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EARNINGS MANAGEMENT BY HEALTH INSURANCE COMPANIES IN BRAZIL

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1 INTRODUCTION

Health insurance companies (HICs) in Brazil are regulated by the Agência Nacional de Saúde Suplementar (National Agency of Supplementary Health; ANS), which operates under the umbrella of the Ministry of Health. The agency was established by Law 9961/2000 and aims to regulate, standardize, control, and supervise activities related to supplementary health (Cardoso, 2005; Guimarães & Alves, 2009). One of the ANS policies introduced was a qualification program for service providers. The program involves an evaluation system based on the Índice de Desempenho de Saúde Suplementar (Supplementary Health Performance Index; IDSS). The indicators are aggregated into four dimensions: quality in health care, guarantee of access, sustainability in the market, and process and regulatory management, the latter based on the evaluation and stimulation of the quality in the sector, according to ANS.

For ANS, the performance measured by the Indicador da Dimensão Econômic-Financieira (indicator of the economic and financial dimension; IDEF) and the Indicador da Dimensão de Sustentabilidade no Mercado (indicator of sustainability in the market; IDSM) – the latter replaced the former after the reformulation of the qualification program in 2015 – monitor the HICs sustainability, verifying the firm's economic and financial balance, as well as its ability to fulfill obligations. The results are calculated based on a set of indicators: net assets and current liquidity indicators, indicator of provision for events incurred but not reported, indicator of sufficient guarantee assets, own resources, financial availability, inspection rate, and rate of resolution of preliminary intermediation notifications.

The ANS uses the qualification program to promote quality, comparability, and competition in the sector. Also, the program reports the overall performance of the HICs, increases transparency, and offers the beneficiaries a better choice of service providers (ANS, 2017). According to Pinheiro, Peleias, Silva, and Martins (2015), the issuance of the ANS provisions related to their economic and financial aspects forced the HICs to adopt more effective management.

However, a study by (Mensah, Considine, & Oakes, 1994) suggests that, in this industry, despite regulatory supervision, managers exercise earnings management to achieve specific goals. Greenwood, Baylis, and Tao (2017) pointed to the existence of econometric evidence in which they point out that when the performance is just below the intervention threshold, or well above, the result management is used to avoid the intervention of the regulator.

In this sense, managers may use earnings management due to incentives (Dechow, Ge, & Schrand, 2010) such as: hiding administrative abnormalities; showing the required indicators – by the ANS qualification program – of net assets, liquidity, provision for events incurred but not reported, sufficient guarantee assets, own resources, and financial availability; and finally, to be better ranked in the IDSS, as it is an evaluation tool that consumers can use to support decision-making on hiring or changing health insurance companies. Thus, this research seeks to answer the following question: **Do Brazilian HICs use earnings management to avoid reporting a low performance indicator of sustainability in the market (IDSM)?**

The objective of this study was to observe whether HICs engage in earnings management through discretionary accruals or operational decisions, refraining from reporting low indicators of sustainability in the market.

There are some important studies on the issue in Brazil, such as Cardoso (2005),

which verified the impact of health insurance regulation on the incentives to choose accounting practices using data from 2001 to 2003. Other examples are Guimarães and Alves (2009), who tested a prediction model for estimating the probability of insolvency, and Ferreira, Cardoso, Martinez, and Mário (2011), who verified whether the external audit minimizes the propensity to engage in earnings management. Sancovschi, Macedo, and Silva (2014) examined the relationships between the rank of the HICs in the IDSS and their likelihood to be subject to special regimes. Pinheiro, Peleias et al. (2015) analyzed the dynamics of financing strategies, pointing out the need for more comprehensive analysis on HICs. Nevertheless, according to Bragança, Pinheiro, Bressan and Soares (2019) more studies are necessary on HICs in Brazil and other countries, especially ones related to their solvency and sustainability.

Given that none of this previous studies discussed performance indicators (IDEF and IDSM) or their relationship with earning management, this paper, exploring this lacuna, offers original empirical evidence from Brazil of the association between earnings management and the ANS's indicator of sustainability, providing a clear result that companies manage earnings oriented toward increasing these indicators, obscuring the agency's ability to perceive risks.

This research contributes to the literature on the supplementary health market in Brazil, which, according to the ANS, was worth approximately R$ 179 billion, and served approximately 24% of the Brazilian population. We seek to demonstrate the existence of earnings management in this sector by discussing the incentives for manipulating accounting information. The study highlights the risks to the regulators in the system of control, stimulating the improvement of the tools used to monitor HICs. In addition, it seeks to help users of HICs in the decisions of hiring or exchanging health insurance, as well as instigate regulators to improve the assessement of economic and financial risks of HICs.

The study used data available on the ANS website, referring to the yearly reports of registered HICs active from 2012 to 2018. The sample was formed by all HICs that had sent complete information to the ANS during the period analyzed. A total of 1,362 companies were included, with 7,549 observations in total.

