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ANALYSIS OF THE EFFICIENCY OF PUBLIC SPENDING ON SOCIAL ASSISTANCE IN BRAZIL DURING THE PERIOD FROM 2012 TO 2019

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Abstract

Efficiency analysis has been frequent in the literature for research on public spending. In Brazil, the evolution of public resources for social assistance has been the object of many studies, but the same is not true for the investigation of efficient allocation at the state level. In this sense, the objective of this research is to analyze the efficiency of public spending on social assistance in Brazilian states in the period from 2012 to 2019. For this, the Data Envelopment Analysis (DEA) methodology was used, through the input-oriented BCC model. In terms of average per capita spending on social assistance, only eight states are above the national average. The model results show that Amapá, Minas Gerais, Paraná, Rondônia and São Paulo are the benchmark states on the efficiency frontier for the entire period analyzed, and that, on average, nine states were efficient per year.

Keywords: DEA; BCC; Technical efficiency; Public expenditure; Social care.

JEL Classification: C14, H50

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LIST OF ABBREVIATIONS AND ACRONYMS

- BCC** - Banker, Charnes and Coopers
- BPC** - Continuous Cash Benefit
- CADUNICO** - Single Registry for Social Programs of the Federal Government
- CCR** - Charnes, Cooper and Rhodes
- POP Center** - Specialized Reference Center for the Homeless
- ECLAC** - Economic Commission for Latin America and the Caribbean
- CRAS** - Social Assistance Reference Centers
- CREAS** - Specialized Social Assistance Reference Centers
- CRS** - Constant Returns to Scale
- DEA** - Data Envelopment Analysis
- DGSUAS** - SUAS Management Department
- DMU** - Decision Making Units
- FNAS** - National Social Assistance Fund
- GSF** - Federal Social Expenditure
- IBGE** - Brazilian Institute of Geography and Statistics
- LDO** - Budget Guidelines Law
- LOA** - Annual Budget Law
- LOAS** - Organic Law of Social Assistance
- OECD** - Organization for Economic Cooperation and Development
- UN** - United Nations Organization
- PBF** - Bolsa Família Program
- GDP** - Gross Domestic Product
- PNAS** - National Social Assistance Policy
- PPA** - Multi-Year Plan
- RMV** - Lifetime Monthly Income
- SNAS** - National Secretariat of Social Assistance
- STN** - National Treasury Secretariat
- SUAS** - Unified Social Assistance System
- SUS** - Single Health System
- VRS** - Variable Returns to Scale

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1. INTRODUCTION

Social assistance is provided for in the Federal Constitution of 1988 in its articles 203 and 204 to whoever needs it, regardless of whether they contribute to social security (BRASIL, 1988). In addition to being a citizen's right and a duty of the State, as recognized by the Organic Law of Social Assistance (LOAS) under number 8.742, of December 07, 1993 (BRASIL, 1993).

In Brazil, the new form of social assistance is not in line with the paternalistic concept of providing favors, but rather with the guarantee of social assistance rights aimed at promoting social protection from the State (BRASIL, 2011).

Brazilian public spending on Social Assistance increased about four and a half times in real values in the period from 2002 to 2018, growing consistently throughout the period except for the year 2015, which was reduced compared to the previous year due to the combination of the facts that there was less annual growth in GDP and high inflation, and that it exceeded R\$ 100 million in contributions in 2017 (BRASIL, 2019). Studies such as this one was made possible thanks to the separation of budgetary functions, such as the budgetary function of Social Assistance that was disaggregated from Social Security in 2001 (BRASIL, 2005).

Because of the magnitude involved in managing an item that guides the budgets of others, impacting the supply of services, as is the case of social assistance, it is also necessary to have instruments that better coordinate an action. In this sense, the National Secretariat for Social Assistance (SNAS) is responsible for managing the National Social Assistance Policy (PNAS), the Social Assistance Fund (FNAS), and the Unified Social Assistance System (SUAS) (BRASIL, 2021).

According to Nascimento (2010), after 2003 social assistance was administratively planned and guided by SUAS based on the Organic Law of Social Assistance, the Basic Operational Standards, and the 1988 Constitution, suggesting the federative pact for management and guiding the social issue in a decentralized manner observing territorial inequalities and social participation.

In the literature on social welfare spending, there are concepts that are somehow connected and will be better explained throughout the referential, such as Federal Social Expenditure and Social Security.

Pires and Dos Santos (2020), point out that despite Social Assistance spending going from 0.08% in 1995 to 1.24% of GDP in 2016, this increase in spending was conflicting given that the increase in the Continuous Cash Benefit Program may have been the cause of this growth, decreasing inequality but partially satisfying PNAS and SUAS.

The Bolsa Família Program (BFP) is an important contribution to the social assistance budget and a reference in the fight against poverty and the reduction of inequality. It was recognized by the United Nations (UN) in 2014 as essential for removing Brazil from the World Hunger Map (BRASIL, 2015).

In recent data, according to the Social Information Report for the whole country scenario, only in July 2021 the PBF benefited 14.694.962 families with an average number of R\$ 84,05 reaching

the federal government's spending mark of R\$ 1,235,187,856.00 in that month (BRASIL, 2021). The same report also highlights that in April 2021, there were 29,847,849 families enrolled in the Unified Registry for Social Programs of the Federal Government (CADUNICO), which is equivalent to 76,999,108 people registered.

In this debate, there is the figure of the public good in relation to the impact on society. Giambiagi and Além (2011) conceptualize public goods as those whose consumption and/or use is indivisible, non-rivalrous and non-exclusive, since, if there is consumption by an individual or group, there is no impossibility of consumption by others in society, so that everyone benefits from the provision of public goods. Thus, social welfare is seen as an intangible public good in view of the externalities that it can generate in society.

Thus, the relevance of this work is due to the analysis of the efficiency of the allocation of public resources by the federative entity in the function of the budget, which is fundamental for the equal promotion of support for a portion of society in terms of providing assistance to those who have insufficient economic resources, and may also serve as an instrument to indicate the reach of the right to social protection by the Brazilian states.

Although the evolution of public resources for social assistance in Brazil is the subject of many studies, the same does not seem to recur for the investigation of efficient allocation and at the level of the federation units. Hereafter, when Brazilian states are mentioned, the twenty-six Brazilian states and the Federal District are considered. Thus, the research question of this paper is: what is the behavior of the efficiency of public spending on social assistance of the Brazilian states in the period 2012 to 2019?

The main objective of this work is to analyze the efficiency of public spending on social assistance in the Brazilian states from 2012 to 2019. The following specific objectives were defined: a) to verify the volume of per capita public spending on social assistance in Brazilian states; b) to measure the level of efficiency of per capita public spending on the social assistance function in Brazilian states; c) to compare the efficiency of per capita public spending on social assistance among the federative units.

The study is quantitative and descriptive in nature, based on secondary data. To reach the mentioned objectives, the Data Envelopment Analysis (DEA) method was used, by means of the BCC model of Banker, Charnes and Coopers (1984), which will be explained in the methodology section.

This paper is structured in five (5) sections, including this introduction. In section two, the literature review that reflects on the study of efficiency and public spending will be presented. The research typology, data source, applied model, and the selection of input and output variables are presented in section three. Section four will address the results of the model and its interpretation. Finally, section five will present the paper's final considerations.

2. LITERATURE REVIEW

The study of public spending in its particularity falls within the area of knowledge called Public Sector Economics. In the specific case of efficiency analysis, it has been common practice to assess the efficient allocation of public resources, which can be observed throughout this review.

This section is subdivided into the following topics: the dynamics of public spending, efficiency in the public sector, the financing of social assistance in Brazil, and empirical studies on efficiency of social public spending.

2.1. The dynamics of public spending

Giambiagi and Além (2011), report according to Stiglitz that government spending impacts on various activities that in some period is related to everyone in society. Thus, public spending in its broad extent, including the federative entities, should match spending that is related to the population.

That said, the question of where government spending is allocated is a recurring one. The answer to this question is in the functions that are typical of the government, dealing with areas that if the government does not act, possibly there would be no provision and in a positive situation would be unsatisfied due to the nature of being public goods, being: health, education, national defense; policing; regulation; justice; and welfare (GIAMBIAGI; ALÉM, 2011).

Allocative, distributive, and stabilizing functions are the basic functions of government, which are respectively oriented towards: i) efficient allocation of resources that the market cannot provide, and it is up to the state to provide public goods; ii) fairer income distribution throughout society; iii) control of production, employment, prices, and balance of payments equilibrium, out the appropriate rates for economic growth (RODRIGUES; TEIXEIRA, 2010).

Added to this is the efficiency of public spending understood by technical efficiency that looks at inefficiencies in each item of spending and allocative efficiency that is oriented to prefer alternative spending components in a coherent way and direct resources to programs of greater social return, both of which are essential efficiencies to benefit equity and long-term economic growth (IZQUIERDO; PESSINO; VULETIN, 2018).

In Brazil, the public budget is governed mainly by articles 163 to 169 of the 1988 Federal Constitution regarding public finances, the Budget Law no. 4,320 of March 17, 1964, and the Fiscal Responsibility Law no. 101 of May 4, 2000. Article 165 of the CF/88 also provides for the budget being comprised of the Multi-Year Plan (PPA), the Budget Guidelines Law (LDO), and the Annual Budget Law (LOA). This explains the normative nature of the budget in specifying the functions of the budget.

Reis and Bueno (2019), in a study for countries of the Organization for Economic Cooperation and Development (OECD) and the Economic Commission for Latin America and the Caribbean (ECLAC), provide results that investment in social public spending on the part of the state impacts negatively on economic growth, but this does not indicate the lack of social investment by countries

that as the case of Brazil, are necessary expenditures being an unequal society and with poverty.

On the other hand, Neduziak and Correia (2017), in their study on public spending allocation and economic growth for Brazilian states in the period from 1995 to 2011 using a Fixed Effects panel econometric model, point out that a 1% expansion in spending on housing and urbanism provides an expansion in growth of 0.0041%, while spending on assistance and social security enables an expansion of 0.0096% in the growth of Brazilian states, and such results may also be related to the scope of spending, being of the social aggregate.

2.2. Efficiency in the Public Sector

Efficiency in the Public Sector plays a fundamental role in society and represents the State's capacity to provide public services. Moreover, efficiency is also present in the field of Public Administration through the Federal Constitution. According to the Constitutional Amendment No. 19 of 1998, efficiency was included in the caput of Article 37 of the 1988 Federal Constitution, which previously contained four principles, namely: legality, impersonality, publicity and morality (BRASIL 1988 1993).

Lima (2015), points out that although efficiency is popular, its measurement is complex in the public sector and the most appropriate way seems to be the measurement of costs by the activity-based method. In his study, the author applied such methodology to evaluate the impact in the sense of technical efficiency resulting from the change in the budget decentralization process, concluding that there were significant indications for the increase in efficiency and timeliness when using technology and communication mechanisms in the process.

