

## **EFFECTS OF THE NEOLIBERAL AGENDA ON ACADEMIC RESULTS AT FEDERAL UNIVERSITIES**

### **EFEITOS DA AGENDA NEOLIBERAL NOS RESULTADOS ACADÊMICOS DAS UNIVERSIDADES FEDERAIS**

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## ABSTRACT

With the emergence of debates about the weight of federal public universities' budgets in public accounts, the development of scientific research that present data on such issues to society becomes relevant. In this context, this work sought to identify the effects on the academic performance of Federal Institutions of Higher Education (FIHE) caused by the application of the neoliberal agenda in the budget formation of these institutions. For this purpose, the adopted methodology grouped the universities based on their similarities, using the cluster analysis method, and verified the existence of a correlation between the budget and performance variables. The results found point to a scenario of disruption in FIHE budgets, represented by attacks on the financing model of these institutions under arguments of inefficient performance based on incomplete or biased analyses. In addition, the emergence of the application of neoliberal measures generates signs of a change in the profile of actions carried out within universities, moving from a vanguard place in the generation of scientific knowledge to a kind of service provider in which market demands are met through financial support.

**Keywords:** University Budget. Performance of Higher Education Institutions. Financing of Higher Education. Neoliberal Agenda.

## RESUMO

Com a emergência de debates acerca do peso dos orçamentos das universidades públicas federais nas contas públicas, torna-se relevante o desenvolvimento de pesquisas científicas que apresentem à sociedade dados sobre tais questões. Nesse contexto, este trabalho buscou identificar os efeitos no desempenho acadêmico das Instituições Federais de Ensino Superior (Ifes) causados pela aplicação da agenda neoliberal na formação do orçamento dessas instituições. Para tanto, a metodologia adotada agrupou as universidades a partir das suas similaridades, empregando o método de análise de cluster, e verificou a existência de correlação entre as variáveis de orçamento e de desempenho. Os resultados encontrados apontam para um cenário de desestruturação dos orçamentos da Ifes, representado por ataques ao modelo de financiamento dessas instituições sob argumentos de desempenho ineficiente pautados em análises incompletas ou enviesadas. Além disso, a emergência da aplicação de medidas neoliberais gera indícios à mudança do perfil das ações realizadas no âmbito das universidades, passando de um local de vanguarda na geração do conhecimento científico para uma espécie de prestador de serviço no qual as demandas mercadológicas são supridas mediante aporte financeiro.

**Palavras-chave:** Orçamento das Universidades. Desempenho das Instituições de Ensino Superior. Financiamento da Educação Superior. Agenda Neoliberal.

## **1 INTRODUCTION**

The escalation of a neoliberal model of government has employed, over the last few years, a series of reductions in the budgets of Federal Institutions of Higher Education (FIHE) in Brazil. According to data from the Department of Planning and Budget (DPB) of the Ministry of Education (MEC), since 2013 there has been a fall in the FIHE budget so that in 2019 it was equivalent to approximately 50% of the real value of that year (TREASURY MANAGERIAL, 2020). For the year 2020, the budget was equal to the nominal value of 2019, and for 2021 the Annual Budget Law Proposal provided another linear cut of 16.5% (BRASIL, 2021).

On the other hand, the demands placed on universities continue to grow. The expansion of the supply of vacancies and the growing need for quality in services have been the main demands of society, which require greater qualification of the teaching staff, better equipment, and even availability of resources to offer student assistance (PAULA; ALMEIDA, 2020).

In the literature, there is a gradual offer of research dedicated to the study of the performance of public universities. It is understood that this increase is due to increased social pressure for the efficiency of FIHE and its results for society in general (COSTA et al., 2012).

In the social context, the discourse commonly observed in debates about the relationship between the performance of FIHE and the budget allocated to these organizations is often rooted in aspects that do not match Brazilian characteristics. An example of this is that in favor of discourse focused on efficiency, the World Bank (WB) published in 2017 a report on higher education in Brazil indicating that the average cost per student in public university education, according to data analyzed between the years for 2013 and 2015, it would be R\$ 40.9 thousand, more than triple the cost of students in the private universities (of approximately R\$ 12.6 thousand) (WORLD BANK, 2017).

The hypothesis raised by the WB is that FIHE budgets, and their weight in public accounts, are inflated and that a solution to this issue would be the readjustment of the sources of funds and the adoption of new management practices that would provide greater efficiency in use resources implying cost reduction for the government. However, the report disregards aspects ranging from the principles that govern the Brazilian public administration, which cover the performance of the FIHE and among them, the purpose of serving the public

interest, to the mission and profiles of public universities, which are essentially different from those of private institutions.

In addition, when examining MEC data on the General Course Index (GCI) – an indicator that measures the quality of all undergraduate and graduate courses – it is noted that among the 20 universities with the best grades, 90% are public (MINISTÉRIO DA EDUCAÇÃO, 2018). In an international ranking that evaluates the best in the world, among the 14 Brazilian with the high positions, only two are private (QS RANKINGS, 2021).

