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VALUE CREATION IN PRIVATE HEALTHCARE PROVIDERS: AN ANALYSIS CONSIDERING THE REGULATIONS OF SUPPLEMENTARY HEALTH AGENCY (ANS)

CRIAÇÃO DE VALOR EM OPERADORAS DE PLANOS DE SAÚDE: UMA ANÁLISE CONSIDERANDO A REGULAÇÃO DA AGÊNCIA DE SAÚDE SUPLEMENTAR (ANS)

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Abstract: This paper presents the results of a study aimed at analyzing the variables that impacted value creation in Brazilian private healthcare providers (OPS) under the Supplementary Health Agency (ANS) regulation in the period comprising 2010 and 2016. The employed sample consisted of healthcare OPS whose 2010-2016 data are publicly available on the ANS website. Data analysis followed these techniques: content analysis, descriptive statistics, and data panel regression. Regarding investment decisions focused on value creation, it has been found that OPS often create more value than destroy it (except for organizations in the Philanthropy modality). We can conclude that the ANS rules affected the different provider modalities in various ways, with respect to value creation (linked to investment decisions). Almost all regulatory variables were significant in different contexts and varied depending on the modality of OPS. This demonstrates the relevance of considering the specificities of each of them in the analyzes. The presented discussion can support decisions for regulators and organizations' decision-makers due to verification that the regulation of ANS over the OPS creating/destroying value in Brazilian providers. One can say that regulation can develops an oligopoly in this sector and/or creating opportunities for creating value for the organizations.

Keywords: Private healthcare providers (OPS). Supplementary Health Agency (ANS). Value creation. Regulation.

Resumo: Este artigo apresenta os resultados de um estudo que teve como objetivo analisar as variáveis que influenciaram a criação de valor nas operadoras de planos de saúde (OPS) brasileiras, sob perspectiva da regulação da Agência de Saúde Suplementar (ANS), no período de 2010 a 2016. A amostra empregada foi composta por OPS médico-hospitalares cujos dados estavam disponíveis publicamente no site da ANS. A análise dos dados empregou as seguintes técnicas: análise de conteúdo, estatística descritiva e análise de regressão com dados em painel. Com relação às decisões de investimento, com foco na criação de valor, constatou-se que as OPS usualmente criaram mais valor do que destruíram (exceto no caso das organizações da modalidade Filantropia). Pode-se concluir que as regras da ANS afetaram as diferentes modalidades de operadoras de várias formas, no que diz respeito à criação de valor. Quase todas as variáveis regulatórias foram significantes em diferentes contextos e variaram dependendo da modalidade de OPS. Isso demonstra a relevância de se considerar as especificidades de cada uma delas nas análises. A discussão apresentada pode subsidiar decisões de reguladores e gestores das organizações, devido à constatação de que a regulação da ANS sobre as OPS influencia na criação ou destruição de valor nas mesmas. Pode-se dizer que a regulação pode desenvolver um oligopólio neste setor e/ou criar oportunidades de criação de valor para as organizações.

Palavras-chave: Provedores de saúde privados (OPS). Agência de Saúde Suplementar (ANS). Criação de valor. Regulação.

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1 Introduction

Largania, Kaviani and Abdollahpour (2012) have pointed out that, in today's competitive environment, value creation has become one a key business objective. Along these lines, Vogel (2011) states that the principle of value maximization institutes that management should focus primarily on the interests of owners. In turn, Damodaran (2004) and Ross, Westerfield, Jaffe and Lamb (2015) emphasize that investment decisions are paramount in creating value for companies.

In this context, the concept of economic value aggregate (EVA) emerged, which is a measure of value creation related to the organization's operational performance, combining concepts of accounting and finance (Vogel, 2011; Largania *et al*. 2012). It is important to point out, however, that several authors highlight that not only should companies focus on value creation in their investment decisions, but also other organizations such as cooperatives and even philanthropic ones, so as to meet the expectations of their stakeholders (Santos, 2002; Assaf Neto, Araújo & Fregonesi, 2006).

Despite the importance given to investment decisions and their impact on value creation of organizations, there is a lack of studies addressing this phenomenon regarding Brazilian private healthcare providers (OPS). The Supplementary Health Agency (ANS, 2017) and Bragança (2017) affirm that those organizations are crucial for the Brazilian health system, serving tens of millions of people. It should be noted that providers are heavily regulated by the ANS, and this regulation significantly impacts financial decisions, including the investments of such organizations (Pinheiro, Peleias, Silva & Martins 2015).

In view of the above, this study has aimed to answer the following research question: Has the ANS regulation impacted value creation in different OPS modalities from 2010 to 2016? The general research objective was to analyze the variables that impacted value creation in OPS under the perspective of the ANS regulation in the period comprising 2010 and 2016. Therefore, the following specific objectives were proposed: (a) to identify the regulatory variables of ANS that can potentially affect value creation in OPS; (b) to analyze value creation (or destruction) of different modalities of providers in the period studied; and (c) to estimate a model for each type of OPS that shows the relationship between the value creation of providers and the selected variables.

Research that analyzes aspects concerning the investment decisions and value creation in OPS is relevant in several ways. Data from the ANS (2018a) indicate that there are more than 47 million beneficiaries who use the supplementary health system, that is, almost 23% of

the Brazilian population. However, many providers face management problems (Xavier, 2017). Moreover, in addition to the issues faced by health organizations in Brazil today, Varella and Ceschin (2014) point out that the situation tends to worsen if these organizations and regulators do not change their *modus operandi*. Finally, Bragança (2017) shows that the ANS regulation on providers has continuously reduced the number of these organizations in the Brazilian market, creating an environment favorable to the formation of a possible oligopoly.

