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CRCMG CONSELHO REGIONAL DE CONTABILIDADE DE MINAS GERAIS

# ABUNDANCE PARADOX THEORY: AN ANALYSIS OF HEALTHCARE COMPANIES' ECONOMIC AND FINANCIAL INDICATORS DURING THE PANDEMIC

## *TEORIA DO PARADOXO DA ABUNDÂNCIA: UMA ANÁLISE DOS INDICADORES ECONÔMICO-FINANCEIROS DE EMPRESAS DO SETOR DE SAÚDE DURANTE A PANDEMIA*

**ABSTRACT**

This study examines the behavior of liquidity, capital structure, and profitability indicators of healthcare companies listed on B3 before, during, and after the Covid-19 pandemic, using the Abundance Paradox Theory. The research adopts a quantitative approach, analyzing a sample of 23 healthcare companies on B3. The study period includes quarterly data from 2018 to 2024. Friedman's repeated-measures test results show that the pandemic had a direct impact on the healthcare sector. In the early stages of the pandemic, the industry experienced a positive change in economic and financial performance; however, this trend reversed after the pandemic, consistent with the Abundance Paradox Theory. Liquidity indicators improved during the pandemic but declined afterward. The equity structure remained stable before and during the pandemic, but third-party capital increased afterward. Profitability indicators reflected the sector's economic optimism, which was later reversed in the post-pandemic phase. The data support the idea that the Abundance Paradox Theory is a valuable tool for analyzing periods of economic euphoria affecting specific sectors. This study contributes to the literature by illustrating how this theoretical framework can be applied to other sectors during periods of resource abundance, thereby helping to predict factors that may hinder the sustainable growth of companies and the broader economy.

**Keywords:** Covid-19 Pandemic, Health Sector, Economic-Financial Indicators.

**RESUMO**

O presente estudo tem como objetivo analisar o comportamento dos índices de liquidez, da estrutura de capital e da rentabilidade das empresas do setor de saúde listadas na B3, antes, durante e após a pandemia de Covid-19, à luz da Teoria do Paradoxo da Abundância. A pesquisa adota uma abordagem quantitativa, com uma amostra de 23 empresas listadas na B3 do setor de saúde. O período de análise abrange os dados trimestrais de 2018 a 2024. Os resultados dos testes de medidas repetidas de Friedman revelaram que a pandemia impactou diretamente o setor de saúde. No primeiro momento pandêmico, o setor foi impactado positivamente em sua situação econômico-financeira, mas esse cenário foi revertido no período pós-pandemia, conforme a Teoria do Paradoxo da Abundância. Os indicadores de liquidez apresentaram melhora durante a pandemia; entretanto, voltaram ao nível anterior após o término dela. A estrutura patrimonial manteve-se estável antes e durante a pandemia, porém apresentou aumento do capital de terceiros após ela. Os índices de rentabilidade evidenciaram a euforia econômica que impactou o setor, mas essa euforia foi revertida no período posterior à pandemia. As evidências desta pesquisa, sob a ótica da Teoria do Paradoxo da Abundância, demonstram que ela pode atuar como uma ferramenta adicional de análise financeira em períodos de euforia econômica, revelando impactos em setores específicos. Contribui-se, portanto, ao demonstrar que essa análise pode ser utilizada para estudar outros setores em períodos de abundância de recursos, a fim de prevenir situações que possam constranger o desenvolvimento sustentável das empresas e do setor econômico.

**Palavras-chave:** Pandemia de Covid-19, Setor de Saúde, Indicadores Econômico-Financeiros.

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## 1 INTRODUCTION

The Covid-19 pandemic was a global event that significantly affected public health, the economy, and social relations. According to Silveira, Miranda, and Sousa (2024), the pandemic hindered progress toward the United Nations' Sustainable Development Goals (SDGs) of the 2030 Agenda, especially in low-income countries. Research involving 43 health indicators across 185 countries found that economic impacts were more severe in the most vulnerable nations, with a 16% decline in economic indicators, compared with only a 3% decrease in developed economies. The World Health Organization (WHO, 2024), through the Global Laboratory Leadership Programme (GLLP), highlighted that the pandemic placed unprecedented pressure on global health systems, exposing structural weaknesses and emphasizing the urgent need to strengthen laboratory and healthcare services.

Although the economic crisis affected many industries, the health sector stood out for its significant growth in several regions. In Brazil, the Brazilian Institute of Geography and Statistics (IBGE, 2024) reported a 10.3% increase in the health sector in 2021, making up 8% of the country's jobs, a 5.3% increase from 2010. Total wages in the sector amounted to R$372.3 billion, representing 10.5% of the Brazilian economy. Globally, the remarkable rise in healthcare company stocks during the pandemic demonstrated investor confidence in this sector, even amid the widespread economic downturn (Oncu, 2021; Sun et al., 2021).

An interpretive view on understanding this dynamic relates to the Theory of the Paradox of Abundance. This theory examines episodes of economic euphoria and emphasizes that their effects can be both positive and negative. It is derived from the Dutch Disease Theory. This approach suggests that periods of economic growth driven by abundant resources can lead to unbalanced development. Pamplona and Cacciamali (2017) observed that increases in natural resource exports in underdeveloped countries often lead to development that harms society. Chaves et al. (2020) highlighted the effects of the Kandir Law, which, while promoting exports, also negatively impacted basic education in Pará. Therefore, the Abundance Paradox Theory demonstrates that periods of economic euphoria can obscure structural vulnerabilities and impede long-term development.