Given this context, it is admitted that the understanding of Sleutjes (1999) remains current. The author sees that changes in society as a result of post-modernity and the fragmentation of principles began to impose questions on hitherto important institutions, such as universities.

Thus, given these arguments, this research sought to identify the effects on the academic performance of FIHE caused by the application of the neoliberal agenda in the formation of the budget of these institutions. To this end, we observed in the literature cases of universities from different countries that have already experienced this process and these reports are confronted with what the FIHE have been facing.

As a way of getting to know the Brazilian scenario, the method of grouping by similarities and the Spearman test are applied to verify the correlation between the budgets of FIHE and the performances presented by these institutions, based on the hypothesis that there is no correlation between them.

In this sense, it is believed that the main contribution of the study is to resolve doubts about the validity of the arguments pointed out by the defenders of the neoliberal model, whose main idea is in the argument of the existence of inefficiency in FIHE. In addition, this study presents the society with data on such discussion under an appropriate comparative perspective, considering the particularities of institutions spread across Brazil.

In addition to this introduction, this paper has a theoretical foundation section, which provides the basis for the discussion, one on methodology, one on results for the presentation of data and establishment of the analysis, and, finally, the final considerations of the research and its potential consequences and limitations.

## **2 LITERATURE REVIEW**

Brazilian universities are organizations endowed with didactic-scientific, administrative, and financial, and asset management autonomy, as provided in Article 207 of

the Federal Constitution. Regarding the concept of autonomy, Enders, Boer, and Weyer (2013) define it as self-government that is the capacity to develop functions in the environment where they are inserted, independently.

Within this context, it is understood that the concept of university evolves towards a social pact between the production of knowledge, the State, and society. In this sense, it would be up to the State the role of guardian of universities concerning the governance of these institutions, the protection of academic freedom, and the guarantee of resources for their functioning (ENDERS; BOER; WEYER, 2013).

However, although the Brazilian FIHE are institutions that are at the forefront of national scientific production, for a long time they had their social function questioned because they were treated as excluding spaces in society, where access was limited and commonly occupied by individuals from a portion of the population that was not subject to free higher education for admission to it (LIMA, 2013).

As a result of this vision, in the 1990s there was a process of de-structuring and scrapping of public universities, which began to present an increasingly precarious infrastructure, in addition to a technical and teaching staff with high levels of lags (PAULA; ALMEIDA, 2020).

As a counterpoint to this trajectory, in the 2000s the Program to Support Plan for Restructuring and Expansion of Federal Universities (Reuni) was implemented through structuring actions, such as increasing the supply of places in undergraduate and graduate; creating new courses; readjusting the physical infrastructure; encouraging the qualification of technical and teaching staff; and, finally, improving indicators in terms of quantity and quality of service provided (LIMA, 2013; PAULA; ALMEIDA, 2020).

From this context, it is possible to observe between 2007 and 2013 an important advance in higher education in Brazil, represented by the fortification of the FIHE, which resulted from the contribution of financial resources to these institutions as a result of the education policy adopted in the period. This process resulted in the improvement of national scientific indicators and promoted the so-called universalization of higher education (LIMA; MACHADO, 2016).

However, for some, the cost of these advances was high and the return below expectations. Although the massification of higher education has led to a vigorous increase in the number of students – with an average growth of 90% during the Reuni period –, the public funding for the sector dropped after 2013, especially with the resumption of neoliberal ideals

in politics Brazil, which increased dependence on private sources of financing and uncertainty about future cash flows (LIMA; MACHADO, 2016). In this context, criticism of universities began to focus on the idea that the cost of these institutions is high for the results obtained (WORLD BANK, 2017).

Observing the international situation, it is possible to verify that the reduction of public spending on universities seems to be a worldwide trend. Such aspects were also observed by Courtois and O'Keefe (2015) and Raudla et al. (2015) when studying the case of European higher education institutions. In their analyses, the authors did not identify benefits presented by the models that were being implemented from a neoliberal perspective.

They found a deterioration in the university system, including the teaching staff, given that the reduction in public resources boosted the search for low-paying temporary jobs. This restructuring of the labor factor also resulted in the emergence of the casual academic figure, individuals employed in higher education institutions temporarily. This situation led to the emergence of other problems, such as the decrease in the quality of research and the compromise of long-term scientific production (COURTOIS; O'KEEFE, 2015).

It was also found that a considerable part of the international literature on the influence of neoliberal models in universities does not point to issues related to the analysis of the social role of these institutions, so that market principles-imposed changes in values, in the central mission and in operational aspects of universities. In this context, higher education starts to present an economic value, being understood as a profitable and important investment for the formation of human capital, in addition to facilitating technological innovation, thus leaving aside its cultural role in the construction of a society fairer (COURTOIS; O'KEEFE, 2015; HOLBOROW, 2012).

