JAMG
Journal of Accounting, Management and Governance
Revista Contabilidade, Gestão e Governança
E-ISSN 1984-3925

OPEN ACCESS

Responsible Editor: Rafael Barreiros Porto
Associate Editor: Julio Araujo Carneiro da Cunha
Evaluation Process: Double Blind Review pelo SEER/OJS

The Relationship between Financial and Non-Financial Indicators for Health Plan Operators

ABSTRACT

Objective: This study seeks to investigate the relationship between economic-financial indicators and non-financial indicators of Health Plan Operators (HPO) for the Health Qualification Program (HQP) of the National Health Agency (NHA) We analyzed the period from 2011 to 2014 to verify whether financial performance is determinant in terms of the operational performance of 916 Health Plan Operators during the following period and vice-versa.

Method: Five statistical regression models were constructed based on Ordinary Least Squares (OLS) with robust standard errors.

Originality/Relevance: This article highlights the importance of the performance measurement system for Health Plan Operators from the perspective of regulatory obligations and the possibility of citizens/users effectively using these indicators when they choose their health plans.

Results: The results confirm that the financial index has a positive relationship with the non-financial indicators during the following period. An exception is the beneficiary satisfaction indicator, and in this case, the non-financial indicators were capable of explaining the financial index.

Theoretical/Methodological contributions: This study has the potential to raise new questions about the implementation of the Health Qualification Program and whether the Health Qualification Index (HQI) supplies significant informative content to inform the selection of health plans by future beneficiaries.

Keywords: National Health Agency, Health Plan Operators, Performance.

Leandro Fernandes de Jesus
Universidade Federal do Rio de Janeiro, RJ, Brasil
E-mail: leandrofj@hotmail.com

Juliana Molina Queiroz
Universidade Federal do Rio de Janeiro, RJ, Brasil
E-mail:julianamolina@facc.ufrj.br

Marcelo Álvaro da Silva Macedo
Universidade Federal do Rio de Janeiro, RJ, Brasil
E-mail: malvaro@facc.ufrj.br

Cláudia Ferreira da Cruz
Universidade Federal do Rio de Janeiro, RJ, Brasil
E-mail: claudiacruz@facc.ufrj.br

Fernanda Filgueiras Sauerbronn
Universidade Federal do Rio de Janeiro, RJ, Brasil
E-mail: fernanda.sauerbronn@facc.ufrj.br

Received: November 07, 2018
Revised: July 02, 2019
Accepted: July 31, 2019
Published: December 16, 2019

How to Cite (APA)
Jesus, L. F. de., Queiroz, J. M., Macedo, M. A. da S., Cruz, C. F. da, & Sauerbronn, F. F. (2019). The Relationship between Financial and Non-Financial Indicators for Health Plan Operators. *Journal of Accounting, Management and Governance*, *22* (3), 316-333. http://dx.doi.org/10.21714/1984-3925_2019v22n3a1

1 INTRODUCTION

The Health Qualification Program – HQP, instituted in November 2006 through Normative Resolution (NR) Nº 139, seeks to improve the regulatory capacity of the National Health Agency (NHA), establishing annual metrics of institutional qualification for Health Plan Operators (HPO). These metrics are formed based on indicators grouped in four dimensions to evaluate the performance of operators and the National Health Agency and its repercussions in the health field.

Data presented by the National Health Agency demonstrates that, in the year 2016 alone, the amount received by Health Plan Operators was roughly R$161 billion which represents an increase of 150% compared to the revenues of 2006 (ANS, 2018). The growth of the participation of the Brazilian population in private plans and health insurance has led to difficulties for the assistance offered by the network of private services, demanding that the regulatory agency of the plan operators and service providers adopt new managerial and operational measures to improve the efficiency and effectiveness of the sector (Carvalho *et al.*, 2013).

There is, therefore, a triangular relationship in the health sector, in which agents put antagonistic values in conflict (Gouveia, 2004). The great novelty presented by the Health Qualification Program has to do with the methodology of the National Health Agency, which applies to all operators. The research examined the index systematically during the period from 2011 to 2014. It used the weighted average of the results of Health Plan Operators in relation to the following dimensions: Economic & Financial – measured by the Economic-Financial Situation Index (EFI); Attention to Health – measured by the Customer Service Index (CSI); Structure and Operations – measured by the Structure and Operations Index (SOI) and; Beneficiary Satisfaction – measured by the Beneficiary Satisfaction Index (BSI).

The main objective of the program is to transform operators into health managers, service providers into health care producers and beneficiaries into users who are health conscious (ANS, 2018). NHA website highlights the relevance of the Health Qualification Index on several situations. For example, the consumer may choose a health plan considering the operator´s performance evaluation and its position in the ranking of consumers' complaints.

In general, the needs of the consumer are what inform the level of customer service that should be provided (Sedevich-Fons, 2014). As a result, service users possess two important mechanisms of social control of the results of public administration in terms of the health assistance area. The first is the National Health Service's evaluation of institutional performance in terms of market regulation, and the second is the public policy evaluation which foresees the economic, structural and operational regulation of the health sector. The objective of the second mechanism is to meet the public interest by evaluating the informational content within the Health Qualification Index (HQI) for registered companies.

The Health Qualification Index applies to all Health Plan Operators (except for benefits administrators), and thus, its mandatory use does not dependent on its institutional structure or formation or location. Therefore, this work addresses the following research question: What is the relationship between the financial indicator (EFI) and the non-financial indicators (CSI, SOI and BSI), measured by the Health Qualification Index, as required by the National Health Agency? The main objective of this study is to analyze the relationship between the financial and non-financial indicators of Health Plan Operators measured by the Health Qualification Program.

Given previous results (Banker *et al.*, 2001; Dawson, 2016; Delen *et al.*, 2013; Kudlawicz, 2013; Lima *et al.*, 2013; Rocha *et al.*, 2012; Rust & Zahorik, 2004; Saliterer & Korac, 2013; Schiozer *et al.*, 2011; Sedevich-Fons, 2014) which indicate that there is a positive and significant relationship between economic-financial indicators and other qualitative performance indicators, it was possible to create this study's hypothesis: H_1: There is a positive relationship between the economic-financial indicator (EFI) and the operational quality indicators – CSI, SOI, BSI. It also evaluates this relationship considering certain control variables, such as location, focus on profit, and exclusively dental organization.

2 THEORETICAL REFERENCES

2.1 Health Plan Operator (HPO)

They participate in the health market, and they supply health services together with health professionals and service users. For this sector to have effective regulation, there must be adequate mechanisms.

The number of health plan operators during the period from 2011 to 2016, according to the NHA, are represented in Table 1:

Table 1

Quantity of HPOs in Operation during the Period from 2011 to 2016.

Year	Medical Assistance	Exclusively dental plans	Medical Assistance with beneficiaries	Exclusively dental plans with beneficiaries
Dec/11	1.172	425	1.006	365
Dec/12	1.118	416	961	359
Dec/13	1.073	392	915	341
Dec/14	1.037	383	875	342
Dec/15	967	363	824	326
Dec/16	959	351	800	312

Source: Data divulged by the NHA on the website http://www.ans.gov.br/.

