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Crisis and federalism: trends and regional patterns of health revenues and expenditures in the brazilian states

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Abstract *This study aims to analyze regional trends and patterns of health revenues and expenditure in the Brazilian states from 2006 to 2016. This is an exploratory and descriptive study based on secondary national data and selected indicators. Higher per capita net current revenues for all states and regions, with decreasing levels in specific years associated with the crises of 2008-2009 and 2015-2016 were observed. Per capita health expenditure showed an increasing trend, even in times of economic crisis and declining collection. Diversity of sources and heterogeneity of health revenues and expenditures, as well as different impacts of the crisis on the regional budgets, were observed. The results suggest the protective effect of constitutional health linkage, spending commitments and priorities, and compensation mechanisms of fiscal federalism revenue sources in state health expenditures. However, challenges remain for the implementation of a transfer system that reduces inequalities and establishes greater cooperation among entities, in a context of austerity and strong public health financing constraints in Brazil.*

Key words *Federalism, Government Financing, State Government, Healthcare Financing, Unified Health System.*

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Introduction

Federalism is a system that distributes the political authority of the state into multiple territorially-defined and ordained centers and allows the simultaneous exercise of self-rule and shared-rule[1]. However, the diversity of 'federative situations' is significant[2], and is expressed in the institutions that characterize and influence public policies in these countries[3].

Among factors explaining the existing variations, international comparative studies highlight the importance of the distribution of tax competencies and fiscal sharing relationships to foster coordination and cooperation between levels of government in the federations[4]. Federalism fiscal components have also been valued for understanding the authority of mid-level or regional governments (states, provinces, länder, cantons, etc.) in defining their policies (tax autonomy criteria) and decisions taken in national arenas (fiscal control criteria)[5].

Brazil stands out in the international scenario with its triune arrangement, marked by territorial inequalities and shared responsibilities among entities in various areas of the public policy[6,7]. The federal sphere concentrates the power to collect and decide on the formulation of policies and the direction of spending at the state and municipal levels[8], which favors its performance to induce and regulate national priorities, finance, and redistribute resources[9-12].

Several studies point to the limitations of the power assigned to the state spheres in the Brazilian federation. Arretche and Schlegel[13] affirm that the 1988 Federal Constitution (CF88)[14] allowed the recovery of state authority, lost during the authoritarian period (1964 to 1985), which interrupted the democratic regime of 1946. However, the amendments enacted since the 1990s changed CF88's original design of intergovernmental relationships and fiscal federalism and provided for the concentration of resources and decision-making power at the federal level[7,9,15]. The approved reforms have caused losses to state governments and increased the Federal Government's coordination capacity, limiting the decision-making authority of subnational governments, especially concerning their ability to influence national decisions that affect their policies[13,16].

Rezende[17] argued that this progressive deterioration of states' position in the federation in the post-Constituent period is expressed in different aspects, such as tax, by reducing the share of states in the distribution of the fiscal pie; budget, due to the loss of freedom in the use of resources due to constitutional linkages, the burden of conditional revenues, program regulation and debt control; legislative, due to the restricted role developed by the state legislatures; regulatory, due to the dissemination of norms from the central government; political, due to the inability of state leaders to influence the vote of their representatives in the National Congress, who agree with the federal government's agenda even when state command is opposed[17].

Also, the states experienced a debt situation that was aggravated by the 'fiscal war' between them, the compromise of their state banks, and a rising securities debt[18]. Since the 1990s, the federal government has imposed a substantial fiscal adjustment on state governments in order to restore macroeconomic stability, which has weakened the ability of states to promote investments, affecting their development. Institutional reforms (privatization, administrative reform, increasing debt burdens, among others) inhibited productive investment by state governments, and the pressure from states for federal funds transfers was increased[19]. These aspects allow the understanding of the impacts of the 2008-2009 and 2015-2016 economic crises on state public finance.