Looking specifically at Ireland, per capita spending on higher education declined dramatically between 2006 and 2012, despite a 20% increase in student enrollment being identified, increasing the student-teacher ratio. Such aspects characterize a framework of normalization of the precariousness of universities because of a policy of orientation of these institutions to the market, whose initial movement was the reduction of the public budget in financing their activities (COURTOIS; O'KEEFE, 2015).

Returning to the Brazilian case, considering the policies implemented within the scope of the FIHE and focusing on government participation in the financing of universities, Oliveira et al. (2014) highlight that the efficiency levels of universities were higher, including with growth trend, in periods in which there were big public contributions to universities. The

impact of the expansion of public funding in universities generated positive effects on performance indicators, such as the graduation success rate. The study also shows that other positive results were noticed in the years following 2013 due to the legacy of infrastructure left by Reuni (OLIVEIRA et al., 2014).

Other studies observed the relationship between university performance, government budget independence, availability, and source of funding (AGHION et al., 2010; CHRISTENSEN, 2011; ENDERS; BOER; WEYER, 2013). Highlighting the contributions of Aghion et al. (2010), they found that both in European and American universities, autonomy – not only in the budgetary sense but in the ability to self-manage – and university competition are positively correlated with their performance in terms of scientific production, pointing out that the incentive competition for funding funds based on scientific merit would bring benefits to the results of institutions.

It was also found that the increase in spending on universities does not generate positive effects in the cases of those whose scientific activity is far from the technological frontier and those with low autonomy. The most natural general interpretation is that frontier research is something complex and that it can only be carried out effectively if the university has the discretion to direct resources and researchers to what it believes to be the most promising paths (AGHION et al., 2010).

On the other hand, the studies carried out by Kempkes and Pohl (2010) showed – through the application of the non-parametric Data Envelopment Analysis (DEA) model – that the level of qualification of the teaching staff of German universities is an important variable in determining the efficiency of these organizations. In this same study, there is also guidance for governments to create rules for the distribution of part of the resources of public funds based on the performance of the efficiency of universities to reward their efficient allocation and result in a competitive environment in the university system public.

Still observing the public funding of European higher education, there is at least two main forms of resource allocation: basic funding or direct allocation through mechanisms based on the levels of research and projects developed. This second form concerns the issues presented by Aghion et al. (2010) and Kempkes and Pohl (2010). According to the authors, it can generate competition between institutions (RAUDLA et al., 2015).

As pointed out by Raudla et al. (2015), this is the financing model that has grown the most in Europe and which, at least in theory, aims to increase the quality of scientific work, promote efficiency in the use of resources and provide funds for new initiatives. However, the

results of adopting this approach have systematically modified the budget of universities, considering that, based on the theory of resource dependence, changes in the form of funding also lead to changes in the budget systems of institutions, which occur due to the revenues become fluctuating, high transaction costs and the lack of guarantees of budget availability (*ibid*).

This movement observed in Europe and elsewhere in the world has its origins in the United States. Serafim (2011) presents the origin of this discussion regarding institutional changes in the management and academic orientation of universities because of a process of commodification of education that started in the beginning of the 20th century in the USA.

In this sense, Slaughter and Rhoades (2004), when discussing the context of North American universities, presented the concept of "Academic Capitalism" which deals with the engagement of universities in a market-oriented model not only in aspects of organizational management but also regarding the academic activity. This concept bases on the neoliberal perspective that proposes an intrinsic relationship between universities and the socioeconomic and political context, so that the marketing interest inducing them to participate in a process of science and technology production oriented to the capitalization and commodification of knowledge, changing the focus of these institutions (*ibid*).

Thus, it observed in the literature were different positions on public funding for universities. Several models and political conceptions point to different solutions, causing doubts as to what would be more effective: a greater or lesser role of the State in financing the actions of universities. In summary, there were no successful cases capable of sustaining that the reduction of the public budget as part of a model of rewards for results or of private financing can offer better performance to institutions. In fact, the problems observed due to the implementation of models with such characteristics are more recurrent than the potential benefits perceived.

### **3 METHODOLOGY**

This work follows a sequential mixed research approach, combining qualitative and quantitative techniques. Initially, document analysis was carried out whose objective was to gather the information that dealt with the object of this research. For this purpose, publications in specialized media, interviews published in newspapers and magazines, in addition to articles and official data were collected. After this step, we sought to make a



comparative analysis of the information obtained with what the literature has addressed about such aspects.

The next phase was the application of quantitative approach techniques, such as cluster analysis and correlation verification test (HAIR et al., 2009). Data were collected considering three categories of analysis: i) characterization of FIHE - gathered from the publication of the Higher Education Census by NIESRAT (National Institute for Educational Studies and Research Anísio Teixeira); ii) FIHE budget - obtained from the MEC's SPO; iii) performance of FIHE - according to NIESRAT and Capes (Coordination for the Improvement of Higher Education Personnel).