This phenomenon is evident in the health sector. Despite the global crisis, this sector benefited from positive expectations due to its key role in addressing the pandemic. The health sector received financial incentives and support from government public policies to reduce its impact (Ayati et al., 2020; Brazil, 2021). This initial excitement can lead to a paradox: a seeming economic prosperity for the sector, which later created adverse structural conditions for some companies in the post-pandemic period.

In this context, accounting provides a set of economic and financial indicators that enable the evaluation of a company's and sector's financial health, providing a clearer view of their performance across economic cycles. However, there is ongoing debate about whether these indicators fully capture economic reality, given their methodological limitations and interpretive challenges (Martins et al., 2018). Nonetheless, these indicators are essential tools for measuring the pandemic's economic impact on the health sector.

Given this scenario, this research aims to answer the following question: What were the behaviors of the liquidity, capital structure, and profitability ratios of health companies listed on B3 before, during, and after the Covid-19 pandemic, in light of the Abundance Paradox Theory? The main goal of this study is to analyze these indicators from 2018 to 2024, applying the Abundance Paradox Theory to examine the economic and structural changes resulting from resource reallocation during the health crisis. To achieve this, the study will include: a mapping of net revenue, current liquidity indicators, third-party capital participation, return on equity, and return on assets of health sector companies, as well as statistical tests on these measures before, during, and after the Covid-19 pandemic.

This research is important because it examines whether the pandemic affected the financial dynamics of the healthcare sector. It is understood that the global health crisis not only altered demand for health services but also revealed structural weaknesses that could threaten the sector's financial stability. By incorporating analysis from the Paradox of Abundance Theory, this study offers a valuable perspective for sectoral analyses, particularly when economic sectors experience periods of euphoria. This approach allows identification of whether the growth observed during the pandemic was sustainable or whether it masked structural challenges that became evident after the crisis.

Among the empirical contributions of this research, the ability to use this theoretical lens to explain implications in economic and financial analyses stands out. Beyond the health sector, it can be applied to other sectors during periods of economic euphoria, when temporary expansions are driven by external factors such as government policies, sudden increases in demand, or significant investments. Examples include sectors such as technology during the recent pandemic (Santos et al., 2024), civil construction during real estate booms (Guedes et al., 2016), and the commodities sector during export cycles (Silva & Silva Filho, 2020). Viewing the analysis through the lens of the Abundance Paradox Theory, therefore, broadens understanding of the limits of sustained economic growth and helps identify patterns that may signal poor resource management and missed opportunities.

Therefore, this study not only enhances understanding of the financial behavior of healthcare companies during the Covid-19 pandemic but also provides an analytical approach applicable to other economic contexts. This broader application of the theoretical framework can further assist managers, investors, and public policymakers in developing stronger, more resilient strategies to mitigate risks associated with economic growth driven by temporary or cyclical factors (Martins et al., 2018).

## 2 THEORETICAL FRAMEWORK

### 2.1 Abundance Paradox Theory and Financial Indicators

The Abundance Paradox Theory explains that having many natural resources does not necessarily lead to sustainable growth for countries, nor does it yield higher economic growth than countries lacking such abundance. In this context, the literature on the topic mainly focuses on countries (Varela et al., 2018). These studies show that while natural resource exports generate financial wealth for countries, this abundance—both natural and financial—has adverse effects on the economy overall and ultimately does not lead to the country's improvement or sustainable economic growth. According to Pamplona and Cacciamali (2017), "something that we can call the 'paradox of abundance' has been established, in which the generosity of nature, represented by the profusion of natural resources, originates, among other deleterious effects, low economic growth in the long term" (Pamplona & Cacciamali, 2017, p. 253).

Variations of this theory are viewed through the lens of Dutch disease or the resource curse. From this perspective, rapid growth in a sector such as natural resources can lead to deindustrialization and weaken other economic sectors, particularly in open and small economies (Strack & Azevedo, 2012).

Bresser-Pereira et al. (2024) expanded the discussion and defined Dutch disease as the persistent overvaluation of a country's exchange rate, caused by the exploitation of abundant and inexpensive natural resources. This overvaluation of the exchange rate enables commodity exports to occur at a more appreciated exchange rate than is necessary for other sectors of tradable goods that utilize advanced technology to remain competitive. If Dutch disease is not addressed, it can hinder industrialization or even lead to deindustrialization, creating a barrier to the country's sustainable economic growth.

Therefore, in these studies, the initial euphoria generated by a boom in the natural resources sector can hinder long-term economic growth, delaying the economy's diversification in subsequent years. Bresser-Pereira et al. (2024) emphasize that this is a "wealth shock in the natural resources sector, which creates excess demand in the non-tradable goods sector, implying a change in relative prices" (Bresser-Pereira et al., 2024, p.3). This idea of a wealth shock is key to understanding how it can influence economic development.

