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RESEARCH ARTICLE

Absenteeism as a Mechanism of Repression of Demand in the Brazilian Public Sector: Accounting Reflex in Federal Education Public Institutions

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Abstract:

Absenteeism is seen as a critical problem in public organizations Brazilian, since the factors that generate it negatively impact the productivity of organizations. In this sense, considering that Federal Public Institutions of Higher Education represent almost half of the entire workforce existing in the Brazilian Federal Executive Branch, this article aims to identify absenteeism, as well as its typification, in addition to measuring its accounting reflex. The methodology adopted was panel data analysis, through the analysis of the absenteeism index with time series from 2008 to 2018. The research findings reinforce that absenteeism is more representative when it is due to a stricto sensu graduate program and medical licenses, is worth emphasizing that the absenteeism types were analyzed according to labor legislation regarding Brazilian public workers. Furthermore, it was found that the absenteeism rate doubles every 5 years. The search for increased productivity demands more and more from the workers, impacting the quality of life at work. Thus, this result materialized through processes of corporate rationalization and techniques that incorporate new technologies and management models. Thus, absenteeism has created a critical problem for the Brazilian public administration, more specifically for the civil service, because the variety of factors generating it have increased and have a negative impact on productivity. Consequently, prioritizing public policies aimed at understanding the causes of absenteeism can significantly contribute to increasing the efficiency of the state structure. The study aimed to identify absenteeism in

Federal Institutions of Higher Education, as well as to measure its impact on public accounts. Methodologically, panel data analysis was used, which investigated the institutions' absenteeism index in the period from 2008 to 2018. The data was obtained from the Federal Government's Integrated Financial Administration System and Personnel Administration Integrated System. That said, the research is justified by the fact that absenteeism causes critical problems for organizations that represent 49.42% of the existing workforce in the Federal Executive Branch. The results indicate that absenteeism has greater expression when it occurs due to a stricto sensu graduate program and sick leave, so it was observed that it ends up doubling every 5 years as shown in this article

Keywords: Absenteeism, Public Organizations, Federal Institutions of Higher Education, Measurement, Public Accounting.

Introduction

Contemporary society presents historical advances stemming from socioeconomic, political, scientific, technological and cultural factors. According to Wilson (2005), within organizations, simple tasks have become complex, the number of leaders and society have increased in great proportion, and such changes have impacted the way the government is managed, public resources are managed, and accountability is rendered.

In this light, studies in the areas of economics and accounting consider that employees may decide whether or not to be present in the work environment, according to their maximization of utility and well-being, with finite resources of time and money. Thus, the comparative statistics of the absence behavior provides that variations in the wage rate generate a certain variation in the individual's propensity to be absent from work. Another analysis is that an increase in working hours increases the tendency to be absent, as it increases the decreasing marginal utility of leisure.

However, absenteeism has important consequences for both employees and organizations, as the increase in absenteeism decreases the optimal levels of individuals on the payroll of companies and individuals present, while the ideal number of work hours per worker in attendance increases, to obtain balance. Thus, the possibility of decreasing real wages is inferred, causing the worker to wish to decrease his hours of work, thus, it is possible to increase the number of absences from work, increasing the number of hours of work to be absorbed by the other workers present. Thus, the worker tends to be absent whenever the benefits of his absence are greater than the costs (Allen, 1981; Böckerman & Ilmakunnas, 2008). However, there are also individual costs of absences due to the risk of being fired, or due to the direct loss of income due to the individual's absence from the workplace (Costa, 2015).

According to Mc Donald and Shaver (1981), Culp and Malone (1992), Alves (1999) and Oliveira, Granzinolli and Ferreira (2007) the causes of unforeseen

absences, related to absenteeism, are: intrinsic (which reflect on the worker's satisfaction), extrinsic (resulting from environmental factors) and personality, which are related to the worker's behavior (conflicts, immaturity and demotivation).

Absenteeism refers to the absence of the worker from the workplace (Harrison & Martocchio, 1998; Johns, 2002; Martocchio & Jimeson, 2003; Patton & Johns, 2007; Robbins, Judge, Odendaal & Roodt, 2016). Siqueira (1984) noted that absenteeism has increased within civil service and that this trend deserves attention from the authorities. In view of this, he identified a research gap concerning the consequences absenteeism can have on public organizations. Thus, this study presents as a research question: What is the accounting reflection of absenteeism in Federal Higher Education Institutions (IFES's)?

Furthermore, considering the importance of the subject and the relevance to the country's economy, this research aims to stimulate similar research in order to reinforce the need to understand flaws within the Public Administration, as well as to enable improvements in the management of public resources.

Another relevant fact is that the study is not about student absenteeism; employees in federal educational institutions are governed by the same legislation as other employees in the Brazilian Federal Executive Branch; however, they were chosen because of the amount they represent, 49.42% of the studied population. Thus, this study will not address absenteeism among students.

The work is composed, in addition to this introduction, of a theoretical reference focused on accounting measurement and absenteeism. Next, the methodology describes the steps taken to fulfill the research objective. Later, the results are presented, describing each one of the organs under analysis. Finally, the final considerations report the conclusions that were possible to reach regarding absenteeism raised by the Work Force Sizing methodology (DFT) developed for the Federal Higher Education Institutions (IFES's).

Measuring and accounting theory

Initial studies on measurement theory began with Campbell (1920) and were focused on measurement in the physical sciences. From the 1950s on, analysis of measurement theory began to bring contributions to the social sciences (Weymark, 2005). The seminal studies that stood out in this area were those of Scott and Suppes (1958), Pfanzagl (1959) and Suppes and Zinnes (1963). Such studies verified the systematization of a modern and representative measurement theory, with a sufficiently broad approach to encompass issues involving both the physical and social sciences.

Measurement is conceived as the determination of the measurement of something through value attribution. Accounting is defined as the science that studies, interprets and registers phenomena that affect the patrimony of an entity. In this sense, measurement is an essential attribute for Accounting, since it registers facts that have monetary values, generally determined by a method of measurement.

For Deming (1990) and Kaplan and Norton (1997), what is not measurable is not manageable. Therefore, in order to pass on information to its users, accounting uses the language and algebra of evaluation (Christensen & Demski, 2003). For this, accounting focuses on information generated to the user, while measurement is concerned with the object measured and its forms of

measurement (Riahi-Belakaoui, 2004). Accounting measures various items such as assets, capital, revenues, expenses, and income. However, until the 60s, the nature of the object that should be measured by Accounting had not yet been determined (Larson, 1969). Chambers (1965) already observed the difficulty of accounting literature in determining what should actually be measured. Such reflections highlight the concern and difficulties that accounting professionals were facing and that still do not present major advances.

According to Stevens (1951), measurement theory is a branch of applied mathematics, with the purpose of assisting in data analysis. The concepts and fundamentals of measurement support the understanding of this interdisciplinary matter theory applicable to both the social sciences and the exact sciences and define the set of principles that underpin measurement (Willett, 1987). This theory makes it possible to make the connection between the empirical and the theoretical worlds by enabling the use of mathematics and statistics in the development of forecasts and explanations for events (Mason & Swanson, 1981). In this way, we can affirm that the theory is taken as normative, by offering general guidelines on how measurements should occur (Staubus, 1986).

Measurement theory is classified into two categories. The first, known as fundamental (non-numerical) theory focused on the quality of the properties that the empirical structures should have. And the second, as a derived theory that aims to identify the existing relations between the attributes obtained by the fundamental measurement, making them available through numerical functions (Willett, 1987). Thus, the theory enables the understanding and reproduction of the measurement characteristics, in an objective way, allowing the adequate decision making (Hille, 1997). It is important to emphasize the aspect of approximation, which is relevant to measurement and can also be used in Accounting. In this sense, measurement is about assigning numbers to events (Stevens, 1951; Larson, 1969). Thus, the items to be accounted for as assets and rights of organizations must be clearly identified and measurable properties (Kam, 1990).

In the public sector, the post-decision role has relevance, because it provides greater transparency of government actions, however, to achieve this objective it is necessary to create governance mechanisms that ensure adequate accountability. Ishikura et al. (2010) emphasize that accountability does not correspond to the exclusive will of the manager, since there are specific laws that regulate the information to be made available, where the agent is accountable for his acts and may suffer the provisioned penalties.

Additionally, the concept of transparency is related to the problem of the information economy, where society is seen as an investor and consumer of public goods. According to Ferejohn (1999), the public institutions invest their resources in the actions of public managers and expects a positive return on the investment made. Thus, the balance point in this relationship depends on the existence of transparent institutions that reduce the uncertainties of the investment made. Thus, considering that, in reducing information asymmetry, transparency maximizes accountability, this study intends to explore absenteeism, as well as to encourage that such strategic information be widely publicized and contribute to the management of public resources.