The treatment of data considered the FIHE that presented, for the year 2018, all the information necessary for the research. In addition, only universities were selected for the sample, since the focus of the work is fundamentally higher education. Thus, we worked with 62 institutions, whose identifications are presented in Box 2.

The working hypothesis points to the need to verify the existence of a correlation between the GCI performance variable and the Bud\_annual budget variable. Therefore, Spearman's correlation test was applied, considering that this coefficient can capture the direction and intensity between two variables, considering a monotonic relationship. Furthermore, it is noteworthy that the correlation coefficient varies between -1 and 1, so that the closer to the extremities, the greater the correlation, and the sign indicates whether the correlation is positive or negative.

In addition, the relationship between the performance of Federal Institutions of Higher Education, in terms of GCI, and their budget still needs to look at other variables that can cause analytical bias. It is understood that the acceptance of the *ceteris paribus* clause is not enough to minimally guarantee that the results are consistent with reality.

Thus, to carry out an adequate analysis, the diversity of the FIHE was considered to identify the similarities between them and carry out the analysis between the most similar ones. For this purpose, the cluster analysis technique was applied, which groups individuals based on their characteristics.

The selected variables (Box 1) to compose the set of characteristics that established the similarity levels between the FIHE correspond to the data for the year 2018, which were chosen because they are the most consistent consolidated available.

**Box 1** Description of group definition variables

Variable	Description
Under_undergrad	Number of undergraduate students
Enr_underg	Number of students enrolled in undergraduate courses
Grad	Number of graduates
Courses_underg	Number of undergraduate courses
NESP	Average grade obtained in NESP
Stud_grad	Number of graduate students
Courses_grad	Number of graduate courses
Av_Capes	Capes average rating
Professors	Number of professors
Tech_servers	Number of technical servers
GCI	General Course Index
bud_annual	Annual budget

Source: elaborated by the authors.

It is noteworthy that the variables related to performance are: NESP (National Exam of Student Performance), Av\_Capes, and GCI. As established by the MEC, the GCI is the main performance indicator of the FIHE and its calculation is defined by.

$$GCI = \alpha \cdot G + \left[ (1 - \alpha) \cdot \frac{(\beta)}{2} \right] \cdot (M + 5) + \left[ \frac{(1 - \alpha) \cdot (1 - \beta)}{3} \right] \cdot (D + 10)$$

where G is the average graduation concept,  $\alpha$  is the proportion of undergraduates,  $\beta$  corresponds to the proportion of equivalent Master's students, M is the average concept of the master's degree, and D is the average concept of the doctorate.

However, NESP and Av\_Capes were added to the set of characteristics to define the groups to obtain a more complete characterization of each FIHE, since the GCI is a composite indicator with weighted variations.

Another highlight is the budget amount, whose data were taken from the Federal Government's Annual Budget Law (for 2018). This variable corresponds to the final amounts received by FIHE, including all the supplements made during the reference year.

The other variables are structural characteristics of the Institutions regarding the capacity and performance of the services offered. Thus, in the results, the variables will be classified among the axes of undergraduate, graduate, human resources, performance, and budget.

The cluster model was applied using the Stata statistical software (v.15). Considering the characteristics of the variables, and the objective of the work, the Ward linkage grouping method was chosen, whose main characteristic is its agglomerative hierarchical form that provides clusters of similar sizes.

It is noteworthy that the Euclidean distance was applied to verify, through the analysis of the length of a straight line, how far each individual is from the mean value of the sample. For the possibility of the existence of different quantities and scales between the variables, It was considered the amplitude technique, which observes the extension between the variables as another defining aspect of the clusters (HAIR et al., 2009).

After estimating the model, the weight and classification of the observations were verified, and – based on the characteristics identified through the outputs obtained – a total of 3 clusters for this study was defined. To verify the model's fit, including the number of clusters, the following tests were applied: i) Hotelling's T<sup>2</sup>, a similarity of means test that compares the mean values of the variables in the clusters; ii) covariance matrix symmetry test; iii) correlation matrix symmetry test; and iv) Doornik-Hansen, normality test based on the asymmetry of multivariate data (MINGOTI, 2005).

Finally, aiming to analyze the predictive capacity of the model and the level of dissimilarity of the responding variables, the multivariate analysis of variance (MANOVA) was applied, whose analytical form deals with the simultaneous verification of the relationships between the variables that make up the model (HAIR et al., 2009).

## **4 RESULTS**

### **4.1 CONTEXT ANALYSIS**

In 2015, the Ulysses Guimarães Foundation published a document entitled “The bridge to the future”, whose basis for the arguments supported there reflect the resumption of neoliberal hegemony in Brazilian politics. Actions aimed at confronting the fiscal crisis are defended – a product of public spending associated with insufficient private investments – as well as the replacement of public policy spending by the payment of interest on the public debt; the untying of federal public revenues from spending on health and education; and harsh pension reform (LIMA, 2019).