Other authors have explored this idea in different contexts. Dantas Júnior et al. (2020), for example, examine the relationship between oil royalties and the development of Brazilian municipalities, questioning whether these revenues genuinely support local progress. The research is grounded in the "resource curse" theory. It tests the hypothesis that the influx of financial resources from a boom in oil prices does not necessarily lead to socioeconomic development in the municipalities that receive these royalties. The study analyzes data from oil-producing and non-oil-producing municipalities between 2013 and 2016, using municipal development indices created by FIRJAN. The results indicate that, although royalties may initially promote economic growth, their effects on health and education may be harmful.

At the state level, Santos and Rodrigues (2017) examine the effectiveness of the Fundo de Participação dos Estados (FPE) in fostering socioeconomic balance among Brazilian regions, considering disparities in transfers and socioeconomic inequalities. The Theory of the Paradox of Abundance is referenced to understand the FPE's situation, which, although designed to reduce inequalities, may not be fulfilling this goal. The results suggest that the FPE distribution model is ineffective in decreasing socioeconomic disparities. Even in states that receive substantial resources, the initial positive effects on economic growth and on reducing income concentration are not sustained in the long run. This may be due to the absence of tools to ensure effective resource management, such as mandatory matching funds, accountability mechanisms, and performance evaluation systems.

The study by Chaves et al. (2020) also applies the Abundance Paradox Theory to analyze the connection between natural resource exports (primary and semi-processed) and the educational development of Pará. It demonstrates that higher natural resource exports lead to greater ICMS tax relief in the state, which, in turn, negatively affects the development of basic education.

In a business context, no studies have been found that implement the theory. However, there is extensive literature addressing financial bubbles in stock prices. These studies show that there are periods during which the price of company shares exhibits an upward (explosive or abnormal) trend that exceeds the company's investments (Morandim, 2020). Moments of market euphoria involve an abnormal increase in share value. This extraordinary growth can influence company dynamics, affecting the development of those experiencing such euphoria. In this way, the theory of the paradox of abundance can help expand the understanding of corporate analysis by including these moments and evaluating their impact on companies' financial health and the sector as a whole. For instance, this euphoria may be reflected in increased net revenues for companies and the sector as a whole. For example, in the healthcare sector, demand for services resulting from the Covid-19 public health crisis may have led to higher net revenues and potentially improved liquidity, capital structure, and profitability ratios.

### 2.2 The Abundance Paradox Theory applied to sectoral business analysis

The Abundance Paradox Theory, often explored in macroeconomic settings, can also be applied to sector-specific business analysis, particularly in sectors that have experienced rapid growth following positive economic shocks. Heresi (2023), in a study on commodity booms, found that these booms encourage the reallocation of productive factors to

non-tradable sectors, thereby reducing the productivity of the local manufacturing sector. Likewise, Ismail (2010), in analyzing the effects of Dutch Disease in oil-exporting countries, found that permanent increases in oil prices can negatively affect manufacturing output, particularly in economies with more open capital markets.

These studies demonstrate that macroeconomic shocks related to resource abundance, such as economic euphoria, can adversely affect firms' competitiveness and sustainability. Specifically, in the health sector, the influx of financial resources and increased demand during the pandemic may have masked operational weaknesses and led to increased debt.

The strategic management literature also supports this analytical shift. Macro-environmental analysis models, such as PESTAL (Politics, Economics, Society, Technology, Environment, and Law), are used in strategic planning to identify external factors that affect organizational performance. According to Silva and Ramos (2022), the PESTAL model enables a structured analysis of the external environment and its impact on sectoral return indicators, demonstrating practical value for managers and financial analysts alike. In this context, the Covid-19 pandemic represents a highly impactful external event across the health and economic sectors, altering market dynamics and significantly affecting specific industries such as healthcare. The paradox of abundance theory can be seen as a way to interpret the "economic" factor in PESTAL analysis, helping us understand that a period of prosperity may not necessarily lead to sustainable growth.

Therefore, by adopting this theoretical perspective, the present study extends the application of the Theory of the Paradox of Abundance in the applied sciences, suggesting that understanding macroeconomic phenomena can inform sectoral and business behavior during periods of crisis and recovery.

## 2.3 Economic-financial indicators

Economic and financial indicators are crucial for evaluating a company's health and performance. During periods of economic euphoria, such as the one observed in the health sector during the Covid-19 pandemic, this analysis becomes even more vital because it uncovers changes in the equity structure of companies and the sector. Analyzing financial statements provides valuable insights into a company's situation (Martins et al., 2018). In this context, this study aims to determine whether the paradox of abundance influences the structure of healthcare companies listed on the B3 stock exchange and to assess whether this is reflected in key economic-financial indicators like liquidity, equity structure, and profitability.

### 2.3.1 Liquidity Indicators

Liquidity ratios provide insights into a company's capacity to meet its debt obligations. As Santos and Santos (2008) argue, managing and analyzing liquidity is one of the most important aspects of financial management, especially when facing insolvency risk. They emphasize that a thorough liquidity analysis should incorporate not only traditional ratios but also alternative methods to avoid misjudging the company's actual ability to meet its obligations. Additionally, there is a connection between liquidity and profitability: profitable companies tend to manage liquidity more effectively, using credit lines and cash reserves to buffer shocks and preserve financial flexibility (Nikolov et al., 2019). Therefore, in a state of euphoria—such as in a paradox of abundance scenario—liquidity may increase due to higher sector resources, leading companies to hold more assets (including liquid assets) than liabilities. Given this context, hypothesis 1 is introduced.