To begin the analysis of our question, we will first present the theoretical background, followed by a discussion of our methodology. Following this, we will present our results and conclude with a critical assessment.

2 THEORETICAL FRAMEWORK

The regulation establishes the conditions to ensure that the performance of private health agents such as health insurance companies (HICs), meet global criteria of economic and social sustainability to protect the public interest (Silva, Ávila, & Campos, 2000; Pinheiro et al., 2015). According to Cardoso (2005), some markets present a small number of companies, and a monopoly operates specific services. The author emphasizes that consumers do not have access to complete information, and there is, therefore, an important information asymmetry regarding the economic and financial situation. In addition, Cardoso (2005) highlights the role of the state to minimize market failures.

Based on analyses of the different market structures, Campos and Camacho (2014) identified the existence of inefficiencies that generate a social cost, one which requires public policies to promote efficiency and regulation to prevent failures and to universalize products and services. Therefore, the Brazilian government created executive agencies in areas of social interest, such as sanitary control and supplementary health. According to Pinheiro et al. (2015), supplementary health is a sector of higher risks, since it is not possible to know in advance the future expenses involved in the health services, even if—

at present—the HIC shows a positive financial cycle due to the anticipated monthly fees.

The Instituto de Estudos de Saúde Suplementar (Institute for Supplementary Health Studies; IESS) details the functioning of supplementary health within a production chain (IESS, 2016). The process starts in the consumer industry and advances through distributors, health care providers, and, finally, beneficiaries of health insurance that pay for the services rendered through monthly fees. Three agencies regulate the supplementary health system in Brazil: the Agência Nacional de Vigilância Sanitária (National Agency of Sanitary Control; ANVISA) – responsible for the sanitary and economic regulation of the hospital supplies market; the ANS – which regulates the financial and service dynamics among health insurance companies, beneficiaries, and service providers; and the Sistema Brasileiro de Defesa da Concorrência (Brazilian System for Competition Defense; SBDC) – which aims to ensure competitiveness in the sector.

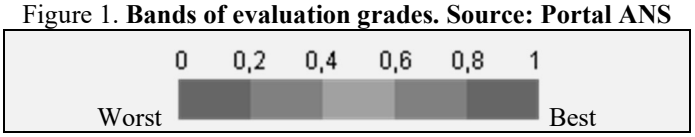
The ANS is a regulatory agency linked to the Ministry of Health, with competence to issue norms, independence in its decision-making processes, and administrative and financial autonomy. The ANS is responsible for regulating the HICs (Cardoso, 2005). According to the IESS (2016), HICs are legal entities, registered with the ANS, which operate or comercialize private health care plans. They are classified into modalities in the medical/hospital and dental segments. Cardoso (2005) points out that some HICs may be subject to more than one regulatory body and scheme. One example is the case of closed complementary pension entities, which have their main activity regulated by the national superintendence of complementary pensions. These entities have to meet the accounting standards established by superintendence along with those of the ANS.

For Salvatori and Ventura (2012), regulatory agencies perform executive, legislative, and judiciary roles, since they oversee economic activities and rights, publish regulations (such as sectorial norms) and procedures that are legally enforced, and impose sanctions on the players under their control. Among the legal powers granted to ANS in Law 9961/2000, the agency is responsible for: proposing general policies and guidelines to regulate the sector; establishing standards, routines, and procedures for recording, authorizing, maintaining, and canceling registration of the plans commercialized by HICs; issuing norms and standards for the HICs to send economic and financial information; establishing parameters and indicators of quality and regarding health care coverage for the services rendered directly by HICs or services provided by third-parties based on the commercial plans of HICs (ANS, 2017).

According to Cardoso (2005), the standardization of accounting practices allow the comparability of HICs in the market and highlights the economic and financial situation of the HICs. Accounting and financial information are resources for understanding a firm's economic and financial position, development, and trends (Assaf, 2010, p.35). Other types of standardization benefit consumers and other entities choosing between HICs.

The qualification program of service providers began in 2004 and was redesigned in 2015 to improve and adequate the services to the new rules and practices of the sector (ANS, 2017). The evaluation carried out in the program is based on the supplementary health performance index (IDSS), calculated by aggregated indicators in four dimensions: quality in health care, guarantee of access, sustainability in the market, and process and regulatory management. The IDSS bands range from 0 to 1, with the evaluation bands as shown in Figure 1.

Figure 1. **Bands of evaluation grades. Source: Portal ANS**



According to the ANS, the qualification program allows evaluating the improvement of HICs, stimulating competition and benefiting the consumer. The ANS seeks to make the dimensions in analysis as close to reality as possible in order to improve the qualification program. Therefore, the methodology to evaluate IDSS may change whenever necessary.

The dimension that seeks to evaluate the performance of HIC's economic and financial balance and its capacity to fulfill its obligations has evolved, as shown in Box 1.