The 2008 financial crisis stemmed from the high subprime exposure of the US mortgage market, which coupled with rising noncompliance, led to the decapitalization of large banks, including the closing of Lehman Brothers in September 2008. It turned into a global crisis, with significant effects on the real economy, leading to declining economic activity, unemployment, stocks' devaluation and falling prices of manufactured goods and commodities. In Brazil, the impacts of the international crisis in this period have been minimized by adopting a wide range of policies to stimulate production and domestic demand, including measures to boost banking sector's credit and liquidity, although the country has not been entirely immune to its effects on tax collection[20-23].

The 2015-2016 crisis was more directly related to national factors and a series of governmental measures (fiscal adjustment, water crisis, currency devaluation, and the Special System for Settlement and Custody (SELIC) interest rate increase, among others), which helped to reduce economic growth capacity and generated a high fiscal cost. Other factors have intensified the recession, such as falling incomes, rising unem-

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ployment, shrinking credit markets, and falling public investments[23,24].

Studies suggest that recession and austerity policies have tended to affect states' revenues more significantly compared to other entities in the federation[25,26]. In this context, this paper aims to analyze the regional trends and patterns of health revenues and expenditures of Brazilian states in the 2006-2016 period. The crises that hit the country in the second decade of the 2000s have a federative dimension, which is expressed differently in the state budgets because of the division of tax competencies, the fiscal sharing system, and the financing mechanisms of the Unified Health System (SUS).

This study is justified by the importance of states for the setting of the federative arrangement and conducting the Brazilian health policy[27]. While some studies on SUS financing analyze the distribution of revenue sources and the composition of health expenditure[28-30], few studies address the different effects of fiscal federalism on health financing and spending capacity of subnational entities[31-34].

Notably, the possible impacts of the Brazilian economic crises have not yet been sufficiently explored in the production of the Collective Health, leaving gaps that prevent the understanding of their effects on the state funding of SUS.

Methods

This is an exploratory and descriptive study oriented to analyze the health financing and spending conditions of the Brazilian states.

Two databases were built on the income and expenses of the 26 Brazilian states. The Federal District was not included in this study because it is a "city-state" and has tax competencies, and budget binding and detailing criteria different from the Brazilian states. The databases' variables are monetary values (in national currency) of public revenues and expenditures made by the Brazilian states from 2006 to 2016. This period was chosen because it allows the analysis of a historical series of budget implementation at a time of ascent and rising budgetary constraint in the face of the 2008-2009 and 2015-2016 economic crises.

The revenue database was constructed from data obtained from the budget implementation reports of the Brazilian Finance Information System (FINBRA). In some cases, when verifying data from some hugely discrepant items, a comparison was made with reports informed on each state transparency website, and the National Treasury Secretariat (STN) reports. In 2013, in the state of Mato Grosso, it was necessary to adjust the ICMS deduction related to the FUNDEB. In the FINBRA report, the deduction was around 66%, and was adjusted to 20%, which is the established percentage, and confirmed on the state transparency website. The health expenditure base was built from data obtained through the Public Health Budget Information System (SIOPS). For comparability purposes, the monetary values of the specific items used in the calculation of the indicators were deflated for December 2016 using the Extended National Consumer Price Index (IPCA) of the Brazilian Institute of Geography and Statistics (IBGE), which was also the total resident population data source.

FINBRA is the responsibility of STN and SIOPS of the Ministry of Health. These databases were chosen because they are in the public domain and open access, and gather all the realized revenues and committed expenses of all Brazilian states. The following indicators were used in this paper: per capita net current revenue (NCRpc); per capita health expenditure (HEpc); percentages of directly collected revenues (DCR), redistributive transfers (RT), compensatory transfers (CT), and health-related revenues (HRR) in the net current revenues. The classification of transfers was based on the typology proposed by Prado[35].

Specific items of realized revenues and committed expenditures from 2006 to 2016 were used to calculating the indicators. Box 1 breaks down the indicators calculated for each of the states and their aggregates – total Brazil, and North (N), Northeast (NE), Midwest (MW), Southeast (SE) and South (S) regions – in the several years of the series.