It is known that the logic of efficiency is established by the cost-benefit ratio in relation to the service provided, and it should be a priority of the State to maximize the consumption of services with the best optimal expenditure. In this sense, Silva and Crisóstomo (2019), analyzed the effects of fiscal management and efficiency of municipal management on the socioeconomic development of Ceará municipalities in the period from 2007 to 2013, through DEA and linear regression. The study attested that both fiscal management and public management efficiency positively affect the socioeconomic development of Ceará's municipalities.

Efficiency is understood by the rationalization of action with the aim of having the smallest possible errors, being the efficient practice when using the most rational way to achieve this end (GIANNAKOS, 2017). Added to this, the public interest that guides the actions of the state should also prevail, serving as a guideline for all bodies that make up the public administration to meet the interests of the population.

2.3. Financing Social Assistance in Brazil

The Fiscal Responsibility Law (Complementary Law no. 101, of May 4, 2000) through article 51 obliges states, the Federal District, and municipalities to provide the National Treasury Secretariat

with expenditures by budget function (BRASIL, 2005). With this, studies such as, for example, those carried out by the Ministry of Social Development and Fight against Hunger on the financing of Social Assistance in Brazil between 2002 and 2004 were made possible, given that social assistance until 2001 was integrated with social security expenses.

Thus, it is necessary to understand the norms that guide the function of the budget in relation to social assistance. According to article 194 of the Federal Constitution of 1998, “social security comprises an integrated set of actions initiated by the public authorities and society, aimed at ensuring the rights to health, social security, and social assistance. This perspective of the Constitution explains why social assistance is related to social security and even to health, due to the integration of the three areas in social security.

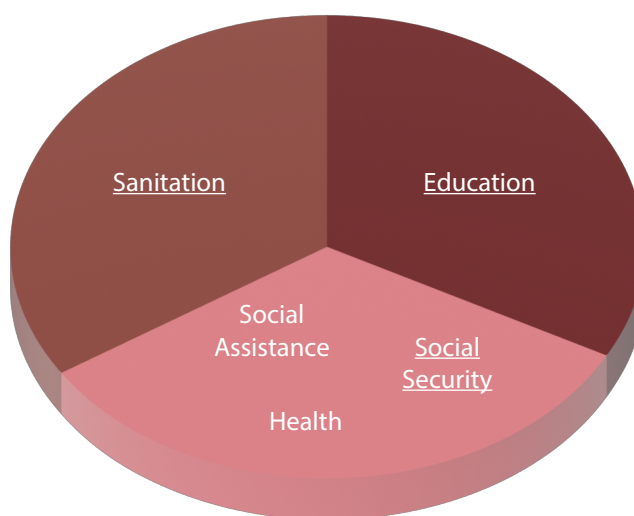
On the other hand, the Organic Law of Social Assistance (LOAS) of December 7, 1993, states in its first article that

“Social assistance, a right of the citizen and a duty of the State, is a non-contributory Social Security Policy, which provides the minimum social needs, carried out through an integrated set of actions of public initiative and society, to ensure that basic needs are met”.

In addition to the social assistance and social security included in article 194 of the Federal Constitution of 1988, the Federal Social Expenditure (GSF) is also part of the budget debate.

According to Pinheiro (2011), the concept refers to the Federal Government’s expenditures, including negotiated transfers to other entities of the federation or to private institutions in social areas, which, in turn, matches the budget functions related to education, sanitation and social security. This interface of budget functions in the social sphere considered by the GSF is represented in figure 1.

Figure 1 - Representation of the interface of budget functions in the GSF



Source: Prepared by the author (2021).

Pinheiro (2011), also points out that social security has the highest percentages of spending compared to the Gross Domestic Product (GDP), for the period analyzed, followed by the health function and corroborates the previously mentioned that social assistance has increasing federal spending in the period, unlike the resources for the functions of education and sanitation.

The largest portion of funding for Social Assistance, in relation to the period from 2002 to 2010, is under the control of the Federal Government, which is related to the contribution of programs with larger budgets such as Bolsa Família and Benefício de Prestação Continuada (Continuing Benefit Conveyance - BPC) and funding of social assistance services is the responsibility of the three federative entities in a shared manner (BRASIL, 2011).

In a broader analysis from the perspective of the Union for resources allocated to Social Assistance, in the period from 2002 to 2010, the appropriations went from R\$ 11.9 billion to R\$ 42.9 billion and when observing nominal values, the increase was 498.5% between the two years (BRASIL, 2011). This perspective also extended until 2018 with the participation of the Union visibly high when observed the other entities, since it performs cash transfer (BRASIL, 2019).

Still in this broad view of the budget in the period from 2002 to 2010, the participation of Social Assistance in the total of Social Security, went from 4.2% to 9.14%, but this growing trajectory did not extend when analyzed under the budget of the union (BRASIL, 2011). When analyzing the period from 2002 to 2018, the relative participation of social assistance in the Social Security budget went from 3.7% to 8.9% (BRASIL, 2019).

Among the structure responsible for providing social assistance services, it is important to highlight that the Social Assistance Reference Center (CRAS) is an instrument of Basic Social Protection seeking to prevent the occurrence of situations of social vulnerability and risk, while the Social Assistance Specialized Reference Center (CREAS), an instrument of Specialized Social Protection, serves families and individuals in situations of personal and social risk due to violation of rights or in situations of violence (BRASIL, 2021).

The SUAS has shown an increase in resources that can be seen by the total invested in constant values having increased 4.9 times in the period from 2002 to 2018, being mostly related to BPC and Monthly Income for Life (RMV), but with growth of social assistance services for society, for example, the CRASs, CREASs, Specialized Reference Centers for the Homeless Population (Centro POP), Co-existence Services and Strengthening of Links, Volant Teams and others (BRASIL, 2019).

2.4. Empirical studies on the efficiency of social public spending

Table 1 shows a survey of studies addressing the topic of efficiency of social public spending, conducted between the years 2010 and 2020. The data were collected from the CAPES PERIODICOS platform, with the filters: (Efficiency) AND (Social public spending); peer-reviewed journals; Brazil; publication date from 2010 to 2020. The search resulted in 181 publications, of which, after a selection

through careful reading of the abstracts aiming at the best fit to the theme, 172 were excluded and the 9 highlighted in Table 1 were considered:

Box 1 - Empirical studies on the efficiency of social public spending

| AUTHORS | EXPLOITED AREA | METHODOLOGY |
|--|-------------------------------------|---|
| Varela and Pacheco (2012). | Public Spending on Health | Data Envelopment Analysis (DEA) |
| Cavalcante (2013). | Elections | Spatial regression |
| Monteiro, Ferreira, and Silveira (2013). | Social Protection | Multiple linear regression with panel data |
| Maciel (2013). | Public Finance | Comparative analysis of indicators and policy-oriented approach |
| Borges, Mario and Carneiro (2013). | Public Accounting | Theoretical and descriptive analysis |
| Degenhart, Vogt, and Zonatto (2016). | Public spending and economic growth | Multivariable nonlinear regression |
| Moutinho and Kniess (2017). | Public Management | Correlation study via desk research |
| Andreet et al (2018). | Public Spending on Health | Data Envelopment Analysis (DEA) |
| Santos-Neto et al (2019). | Health Expenditure Management | Health Technical Efficiency Index |

Source: Prepared by the author (2021).

2.4.1 The nature of efficiency in social public spending

DEA has been frequently used to measure efficiency in the literature. In this sense, Varela and Pacheco (2012), sought to verify implications of the federative structure of Brazil in the comparative performance evaluation of public spending in health through the evaluation of the technical efficiency of the municipalities of the Metropolitan Region of São Paulo in relation to basic health care, using DEA.

Cavalcante (2013), investigated the determinants of municipal performance based on efficiency indicators in the areas of education, health, and social assistance, elaborated from data envelopment analysis, and using regressions indicating that the political ratio elucidates part of the performance of the municipalities even though electoral competition does not interfere with government efficiency.

On the other hand, Monteiro, Ferreira and Silveira (2013), seek to highlight factors that direct the distribution of public resources of social programs in Brazil, with the period analyzed being from 2004 to 2006, concluding that the PBF predominates in the resources allocated to social programs. In addition, as to the factors that direct the transfer of resources, the authors identified the following: population, proportion of poor people, life expectancy at birth, unemployment rate, crude mortality rate, illiteracy rate and elementary school enrollment.

Unlike the previous perspectives, Maciel (2013) proposes a methodology that is based on the quality of public spending in terms of efficiency, effectiveness, effectiveness and allocative improvement. Borges, Mario and Carneiro (2013), analyzed the Brazilian federal government through the inclusion of new management instruments in comparison with the Australian reform, prevailing a more technological output rather than a broader institutional mobilization.

Degenhart, Vogt and Zonatto (2016) studied the influence of public spending on the growth of municipalities in the southeastern region of Brazil and found a positive relationship, with impacts on municipal/state GDP. Still in the view focused on municipalities, Moutinho and Kniess (2017), investigated the transfers of Union resources to these federative entities to identify correlations, resulting in a high correlation between the number of resources released and the agglomeration of voters.

Andreet et al (2018), ascertained the efficiency of state public spending in health care in Brazil during the period from 2005 to 2014, using DEA, showing that only the state of Maranhão was efficient throughout the period, with 9 being efficient in at least 1 year regarding health indicators.

In this same area of the budget, Santos-Neto et al (2019), examined the technical efficiency of the seven municipalities of the Rota dos Bandeirantes health region of the state of São Paulo from 2009 to 2012, using the SUS Health Technical Efficiency Index. Only the municipality of Barueri was found to have high technical efficiency and pointed out that the municipalities with the highest available revenue and per capita spending obtained the best results in health indicators.

Therefore, the essence of the analysis of efficiency in the context of social spending has been the subject of investigations. Among the methods, there are studies that dialogue directly with data envelopment analysis.

3. METHODOLOGY

This section presents the methodology used, comprising first the typology adopted, then data collection, the presentation of the model applied, and finally the input and output variables selected.

3.1 Research Typology

This is a quantitative type of research, since quantification was used in data collection, data treatment, and statistical techniques to verify and explain the influence of variables on others (MICHEL, 2009).

As for its purpose, it is characterized as descriptive (GIL, 2002) given its nature of describing the behavior of the efficiency of public spending on social assistance. In addition, it is based on a literature review.