Table 2 displays the operators that were active during the period under study (2011 to 2014), showing the percentage evaluated by the Health Qualification Index.

Table 1

Quantity of HPOs in Operation during the Period from 2011 to 2014

Number of HPO \ Year	2011	%	2012	%	2013	%	2014	%
Number of HPO wich divulged HQI	1.129	71	1.110	72	1.075	73	1.030	73
Number of HPO wich didn't divulged HQI	468	29	424	28	390	27	390	27
HPO total	1.597		1.534		1.465		1.420	

2.1.1 Types of Operators

These operators are quite varied and multifaceted because they come in all shapes and sizes. They range from large conglomerates linked with holding companies to modest non-profit associations. This variety accentuates the inequality in terms of the size of the HPOs, which also vary in terms of their nature, especially in terms of taxation and constitution (Gouveia, 2004). NHA classified the HPOs in various types according to their statutory varieties: self-governing, medical cooperative, dental philanthropic cooperative, benefits administrators, health insurance specialists, doctors' groups, and dental groups.

2.1.2 Plan Coverage

There are two types of coverage on HPOs: Medical assistance (plan beneficiaries which contain hospital and/or ambulatory segments and can also contain dental segments) and those which are exclusively dental (plan beneficiaries of purely dental plans).

Dental cooperatives and groups are considered exclusively dental. According to the information provided by the National Health Agency, it presents the distribution of HPOs by type of coverage, which presented HQIs during the period of this study. Table 3 displays the division between HPOs which are exclusively dental and HPOs, which offer medical-hospital assistance with or without dental.

Table 2
Quantity of HPOs which are Exclusively Dental from 2011 to 2014

Health Plan Operators	2011	%	2012	%	2013	%	2014	%
HPO - dental plans only	310	27	313	28	313	29	295	29
HPO medical assistance including those with dental plans	819	73	797	72	762	71	735	71
Total of HPO wich divulged HQI	1.129		1.110		1.075		1.030	

This work will use the plan type as a control variable to analyze the impact of the coverage type on HPOs in determining the economic-financial index based on the indices of customer service, structure, and operations, and beneficiary satisfaction divulged by the HQP.

2.2 Health Qualification Program (HQP)

Performance measurement methodologies are diverse and usually follow the managerial and organizational needs of each company or institution (Mcintyre *et al.*, 2001). The preparation, continual improvement, divulgation and evaluation of performance indicators for HPOs is justified by the demands of the beneficiaries, hiring companies (public or private), researchers, and of course the regulatory body (ANS, 2018). These demands are related to the obtaining of information about type and quality of health service offered and the respective charging of reasonable premiums.

The performance indicator variables help to compare the operators. The HQP uses the HQI to establish a ranking of operators and to provide transparent and effective regulation (Nunes *et al.*, 2011). The information contained is essential to the improvement of performance management systems since it capture internal transformations as well as external transformations, and they effectively tend to help in the resolution of problems. Therefore, we should consider the HQP to be a performance measurement system for an HPO which is obliged to provide, significant, unique and appropriate information, not only in terms of control but also in terms of organization, planning and problem resolution (Dawson, 2016).

During the years 2011 to 2014, the HQI calculus considered the Normative Resolution Nº 386. It considered the weighted average of results, achieved by each plan operator, considering the following indicators, categories, and dimensions (ANS, 2018):

i) Economic and Financial Index (EFI): measures the economic and financial situation of the operators and their capacity to fund the actions which are necessary for integral and continuous attention, according to the contracts that they have assumed.

ii) Attention to Health – Customer Service Index (CSI): measures the actions that promote the prevention of health problems and the assistance provided to the beneficiaries of private health plans.

iii) Structure and Operations Index (SOI): measures the ability of operators to provide sufficient and appropriate assistance networks that are adequate to the requirements and to fulfill the technical and registration obligations that they share with the NHA.

iv) Beneficiary Satisfaction Index (BSI): measures the extent to which those who buy these private plans have their needs and expectations met by these plan operators.

The dimensions of the Economic and Financial, Attention to Health – Customer Service, Structure and Operations, and Beneficiary Satisfaction form, therefore, the EFI, CSI,

SOI, and BSI performance indices, analyzed in the determination of the HQI by the NHA. The practice of evaluating HPOs through performance indicators is a worldwide trend.

Nunes *et al.* (2011) emphasize the importance of public information made available by the private sector in health plans in Portugal and the United Kingdom. They highlight that the presentation of performance indicators is intended to promote more just competition and improve the performance of HPOs and, to achieve this, two characteristics are required for transparent and effective regulation: the comparability of quality and economic-financial indicators and their availability in a ranking.

Santos *et al.* (2008) have demonstrated the main results achieved by this sector after the regulation process and view the HQI in a positive light because they consider that the evaluation in the four proposed dimensions encourages HPOs to improve their operations and consequently their evaluation in the ranking.

2.3 Performance Measurement

Dawson (2016) made a summary of the characteristics of a measurement system in which we emphasize the one that has a strong convergence with this study, providing data for analyzing past performance, and monitoring and planning future performance. As a result, the performance measurement possesses informational content of past operations and indicators of performance in subsequent periods.

Banker *et al.* (2001) delved into the study of the impact of non-financial indicators on financial indicators, concluding that beneficiary satisfaction indices offer more significant information than certain economic-financial indices and the forecasts of future financial performance.

Franco-Santos *et al.* (2012) identify the impacts of performance measurement and classify them into three categories: agent behavior, organizational capacity, and the consequence of the performance. In this last category, they conclude that the actual measurement of performance still requires more investigation because it lacks related studies. According to the authors, many researchers argue that seeking a direct connection between the measurement of performance and the improvement of this performance can be dangerous, given that there are many other internal and external factors which also impact in the evaluation of economic and operational performance.

Lima *et al.* (2013) researched together with specialists in the area of management and strategy, including academics and professionals from various countries. They questioned the role of a performance system and the practices adopted to help companies. They focused on the formation of strategies, knowledge on organizational behavior, and the evolution of operational management. They identified that there is a consensus that the role of a performance measurement system is to support with useful information in order to define an operational strategy to maintain efficiency and effectiveness of business, as well as monitoring the implemented strategy and evaluating the results obtained.

Baldassare (2014) uses the *Domain of Business Performance*, as a typology to measure the performance of HPOs based on indicators of financial results and addresses the latest studies in strategy, considering operational indicators together with financial ones. It includes independent variables: Return on Assets (ROA), Return on Equity (ROE) and the Operational Return on Assets (OROA), as well as current liquidity and customer usage as a performance measure (dependent variable). It also includes control variables such as modality, size, and type of operator.