A simple descriptive analysis of the time series of the revenue and expenditure indicators was made. Aggregate indicators were calculated as the national and region-by-region synthesis, i.e., the ratio of aggregates (total states financial values in the numerator divided by the respective total numbers of inhabitants in the denominator). Thus, it is different from what would be a measure of central tendency of the observed values in the units (for example, the simple mean).

The net current revenue variation was compared with that of gross domestic product (GDP) for the period obtained from the IBGE. Also, the relative dispersion was calculated, which allows the analysis of inequalities, through the coeffi-

Box 1. Indicators used in the study: definition, interpretation, method and calculation formula, and data source.

Indicator	Definition	Interpretation	Calculation Method	Calculation formula	Data Source
1. Net Current Revenue (NCR) per Capita	Current revenue minus constitutional transfers and social contributions per inhabitant (in R$).	Indicates the budgetary resources available to the state for the execution of the expenses of the activities of the public administration entities.	Numerator: current revenue less total constitutional transfers and social contributions. Denominator: total resident population.	{1.0.00.00.00 - [(0,5* 1.1.12.05.00) + (0,25* 1.1.13.02.00) + (0,25* 1.7.21.01.12) + 9.1.1.12.05.00 + 9.1.1.12.07.00 + 9.1.1.13.02.00 + 9.1.7.21.01.01 + 9.1.7.21.01.12 + 9.1.7.21.09.01)] - 1.2.10.00.00}/ state population	FINBRA and IBGE
2. Percentage of directly collected revenues	Percentage of directly collected revenue against net current revenue (%).	Indicates the importance of directly raised funds (taxes, fees, contributions, fines, and default interest) as a source of budget revenue.	Numerator: total revenues from taxes, fees, contributions, and fines X 100. Denominator: NCR.	[1.1.12.04.00 + (0,5*1.1.12.05.00) + 1.1.12.07.00 + (0,75*1.1.13.02.00) + 1.1.20.00.00 + 1.1.30.00.00 + 1.2.2.0.00.00 + 1.6.00.00.00 + 1.9.11.00.00 + 1.9.13.00.00 + 1.9.31.00.00] / NCR * 100	FINBRA
3. Percentage of redistributive transfers	Percentage of federal redistributive transfers against net current revenue (%).	Indicates the relevance of federal redistributive transfers as a source of budget revenue; federal redistributive transfers aim to reduce inequalities in spending capacity between states.	Numerator: financial transfers from the FPE share X 100. Denominator: NCR.	1.7.21.01.01/ NCR*100	FINBRA
4. Percentage of compensatory transfers	Percentage of federal compensatory transfers against net current revenue (%).	Shows the relevance of federal compensatory transfers as a source of budget revenue; federal compensatory transfers are those intended to offset the loss of revenue arising from the ICMS export exemption.	Numerator: total financial transfers performed from ICMS + exemption Complementary Law No. 87/96 (Kandir Law) + 75% of IPI Export X 100. Denominator: NCR.	[1.7.21.36.00 + (0,75* 1.7.21.01.12)] / NCR*100.	FINBRA
5. Percentage of health-related revenues	Percentage of health-related revenues against net current revenues (%).	Shows the relevance of health-related resources as a source of budget revenue; health-related revenues are those directed to the exclusive financing of the health sector.	Numerator: total health-related revenues (transfers from the SUS; agreements; provision of services, among others) X 100. Denominator: NCR.	[(1.7.21.33.00) + (1.7.22.33.00) + (1.7.23.01.00) + (1.7.61.01.00) + (1.7.62.01.00) + (1.7.63.01.00) + (1.6.00.05.00)] /NCR*100.	FINBRA
6. Health expenditure per capita	Total public health expenditure per inhabitant (in R $).	This is the total public health expenditure, under state responsibility, from all sources.	Numerator: committed health expenditure from all sources (taxes, SUS transfers, credit operations, among others). Denominator: total resident population.	3.3.0.00.00.00.00 + 3.4.0.00.00.00.00 – 3.3.1.90.01.00.00 – 3.3.1.90.03.00.00	SIOPS and IBGE

Note: All funds were adjusted to December 2016 by the Extended National Consumer Price Index (IPCA) of the Brazilian Institute of Geography and Statistics (IBGE).
Source: Elaborated by authors.