2 Theoretical frameworks

2.1 Investment decisions and value creation

According to Damodaran (2004), investment decisions are the most important among financial decisions, reflecting a commitment to the continuity of the organization. In general, several techniques are used for the analysis of investment decisions, the most relevant being those that consider discounted cash flows and the opportunity cost of investments (Ross *et al*., 2015). Among these techniques, net present value (NPV) is commonly used and, according to Copeland, Weston and Shastri (2005), is a basis for maximizing the value of owners. According to Vieira (2015), an investment with positive NPV would represent value creation for the organization, while an investment with negative NPV would destroy value. It should be noted that when departing from the value analysis, one can direct the management of an organization. Largania *et al*. (2012) point out that, from the perspective of value creation, traditional accounting metrics would not be so aligned with value for owners.

In this context, the concept of economic value added (EVA) emerged, which is a measure of value creation related to the organization's operational performance (Largania *et al*., 2012; Correa, Basso & Nakamura, 2013). According to Vogel (2011), the EVA attempts to determine the company's actual economic profit by combining accounting and financial concepts to measure whether operations have increased owner wealth over a given period.

It should be noted that although value creation is typically used in the case of traditional firms, this concept can also be applied to other types of organizations. Santos (2002), for example, point out that in cooperative organizations the investors' expectation (in this case, cooperatives) corresponds to the service provision maximization. However, as the author emphasizes, it is understood that this maximization will be provided based on the cooperative performance in the market, through the generation of operating results that can promote the remuneration of the invested capital in the organization. Even in nonprofits such

as philanthropic organizations, value creation is considered paramount. Jergers (2011) states that non-profit and for-profit entities differ in the distribution of results. In this sense, Assaf Neto *et al*. (2006) argue that the ultimate goal of philanthropic organizations should be to maximize the benefits generated with each monetary unit collected. Thus, profit would point to the efficient use of resources. In this case, the authors state that one way of calculating the capital cost of this type of organization so as to evaluate value creation is to use the cost of third-party capital since if there are no donations, the organization will use this capital to sustain its operations.

The EVA can be calculated according to Equation 1, following the exposition by Damodaran (2012). According to these authors, an organization that creates value for owners – and therefore raises its aggregate market value – must have a return on net operating assets (RONA) above the weighted average cost of capital (WACC).

$$EVA = (RONA - WACC) \times NOA \quad (1)$$

Keys: RONA – Return on Net Operating Assets; WACC – Weighted Average Cost of Capital; and NOA – Net Operating Assets.

It is verified that for the adequate calculation of the EVA, it is important to measure the WACC. According to Largania *et al*. (2012), WACC is the weighted average cost of equity and the cost of debt after taxes. Ross *et al*. (2015) present the formula highlighted in Equation 2 for the WACC calculation.

$$WACC = {}^{E}/_{V} \times C_E + {}^{D}/_{V} \times C_T \times (1 - T_P) \quad (2)$$

Keys: E – Shareholders' Equity Value; D – Debt Value; V – Company Value (Liabilities added to Shareholders' Equity); C_E – Cost of Equity; C_T – Cost of Third-party Capital; and T_P – Tax Rate on Profit.

The cost with third-party capital can be understood as the return that creditors demand on the organization's debt, that is, the interest rate that the organization must pay on new financing (Ross *et al*., 2015). In the case of cost of equity, however, measuring is more difficult. Usually, the Capital Asset Pricing Model (CAPM) is used. Copeland *et al*. (2005) point out that the CAPM has proved to be a useful conceptual framework for calculating the cost of equity, even when there is a relaxation of some of its assumptions. These authors point out that the cost of equity can be obtained by the CAPM model, calculated according to Equation 3.

$$E(R_j) = R_f + \left[E(R_m) - R_f\right] \times \beta_j + \varepsilon \quad (3)$$

Keys: $E(R_j)$ – Expected return on asset j; R_f – Return on risk-free assets; $E(R_m)$ – Expected return on the market; and β_j – Covariance between the return of the asset j and the market return, divided by the variance of the market return.

According to Assaf Neto (2012), the use of CAPM in Brazil has significant limitations and may distort the results. Thus, for the adequate use of this model in the calculation of the WACC, the author recommends the estimation based on a reference of the information demanded by the model in another financial market that does not present the limitations of the Brazilian one (usually the American). In this sense, when analyzing the EVA of Brazilian companies, Santos and Watanabe (2005), Salvi (2007) and Correa *et al*. (2013), for example, used a separate model for CAPM calculation. It is the modified model, according to Equation 4, which is indicated by Assaf Neto (2012).

$$E(R_j) = R_f + \left[E(R_m) - R_f\right] \times \beta_j + CR_p + \varepsilon \quad (4)$$

Keys: $E(R_j)$ – Expected return on asset j; R_f – Return on risk-free assets; $E(R_m)$ – Expected return on the market; β_j – Covariance between the return of the asset j and the market return, divided by the variance of the market return; CR_p – Country Risk Premium.

It is important to point out that these authors used the unleveraged beta (βu) sector to calculate the modified CAPM. This beta is highlighted by the Hamada Model, first published in Hamada (1969) and later synthesized by Rubinstein (1973 as cited in Copeland *et al*., 2005). In this case, the Hamada model, in relation to the CAPM, can be presented as in Equation 5, described by Copeland *et al*. (2005).

$$E(R_j) = R_f + \left[E(R_m) - R_f\right] \times \beta_u + \left\{R_f + \left[E(R_m) - R_f\right] \times \beta_u\right\} \times (1 - T_P) \times {}^{D}/_{S} \quad (5)$$

Keys: $E(R_j)$ – Expected return on asset j; R_f – Return on risk-free assets; $E(R_m)$ – Expected return on the market; β_u – unleveraged beta; T_P – Tax Rate on Profit; and D/S – Indicator Debt over Shareholders' Equity.