Hypothesis 1: There was an increase in the current liquidity of companies and the health sectors during the pandemic.

### 2.3.2 Equity Structure

The equity structure describes how a company's capital is arranged, including the portion of assets financed by equity and third-party resources (debt). Using third-party resources imposes financial burdens on the company, whereas capital equity has no explicit cost but an implicit one that reflects the expected return to investors (Martins et al., 2018). Brito et al. (2007) examined the factors influencing a company's capital structure and highlighted the significance of risk, size, asset composition, and growth. Companies with higher risk tend to be less leveraged, while larger companies generally have better access to resources. Asset composition and growth potential also affect indebtedness. However, profitability was not found to be a key determinant of the equity structure (Brito et al., 2007).

Furthermore, the link between debt and business performance is often negative in developing countries, as Delgado (2021) demonstrates; high debt levels tend to reduce performance due to higher financing costs during crises.

During periods of economic euphoria, such as the one experienced in the pharmaceutical sector during the Covid-19 pandemic, companies may increase their fixed assets, either through equity or loans. However, this rapid growth in assets can strain the company's finances if it is not sustainable over the long term. Based on these arguments, hypothesis 2 is proposed.

Hypothesis 2: There was an increase in the share of third-party capital after the pandemic.

### 2.3.3 Profitability Indicators

Profitability indicators assess how effectively a company generates profits from its invested resources (Martins et al., 2018). These indicators are affected by both internal and external factors. According to Santos et al. (2024), internal factors include the company's operations and management, while external factors pertain to macroeconomic variables and market conditions. Regarding internal factors, Carvalho et al. (2017) note that the ROE (Return on Equity) of Brazilian companies can directly reflect their operational characteristics, particularly when analyzed through net margins and asset turnover, which demonstrate the company's ability to produce returns on equity.

Regarding external factors, macroeconomic variables like GDP and the exchange rate can influence profitability indicators. These variables typically enhance a company's ability to generate profit during growth periods, whereas in downturns they can substantially reduce returns (Jacques et al., 2020).

During the Covid-19 pandemic, the healthcare sector experienced a noticeable increase in demand for its products and services, which likely led to significant improvements in profitability indicators. However, according to the Abundance Paradox Theory, this growth may only be temporary. Although the sector initially experienced a "boom," once demand stabilizes or declines, profitability indicators often fall. This may indicate unsustainable growth that will become apparent when external factors and demand return to normal levels. In light of this, hypothesis 3 is introduced.

Hypothesis 3: There was a drop in the profitability indicators of companies in the healthcare sector after the pandemic.

## 3 METHODOLOGY

To analyze the behavior of liquidity ratios, capital structure, and profitability of healthcare companies listed on B3 before, during, and after the Coivd-19 pandemic, a descriptive study was conducted using financial data, employing a quantitative approach in light of the Abundance Paradox Theory. The population includes publicly traded companies listed on B3 in the healthcare sector from 2018 to 2024. Financial data were collected from the Economatica platform, which is divided into four subsectors: medicines and other products, medical services (hospitals, analysis, and diagnostics), equipment, and trade and distribution. During the analysis period (2018 to 2024), 23 companies were identified, constituting the final sample for the study.

Although identifying subsectors enables more detailed analysis, an overall approach was chosen. This choice is supported by the limited number of observations in each subsector, which could reduce the statistical power required for comparison tests between periods (Dancey et al., 2017). Additionally, because the primary goal is to understand the pandemic's systemic effects from the perspective of the Paradox of Abundance Theory, the overall analysis more effectively captures macroeconomic trends common across sectors.

### 3.1. Data Collection

For data analysis, the following information was collected from Economática: net revenue, liquidity indicators, equity structure (third-party capital and net worth), and profitability (ROE and ROA). The data spans a quarterly time series from 2018 to 2024. This analysis covers three distinct periods, considering that the Emergência de Saúde Pública de Importância Nacional (ESPIN) due to Covid-19 was declared by the Ministry of Health on February 3, 2020, and ended on April 22, 2022. Therefore, the time periods are as follows:

- Before the pandemic (first quarter of 2018 to first quarter of 2020);
- During the pandemic (second quarter of 2020 to second quarter of 2022), and
- Post-pandemic (from the third quarter of 2022 to the third quarter of 2024).

The quarterly frequency was chosen to enable a more precise and comparable analysis of the indicators over time. The indicators collected on the Economática Platform are listed in Table 1.