Box 1. **Evolution of ANS's measure of economic and financial dimensions of HICs**

Year	Abbreviation	Indicators	Formulas
2012 – 2014	IDEF	NAI – Net asset indicator	NAI = (Adjusted net asset)/(Solvency margin)
		CLI – Current liquidity indicator	ILC = (Current asset)/(Current liability)
		IPEINR – Indicator of provision for events incurred but not reported	IPEINR = (0, if the accounting of PEINR is insufficient in the 4th quarter; 1, if PEINR is sufficient in the 4th quarter)
		ISG – Indicator of sufficient guarantee assets	ISG = (0, if there is no sufficient guarantee; 1, if there are guarantee assets)
2015 – 2017	IDSM	IOR – Indicator de own resources	IOR = (Adjusted net asset)/(Solvency margin)
		IFA – Indicator of financial availability	IFA = (Current assets)/(Current liability)
		IR – Inspection rate	IR = (1,0 x UD^{A*}+0,5 x UD^{N-A**}+0,25 x EVR^{A**}+0,25 x $EVR^{N-A****}$)/(2xAverage_Beneneficiary) x 10.000
		RR – Rate of resolution of preliminary intermediation notification	RR = (Total demand of preliminary intermediation notification (PIN), classified as: RVE, Inactive, Preliminary notification)/(Total of social classified PIN demands) x 100

Source: ANS Website. * Total of the HIC's unresolved demands of preliminary intermediation notificiation (PIN) related to services in the period; ** Total of the HIC's unresolved demands of PIN non related to services in the period; *** Total of the HIC's demands of PIN related to services classified as Effective Voluntary Reparation (EVR); **** Total of the HIC's demands of PIN non related to services classified as EVR;

In the context of the qualification program, in particular with the indicator of sustainability, there is a risk that HICs use discretionary accounting choices (on recognition and measurement), operational decisions, and/or the selection of criteria for presentation of financial statements (disclosure) within the limits of accounting standards, to modify the earnings reported for the purpose of influencing the perceptions of ANS about the underlying economic facts.

Earnings management occurs when managers use discretionary criteria to manipulate financial statements, which can mislead some users about the effect of the firm's economic performance (Cardoso, 2005). Martinez and Cardoso (2009) understood earnings management as being choices of accounting practices and decision-making to prepare and disclose accounting numbers different from those that would be prepared and disclosed without adopting such practices.

For Healy and Wahlen (1999, p. 368) "earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic

performance of the company or to influence contractual outcomes that depend on reported accounting numbers."

In the U.S., Dong (2016) collected hospital financial data from all U.S. hospitals that requested reimbursement from the federal government for treating Medicare patients, and regressed discretionary accruals on hospital size, profitability, asset liquidity, operating efficiency, labor cost, and ownership. The author provided direct evidence of the use of discretionary accruals to manage financial earnings among U.S. hospitals in this very special public and quasi-public service sector.

Academic research on earnings management in Brazil has used methods based on statistical models, such as discretionary accruals detection models, especially the Jones and Modified Jones model, which according to Dechow, Sloan, and Sweeney (1995) are more successful in explaining the variation accruals. Brazilian research has also adopted management decision-making models for operational decisions, income distribution, specific accruals, income smoothing, and accruals of abnormal working capital.

Although regulation is generally perceived as a mechanism that limits opportunistic behaviour, in some particular situations, it may have the opposite effect. Regulations generally aim at enhancing management incentives to improve performance; such incentives may create a pressure to manage earnings (El-Diri, 2018). Firms may manage earnings in different ways under the pressure of regulation. Regulatory investigations or new regulatory projects drive firms to manage discretionary accruals downwards in order to demotivate regulators from issuing strict norms.

In this sense, the managers of the HICs may have the incentive to not present indications of abnormality, mainly to avoid monitoring by the ANS and because it is the qualification program that demonstrates the overall performance of HICs. As the latter, it can be a tool that users can use to subsidize hiring decisions or exchange plans and seek to get better ranked in the IDSS. In this way, this research examines the following hypothesis: **H1 – HICs managers use earnings management to avoid reporting a low performance indicator of sustainability in the market.**

3 METHODOLOGY

The methods used were hypothetical-deductive and quantitative, using secondary and longitudinal data. The research was empirical, with a descriptive objective, having as the field of studies the HICs. The population consists of all HICs with active enrollment in the ANS, and a probabilistic sample was selected in the period from 2012 to 2018.

The field of study covers HICs that in 2017, according to the ANS, had a financial movement of approximately 179 billion reals and served about 24% of the Brazilian population, with private health care and dental (exclusive) plans. Since HICs send accounting and financial information quarterly to the ANS, the database was constructed using information from the fourth quarters of each year.

The measurement adopted to detect earnings management was the Jones (Jones, 1991), Modified Jones model (Dechow et al., 1995), to estimate discretionary accruals, and the one described by Roychowdhury (2006), for abnormal behaviors of operational decisions. According to Dechow et al. (1995), standard errors tend to be lower for the Jones and Modified Jone models, in which they are more efficient in the time series, and, according to Magro, Lavarda and Klann (2019), the modified Jones Model has been the most widely used in both international and national literature, even though they recognized that other recent models may offer diferente perspectives.