By equating the model presented in Equation 3 (considering the leveraged beta) and the one shown in Equation 5, one can deduce the value of the leveraged beta (βL) and the unleveraged beta (βu), according to equations 6 and 7, respectively.

$$\beta_L = [1 + (1 - T_P) \times {}^{D}/_{S}] \times \beta_u \quad (6)$$

Keys: β_L – Beta Leveraged; β_u – Unleveraged beta; T_P: Tax Rate on Profit; and D/S – Indicator Debt

over Shareholders' Equity.

$$\beta_u = {\beta_L}/{[(1 - T_P) \times {D}/{S}]} \quad (7)$$

Keys: β_L – Beta Leveraged; β_u – Unleveraged beta; T_P – Tax Rate on Profit; and D/S – Indicator Debt over Shareholders' Equity.

Illustration 1 presents some variables that are relevant to the determination of an organization's EVA. Such variables are commonly called "value drivers." According to Vogel (2011), value drivers can be understood as components that express influence on the value of the organization, helping managers in decision making. It can be said that the "analysis of these indicators should allow the study of the whole chain of results that add value to the company, as well as the areas responsible for the various decisions, identifying their strengths and weaknesses" (Assaf Neto, 2012, p. 166).

Several variables can be used as value drivers, such as: tax rates, organizational growth, equity spread, company size, operating margin, degree of financial leverage, working capital requirements and asset turnover (Copeland *et al.*, 2005; Santos & Watanabe, 2005; Oliveira, Martin & Nakamura, 2005; Salvi, 2007; Vogel, 2011; Largania *et al.*, 2012; Assaf Neto, 2012; Damodaran, 2012; Correa *et al.*, 2013). Damodaran (2012) points out that the value drivers are different according to the type of organization studied.

Illustration 1 - Some variables that impact the EVA of organizations

Variables	Description
Tax rates	The amounts calculated by the EVA should be considered after taxes.
Organizational Growth	Potential growth level of the organization.
Equity *Spread*	ROE subtracted from the cost of equity.
Company Size	The EVA is a monetary measure that has a direct relation with the size of the company and the values it moves.
Operating Margin	Efficiency in obtaining the organization result.
Degree of financial leverage	Relationship between liabilities and shareholders' equity.
Need for working capital (NWC)	Value of working capital to be financed by the organization.
Asset turnover	Essential component of the return obtained by the organization.

Source: Prepared by the authors based on Copeland *et al.* (2005), Santos and Watanabe (2005), Oliveira *et al.* (2005), Salvi (2007), Vogel (2011), Largania *et al.* (2012), Assaf Neto (2012), Damodaran (2012) and Correa *et al.* (2013).

2.2 The ANS regulation in OPS

According to Law No. 9.656/1998, OPS may be defined as a legal entity constituted under the modality of civil or commercial, cooperative, or self-management entity, operating the product, service or contract referred to in item I of Article 1 of the same law. It should be noted that item I of Article 1 of the aforementioned law deals with the Private Health Care Plan, defined as a continuous provision of services or coverage of care costs at a pre or post-established price, for an indefinite period, in order to guarantee, without financial limit, health care, by the faculty of access and care by professionals or services of health (Law No. 9.656, 1998).

According to Ugá *et al*. (2008), the operation of health insurance plans, although it happened more than 40 years ago in the country, only began to be regulated in 1998, through Law No. 9.656/1998, which disciplined the operation of these plans and the organizations that could be defined as providers. In this sense, ANS was created, through Law No. 9.961/2000. According to Veloso and Malik (2010), the ANS regulation led to limitations in the increase of the premiums, the standardization of service coverage and a lower level of differentiation between providers, while there was a significant expansion in the rights of users. Xavier (2017) also points out that the ANS regulation allowed to draw a profile of the sector, through accounting information and statistical data of the OPS.

OPS are classified in different ways by ANS. In accordance with the Resolution of the Board of Directors (RBD) No. 39, 2000, the OPS should be classified in many ways such as medical cooperative (MCO), self-management (SEL), group medicine (GMD), or philanthropy (PHIL) (ANS, 2000a). The definition of each of these modalities can be seen in Illustration 2.

Illustration 2 - Different types of OPS

Modality	Concept
Medical cooperative (MCO)	The category of the medical cooperative is classified as a non-profit corporation, constituted according to the provisions of Law No. 5,764 of December 16, 1971, which operate private health care plans.
Self-management (SEL)	Organizations that operate exclusively for their employees, not providing health care services to persons who are not connected to the organization.
Group medicine (GMD)	Companies or entities that operate private healthcare plans are classed as group medicine, except those classified in the modalities contained in Sections I, II, IV, and VII of this Resolution.
Philanthropy (PHIL)	Non-profit entities that operate private health care plans and have obtained the certificate of charity of social assistance issued by the competent ministry, within the validity period, as well as the declaration of federal public utility, are classified in the form of philanthropy, together with the Ministry of Justice or a statement of public interest, state or municipal, along with the organs of state and municipal governments, in the form of specific regulations in force.

Source: Adapted from ANS (2000a) and Kudlawicz and Santos (2013).

Table 1 shows the number of beneficiaries (in millions) and active OPS in the study period. Table 1 shows a decrease in the number of providers of all modalities. This phenomenon is discussed in studies, such as Bragança (2017). This author points out that this can generate problems for the beneficiaries of OPS, considering the possible formation of an oligopoly in the sector.