**Table 1 – Economic-Financial Indicators**

| Indexes | Calculation Formula | Interpretation |
|---|---|---|
| Net Revenue | Net Revenue DRE | Total value received from the sale of its products or services, after deducting the costs of sale. |
| Current Ratio (CR) | Current Assets / Current Liabilities *100 | Demonstrates the company's ability to meet short-term obligations. |
| Third-Party Capital | Total Net Debt / Net Worth *100 | Represents the total amount of third-party capital in relation to equity (debt). |

| Indexes | Calculation Formula | Interpretation |
|---|---|---|
| ROE (average) | LL/PL*100 | Expresses the ability to generate profit relative to the owners' investment. |
| ROA | LL/ Active *100 | Signals the ability to generate profit relative to all invested Capital. |

**Legend**: DRE = Income Statement; LL = Net Profit; PL = Equity; ROE = Return on Equity; ROA = Return on Assets.
**Source**: Economatica – adapted by the authors

As shown in Table 1, the current liquidity ratio was used as a representative of the liquidity indicator. To analyze capital structure, specifically the involvement of third-party capital, the third-party capital ratio was used. Additionally, for profitability indicators, the focus was on ROE and ROA. It is assumed that ROE measures the company's efficiency in using shareholders' capital to generate profit, whereas ROA assesses the company's effectiveness in converting assets into profit.

### 3.2. Data Processing

Data processing involved comparing the averages of financial indicators across three analysis periods. To determine if the differences between these periods are statistically significant, analysis of variance (ANOVA) was used. This method assesses whether there are meaningful differences among the indicator averages at three points: before, during, and after the Covid-19 pandemic (França, 2023).

This methodology follows the approach used in previous studies (Araújo et al., 2021; Santos et al., 2024), in which quarterly data are analyzed to identify patterns in economic and financial behavior across different phases of crises. The use of ANOVA enables simultaneous comparisons of periods and helps detect variations in financial indicators in response to the pandemic (Dancey et al., 2017).

Because the sample data were not normally distributed, nonparametric tests were used. The Friedman test for repeated measures was adopted. In this test, data are transformed into ranks by ordering the values of each experimental unit in ascending order. The Friedman test assesses whether significant differences exist among the medians of the conditions under study, accounting for the relative order of the data (Fadeyi, 2021). If the test reveals a significant difference, it is concluded that at least one condition differs from the others. However, the test does not specify which periods differ, so post-hoc tests, specifically the Multiple Comparisons test (Durbin-Conover), are necessary. This non-parametric approach is robust to asymmetrical distributions and outliers, making it a practical alternative when the assumptions of ANOVA are not met (Dancey et al., 2017).

The data includes 23 companies in the health economics sector of B3. These companies vary in size, from smaller firms with assets of approximately R$250 million to those with assets exceeding R$90 billion. They also serve different economic roles; some focus on hospital management, drug manufacturing, distribution and marketing, or production and supply of equipment. Table 2 summarizes information on stock exchange trading and asset size for the companies in the sample.

**Table 2 – Information about health companies**

| Company | Subsector | Start of trading of shares | Total Assets in thousands of R$ | Number of Shares in thousands |
|---|---|---|---|---|
| ALLIAR | Hospital Services, Analyses, and Diagnostics | 28/10/2016 | 2.669.811 | 118.080 |
| BAUMER | Equipment | 20/05/1970 | 249.925 | 9.785 |
| BIOMM | Medicines and Other Products | 03/02/2014 | 344.698 | 89.100 |
| BLAU | Trade and Distribution | 19/04/2021 | 3.053.528 | 177.681 |
| DASA | Hospital Services, Analyses, and Diagnostics | 19/11/2004 | 26.213.200 | 747.048 |
| D1000VFARMA | Trade and Distribution | 10/08/2020 | 1.548.519 | 50.603 |
| FLEURY | Hospital Services, Analyses, and Diagnostics | 17/12/2009 | 11.579.968 | 545.041 |
| HAPVIDA | Hospital Services, Analyses, and Diagnostics | 25/04/2018 | 73.186.145 | 7.495.107 |
| HYPERA | Trade and Distribution | 18/04/2008 | 24.508.751 | 632.909 |
| KORA SAUDE | Hospital Services, Analyses, and Diagnostics | 13/08/2021 | 4.704.610 | 768.481 |

| | | | | |
|---|---|---|---|---|
| LIFEMED | Equipamentos | 06/01/2020 | 317.560 | 2.576 |
| MATER DEI | Hospital Services, Analyses, and Diagnostics | 16/04/2021 | 5.171.451 | 382.043 |
| NORTCQUIMICA | Medicines and Other Products | 03/02/2014 | 331.376 | 11.878 |
| ODONTOPREV | Hospital Services, Analyses, and Diagnostics | 01/12/2006 | 2.163.973 | 552.496 |
| OUROFINO S/A | Medicines and Other Products | 21/10/2014 | 9.181.154 | 508.285 |
| ONCOCLINICAS | Hospital Services, Analyses, and Diagnostics | 10/08/2021 | 1.279.009 | 53.768 |
| PROFARMA | Trade and Distribution | 26/10/2006 | 4.937.926 | 122.611 |
| PAGUE MENOS | Trade and Distribution | 02/09/2020 | 8.988.598 | 538.978 |
| DIMED | Trade and Distribution | 03/08/1984 | 3.077.470 | 148.852 |
| QUALICORP | Hospital Services, Analyses, and Diagnostics | 29/06/2011 | 4.509.325 | 279.248 |
| RAIADROGASIL | Trade and Distribution | 03/07/2007 | 20.094.412 | 1.714.382 |
| REDE D OR | Hospital Services, Analyses and Diagnostics | 10/12/2020 | 90.342.356 | 2.254.607 |
| VIVEO | Trade and Distribution | 09/08/2021 | 10.186.693 | 320.047 |

**Source**: B3 – adapted by the authors

## 4. RESULTS

Table 3 presents the selected health-sector indicators for the periods preceding, during, and following the pandemic. Overall, the sector exhibits liquidity ratios indicating its ability to meet obligations across all sample periods, as current assets exceed current liabilities in every period. Therefore, it is assumed that companies have enough assets to cover their liabilities, including in the short term.