Absenteeism in public organization and workforce sizing

Absenteeism is considered a costly socio-economic burden for organizations because it entails production losses. Among the results generated by absenteeism in the public sector, there is a decrease in productivity, which in turn increases the production costs of organizations; detriment to all workers, as the work is realized by a sequence of their actions; progressive increase in absenteeism; increase in the cost of social security, with the transfer of expenses to society; decrease in the worker's income while increasing personnel expenses for the organization, and; loss of agility due to workers on leave (Pouliakas and Theodoropoulos, 2009).

In addition, absenteeism stands out as a complex problem, challenging governments and professionals (administrators, doctors, social workers, among others), causing damage to social and work development, increasing production and social security costs, negatively influencing the morale of workers, and decreasing the quality of goods and services, as well as productivity (Couto, 1987; Danatro, 1997). Thus, organizations need to understand the problem's dimensions so that they can define policies and intervene in solutions aimed at improving both the productivity and their employees' quality of life (Oliveira, Granzinolli & Ferreira, 2007).

Moreover, absenteeism stands out as a complex problem because it challenges governments and professionals (administrators, doctors, social workers, among others), because it harms social and labor development; it increases production and social security costs; it negatively influences workers' morale, decreases the quality of goods and services and productivity (Nogueira & Azevedo, 1982; Couto, 1987; Danatro, 1997). Thus, organizations need to understand their dimension in order to define policies and intervene in solutions that aim at improving both productivity and the quality of life of their employees (Oliveira, Granzinolli & Ferreira, 2007).

The dissatisfaction of citizens with the provision of services to society is one of the factors that mobilize public agencies to bring about changes in their work environment (Osborne & Gaebler, 1994). In the public sector, the implementation of changes in human resource management faces difficulties that sometimes do not exist in the private sector, such as the differentiated employment contract, the lack of autonomy to reward and punish workers, as well as the little concern with communication (Rainey & Bozeman, 2000).

Thus, organizations that manage change processes without considering the influence of their human resources increase the chances of failure and compromise the organizational climate (Dick, Ullrich & Tissington, 2006). In this way, sizing aims to choose, estimate or predict the ideal amount of personnel, which maximizes, optimizes or increases the chances of resulting in greater productive capacity (Serrano, Iwama, Almeida, Cunha & Franco, 2018). However, dimensioning is not a simple task, as several contextual factors such as climate change, economic, legislation, suppliers and society itself must be considered (Serrano, Mendes & Abila, 2019).

Thus, if on one hand the surplus of resources can be considered wasteful, the lack of it can compromise the provision of services and generate significant damage to society (Colley & Price, 2010). For this reason, the Government seeks to improve its Labor Force Planning models in order to reallocate the workforce according to the real needs of the organization (Anderson, 2004; Colley & Price, 2010). Therefore, the main advance of administrative reforms is the search for

actions based on the application of the principles of strategic planning in public management by results (Corrêa, 2007). In view of all the above, the need to review management controls in Public Administration becomes clear, as well as human resources practices and policies. Factors such as low attendance and high level of absenteeism, motivated and combined with the fragility of frequency and time controls, configure inefficiency and consequent repression of the demand for services to society.

Danatro (1997) highlights that in Western Europe, absenteeism rates are twice as high compared to those in Japan and the United States. Still according to the author, in Uruguay, studies in state companies identified that the highest rates of absenteeism correspond to respiratory, osteomuscular and digestive system diseases.

National surveys reveal that the highest rates of employee absenteeism are related to illness (Estorce & Kurcgant, 2011). For Mendes, Moraes and Mendes (2011) the exposure to intense loads in a specific way, generating physical and mental wear, similar to psychic suffering, motivates the absenteeism of nursing professionals.

It is important to emphasize that absenteeism, although it represents the individual's absence in the workplace, cannot be seen as negative, since there are necessary absences supported by the law, which are due to the workers as rights, such as: vacations; pregnancy, adoption and paternity leave; marriage leave; bereavement leave, among others.

As for the absenteeism rate, this study has specific rates standardized by the Absenteeism Subcommittee of the International Labor Medicine Association. In short, the indices presented address the severity, frequency and lost time index, as mentioned by Mendes (1980) and Couto (1987).

The calculation of the absenteeism frequency index represents the total number of absences due to Health Treatment Leave (LTS) by the total number of employees, as follows:

$$Frequency = \frac{\text{Number of absences due to LTS}}{Total\ number\ of\ workers} \quad (1)$$

The absenteeism severity rate represents the ratio of days lost due to LTS and the average number of employees, as follows:

$$Severity = \frac{\text{Time lost due to LTS (in days)}}{Total\ number\ of\ workers} \quad (2)$$

The lost time index is demonstrated by the ratio between the number of work days lost in the period and the scheduled number of days in the period, as follows:

$$Lost\ time = \frac{\text{Number of work days lost in the period}}{Total\ number\ of\ days\ scheduled\ in\ the\ period} \text{ x } 100 \quad (3)$$

According to studies such as Marras (2000) and Marques Neto (2006), the absenteeism rate was used over a greater variey of absences, not being restricted only to medical leave absences . The authors proposed the following calculation to determine absenteeism:

$$IA = \frac{\text{Absence Days}}{\textit{Average Personnel x Day quantity}} \text{ x } 100 \quad (4)$$

This study will adopt the absenteeism index used by Marques Neto (2006), as it will not restrict only absences due to illness reasons.

Methodology

The present study has an exploratory nature, both qualitative and quantitative (Alves-Mazzotti; Gewandsznajder, 1999; Gil, 2008). The research was developed through the bibliographic review, of qualitative character, when analyzing absenteeism in organizations. The bibliographic research was based on the survey of the subject discussed, in order to base the analysis of absenteeism in public organizations. The quantitative data was analyzed by means of regression in a data panel.

The challenge of achieving efficient public spending is a crucial and constant attitude indispensable for the well-being of society (Pereira Filho, Pianto & Souza, 2010). Since the outbreak of economic crises, such as those of the 1970s and 1980s, as well as the fact that international organizations (IMF and World Bank) began to work on renegotiating some countries' debts (Figueiredo, 2009), society has been concerned about greater efficiency in the use of public resources. This uneasiness can be visualized through the reforms of the state.

Federal Public Higher Education Institutions (IFES's), perceive public resources to perform their functions of generation and transmission of knowledge. These resources come from the collection of taxes, derived from the effort of the whole society. In this way, taxpayers expect the spending of these resources to occur in an effective way (fulfill its predetermined function) and efficiently (fulfill its function in the most rational way and at the lowest possible cost). In this context, the survey's delimitation will include the Federal Institutions of Higher Education (IFES's), since in addition to their relevance in terms of public education provision and services to society, they comprise 49.42% of the entire workforce of the Federal Executive Branch, as detailed in Table 3 of this study. Thus, the sample includes 100 (one hundred) IFES's, being 62 Federal Universities and 38 Federal Institutes registered in the Integrated System of Human Resources Administration (SIAPE).

The extraction of SIAPE data recorded 1,377,021 occurrences of formal absences registered in that system, from which 63,634 occurrences were excluded due to the absence of information on the start and end dates of the absence, in these cases both the start date and the end date were 9/9/9999, this factor is due to the non-filling of the start and end dates in the SIAPE system. Thus, the final sample resulted in 1,313,387 occurrences of absences valid for the entire analyzed sample.

To address the research question, this article has surveyed absenteeism at the IFES's over the past 11 years to identify absenteeism over the period under

review. Then, a projection of the representativeness of absenteeism in public accounts was made, as well as its value per individual. The data mining was done using the Postgre SQL version 11.2 database and the programming of the data was done with Python. The data resulting from the mining and programming was analyzed through regressions in a data panel.

The variables used in the survey are those included in the following Table 1.

Table 1: Research Variables

Qty	Research Variables	Source
1	Federal Higher Education Institutions – IFES's	Integrated System of Human Resources Administration – SIAPE
2	Federal Executive Branch Workforce, in December 31 in each year analyzed (2008 to 2018)	Statistic Personnel Pannel (MP, 2019)
3	IFES's Workforce, in December 31 in each year analyzed (2008 to 2018)	Statistic Personnel Pannel (MP, 2019)
4	Absenteeism Index	Made by the authors, from the formula used by the BNA and in studies from Chiavenato (1999), Marras (2000) and Marques Neto (2006).
5	Federal Executive Branch Personnel Expenses	Federal Government Integrated System of Financial Management – SIAFI
6	IFES's Personnel Expenses	Federal Government Integrated System of Financial Management – SIAFI

Source: Data collection. Made by the authors (2020).

The values collected were deflated by the annual Broad National Consumer Price Index (IPCA) for the year 2019, in order to exclude inflationary effects from the statistical series.

Given that the quantitative data of this study are available at the level of educational institutions (cross-sectional level) and over time (time-series level), the most appropriate would be the use of modeling with longitudinal data (e.g., modeling that allows the analysis of the various individuals over time, i.e., data panel).

The data panel technique was chosen due to the configuration of the research data, from which observations of several individuals (IFES's) over a time series are presented. The use of panel data allows the analysis of the same IFES's in several periods (i.e., from 2008 to 2018), allowing a more diligent analysis of the relationship between the variables (Gujarati & Porter, 2011).