He concludes that operators that present better performance, according to the applied methodology, are the modality of group medicine of small size, located in the southeastern region. He also identified the significance of financial indicators for each operator considering

their modality and size. These control variables significantly influenced the current liquidity indicator and customer usage. Moreover, the type of operator influences the results presented for ROA and OROA, modality influences OROA and size influences ROA. ROE was not significant for any of the used models.

Along these lines, Delen *et al.* (2013) analyzed which financial indicators best represented the performance of Turkish companies listed on the Istanbul Stock Exchange and identified the return over equity and return over assets. Based on this information, they sought to understand if there are specific financial indices that can influence the composition of ROE and ROA and which would be the main indices that can forecast the formation (or measurement) of good measurements of ROE and ROA in subsequent periods. As a conclusion, they found that the indices related to profitability (EBITDA Margin and Gross Profit Margin) had a greater impact on the composition of the financial indicators ROE and ROA, and thus directly affecting company performance.

Ismail (2007) made a study that used questionnaires sent to a sample of 150 companies registered on the Egyptian Stock Exchange, through which it sought to identify which performance measurements are used for business analysis with the greatest frequency. They concluded that most of the companies are supported both by financial and non-financial indicators. They identified that the most common indicators utilized were Profit Margin (Net Profits divided by Revenues) to measure financial performance and customer satisfaction to measure operational (non-financial performance). The author considers that the utilization of multidimensional performance measures are important to companies; however, he finds that they are not effectively used to manage performance.

Kudlawics (2013) finds that HPOs have significant special aspects that directly influence their rate of return, considering modality, size, and operation. He identified that those with greater rates of return have better indices of current liquidity, return over assets, and net profit margin. Meanwhile, the indices that can negatively affect HPO rates of return are the debt and the loss ratio.

3 METHODOLOGY

3.1 Sample

Our research sample consists of Health Plan Operators. We collected information concerning the indicators that make up the HQI of the HPOs. This information is made available by the NHA. Therefore, secondary data was collected directly from the internet website. The sample corresponds to all of the companies registered with the agency which divulge the information necessary for the analysis.

The period refers to the database dates of 2011 to 2014. The data presented by the NHA related to HQI include raw data from 2008 to 2014. However, we opted to exclude information from companies from the period of 2008 to 2010. This exclusion is due to the alteration in the methodology to calculate the indicators that were different when comparing the periods of 2008 to 2010 and 2011 to 2014. The use of the HPO data from 2008 to 2010 would introduce a bias into this study as it seeks to be an analysis of the operators' continual improvement. This analysis considers the minimum period of one year, which is understood to be reasonable for the results determined for qualitative indicators of the economic-financial index which helped the consumer or beneficiary in the monitoring of the HPOs.

The study used a convenience sample to assure that the data could be compared and resulted initially in a total number of 1,718 HPOs. To make the database appropriate in terms of our stated goal, we excluded all HPOs that did not present complete data for the period. With this procedure, at this stage, the sample considered 925 operators. Later we eliminated

those HPOs which were in stages of intervention because we understood that these numbers could be compromised. We excluded nine HPOs in this situation. Thus, the final sample had 916 operators, that equals 2,748 observations considering all the segments and operation types.

3.2 Performance Variables – Financial and Non-Financial Indicators

The performance variables considered the information from the indices which make up the HQI: the Economic-Financial Index (EFI), the Customer Service Index (CSI), the Structure and Operations Index (SOI) and the Beneficiary Satisfaction Index (BSI). The determination of the HQI for the years 2011 to 2014 is based on a weighted average of the results achieved by the operator, according to Normative Resolution Nº 386.

3.3 Control Variables

The control variables used in this study are related to location (capital or not), type of company (for-profit or non-profit) and the dental exclusivity of the HPO. These control variables were included to analyze whether these factors are significantly related to the values measured for the economic-financial index presented by the HQP in the subsequent period.

The control variable for location (CV1) aimed to understand if there are incentives (possibility of increasing operations and competition) for the performance indices of operators established in large urban centers. So, the control variable for location assumes a value of 1 for capitals and 0 for other locations.

The control variable for the type of company (CV2) intended to verify whether having commercial objectives influences the quality in terms of the indicators divulged by the HQP. According to Dawson (2016), the presentation of indexes on non-profit entities seeks fund-raising of public or private resources. Therefore, non-profit entities tend to present better indicators. Hence, the control variable for TYPE assumes a value of 1 for for-profit and 0 for others.

Finally, the last variable analyzes whether it is exclusively dental or not (CV3), which may lead to significant differences in the HQI indicators.

The last two control variables (CV2 and CV3) contemplated recommendations of previous studies (Baldassare, 2014; Rocha *et al.*, 2012) which indicated that there is a difference in performance between HPOs due to the nature of their constitution. Thus, this variable assumes a value of 1 for exclusively dental entities and 0 for those which are not.

3.4 Statistical analysis of the data and the construction of the econometric models

When considering a system of measurement and the management of performance, there is the need for comparative evaluation, or in other words, corroborating whether the results presented during a given period provide useful information to promote concrete actions in the present that will contribute to the improvement of future performance, in either operational or financial terms (Lebas, 1990). Thus, it appears to be mandatory for the certification of the quality of the public policy implemented to have a posterior evaluation of the results obtained after the intervention made by the NHA.

For this study, we used five statistical analysis models. We compare the indicators (EFI, CSI, SOI and BSI) of the indicators in the following year. Thus, to achieve our proposed objective, we estimated the regression models based on the Ordinary Least Squares (OLS) and robust standard errors.

The first, second and third models had the objective of determining whether the EFI has a positive relationship with the CSI (model 1), the SOI (model 2) and BSI (model 3) in the following period. The fourth model identifies whether the non-financial (CSI, SOI and BSI)

performance variables have a positive relationship with the EFI. The fifth model includes the control variables for location (CV1), type (CV2), and dental exclusivity (CV3). Thus, we can identify whether all of the performance-based non-financial and control variables have a positive relationship with the EFI.

In the first model, supporting the findings of Santos *et al. (*2012), we seek to identify whether there is a positive impact on economic-financial performance with improvement in operational performance during subsequent periods. In this study, we find that the impact is not always positive; however, moderate impacts were identified for organizational structure and improvements in the product or service offered. In this manner, we expect that the regression will have a positive and significant relationship with the predictive variable CSI and the explanatory variable EFI.

The second model corrobotate the findings of Lima *et al.* (2013), in which they identified that the strategic implementation of a measurement system for economic-financial performance produces information that is useful in improving organizational efficiency and thus its operational structure. In this manner, this regression is expected to have a positive and significant relationship between the predictive variable SOI and the explanatory variable EFI.

The third model seeks to support the work of Schiozer *et al.* (2011), who concluded that an increase in beneficiary satisfaction is related to an HPO's favorable financial situation. In this way, we are expecting a positive and significant relationship between the predictive variable BSI and the explanatory variable EFI.

The fourth model makes it possible to identify whether some of the dimensions analyzed in the calculation of the HQI lose explanatory significance in terms of the EFI when analyzed together with the other performance indicators. In any event, in this regression, we expect a positive and significant relationship between the predictive variable EFI and the explanatory variables CSI, SOI, and BSI.