Regarding capital structure, the equity-to-debt ratio is confirmed. The debt-to-equity ratio measures the proportion of capital financed by debt relative to net worth, indicating the level of financial leverage. After the pandemic, this ratio averaged 42.29% and had a median of 44.64%, indicating that the companies analyzed began to rely more on debt. Although this suggests increased dependence on debt, net worth still exceeds debt, indicating a relatively balanced financial structure.

Profitability ratios indicate healthcare companies' ability to generate profits, as measured by ROE and ROA. Both experienced a sharp decline after the pandemic, showing decreased financial efficiency.

**Table 3 – Descriptive Statistics of the Indicators**

| Index | Before | | During | | After | |
|---|---|---|---|---|---|---|
| | Average | Median | Average | Median | Average | Median |
| Net Revenue* | 1.259,2 | 821,1 | 1.677,3 | 936,4 | 2.359,1 | 1.146,9 |
| Current Ratio (CR) | 1,79 | 1,58 | 2,02 | 1,66 | 1,97 | 1,52 |
| Third-Party Capital | 39,20 | 40,34 | 36,73 | 32,11 | 42,29 | 44,64 |
| ROE (average) | 4,10 | 3,47 | 3,96 | 3,19 | 1,63 | 2,04 |
| ROA | 1,89 | 1,61 | 1,69 | 1,19 | 0,87 | 0,88 |

**Legend:** *In millions of R$ adjusted for inflation
**Source**: Economática – adapted by the authors.

Subsequently, analysis of variance tests were performed. Initially, it was verified whether the sample data followed a normal distribution to determine whether a parametric (ANOVA) or non-parametric (Friedman) test was appropriate (Dancey et al., 2017). AS shown in Table 4, all indicators exhibited non-normal distributions. Therefore, the nonparametric Friedman test was used to compare the medians of the periods before, during, and after the Covid-19 pandemic. In addition, the Multiple Comparisons test (Durbin-Conover) was applied to verify the difference between the periods.

**Table 4 – Normality and Friedman Tests**

| Index | Friedman's Test | Multiple Comparisons | | |
|---|---|---|---|---|
| | | 1-2 | 1-3 | 2-3 |
| Net Revenue | <,001* | <,001* | <,001* | 0,021* |
| Current Ratio (CR) | <,001* | <,001* | 0,273 | 0,008* |
| Third-Party Capital | <,001* | 0,954 | 0,009* | 0,007* |
| ROE (average) | <,001* | 0,122 | 0,015* | <,001* |
| ROA | <,001* | 0,47 | <,001* | <,001* |

**Legend**: Reject H0 with 5% significance.
**Source**: Prepared by the authors.

The results indicated statistically significant differences in the medians across the three periods analyzed for all indicators. The Friedman test results showed statistically significant differences among the three periods ($p < 0.001$), with the average increasing from R$1,259.2 million in the pre-pandemic period to R$2,359.1 million in the post-pandemic period. Despite this notable rise in healthcare sector sales, revenue growth did not lead to improvements in profitability indicators. This suggests that higher sales may have been offset by increased operating costs and financial expenses, thereby hampering companies' financial efficiency during the period examined.

Current Liquidity showed a significant difference only between two pairs of periods: before and during the pandemic, and during and after the pandemic. There was no significant difference between the pre- and post-pandemic periods, indicating that the health sector returned to the pre-crisis liquidity level. This difference was evident both before and during the pandemic, when the current liquidity ratio increased from 1.58 to 1.66. After the pandemic, liquidity decreased to 1.52, a level significantly different from that during the pandemic. This movement in liquidity reflects a cycle of economic euphoria during the pandemic, which was reversed after the critical period ended. During the pandemic, the health sector had higher liquidity despite high demand for its services, but this liquidity later returned to earlier levels. These findings do not allow us to reject hypothesis 1 and reinforce the idea that periods of economic euphoria increase the sector's liquidity and its ability to meet obligations.

The capital structure, as indicated by the Third-Party Capital measure, also showed statistically significant differences between the periods before and after the pandemic, as well as between the periods during and after the pandemic. Before and during the pandemic, third-party capital stayed steady, with a median of 32.11. However, in the post-pandemic period, it rose significantly to 44.64, the highest debt level observed during this period. This suggests that the healthcare sector became more reliant on third-party capital after the pandemic, possibly due to higher global interest rates at that time (Holston et al., 2023). Likewise, this result does not allow us to dismiss hypothesis 2, as the share of third-party capital increased following the pandemic.