Table 1 - Number of beneficiaries (in millions) and of medical and hospital OPS active in the study period

Modality	SEL		MCO		PHIL		GMD	
Year	Benef.*	OPS	Benef.*	OPS	Benef.*	OPS	Benef.*	OPS
2010	5,6	240	16,4	335	1,5	93	16,1	451
2011	5,4	238	17,2	335	1,5	96	16,1	450
2012	5,5	214	17,9	326	1,5	88	16,5	384
2013	5,3	206	18,6	319	1,5	78	17,0	352
2014	5,5	202	19,5	317	1,2	76	17,0	344
2015	5,1	181	18,9	310	1,1	58	17,2	294
2016	4,9		17,8		1,0		17,4	

Note: * Beneficiaries (in millions)
Source: Data from ANS (2015; 2017).

Considering the various norms related to ANS regulation on OSPs in Brazil, a series of hypotheses were developed about their influence on the value creation of such organizations. These hypotheses are summarized in Illustration 3. It should be noted that all hypotheses were based on national and RBD and Normative Resolutions (NR) issued by ANS, except for

Hypothesis 1 - This was based on an Unconstitutionality Action (UNAC) of the Federal Supreme Court (FSC)

Hypothesis	Description	Support
1	The proportion of old contracts in their portfolios has a significant relationship with the value creation of the different OPS modalities.	UNAC No. 1,931 / 2003 (STF, 2003)
	Detail: In accordance with Unconstitutionality Action No. 1.931, of 2003, health plans contracted prior to ANS regulation (known as "old plans") do not comply with the rules of this agency, with the agreement between the parties (OPS and beneficiaries) (FSC, 2003).	
2	The average age of the beneficiaries is significantly related to the value creation of the different OPS modalities.	NR No. 63/2003 (ANS, 2003)
	Detail: The establishment of prices of individual health plans, an essential decision for the OPS, must be carried out according to ANS rules. In the case of the elderly (who use the most), the ANS requires that the adjustment of health plans of the same is restricted to a fixed value in relation to the first age group (necessarily the cheapest), which that OPSs have their revenues reduced and costs leveraged (Kudlawicz, Steiner Neto & Frega, 2015).	
3	The proportion of beneficiaries of joint plans in their portfolios is significantly related to the value creation of different OPS modalities.	RBD nº 29/2000 (ANS, 2000b)
	Detail: The readjustment of individual health plans is distinct from joint ones (linked to companies and other organizations). While the former can only be readjusted with the authorization of the ANS, joint plans, with some limitations, are readjusted based on negotiations between the parties (Varella & Ceschin, 2014). Thus, it is expected that OPS will have preferences for joint plans to better guarantee its interests, as evidenced by Leal (2014).	
4	The size of OPS has a significant relationship with the value creation of different OPS modalities.	NR nº 274/2011 (ANS, 2011)
	Detail: The ANS considers the size of OPS in its standards, due to its capillarity, establishing differential treatment for small and medium-sized OPS. This agency aims to reduce the administrative expenses of smaller providers (Baldassare, 2014).	
5	The region of action of the OPS has a significant relationship with the value creation of different OPS modalities.	NR No. 209/2009 (ANS, 2009)
	Detail: According to the region of OPS, ANS requires different levels of own minimum resources (Adjusted Net Worth – ANW) and the constitution of technical provisions, in accordance with RN 209/2009 (ANS, 2009). The ANW is the minimum asset requirement that an operator must have to operate in a given area, regardless of its size, being a kind of "guarantee"; while technical provisions represent the expected risk, measured based on business	

	criteria and require real guarantees (real estate, bonds, etc.) (Pinheiro *et al*., 2015).	
6	The performance achieved by OPS in the Supplementary Health Performance Index (SHPI) has a significant relationship with the value creation of different OPS modalities.	ANS (2018a)
	Detail: It can be said that the primary instrument adopted in the evaluation program of the OPS in Brazil is the SHPI, used to measure the performance of the providers. The SHPI simultaneously assesses several aspects related to the different dimensions of the providers (operational, health, beneficiary satisfaction, etc.) (ANS, 2018b). For best results on all indexes that make up the SHPI, it is expected that a series of extra activities (and expenditures) will be carried out by the providers.	
7	The fact that OPS has passed through the fiscal management regime has a significant relationship with the value creation of different OPS modalities.	NR No. 316/2012 (ANS, 2012)
	Detail: According to Bragança (2017), the fiscal management regime requires the presence of a Fiscal Director, designated by the ANS, who requests remuneration paid by the OPS to the professional that acts in its recovery. Thus, it is expected that a provider that has already passed through the fiscal management regime will have its financial decisions more in line with ANS regulation.	
8	The fact that OPS was registered after the creation of ANS has a significant relationship with the value creation of different OPS modalities.	Law 9.961 / 2000 (Brazil, 2000)
	Detail: As presented previously, ANS was created in the year 2000, by Law 9.961. It is incumbent upon this agency to "authorize the registration and operation of private health care providers" (Law 9.961, 2000). According to Veloso and Malik (2010), there were changes in the OPS relationship after the creation of the ANS. However, previously, there were no specific limits on the providers' performance.	
9	The OPS dependency ratio has a significant relationship with the value creation of different OPS modalities.	NR No. 63/2003 (ANS, 2003)
	Detail: The dependency ratio expresses "the percentage relation between the number of children under 15 years old, added to those over 60 years of age over the beneficiaries between 15 and 59 years-old" (ANS, 2016, p.4). In this case, it is expected that the value creation of the providers will be impacted according to the proportion between those beneficiaries and the total beneficiaries.	

Source: Prepared by the authors.