Finally, the fifth model intends to identify whether some of the dimensions analyzed in the calculation of the HQI lose significance in explaining the EFI when used in conjunction with other performance indicators and the control variables. Statistical data analyses used Stata® software.

4 RESULTS

The overall objective of this study is to analyze the relationship between performance indicators - the financial indicator and non-financial indicators for HPOs, considering the indices used to calculate the HQI. This section presents the results of five different statistical analyses.

Table 4 shows the results of the analyses of Models 1, 2, and 3 respectively. The first analysis seeks to identify the existence of a relationship between the financial performance indicator – EFI for a given period and the non-financial indicator – CSI during the following year. The second analysis seeks to identify a relationship between the financial performance indicator – EFI for a given period and the non-financial indicator – SOI during the following year. The third analysis seeks to identify a relationship between the financial performance indicator – EFI for a given period and the non-financial indicator – BSI during the following year.

The results of the first analysis confirm that the independent variable EFI has a positive and significant relationship (a level of 1%) and the subsequent CSI indices, or in other words, the better the financial situation presented in the EFI, the more likely that the

HPO will divulge good indices for customer service, which thus is in accordance with the studies of Santos *et al.*, (2013).

Table 4
Results of the First, Second, and Third Analyses

Model for Analysis	(1) CSI	(2) SOI	(3) BSI
EFI	0,177***	0,125***	0,082***
	(10,93)	(13,08)	(6,096)
Constant	0,515***	0,649***	0,748***
	(43,62)	(91,74)	(73,95)
Nº of Observations	2.748	2.748	2.748
R^2	0,052	0,083	0,017
R^2 Ajusted	0,051	0,082	0,0169
F- value	119,6	171,1	37,16
P-value	<0,001	<0,001	<0,001

In which: (1) is the Model for Analysis 1 with the independent variable EFI and the dependent variable CSI; (2) is the Model for Analysis 2 with the independent variable EFI and the dependent variable SOI; (3) is the Model for Analysis 3 with the independent variable EFI and the dependent variable BSI; EFI: Economic & Financial Index; CSI: Customer Service Index; SOI: Structure and Operations Index; BSI: Beneficiary Satisfaction Index CV1: Control variable 1 for location with 1 for capitals and 0 for other locations; CV2: Control variable for type with 1 for for-profit and 0 for non-profits; CV3: Control variable for entities that are exclusively Dental with these assuming a value of 1 and others assuming a value of 0; *** p<0.01, ** p<0.05, * p<0.1.

The results of the second analysis confirm that the independent variable EFI has a positive and significant relationship (a level of 1%) with the subsequent SOI indices. Thus, it corroborates the findings of Lima *et al.* (2013) and demonstrates that the financial situation of the HPOs can positively influence their maintenance of structure and operations in subsequent periods.

Meanwhile, the results of the third analysis run contrary to the findings of Schiozer *et al.* (2011). That study sought to identify whether there is a direct relationship between HPO modality and its financial performance, as well as the economic-financial situation of the firm and beneficiary satisfaction. It concludes that there is a positive relationship between economic-financial performance and the type of fund-raising and modality of HPOs. However, they did not present results that attest to a direct relationship between good economic-financial performance and beneficiary satisfaction. On the other hand, the results of the third analysis displayed a positive and statistically significant relationship between EFI and BSI. Nonetheless, there is not necessarily a substantive relationship between these indicators, so this result should be better investigated in the future.

Besides, with the intent of presenting a visualization of the results of the first three analyses, we present scatterplots of the first three models tested. Figure 1 shows the results for the first model in which the dependent variable is CSI, and the independent variable is EFI.

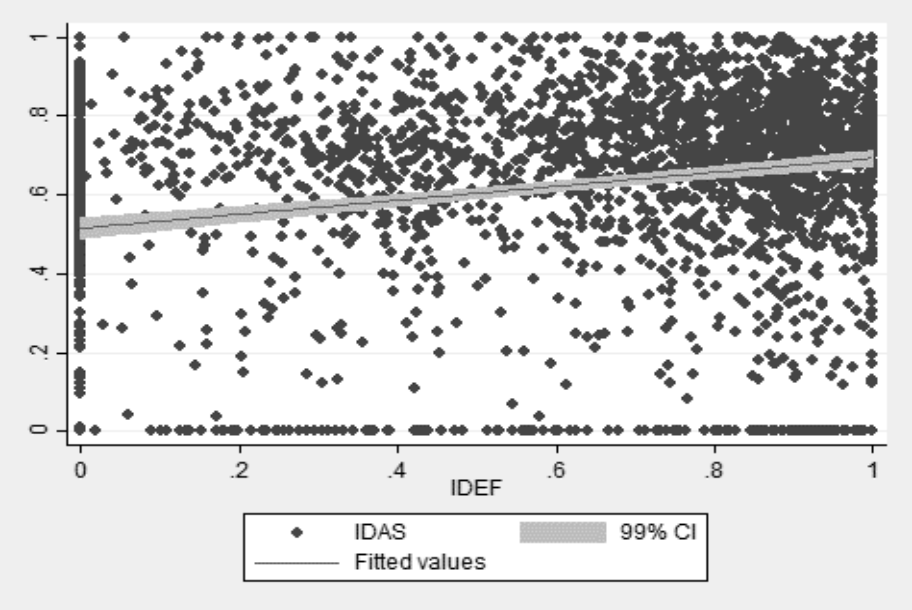


Figure 1. Scatterplots of Model 1

Figure 2 displays the results for the second model in which the dependent variable is SOI, and the independent variable is EFI.

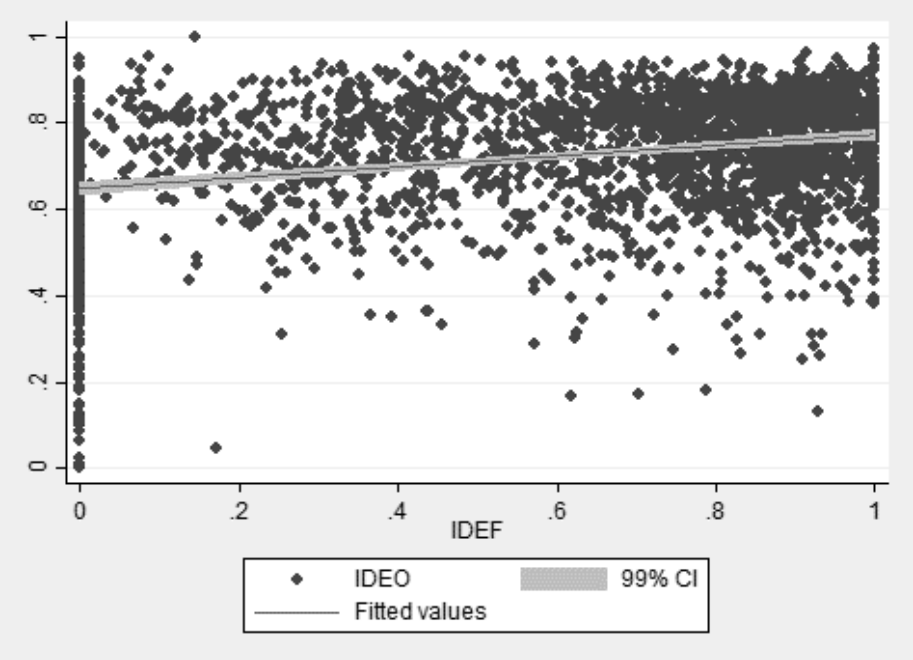


Figure 2. Scatterplots of Model 2

Figure 3 displays the results of the third model in which the dependent variable is BSI, and the independent variable is EFI.