This neoliberal resumption in Brazil has provided a search for alternatives based on fiscal rebalancing, systematically incurring controversial issues. A report commissioned by the federal government and produced by the World Bank in 2017, under the title "A Fair Adjustment: analysis of the efficiency and equity of public spending in Brazil", presents a review of Brazilian public spending through the discussion on sustainability tax, spending ceiling, civil service reforms, government procurement, social security, labor market, social

assistance, health, support for the private sector, and also spending, efficiency and equity in public education (WORLD BANK, 2017).

Focusing on the analysis regarding higher education, the report shows the increase in public spending from 2000 to 2013, confirming that there was a real annual increase of 7% in spending on higher education. It also presents arguments about the average expenditure per student, indicating that the cost of a student in a public university is up to three times higher than that of a private organization, which, considering a similar added value between public and private institutions, would show a scenario of the inefficiency of the FIHE (WORLD BANK, 2017).

The conclusions that the report points out are the following: i) public spending on higher education should be limited to 0.26% of GDP and that the students themselves should be responsible for paying for their higher education; ii) expansion of the contribution to private institutions through the expansion of Fies; and iii) to seek other sources of funds for the constitution of the FIHE budget (WORLD BANK, 2017).

Faced with such considerations, several manifestations emerged from society, especially considering the incipient interpretation presented by the report for disregarding a series of important factors that were left out of the analysis.

Representatives of various organizations linked to public universities pointed out inconsistencies arising from the excessive use of data without proper knowledge of the reality of higher education in Brazil. The reductionism of the analysis performed about the cost-student is one of the highlights among the identified mistakes: the calculation does not consider the fact that the FIHE, in addition to undergraduate education, develops *stricto sensu* postgraduate education, research, and extension, while private organizations predominantly practice undergraduate education. A proper comparative analysis should consider only the costs of undergraduate education at the FIHE (AVANCINI, 2017).

Another major factor that did not consider by the World Bank report is the effect of Distance Learning Courses (DLC). It is not intelligible to compare the cost of a DLC student with low execution cost and high scale in the offer of places, with on-site courses in the same area (AVANCINI, 2017).

As for the inefficiency of the FIHE, which is the basis of the argument for reducing public spending on higher education and the implementation of monthly fees at federal universities, the parameter used (the Observed and Expected Performance Difference Indicator - OEPDI) is not adequate because it favors the low performance of NEUSE

(National Exam of Upper Secondary Education), which, according to NIESRAT, is concentrated in private institutions (TUFFANI, 2017).

Thus, what is evident is that neoliberal arguments aimed at the commodification of universities and of the knowledge they produce ignore the role of FIHE in being catalysts for the country's scientific, technological, and socio-economic development.

Furthermore, the role of universities in the country's social transformation is gaining more and more strength. This is evidenced by the observation of the current profile of students in Brazilian public universities. According to data from the National Association of Directors of Federal Institutions of Higher Education – NADFIHE, published in 2018, 70.2% of students are included in a range of monthly per capita income of up to 1.5 minimum wages. The survey also reveals that the profile of undergraduate students at the FIHE is increasingly closer to the average of the country's sociodemographic profile (ANDIFES, 2019).

Although the data properly contextualized present a different scenario from that presented by the WB and by those who defend the adoption of the neoliberal agenda in the FIHE, what is actually verified is the real loss of resources in the budget of the FIHE from 2014 onwards.

The recent situation of national higher education presents a public-private relationship that provides changes in the democratic management of FIHE. The existence of a dual role of the State is observed: the transfer of responsibility from the public to the private, with the strengthening of programs such as SFF (Student Funding Fund), and at the same time the permanence of State ownership, but with the implementation of policies aimed at market, as the incentive to search for other sources of resources to make up the budget of the FIHE (PERONI, 2012; SLAUGHTER; RHOADES, 2004).

The context of Brazilian federal public universities is quite complex and deserves a lot of attention from society. The neoliberal actions implemented by the government in a top-down way push universities to a space where the focus is to meet market demands (SERAFIM, 2011).

Society, in turn, demands from these institutions the due and fair return in the form of solutions to their problems. However, such requirements have removed the State's obligations towards universities, as identified by Enders, Boer and Weyer (2013). These new demands from society are full of arguments immersed in neoliberal rhetoric and, as a result, have given rise to questioning efficiency, productivity, and, consequently, the need to maintain such institutions (SEVERINO, 2008).

In summary, the adoption of neoliberal policies applied to FIHE has potentialized a kind of identity crisis in society and its understanding of the important role of universities in the development of a country and society.

#### 4.2 DATA PRESENTATION

After tabulating the data, we started to investigate the correlation between the main variables of interest, GCI and bud\_annual. Spearman's correlation analysis was applied, which fits the analysis model depending on the characteristics of the database used. The analysis was performed to understand the behavior and symmetries of the variables in the sample. The results obtained are in Table 1.