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cient of variation, calculated as the ratio between the standard deviation and the mean (from the regions considering the dispersion between the states of each one and as a whole, and in turn, within the national framework, considering the dispersion among the five regions).

Results

A growing trend in the NCRpc of the Brazilian states was recorded from 2006 to 2016, with downturns in specific years (2009, 2015 and 2016) (Figure 1). However, in general, the NCRpc levels in 2016 were higher than in 2006. HEpc showed different behavior of revenue, with an upward trend over the years and a sharp increase from 2014.

Table 1 shows the real growth rate of Brazilian GDP and total NCR for all states and their regional aggregates. In the period analyzed, the NCR had a higher growth rate than the national GDP for states and regions, except the SE. However, the aggregate of the states evidenced negative growth rates in 2009 (-1.7), 2015 (-5.9) and 2016 (-1.6) and, except for 2016, below the growth rate of the Brazilian GDP, which in these years was also negative (-0.1; -3.5 and -3.3; respectively). In 2009, N, MW, and SE results followed this national trend. In 2015, all regions had negative NCR growth rate values and lower than the Brazilian GDP, except for the S region. The MW region evidenced the most considerable value fluctuations (Table 1).

Directly collected funds were the primary sources of state budget revenue (on average, about 69% of NCR), followed by redistributive transfers (on average, about 15%) (Figure 1). There was no significant variation in the proportional share of the different sources of NCR, except for the slight decrease in funds directly collected in 2008, 2011 and 2014, and the fluctuations over the years in the case of other sources of revenue (range from 9% to 13%). Health-related revenues accounted for about 4% of NCR.

Figure 2 shows different regional patterns of state revenue and total health expenditure indicators. The SE and MW regions had the highest NCRpc values. This indicator showed a growing trend in practically all regions with a decrease in specific years (2009, 2013 and 2015), except in the SE region, whose decrease in revenue can be observed from 2013. HEpc followed the growing trend, however, without fluctuations, except in 2011 (MW region) and 2013 (SE and S regions). Region N had the highest health expenditure, and the NE Region, the lowest (Figure 2).

Concerning the proportional share of revenue sources, the states of the N and NE had the highest rates of redistributive transfers (on average, about 42% and 38%, respectively), compared to other regions (14% in the MW, 3% in the SE and 7% in the S), which had higher rates of funds directly collected (on average, 75%, 78%, and 78% respectively). Health-related revenues were low in all regions, ranging from 1% (MW) to 5% (NE). The other sources of revenue were those with the most considerable variations between regions (Figure 2).

In 2009, all regions showed a reduced proportional share of redistributive transfers, except the South. The MW states showed the most considerable fluctuations in the proportion of redistributive transfers and revenues from other sources during the period studied (Figure 2).

Table 2 shows the coefficient of variation of NCRpc and HEpc for the set of states and their regional aggregates, as well as between regions. In both indicators, the differences were marked and fluctuated throughout the period and were more pronounced in the case of HEpc. However, a declining inequality was observed, especially concerning HEpc, in 2016 compared to 2006.

It is noteworthy that the inequalities of NCRpc were more significant in the states of the N and MW region, as well as that of HEpc in the SE states. Fluctuations of coefficients were noted over the period, tending to reduce inequality, especially in the NE and SE. In both indicators analyzed, the lowest inequality between states of the S region is striking (Table 2).

Discussion

This study analyzed the trends and regional patterns of state health revenues and expenditures from 2006 to 2016 to identify possible repercussions of the economic crises, in the face of the division of tax competencies, the tax sharing system, and SUS funding mechanisms.