The control variables were calculated and the performance indicators IDSM (2015 to 2018) and the IDEF (2012 to 2014) were compiled from all HICs with valid registration in the ANS. The data of the IDSM for 2019 were not updated because the ANS had not

made them available at the time of the research. We excluded HICs that did not send lagged accounting information (t-1) to the ANS and those that present a negative net assets (NA). The full set of data adjustments are seen in Table 1.

Table 1. **Data adjustments.**

Year	Observations	Exclusions		Adjusted	Exclusions	Adjusted
		Adjustment (t-1)	NA<0	Observations for Earning Management	Without IDSM/IDEF	Final Sample for IDSM/IDEF Analysis
2012	1,283	31	113	1,139	162	977
2013	1,263	41	111	1,111	158	953
2014	1,240	42	96	1,102	177	925
2015	1,203	31	83	1,089	209	880
2016	1,173	32	90	1,051	194	857
2017	1,129	30	64	1,035	201	834
2018	1,112	44	46	1,022	215	807
Total	**8,403**	**251**	**603**	**7,549**	**1,316**	**6,233**

3.1 Model to detect earnings management

According to Martinez (2013), most Brazilian empirical studies use accrual-based detection models. As noted above, the model used here to detect earnings management through discretionary accruals (DA) was the Jones and Modified Jones model and, for the abnormal behaviors of operational decisions, the one described by Roychowdhury, due to its popularity and wide use in academic research (Almeida, 2006; Martinez, 2013; El-Diri, 2018). The Fama and Macbeth (1973) method was used in the regressions of the models to detect earnings management.

The ANS does not make available the Cash Flow Statements (CFSs) of the HICs, so total accruals (TA_{it}) were estimated based on their balance sheets, using Equation (1) (Dechow et al., 1995; Martinez, 2013; Heese, 2018):

$$TA_{it}= [(\Delta CA_{it}-\Delta Cash_{it})-(\Delta CL_{it}-\Delta STD_{it})-Dep_{it}]/A_{it-1} \quad \text{Equation (1)}$$

where: ΔCA_{it} = change in the current assets of firm I at the end of period t-1 to the end of period t; $\Delta cash_{it}$ = change in the cash availability of firm I at the end of period t-1 to the end of period t; ΔCL_{it} = change in the current liabilities of firm I at the end of period t-1 to the end of period t; ΔSTD_{it} = change in short-term debt of firm I at the end of period t-1 to the end of period t; Depit = amount of depreciation and amortization expense of firm I during period t; and, A_{it-1} = total assets of firm I in year t-1.

The coefficients α_i, β_{1i}, and β_{2i}, of Equation (2) are estimated by the regression of Equation (5), and the discretionary accruals of the Jones model are predicted by ε_{it}

$$TA_{it}/A_{it-1}= \alpha_i[1/A_{it-1}]+\beta_{1i}[\Delta REV_{it}]+\beta_{2i}[PPE_{it}]+ \varepsilon_{it} \quad \text{Equation (2)}$$

To calculate non-discretionary accruals, from the Modified Jones model, we use coefficients and the variables of Equation (3):

$$NDA_{it}= \alpha_i[1/A_{it-1}]+\beta_{1i}[\Delta REV_{it}-\Delta REC_{it}]+\beta_{2i}[PPE_{it}] \quad \text{Equation (3)}$$

here: NDA_{it} = non-discretionary accruals of firm I in year t; A_{it-1}= total assets of firm I in year t-1; ΔREV_{it} = change of the gross revenue of firm I between years t and t-1, weighted by the total assets at the end of period t-1; ΔREC_{it} = change in accounts receivable from firm I between years t and t-1, weighted by total assets at the end of period t-1; and, PPE_{it} = Property, plant and equipment of firm I in year t-1, weighted by total assets at the end of period t-1.

For Dechow et al. (1995), discretionary accruals (DA) are estimated by subtracting nondiscretionary accruals (NDA) from total accruals (TA), described in Equation (4). Paulo (2007) points out that, with the inclusion of the variable ΔREC_{it} in the Modified Jones model, discretionary accruals are no longer found by the residuals of Equation (2).

$$DA=TA-NDA \quad \text{Equation (4)}$$

The real earnings management (REM) was calculated using the models proposed by Roychowdhury (2006), according to Equation (5) and (6). According to Paulo and Mota (2019), the model measures the normal activity levels of a company to subsequently predict the abnormal behaviors by the residues, in which, the result is obtained by the sum of the behaviors, described in Equation (7). The estimation of FCSs behavior was not used, as the net effect is ambiguous because it is affected in different directions (Zang, 2012; Paulo & Mota, 2019).

