

Adding value, profitability and indebtedness: an approach to companies listed on the B3 stock exchange in the pandemic period

The objective of this work was to analyze the degree of explanation of the size factor, the economic value added and the profitability as a function of equity on the level of indebtedness of the main companies listed on the Brazilian Stock Exchange. The discussion of the health crisis caused by Covid-19 is incorporated as a determining factor, as well as the theoretical discussion that the stock market indicator can be an important estimator of the behavior of the economy. The methodology used was a dynamic panel based on the methodology developed by Arellano and Bond in 1991, justified by the nature of the data. The results support the hypotheses launched in the study, where the variation in value addition has a positive impact on indebtedness for the pandemic period, and increases in profitability reduce companies' financial risk exposure. The effects of each of the variables are notable according to the analyzed interval, that is, in the pre- and pandemic period. The main contribution of this article is to provide a broad and rigorous empirical approach in order to assess the impact of the studied variables. In addition, this study considers companies with greater volume and liquidity serving as a proxy for the sectors of the Brazilian economy.

Palavras-chave: Added economic value; Publicly traded companies; Indebtedness; Economic crisis.

Valor adicionado, rentabilidade e endividamento: uma abordagem com empresas listadas na bolsa B3 no período de pandemia

O objetivo deste trabalho foi analisar o grau de explicação do fator tamanho, do valor econômico agregado e da rentabilidade relacionado ao patrimônio líquido no nível de endividamento das principais empresas listadas na Bolsa de Valores brasileira. Se incorpora a discussão da crise sanitária causada pela Covid-19 como fator determinante, assim como, a discussão teórica de que o indicador do mercado de ações pode ser um importante indicador do comportamento da economia. A metodologia utilizada foi um painel dinâmico baseado na metodologia desenvolvida por Arellano e Bond em 1991, justificada pela natureza dos dados. Os resultados corroboram as hipóteses lançadas no estudo, onde a variação na agregação de valor impacta positivamente no endividamento para o período de pandemia, e aumentos na rentabilidade reduzem a exposição ao risco financeiro das empresas. Os efeitos de cada uma das variáveis são notáveis de acordo com o intervalo analisado, ou seja, no período pré e pandêmico. A principal contribuição deste artigo é fornecer uma abordagem empírica ampla e rigorosa para avaliar o impacto das variáveis estudadas. Além disso, este estudo considera empresas de maior volume e liquidez servindo como proxy para os setores da economia brasileira.


Keywords: Valor econômico agregado; Empresas de capital aberto; Endividamento; Crise econômica.

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INTRODUCTION

With the crisis caused by the Covid-19 pandemic, all economies were affected, and different sectors of the economy were exposed to this effect, with some sectors being more vulnerable than others. Although the crisis has affected the entire system, some sectors have surprised with good performances in revenue, especially companies linked to the agribusiness and mining sector, linked to this context is the strong appreciation of foreign currency, the dollar and a shock of demand called "China".

In this context, agribusiness has surprised with good numbers with regard to the performance of foreign trade. Compared with the previous year from 2020 to 2021, this sector had an increase of 4.1% in exports and this sector is responsible for approximately 26% of the Brazilian GDP¹. According to information from MAPA² in 2020, exports totaled US\$ 100.81 billion, with an emphasis on soy and meat, with percentages of 35% and 17%, respectively. Amidst the crisis caused by the covid-19 pandemic, and the consequent systemic risk that this context involves, all sectors of the economy were affected, however, as explained, the agribusiness sector had important results. Similarly, the ore sector closed the year 2020 with a positive performance. It should be noted that it was "the China effect", the exchange rate variation and the appreciation of international prices which were decisive for the performance of the sector, thus, in 2020 compared to 2019, revenue had a positive variation of 36%³.

Complementing the results of agribusiness, the behavior observed is supported from a theoretical point of view, whenever basic needs tend to be met in crisis situations. In addition, other factors can help explain this behavior, with the importance of destination markets (mainly China) and the appreciation of foreign currency (MATTEI et al., 2016). In view of this, the context presented motivates the carrying out of the study, for which the companies listed on the Stock Exchange linked to each of the sectors of the economy will be considered, serving as a proxy for performance.