3.2. Data Collection

The population refers to the twenty-six states and the Federal District, being twenty-seven (27)

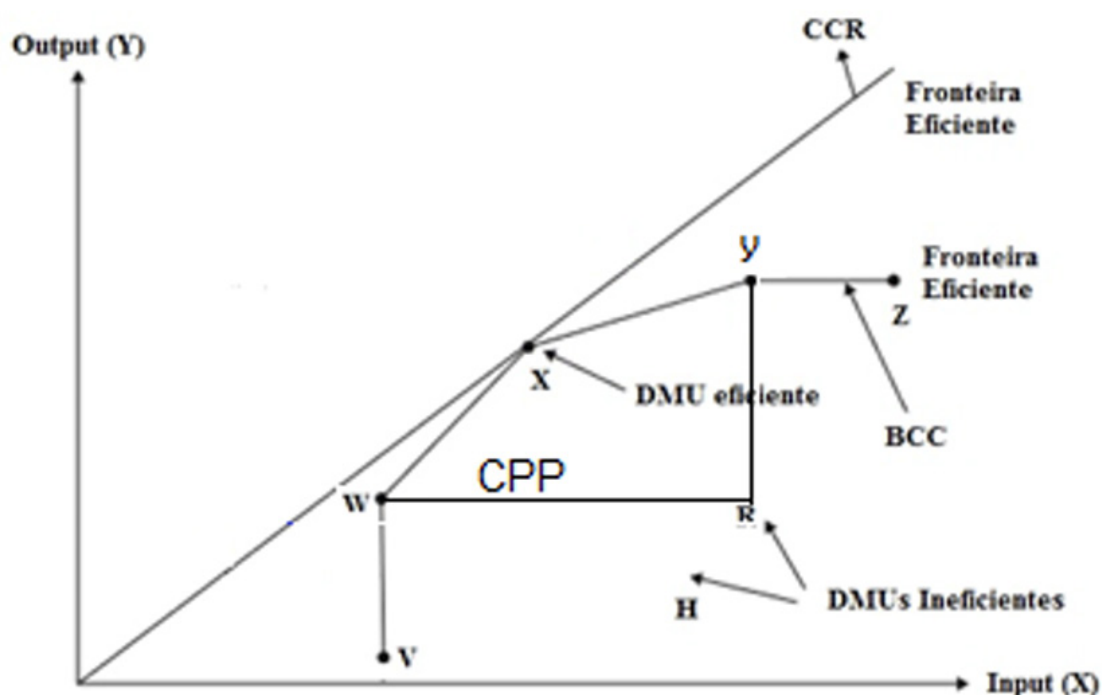
Decision Making Units (DMU's), in the period from 2012 to 2019 with the justification of this time cut due to data availability. The data used are considered secondary and information from the National Treasury Secretariat (Secretaria do Tesouro Nacional - STN) regarding expenses per function, from the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística - IBGE) regarding population data and from the National Secretariat of Social Assistance (Secretaria Nacional da Assistência Social - SNAS) for SUAS information.

3.3. Data Envelopment Analysis - DEA

Data Envelopment Analysis (DEA) is a non-parametric technique that uses linear programming to calculate the efficiencies of different production systems by building a production frontier (BARBOSA; FUCHIGAMI, 2018). Being used in the literature to measure efficiency in various ways, but quite popular in two classical perspectives: constant returns to scale (Constant Returns to Scale - CRS) and variable returns to scale (Variable Returns to Scale - VRS). The first is the CCR model created by Charnes, Cooper and Rhodes (1978), while the second is called the BCC model developed by Banker, Charnes and Coopers (1984).

DEA models appreciate the performance of DMUs in a multidimensional way in different situations, being guided by the fundamentals of microeconomic production theory (FERREIRA; GOMES, 2020). The graph below shows the efficiency dimension of the CCR and BCC models, with the straight line being the efficiency frontier of the CCR model with only the variable X and straight set joined by the variables V, W, X, Y and Z, forming the convex set of the efficiency of the BCC model (BARBOSA; FUCHIGAMI, 2018).

Chart 1 - Efficiency in the CCR (CRS) and BCC (VRS) models



Fronteira Eficiente – Efficient Frontier

DMU Eficiente – Efficient DMU

DMU's Ineficientes – Inefficient DMU's

Source: Barbosa and Fuchigami (2018).

Soares, Costa and Lopes (2019), Andrade et al (2017), Duarte et al (2016), Fonseca and Ferreira (2009), took advantage of the BCC model in their studies on efficiency analysis, unlike cases such as those of Machado Junior, Irffi and Benegas (2011) and Andrett et al (2018) who adopted the CCR model.

The reason for the distinct use of the DEA method may be related to the difference between the two models. According to Peña (2008), both the BBC and CCR models can be applied in two perspectives aiming to maximize efficiency: i) decreasing the consumption of inputs, maintaining the production volume, being input oriented; and ii) raising production, under the volume of inputs, and thus, product oriented.

3.4. BCC Model

This work is close to Andrade et al (2017), starting from the same DEA conception, but differs in the analysis perspective. The authors evaluated the efficiency of each of the 27 Brazilian capitals regarding public health.

The choice of the BCC model is justified because it considers variable returns to scale, unlike the CRR, which admits proportionality between inputs and outputs. The intention is to analyze the efficiency of per capita public spending on social assistance, being input-oriented and maintaining the level of output.

The input-oriented BCC model can be described according to Peña (2008):

$$Max h_o = \sum_{r=1}^m u_r y_{ro} - u_o \quad (1)$$

Subject to

$$\sum_{i=1}^n v_i x_{io} = 1 \quad (2)$$

$$\sum_{i=1}^m u_i y_{rj} - \sum_{i=1}^n v_i x_{ij} - u_o \leq 0 \quad j = 1, \dots, 0, \dots, N \quad (3)$$

$$u_r, v_i \geq 0 \quad r = 1, \dots, m; \quad i = 1, \dots, n \quad (4)$$

Where h_o is the efficiency of the DMU o under analysis; u_r e v_i are the weights of inputs r , with $r = 1, \dots, m$, and outputs i , with $i = 1, \dots, n$ respectively; x_{ij} e y_{rj} are the inputs i and outputs r of DMU j , $j = 1, \dots, n$, x_{io} e y_{ro} are the inputs i and outputs r of DMU o .

The efficiency measured by the BCC model will result in a score from 0 to 1, the closer to 1, the more efficient. The model considers pure technical efficiency given variable returns to scale, following the concept of productive efficiency:

$$\text{Efficiency} = \text{Productivity} / \text{Productivity}_{\max}$$

Resulting in Relative Technical Efficiency, because the analysis considers the productivity of a DMU divided by the maximum productivity it can achieve within the data set in question.

In this sense, is the concept of Pareto-Koopmans efficiency. Complete efficiency is achieved by a DMU if, and only if, the performance of other units of analysis in question says it is not possible that some of the variables of such DMU can be improved, without harming the other variables of the other DMUs (FERREIRA; GOMES, 2020). It is also recommended that in the DEA model used, the number of DMU's is at least four to five times the number of variables, in order not to impact the projections in the sense of Pareto (FERREIRA; GOMES, 2020).

3.4.1. Selecting Variable Inputs and Outputs

As for the composition of the adopted model, the decision making unit or DMU (27) will be comprised by the variable States, while the inputs will be denominated by means of the per capita liquidated expense in social assistance, the number of CRAS/CREAS workers, and the total number of these establishments, and the outputs will be presented by the number of individualized care provided by CRAS and cases being monitored by the Specialized Protection and Care Service for Families and Individuals (PAEFI) in CREAS.

The definition of the variables followed the observation of previous studies, and the following were selected:

a) Per capita spending on social assistance: which was used from the perspective of per capita spending (input), but in health by Teles (2018), Soares, Costa and Lopes (2019); and Duarte et al (2016), but as total health spending (input).

b) Number of human resources: Fonseca and Ferreira (2009) and Andrade et al (2017), represented by the number of health care professionals (input).

c) Number of establishments: Andrade et al (2017) and Fonseca and Ferreira (2009), with number of healthcare establishments (input).

d) Quantity of attendances: Duarte et al (2016), however, being number of visits (output); Fonseca and Ferreira (2009), with accompanied families (outputs).

Thus, the aim was to verify the efficiency behavior of the Brazilian states (DMU) in terms of the number of services provided (outputs) based on the expenditures allocated to social assistance, the

number of human resources and the number of establishments (inputs). To this end, the R statistical software was used to apply the DEA analysis method through the BCC model, which is input-oriented, having three inputs and one output, as shown in Table 2.

Box 2 - Summary of the model variables

| Inputs / Outputs | Variables | Dimension | Source |
|-------------------------|--|---|---------------|
| Inputs | Per capita spending on social assistance | <ul style="list-style-type: none"> • Liquidated expenditures on social assistance • Population Projections | STN/IBGE |
| Inputs | Number of human resources* | <ul style="list-style-type: none"> • Number of CRAS workers • Number of CREAS workers | SNAS |
| Inputs | Number of establishments* | <ul style="list-style-type: none"> • Number of CRASs • Number of CREASs | SNAS |
| Outputs | Number of attendances** | <ul style="list-style-type: none"> • Total of individualized services provided (month/year) in the CRAS • Total number of cases (families or individuals) being followed up by PAEFI in CREAS | SNAS |

Source: Prepared by the author (2021).

*: SUAS census; **: Monthly Attendance Register (RMA) of CRAS and CREAS; considering the data with identifiable federative units.

4. PRESENTATION AND ANALYSIS OF RESULTS

This section presents the data regarding social assistance spending by states, the results and analysis of the BCC model.

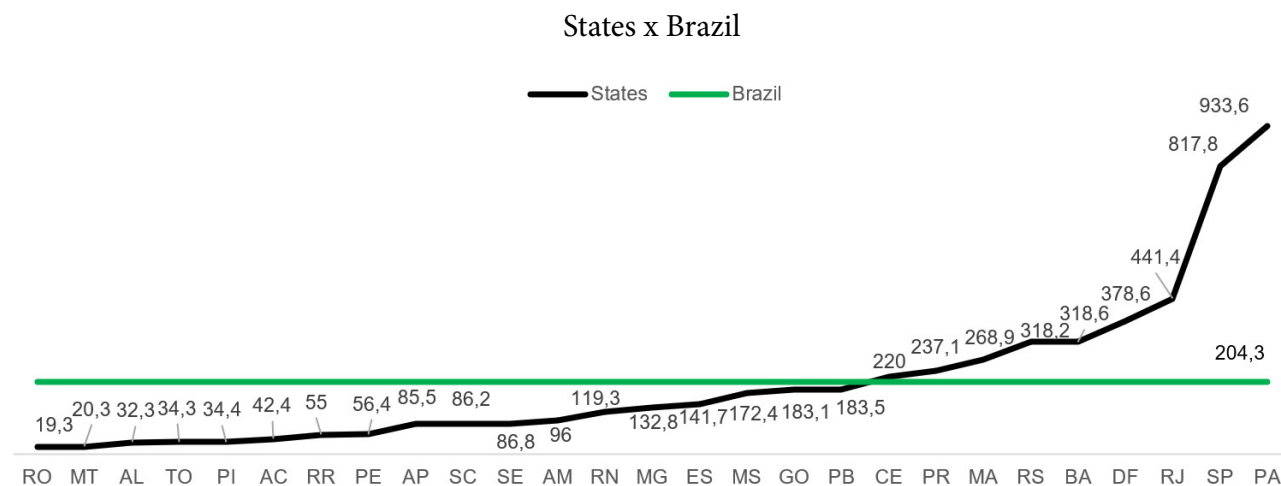
4.1. Overview of social assistance spending

APPENDIX A contains the public spending on social assistance by Brazilian states for the period 2012 to 2019, with such spending being considered the settled expenditure in the budget of the respective states and, values corrected by the IPCA of 2019 (4.31%).

After the raw data regarding spending by state were identified, it was possible to work with the average statistic in the annual sense among all the states, and for the period by state. Both are better represented in the following graphs. Analyzing the data, it is worth mentioning that in the period from 2012 to 2019, the liquidated expenses ranged from an average of R\$ 173,5 million to R\$ 189.8 million, showing an increase of almost 10%.