$$Prod_t/A_{t-1}= \alpha_0 + \alpha_1[1/A_{t-1}]+\beta_1[REV_t/A_{t-1}]+\beta_2[\Delta REV_t/A_{t-1}]+\beta_3[\Delta REV_{t-1}/A_{t-1}]+ \varepsilon_{it} \quad \text{Equation (5)}$$

$$Desp_t/A_{t-1}= \alpha_0 + \alpha_1[1/A_{t-1}]+\beta_1[REV/A_{t-1}]+ \varepsilon_{it} \quad \text{Equation (6)}$$

$$REM_{it}= Ab\_Prod_{it} + (-1 * Ab\_Desp_{it}) \quad \text{Equation (7)}$$

here: $Prod_t$ = production costs of firm I in year t, weighted by the total assets at the end of period t-1; $Desp_t$ = operating expenses of firm I in year t, weighted by the total assets at the end of period t-1; REV_t = net revenues of firm I in year t, weighted by the total assets at the end of period t-1; ΔREV_t = change in net revenues of firm I in year t for period t-1, weighted by the total assets at the end of period t-1; ΔREV_{t-1} = change in net revenues of firm I in year t-1 for period t-2, weighted by the total assets at the end of period t-1; Ab_Prod_{it} = abnormal behavior of production costs of firm I in year t; and, Ab_Desp_{it} = abnormal behavior of operating expenses of firm I in year t;

3.2 Proposed model

The measurement expressed in Equation (7), (8) and (9) verifies whether the performance (IDSM and IDEF) of HIC are related to the DA:

$$HIC\ performance_{it}=\alpha+\beta_1 DA_{it}+\beta_2 d\_IDSM_{it}+ControlsΓ_{it}+\varepsilon_{it} \quad \text{Equation (7)}$$

$$HIC\ performance_{it}=\alpha+\beta_1 DACC_{it}+\beta_2 d\_IDSM_{it}+ControlsΓ_{it}+\varepsilon_{it} \quad \text{Equation (8)}$$

$$HIC\ performance_{it}=\alpha+\beta_1 REM_{it} + \beta_2 d\_IDSM_{it}+ControlsΓ_{it}+\varepsilon_{it} \quad \text{Equation (9)}$$

where: $HIC\ performance_{it}$ = Indicators of the Market Sustainability Dimension (IDSM) and the Economic and Financial Dimension (IDEF); DA_{it} = discretionary accruals Jones model of firm I in year t; $DACC_{it}$ = discretionary accruals Modified Jones model of firm I in year t; REM_{it} = abnormal behaviors of operational decisions of firm I in year t; and, Control variables include: $SIZE_{it}$ = natural logarithm of Total Asset of firm I in year t; LEV_{it} = Degree of financial leverage of firm I in year t; ROA_{it} = Return on Asset of firm I in year t; $INDEBT_{it}$ = Indebtedness of firm I in year t; and, ε_i = regression residue for firm I in year t.

The control variables are firm's size, degree of total leverage, asset return, and indebtedness, which were calculated according to Box 2.

Box 2. **Control variables.**

Variable	Abbreviation	Formulas	References
Firm size	SIZE	Natural log of total assets	Dechow and Dichev (2002)

Financial leverage	LEV	Total liabilities/Total assets	Barnett and Salomon (2012)
Returno of assets	ROA	Edit/Total assets	Kothari, Leone and Wasley (2005); Joia and Nakao (2014)
Indebtedness	INDEBT	Onerous liability/Total assets	Watts and Zimmerman (1990); Joia and Nakao (2014)

Firm size (SIZE), observed by the natural log of total assets, was used, since the performance may be explained in part by the size of the HICs. Dechow and Dichev (2002) also use the logarithm of total assets as a measure of firm size. Barnett and Salomon (2012) used financial leverage (LEV) as a control proxy in the performance analysis, as the debt increases the volatility of future earnings. The return on assets (ROA) was considered as a measure of performance, indicating that the assets are the company's future economic benefits (Joia and Nakao, 2014). Kothari et al. (2005) found that tests that use return of assets is a measure adequate for performance are well-specified and present substantial power. The variable indebtedness (INDEBT) was adopted based on Watts and Zimmerman's (1990) understanding that managers of companies with higher indebtedness tend to use methods to show increasing results and study by Barnett and Salomon (2012), point out that debt affects the behavior of managers.

4 ANALYSIS OF THE RESULTS

This section presents the data description and analysis of the Jones, Modified Jones model, the one described by Roychowdhury, and the regression model proposed.

4.1 Jones, Modified Jones and Roychowdhury model

The Panel A, variables for accruals earnings management calcularion, and the Panel B, variables for real earnings management calcularion, from Table 3 presents the descriptive statistics of the variables used in our Jones, Modified Jones and Roychowdhury model. The total accruals (TA_{it}) presented an average -0.0291, with a standard deviation of -0.0276. The variables $Prod_{it}$ and $Desp_{it}$ had averages of 1.4796 and 1.1255, respectively, indicating, on average, that both act in favor of a positive REM signal (Paulo & Mota, 2019).