Other sectors such as minerals and oil had different performances. In 2020, the price war between OPEC countries and Russia resulted in the devaluation of the world's oil barrel. In the case of ore, in 2020 the appreciation of the price of ore in the international market drew attention⁴, linking this behavior to the strong demand registered by China for this product. As a result of the positive demand shock, and a signaling effect, the share price of companies focused on this sector appreciated.

In the case of commerce, in 2020 sales had a variation of 1.2%, the lowest result since 2017⁵. An aspect that surprised market analysts was the low level of sales observed in December 2020, although it was positive. However, it cannot be denied that trade was one of the highlights of the recovery of the Brazilian economy and, by linking this sector with household consumption, the latter represents approximately 60% of the national GDP, compared to which, stands out as an important engine of growth.

Thus, the proposed study sought to analyze the indebtedness behavior in the pre and pandemic

¹ <https://www.cepea.esalq.usp.br/br>

² <https://www.gov.br/agricultura/pt-br/aceso-a-informacao/dadosabertos>

³ <https://ibram.org.br/wp-content/uploads/2021/06/Infografico-Mineracao-em-Numeros-2020-NOVO.pdf>

⁴ <https://tradingeconomics.com/commodity/iron-ore>

⁵ <https://www.ibge.gov.br/explica/pib.php>

period of the main publicly traded companies based on variables such as return on equity, added economic value – EVA and company size. Considering that the Stock Exchange indicator is a strong measurer of the performance of a country's economy, it is expected that the aggregation of value may reflect the behavior of the sectors of the economy and the variable profitability may jointly signal the performance of companies considering the crisis as a break in the structure of the system (BARROS et al., 2020; GASPAR et al., 2020; MACIEL et al., 2017).

THEORETICAL CONTEXT

In the year 2020, specifically in the month of March when the UN declared covid-19 a world pandemic, the effect it would bring to the business environment was expected, as a result of which, the share prices of publicly traded companies were affected and, contemporarily, stock exchange indices lost value. In effect, systemic risk events such as pandemics reduce investment, which causes, on the one hand, an excess of productive capacity, affecting consumption intention (AREVALO, 2017).

In fact, the pandemic has changed everyone's lives to some extent. One of the biggest changes observed in the pandemic period was the e-commerce boom, which established itself as a new alternative for the purchase of everyday products through applications. This context has given rise to investor optimism in the retail sector in which a reasonable level of revenue was expected. At the same time, in the business environment, the discussion on the effect that the crisis would have on national income was incorporated, since in the Brazilian case, household consumption is responsible for approximately 60% of the composition of GDP from the perspective of expenditure, in addition, the consumption variable has a close relationship with the trade sector. In a country like Brazil, with an unconsolidated middle class that is sensitive to economic cycles, household consumption becomes a fundamental variable in the composition of national income.

In light of this observance, if the effect of the crisis caused by the COVID-19 pandemic is analyzed, the main trigger was the working capital of companies and the capacity of companies to deal with the restriction measures imposed by governments. In theory, third-party capital is cheaper than equity, but in practice certain companies, when resorting to a source of loans in the financial system, can have high interest rates, against which the theory would not be supported (MOORE et al., 2012; KONG, 2018). And in the pandemic context, the ability of companies to survive in the midst of the crisis was put to the test and, before which, the indebtedness was notorious mainly due to the adoption of expansive monetary policies through the Central Bank.

As a parenthesis, many companies fail due to inefficient working capital management, this case being more notorious in companies in a process of sedimentation (ALEXANDER et al., 2013) and, when considering the crisis, the fact becomes more aggravating one must now deal with a larger aspect that messes with the entire system. Also in this scenario, it was expected that, in crisis situations, public utility companies would perform better in terms of revenue, as well as those aimed at providing food (SILVA et al., 2018).

At the same time, it is worth emphasizing certain events that combine with economic cycles and that

denote a relationship with stock exchange cycles, as well as with human behavior. When an economy signals short-term growth potential, consumer and/or investor confidence will be encouraged, which consequently, through a short-term synergistic effect, would increase the value of companies (EDI et al., 2021; DAS, 2021; PONGKONGKAEW et al., 2020).

At this point, expectations are fundamental, for example: if there is no short-term risk to the income level, the trend could indicate an increase in consumption, which would have a domino effect on income. Namely, at the company level, factors such as the level of market consumption and the cost of money over time are determinant in the pricing of the company's value, which must be accompanied by investors' expectations.