3 Methodology

The research presented in this article can be classified essentially as quantitative, descriptive and causal according to the classifications of Malhotra and Birks (2007). The employed sample consisted of OPS classified as doctor-hospitals (SEL, MCO, PHIL, and GMD), which presented their financial data throughout the study period (2010 to 2016),

publicly on the ANS website. Table 2 shows the number of providers analyzed over the period. It should be noted that data were collected from 2010, due to the significant convergence of Brazilian accounting standards to international standards from that year (Ernest & Young, 2010). In the case of 2016, this was the most recent year that researchers had access during the research period.

Table 2 - Number of observations per year and by modality

OPS Modality	2010	2011	2012	2013	2014	2015	2016	Total
SEL	104	102	88	94	96	96	95	**675**
COM	304	241	290	287	289	287	283	**1.981**
PHIL	51	58	38	38	31	30	27	**273**
GMD	242	235	199	194	185	191	188	**1.434**
Total	**701**	**636**	**615**	**613**	**601**	**604**	**593**	**4.363**

Source: Prepared by the authors based on research data.

For research development, secondary data were primarily used. Financial data were collected from the financial statements published by the organizations that composed the sample, as well as operational data collected from the ANS. It is important to point out that part of the operational data was obtained from direct requests to ANS, based on Law No. 12.527/2011, known as the Law of Access to Information (LAI). In addition, data on de-leveraged betas (βu) from the health sector, the US Treasury history, US inflation, and Brazil Country Risk Premium (CRP) were obtained from the Damodaran Online database maintained by Professor Aswath Damodaran (Damodaran Online, 2016). All the data collected were tabulated and prepared by the researchers to allow the application of the appropriate analysis techniques.

It should be noted that several revisions were made to guarantee the integrity of the analyzed data, employing techniques, whenever possible, that assure the use of all observations in the achievement of the research objectives. In the analyzes in which the outliers became impeditive, these observations were excluded, considering three standard deviations more or less in relation to the mean, as developed by Baldassare (2014).

Illustration 5 presents the variables related to regulation used in the models for value creation analysis (investment decisions) of organizations. It should be noted that the BEN (beneficiaries) variable was replaced by the OPSS variable in the studies, since a review of the data collected showed that there is a high correlation coefficient positive and quite

significant (less than 1%) between the two variables, and the latter is traditionally employed, in econometric models, as a control variable.

Illustration 5 - Variables related to the regulation of the studied organizations

Variable	Abbrev.	Calculation	References
Proportion of antique contracts	ANT	OPB ÷ TOB	ANS (2018a)
Dependency reason	DEP	U15O60 ÷ A15U60	ANS (2016)
Average age of beneficiaries	AAB	$\frac{\sum Average\ age\ of\ beneficiaries}{Number\ of\ beneficiaries}$	ANS (2016)
% of beneficiaries of joint plans	COL	BCOL ÷ (BCOL + BIP)	Adapted from ANS (2016)
OPS size	OPSS	Number of beneficiaries (BEN)	Baldassare (2014) and ANS (2011)
OPS in Region 1	ARC1	If the operator operates in Region 1, 1; if not, 0.	ANS (2009)
OPS in Region 2	ARC2	If the operator operates in Region 2, 1; if not, 0.	ANS (2009)
OPS in Region 3	ARC3	If the operator operates in Region 3, 1; if not, 0.	ANS (2009)
OPS in Region 4	ARC4	If the operator operates in Region 4, 1; if not, 0.	ANS (2009)
OPS in Region 5	ARC5	If the operator operates in Region 5, 1; if not, 0.	ANS (2009)
SHPI	SHPI	From 0 to 1.	ANS (2016)
ANS Registration	ANSR	If the operator was registered before the creation of ANS, 0; If not, 1.	LAI
Fiscal direction	FD	If the operator had already passed the ANS tax management regime, 0; If not, 1.	LAI
Hospital	HOS	If the OPS has its own hospital, 1; If not, 0.	LAI

Keys: OPB – Old plan beneficiaries; TOB – Total beneficiaries; U15O60 – Beneficiaries under 15 and over 60; A15U60 – Beneficiaries over 15 and under 60; BCOL – Beneficiaries of joint plans; BIP – Beneficiaries of individual plans.
Source: Prepared by the authors.

After data collection and treatment, we applied the following analysis techniques: content analysis, descriptive statistics and regression analysis with panel data. In this paper, content analysis was used in legislation and standards related to supplementary health, in order to identify regulatory variables that could impact the economic-financial performance of the organizations studied. Descriptive statistics were used to analyze information on measures of central tendency, as well as the dispersion of the economic-financial and operational data

of the studied OPS. It should be emphasized that the calculation on value creation was performed considering the above in equations 1 to 7 of this paper.

Finally, as for regression analysis with panel data, this technique was used to develop models that explain the influence of variables related to the ANS regulation on value creation the studied OPS. In this case, the EVA was treated as the dependent variable. They were employed as independent variables, besides those related to regulation (cited in Table 6) and traditional value drivers (mentioned in Table 1). To choose the most appropriate model, the specific tests suggested by Gujarati and Porter (2011): (a) Chow test – Model *pooled ordinary least square* (POLS) versus Fixed Effects Model (FEM); (b) Breusch-Godfrey test – POLS versus Random Effect Model (REM); and (c) Hausman test – FEM versus REM. The models estimated for each modality of OPS are presented in Equation 8. In all the models, β_0 represents the intercept, ε represents the error term and the subscripts *i* and *t* specify, respectively, the observations regarding the organizations and the years of analysis.