A growing trend of revenues was observed, with falls in specific years associated with the 2008-2009 and 2015-2016 crises. Several studies suggest that the Federal Government's tax collection difficulties during this period compromised the calculation bases of the State Participation Fund (FPE) – the Industrialized Products Tax (IPI) and the Income Tax (IR) – which represents a significant portion of state revenues[25,26]. Afonso

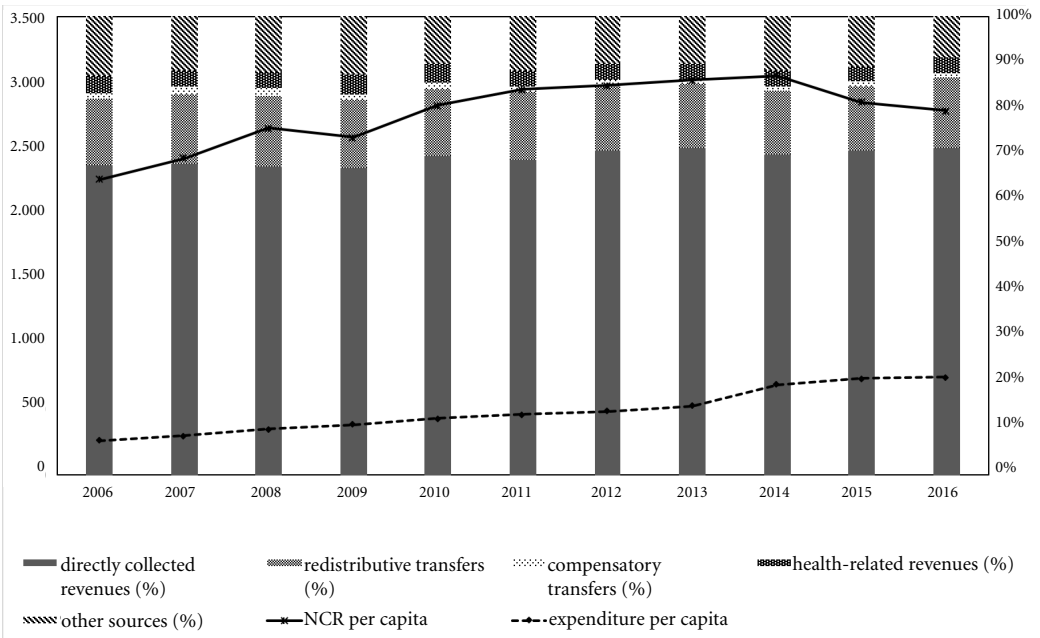

Figure 1. Evolution of states' total health expenditures and revenues: net current revenues (R$ per capita), directly collected revenues (%), redistributive transfers (%), health-related revenues (%), compensatory transfers (%), other sources (%), total health expenditure (R$ per capita). Brazil, 2006 to 2016.

Note: Realized revenues and committed expenses, adjusted to 2016 figures by the Extended National Consumer Price Index (IPCA) of the Brazilian Institute of Geography and Statistics (IBGE).
Source: FINBRA (revenue) and SIOPS (expenditure). Elaborated by authors. Left axis refers to the per capita values and the right axis to the percentage values.

Table 1. Development of the real growth rate of the Brazilian GDP and the net current revenue of the states (total and by region). Brazil, 2006 to 2016.

Year	Brazil's Actual GDP Growth Rate (%)	Actual Total NCR Growth Rate of States (%)	North Region	Northeast Region	Midwest Region	Southeast Region	South Region
2006	4.0						
2007	6.1	5.5	8.3	3.2	9.0	6.0	3.8
2008	5.1	12.8	16.1	12.4	15.1	12.2	12.7
2009	-0.1	-1.7	-2.7	0.2	-0.9	-3.0	0.4
2010	7.5	8.9	6.9	9.4	4.8	9.6	8.8
2011	4.0	5.3	12.6	5.7	10.2	3.7	4.0
2012	1.9	1.8	3.9	1.7	6.0	0.9	1.9
2013	3.0	4.3	1.6	9.7	-2.9	3.2	6.0
2014	0.5	2.8	4.0	-0.2	28.4	-1.5	10.2
2015	-3.5	-5.9	-6.7	-4.8	-18.7	-5.0	-2.8
2016	-3.3	-1.6	4.9	3.7	10.5	-7.2	-0.9
Mean(2006 to 2016)	2.0	3.1	4.7	4.0	5.5	1.7	4.3

Note: Realized revenues adjusted to December 2016 values by the Extended National Consumer Price Index (IPCA) of the Brazilian Institute of Geography and Statistics (IBGE).
Source: FINBRA (revenues) and IBGE (GDP). Elaborated by authors.