With regard to regression, with grouped data, with stacked model (polled by Ordinary Minimal Squares), fixed effects or random effects, the best adjustment of the model was first observed through the Chow test, the Hausman test and the Breusch-Pagan test (Wooldridge, 2016).

Below are the hypothesis tests to be performed to confirm the model (Wooldridge, 2016)

$$Chow\ Test = \begin{cases} H0: & pooled \\ H1: & fixed\ effects \end{cases} \quad (5)$$

$$Hausman\ Test = \begin{cases} H0: & random\ effects \\ H1: & fixed\ effects \end{cases} \quad (6)$$

$$Breusch - Pagan\ Test = \begin{cases} H0: & pooled \\ H1: & random\ effects \end{cases} \quad (7)$$

Based on these results, controls were adopted for fixed effects in time, individuals and regions, generating three econometric models. The results are exposed in the regression tests section.

Results

Therefore, in order to evaluate which model best fits the data of this research, the following tests were adopted, according to the results presented in Table 2 below.

Table 2: Specification Tests

Test	Basic Regression Model
Chow F	F = 10.62 ***
Hausman	X^2 = 45.16 ***
Breusch-Pagan LM	X^2 = 736.78 ***

Source: Made by the authors (2020).

According to the tests, the estimation that best applies is the one obtained through the fixed effects model. According to Chow's F test, the null hypothesis that there is equality of intercept and inclination for all teaching institutes is rejected, so the result indicates the use of the fixed effects model. The Hausman test then helps reject the null hypothesis that the random effects model has more consistent estimates, thus confirming that the fixed effects model is the most appropriate option. Thus, for the case analyzed, it is not necessary to apply the Breusch-Pagan LM test.

Table 3 shows that the Federal Institutions of Higher Education (IFES's) have increased their labor force over the years to make up almost half (49.42%) of the entire Federal Executive Branch workforce.

Table 3: IFES's Workforce Representativity

Year	Federal Executive Branch Workforce in December 31	IFES's Workforce	% UFs' WF
2008	536.259	158.450	29,55%
2009	527.081	165.041	31,31%
2010	518.700	207.901	40,08%
2011	526.530	221.391	42,05%
2012	534.942	232.367	43,44%
2013	549.438	243.166	44,26%
2014	572.434	260.591	45,52%
2015	578.122	268.908	46,51%
2016	582.464	278.854	47,87%
2017	586.836	285.066	48,58%
2018	584.620	288.891	49,42%

Source: Research Data (2019).

In front of Table 3, it is observed an increase of IFES's over the years. In 2008, the HFIs represented 29.55% of the entire Federal Executive Branch, reaching 49.42% in 2018. Thus, there was a significant increase in the representativity of the HFIs in the period under analysis. This growth is clear as illustrated in Figure 1.

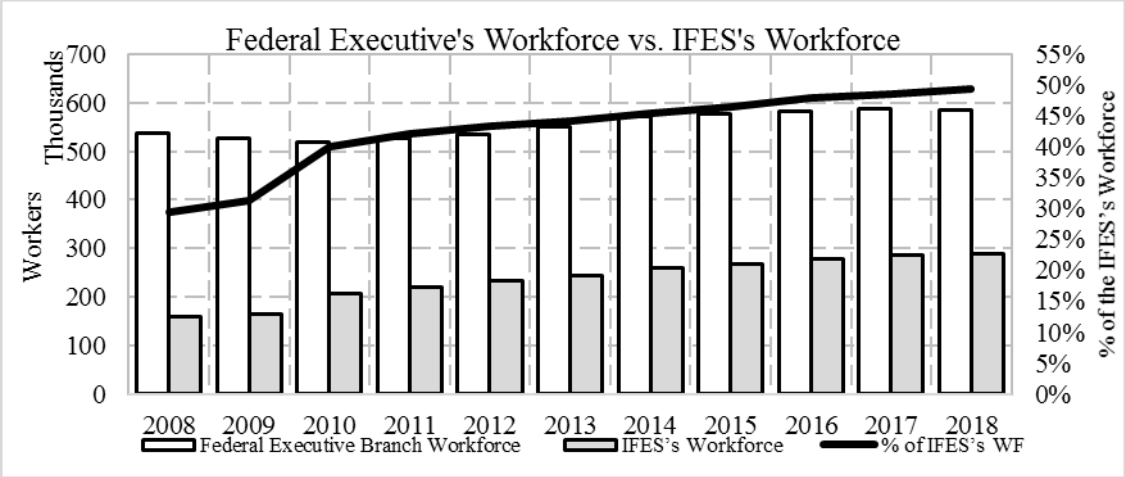

Figure 1: Workforce Comparison (Federal Executive vs. IFES's)
Source: Research Data (2019).

As shown in Figure 1, it can be seen that growth started from 2009 to 2010, always maintaining a growing behavior, from 2013 to 2018.

Absenteeism in Federal Institutions of Higher Education of the Federal Executive Branch

This research has identified, from government systems (SIAPE and PEP), the Absenteeism Index (IA) over 11 years, period available in these systems.

For some IFES's, the registration of the AI started from its creation and beginning of its activities. It is worth mentioning that this fact is justified by the

appearance of new IFES's, mediating the creation of Federal Institutes and the expansion of the network of Federal Universities.

From the AI analysis, it can be observed that of the 100 IFES's (Appendix A), in 4 (UFESBA, UFOB, UFSC and UFVJM), absenteeism (AI) presents an increasing evolution during the whole period of analysis. In 12 (IFAC, IFAM, IFAP, IFRR, UNIR, UFBA, FUFOP, IFNORTEMG, IFSULMG, UFRJ, FURG and UNILA) of the cases, the AI remains growing from 2008 to 2017, with reduction only in 2018. IFMS stands out, which had a decreasing AI only in 2012, for the other years of the sample, the behavior of the AI remained growing.

In 2 years from the sample period, the AI showed in decrease in 26 of cases, being: FUAM, FUFT, IFPA, IFRO, UFRA, UNIFAP, IFAL, IFPB, IFSERTPE, UFRN, UNIVASF, IFBRASILIA, IFGOIANO, UFMS, UNB, FUNREI, IFFLU, IFTRIANMG, UFF, UFJF, UFTM, IFFARROUP, IFPR, IFSC, UFFS e UNIPAMPA.

In 3 of the 11 years analyzed, 31 IFES's showed decreasing behavior, being: UFAC, FUFS, IFBAIANO, IFCE, IFPE, IFPI, IFRN, IFSE, UFAL, UFPE, UFRPE, UNILA, IFMT, UFGD, UFMT, IFES, IFMG, IFRJ, IFSP, UFABC, UFES, UFMG, UFRRJ, UFV, UNIFAL-MG, UNIFEI, UNIFESP, UNIRIO, FUFPEL, IFCATARINA e UFRGS/RS.

In 4 years of the analysis period, in 19 cases, the IFES's showed a decrease in AI, as follows: IFTO, UFOPA, UFPA, UNIFESSPA, IFBA, IFMA, UFCE, UFCG, UFERSA/RN, UFPB, UFPI, UFGO, FUFSCAR, IFSUDMG, IFRS, UFSRIOGRAN, UFCSPA, UFPR e UFSM/RS. For the cases of decreasing AI in 5 of the 11 years analyzed, we have 5 IFES's (FUMA, UFRB, IFGO, UFLA and UFU). While 2 IFES's (UFRR and UFTPR) showed a decrease in AI in 6 of the 11 years (almost half of the analyzed period).

In general, Absenteeism presents indexes with maximum and minimum levels, so Table 4 shows the IFES's that stood out for demonstrating greater and lesser absenteeism, by region, over the analyzed period.

Table 4: Higher Absenteeism vs. Lower Absenteeism

REGION	NORTH		NORTHEAST		CENTER-WEST		SOUTHEAST		SOUTH	
IA	Greater	Lower	Greater	Lower	Greater	Lower	Greater	Lower	Greater	Lower
2008	UFRR	UFRA	FUMA	UFERSA	UNB	UFGD	UFES	UNIFAL	UFPR	UNIPAMPA
2009						IFB		UFABC	UTFPR	
2010		IFAC	IFAL			IFMS	FUFOP	UNIFAL		
2011		IFRO								UNILA
2012		IFAP							IFSRIOGRAN	
2013	IFTO			UNILAB				UFLA		
2014				UFPE	IFB			FUFSCAR		
2015	FUAM		UNIVASF	UFESBA			IFES	UNIFEI		UFCSPA
2016							FUFOP	UNIFESP		
2017		UFRA	IFAL						IFPR	
2018	FUFT		IFSERTPE		UFMT	UFGO	IFSULMG	UFRJ		

Source: Research Data (2019).