$$VEA_{it} = \beta_0 + \beta_1 \times TRIB_{it} + \beta_2 \times OPSS_{it} + +\beta_3 \times GROW_{it} + \beta_4 \times SNE_{it} + \beta_5 \times PRO_{it} + \beta_6 \times DOL_{it} + \beta_7 \times HOS_{it} + \beta_8 \times ANT_{it} + \beta_9 \times DEP_{it} + \beta_{10} \times AAB_{it} + \beta_{11} \times COL_{it} + \beta_{12} \times ARC1_{it} + \beta_{13} \times ARC2_{it} + \beta_{14} \times ARC3_{it} + \beta_{15} \times ARC4_{it} + \beta_{16} \times ARC5_{it} + \beta_{17} \times SHPI_{it} + \beta_{18} \times ANSR_{it} + \beta_{19} \times FD_{it} + \varepsilon_{it} \quad (8)$$

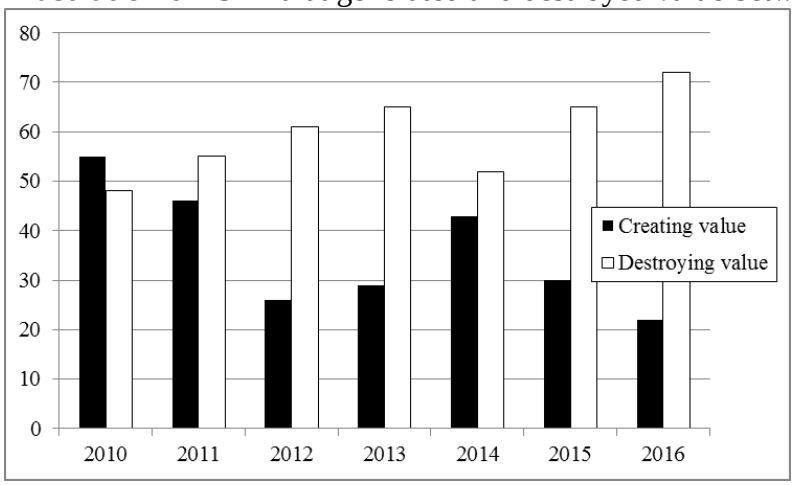
In order to evaluate the general quality of adjustment of the estimated models, the adjusted R^2 and the F Test were used, as suggested by Gujarati and Porter (2011). For analysis of the residues, the Shapiro-Wilk tests (for small samples) was used, Anderson-Darling (for large samples), Breusch-Pagan and Durbin-Watson, to evaluate possible problems of normality, homoscedasticity, and autocorrelation, as recommended by Gujarati and Porter (2011) and Fávero (2015). To avoid problems with multicollinearity, we performed a correlation analysis of the independent variables in each model and excluded those that presented statistically significant coefficients. It should be noted that in cases of heteroscedasticity and the presence of autocorrelation of residues, the Arellano model (1993 as cited in Arellano, 2003) was used to correct such dysfunctions.

4 Presentation and discussion of results

4.1 Value Creation and Destruction: Descriptive Analysis

Illustrations 6 to 9 show the number of OPS that created (aggregated) or destroyed (disaggregated) value in the SEL, MCO, PHIL, and GMD modes, respectively. Illustration 6 shows the number of OPS of the SEL modality that generated or destroyed value over the analysis period. It should be noted that in 2010 alone, the number of those providers that added value was higher than those that destroyed value. There is almost continuous growth in the number of providers that have destroyed value over the analysis period. In general, in 62.4% of the observations, there was a destruction of value by parts of the OPS.

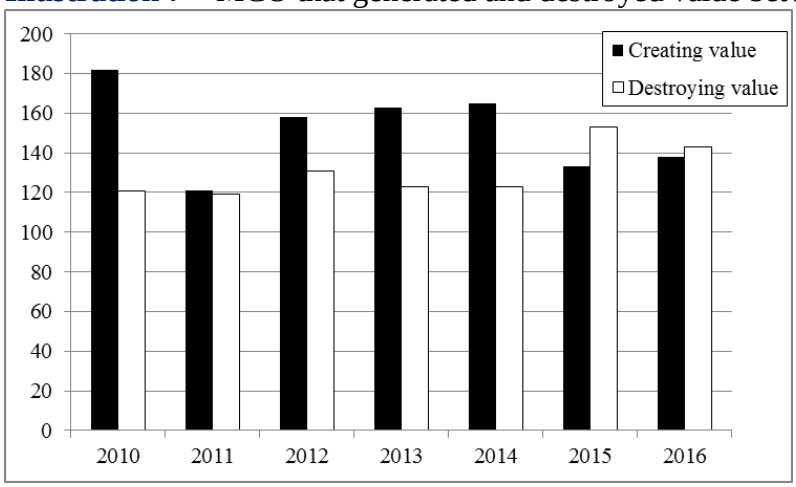
Illustration 6 – SEL that generated and destroyed value between 2010 and 2016



Source: Prepared by the authors based on research data.

Illustration 7 shows the number of MCO providers that generated value and destroyed value over time. It is observed that up to 2014, the number of providers classified as cooperatives that were able to create value was higher than those that destroyed value. This situation reversed in 2015 and continued in 2016. Overall, however, there were more providers creating value (53.7% of observations) than that destroyed it.