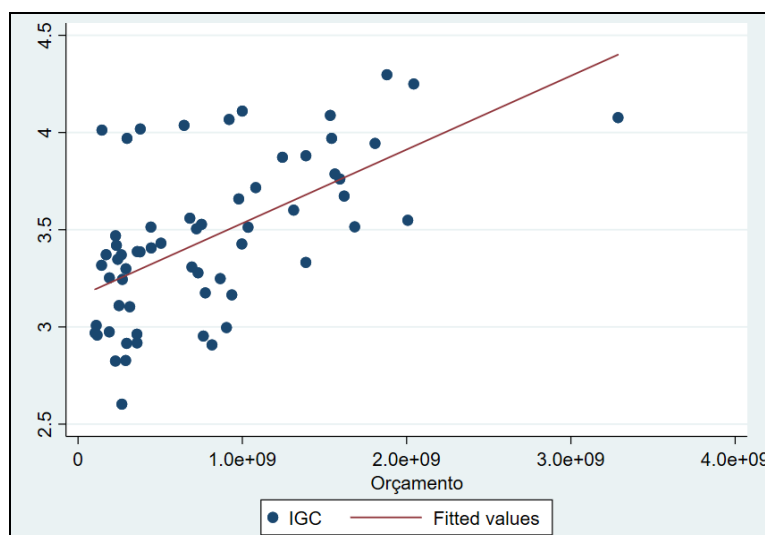
**Table 1** Coefficient and correlation matrix

Spearman Correlation Coefficient: GCI and		Matrix of Spearman Correlation		
Test of H0:	<i>IGC and orc anual are</i>		<b>GCI</b>	<b>Bud annual</b>
Number of obs:	62	<b>GCI</b>	1,000	
Spearman's rho:	0,5956	<b>Bud annual</b>	0,5956	1,000
Prob >  t :	0,000			

Source: survey data (2020).

As the results show, the null hypothesis of independence between the analyzed variables can be statistically rejected in the analyzed context. Thus, the existence of an important positive correlation between the performance of the FIHE and its budget is evident. This aspect can be seen more clearly in Figure 1.

**Figure 1** Correlation graph between GCI and Bud\_annual



Source: survey data (2020).

Based on these results, it was considered the existence of other variables with potential impact on the performance results of the analyzed institutions. Thus, the cluster model was applied to group the FIHE based on their characteristics, so that the results obtained are in Box 2.

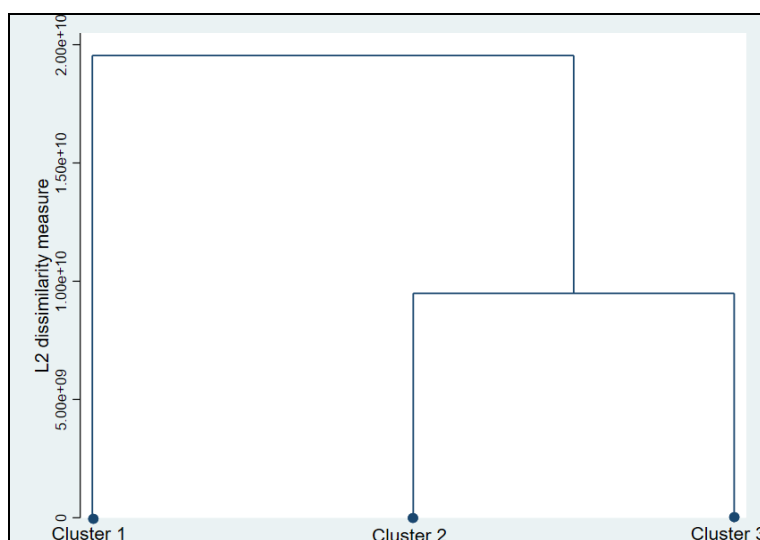
**Box 2** FIHE Groupings

Cluster 1: lower averages								
FURG	UFABC	UFAC	UFCA	UFCSPA	UFERSA	UFFS	UNIVASF	UFLA
UFOB	UNIRIO	UFRA	UFSJ	UFVJM	UNIFAP	UFOPA	UNIFESSPA	UFTM
UFRB	UNIFAL	UFRR	UFT	UNIFEI	UNILA	UNILAB	UNIPAMPA	UNIR
UFOP	UFGD	-	-	-	-	-	-	-
Cluster 2: intermediate averages								
UFAL	UFAM	UFCG	UFES	UFJF	UFMA	UFMS	UFMT	UFPEL
UFPI	URPE	UFS	UFU	UFSCAR	UFRRJ	UFV	UNIFESP	UTFPR
Cluster 3: highest averages								
UFBA	UFC	UFF	UFG	UFMG	UFPA	UFPB	UFPE	UFPR
UFRGS	UFRJ	UFRN	UFSC	UFSM	UNB	-	-	-

Source: survey data (2020).