From the analysis of Table 4, it can be seen that, in the Northern region, the IFES's that presented the greatest absenteeism were UFRR, IFTO, FUAM and FUFT, belonging to the States of Amazonas and Tocantins. For the Northeast region, the FUMA, IFAL, UNIVASF and UFRA stand out, being 2 belonging to the State of Pernambuco. IFAL stands out in 6 of the 11 years analyzed. While for the Midwest region, IFES are UNB, IFB and UFMT, on which occasion UNB appeared as the IFE with the highest absenteeism in 6 of the 11 years analyzed. In the Southeast region, UFES, FUFOP, IFES, FUFOP and UFSULMG, belonging to the State of Minas Gerais and Espirito Santo, stand out, with emphasis on FUFOP in 5 of the 11 years analyzed. For the South region, the IFES's that presented the highest absenteeism in the region were UFPR, UTFPR, IFSRIOGRAN and IFPR, being 3 of the 4 belonging to the State of Paraná.

Regarding the IFES's that presented lower absenteeism were UFRA, IFAC, IFRO and IFAP. In the Northeast region, UFERSA, UNILAB, UFPE and UFESBA stand out. In the case of the Center West region, IFES's UFGD, IFB, IFMS and UFGO presented low absenteeism, when IFMS predominated as the IFE with the lowest absenteeism in 8 of the 11 years that comprise the analysis period. For the Southeast region, it is worth mentioning UNIFAL, UFABC, UFLA, FUFSCAR, UNIFEI, UNIFESP and UFRJ, belonging to the States of São Paulo and Minas Gerais. For the South region, the IFES's that presented low absenteeism in the region were UNIPAMPA, UNILA and UFCSPA, belonging to the States of Rio Grande do Sul and Paraná.

It remains clear that absenteeism shows considerable growth over the years, in this sense, Figure 2 demonstrates the effect of absenteeism in the years 2008, 2013 and 2018, respectively, as well as its increasing effect throughout the country.

Figure 2: Absenteeism Index in the years 2008, 2013 and 2018, respectively

Note: The absenteeism rate of less than 5% was illustrated in blue, when the rate was between 5% and 10% was illustrated in orange, and for cases where the absenteeism rate was above 10% it was illustrated in red.

Source: Research data (2019).

In view of what is illustrated in Figure 2, the accelerated expansion of absenteeism in the analyzed period remains clear. This fact reinforces the importance of accountability in the disclosure of information, since transparency reduces the asymmetry between society and public agents, as already evidenced by Albuquerque and collaborators (2007). The following item 3.5.2 demonstrates the causes that motivate such absences.

Absenteeism index per type

Absenteeism, in turn, is conceptualized as the absence of the worker from his/her workplace (Harrison & Martocchio, 1998; Johns, 2002; Martocchio & Jimeson, 2003; Patton & Johns, 2007; Robbins, Judge, Odendaal & Roodt, 2016). In this sense, the present study adopted as absenteeism, all absences formally recorded in the absence module of the federal government's official system. Then, an analogy was made with the existing absences in the aforementioned legislation to identify their types, which resulted in 67 types of absenteeism, which fit the concept of absenteeism, arising from absences from work, namely: 1) Abandonment of Position; 2) Accident in Service; 3) Leave from Permanent Position to Exercise Commissioned Position; 4) Leave of Absence due to partial work day reduction; 5) Electoral Enrollment or Re-registration; 6) Training; 7) Business Activity; 8) Political activity; 9) Political activity without burdens; 10) Delay or early departure; 11) Sick leave; 12) Decentralized career; 13) Assignment; 14) Assignment without burdens; 15) Summon to court; 16) Sports competition; 17) Formation course; 18) Judicial decision; 19) Judicial decision without burdens; 20) Performance of Class Mandate; 21) Performance of Class Mandate without burdens; 22) Relocation to new headquarters (in transit); 23) Availability; 24) Blood Donation; 25) Studying Abroad; 26) Studying Abroad without burdens; 27) Provisional Exercise; 28) Exercise of Elective Mandate; 29) Exercise of Elective Mandate without burdens; 30) Absence; 31) Justified absence; 32) Field leave; 33) Vacation; 34) Jury and other services; 35) Training Leave; 36) Special Leave; 37) Gala Leave; 38) Incentive Leave; 39) Medical Leave for Health Treatment; 40) Medical Leave due to family member illness; 41) Bereavement Leave; 42) Premium Leave; 43) Sabbatical Leave; 44) Compassionate Leave; 45) Maternity Leave, Adoption Leave and Paternity Leave; 46) Maternity Leave, Adoption Leave and Paternity Leave without burdens; 47) Overseas Mission; 48) Overseas Mission without burdens; 49) Option for another position - legal accumulation; 50) Participation in Administrative Inquiry Commission; 51) Participation in Police Inquiry Commission; 52) Participation in National System of Permanent Negotiation; 53) Provision of Collaboration; 54) Stricto Sensu Post Graduation Program; 55) Training Program; 56) Training Program – Superior Military Academy; 57) Training Program without burdens; 58) Recess; 59) Reclusion; 60) Requisition; 61) Serving in an International Organization; 62) Service in an International Organization without burdens; 63) Military Service; 64) Administrative Suspension; 65) Suspension of the Employment Contract; 66) Hazardous Work Leave; and, 67) On duty travel . Absenteeism rates per type of absence are detailed in Appendix B.

It is observed that the absences that present greater representativeness - from highest to lowest -, as to their reason, were related to: stricto sensu postgraduate program; medical leave for health treatment; provisional exercise; maternity, adoption and paternity leave; and sabbatical leave. Of the reasons for the absences mentioned, it is worth mentioning that of the five (5) types of absences, three (3) are mandatory, which are: medical leave for health treatment; provisional exercise; and, maternity leave, adoption leave and paternity leave.

It is important to emphasize the departures for participation in graduate programs stricto sensu that occur in the interest of the Administration, on a discretionary basis, with the condition that the workers remain in the exercise of their functions upon their return, for the same period of time of the departures granted. It should be emphasized that for this type of withdrawal, if the server is

dismissed before the deadline set by law, or if at the end of the withdrawal has not obtained the said title or degree, it will have to reimburse the treasury the expenses incurred with its improvement. This absenteeism stands out for considering as a sample the Federal Higher Education Institutions, which have the main purpose of providing educational services, therefore, it is justified that the organizations need to invest in their workforce to provide a quality public service for society.

Thus, it is a positive absenteeism, as it is characterized by the agency's investment in its labor force, by conditioning the worker's return to his activities after the referred qualification, as well as providing for restitution to the treasury when not obtaining the return sought by the Administration.

With regard to absenteeism for medical leave for health treatment, it should be noted that this type of absenteeism, called disease-absenteeism, is given for health treatments. The data reinforce previous studies that identified that the highest rates of absenteeism are related to sick leave (Danatro, 1997; Estorce & Kurcgant, 2011; Mendes, Lima & Matias-Pereira, 2018). Research in the public sector that deepened the study of absenteeism due to illness, identified that "mental and behavioral disorders" (MST) are the main cause of disease-absenteeism (Santos & Mattos, 2010; Leão et al., 2015). In the studies of Silva, Pinheiro and Sakurai (2007), Sala et al. (2009) and Cunha, Blank and Boing (2009), absenteeism-disease was more representative when incurred due to osteomuscular diseases (DOM). Thus, it remains clear that preventive administrative measures should be adopted in order to prevent diseases, in order to value health and quality of life at work.

Absenteeism for provisional exercise occurs in cases where a servant, whose spouse or partner is also a civil or military public servant, from any of the Powers of the Union, States, Federal District or Municipalities. In this case, the provisional exercise may take place in a body or entity of the direct, municipal or foundational Federal Administration, provided that the exercise of the activity is compatible with the position of the public worker.

Thus, although this is a type of leave provided for by law, the workers continues to perform their duties in another body, their absence being counted only in the body that granted the said leave. Thus, on the other hand, the workers perform their activities in the agency where they are temporarily, acting as its labor force. This absenteeism is relative, since the activities continue to be carried out and the absence from work in the Public Administration is not counted.

For cases of absenteeism due to maternity leave, adoption and paternity leave, both in the private and public sectors, the legislation confers a series of rights related to maternity leave, adoption and paternity leave, in order to support the family during the first months of the baby's life, when a strong family affective bond is formed. Depending on the case, the license can vary its period and reach up to 180 days, for cases where breastfeeding is needed. In these cases, the absenteeism occurs depending on factors external to the organization, however, some public organizations stand out for providing day care centers to assist the worker in the process of returning to work after the end of the referred license. In this way, such initiatives contribute to the increase of the organization's productivity and to the increase of the quality of life at work, in order to welcome the server in the return to his/her work activities.

In relation to absenteeism due to sabbatical leaves, Law no. 8,112 of 1990 provides that this type of removal occurs in the interest of the Administration, with a term of up to 3 (three) consecutive years and without compensation, and

the license may be interrupted at any time by the server or in the interest of the Administration. In this case, the vacancy code of the worker is occupied by the worker removed and the Public Administration is unable to recompose this workforce, during the period of absence of the worker. Therefore, it is the organization's responsibility to better manage its human resources, as well as to establish objective criteria when it comes to absenteeism, discretionary to the Administration.