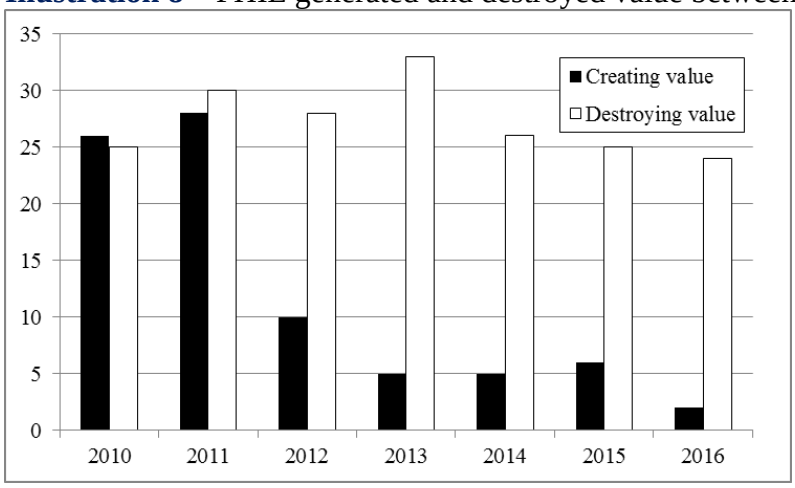
Illustration 7 – MCO that generated and destroyed value between 2010 and 2016



Source: Prepared by the authors based on research data.

Illustration 8 shows the number of philanthropic providers that created and destroyed value in the period analyzed. It is observed that in 2010 alone, the number of OPS of this modality which created value was higher than those that destroyed it. In the following years, the number of providers that destroyed value went well beyond those that created value, generating the most significant difference of the other modalities of providers studied. In general, 70% of the observations of the OPS in the FIL modality evidenced value destruction.

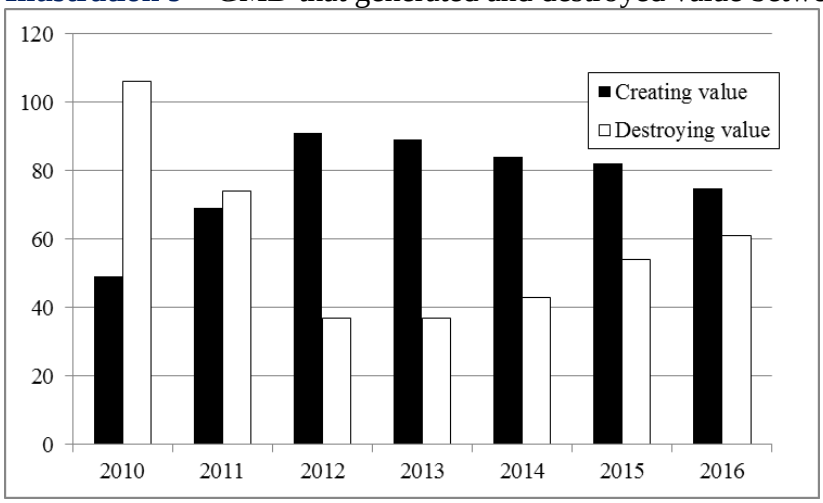
Illustration 8 – PHIL generated and destroyed value between 2010 and 2016



Source: Prepared by the authors based on research data.

Finally, in the case of providers classified as GMD, the number of those generating and destroying value between 2010 and 2016 is shown in Figure 4. It is not possible to observe a trend either in the number of providers that created value or those that destroyed value over time. In total, 50.4% of the observations evidenced value destruction.

Illustration 9 – GMD that generated and destroyed value between 2010 and 2016



Source: Prepared by the authors based on research data.

4.2 Variables that impacted value creation

In Table 3, the results of the estimated models for the EVA of the providers SEL, MCO, PHIL, and GMD are presented. The analysis of the results of the table of the SEL modality indicates that, among the traditional value drivers, the SNE (spread net equity) variable had its significant coefficient. In this case, positivity suggests relationships in line with the literature. In the case of variables related to regulation, the variable ANSR was considered significant. The negative coefficient of this variable indicates that providers registered after the creation of ANS tended to create less value than the other ones.

Table 3 - Results of the estimated model for the EVA's providers studied

Modality	**SEL**		**MCO**		**PHIL**		**GMD**	
Model	**FEM**		**FEM**		**FEM**		**FEM**	
Variable	**Coef.**	**P-value**	**Coef.**	**P-value**	**Coef.**	**P-value**	**Coef.**	**P-value**
SNE	**40,51**	**0,00**	**62,73**	**0,00**	21,41	0,37	**36,44**	**0,00**
DFL			**-0,12**	**0,00**	**-0,15**	**0,01**	-0,02	0,66
DOL	-0,12	0,73	-0,04	0,21	**1,01**	**0,05**	0,02	0,61
GROW			0,00	0,42	0,05	0,36	0,02	0,29
OPSS	-0,01	0,07	0,00	0,10	**-0,03**	**0,00**	0,01	0,08
FD			0,00	0,40	-0,01	0,32	**-0,01**	**0,02**
ANSR	**-0,02**	**0,01**	0,00	0,21			0,00	0,76
ARC1			0,00	0,99				
ARC2			0,00	0,50				
ARC3	0,01	0,21	0,01	0,15				
ARC4	0,00	0,55	**0,01**	**0,00**	**-0,03**	**0,00**	0,00	0,76
ARC5			0,00	0,36	0,00	0,62	0,00	0,97
HOSP	0,02	0,12	0,00	0,07	-0,02	0,34	0,00	0,60
AAB			0,00	0,65	0,01	0,36	**-0,01**	**0,01**
SHPI			0,00	0,07				
COL	-1,34	0,15	0,00	0,10	**0,02**	**0,03**	**0,00**	**0,05**
ANT	0,00	0,15	**0,00**	**0,04**	0,00	0,66	**0,00**	**0,00**
DEP			0,00	0,90	0,62	0,12	0,01	0,88
R^2 adjusted	**43,50%**		**51,90%**		**47,00%**		**44,50%**	
Test F	**6,61***		**27,31****		**4,40***		**9,67****	

Keys: * Significant to 5%; ** Significant to 10%
Source: Prepared by the authors based on research data.