Considering that the cluster model groups individuals based on the similarity levels of the chosen variables, each grouping presents levels of dissimilarity from the others. Such differences are in the dendrogram shown in Figure 2.

**Figure 2** Dendrogram



Source: survey data (2020).

Based on the constructed groups, descriptive statistics results for each of the groups were summarized, categorizing each of the variables according to their analytical axes, as observed in Table 2.

**Table 2** Variable means per cluster

Axis	Variables	cluster 1	cluster 2	cluster 3
Undergraduate	Entrants	2.343,35	5.383,44	8.172,80
	Enrollment	8.292,52	22.069	32.162,4
	Graduating	987,34	2.499,94	4.355,33
	Total courses	42,69	94,72	128,80
Graduate	Active students	909,62	3.221,28	8.611,67
	Total courses	17,82	57,67	126,87
Human resources	Professors	710,31	1.799,17	2.951,67
	Technical	682,62	1.586,11	4.018,53
Performance	NESP	2,97	3,15	3,43
	Capes	3,53	3,98	4,53
	GCI	3,26	3,45	3,84
Budget	Annual budget	2,71E+08	8,05E+08	1,73E+09

Source: survey data (2020).

The first inference concerns the result of the averages of the performance and budget variables. It is noticed that considering the higher education assessment standards established by NIESRAT, the average GCI of each of the groups is in the same continuous range, with a value equal to 4. On the other hand, the difference in the average annual budget between the clusters is significant.

A hasty analysis could lead to the mistaken impression of the inefficiency of the universities that make up clusters 2 and 3 since they have larger budgets for performance only slightly better than that of cluster 1. However, the size of the academic community adjusts for this, that is, for a larger community, more resources need to be employed, and obtaining better indicators under these conditions is something as important as presenting a similar performance, but with limited resources.

Thus, the tests of similarity of means, symmetry of the covariance matrix, and then the normality test were applied. A multivariate analysis of variance was also performed, seeking to attest to the predictive capacity of the model and the level of dissimilarity of the respondent variables. The results are in Table 3.

After the tests, it was verified that the model is correctly adjusted because the data reflect similar institutional aspects for the components of each cluster. Moreover, considering the correlation analysis carried out initially, it was possible to raise some approximations with



the themes that they emerged in a very fruitful way from the analysis of the literature, which will be discussed in the next subsection.

**Table 3** Tests applied to the model

Average similarity test		Covariance matrix symmetry test						
Hotelling T2	21.257,77	Adjusted LR chi2(21)	1.302,07					
Hotelling F(12,50)	1.452,03	Prob > chi2	0					
Prob > F	0							
Correlation matrix symmetry test		Normality test						
Lawley chi2(20)	921,19	Doornik-Hansen chi2(14)	576,41					
Prob > chi2	0	Prob>chi2	0					
Multivariate analysis of variance (MANOVA)								
Number of obs. = 62		W = Wilks' lambda	L = Lawley-Hotelling trace					
		P = Pillai's trace	R = Roy's largest root					
Source	Statistics	df	F(df1, df2) =	F	Prob>F			
Clusters	W	0,0382	2	24	96	16,46	0	e
	P	1,3518		24	98	8,52	0	a
	L	14,9571		24	94	29,29	0	a
	R	14,2406		12	49	58,15	0	u
Residual			59					
Total			61					

Source: survey data (2020).

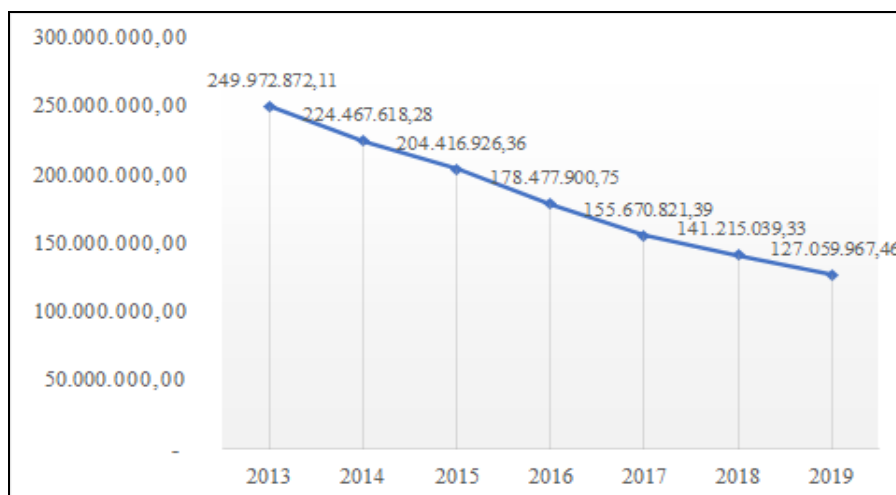
e = exact, a = approximate, u = upper bound on F

### 4.3 DISCUSSION

The results obtained raise a series of aspects to be discussed, mainly regarding the issues presented in the context and the literature review on the behavior of universities in different countries, their dynamics, and their effects.