In this scenario, the Public Administration, when able to identify absenteeism and its causes, is subsidized to make managerial decisions regarding the dimensioning of its workforce. Thus, the disclosure of this information on absenteeism is of extreme importance for social control of the population, since the institution of control mechanisms contributes to reducing the probability of workers acting contrary to the interests of society.

Measuring absenteeism

From an economic-financial perspective on the absenteeism index, Table 5 shows the representativeness of the IFES' personnel expenses and their growth variation, in relation to the Federal Executive Branch.

Table 5: Representativity of Expenses with IFES's Personnel

Year	Federal Executive Branch Personnel Expenses	IFES's Personnel Expenses	IFES's Personnel Expense Percentage	Variation of Personnel Expenses Growth
2008	200.348.381.208,05	26.873.190.060,02	13,41%	-
2009	219.819.776.673,11	34.692.549.921,30	15,78%	29,10%
2010	236.681.367.828,07	44.635.454.083,71	18,86%	28,66%
2011	240.729.545.161,99	47.583.331.261,38	19,77%	6,60%
2012	234.603.030.047,77	49.293.087.977,74	21,01%	3,59%
2013	241.470.294.543,09	54.509.879.831,53	22,57%	10,58%
2014	247.831.760.997,64	60.476.839.969,62	24,40%	10,95%
2015	254.768.126.553,99	64.493.154.445,63	25,31%	6,64%
2016	241.843.189.170,36	64.683.439.901,13	26,75%	0,30%
2017	253.041.928.933,37	56.483.761.472,38	22,32%	-12,68%
2018	289.849.740.526,19	53.444.922.664,47	18,44%	-5,38%

Source: Research Data (2019).

From the analysis of Table 5, it can be seen that the amount of personnel expenses shows increase over time, rising from 13.41% in 2008 to 18.44% in 2018. It should be noted that in 2015 the percentage of personnel expenses reached 25.31%. As for the growth of these expenses, it can be seen that from 2008 to 2016 the variation remained positive and growing, however, for the years 2017 and 2018 there was a negative variation, i.e., instead of an increase in expenses, there was a decrease, which can be justified by the scenario of economic crisis that the country was facing.

In relation to the measurement of absenteeism for the public accounts, Table 6 details the annual value of this absenteeism for the selected sample, as well as its value per worker, in order to identify the economic burden of absences from work, as follows.

Table 6: Measurement of Absenteeism Expenses

Year	Absenteeism Index	IFES's Personnel Expenses	Absenteeism Expenses	Absenteeism Expenses per capita
2008	4,42%	26.873.190.060,02	1.187.795.000,65	7.496,34
2009	4,83%	34.692.549.921,30	1.675.650.161,20	10.152,93
2010	5,09%	44.635.454.083,71	2.271.944.612,86	10.928,01
2011	5,61%	47.583.331.261,38	2.669.424.883,76	12.057,51
2012	6,17%	49.293.087.977,74	3.041.383.528,23	13.088,71
2013	7,89%	54.509.879.831,53	4.300.829.518,71	17.686,80
2014	12,47%	60.476.839.969,62	7.541.461.944,21	28.939,84
2015	13,68%	64.493.154.445,63	8.822.663.528,16	32.809,23
2016	13,79%	64.683.439.901,13	8.919.846.362,37	31.987,51
2017	14,02%	56.483.761.472,38	7.919.023.358,43	27.779,61
2018	9,09%	53.444.922.664,47	4.858.143.470,20	16.816,53

Source: Research Data (2019).

Table 6 shows that absenteeism, which corresponded to R$ 1.2 billion in 2008, quadrupled to R$ 4.86 billion in 2018. In 2015, absenteeism reached an expense of R$ 8.92 billion for the public coffers. In view of the above, measures should be adopted in order to minimize these losses in a preventive manner.

As for the per capita value, in 2008 the absenteeism per worker corresponded to R$ 7,496.34 reais, reaching R$ 16,816.53 reais, in the year 2018. The year 2015 stands out, when absenteeism reached the amount of R$ 32,809.23 reais, per worker.

This study corroborates the statement of Robbins (1999) who identified that the cost of absenteeism is a major factor in the increase in costs in organizations. In addition, the post-decisory role is important for accounting because it generates its predictive value (Hendriksen & Van Breda, 1999). Thus, making these absenteeism data available to the workforce is crucial information to understand their causes and adopt preventive measures aimed at the worker's health and quality of life.

Absenteeism Analysis through Regression Model Specification Tests and Estimated Coefficients

As explained in Wooldridge (2016) and Fávero and Belfiore (2017), the most adopted panel data estimators in social science research are the fixed effects and random effects estimators. The fixed effects model, usually given by $y_{i,t} = \beta_{0,i} + x'_{i,t}\,\beta_1 + \epsilon_{i,t}$ allows for the $\beta_{0,i}$parameters to be correlated with the $x'_{i,t}$ regressors, which offers a limited form of endogeneity. On the other hand, the estimator of random effects, given by $y_{i,t} = x'_{i,t}\,\beta_1 + (\beta_{0,i} + \epsilon_{i,t})$, allows for the $\beta_{0,i}$ parameters and the $\epsilon_{i,t}$ idiossyncrathics error terms be independent and identically distributed.

Table 7 presents the estimates of the regression model coefficients exposed in Equation 1. In order to broaden the comparison, in Column (1) only the non-observable effects among individuals (IFES's) were controlled. In Column (2) we added the control for the non-observable effects in time. In Column (3), the fixed effect on HFIs was replaced by the fixed effect in Brazilian macro-regions (North, Northeast, Center-West, Southeast and South).

Table 7: Results for the Equation 1 Estimates

Variable	Coefficient	Coefficient values		
		(1)	(2)	(3)
$Intercepto$	$\gamma_{0,i}$	0,7712 ***	0,8452 ***	1,186 ***
		(9,31)	(7,14)	(5,55)
$TMCC_{IA}$	γ_1	0,1842 ***	0,1312 ***	0,1255 ***
		(14,34)	(9,29)	(8,51)
Fixed Effects				
IFES's		Yes	Yes	No
Regions		No	No	Yes
Time		No	Yes	Yes
Number of Observations		988	988	988
R2		33,37%	40,41%	44,75%

Table7 presents the test model $ln(IA_{i,t}) = \gamma_{0,i} + \gamma_1 (TMCC)_t + \sum(EfeitosFixos) + \epsilon_{i,t}$, which estimates the average constant rate of absenteeism growth throughout the survey sample.
Sig.: *, **, ***, are, respectively, p-value $< 1\%$, $< 5\%$ e $< 10\%$.
Note: In column (1), the result of the estimation is presented using panel data with fixed effects on the IFES's. Column (2) shows the result of the estimation with fixed effects on the IFES's and Time. Finally, column (3) presents the estimation with fixed effects in the regions (North, Northeast, Center-West, Southeast and South) and in Time. In each column the estimated coefficients and their respective t-statistics are reported (in brackets) obtained with standard errors from Rogers (1993) (cluster errors at the individual level), robust in the presence of heteroscedasticity and serial correlation of the residues. The standard errors of Driscoll and Kraay (1998) and Newey and West (1987) were also adopted, but no substantial changes were observed.
Source: Research Data (2019).

The average constant growth rate (ACGR) presented a coefficient of 0.1842, 0.1312 and 0.1255 for the models exposed in columns (1), (2) and (3), respectively (Table 7). That is, in exact terms, the Average Constant Growth Rate of Absenteeism during the period from 2008 to 2018 was 20.23%, 14.02% and 13.37%, respectively for Columns (1), (2) and (3). Respecting the conservatism of the estimates, all more constant, we can affirm that the ACGR of absenteeism is close to the average of the Columns (2) and (3) coefficients, that is, ˜13.70%. Based on these data it is possible to estimate that the absenteeism rate in the IFES's, doubles, approximately, every five years and five months.

Figure 3 presents a comparison between the observed values and the predicted values, estimated with t Measured Column Growth Rate (2) and (3) of Table 9. It can be seen that during the years 2014 to 2017, absenteeism presented the highest percentage of growth of the sample, decreasing in the year 2018 to values below the predicted.