Graph 2, shows the average public spending (liquidated expenditure) on social assistance in the period 2012 to 2019, highlighting the average at the level of states and, Brazil in R\$ 204.3 million that considered the liquidated expenditure of all states for each year, having the average for the period and, the observation under the 27 states. Of these, only nine are above the national average, which represents 33.3% of the Brazilian states, being the following: Ceará, Paraná, Maranhão, Rio Grande do Sul, Bahia, Distrito Federal, Rio de Janeiro, São Paulo and Pará.

Graph 2 - Average public spending on social assistance in the period 2012 to 2019 (R\$ mi):

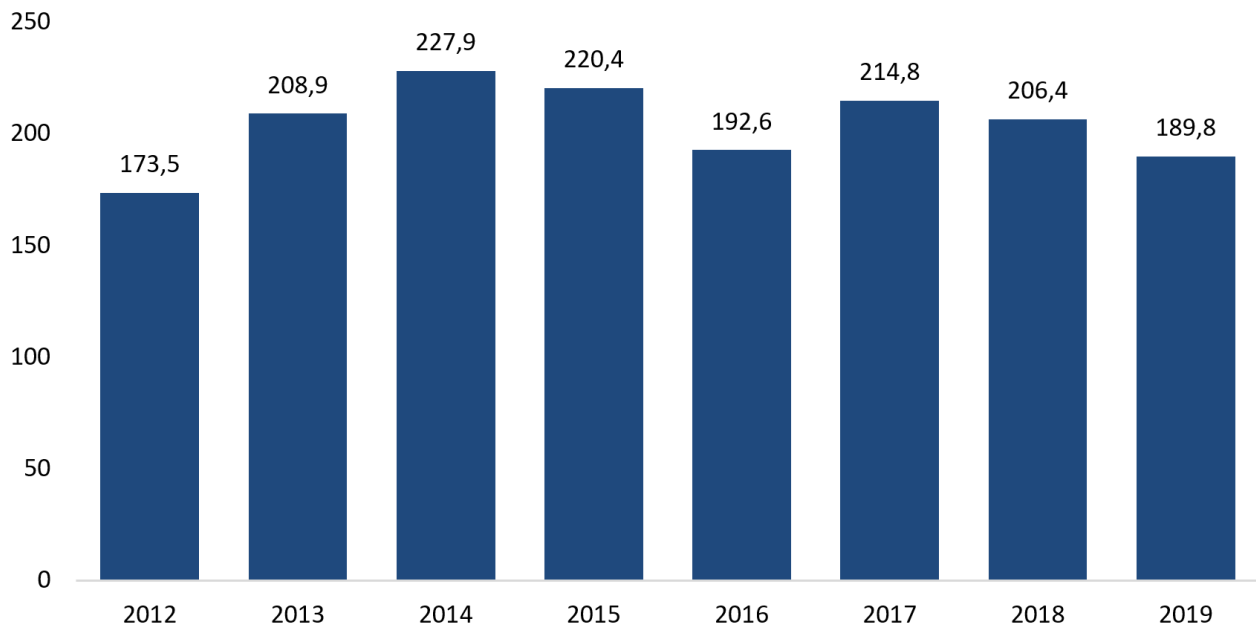


Source: Prepared by the author with STN data corrected by IPCA-IBGE for 2019 (2021).

On the other hand, 66.6% of the states are below this average liquidated expense for the country, which is equivalent to 18, being: Rondônia, Mato Grosso, Alagoas, Tocantins, Piauí, Acre, Roraima, Amapá, Rio Grande do Norte, Minas Gerais, Espírito Santo, Mato Grosso do Sul, Goiás and Paraíba.

The graph 3, shows the average liquidated expenses per year of the Brazilian states in budget function 08, highlighting 2014 as the year of highest average public spending on social assistance by Brazilian states at R\$ 227.9 million.

Graph 3 - Average public spending on social assistance in Brazilian states per year during the period 2012-2019 (R\$ mi)



Source: Prepared by the author with STN data corrected by IPCA-IBGE for 2019 (2021).

The expenditure under analysis is the settled expenditure on social assistance, function 08 of the budget, by the Brazilian states in the period from 2012 to 2019. The per capita expenditure in this function, in turn, took into account the IBGE projections (Appendix A) as to the population data of the states for the years in question, in addition to the values referring to the settled expenses have been corrected by the IPCA/2019.

That said, the table 1 presents the per capita public spending on social assistance by Brazilian states from 2012 to 2019, in descending order of average for the period and can be seen in graph 4. Regarding the average of said per capita spending per year, one has the highest in 2014 (45.74) and lowest in 2019 (32.82). Roraima had the highest per capita public spending on social assistance during 2012 (R\$ 182.23), 2013 (R\$ 170.57) and 2014 (R\$ 163.63), while the Federal District led in 2015 (145.40), Pará in 2016 (R\$ 131.53) and 2017 (R\$ 158.72), and the Federal District returning to the top of the ranking in 2018 (R\$ 140.15) and 2019 (R\$ 128.01).

Table 1 - Public spending per capita on social assistance by Brazilian states from 2012 to 2019.

| UF | Average | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|
| DF | 132.18 | 136.63 | 140.95 | 160.24 | 145.40 | 64.17 | 141.89 | 140.15 | 128.01 |
| PA | 112.11 | 40.05 | 94.34 | 108.08 | 126.19 | 131.53 | 158.72 | 121.46 | 116.50 |
| AP | 109.70 | 128.87 | 145.76 | 134.44 | 138.02 | 75.42 | 70.50 | 99.91 | 84.68 |
| RR | 107.86 | 182.23 | 170.57 | 163.63 | 95.58 | 84.59 | 97.54 | 66.15 | 2.60 |
| MS | 64.64 | 63.19 | 64.99 | 64.53 | 65.53 | 65.53 | 66.97 | 68.07 | 58.32 |
| AC | 50.77 | 49.02 | 54.99 | 60.11 | 57.93 | 46.38 | 50.75 | 44.47 | 42.53 |
| PB | 46.55 | 38.46 | 54.32 | 52.24 | 41.02 | 46.83 | 47.58 | 44.22 | 47.70 |
| SE | 39.05 | 36.56 | 39.18 | 45.89 | 39.36 | 37.02 | 41.60 | 36.88 | 35.95 |
| MA | 38.71 | 21.87 | 26.24 | 42.94 | 47.40 | 44.88 | 45.54 | 43.95 | 36.84 |
| ES | 37.07 | 38.64 | 45.12 | 66.52 | 58.99 | 18.52 | 15.99 | 29.66 | 23.10 |
| RN | 34.96 | 47.57 | 25.79 | 25.85 | 25.61 | 29.99 | 29.34 | 45.04 | 50.51 |
| RS | 28.37 | 17.82 | 22.22 | 30.82 | 28.84 | 28.68 | 32.43 | 33.12 | 33.02 |
| GO | 27.45 | 29.03 | 26.19 | 28.93 | 24.38 | 26.30 | 27.39 | 30.29 | 27.12 |
| RJ | 26.28 | 33.51 | 37.97 | 40.11 | 37.88 | 21.61 | 14.23 | 14.56 | 10.39 |
| AM | 24.80 | 33.38 | 34.92 | 33.60 | 26.87 | 23.11 | 15.08 | 14.61 | 16.86 |
| CE | 24.57 | 21.07 | 20.62 | 21.44 | 21.87 | 21.74 | 25.52 | 31.68 | 32.62 |
| TO | 22.86 | 33.25 | 31.49 | 25.22 | 17.90 | 18.93 | 18.47 | 17.55 | 20.06 |
| BA | 21.76 | 28.65 | 21.90 | 21.32 | 23.43 | 21.14 | 20.30 | 18.30 | 19.05 |
| PR | 21.29 | 15.54 | 27.11 | 22.41 | 12.18 | 18.10 | 34.67 | 26.62 | 13.73 |
| SP | 18.40 | 16.35 | 21.92 | 22.77 | 21.26 | 18.25 | 16.03 | 15.44 | 15.17 |
| SC | 12.55 | 7.05 | 13.45 | 13.45 | 10.30 | 13.56 | 13.58 | 17.97 | 11.02 |
| RO | 11.26 | 11.50 | 2.97 | 10.59 | 10.57 | 15.83 | 12.08 | 17.29 | 9.25 |
| PI | 10.61 | 5.18 | 6.34 | 5.09 | 11.07 | 7.84 | 12.89 | 18.09 | 18.36 |
| AL | 9.86 | 8.65 | 10.65 | 14.51 | 6.05 | 3.71 | 9.90 | 20.55 | 4.87 |
| MG | 6.43 | 9.39 | 8.13 | 4.15 | 7.19 | 5.10 | 7.52 | 5.04 | 4.93 |
| PE | 6.06 | 5.40 | 6.05 | 9.78 | 6.27 | 7.00 | 5.74 | 4.50 | 3.73 |
| MT | 6.03 | 3.79 | 5.25 | 6.24 | 3.24 | 1.77 | 4.82 | 3.94 | 19.16 |
| Average | | 39.36 | 42.94 | 45.74 | 41.12 | 33.24 | 38.41 | 38.13 | 32.82 |

Source: Prepared by the author (2021) with data from STN/IBGE.

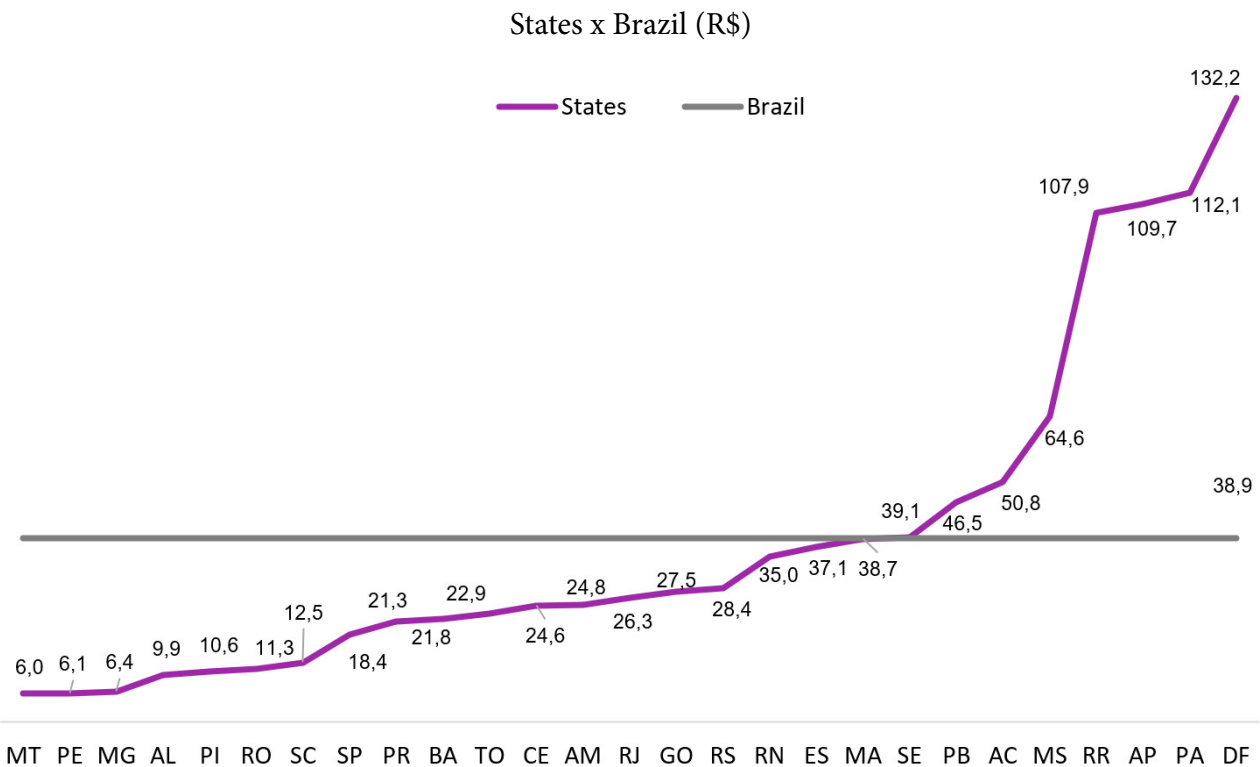
Likewise, in relation to the states that had the lowest per capita spending on social assistance, Mato Grosso was the case in 2012 (R\$ 3.79), Rondônia in 2013 (R\$ 2.97), Minas Gerais in 2014 (R\$ 4.15), Mato Grosso in 2015 (R\$ 3.24), 2016 (R\$ 1.77), 2017 (R\$ 4.82), 2018 (R\$ 3.94), and Roraima in