Table 3. **Descriptive statistics**

Variables	Mean	Median	Standard deviation	Minimum	Maximum
Panel A: Variables for accruals earnings management calculation					
TA_{it}	-0.0291	-0.0276	1.3473	-26.8898	97.6802
$1/A_{it-1}$	2.32E-06	1.19E-07	7.00E-06	9.39E-10	5.13E-05
ΔREV_{it}	0.6785	0.1839	6.9852	-9.1695	408.2076
ΔREC_{it}	0.0590	0.0006	1.3224	-0.9531	98.4902
PPE_{it}	0.1928	0.1148	0.2068	0.0000	0.9998
Panel B: Variables for real earnings management calculation					
Ab_Prod_{it}	1.4796	1.1817	5.3153	0.0000	352.1589
Ab_Desp_{it}	1.1255	0.7083	2.0622	-0.0016	62.4721
$1/A_{it-1}$	2.32E-06	1.19E-07	7.00E-06	9.39E-10	5.13E-05
REV_{it}/A_{it-1}	2.7188	2.1323	7.0366	-0.0060	408.2076
REV_{it-1}/A_{it-2}	2.0403	1.8888	1.3737	-0.0027	20.5024

$\Delta REV_{it}/A_{it-1}$	0.6785	0.1839	6.9852	-9.1695	408.2076
$\Delta REV_{it-1}/A_{it-1}$	0.2293	0.1822	0.9121	-20.3082	13.7827

Note. The presented variables do not follow the normal distribution in the Jarque-Bera and Kolmogorov-Smirnov tests.

The variables shown in Table 3 did not follow a normal distribution, at the significance level 0.01 using the Jarque–Bera and Kolmogorov–Smirnov tests. Hoffmann (2016, p. 47) states that, based on the central limit theorem, a large number of independent random variables have approximately normal distributions when none of them are dominant, so the estimates of the Ordinary Least Squares (OLS) method satisfy the asymptotic normality.

Paulo (2007) states that estimates of the coefficients for calculating discretionary accruals through time series require an expanded period to gather data. Therefore, the regression to estimate the coefficients of the Modified Jones model was performed using the crosssectional approach, using the Fama and Macbeth method (1973).

4.2 Results of the proposed model in terms of performance

Table 4 presents the results of the descriptive statistics of the variables of the regression model used to capture the effect of results management in HIC performance. The variables did not follow a normal distribution at the significance level of 0.01, in the Jarque–Bera and Kolmogorov–Smirnov tests.

Table 4. **Descriptive statistics – Regression model proposed.**

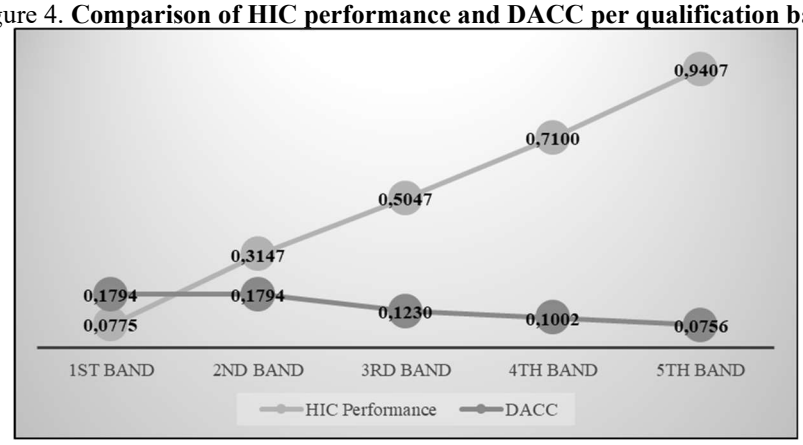
Variables	Mean	Median	Standard deviation	Minimum	Maximum
$IDSM_{it}$	0.8323	0.8907	0.1887	0.0000	1.0000
$IDEF_{it}$	0.7172	0.8296	0.2895	0.0000	1.0000
DA_{it}	-0.0291	-0.0574	0.2572	-0.3399	14.6767
$DACC_{it}$	-0.0587	-0.0348	1.3570	-27.0438	95.2814
REM_{it}	0.3412	0.3079	4.6350	-8.5985	295.4753
LEV_{it}	0.5244	0.5671	0.2971	-5.1109	0.9995
ROA_{it}	0.0273	0.0193	0.4760	-10.8802	10.0939
$SIZE_{it}$	15.7553	16.1261	2.3881	9.8784	20.7863
$INDEB_{it}$	0.0453	0.0000	0.0998	0.0000	1.3226

Note. [1]The presented variables do not follow the normal distribution in the Jarque-Bera and Kolmogorov-Smirnov tests. [2] The HIC performance are presented by the indices of IDSM (2015/2018) and IDEF (2012 to 2014). [3]The IDSM data from the 2019 base year were not included because the ANS did not make available until the date.

Based on the graphical representation in Figure 4, it is observed that, on average, the smaller the band of the HIC performance (worst indicator), the greater the discretionary accruals (DA), in which they show that discretionary accruals are managed for avoid reporting worst indicator (Greenwood et al., 2017). For the calculation of the mean of the DA values, the data are in module.