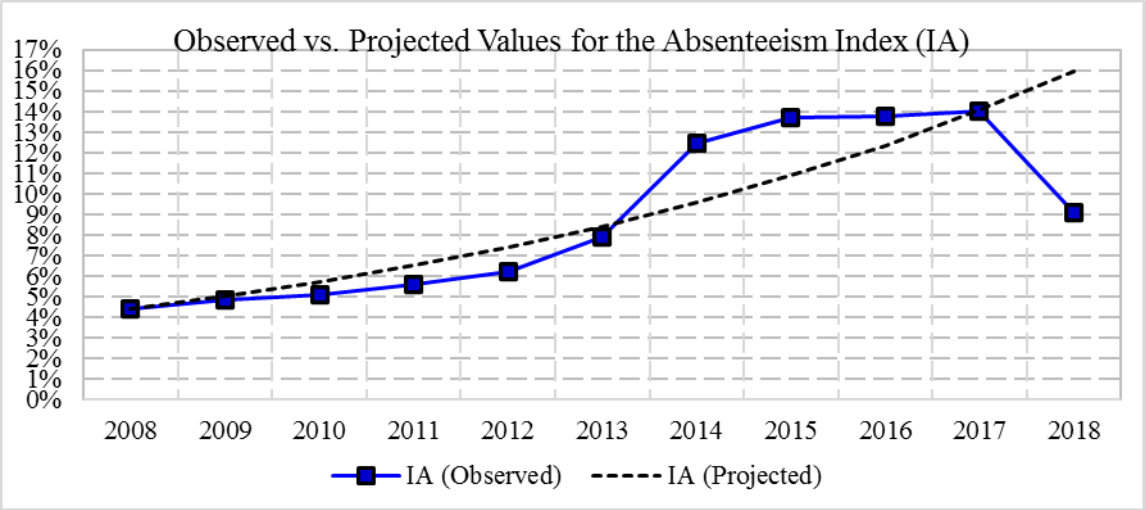

Figure 3: Observed vs. Projected Values for the Absenteeism Index (IA)
Source: Research Data (2019).

These results confirm that there is a growing trend of absenteeism at the IFES's, with a considerable drop in the year 2018. This fall may be justified by the scenario of economic crisis in which the country faced, since in the face of a situation of economic instability, workers may have acted conservatively by avoiding being absent from work, a fact that may give rise to presentism within organizations.

In Table 8, we have the estimates of the coefficients of the regression model exposed in Equation 2. Similar to that reported in Table 7 with Equation 1, Column (1) of Table 8 presents the estimation with control for non-observable effects among individuals (IFES's). In Column (2) the control for unobservable effects over time was added. In Column (3), the fixed effect on HFIs was replaced by the fixed effect in the Brazilian macro-regions (North, Northeast, Center-West, Southeast and South) and, finally, in Column (4), the fixed effects over time are replaced by the natural log of the GDP (ln(PIB)).

Table 8: Results for the Equation 2 Estimates

Variable	Coefficient	Coefficient Values			
		(1)	(2)	(3)	(4)
Intercepto	$\delta_{0,i}$	7,9681 ***	8,1127 ***	8,4096 ***	-54,039 ***
		(88,54)	(63,03)	(34,08)	(-2,92)
$TMCC_{DAPC}$	δ_1	0,2082 ***	0,1410 ***	0,1202 ***	0,1916 ***
		(14,92)	(9,45)	(7,62)	(14,09)
$\ln(PIB)$	δ_2				2,2019 ***
					(3,36)
Fixed Effects					
IFEs		Yes	Yes	No	Yes
Regions		No	No	Yes	No
Time		Yes	Yes	Yes	No
Number of Observations		988	988	988	988
R^2		29,95%	36,72%	38,10%	30,32%

Table8 presents the model test $ln(DAPC_{i,t}) = \delta_{0,i} + \delta_1(TMCC_{DAPC})_t + \sum(FixedEffects) + \epsilon_{i,t}$, which estimates the average constant rate of growth of absenteeism expenditures throughout the survey sample.
Sig.: *, **, ***, are, respectively, p-value $< 1\%$, $< 5\%$ and $< 10\%$.
Note: In column (1), the result of the estimation is presented using panel data with fixed effects on the IFES's. Column (2) shows the result of the estimation with fixed effects on the IFES's and Time. Column (3) presents the

estimation with fixed effects in the regions (North, Northeast, Center-West, Southeast and South) and in Time. Finally, in Column (4), the fixed effects in time are replaced by the natural log of the GDP (ln(GDP)). In each column the estimated coefficients and their respective t-statistics are reported (in brackets) obtained with standard errors from Rogers (1993) (cluster errors at the individual level), robust in the presence of heteroscedasticity and serial correlation of the residues. The standard errors of Driscoll and Kraay (1998) and Newey and West (1987) were also adopted, but no substantial changes were observed.
Source: Research Data (2019).

The estimated constant average growth rates for expenses with per capita absenteeism (〚TMCC〛 _DAPC) were 23.15%, 15.14%, 12.77% and 21.12%, for Columns (1), (2), (3) and (4), respectively. Again, respecting the conservatism of the estimates, we can state that the TMCC of the expenses with absenteeism is close to the average of the column coefficients (2) and (3), that is, ˜13.96%. Based on these data, it is possible to estimate that the absenteeism rate at the IFES's doubles approximately every five years and four months.

Again, Figure 4 presents a comparison between the observed values and the predicted values, estimated from Columns (2) and (3) of Table 10. Similar to that reported in Figure 3, it can be seen that during the years 2013 to 2017, absenteeism expenses presented higher than predicted values, with a substantial reduction in 2018.

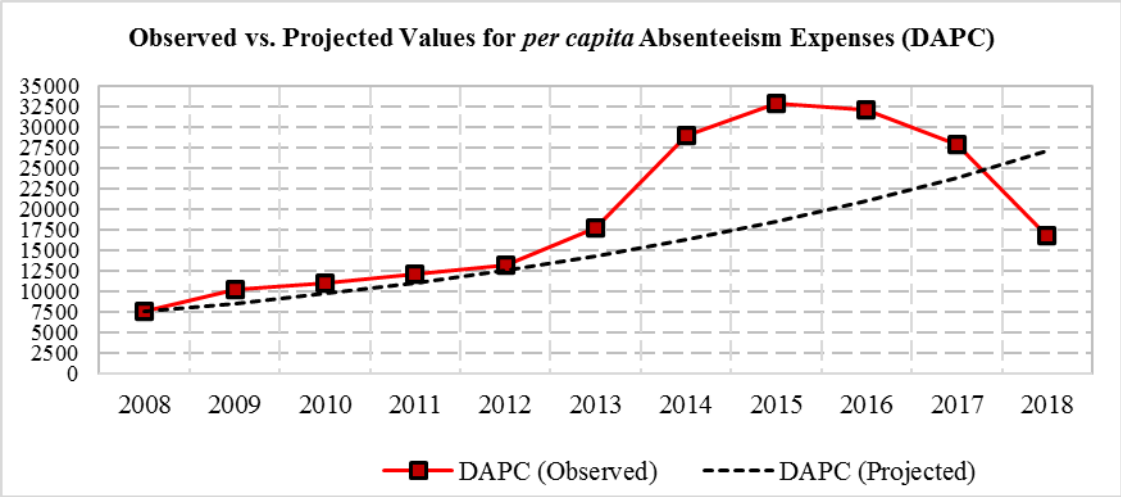

Figure 4: Observed vs. Projected Values for per capita Absenteeism Expenses (DAPC)
Source: Research Data (2019).

The results confirm those exposed in the descriptive stage of this research and point to an increase in expenses incurred with absenteeism within the scope of the IFES's, in the period analyzed.

Final considerations

Since 2017, the Brazilian federal government institutes regulations that provide for the criteria and procedures for prioritizing the implementation of the workforce dimensioning model in the bodies and entities that are part of the Civil Personnel System. In this way, the present study aims to answer how the dimensioning of the workforce, but specifically absenteeism in Brazilian Federal Public Universities impact public accounts from an accounting perspective, such a

mechanism, will take place under the perspective of the innovation process , with contributions of empirical-scientific knowledge being pointed out.

Understanding the absenteeism in Public Institutions of Higher Education in Brazil from the perspective of the innovation process, the methodology is contextualized in the light of the model recommended by Serrano et al (2018). Thus, from the in-depth description of the systematic development and implementation of this new management analysis initiative in a public context, it can be recognized as an innovation process understood by methods, techniques, instruments and organizational resources that were implemented with the involvement of actors indicated in the respective characterization.

After analyzing the absenteeism present in the Federal Institutions of Higher Education (IFES's) and its reflection on public accounts, it was possible to visualize the importance of understanding it, within organizations. Absenteeism was more representative when the absenteeism was related to: stricto sensu postgraduate program; medical leave for health treatment; provisional exercise; maternity, adoption and paternity leave; and, sabbatical leave. Regarding the measurement of absenteeism, it was identified that the per capita worker value for absences from work reached the equivalent of R$ 32,809.23 in 2015.

Thus, the present study identified the behavior of absenteeism, signaling that this public information can be used by the government in the subsidy to decision making, as a management tool. And, that the expenditure of public resources with absenteeism is considerable and can be minimized with preventive measures focused on health and quality of life at work.