All of the scatterplots presented positive relationships between CSI, SOI, and BSI with the dependent variable EFI. These results corroborate those found in the regressions.

The results of the fourth and fifth analyses are displayed in Table 5. The fourth analysis seeks to identify the existence of a relationship between the financial performance indicator – EFI for a given period and the non-financial performance indicators – CSI, SOI, and BSI for the subsequent year. The fifth analysis introduces the control variables of the

model tested in Analysis 4. The fifth analysis seeks to identify the existence of a relationship between the financial performance indicator – EFI for a given period and the non-financial indicators and the control variables – CSI, SOI, BSI, VC1, VC2, and VC3.

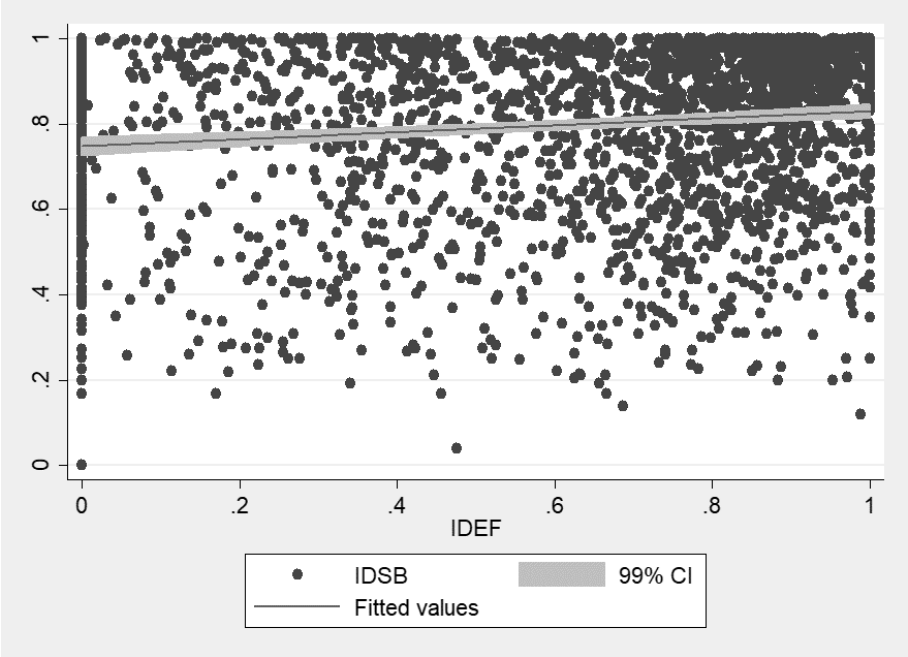


Figure 3. Scatterplots of Model 3

Table 5

Results of the Fourth and Fifth Analysis.

Models for Analysis	(4) EFI	(5) EFI
CSI	0.214*** (8.498)	0.217*** (8.642)
SOI	0.479*** (12.09)	0.457*** (11.25)
BSI	0,0768** (2.564)	0.010 (0.305)
VC1		-0.0219* (-1.664)
VC2		-0.074*** (-5.629)
VC3		-0.067*** (-4.687)
Constant	0,142*** (4.170)	0.943*** (68.70)
Nº of Observations	2.748	2.748
R^2	0,133	0,151
R^2 Ajusted	0,133	0,149
F- value	122.7	72.22
p-value	<0,001	<0,001

In which: the Model is for Analysis 5 with dependent variable EFI and independent variable CSI; EFI: Economic & Financial Index; CSI: Customer Service Index; SOI: Structure and Operations Index; BSI: Beneficiary Satisfaction Index; CV1: Control variable for location with 1 being for capitals and 0 for other locations; CV2: Control variable for type of company with 1 being for for-profit and 0 being non-profit; CV3: Control variable for organizations that are exclusively dental and 0 for other organizations; *** p<0.01, ** p<0.05, * p<0.1.

Based on the results of the fourth analysis, it is possible to indicate that all of the quality indices have a positive relationship with the economic-financial index EFI. All were significative at level 1% except BSI, which was only significant at a 5% level. In a complementary manner, the SOI is the variable of greatest explanatory significance for variations in EFI in the subsequent period. Right away, we can see that the variables CSI, SOI and SBI are significant in the explanation of EFI. This result add up with the recent studies that conclude that there is a greater significance of the operational indices in predicting future financial performance than usually calculated indices (Banker *et al.*, 2000).

In terms of the results of the fifth analysis, the control variables inserted were considered significant and had a negative effect, indicating that the fact of having these specific characteristics influenced the measurement of the economic-financial index. A CV1, referring to Location variable, presented a significance level of 10%, while the other two variables (CV2 and CV3) are significant to a level of 1%.

In any event, the model in question (Model 5) indicates that there is a relationship between location (CV1), type (CV2) and dental exclusivity (CV3) and the values of the EFIs of the HPOs. The negative coefficient of CV1 indicates that if the HPO is localized in the capital, it tends to present lower EFI values. It was also true of for-profit organizations (CV2) and those which are exclusively dental (VC3), which also tend to present lower EFI values.

In the expectation of corroborating the findings of Rust and Zahorik (2004) who indicate that beneficiary satisfaction and the retention of customers through maintaining levels of operation and structure increases the possibility of presenting good economic-financial indices, we identified that the SBI variable is significant at a 5% level without including the control variables. With the inclusion of the control variables, the BSI becomes insignificant. Thus, it is not clear what the relationship of the beneficiary satisfaction index represent faced with the improved economic-financial indices in the following period. It will be necessary to further explore this topic, perhaps with a more specific methodology to corroborate this finding.

Accordingly, it was possible to corroborate the findings of Sedevich-Fons (2014) and Banker *et al.*, (2000), which demonstrated that the non-financial (or operational) indices contribute to forecasting later economic-financial performance during the next period. The significant positive relationship of most of the coefficients of CSI, SOI, and BSI in explaining the EFI indicated this result.