The first issue is that the de-structuring of universities from a budgetary point of view seems to be a movement that has been taking place in Brazil in a way and for reasons similar to those observed in the works of Courtois and O'Keefe (2015), and Raudla et al. (2015). According to it was presented in the contextualization, the data show that the real budgets of FIHE have been showing a decline since 2013, as indicated in Figure 3.

**Figure 3** Variation in the Average Real Budget of the FIHE



Source: Managerial Treasury (2020).  
Note: constant values, base year 2019.

Despite the budget drop, performance indicators showed, on average, low and stable growth. In the year 2018, chosen for data analysis, there was a positive correlation between them. This means that the perceived decrease (Figure 3) should imply a reduction in institutional performance, which did not happen. Deductively, it is believed that this is because the results of other variables have positively affected such indicators, such as, for example, the case of the qualification of the teaching staff, as observed by Kempkes and Pohl (2010), when studying the case of German universities.

The context of the Brazilian FIHE is of relative concern given that it seems to be moving on a trajectory similar to that observed by Courtois and O'Keefe (2015) in the case of Ireland and other European countries, in which market principles have changed the values, mission and operational aspects of universities. To avoid the result in Brazil being the full implementation of a university financing model along the neoliberal molds, it is necessary to strengthen the premises of autonomy and self-management, so that the State continues to act in defense of universities and as a faithful trustee and funder of its activities, ensuring the appropriation of science and cutting-edge technologies produced within these institutions.

It was also noted in the literature the need and importance of reviewing budget distribution models, employing performance benefit techniques (RAUDLA et al., 2015), but that does not promote, in a predatory way, competition between institutions, as the FIHE network is unique, and its results are shared.

Currently, the main form of budget distribution is the application of the criteria established in the Budget Resource Allocation Matrix (OCC Matrix), built within NADFIHE to define the distribution of costing and capital resources based on the performance of the

FIHE. However, due to the current difficulties, the Matrix has not been applied by the federal government, which has only been repeating the previous year's budget, disregarding the inflationary losses in the period.

Furthermore, concerning the results of the clusters, there is more similarity between clusters 2 and 3, except for the performance variable for which the average values were closer between clusters 1 and 2. Invariably, the fundamental reason is directly related to budget availability, reinforcing the results obtained by applying the Spearman coefficient. The cluster model proved to be very useful to facilitate the understanding of the behavior of FIHE with similar characteristics, in addition to enabling the discussion on the levels of dissimilarity between the clusters. The tests performed point to the proper fit of the model and the statistical validity of the information generated.

## **5 FINAL CONSIDERATIONS**

This study sought to identify the effects on the academic performance of FIHE caused by the application of the neoliberal agenda in the formation of the budget of these institutions.

The data analyzed pointed to a scenario of disruption in FIHE budgets, represented by attacks on the financing model of these institutions under arguments of inefficient performance based on incomplete or biased analyses.

In addition, the emergence of the application of neoliberal measures generates signs of a change in the profile of actions carried out within universities, moving from a vanguard place in the generation of scientific knowledge to a kind of service provider in which market demands are met through financial support. Furthermore, the studied literature shows that such issues can trigger effects such as those observed in institutions in other countries, affecting the quality of universal science production and implying a process of commodification of higher education.

The results also pointed to the existence of a positive correlation between budget and performance, which leads, under the conditions analyzed, to the non-acceptance of the postulated hypothesis. This means that a possible increase in the FIHE budget should generate an increase in the performance observed by these institutions and that a decrease should also mitigate institutional performance.

However, the indicators observed showed that the performance of the analyzed FIHE continued to grow in the period considered, even in a scenario of budget reduction. Examining this situation, it is understood that this behavior occurs because there are delayed

effects of the levels of investments made until 2013, which favored, for example, the qualification of the teaching staff and the improvement of the infrastructure of the FIHE.

Although, in the long term, the tendency is that the effects of the reduction of the public budget in the FIHE, cause a stagnation in the academic performance indicators of these institutions, as it will generate a decrease in the quality of the teaching staff, which will need to dedicate to other activities, and structures of federal universities, as observed in the studies by Courtois and O'Keefe (2015) and Raudla et al. (2015).

Thus, the main contributions of this article are in the presentation of counterarguments to the neoliberal proposal, based on the verification of data that demonstrate the importance of the State in the development of FIHE, in guaranteeing resources for their functioning and in the institutional security of scientific production. The study emphasizes that failure to observe the particularities of Brazilian federal universities produces counterproductive information about the efficiency of these institutions and about the need for the State to contribute to their budgets.

Furthermore, this paper has as a limitation it has not extended the analysis to private universities to strengthen the information provided about these organizations, which would allow a better comparison between public and private universities about performance and their operations costs. This is a suggestion for the development of future research, which can adequately compare such institutions considering the characteristics, purposes, and structures of each one correctly.

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