With regard to the limitations of the present study, it is pointed out: the non-participation of satellite actors regarding the evaluation of absenteeism and its impact generated in the implementation of the DFT method; absence of perception of control and regulation bodies of the federal public administration about the object of study. Regarding the research agenda to be undertaken, some recommendations can be made: study on the application / implementation of the DFT method in a public organizational context with an increase in variables to reassess the impact of absenteeism on public accounts; conducting a comparative study between public and private higher education institutions; development of an instrument that measures the impact of the results on the strategic objectives of public organizations; characterization of the learning process developed along the innovation process.

For future research, it is suggested to study how absenteeism interferes in the efficiency of public organizations, as well as to expand the present study to the other spheres of government, with the purpose of reaching the entire Public Administration. Furthermore, considering that accountability tends to increase social control of public agents, it is expected that this work may motivate studies aimed at understanding absenteeism, its variables, as well as encouraging the improvement of public resource management in order to reduce expenses with absenteeism that may be managed.

In general terms, it was observed that, from 2013 to 2017, absenteeism presented the highest growth percentage in the sample, decreasing in 2018 to values below the forecast. Panel data analysis estimated that the absenteeism rate doubles every five years. Thus, prioritizing public policies aimed at addressing absenteeism, in addition to reducing the absenteeism rates in the organization, will contribute significantly to increasing efficiency in the Public Administration, by resulting in greater productivity in the provision of services to the public.

For future research, the analysis of absenteeism in Higher Education should de done, as demonstrated throughout the study, as it represents almost half of the Federal Executive Branch. In order to determine ways for reducing absenteeism, suggested measures are determining the ideal rate of absenteeism in organizations, as well as performing a comparison with the similarities and differences between absenteeism in the public sector and in the private sector.

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APPENDIX A - FEDERAL INSTITUTIONS OF HIGHER EDUCATION

Region	Quantity	Acronym	State	Code SIAPE	Institution Name
NORTH	1	FUAM	AM	26270	Fundação Universidade do Amazonas
	2	FUFT	TO	26251	Fundação Universidade Federal do Tocantins
	3	IFAC	AC	26401	Instituto Federal do Acre
	4	IFAM	AM	26403	Instituto Federal do Amazonas
	5	IFAP	AP	26426	Instituto Federal do Amapá
	6	IFPA	PA	26416	Instituto Federal do Pará
	7	IFRO	RO	26421	Instituto Federal de Rondônia
	8	IFRR	RR	26437	Instituto Federal de Roraima
	9	IFTO	TO	26424	Instituto Federal de Tocantins
	10	UFAC	AC	26275	Universidade Federal do Acre
	11	UFOPA	PA	26441	Universidade Federal do Oeste do Pará
	12	UFPA	PA	26239	Universidade Federal do Pará
	13	UFRA	AM	26253	Universidade Federal Rural da Amazônia
	14	UFRR	RR	26250	Universidade Federal de Roraima
	15	UNIFAP	AP	26286	Fundação Universidade Federal do Amapá
	16	UNIFESSPA	PA	26448	Universidade Federal do Sul e Sudeste do Pará
	17	UNIR	RO	26268	Fundação Universidade Federal do Rondônia
NORTH EAST	18	FUFS	SE	26281	Fundação Universidade Federal do Sergipe
	19	FUMA	MA	26272	Fundação Universidade Federal do Maranhão
	20	IFAL	AL	26402	Instituto Federal de Alagoas
	21	IFBA	BA	26427	Instituto Federal da Bahia
	22	IFBAIANO	BA	26404	Instituto Federal Baiano
	23	IFCE	CE	26405	Instituto Federal do Ceará
	24	IFMA	MA	26408	Instituto Federal do Maranhão
	25	IFPB	PB	26417	Instituto Federal da Paraíba
	26	IFPE	PE	26418	Instituto Federal de Pernambuco
	27	IFPI	PI	26431	Instituto Federal do Piauí
	28	IFRN	RN	26435	Instituto Federal do Rio Grande do Norte
	29	IFSE	SE	26423	Instituto Federal de Sergipe
	30	IFSERTPE	PE	26430	Instituto Federal do Sertão Pernambucano
	31	UFAL	AL	26231	Universidade Federal de Alagoas
	32	UFBA	BA	26232	Universidade Federal da Bahia
	33	UFCE	CE	26233	Universidade Federal do Ceará
	34	UFCG	PB	26252	Universidade Federal de Campina Grande
	35	UFERSA	RN	26264	Universidade Federal Rural do Semi-Árido
	36	UFESBA	BA	26450	Universidade Federal do Sul da Bahia
	37	UFPB	PB	26240	Universidade Federal da Paraíba
	38	UFPE	PE	26242	Universidade Federal de Pernambuco
	39	UFPI	PI	26279	Universidade Federal do Piauí
	40	UFRB	BA	26351	Universidade Federal do Recôncavo da Bahia
	41	UFRN	RN	26243	Universidade Federal do Rio Grande do Norte
	42	UFRPE	PE	26248	Universidade Federal Rural de Pernambuco
	43	UNILAB	CE	26442	Universidade da Integração Internacional da

					Lusofonia Afro-Brasileira
	44	UNIVASF	PE	26230	Fundação Universidade Federal do Vale do São Francisco
MIDWEST	45	IFBRASILIA	DF	26428	Instituto Federal de Brasília
	46	IFGO	GO	26429	Instituto Federal de Goiás
	47	IFGOIANO	GO	26407	Instituto Federal Goiano
	48	IFMS	MS	26415	Instituto Federal do Mato Grosso do Sul
	49	IFMT	MT	26414	Instituto Federal do Mato Grosso
	50	UFGD	MS	26350	Universidade Federal da Grande Dourados
	51	UFGO	GO	26235	Universidade Federal de Goiás
	52	UFMS	MS	26283	Universidade Federal de Mato Grosso do Sul
	53	UFMT	MT	26276	Universidade Federal de Mato Grosso
	54	UNB	DF	26271	Universidade Federal de Brasília
SOUTHEAST	55	FUFOP	MG	26277	Universidade Federal de Ouro Preto
	56	FUFSCAR	SP	26280	Universidade Federal de São Carlos
	57	FUNREI	MG	26285	Universidade Federal de São João Del Rei
	58	IFES	ES	26406	Instituto Federal do Espírito Santo
	59	IFFLU	RJ	26434	Instituto Federal Fluminense
	60	IFMG	MG	26409	Instituto Federal de Minas Gerais
	61	IFNORTEMG	MG	26410	Instituto Federal do Norte de Minas Gerais
	62	IFRJ	RJ	26433	Instituto Federal do Rio de Janeiro
	63	IFSP	SP	26439	Instituto Federal de São Paulo
	64	IFSUDMG	MG	26411	Instituto Federal do Sudeste de Minas Gerais
	65	IFSULMG	MG	26412	Instituto Federal do Sul de Minas Gerais
	66	IFTRIANMG	MG	26413	Instituto Federal do Triângulo Mineiro
	67	UFABC	SP	26352	Fundação Universidade Federal do ABC
	68	UFES	ES	26234	Universidade Federal do Espírito Santo Carlos
	69	UFF	RJ	26236	Universidade Federal Fluminense
	70	UFJF	MG	26237	Universidade Federal de Juiz de Fora
	71	UFLA	MG	26263	Universidade Federal de Lavras
	72	UFMG	MG	26238	Universidade Federal de Minas Gerais
	73	UFOB	BA	26447	Universidade Federal do Oeste da Bahia
	74	UFRJ	RJ	26245	Universidade Federal do Rio de Janeiro
	75	UFRRJ	RJ	26249	Universidade Federal Rural do Rio de Janeiro
	76	UFTM	MG	26254	Universidade Federal do Triângulo Mineiro
	77	UFU	MG	26274	Fundação Universidade Federal de Uberlândia
	78	UFV	MG	26282	Universidade Federal de Viçosa
	79	UFVJM	MG	26255	Universidade Federal dos Vales do Jequitinhonha e Mucuri
	80	UNIFAL	MG	26260	Universidade Federal de Alfenas
	81	UNIFEI	MG	26261	Universidade Federal de Itajuba
	82	UNIFESP	SP	26262	Universidade Federal de São Paulo
	83	UNIRIO	RJ	26269	Universidade do Rio de Janeiro
SOUTH	84	FUFPEL	RS	26278	Fundação Universidade Federal de Pelotas
	85	FURG	RS	26273	Fundação Universidade Federal de Rio Grande
	86	IFCATARINA	SC	26422	Instituto Federal Catarinense

	87	IFFARROUP	RS	26420	Instituto Federal Farroupilha
	88	IFPR	PR	26432	Instituto Federal do Paraná
	89	IFRS	RS	26419	Instituto Federal do Rio Grande do Sul
	90	IFSC	SC	26438	Instituto Federal de Santa Catarina
	91	IFSRIOGRAN	RS	26436	Instituto Federal Sul Rio-Grandense
	92	UFCSPA	RS	26284	Universidade Federal de Ciências da Saúde de Porto Alegre
	93	UFFS	SC	26440	Universidade Federal da Fronteira Sul
	94	UFPR	PR	26241	Universidade Federal do Paraná
	95	UFRGS	RS	26244	Universidade Federal do Rio Grande do Sul
	96	UFSC	SC	26246	Universidade Federal de Santa Catarina
	97	UFSM	RS	26247	Universidade Federal de Santa Maria
	98	UNILA	PR	26267	Universidade Federal da Integração Latino-Americana
	99	UNIPAMPA	RS	26266	Fundação Universidade Federal do Pampa
	100	UTFPR	PR	26258	Universidade Tecnológica Federal do Paraná

Source: Made by the authors (2019). Data collected from SIAPE.