5 DISCUSSION OF THE RESULTS AND CONCLUSION

The study focus was to analyze the relationship between the financial performance indicator (EFI) and the non-financial operational performance indicators (CSI, SOI and BSI), measured in conformity with the HQP. The analysis has sought to demonstrate positive financial or operational values in the measurement of performance in subsequent periods. This analysis plays an important role for operators in supporting the establishment of metrics for measuring the economic-financial indices, with various goals, among which we can point out: the maintenance of economic-financial equilibrium (Franco-Santos *et al.*, 2012); the evaluation of performance and the rate of return (Delen *et al.*, 2013; Ismail, 2007; Kudlawicz, 2013); comparability between market competitors (Chenhall *et al.*, 2013; Nunes *et al.*, 2011) and performance management (Lebas, 1995).

As a result, we have identified a positive relationship between the economic-financial performance indicator (EFI) and the operational performance indicators (CSI, SOI and BSI),

asserting the explanatory power of the EFI in the variations of the operational indicators of these last three indices in terms of variations in the first.

The results corroborate the findings of Lima *et al.*, (2013) and Schiozer *et al.*, (2011); it indicates that the favorable financial condition improves the operational performance and the quality of customer service in subsequent periods. However, it contradicts the results of Santos *et al.*, (2013) that didn´t find a relationship between the financial condition and operational performance.

Even though demonstrating this positive relationship of the indicators, the results were not conclusive in terms of the prediction of the beneficiary satisfaction indicator in determining the economic-financial situation of the HPOs in the following period. It is contrary to the findings of Banker *et al.*, (2000). They concluded that there is a significant relationship between customer satisfaction indices with future economic-financial performance, and added it to the idea that the beneficiary satisfaction index contains significant information that is not contained in the economic-financial indicators.

The results obtained in the statistical tests demonstrated the significance of the EFI in the determination of operational indicators in the following period to a level of 1%, however with a lower percentage of explanatory power than the determination of operational indicators on the following economic-financial situation. It should be considered, therefore, that a favorable economic-financial situation does not necessarily represent a significant increase in investments to improve the operation of HPOs (Banker *et al.*, 2000). Often this rate of return will be used to improve indices of indebtedness, or for reaping profits or dividends to controllers and shareholders (for HPOs which are for-profit) or increasing financial revenues.

Given the relatively low value for the determination coefficient (R^2), we rely on the arguments presented by the work of Moksony (1990). The author discourses about the utilization of the determination coefficient by some social scientists as a piece of indispensable information for any academic work. In this article, we clarify that the use of R^2 to evaluate the quality of the model is overestimated. It is reasonable to validate regression models whose objective is predictive quality, but not for models whose objective is to test a theory. Among the explanations for this, he argues that the exclusive use of R^2 to evaluate the explanatory capacity of a model is, sometimes, misleading, because it fails to distinguish between the substantive explanation and the statistical explanation. “In a purely statistical sense, R^2 does indicate the proportion of variance explained by the independent variables; this, however, has nothing to do with a substantive explanation” (Moksony, 1990). In this same manner, it is necessary to segregate the explanations that come from the statistical model employed.

As an example, we suggest the use of the dependent variable as an independent variable, in which the expected result is that R^2 is equal to 1.0, however, we cannot seriously consider that there exists any explanatory power in this formula. The author further notes that this problem is not present in a predictive statistical model, because it does not have the pretension of confirming a theory, but rather seeks to forecast, with sufficient precision, the future course of some specific phenomenon, controlling as much as possible, various variables related to that phenomenon.

He also utilizes another example to indicate that statistical models can have low R^2 values with substantially more explanatory power than statistical models with high R^2, given that it is necessary to segregate the model explanation on purely mathematical (or statistical) terms, from a substantive explanation which is possible to obtain from a given model. He demonstrates how authors can “inflate” their models with variables that increase R^2 but do not necessarily explain the relationship between the variables. The studies used as a reference for this article, even though they present R^2 values that are also comparatively low, did not

discard models due to this fact. In these cases, the determination coefficients were analyzed, but with a focus on the substantive explanation of the model and not a simple statistical explanation.

In this study, we have opted to consider the explanatory and predictive capacity of the models in question despite relatively low R^2 values, given that the HQP uses financial and non-financial indicators as self-feeding sources of information. As mentioned above, this is the supplying of data for the analysis of past performance, monitoring, planning, and future performance (Franco-Santos *et al.*, 2012). Along these lines, they consider the capacity of substantive explanations in predictive statistical models, even when they present low R^2 values, because the objective of this work is to confirm that the system of measuring and managing performance implemented by the NHA offers useful information for taking concrete actions in the present and perfecting HPO operations in the future (Lebas, 1995).

We wish to emphasize, in this case, that operational performance indicators present significant results in the determination of the economic-financial index. This result demonstrates the need for managers to revise their convictions about meeting regulatory demands, in line with the agency's resolutions, referring to the quality of their structure and operations which can favor the maintenance of an economic-financial situation in the following period. In line with the arguments of Banker *et al.*, (2000), the current literature on this subject suggests that, in accordance with the studies that prove that operational indicators are better predictors of economic-financial indicators than economic-financial indicators themselves, this should help the referenced managers rethink (or "refocus*")* their efforts in terms of the future repercussions of their present actions.

In terms of this study's limitations and implications, first of all, the obtained results may not be generalized given that this is a quantitative work that takes into account a non-probabilistic sample. The results (relationships and explanations) are applied only in the HPO sample studied from 2011 to 2014, and they seek to validate predictions of the following one year period, which is understood to be pertinent to the purchase of these plans by beneficiaries and the possibility of plan portability to other operators.

Besides, this study is limited to data collected through the information integrated by the regulatory body of these HPOs and later published. The data inserted in the operational systems linked with the NHA are provided by the operators, and therefore, it exists the possibility of error or fraud in filling out the information made available by the regulatory body.

There is no clear definition of performance selected by the managers who use performance measurement. As an example, we can cite the work of Lebas (1995) who sought a specific sector of operations with the intent of identifying homogeneous responses that could be used to guide a concept of performance for that sector. However, a small similarity was identified, or in other words, the concept of performance is still quite vast and general.

The changes proposed by the regulatory agency based on the base date of 2015 do not seem to pay attention to the evaluation cycle of the implemented public policy, even though it recognizes the difficulty of choosing indicators for different strategic orientations. In the health field, studies indicate that there is a need to use different measures combined to obtain useful information in the management of performance. This conclusion goes against the reduction in the informational content of indicators which began in 2015, especially in terms of the EFI.

It has been possible to demonstrate as well that the control variables related to location (capital or interior), type (for- or non-profit) and exclusively dental coverage have a negative effect on the determination of quality indicators. Thus, the NHA should make an effort to overcome these challenges and, in terms of its management indicators, accompany measures

that demonstrate the reality of the plans, service providers and plan beneficiaries to guarantee that the public interest is, effectively, being achieved, as pointed out by Salvatori and Ventura (2012).