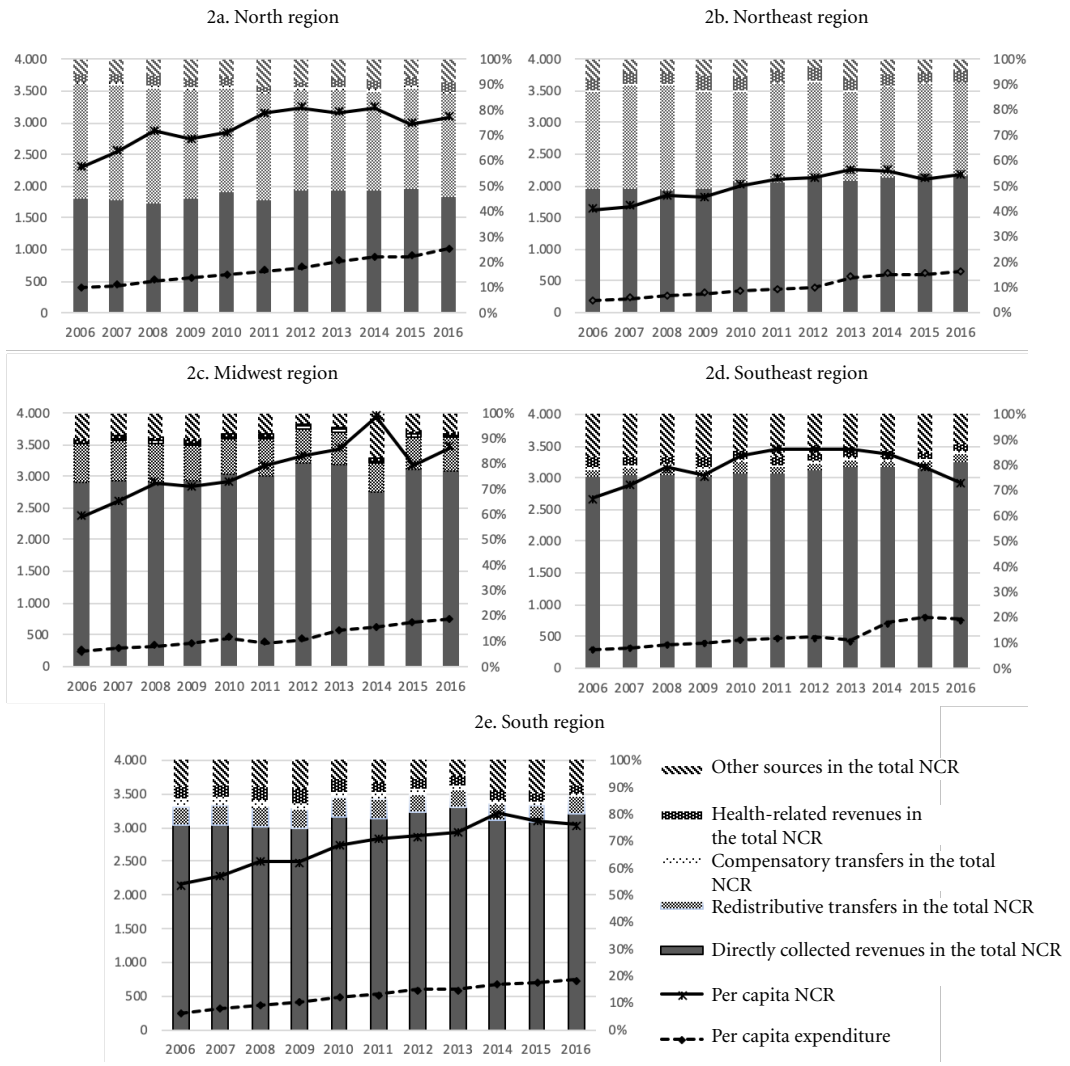

Figure 2. Evolution of states' total health expenditures and revenues by region: net current revenues (R$ per capita), directly collected revenues (%), redistributive transfers (%), health-related revenues (%), compensatory transfers (%), other sources (%), total health expenditure (R$ per capita). Brazil, 2006 to 2016.

Note: Realized revenues and committed expenses, adjusted to December 2016 values by the Extended National Consumer Price Index (IPCA) of the Brazilian Institute of Geography and Statistics (IBGE).
Source: FINBRA (revenue) and SIOPS (expenditure). Elaborated by authors. Left axis refers to the per capita values and the right axis to the percentage values.

and Castro[26] point out that, after 2008, the course of federal collection and spending was shallow, with a structural break of the trend that prevailed in the first decade of 2000. Notably, a concomitant increase of public spending was observed in these years, especially in a context of the exceptional performance of the development of national tax revenues, in which the gross tax burden achieved levels exceeding two-thirds of GDP.

The measures adopted by the federal government to contain the 2008 crisis through tax exemptions also compromised the composition of FPE[36]. Together with the non-updated FPE[17] apportionment criteria, these measures led to

Table 2. Coefficient of variation of per capita net current income and total per capita health expenditure of states by region and across regions (%). Brazil, 2006 to 2016.

Coefficient of Variation of the per capita NCR							