We conducted the Student's t-test, parametric, and non-parametric Kruskal–Wallis test, to verify if the means of the discretionary accruals by band were significantly different. The parametric test was performed with the 1st and 5th bands, and the non-parametric test with all the ranges. However, both tests showed evidence of significant mean differences for the discretionary accruals.

Figure 4. **Comparison of HIC performance and DACC per qualification band**



The results show the most remarkable presence of earnings management in the 1st band (worst indicator), which is reduced gradually in the 2nd, 3rd, 4th and 5th bands in sequence, i.e., with low presence of earnings management in the 5th band (best indicator). These facts are consistent with the hypothesis that HICs with the worst performance indicators tend to use earnings management more aggressively and frequently.

Table 5 presents the results of the proposed regression model used to capture the effect of earnings management in HIC performance.

Table 5. **Coefficients – Regression model proposed for HIC performance.**

Variables	**Jones model**	**Modified Jones model**	**Roychowdhury model[2]**
DA_{it}	-0.0615***		
	(0.0203)		
$DACC_{it}$		0.0126*	
		(0.0072)	
REM_{it}			-0.0037***
			(0.0008)
d_IDSM_{it}	0.0447***	0.0452***	0.0425***
	(0.0085)	(0.0085)	(0.0086)
LEV_{it}	-0.2283***	-0.2266***	-0.2308***
	(0.0340)	(0.0344)	(0.0350)
ROA_{it}	0.0570**	0.0552**	0.0545**
	(0.0224)	(0.0223)	(0.0226)
$SIZE_{it}$	0.0877***	0.0873***	0.0925***
	(0.0140)	(0.0140)	(0.0142)
$INDEBT_{it}$	-0.3188***	-0.3200***	-0.3212***
	(0.0667)	(0.0669)	(0.0677)
Constant	-0.5220**	-0.5136**	-0.5933***
	(0.2249)	(0.2244)	(0.2292)
Observations	6233	6233	6170
R^2	0.123	0.122	0.124
AIC	-4987.7003	-4977.0206	-4969.7878

Note. [1]*p<0,1, **p<0,05, ***p<0,01. [2]Proposed by Paulo e Mota (2019).

The parameters generated by the regression of Equation (7), (8) and (9) are shown in Table 5. It can be observed that in both models statistical significance was found at

0.01, in the variables DA_{it}, REM_{it}, $IDSM_{it}$, LEV_{it}, $SIZE_{it}$ and $INDEBT_{it}$, at 0.05 in the variable ROA_{it} and at 0.10 in the variable $DACC_{it}$.

The Chow, Breusch–Pagan, and Hausman tests were used to define the model, and the fixed effect for the regression model of Equation (7), (8) and (9) is, therefore, more appropriate. The Wooldridge test detected the existence of serial autocorrelation, and the Wald test the existence of heteroscedasticity. The variables of the proposed regression model did not follow a normal distribution, at a significance level of 0.01, as tested using the Jarque–Bera and Kolmogorov–Smirnov tests.

In order to correct for serial autocorrelation and heteroscedasticity, the robust estimation method was used in the adjusted fixed effect model, as presented in Table 6. As for the normality assumptions, they were relaxed in the inferences of the model parameters, since the coefficients are asymptotically consistent and not biased, even in the existence of serial autocorrelation and heteroscedasticity (Formigoni, Antunes, & Paulo, 2009; Ferreira et al., 2012).

The results indicate, with strong statistical support, that when we increase the discretionary accruals there is an increase of the HIC performance. These findings corroborate the hypothesis that earnings management practices are used to increase these indicators and thus improve the perceptions of regulators and users of the economic and financial vitality of the HICs. A positive and significative coefficient provide evidence the increase in earnings management is followed by an increase in the HIC performance. So, earnings management has been used to have higher indicators, reducing the possibility of more rigorous supervision by ANS.

To ensure greater robustness to the conclusions, Table 6 presents the results of the proposed regression model including the variable DA_{it} in module. By doing so, we hoped to verify a different scenario of results management, where it can be income-increasing or incomedecreasing. A higher DA_{it} in module represents a more intense practice of earnings management. A lower DA_{it} in module near zero, evidences a less pronounced practice of earnings management.

Table 6**. Coefficients Regression model proposed for HIC performance, adjusted fixed effect per DA Module**

Variables	Jones model	Modified Jones model	Roychowdhury model[2]
DA_{it}	-0.0599***		
	(0.0211)		
$DACC_{it}$		-0.0156**	
		(0.0077)	
REM_{it}			-0.0035***
			(0.0007)
*d*_$IDSM_{it}$	0.0448***	0.0447***	0.0429***
	(0.0085)	(0.0086)	(0.0086)
LEV_{it}	-0.2291***	-0.2277***	-0.2301***
	(0.0341)	(0.0342)	(0.0352)
ROA_{it}	0.0560**	0.0552**	0.0532**
	(0.0223)	(0.0223)	(0.0224)
$SIZE_{it}$	0.0880***	0.0881***	0.0915***
	(0.0140)	(0.0140)	(0.0142)
$INDEBT_{it}$	-0.3191***	-0.3173***	-0.3209***

	(0.0667)	(0.0667)	(0.0679)
Constant	-0.5201**	-0.5246**	-0.5768**
	(0.2248)	(0.2249)	(0.2286)
Observations	6233	6233	6170
R^2	0.123	0.122	0.124
AIC	-4985.8862	-4979.5060	-4968.2537

Note. [1]*p<0,1, **p<0,05, ***p<0,01. [2]Proposed by Paulo e Mota (2019).

