There is a movement to monitor working conditions for professors and improved opportunities that provide internationalization in regions that were not served before. This provides a good platform to ensure more holistic support of Brazilian HE so it will remain relevant and able to contribute to knowledge exchange and research.

Conclusion

This paper highlights the contribution of SwB to internationalization within Brazil. The regional participation in this program is worth highlighting as it demonstrates the historical challenges related to the reproduction of inequities. The significant increase of HE participation and SwB participation in the disadvantaged regions needs to be strategically monitored and expanded. Key policies around this will need to draw from more robust analysis of SwB indicators and outputs. As shown in this study, the SwB provided exponential benefits far beyond the domain of tradition internationalization. Data on access, inclusion, and collaboration between the regions were unequal, with particular respect to disadvantaged regions vs. non-disadvantaged regions. Examining small, medium, and large city engagement provides good indicators for how to grow and support the quality and contribution of Brazilian HE.

Policy Implications

The SwB program significantly enhanced internationalization in Brazil, though careful consideration needs to examine the ways policy change affects entrenched inequalities and opportunities for disadvantaged groups. The analysis here suggests a great need for comprehensive collection of data and evaluation. Policy makers should provide a framework for evaluating expensive programs before they are implemented. Furthermore, it is important that evaluation is responsive and built into the policy implementation with mechanisms for adapting the implementation process in real time and enhancing inclusive and broad impact.

Limitations

The principal limitations of the study were data management and cross referencing for the SwB. This created a significant limitation with respect to the analysis. The study was able to cross reference data from other sources to infer how the SwB may have influenced access from disadvantaged regions. This demonstrates why it is important to collate data that can be used for understanding how the funding supported universities and students beyond the first order indicators of send and receive fellowships/students.

The process of internationalization of higher education in Brazil provides an interesting lens for highlighting the advantages and challenges for internationalizing education. The path towards

internationalization in this context has developed from a critical perspective, purposively trying to ensure Brazilian HE can connect with counterparts across the world, learn from others, and engage with different knowledge traditions.

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Rafael led the development of this work over the last three years. He was a young researcher, committed to research practice that was purposeful and impactful on policy and social norms. Rafael was committed to making evaluation about inequalities visible. His research connections included a broad network of interdisciplinary scholars. He will be dearly missed by all his colleagues in the UK, Brazil, and around the world.

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