Years	Coefficient of Variation of the per capita NCR of the states, by region and total						Inequality between regions
	N	NE	MW	SE	S	Total	
2006	42%	23%	19%	21%	6%	42%	17%
2007	40%	21%	18%	19%	6%	44%	19%
2008	43%	21%	20%	18%	9%	46%	19%
2009	43%	20%	22%	17%	9%	45%	18%
2010	37%	20%	17%	16%	9%	38%	17%
2011	39%	19%	14%	17%	8%	42%	17%
2012	35%	16%	14%	17%	5%	39%	18%
2013	36%	15%	19%	15%	3%	38%	15%
2014	39%	17%	43%	14%	9%	43%	19%
2015	35%	17%	18%	11%	6%	36%	15%
2016	37%	13%	26%	9%	1%	39%	16%
Coefficient of Variation of the per capita Health Expenditure							
Years	Coefficient of Variation of the per capita Health Expenditure of the states, by region and total						Inequality between regions
	N	NE	MW	SE	S	Total	
2006	36%	45%	47%	64%	24%	61%	28%
2007	39%	50%	51%	68%	7%	62%	25%
2008	40%	42%	58%	68%	11%	62%	25%
2009	41%	41%	57%	67%	15%	60%	23%
2010	38%	38%	53%	69%	15%	56%	21%
2011	40%	42%	57%	69%	15%	61%	26%
2012	43%	46%	44%	69%	20%	64%	26%
2013	41%	24%	20%	70%	4%	59%	26%
2014	43%	23%	17%	36%	4%	51%	21%
2015	40%	21%	29%	35%	5%	49%	19%
2016	37%	17%	28%	34%	5%	48%	17%

Note: Realized revenues and committed expenses, adjusted to December 2016 values by the Extended National Consumer Price Index (IPCA) of the Brazilian Institute of Geography and Statistics (IBGE).
Source: FINBRA (revenue) and SIOPS (expenditure). Elaborated by authors.

lower levels of transfers to the Brazilian regions. The states of the N, NE and MW were the most affected by the changes, with a loss of R$ 108.4 billion in the 2008-2012 period, as estimated by the Federal Court of Accounts[37].