The profitability indicators also showed significant results in the Friedman test at a 5% significance level. Profitability, measured by ROE and ROA, was notably lower in the post-pandemic period than during the pandemic. The median ROE decreased from 3.19 to 2.04, while the median ROA declined from 1.19 to 0.88. These findings emphasize a notable drop in the operational efficiency of the analyzed companies, which started generating less profit per unit of invested capital after the pandemic.

The ROA values indicate that, in the healthcare sector, starting with R$100 in assets, the firm generated R$1.61 in net profit during the pre-pandemic period. During the pandemic, this value decreased to R$1.19; in the post-pandemic period, it fell to R$0.88. The median analysis indicates that, in the post-pandemic period, half of the observations are above R$0.88 and half are below. Additionally, in the percentile analysis, 25% of companies reported a negative indicator of R$0.36 in the same period. In the upper percentiles, 75% of companies reported lower net profit, ranging from R$2.38 to R$1.36. These data reinforce the decline in the healthcare sector's overall ability to generate net profit from its assets. These findings also support hypothesis 3, which posits that the reversal of economic euphoria affects the healthcare sector by reducing its profitability.

To better understand the decline in the ROA profitability indicator from the pandemic period to the post-pandemic period, Table 5 presents the components of this indicator, specifically total assets and consolidated profit (i.e., net profit plus the result of minority shareholders).

**Table 5 - Descriptive Statistics – Total Assets and Consolidated Profit adjusted for inflation.**

| Items | Total Assets | | | Consolidated Profit | | |
|---|---|---|---|---|---|---|
| | Before | During | After | Before | During | After |
| Median | 3.466,5 | 4.508,2 | 4.922,9 | 32,3 | 35,5 | 18,9 |
| 25º percentile | 994,4 | 1.602,3 | 1.659,8 | 3,4 | 7,1 | -12,6 |
| 50º percentile | 3.466,5 | 4.508,2 | 4.922,9 | 32,3 | 35,5 | 18,9 |
| 75º percentile | 6.820,3 | 7.586,8 | 12.046,9 | 126,1 | 113,3 | 87,6 |
| Friedman p-value | 0,001* | | | 0,022* | | |

**Note:** Values are in millions of R$. * Significant at 95%.
**Source**: Prepared by the authors.

According to Friedman's repeated measures test, complemented by Durbin-Conover's Multiple Comparisons, it was found that the median Total Assets of healthcare companies showed statistically significant differences between the three periods analyzed. Before the pandemic, the median total assets of the companies were R$3.4 billion, increasing to R$4.5 billion during the pandemic and reaching R$4.9 billion in the post-pandemic period. This increase suggests sustained asset expansion, possibly driven by infrastructure investments, asset acquisitions, and growth in demand for healthcare services.

Conversely, the companies' consolidated profits declined sharply in the post-pandemic period. During the pandemic, the median consolidated profit was R$35.5 million; it declined to R$18.9 million thereafter. Additionally, the 25th percentile paints an even more concerning picture: many companies reported losses after the pandemic, with losses of approximately R$12.6 million. This decline can be attributed to higher operating costs, increased financial expenses due to higher debt levels, and shrinking profit margins, despite revenue growth.

The gap between the rise in Total Assets and the decline in Consolidated Profit indicates that the Brazilian healthcare sector struggled to translate its asset growth into solid financial results. This suggests that operational inefficiencies may have occurred and that costs rose during the period studied. It was also seen that healthcare companies' total assets increased in all periods analyzed. However, this growth did not lead to higher consolidated profits.

The Theory of the Paradox of Abundance suggests that episodes of economic euphoria can lead companies and sectors to pursue paths that are not necessarily beneficial, highlighting the paradoxical effects of abundance. In the healthcare sector examined, economic growth during the pandemic led to a steady rise in net revenue and greater liquidity. In other words, the healthcare sector received more resources than it committed to during this period.

The Brazilian regulatory environment changed during the pandemic, which may explain companies' financial performance in the sector. The enactment of Law 13.979/2020 and the declaration of a Public Health Emergency of National Importance (ESPIN) enabled greater flexibility in public procurement processes, the purchase of supplies, and the approval of medicines, thereby increasing liquidity observed during the pandemic (Nobre & Aguiar, 2020). Companies could accelerate their buying and selling processes, reducing the timeframes that typically define the sector, which may partly account for the sustained growth in net revenue over the three periods analyzed. The public health policies implemented also contributed to these results. The Federal Government launched an unprecedented investment program totaling over R$540 billion to combat the pandemic, allocating R$106 billion through specific extraordinary Covid-19 credits (Ministry of Health, 2022). This large volume of public resources created an environment of financial abundance that may have directly impacted the liquidity indicators of the companies studied. The government's strategy of expanding healthcare capacity by creating ICU beds and acquiring medical equipment generated extraordinary demand for private-sector goods and services, boosting net revenue and improving liquidity indicators during the pandemic. Furthermore, the creation of financing mechanisms, facilitated by BNDES with subsidized rates and extended terms, partly explains the rise in third-party capital participation observed after the pandemic (BNDES, 2020).