As discussed, in the crisis scenario, economic cycles denote to be an important topic of discussion, as it implies fiscal or monetary policies that should be adopted mainly by the government and the Central Bank, enabling decision-making by companies taking the best path. that is reflected in the generation of value by companies as the final means. In situations when the State spends more than it collects, it generates a fiscal deficit which produces a cost to the financial system. And this difference to pay the bills, the State captures from the market, thus becoming a competitor of the resources available in the economy, which in the short term, would make access to the rest of the money more expensive (CANALE et al., 2021; SILVA, 2021).

In general, the cycles affect the companies' cash, so that, when the economy presents risks to its future income generation, the companies' shares go through a cycle of decline. In uncertain scenarios, revenues tend to be lower and, consequently, the value of companies tends to be lower, which is concomitantly justified by the share price. This observation is important, as it would imply knowing the right time to buy shares, which is one of the strategies outlined by investors. In short, investment intentions incorporate variables such as profitability and value addition, which are determinant in the structure and cost of capital (OBENG, 2019; KURNIAWAN, 2020), and this premise is to be tested in the study and, as scenarios crisis, may indicate different effects for each of the variables.

METHODOLOGY

Model specification and data source

In the study, the panel data methodology was used, specifically a dynamic panel (Arellano & Bond, 1991) to analyze the importance of certain variables such as company size, return on equity (ROE) and Economic Value Added (EVA) as determinants to explain the level of indebtedness of the main publicly traded companies listed on the Brazilian Stock Exchange. In general, the method used in the study follows the principle of parsimony in which this specification is adopted at the expense of another within the universe of panel data, because it is the one that fits the analyzed data.

The data is sourced from Economática⁶, from which the cost of capital was calculated using the CAPM, to subsequently determine the EVA, and thus complete the universe of variables that are measured

⁶ <https://economica.com/>

in the study. The universe of companies analyzed is 10 and correspond to the oil and mining, finance, trade, construction and health sectors. The balances analyzed correspond to the first quarter of 2019 to the first quarter of 2021, making a total of 100 observations in the general analysis, 40 in the pre-pandemic period and 60 in the pandemic period. The relationship to be analyzed and which will allow testing of the study's hypotheses can be expressed as follows:

$$\text{Indebtedness} = \text{function} (\text{previous indebtedness (lagged)}, \text{company size, EVA, ROE}) \quad (1)$$

The variables included to explain the indebtedness level of the main companies listed on the Brazilian Stock Exchange were selected based on a literature review. The variable called previous indebtedness is a lagged variable (ENDt-1) was included to allow adjustments between the long and short term when considering the effect of indebtedness, as well as the estimation of the dynamic panel. This addition helps to correct the problem of parameter overestimation caused by using the static model instead of the dynamic model.

In the case of company size, it is understood that the larger the company, the higher the indebtedness level, hypothesis 1 (SOUZA et al., 2021; BAKARGY et al., 2020). A high degree of indebtedness, a priori, cannot be seen as a negative aspect, with managerial capacity being essential as a determinant in incorporating value addition through the use of financial risk. According to the theory of trade off associated with bankruptcy costs, usually larger and established companies are more diversified, which a priori decreases the probability of bankruptcy.

On the EVA side, from a theoretical point of view, it is understood that the higher the level of indebtedness of companies, the greater will be the added economic value (LEITE et al., 2019). In other words, it is argued that there is a positive relationship between the level of indebtedness and the EVA, hypothesis 2 (CORRÊA et al., 2012). In other words, indebtedness influences the capital structure, which causes an increase in financial risk and, as a result, the company's value would also be affected. Thus, the increase in financial risk explained by the increase in the cost of third-party capital influences the company's ability to generate added value.

When speaking of profitability (ROE), it is understood that the greater the profitability of the company's equity, the lower its level of indebtedness, hypothesis 3. Companies that present profitability usually opt for internal financing, which would consequently encourage the reduction of the need for external financing (SULZBACH et al., 2015).

Another form adopted by companies aiming to reduce the financial risk resulting from the leverage level is the issuance of shares. At this point, a primordial factor that determines the investment intention on the part of the market agents are the fundamentalist indicators and mainly the company's value creation, before which, the profitability plays an important role.