The coefficient estimated in the regression, in modules, of the variables DA_{it}, $DACC_{it}$ e REM_{it}, was negative and significative. It corroborates that the more intense practice of earning management is associated with lower HIC performance. In other words, earnings management is more pronounced in HICs that have the lowest HIC performance scores. With these statistical findings, there is sufficient evidence that HICs' managers engage in earnings management through discretionary accruals and operational decisions to avoid reporting low indicators of sustainability in the market, with a more pronounced effect in companies that present a lower HIC performance.

5 FINAL CONSIDERATIONS

This research aimed to empirically show whether there is statistical evidence that HICs use earnings management to avoid reporting a low performance the indicator of sustainability in the market (IDSM). The proposed regression model sought to capture whether the HIC performance was significantly impacted by the use of earnings management through discretionary accruals and operational decisions. To ensure these conclusions, we used control variables referenced in previous studies, as well as static models to gain robustness in our results.

Earnings management has negative consequences for financial reporting, by masking the consequences of management decisions. Earnings management involves manipulating accounting toward a previously established target. Such target may be motivated by a need to maintain the levels of certain economic and financial indicators due to the pressure to maintain a trend of increasing results, financial vitality, and to achieve goals set by regulators.

The data analyzed suggest that Brazilian HICs use earnings management through discretionary accruals and operational decisions, to avoid reporting a low performance. The performance measured by the indicator of sustainability in the market is part of the calculation of the Índice de Desempenho de Saúde Suplementar (Supplementary Health Performance Index) (IDSS), an evaluation measurement adopted in the HICs qualification program promoted by the Agência Nacional de Saúde Suplementar (National Agency of Supplementary Health) (ANS).

ANS has established a recovery plan for HICs, with very low IDSM & IDEF that may create serious administrative abnormalities, such as practices that lead to denying or interrupting services, in collective, recurrent, and non–point-in-time ways, causing serious assistive, actuarial, structural, or operational failures that indicate a risk to quality and continuity of health care of the beneficiaries, according to RN 256/2011, of ANS. According to the ANS, the Risco Assistencial (service risk) consists of the identification of the administrative and service abnormalities (ANS Technical Note 55/2016).

In the case of ANS's regulation, the use of performance indicators (IDEF and IDSM) is not a good mechanism that limits opportunistic behaviour, but just the opposite, as in case of HICs with low indicators, there is an incentive to manipulate earnings. Regulations in their quest to monitor performance create management incentives to

manage earnings (El-Diri, 2018). Firms may manage earnings in different ways under the pressure of regulation, such as misrepresenting income increasing or decreasing.

The correct monitoring of the economic and financial dimension of HICs is crucial for the maintenance of contracts signed in accordance with the current legislation, in order to evaluate their economic and financial situation. The possibility of HICs using earnings management introduces additional risk to the system, which must be diagnosed and treated to avoid negative repercussions for potential users.

As stated by Macadar, Freitas, and Moreira (2015), Brazil has followed the world trends, as an evolving democracy, allowing the expansion of mechanisms of social control and the exercise of citizenship through transparency. Along the same lines, Platt, Cruz, Ensslin, and Ensslin (2007) define three elements to ensure this transparency: i) publicity and the wide dissemination of information to the population, ii) comprehensibility, the visual presentation of information, and iii) usefulness for decision-making processes, i.e., the relevance of information. In this sense, transparent and reliable information on the financial and economic situation of the HICs is crucial for the system's efficient operation.

One recommendation for future research is a more detailed analysis of the service risk by the ANS, investigating other evaluation dimensions for HICs, as well as how these correlate to the companies' economic and financial aspects. Are HICs using earnings management so as not to present serious administrative abnormalities and mask serious problems of operation and sustainability of the plans that are offered in the market?

A possible limitation of the research is the use of the Modified Jones Model, even though it is very popular in the literature. This model can create serious problems of measurement errors in the computation of discretionary accruals, particularly because it does not seem to be the ideal for most companies with the profile of an HICs.

In sum, healthcare is a serious issue, and there is no space for pretending, falsehoods, and commercial interests. In this sense, it is crucial that regulators improve mechanisms that monitor the financial health of HICs to combat the use of earnings management to artificially increase indicators and hide risks from regulators and users. Proactive regulatory and monitoring instruments are a priority to preserve the interests of millions of lives engaged in plans offered by these HICs, that rely solely on them for support in their most debilitating moments.

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