However, with the end of the pandemic, debt levels increased, while profitability indicators declined sharply. This situation indicates growth that, although it occurred during the pandemic, was insufficient to sustain proportional returns after the health crisis ended. In summary, the health sector expanded, but its ability to generate profit did not keep pace with asset growth.

This research broadens the understanding of financial dynamics in the health sector during the pandemic. While Goulart et al. (2023) examined the periods before and during the pandemic and noted increases in liquidity, assets, and net margin, their findings do not account for the significant declines in profitability indicators observed here, which could be due to differences in time frames. Goulart et al. (2023) focused on a period when demand for health services was at its highest, driven by the urgency of the pandemic. In contrast, this study also covers the post-pandemic period, during which economic incentives declined, and financial costs increased.

Another important point is that, according to Goulart et al. (2023), asset growth was associated with more stable financial performance in the analyzed subsectors, such as medical services. However, in the post-pandemic period, as this study shows, this growth was insufficient to sustain profitability, indicating structural weaknesses that were obscured by the pandemic's economic euphoria.

Therefore, while the study by Goulart et al. (2023) emphasizes the immediate and positive impact of the pandemic on the sector, this work provides a more comprehensive perspective by examining the reversal of these indicators in the following period, highlighting the significance of analyzing complete economic cycles and the lasting effects of moments of euphoria.

In this context, the Paradox of Abundance Theory provides an additional perspective for sectoral and business analyses during periods of economic euphoria. The theory warns that positive indicators from these times can hide vulnerabilities that threaten sustainable development. This warning is critical to prevent major surprises in economic and financial indicators when euphoria ends. In this research, it was found that, following the pandemic, liquidity declined, dependence on third-party capital increased, and profitability indicators declined, reinforcing the paradoxical effects of economic abundance.

## 5. CONCLUSION

This study examined the behavior of net revenue, liquidity indicators, equity structure, and profitability of healthcare companies listed on the B3 stock exchange during the periods before, during, and after the Covid-19 pandemic, from the perspective of the Abundance Paradox Theory. This theory proposes that periods of economic abundance can produce contradictory effects, leading to adverse long-term outcomes. Applied to Brazilian healthcare companies listed on B3, the analysis aimed to determine whether the economic euphoria seen during the pandemic was reflected in the economic and financial indicators and whether it reversed after the critical period ended.

The results revealed significant effects on the companies' financial dynamics. Regarding liquidity ratios, current liquidity increased during the pandemic but declined in the post-pandemic period, indicating a reversal of a temporary increase in payment capacity. This behavior supports the hypothesis that the sector experienced a cycle of economic euphoria followed by an adjustment in financial conditions.

Regarding the asset structure, the post-pandemic increase in the share of third-party capital indicates greater reliance on debt, suggesting that companies turned to external financing to support operations and investments in the new economic environment. This finding emphasizes the challenge of balancing asset growth with financial stability.

Profitability indicators, particularly return on assets (ROA), declined significantly in the post-pandemic period, indicating a decrease in the efficiency with which companies convert their assets into profits. This decline can be linked to the slowdown in extraordinary pandemic-related demand and the rise in operational and financial costs, which affected the sector's ability to sustain the profitability levels observed during the crisis.

The findings support the assumptions of the Abundance Paradox Theory, which warns of the dangers of periods of economic euphoria hiding structural weaknesses, leading to unsustainable financial performance over the long term. The analysis indicates that although the pandemic briefly increased liquidity and asset growth in the sector, these gains were reversed in a post-crisis period characterized by higher debt and lower profitability.

The implications of these findings emphasize the importance of carefully analyzing economic and financial indicators during times of euphoria. If this euphoria is transient, it may suggest a paradox that limits sustainable development, with profitability indicators reversing as assets grow and third-party capital participation increases. A practical implication of this research is highlighted by the innovation suggested by the Theory of the Paradox of Abundance, which shows that companies, across sectors, have capitalized on favorable economic conditions. However, these can also create factors that hinder the maintenance of the results achieved.

Although this research was conducted in the health sector, it suggests that this perspective can also be applied to other areas of the Brazilian economy that experienced significant growth during the pandemic, such as the supermarket and e-commerce sectors. For instance, the supermarket sector saw a real sales increase of 9.36% in 2020 and contributed significantly to formal job creation during that period (ABRAS, 2021). Similarly, the e-commerce sector experienced annual growth of over 40%, driven by the digitization of small businesses and increased demand for essential products (IDV, 2020). However, some of this growth may prove unsustainable in the post-pandemic period, owing to shifts in consumer behavior and the gradual return to normalcy (Reis et al., 2024). Analyzing these sectors can reinforce the relevance of the Abundance Paradox Theory, demonstrating that sectors benefiting from positive shocks, like the health sector, may have their vulnerabilities amplified when the economic euphoria ends. These sectors thus present opportunities for future research.

Finally, the findings of this research emphasize the importance of integrating macroeconomic and sectoral analyses into corporate studies, particularly during periods of high volatility. Recognizing how periods of economic euphoria can produce temporary effects or conceal underlying vulnerabilities is crucial for managers and investors when developing sustainable and resilient strategies in the face of future booms and downturns. Therefore, multiple sectors, not just health, can be analyzed through the lens of the Abundance Paradox Theory and economic and financial analysis.

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