2019 (R\$ 2.60). It is also worth noting that 26% to 40% of the states were above average for the periods analyzed.

In the graph 4, we have the average per capita public spending on social assistance for the period 2012 to 2019, with the Federal District (R\$ 132.2) having the highest average per capita public spending, unlike the state of Mato Grosso (R\$ 6.03) which was the lowest for the period.

The average per capita spending on social assistance in Brazil is R\$ 38.9, with eight states (Sergipe, Paraíba, Acre, Mato Grosso do Sul, Roraima, Amapá, Pará and the Federal District) above the national average and the others (Mato Grosso, Pernambuco, Minas Gerais, Alagoas, Piauí, Rondônia, Santa Catarina, São Paulo, Paraná, Bahia, Tocantins, Ceará, Amazonas, Rio de Janeiro, Goiás, Rio Grande do Sul, Rio Grande do Norte, Espírito Santo, and Maranhão) below the average.

Graph 4 - Average per capita public spending on social assistance in the period 2012-2019:



Source: prepared by the author (2021) with data from STN/IBGE.

4.2. Efficiency of spending on social assistance

The table 2 refers to the results of the input-oriented BCC model, and is composed of the Brazilian states in descending order of average efficiency over the period 2012 to 2019.

Table 2 - Relative efficiency of spending on social assistance by Brazilian states

| DMUs - States | Average | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---------------|---------|-------|-------|-------|-------|-------|-------|-------|-------|
| AP | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| MG | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| PR | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| RO | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| SP | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| AM | 0.992 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.939 |
| AC | 0.986 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.884 |
| RR | 0.976 | 1.000 | 0.985 | 0.946 | 1.000 | 1.000 | 0.918 | 0.962 | 1.000 |
| MS | 0.971 | 0.980 | 1.000 | 0.952 | 1.000 | 1.000 | 1.000 | 0.862 | 0.970 |
| MT | 0.964 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.710 |
| RJ | 0.964 | 0.937 | 0.877 | 0.964 | 0.938 | 0.992 | 1.000 | 1.000 | 1.000 |
| DF | 0.886 | 0.795 | 1.000 | 1.000 | 1.000 | 0.955 | 0.811 | 0.687 | 0.842 |
| PE | 0.801 | 0.703 | 0.708 | 0.682 | 0.692 | 0.683 | 0.953 | 1.000 | 0.990 |
| AL | 0.741 | 0.865 | 0.467 | 0.635 | 0.893 | 0.901 | 0.741 | 0.864 | 0.564 |
| ES | 0.740 | 0.767 | 0.776 | 0.711 | 0.708 | 0.798 | 0.726 | 0.717 | 0.717 |
| SE | 0.730 | 0.702 | 0.698 | 0.685 | 0.682 | 0.732 | 0.733 | 0.903 | 0.704 |
| CE | 0.698 | 0.685 | 0.737 | 0.693 | 0.736 | 0.728 | 0.666 | 0.737 | 0.602 |
| PI | 0.693 | 0.819 | 0.702 | 1.000 | 0.619 | 0.669 | 0.682 | 0.549 | 0.500 |
| RS | 0.657 | 0.693 | 0.789 | 0.748 | 0.670 | 0.633 | 0.605 | 0.581 | 0.537 |
| SC | 0.654 | 0.718 | 0.616 | 0.661 | 0.614 | 0.625 | 0.691 | 0.718 | 0.588 |
| GO | 0.648 | 0.801 | 0.867 | 0.679 | 0.624 | 0.591 | 0.518 | 0.591 | 0.517 |
| TO | 0.621 | 0.613 | 0.509 | 0.592 | 0.602 | 0.657 | 0.630 | 0.936 | 0.430 |
| PA | 0.565 | 0.606 | 0.538 | 0.568 | 0.523 | 0.542 | 0.609 | 0.574 | 0.564 |
| BA | 0.486 | 0.462 | 0.468 | 0.476 | 0.465 | 0.457 | 0.477 | 0.597 | 0.486 |
| RN | 0.413 | 0.455 | 0.426 | 0.417 | 0.403 | 0.415 | 0.413 | 0.421 | 0.352 |
| MA | 0.400 | 0.457 | 0.426 | 0.398 | 0.371 | 0.390 | 0.367 | 0.402 | 0.389 |
| PB | 0.397 | 0.466 | 0.465 | 0.366 | 0.406 | 0.372 | 0.362 | 0.444 | 0.292 |
| Average | | 0.797 | 0.780 | 0.784 | 0.776 | 0.783 | 0.774 | 0.798 | 0.725 |

Source: elaborated by the author (2021).

Analyzing the efficiency scores in the table 3, 5 (18%) states were efficient in all the years analyzed, and thus are considered benchmarks, being the following: Amapá, Minas Gerais, Paraná, Rondônia and São Paulo. It is also noteworthy that Amazonas, Acre and Mato Grosso, were efficient in seven of the years observed.

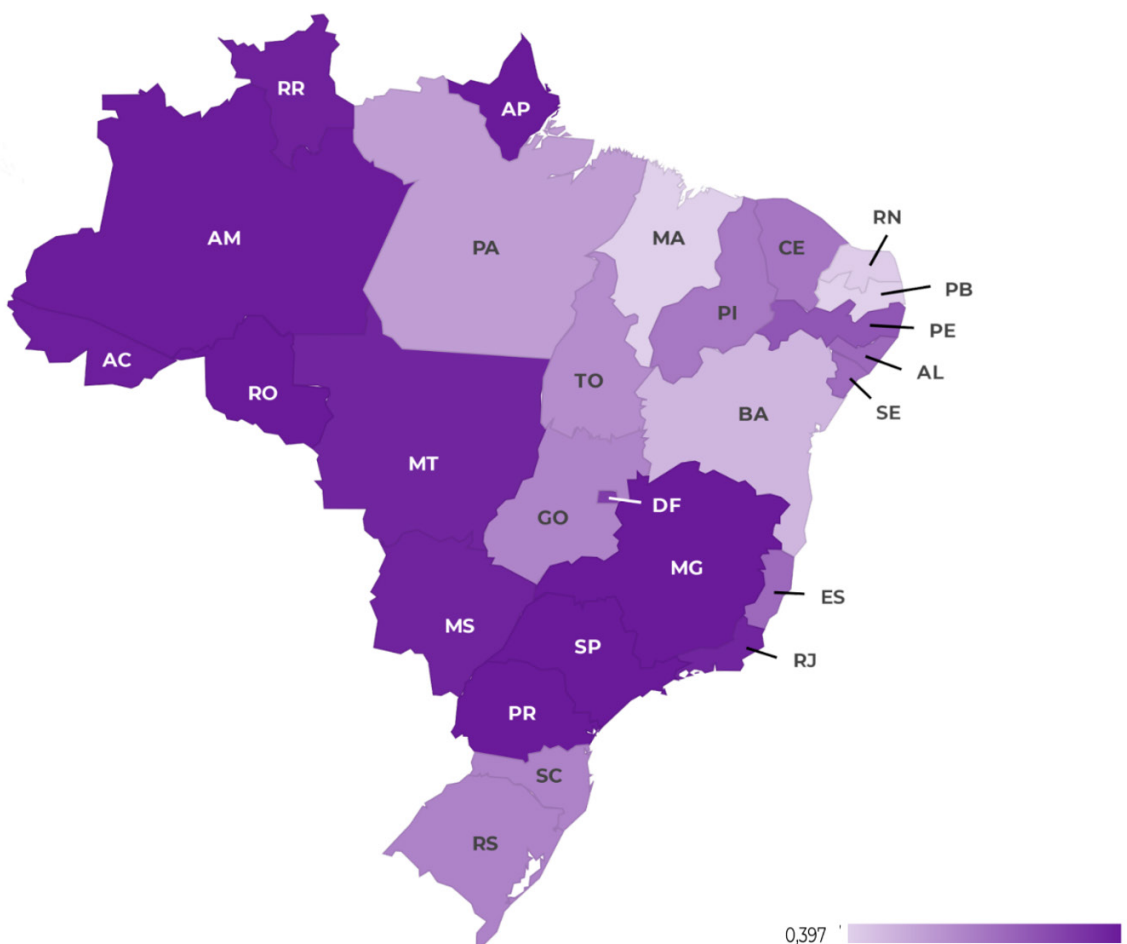
Different from this are the states that obtained efficient ratings in only one of the years analyzed, namely: Piauí (2014) and Pernambuco (2018). Rio de Janeiro and Distrito Federal in three years, while Roraima and Mato Grosso do Sul were efficient in four years of the analyzed period. The remaining states (Alagoas, Espírito Santo, Sergipe, Ceará, Rio Grande do Sul, Santa Catarina, Goiás, Tocantins, Pará, Bahia, Rio Grande do Norte, Maranhão, Paraíba), in case 13, did not reach efficiency level in any of the years in the investigated period. As for the number of efficient states per year, the minimum was 7 and the maximum was 11, respectively, in 2019 and 2015, and per year on average 9 states were efficient.

In a comparative analysis of the scores, it is mentioned that Espírito Santo has been decreasing its score since 2016. From 2018 to 2019, the following states had increased scores: Roraima, Mato Grosso do Sul, and Distrito Federal. Of these, only Roraima became efficient in 2019, integrating the efficiency frontier alongside Rio de Janeiro and the efficient states in all years. Thus, the other states, had reduced and still inefficient scores.

Another factor verified was the average efficiency per year, and it can be pointed out that in the year 2018 the highest average efficiency was noted (0.798), and in 2019 there was the lowest average efficiency (0.725).