Table 3 also shows the results of the estimated EVA model for the MCO modality. The analysis of the results indicates that, among the value drivers, SNE and DFL were considered significant. The coefficient of the first variable was positive, which is consistent with data from the literature. On the other hand, the negative coefficient of the variable DFL indicates that the more significant financial leverage of the providers implied a lower aggregation of value. Regarding the variables related to regulation, ARC4 and ANT were considered significant. The positive coefficients indicate that providers located in Region 4 (São Paulo, Rio de Janeiro, Belo Horizonte and Porto Alegre or Brasília or Curitiba) and/or that presented a higher proportion of old plans in their portfolios added more value than the others.

The results of the estimated model for the EVA of the philanthropic providers are also shown in Table 3. The analysis of the results of the said table indicates that the value drivers considered significant were OPSS and DFL. The negative sign of the coefficients of both variables demonstrates that the higher the providers and/or their level of financial leverage, the lower the value added by them. On the other hand, regarding the variables related to regulation, two were considered significant: ARC4 and COL. The negative coefficient of the ARC4 variable indicates that providers located in Region 4 tended to aggregate less value than those located in other regions. On the other hand, the positive coefficient of the COL variable indicates that providers with a higher proportion of joint plans in their portfolios tended to add more value.

Finally, the last columns of Table 3 present the results of the estimated model to create the value of the providers of the GMD modality. The analysis of the results of the aforementioned table indicates that, among the traditional value drivers, only SNE was considered significant. In the case of this variable, the estimated coefficient was positive, according to the literature. In the case of variables related to regulation, AAB, FD, COL, and ANT were considered significant. The positive coefficients of the latter two indicate that the providers with the highest proportion of joint plans and/or a higher proportion of old plans in their portfolios tended to add more value. In the case of the variables AAB and FD, the negative coefficients indicated that the higher average age and/or the fact that they had already passed through the ANS fiscal management regime tended to reduce the value added by the OPS. Illustration 10 highlights the conclusions about each of the hypotheses developed in section 2.2.

Illustration 10 - Summary of the conclusions regarding the hypotheses developed on the effects of regulation on the value creation of different OPS modalities

Hypothesis	Conclusion
H1	The proportion of old contracts has a significant relationship with the value creation of different OPS modalities.
H2	The average age of the beneficiaries is significantly related to the value creation of different OPS modalities.
H3	The proportion of beneficiaries of joint plans has a significant relation to the value creation of different OPS modalities.
H4	Size has a significant relationship with the value creation of different OPS modalities.
H5	The region of activity has a significant relationship with the value creation of different OPS modalities.
H6	It cannot be said that the performance obtained in the SHPI has a significant relationship with the value creation of different OPS modalities.
H7	The fact that they have passed through the fiscal management regime has a significant relationship with the value creation of different OPS modalities.
H8	The fact of having been registered after the creation of the ANS has a significant relationship with the value creation of different OPS modalities.
H9	It cannot be said that the level of dependence has a significant relationship with the value creation of different OPS modalities.

Source: Prepared by the authors.

5 Conclusions

Regarding investment decisions focused on value creation, it has been found that OPS often create more value than destroy it (except for organizations in the Philanthropy modality), according to the parameters established in this research. However, the frequency of value creation is not so higher than that of value destruction, when analyzing the entire period of the study. In addition, not all variables listed in the literature treated as value drivers were considered significant.

Regarding the variables related to regulation, the providers' performance in Region 4 is highlighted. It was verified that the fact of having acted in São Paulo, Rio de Janeiro, Belo Horizonte and Porto Alegre or Brasília or Curitiba tended to improve value creation for providers of the MCO modality, while at the same time contributing to the destruction of value in philanthropic OPS. These are large Brazilian capitals with a high level of income. However, philanthropic providers may not be able to adapt to a context of intense competition for that income. This finding is consistent with the higher percentage decrease (both in

number of beneficiaries and providers) of this modality in relation to the others over the study period, as evidenced by ANS data (2015, 2017).

On the other hand, there was a consistent result showing that providers with a higher proportion of joint plans in their portfolios tended to create more value. This may explain the preference for joint plans over family plans, as Leal (2014) points out, which is evidenced by the substantial increase in the number of such plans to the detriment of these plans, as shown by the ANS (2016, 2017) data. In addition, the higher proportion of old plans (ANT variable) in their portfolios also contributed consistently to the value creation of the providers of the MCO and GMD modalities. These plans do not comply with the ANS norms according to the FCJ (2003), allowing the providers to act according to their interests at the time. Thus, it can be said that the greater flexibility of the ANS regulation tended to benefit OSP in terms of value creation. This result is related to the greater flexibility of the ANS regulation on the OPS (reflected by the COL and ANT variables) and the higher value creation of the same ones, as confirmed by Veloso and Malik (2010).

With the foregoing, we can conclude that the ANS rules affected the different provider modalities in various ways, with respect to value creation (linked to investment decisions). Almost all regulatory variables were significant in different contexts and varied depending on the modality of OPS. This demonstrates the relevance of considering the specificities of each of them in the analyzes.

Several research contributions presented in this article can be cited for knowledge in the area studied. First, it is necessary to highlight the importance of regulation in the financial decisions of OPS in Brazil since the study presented made clear the relationship between regulatory norms and value creation in these health organizations. The research also demonstrated the validity of some traditional value drivers in models to explain the EVA of OPS. Another contribution of this study was the proposition of regulatory variables to assist in the explanation of value creation in providers. Future research could test the regulatory variables proposed in the study presented in other contexts, whether new samples or different time horizons. In addition, they could introduce new variables to be explored in relation to the OPS regulation and study the phenomenon of value creation under the perspective of regulation in other modalities of providers according to the classification of ANS (2000).

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