Our findings support the relevance of performing new studies based on five questions (Lebas, 1995), aiming to characterize the measurement system and managing performance. The first is to understand the index trajectory. This perspective brings about information on main decisions of the regulatory agency in altering its calculation methodology as well as the previous results that motivated the demand for change. The second would be: what is the operational capacity of measurement? Within this context, we have realized in this work an analysis that considers the indices measured by the regulatory agency itself. However, it would be relevant to propose other types of statistical tests with the help of hypotheses to corroborate the findings of this study.

Next: what is the final objective of the system? This third question brings with it the perspective of the public policy implemented by the NHA and the determination of clear and consistent objectives. Despite this, it is clear that the measurements of quality indicators should be constantly evaluated to verify their real importance and their applicability. The fourth question would be: which method will be applied? Here there is a lot of space for academic studies in the evaluation of the application of the measurement methodologies.

Finally, how will we know if we have achieved the desired results? This last question seeks to tie measurement systems and management performance together and, therefore, needs quantitative returns to self-feed the system in the period following this process. In this study, we have identified that the result achieved is still far from ideal and those discrepancies identified in the analysis of these indicators propose new conduct in terms of the competition between HPOs and the improvement of quality and customer service throughout the entire country.

We conclude that this study has the potential to raise new questions about the implementation of this program, the relationship of costs and benefits in this process, and mainly whether the information made available by the HPOs and published by the NHA really provide significant content that can inform both the buyer and the seller during these plan purchasing decisions.

REFERENCES

Agência Nacional de Saúde Suplementar – ANS. Retrieved from: http://www.ans.gov.br. Acess on: 15 de fevereiro de 2018.

Baldassare, R.M. (2014). Análise do desempenho econômico-financeiro de operadoras de planos de saúde no mercado de saúde suplementar brasileiro [*dissertação*]. São Paulo: Escola de Administração de Empresas de São Paulo – FGV.

Banker, R. D., Potter, G., & Srinivasan, D. (2000). An Empirical Investigation of an Incentive Plan that Includes Nonfinancial Performance Measures. *The Accounting Review*, *75* (1), 65-92. https://doi.org/10.2308/accr.2000.75.1.65

Black, S., Briggs, S., & Keogh, W. (2001). Service quality performance measurement in public/private sectors. *Managerial Auditing Journal*, 16 (7), 400-405. https://doi.org/10.1108/EUM0000000005715

Cardoso, R.L. (2005). Regulação Econômica e escolhas contábeis: evidências no mercado de saúde suplementar brasileiro [*tese*]. São Paulo: FEA/USP.

Carvalho, R.R.O., Fortes, P. A.C., & Garrafa, V. (2013). Perspectiva bioética do modelo de assistência suplementar no Brasil. *Revista Bioética*, *21* (2), 259-267. http://dx.doi.org/10.1590/S1983-80422013000200009

Chenhall, R.H., Hall, M., & Smith, D. (2013). Performance measurement, modes of evaluation and the development of compromising accounts. *Accounting, Organizations and Society*, *38*, 268-287. https://doi.org/10.1016/j.aos.2013.06.002

Dawson, Y. (2016). The institutionalisation of private sector performance measurement in an Australian not-for profit organization [*Dissertação*]. Australia: Southern Cross University.

Delen, D., Kuzey, C., & Uyar, A. (2013). Measuring firm performance using financial ratios: A decision tree approach. *Expert Systems with Applications*, *40*, 3970-3983. https://doi.org/10.1016/j.eswa.2013.01.012

Franco-Santos, M., Bourne, M. & Lucianetti, L. (2012). Contemporary performance measurement systems: A review of their consequences and framework for research. *Management Accounting Research*, *23*, 79-119. http://dx.doi.org/10.1016/j.mar.2012.04.001

Gouveia, M.T.C.S. (2004). O modelo de Agência Reguladora e a ANS: construção do regime regulatório na saúde suplementar [*dissertação*]. São Paulo: Fundação Oswaldo Cruz – Escola Nacional de Saúde Pública – ENSP.

Ismail, T.H. (2007). Performance evaluation measures in the private sector: Egyptian practice. *Managerial Auditing Journal*, *22* (5), 503-513. https://doi.org/10.1108/02686900710750775

Kudlawicz, C. (2013). Um Estudo sobre o Impacto no Nível de Rentabilidade das Organizações Operadoras de Planos de Saúde em Função de seu Perfil [*dissertação*]. Paraná: Universidade Federal do Paraná.

Lebas, M.J. (1995). Performance measurement and performance management. *International Journal of Production Economics*, *41*, 23-35. https://doi.org/10.1016/0925-5273(95)00081-X

Lima, E.P., Beuren, I.M., & Hein, N. (2013) Performance measurement systems: A consensual analysis of their roles. *International Journal Production Economics*, *146*, 524-542. https://doi.org/10.1016/j.ijpe.2012.05.007

Mcintyre, D., Heier, E.J. & Rogers, L. (2001) Overview, History and Objectives of Performance Measurement. *Health Care Financing Review*, *22* (3). https://www.ncbi.nlm.nih.gov/pubmed/25372047

Moksony, F. (1990). Small is Beautiful. The use and interpretation of R^2 in social research. *Szociológiai Szemle, Special issue*, 130-138.

Nunes, R, Brandão C., & Rego, G. (2011). Public Accountability and Sunshine Healthcare Regulation. *Health Care Analysis*, *19* (4), 352-364. http://dx.doi.org/10.1007/s10728-010-0156-6

Rocha, I., Beuren, I.M., & Hein, N. (2012). Rentabilidade de empresas que utilizam o Balanced Scorecard (BSC) versus empresas que utilizam somente indicadores de desempenho financeiros. *Revista Estratégia e Negócios*, *5* (2), 88-119. http://dx.doi.org/10.19177/reen.v5e2201288-119

Rust, R.T., & Zahorik, A.J. (2004). Customer Satisfaction, Customer Retention, and Market Share. *Journal of Retailing*, *69* (2), 193-215. http://dx.doi.org/10.1016/0022-4359(93)90003-2

Saliterer, I., & Korac, S. (2013). Performance information use by politians and public managers for internal control and external accoutability purposes. *Critical Perspectives on Accounting*, *24*, 502-517. http://dx.doi.org/10.1016/j.cpa.2013.08.001

Salvatori, R.T., & Ventura, C.A.A. (2012). A Agência Nacional de Saúde Suplementar – ANS: Onze Anos de Regulação dos Planos de Saúde. *Organizações & Sociedade*, *19* (62), 471-487. http://dx.doi.org/10.1590/S1984-92302012000300006

Santos, F.P., Malta, D.C., & Merhy, E.E. (2008). A regulação na saúde suplementar: uma análise dos principais resultados alcançados. *Ciência & Saude Coletiva*, *13* (5), 463-475. http://dx.doi.org/10.1590/S1413-81232008000500012

Schiozer, R.F., Saito, C.C., & Saito, R. (2011). Desempenho financeiro e satisfação do consumidor das operadoras de saúde suplementar no Brasil. *Caderno de Saúde Pública*, *27* (11), 2175-2187. http://dx.doi.org/10.1590/S0102-311X2011001100011

Sedevich-fons, L. (2014). Financial Indicators in Healthcare Quality Management Systems. *The TQM Journal*, *26* (4), 312-328. http://dx.doi.org/10.1108/TQM-01-2014-0009

Relação entre Indicadores Financeiros e Não Financeiros das Operadoras de Planos de Assistência à Saúde

RESUMO

Objetivo: O presente estudo busca investigar a relação entre o indicador econômico-financeiro e os indicadores não financeiros divulgados pelas Operadoras de Plano de Saúde (OPS) para atendimento ao Programa de Qualificação da Saúde Suplementar (PQSS) da Agência Nacional de Saúde Suplementar (ANS). Para o período de 2011 a 2014 buscou-se verificar se a performance financeira é determinante da performance operacional de 916 OPS no exercício subsequente e vice-versa.