Figure 2, in turn, highlights the average relative efficiency of the Brazilian states for the period 2012 to 2019. The scale follows the order of the states' average for the period, where 0.397 is the lowest average efficiency, in the case of Pernambuco, and 1 is the maximum average achieved by efficient states. Thus, from the figure we have a perspective of the average efficiency of spending on social assistance for the period in question at the level of Brazil, according to the intensity of the color.

Figure 2 - Average efficiency of social assistance spending by Brazilian states in the period 2012 to 2019



Source: Prepared by the author (2021).

As the table 3 with descriptive statistics for the model and periods shows, the average relative efficiency does not change much. It is also seen that the amplitude of the model was increasing between years, from 2012 (0.55) to 2017 (0.64), decreasing in 2018 (0.60) and increasing in 2019 (0.71). As for the quartile, 25% of the states with the lowest efficiency have at least (0.53) efficiency.

Table 3 - Descriptive statistics of the relative technical efficiencies

| Years | Statistics | | | | | | | |
|-------|------------|--------------|--------|---------|--------------|---------|----------|--------------------|
| | Minimum | 1st Quartile | Median | Average | 3rd Quartile | Maximum | Variance | Standard Deviation |
| 2012 | 0.45 | 0.69 | 0.80 | 0.80 | 1.00 | 1.00 | 0.04 | 0.20 |
| 2013 | 0.43 | 0.58 | 0.79 | 0.78 | 1.00 | 1.00 | 0.05 | 0.22 |
| 2014 | 0.37 | 0.65 | 0.75 | 0.78 | 1.00 | 1.00 | 0.05 | 0.22 |
| 2015 | 0.37 | 0.62 | 0.74 | 0.78 | 1.00 | 1.00 | 0.05 | 0.23 |
| 2016 | 0.37 | 0.63 | 0.80 | 0.78 | 1.00 | 1.00 | 0.05 | 0.22 |
| 2017 | 0.36 | 0.62 | 0.74 | 0.77 | 1.00 | 1.00 | 0.05 | 0.22 |
| 2018 | 0.40 | 0.59 | 0.86 | 0.80 | 1.00 | 1.00 | 0.04 | 0.21 |
| 2019 | 0.29 | 0.53 | 0.71 | 0.73 | 0.99 | 1.00 | 0.06 | 0.24 |

Source: Prepared by the author (2021).

Aligning with the objective of comparative analysis, added to the long period under analysis, it was decided to choose states representing the five regions of the country, based on the largest population data in terms of IBGE projections. That said, according to the table 4, São Paulo and Paraná, respectively from the Southeast and South regions, are the most efficient states. Pará, Bahia and Goiás, respectively, representing the North, Northeast and Midwest regions, were not on the efficiency frontier in the period from 2012 to 2019. It is also noteworthy that the representative of the Northeast has the lowest average among the regions. This perspective, in parts, dialogues with Silva, Neto and Barros (2015), given that in that study the Northeast region presented the lowest average efficiency of the CRASs.

Table 4 - Comparative analysis of relative efficiencies

| DMU's -States | Region | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|------------------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|
| PA | North | 0,606 | 0,538 | 0,568 | 0,523 | 0,542 | 0,609 | 0,574 | 0,564 |
| BA | Northeast | 0,462 | 0,468 | 0,476 | 0,465 | 0,457 | 0,477 | 0,597 | 0,486 |
| SP | Southeast | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| PR | South | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| GO | Midwest | 0,801 | 0,867 | 0,679 | 0,624 | 0,591 | 0,518 | 0,591 | 0,517 |

Source: Prepared by the author (2021).

As for the states that were not efficient, one can verify the scenario in which they would be efficient, given the level of efficiency by observing the inputs. For example, Ceará had an efficiency score of 0 in 2012, 685 which is equivalent to saying that to be efficient a reduction of 31,5% of the inputs would be necessary. With this perspective, but through the per capita spending on social assistance variable, the table 5 indicates the per capita spending that, in fact, should be used by the states to provide social assistance services efficiently.

Table 5 - Target of per capita spending on social assistance (continued)

| DMU's - States | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|----------------|--------|--------|--------|-------|-------|--------|-------|--------|
| AM | - | - | - | - | - | - | - | 15.84 |
| AC | - | - | - | - | - | - | - | 37.60 |
| RR | - | 167.97 | 154.79 | - | - | 89.51 | 63.60 | - |
| MS | 61.93 | - | 61.41 | - | - | - | 58.70 | 56.58 |
| MT | - | - | - | - | - | - | - | 13.62 |
| RJ | 31.41 | 33.30 | 38.68 | 35.55 | 21.43 | - | - | - |
| DF | 108.68 | - | - | - | 61.31 | 115.04 | 96.30 | 107.80 |
| PE | 3.79 | 4.28 | 6.67 | 4.34 | 4.78 | 5.48 | - | 3.69 |
| AL | 7.48 | 4.98 | 9.20 | 5.40 | 3.34 | 7.33 | 17.76 | 2.74 |

Source: Prepared by the author (2021).

Table 5 - Target of per capita expenditures in social assistance (continuation)

| DMU's - States | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|
| ES | 29.63 | 35.03 | 47.26 | 41.79 | 14.78 | 11.61 | 21.27 | 16.57 |
| SE | 25.67 | 27.33 | 31.45 | 26.83 | 27.10 | 30.50 | 33.32 | 25.30 |
| CE | 14.43 | 15.20 | 14.86 | 16.09 | 15.83 | 17.00 | 23.35 | 19.62 |
| PI | 4.24 | 4.46 | - | 6.86 | 5.24 | 8.79 | 9.93 | 9.17 |
| RS | 12.35 | 17.52 | 23.04 | 19.31 | 18.17 | 19.61 | 19.23 | 17.74 |
| SC | 5.06 | 8.29 | 8.89 | 6.32 | 8.47 | 9.39 | 12.90 | 6.48 |
| GO | 23.25 | 22.71 | 19.64 | 15.20 | 15.54 | 14.19 | 17.90 | 14.01 |
| TO | 20.40 | 16.03 | 14.94 | 10.78 | 12.43 | 11.63 | 16.42 | 8.62 |
| PA | 24.26 | 50.73 | 61.35 | 66.00 | 71.25 | 96.74 | 69.76 | 65.67 |
| BA | 13.24 | 10.26 | 10.14 | 10.89 | 9.66 | 9.68 | 10.93 | 9.25 |
| RN | 21.64 | 11.00 | 10.77 | 10.33 | 12.43 | 12.13 | 18.95 | 17.80 |
| MA | 10.00 | 11.19 | 17.08 | 17.58 | 17.52 | 16.71 | 17.65 | 14.32 |
| PB | 17.93 | 25.25 | 19.12 | 16.64 | 17.42 | 17.22 | 19.64 | 13.91 |

Source: Prepared by the author (2021).

Next are the tables 6 and 7, which reflect the same analysis perspective of table 6, but with the expected quantities (targets) of the remaining input variables for the states to be on the efficiency frontier.

Table 6 - Target for the quantity of human resources

| DMU's - States | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|----------------|------|------|------|------|------|------|------|------|
| AM | - | - | - | - | - | - | - | 2343 |
| AC | - | - | - | - | - | - | - | 523 |
| RR | - | 516 | 446 | - | - | 437 | 491 | - |
| MS | 1896 | - | 2302 | - | - | - | 2142 | 2414 |
| MT | - | - | - | - | - | - | - | 1805 |
| RJ | 5670 | 5661 | 6664 | 6275 | 6456 | - | - | - |
| DF | 468 | - | - | - | 537 | 435 | 346 | 392 |
| PE | 2071 | 2519 | 3989 | 3525 | 3233 | 4848 | - | 6212 |
| AL | 1370 | 754 | 1517 | 2065 | 2271 | 2098 | 2597 | 1800 |
| ES | 1772 | 1884 | 2072 | 1957 | 2023 | 1848 | 1952 | 1957 |
| SE | 1059 | 1156 | 1435 | 1452 | 1567 | 1647 | 2077 | 1743 |
| CE | 4112 | 4631 | 5485 | 5456 | 5282 | 5418 | 6349 | 5451 |
| PI | 1948 | 1907 | - | 2209 | 2350 | 2823 | 2557 | 2588 |
| RS | 3856 | 4493 | 4752 | 4264 | 3983 | 3907 | 3920 | 3693 |
| SC | 2270 | 1978 | 2400 | 2364 | 2417 | 2634 | 2905 | 2462 |
| GO | 2320 | 2658 | 2720 | 2440 | 2176 | 2133 | 2536 | 2183 |
| TO | 785 | 796 | 1086 | 1093 | 1155 | 1342 | 2130 | 992 |
| PA | 2535 | 2480 | 3231 | 2838 | 2801 | 3472 | 3598 | 3618 |
| BA | 2913 | 3512 | 4700 | 4317 | 4097 | 4692 | 6549 | 5822 |
| RN | 927 | 936 | 1263 | 1213 | 1178 | 1389 | 1513 | 1309 |
| MA | 1581 | 1709 | 2324 | 2020 | 2029 | 2139 | 2511 | 2664 |
| PB | 1020 | 1137 | 1236 | 1262 | 1113 | 1341 | 1799 | 1264 |

Source: Prepared by the author (2021).

Table 7 - Target of Establishment Quantity

| DMU's - States | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|----------------|------|------|------|------|------|------|------|------|
| AM | - | - | - | - | - | - | - | 135 |
| AC | - | - | - | - | - | - | - | 36 |
| RR | - | 29 | 27 | - | - | 31 | 116 | - |
| MS | 182 | - | 185 | - | - | - | 203 | 197 |
| MT | - | - | - | - | - | - | - | 158 |
| RJ | 489 | 478 | 538 | 529 | 564 | - | - | - |
| DF | 27 | - | - | - | 35 | 30 | 35 | 32 |
| PE | 301 | 314 | 316 | 320 | 318 | 465 | - | 508 |
| AL | 164 | 88 | 124 | 178 | 204 | 172 | 131 | 133 |
| ES | 140 | 147 | 143 | 145 | 168 | 159 | 192 | 159 |
| SE | 98 | 100 | 108 | 121 | 133 | 135 | 137 | 131 |
| CE | 327 | 358 | 344 | 366 | 365 | 336 | 298 | 306 |
| PI | 260 | 225 | - | 199 | 217 | 222 | 288 | 173 |
| RS | 458 | 536 | 520 | 469 | 449 | 429 | 419 | 387 |
| SC | 304 | 263 | 289 | 274 | 287 | 322 | 325 | 284 |
| GO | 307 | 335 | 263 | 246 | 226 | 205 | 202 | 206 |
| TO | 107 | 90 | 104 | 103 | 114 | 109 | 152 | 75 |
| PA | 196 | 182 | 200 | 186 | 193 | 221 | 205 | 216 |
| BA | 357 | 374 | 388 | 380 | 379 | 398 | 444 | 415 |
| RN | 124 | 116 | 114 | 110 | 114 | 114 | 215 | 97 |
| MA | 189 | 181 | 173 | 160 | 171 | 161 | 173 | 170 |
| PB | 160 | 165 | 135 | 148 | 137 | 134 | 151 | 108 |

Source: Prepared by the author (2021).