APPENDIX B – ABSENTEEISM RATE GROWTH PER TYPE

QTD	ABSENTEEISM TYPE	ABSENTEEISM RATES										
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1	Abandonment of Position	0,03%	0,03%	0,02%	0,02%	0,02%	0,02%	0,02%	0,02%	0,02%	0,02%	0,00%
2	Accident in Service	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,01%	0,02%	0,01%	0,01%
3	Leave of Absence from Permanent Position to Exercise Commissioned Position	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,00%
4	Leave of Absence due to partial work day reduction	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,00%	0,00%	0,00%	-
5	Electoral Enrollment or Re-registration	-	-	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
6	Training	-	-	-	-	-	0,00%	0,01%	0,03%	0,03%	0,02%	0,02%
7	Business Activity	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	-
8	Political activity	0,05%	0,00%	0,02%	0,01%	0,05%	0,01%	0,03%	0,02%	0,06%	0,01%	0,02%
9	Political activity without burdens	-	-	-	-	-	-	0,00%	0,00%	0,00%	0,00%	0,00%
10	Delayed or early dismissal	-	-	-	-	-	-	0,00%	0,00%	0,00%	0,01%	0,02%
11	Sick leave	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
12	Decentralized career	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	-
13	Assignment	0,18%	0,22%	0,23%	0,26%	0,29%	0,49%	0,88%	1,11%	1,30%	1,51%	0,02%
14	Assignment without burdens	0,02%	0,02%	0,03%	0,04%	0,04%	0,08%	0,13%	0,15%	0,18%	0,21%	0,00%
15	Summon to court	-	-	-	-	-	-	-	-	0,00%	-	-
16	Sports competition	-	-	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
17	Formation course	0,22%	0,21%	0,16%	0,12%	0,09%	0,08%	0,16%	0,11%	0,05%	0,04%	0,02%
18	Judicial decision	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%
19	Judicial decision without burdens	-	-	-	-	-	-	-	0,00%	0,00%	0,00%	0,00%
20	Performance of Class Mandate	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
21	Performance of Class Mandate without burdens	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,01%
22	Relocation to new headquarters (in transit)	0,00%	0,00%	0,00%	0,00%	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
23	Availability	0,01%	0,01%	0,02%	0,03%	0,04%	0,05%	0,06%	0,07%	0,07%	0,08%	0,04%
24	Blood Donation	-	0,00%	0,00%	0,00%	0,01%	0,01%	0,00%	0,00%	0,00%	0,00%	0,00%
25	Studying Abroad	-	-	-	-	0,00%	0,00%	0,08%	0,41%	0,47%	0,48%	0,56%

26	Studying Abroad without burdens	-	-	-	-	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
27	Provisional Exercise	0,36%	0,39%	0,41%	0,46%	0,52%	0,65%	0,75%	0,76%	0,79%	0,83%	0,01%
28	Exercise of Elective Mandate	0,07%	0,08%	0,07%	0,07%	0,07%	0,08%	0,09%	0,07%	0,06%	0,05%	0,01%
29	Exercise of Elective Mandate without burdens	0,00%	0,00%	0,00%	0,01%	0,01%	0,03%	0,03%	0,03%	0,03%	0,02%	0,02%
30	Absence	0,05%	0,07%	0,06%	0,07%	0,07%	0,08%	0,10%	0,11%	0,12%	0,12%	0,05%
31	Justified absence	-	-	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,01%
32	Field break	-	-	-	-	-	-	-	0,00%	-	-	-
33	Vacations	0,00%	-	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	-	-
34	Jury and other services	0,00%	0,00%	0,00%	0,00%	0,01%	0,00%	0,01%	0,01%	0,01%	0,01%	0,02%
35	Training Leave	0,05%	0,06%	0,07%	0,10%	0,13%	0,17%	0,22%	0,22%	0,30%	0,39%	0,52%
36	Special Leave	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	-
37	Gala Leave	0,00%	0,00%	0,00%	0,01%	0,01%	0,01%	0,02%	0,02%	0,02%	0,02%	0,01%
38	Advised Leave	0,13%	0,14%	0,13%	0,11%	0,09%	0,08%	0,06%	0,05%	0,05%	0,05%	0,00%
39	Medical Leave for Health Treatment	0,60%	0,52%	0,52%	0,58%	0,59%	0,50%	1,04%	1,67%	1,85%	1,88%	1,78%
40	Medical Leave due to family member illness	0,01%	0,01%	0,02%	0,01%	0,01%	0,01%	0,05%	0,10%	0,13%	0,13%	0,14%
41	Bereavement Leave	0,00%	0,00%	0,01%	0,01%	0,01%	0,02%	0,02%	0,02%	0,03%	0,03%	0,02%
42	Premium Leave	0,08%	0,11%	0,09%	0,07%	0,06%	0,07%	0,11%	0,08%	0,09%	0,08%	0,06%
43	Sabbatical Leave	0,50%	0,53%	0,54%	0,55%	0,59%	0,67%	0,81%	0,78%	0,73%	0,73%	0,39%
44	Compassionate Leave	0,25%	0,28%	0,26%	0,27%	0,29%	0,32%	0,36%	0,36%	0,37%	0,38%	0,12%
45	Maternity Leave, Adoption Leave and Paternity Leave	0,08%	0,12%	0,18%	0,25%	0,31%	0,34%	0,62%	0,74%	0,78%	0,78%	0,83%
46	Maternity Leave, Adoption Leave and Paternity Leave without burdens	-	0,00%	-	0,00%	0,00%	0,00%	0,01%	0,01%	0,01%	0,01%	0,00%
47	Overseas Mission	0,33%	0,37%	0,36%	0,37%	0,39%	0,54%	0,98%	0,67%	0,34%	0,25%	0,18%
48	Overseas Mission without burdens	-	-	-	-	0,00%	0,00%	0,01%	0,01%	0,00%	0,00%	0,00%
49	Option for another position - legal accumulation	0,02%	0,02%	0,02%	0,02%	0,02%	0,02%	0,02%	0,01%	0,01%	0,01%	0,00%
50	Participation in Administrative Inquiry Commission	-	-	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
51	Participation in Police Inquiry Commission	-	-	-	-	-	0,00%	0,00%	0,00%	0,00%	0,00%	-
52	Participation in National System of Permanent Negotiation	0,00%	-	-	-	-	-	-	0,00%	-	-	0,00%
53	Provision of Collaboration	0,08%	0,11%	0,18%	0,24%	0,29%	0,36%	0,44%	0,48%	0,53%	0,61%	0,01%
54	Stricto Sensu Post Graduation Program	0,84%	0,99%	1,16%	1,38%	1,58%	2,59%	4,66%	4,77%	4,53%	4,40%	3,90%

55	Training Program	0,05%	0,06%	0,04%	0,03%	0,02%	0,03%	0,08%	0,14%	0,16%	0,18%	0,17%
56	Training Program – Superior Military Academy	-	-	-	-	-	-	-	0,00%	-	-	-
57	Training Program without burdens	-	-	-	-	-	-	0,00%	0,00%	0,00%	0,00%	0,00%
58	Recess	-	0,01%	0,01%	0,01%	0,01%	0,01%	0,02%	0,02%	0,03%	0,03%	0,02%
59	Reclusion	0,02%	0,02%	0,02%	0,02%	0,03%	0,03%	0,03%	0,03%	0,02%	0,03%	0,01%
60	Requisition	0,03%	0,03%	0,03%	0,03%	0,03%	0,02%	0,03%	0,02%	0,03%	0,03%	0,01%
61	Serving in an International Organization	0,02%	0,03%	0,02%	0,02%	0,02%	0,02%	0,02%	0,02%	0,02%	0,02%	0,00%
62	Service in an International Organization without burdens	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,00%
63	Military Service	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
64	Administrative Suspension	0,28%	0,33%	0,35%	0,38%	0,41%	0,45%	0,47%	0,46%	0,45%	0,45%	0,04%
65	Suspension of the Employment Contract	0,00%	0,00%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,01%	0,00%
66	Hazardous Work Leave	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	-
67	On duty travel	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,01%	0,01%	0,02%	0,02%	0,02%
TOTAL		4,42%	4,83%	5,09%	5,61%	6,17%	7,89%	12,47%	13,68%	13,79%	14,02%	9,09%

Note: For cases where the Absenteeism Index showed 0.00%, the identified value was $< 0.01\%$.

Source: Research Data (2019).