Nevertheless, redistributive transfers through participatory funds play an essential role in reducing interregional disparities in state budget revenues. The calculation method adopted for the transfer of these resources benefits the governments with lower direct tax collection power[35], which explains the high dependence of the states of the N and NE regions on the FPE, evidenced in this study. However, in a recent study, Arretche[38] showed that FPE transfers have limited effects over the reduction of inequalities, as they do not favor states with a higher concentration of vulnerable populations.

However, the crisis did not have the same impact on health expenditures that tended to increase in all states and regions, even in times of declining revenues. This increase may be associated with the validity of the regulation of Constitutional Amendment Nº 29 (EC29) that defines minimum rates of application of the Federal Government, states and municipalities, in actions and public health services since 2000.

Studies show the protective effect of the Amendment on the Brazilian public health spending, and its repercussion for the significant increase in the participation of state and municipal governments in SUS financing[29,39]. In 2000, when the EC Nº 29 was approved, the states accounted for 18.6% of public resources allocated to the SUS. In 2010, this share increased to 26.4%, corresponding to an increased contribu-

tion of funds of about 200% (from R$ 12 billion in 2000 to R$ 36.3 billion in 2010)[39].

Increased health spending also expresses the commitments and priorities of governments in developing their policies, coordinating nationally induced strategies, and regionalizing health in the context of the 2000s[27]. This process resulted in increased investment and strengthened partnerships and public-private articulation in the organization of networks and the provision of specialized services[40,41].

Noteworthy are the differences found for the set of states and their regional aggregates. While the trends in NCRpc and HEpc in the period were similar, the revenue and expenditure levels were different among regions, as evidenced by the results of the coefficients of variation. These results suggest possible differentiated effects of the crisis due to budget revenue components, as well as the priorities given by the Brazilian states to the governmental expenses.

Worth mentioning is that the challenge of balancing public finances is particularly marked for states, given the fiscal austerity policies adopted by the federal government and their effects on SUS financing mechanisms. Vieira[42] affirms that, in times of crisis, countries tend to reduce public spending to tighten the fiscal environment or adhere to conditions granted by international lending institutions. In this study, the low proportion of health-related revenues in state budgets may be related to the prioritization of municipalities in the decentralization process, but also the containment of federal expenditures, which tends to be aggravated by the freezing of primary Federal Government spending provided for in the Constitutional Amendment 95[43].

Funcia[44] showed that, in 2017, the health financing of the population has already suffered losses. Federal expenditures concerning health actions and services were adversely affected: (a) concerning amounts paid by the Ministry of Health, which, although committed, settled expenses below the Constitutional level; (b) concerning financial transfers from the National Health Fund to the State and Municipal Health Funds, which showed real decrease with nominal variations below the IPCA/IBGE; (c) and concerning variations related to financial transfers of financing blocks that evidenced nominal and real decrease in four of the six blocks[44].

With the economy facing a threat of prolonged recession, this tightening of fiscal and monetary austerity policies will tend to decrease the consumption of household and private investment, leading to a vicious circle of deceleration or even falling tax revenues, lower economic growth and a higher burden of net public debt on national income[45]. Also, austerity materializes as an obstacle to reducing inequalities (UNCTAD) and the human rights of the population (UN, 2018), with severe implications for the right to health[46,47].

This paper has highlighted the diversity of sources and the heterogeneity of health revenues and expenditures, as well as the differential impacts of the crisis on state budgets in the regions. The maintenance of health expenditure growth in times of economic crisis and collection difficulties may be associated with the protective effect of the constitutional health linkage devices, spending commitments and priorities, as well as the mechanisms of compensation of fiscal federalism revenue sources. However, there are still challenges concerning the establishment of a transfer system that will reduce inequalities and establish greater cooperation between levels of government, in a context of austerity and substantial restrictions on Brazilian public health financing.

Collaborations

PC Contarato was responsible for the design, development, collection, and preparation of the database, analysis of information, preparation of tables and figures, drafting and final review of the paper. LD Lima was responsible for the design, development, analysis of information, drafting, and final review of the paper. RM Leal was responsible for the design, analysis of information, preparation of tables, and final review of the paper.

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