Finally, it is also noteworthy that such inefficiency by the inputs could mean the generation of more service with the level of inputs already used. Therefore, it would not be considered the case of input reduction, but that through better management there would be the generation of more product.

5. FINAL CONSIDERATIONS

The general objective of this study was to analyze the efficiency of public spending on social assistance in Brazilian states from 2012 to 2019 using the DEA methodology. To achieve this objective, the BCC model of variable returns to scale, input-oriented, was used.

Among the 27 DMU's analyzed, 5 states were fully efficient in all years, with 9 states on average being efficient per year. Amapá, Minas Gerais, Paraná, Rondônia and São Paulo, were the most efficient states in the entire period, becoming the benchmarks.

The first specific objective was to verify the volume of per capita public spending on social assistance in the Brazilian states. This objective was achieved in subsection 4.1 with the per capita values, after consolidating the expenditure liquidated by the states in the period and observing the population projections.

The second specific objective was to measure the level of efficiency of per capita public spending on social assistance in Brazilian states and the third was to compare the efficiency of per capita public spending on social assistance among the federative units. Both were achieved in subsection 4.2, which brought efficiency from the standpoint of the BCC model, which already establishes the efficiency ranking among DMU's and visibly presents the benchmarks.

It is noteworthy that of the states classified as efficient in all years, the Midwest and Northeast regions had no representatives. In part, it is also pointed out that this is due to the small number of efficient states.

Among those on the efficiency frontier, Amapá is among the three states with the highest per capita expenditures on social assistance. On the other hand, Rondônia, Minas Gerais, São Paulo and Paraná are among the nine states with the lowest per capita expenditures. In relation to the absolute numbers spent on social assistance, São Paulo has the second highest average and Rondônia, the lowest.

Finally, in relation to the limitation of this work, the analysis is restricted to efficiency by the BCC model through DEA with DMU's inputs and products, in this case the states. Thus, efficacy and effectiveness are not subject to study in this work. Added to this, there is the time factor in question, requiring research on a more appropriate method capable of incorporating the temporality aspect in the evaluation and variables that represent reality as closely as possible, since the work can also serve to indicate the performance of a portion of social spending. Furthermore, the results of the study leave an opportunity to deepen the research by taking into consideration the five regions of the country and contribute in highlighting the public spending on social assistance in the Brazilian states.

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APPENDICES

APPENDIX A – SOCIAL WELFARE SPENDING BY STATE (continued)

| UF | Average (R\$ mi) | Absolute values per year | | | |
|------------------|---------------------|--------------------------|-------------|--------------|--------------|
| | | 2012 | 2013 | 2014 | 2015 |
| PA | 933.6 | 318781658.3 | 759862460.2 | 880788544.2 | 1040413723.2 |
| SP | 817.8 | 705207343.9 | 954232046.7 | 1000306455.1 | 943076152.3 |
| RJ | 441.4 | 553305798.4 | 630853395.7 | 670887763.8 | 638020287.7 |
| DF | 378.6 | 371935912.4 | 389518590.4 | 449593422.1 | 414205055.4 |
| BA | 318.6 | 413802434.0 | 317731412.9 | 310483621.8 | 342828077.2 |
| RS | 318.2 | 196253553.4 | 245873505.1 | 342679426.8 | 322325786.4 |
| MA | 268.9 | 148670891.3 | 179408513.0 | 295249248.6 | 327815078.8 |
| PR | 237.1 | 168176127.1 | 295737901.7 | 246431697.0 | 135018783.0 |
| CE | 220.0 | 184098870.5 | 181276175.2 | 189704823.4 | 194779951.4 |
| PB | 183.5 | 149042387.9 | 211340920.2 | 204265959.6 | 161296337.9 |
| GO | 183.1 | 183361864.9 | 168090499.0 | 188665299.9 | 161512183.8 |
| MS | 172.4 | 161605604.7 | 168253098.2 | 169154928.8 | 173904799.8 |
| ES | 141.7 | 142544537.5 | 168580512.2 | 251724994.5 | 226116787.2 |
| MG | 132.8 | 190044704.2 | 165658289.7 | 85082651.9 | 148427233.3 |
| RN | 119.3 | 157114163.3 | 85956776.0 | 86934789.6 | 86909824.7 |
| AM | 96.0 | 122969240.9 | 130985061.6 | 128337850.2 | 104473368.5 |
| SE | 86.8 | 78682623.7 | 85169493.7 | 100720868.0 | 87243820.8 |
| SC | 86.2 | 46029241.1 | 89032463.7 | 90226877.0 | 70040497.9 |
| AP | 85.5 | 93819402.5 | 108566668.7 | 102460844.7 | 107577525.5 |
| PE | 56.4 | 49259564.4 | 55626004.1 | 90463824.9 | 58392672.7 |
| RR | 55.0 | 87521158.7 | 83761218.8 | 82135335.5 | 49061936.9 |
| AC | 42.4 | 38828612.4 | 44266774.7 | 49189129.7 | 48177507.0 |
| PI | 34.4 | 16633550.9 | 20428478.1 | 16441786.3 | 35851781.7 |
| TO | 34.3 | 48201498.7 | 46211339.7 | 37453708.4 | 26909066.1 |
| AL | 32.3 | 27942507.2 | 34585053.9 | 47338000.1 | 19827572.5 |
| MT | 20.3 | 12083499.6 | 16928158.1 | 20399754.4 | 10732192.6 |
| RO | 19.3 | 18836613.3 | 4922459.2 | 17770602.7 | 17956007.7 |
| Average (R\$ mi) | | 173.5 | 208.9 | 227.9 | 220.4 |

Source: Prepared by the author with STN data corrected by IPCA-IBGE for 2019 (2021).

APPENDIX A – SOCIAL WELFARE Spending by State (continued)

| UF | Average (R\$ mi) | Valores absolutos por ano | | | |
|------------------|---------------------|---------------------------|--------------|--------------|--------------|
| | | 2016 | 2017 | 2018 | 2019 |
| PA | 933.6 | 1096207172.0 | 1336846380.4 | 1034082609.8 | 1002224836.3 |
| SP | 817.8 | 816819490.1 | 723778422.2 | 702996524.1 | 696692142.5 |
| RJ | 441.4 | 366207221.1 | 242721744.8 | 249820385.2 | 179439462.2 |
| DF | 378.6 | 185473245.8 | 415882819.8 | 416544271.5 | 385669445.8 |
| BA | 318.6 | 310534362.1 | 299454209.3 | 271004355.4 | 283269044.0 |
| RS | 318.2 | 322043086.0 | 365812336.1 | 375284019.8 | 375732709.8 |
| MA | 268.9 | 312137686.7 | 318522120.7 | 309158014.9 | 260622065.7 |
| PR | 237.1 | 202238959.9 | 390502693.1 | 302068083.1 | 157022632.1 |
| CE | 220.0 | 194896217.0 | 230176563.0 | 287547753.5 | 297920593.9 |
| PB | 183.5 | 185164941.7 | 189105812.1 | 176705245.5 | 191658719.3 |
| GO | 183.1 | 176865218.5 | 186891521.2 | 209710588.6 | 190437075.1 |
| MS | 172.4 | 175979377.3 | 181915830.3 | 187048393.5 | 162070205.9 |
| ES | 141.7 | 71840865.4 | 62772695.6 | 117803033.6 | 92828860.1 |
| MG | 132.8 | 105892563.7 | 157326700.5 | 106127151.3 | 104286376.0 |
| RN | 119.3 | 102665665.8 | 101259481.0 | 156711149.7 | 177126315.8 |
| AM | 96.0 | 91319321.6 | 60559490.5 | 59615144.6 | 69890712.6 |
| SE | 86.8 | 82807733.4 | 93902002.9 | 84032348.1 | 82638064.9 |
| SC | 86.2 | 93455595.1 | 94834768.1 | 127154160.4 | 78980483.9 |
| AP | 85.5 | 60068960.4 | 57324839.4 | 82872205.1 | 71619064.4 |
| PE | 56.4 | 65607377.9 | 54203141.9 | 42688528.9 | 35646324.7 |
| RR | 55.0 | 44493327.3 | 53341180.7 | 38138750.9 | 1576704.2 |
| AC | 42.4 | 39153402.8 | 43468037.4 | 38657825.8 | 37509419.7 |
| PI | 34.4 | 25440183.5 | 41941567.6 | 59044664.9 | 60069890.3 |
| TO | 34.3 | 28779309.3 | 28392747.3 | 27291190.8 | 31555946.7 |
| AL | 32.3 | 12211900.8 | 32737633.3 | 68279965.6 | 16240615.5 |
| MT | 20.3 | 5951092.3 | 16392184.4 | 13548372.7 | 66778257.0 |
| RO | 19.3 | 27199691.1 | 20994968.6 | 30396256.3 | 16436603.6 |
| Average (R\$ mi) | | 192.6 | 214.8 | 206.4 | 189.8 |

Source: Prepared by the author with STN data corrected by IPCA-IBGE for 2019 (2021).

APPENDIX B – NUMBER OF HUMAN RESOURCES PER STATE

| UF | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|--------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| AC | 381 | 443 | 478 | 481 | 423 | 508 | 579 | 592 |
| AL | 1584 | 1613 | 2390 | 2313 | 2520 | 2831 | 3005 | 3192 |
| AM | 1136 | 1277 | 1763 | 1913 | 1986 | 2019 | 2456 | 2494 |
| AP | 165 | 172 | 267 | 226 | 223 | 275 | 318 | 333 |
| BA | 6304 | 7500 | 9882 | 9294 | 8965 | 9845 | 10962 | 11981 |
| CE | 6005 | 6281 | 7915 | 7416 | 7256 | 8132 | 8614 | 9061 |
| DF | 588 | 858 | 631 | 606 | 562 | 536 | 504 | 466 |
| ES | 2311 | 2427 | 2916 | 2762 | 2535 | 2546 | 2722 | 2729 |
| GO | 2897 | 3066 | 4007 | 3913 | 3683 | 4117 | 4291 | 4226 |
| MA | 3458 | 4008 | 5843 | 5446 | 5197 | 5828 | 6254 | 6854 |
| MG | 9992 | 10849 | 12913 | 12532 | 12198 | 13042 | 13974 | 14387 |
| MS | 1935 | 2243 | 2419 | 2350 | 2236 | 2329 | 2484 | 2488 |
| MT | 2028 | 2265 | 2433 | 2506 | 2467 | 2431 | 2470 | 2540 |
| PA | 4184 | 4613 | 5692 | 5426 | 5170 | 5696 | 6265 | 6419 |
| PB | 2189 | 2447 | 3376 | 3111 | 2993 | 3706 | 4049 | 4334 |
| PE | 2947 | 3559 | 5848 | 5095 | 4732 | 5086 | 5517 | 6275 |
| PI | 2378 | 2715 | 3728 | 3566 | 3514 | 4137 | 4660 | 5181 |
| PR | 5763 | 6228 | 6875 | 6728 | 6855 | 6759 | 6939 | 7005 |
| RJ | 6049 | 6454 | 6910 | 6687 | 6509 | 6122 | 6552 | 7051 |
| RN | 2037 | 2196 | 3030 | 3006 | 2841 | 3360 | 3597 | 3715 |
| RO | 654 | 678 | 719 | 729 | 705 | 704 | 782 | 795 |
| RR | 475 | 524 | 471 | 437 | 447 | 476 | 511 | 566 |
| RS | 5562 | 5697 | 6357 | 6367 | 6288 | 6460 | 6753 | 6875 |
| SC | 3161 | 3210 | 3630 | 3852 | 3869 | 3810 | 4047 | 4185 |
| SE | 1508 | 1657 | 2094 | 2130 | 2140 | 2246 | 2299 | 2476 |
| SP | 11188 | 11634 | 12986 | 13547 | 13646 | 13808 | 14720 | 15002 |
| TO | 1280 | 1565 | 1834 | 1814 | 1758 | 2131 | 2276 | 2308 |
| Total | 88159 | 96179 | 117407 | 114253 | 111718 | 118940 | 127600 | 133530 |

Source: Prepared by the author with data from SNAS/Department of SUAS Management (DGSUAS) (2021).