Método: Foram construídos cinco modelos estatísticos de regressão baseados nos Mínimos Quadrados Ordinários (MQO) e com erros-padrão robustos.

Originalidade/relevância: Realça a importância do sistema de mensuração da performance das OPS na perspectiva de atendimento às obrigações regulatórias e a possibilidade de utilização efetiva de tais indicadores pelos cidadãos-usuários no momento de escolha do plano.

Resultados: Os resultados confirmam que o índice financeiro tem relação positiva com os indicadores não financeiros do exercício subsequente. Além disso, exceto com relação ao indicador de satisfação do beneficiário quando da presença das variáveis de controle, os indicadores não financeiros foram capazes de explicar o índice financeiro.

Contribuições teóricas/metodológicas: Esta pesquisa têm o potencial de levantar novas questões sobre a implementação do PQSS e se o Índice de Qualificação da Saúde Suplementar (IDSS) realmente traz conteúdos informacionais significativos no momento de decisão e escolha, por parte do futuro beneficiário, do plano de saúde a ser contratado.

Palavras-chave: Agência Nacional de Saúde Suplementar, Administradoras de Planos de Saúde, Desempenho.

Leandro Fernandes de Jesus
Universidade Federal do Rio de Janeiro, RJ, Brasil
E-mail: leandrofj@hotmail.com

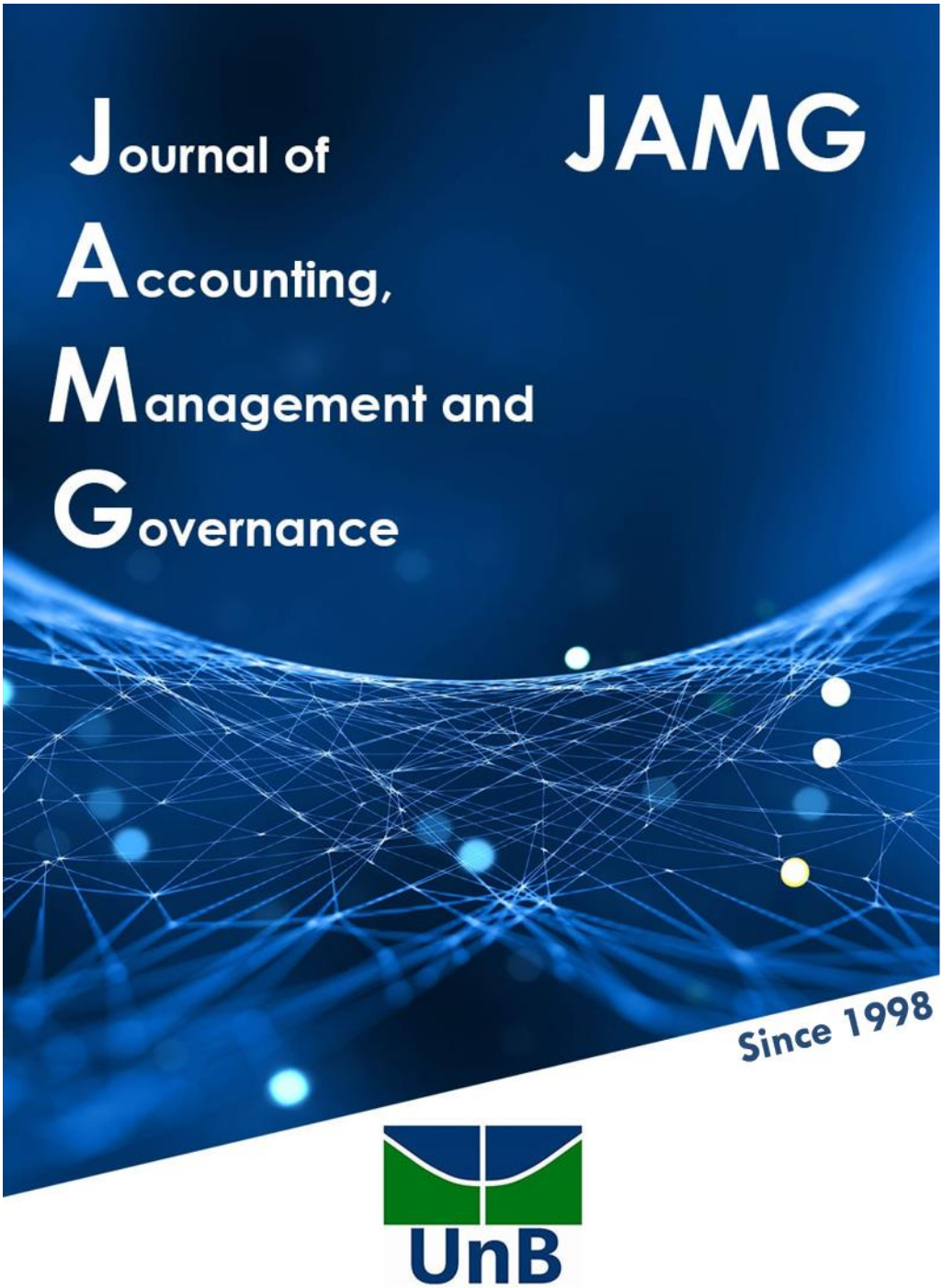
Juliana Molina Queiroz
Universidade Federal do Rio de Janeiro, RJ, Brasil
E-mail:julianamolina@facc.ufrj.br

Marcelo Álvaro da Silva Macedo
Universidade Federal do Rio de Janeiro, RJ, Brasil
E-mail: malvaro@facc.ufrj.br

Cláudia Ferreira da Cruz
Universidade Federal do Rio de Janeiro, RJ, Brasil
E-mail: claudiacruz@facc.ufrj.br

Fernanda Filgueiras Sauerbronn
Universidade Federal do Rio de Janeiro, RJ, Brasil
E-mail: fernanda.sauerbronn@facc.ufrj.br

Recebido: Novembro 07, 2018
Revisado: Julho 02, 2019
Aceito: Julho 31, 2019
Publicado: Dezembro 16, 2019


Journal of
Accounting,
Management and
Governance
JAMG
Since 1998
UnB