APPENDIX C – NUMBER OF ESTABLISHMENTS PER STATE

| UF | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|--------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| AC | 39 | 41 | 41 | 41 | 41 | 42 | 50 | 41 |
| AL | 189 | 189 | 196 | 199 | 226 | 232 | 152 | 236 |
| AM | 120 | 124 | 120 | 133 | 140 | 139 | 141 | 144 |
| AP | 23 | 24 | 26 | 27 | 30 | 30 | 34 | 32 |
| BA | 773 | 799 | 815 | 817 | 830 | 836 | 743 | 854 |
| CE | 478 | 485 | 497 | 497 | 501 | 504 | 404 | 508 |
| DF | 34 | 36 | 36 | 37 | 37 | 37 | 51 | 38 |
| ES | 182 | 189 | 201 | 205 | 211 | 219 | 268 | 222 |
| GO | 383 | 386 | 388 | 394 | 383 | 396 | 342 | 399 |
| MA | 413 | 424 | 434 | 431 | 438 | 439 | 432 | 438 |
| MG | 1290 | 1320 | 1369 | 1373 | 1385 | 1404 | 1228 | 1426 |
| MS | 186 | 192 | 194 | 197 | 201 | 203 | 235 | 203 |
| MT | 216 | 217 | 217 | 218 | 219 | 220 | 359 | 222 |
| PA | 323 | 339 | 352 | 356 | 356 | 362 | 357 | 384 |
| PB | 344 | 354 | 369 | 366 | 369 | 370 | 341 | 370 |
| PE | 428 | 444 | 463 | 463 | 466 | 488 | 552 | 513 |
| PI | 317 | 321 | 320 | 322 | 325 | 326 | 524 | 346 |
| PR | 688 | 695 | 711 | 717 | 742 | 747 | 647 | 761 |
| RJ | 522 | 545 | 558 | 564 | 569 | 558 | 549 | 550 |
| RN | 273 | 271 | 274 | 273 | 274 | 277 | 511 | 276 |
| RO | 77 | 76 | 81 | 81 | 80 | 81 | 247 | 81 |
| RR | 29 | 29 | 29 | 30 | 29 | 34 | 121 | 38 |
| RS | 661 | 679 | 696 | 700 | 708 | 710 | 721 | 721 |
| SC | 423 | 427 | 437 | 446 | 459 | 466 | 453 | 482 |
| SE | 140 | 143 | 157 | 177 | 181 | 184 | 152 | 186 |
| SP | 1167 | 1206 | 1303 | 1355 | 1388 | 1392 | 1248 | 1437 |
| TO | 174 | 177 | 176 | 171 | 173 | 173 | 162 | 175 |
| Total | 9892 | 10132 | 10460 | 10590 | 10761 | 10869 | 11024 | 11083 |

Source: Prepared by the author with data from SNAS/DGSUAS (2021).

APPENDIX D – NUMBER OF ATTENDANCES PER STATE

| UF | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| AC | 76306 | 120014 | 101434 | 76553 | 68482 | 76285 | 87040 | 94323 |
| AL | 184609 | 181505 | 195620 | 169921 | 179738 | 277355 | 386113 | 321283 |
| AM | 315829 | 350003 | 351051 | 381261 | 371132 | 441266 | 528291 | 550777 |
| AP | 14604 | 18426 | 24437 | 29349 | 50120 | 54183 | 63461 | 64625 |
| BA | 840398 | 950655 | 1026652 | 1081690 | 1057499 | 1257379 | 1489619 | 1827888 |
| CE | 799387 | 937568 | 929222 | 1060012 | 1047308 | 1133533 | 1239234 | 1328541 |
| DF | 26794 | 252128 | 373080 | 192187 | 15884 | 36851 | 31024 | 25126 |
| ES | 353547 | 410798 | 443626 | 442755 | 424219 | 445820 | 511930 | 638157 |
| GO | 674863 | 745309 | 704794 | 677750 | 610697 | 630955 | 677910 | 791677 |
| MA | 379097 | 449367 | 445287 | 425456 | 445966 | 512991 | 624087 | 710343 |
| MG | 1829429 | 2038856 | 2376312 | 2474345 | 2464850 | 2824429 | 3254732 | 3636298 |
| MS | 476203 | 574512 | 590843 | 655975 | 666963 | 691325 | 789679 | 812246 |
| MT | 455862 | 555247 | 537388 | 548159 | 507904 | 535987 | 571723 | 609017 |
| PA | 483515 | 528104 | 633660 | 618428 | 637916 | 752010 | 830160 | 921394 |
| PB | 235342 | 304653 | 309004 | 324809 | 292841 | 376209 | 348641 | 396356 |
| PE | 447112 | 526668 | 737976 | 796980 | 814126 | 1026510 | 1213751 | 1346578 |
| PI | 370621 | 448940 | 491646 | 503360 | 522749 | 619460 | 639955 | 722254 |
| PR | 1778355 | 1785341 | 1999920 | 2135885 | 2246461 | 2501766 | 2819083 | 2962997 |
| RJ | 1266789 | 1278669 | 1544383 | 1601521 | 1697724 | 1912690 | 2219840 | 2444532 |
| RN | 215017 | 238038 | 241793 | 235672 | 232493 | 296902 | 386701 | 376405 |
| RO | 97891 | 158276 | 139750 | 143818 | 152416 | 175985 | 190583 | 250391 |
| RR | 52440 | 107188 | 74427 | 57569 | 54010 | 58605 | 81861 | 106544 |
| RS | 1133202 | 1262451 | 1366618 | 1322721 | 1269826 | 1322108 | 1429988 | 1490601 |
| SC | 547057 | 536935 | 570015 | 575142 | 602510 | 710266 | 859725 | 951697 |
| SE | 215910 | 266341 | 295926 | 322649 | 352398 | 415474 | 510524 | 530878 |
| SP | 2894666 | 3168666 | 3572517 | 3693890 | 3943153 | 4312214 | 4688013 | 4845767 |
| TO | 163223 | 200242 | 226293 | 214804 | 237307 | 267466 | 276994 | 269832 |
| Total | 16328068 | 18394900 | 20303674 | 20762661 | 20966692 | 23666024 | 26750662 | 29026527 |

Source: Prepared by the author with data from SNAS/DGSUAS (2021).

ANNEXES**ANNEX A – PROJECTION OF THE POPULATION, ON JULY 1st - 2012/2019**

| UF | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| AC | 792045 | 805014 | 818273 | 831665 | 844137 | 856457 | 869265 | 881935 |
| AL | 3230877 | 3247527 | 3263524 | 3279222 | 3293629 | 3307532 | 3322379 | 3336911 |
| AM | 3684326 | 3751293 | 3819636 | 3887740 | 3952171 | 4015812 | 4080611 | 4144597 |
| AP | 728015 | 744809 | 762156 | 779416 | 796419 | 813084 | 829494 | 845731 |
| BA | 14441531 | 14505033 | 14565807 | 14629018 | 14689684 | 14749868 | 14812617 | 14872858 |
| CE | 8738045 | 8792607 | 8847031 | 8905267 | 8962834 | 9018764 | 9076426 | 9132858 |
| DF | 2722198 | 2763488 | 2805774 | 2848633 | 2890224 | 2931057 | 2972209 | 3012718 |
| ES | 3689347 | 3736386 | 3784361 | 3832826 | 3879376 | 3925341 | 3972388 | 4018650 |
| GO | 6316302 | 6417591 | 6520857 | 6625528 | 6726130 | 6824504 | 6923655 | 7020904 |
| MA | 6798830 | 6836179 | 6875302 | 6916244 | 6955099 | 6994148 | 7035055 | 7075181 |
| MG | 20235204 | 20371328 | 20508631 | 20648978 | 20780264 | 20908628 | 21040662 | 21168791 |
| MS | 2557442 | 2589069 | 2621214 | 2653928 | 2685454 | 2716534 | 2748023 | 2778986 |
| MT | 3185148 | 3226030 | 3269448 | 3314540 | 3356979 | 3398791 | 3441998 | 3484466 |
| PA | 7960134 | 8054419 | 8149418 | 8244575 | 8334346 | 8422634 | 8513497 | 8602865 |
| PB | 3875373 | 3890494 | 3910059 | 3932537 | 3953693 | 3974437 | 3996496 | 4018127 |
| PE | 9126434 | 9189504 | 9252442 | 9317744 | 9377368 | 9434839 | 9496735 | 9557517 |
| PI | 3212635 | 3220646 | 3228556 | 3237691 | 3246228 | 3254626 | 3263754 | 3272447 |
| PR | 10822187 | 10908262 | 10997989 | 11089062 | 11176203 | 11261927 | 11348937 | 11433957 |
| RJ | 16510627 | 16616344 | 16726184 | 16841138 | 16947738 | 17051465 | 17159960 | 17264943 |
| RN | 3302720 | 3332952 | 3363084 | 3393814 | 3422843 | 3450669 | 3479010 | 3506853 |
| RO | 1637884 | 1657620 | 1677766 | 1698263 | 1717911 | 1737578 | 1757589 | 1777225 |
| RR | 480290 | 491066 | 501970 | 513328 | 525967 | 546885 | 576568 | 605761 |
| RS | 11014448 | 11066527 | 11119817 | 11175777 | 11229947 | 11280193 | 11329605 | 11377239 |
| SC | 6530943 | 6620186 | 6710154 | 6802306 | 6894058 | 6984749 | 7075494 | 7164788 |
| SE | 2152329 | 2173632 | 2195015 | 2216657 | 2237132 | 2257266 | 2278308 | 2298902 |
| SP | 43119841 | 43528708 | 43937755 | 44356304 | 44760305 | 45149603 | 45538936 | 45919049 |
| TO | 1449779 | 1467474 | 1485318 | 1503482 | 1520448 | 1537350 | 1555229 | 1572866 |
| Brazil | 198314934 | 200004188 | 201717541 | 203475683 | 205156587 | 206804741 | 208494900 | 210147125 |

Source: IBGE (2018).