Procedures adopted

To complete the number of variables used in the study, it was necessary to calculate the aggregate

economic value. The procedure adopted to calculate the Economic Value Added – EVA follows the methodologies indicated by Assaf (2018) and Damodaran (2018). The economic value added – EVA is a measure of value creation identified in the performance of the company itself, as portrayed by the financial reports (ASSAF, 2018). Its calculation requires some adjustments in the income statements, seeking, among other measures, to show its legitimate part, the segmentation of income tax on the results of the activity and the tax benefits arising from the use of third-party capital. Thus, the added economic value - EVA can be determined following the procedures described:

$$EVA = NOPAT - (WACC \times INVESTMENT) \quad (2)$$

Where: NOPAT (Net operating income of IR); WACC (Weighted average cost of capital); INVESTMENT (working capital plus fixed capital). Also, EVA can be calculated as follows:

$$EVA = (ROI - WACC) \times INVESTMENT \quad (3)$$

Importantly, through the analysis of traditional financial measures (profit and profitability) it is impossible to identify whether the company is creating or destroying value. In this context, EVA is important because, among other relevant contributions, it associates the opportunity cost of capital to the investment made, highlighting the effectiveness of the company's administration (ASSAF, 2018). In addition, EVA is also able to reveal opportunities for economic gains, such as those arising from better risk management, choosing the best capital structure. Complementarily, the determination of the added value can also be calculated from the net utility, using the following expression:

$$EVA = NET\ INCOME - (Ke - PL) \text{ or } EVA = (ROE - Ke) \times Equity \quad (4)$$

Where: Ke (cost of equity. Minimum rate of return required by shareholders); PL (Equity); ROE (Returns on equity). Before determining the values for each of the models, it was necessary to determine the value of the weighted average cost of capital-WACC. The WACC cost incorporates both the cost of equity and third-party capital, in the case of the cost of third-party capital, an average rate of 4.5% was considered for the calculations for the year 2019 and 2020. For the determination of the cost of equity through the Capital Asset Pricing Model – CAPM, an average market return was considered at a rate equivalent to 11.75%.

With regard to the CAPM model, which in Portuguese means "Pricing of Financial Assets", when dealing with financial assets, the value represents the minimum rate of return required by shareholders through which the relationship between risk and return can be determined. investment. To calculate the Ke, the following formula was used:

$$R_i = R_f + \beta_i \times (R_m - R_f) \quad (5)$$

Where: R_f = Risk-free rate. For the scenario, the Selic rate is considered, β_i = Beta of the asset, representing the systemic risk. For the determination, monthly returns for the last 5 years were considered. For the case of companies operating for less than 5 years on the stock exchange, the available time of information was considered and the Beta value was determined through a simple regression between asset and market returns. R_m = market return, in this case the return of the indicated Ibovespa was considered.

After determining the minimum rate required by shareholders through the CAPM, the WACC can be calculated, defined as the average return required by creditors and shareholders. The WACC is determined

by weighting each funding source with its respective cost (ASSAF, 2017). The calculation can be determined as:

$$WACC = K_e (E/D+E) + K_d (D/D+E) \quad (6)$$

Where: K_e (Cost of Capital to shareholders, measured by the CAPM); K_d (Cost of debt, value close to the Selic rate. In the study, 4.5% was considered); E (Total equity); D (total debt (debt)). With the determination of the WACC, one can find the results of the EVA. The information necessary to obtain the values indicated in each of the models (equation 1) was taken from the balance sheet and income statements. Thus, after determining these factors, equation 1 was estimated considering three-time intervals and the results can be seen in table 1.

Source of data and description of companies

The balance sheet and income statement data were collected from the Economática platform, with quarterly data from 2019 to the second quarter of 2021. The companies object of study described according to the sector in which they operate are:

Table 1: Companies subject to study listed by trading code and sector of activity.

Nº	Company	Trading Code	Sector
1	Petróleo Brasileiro S. A.	PETR4	Oil, Gas and Biofuels
2	Vale S.A.	VALE3	Mining - metallic minerals
3	Banco Bradesco S. A.	BBDC4	Financial Intermediaries - Banks
4	Bolsa de valores do Brasil S.A.	B3SA3	Miscellaneous financial services
5	Via S. A.	VIIA3	Commerce, home appliances
6	Magazine Luiza S. A.	MGLU3	Commerce, home appliances
7	Cyrela Brazil Realty S. A.	CYRE3	Construction
8	MRV Engenharia e Participações S. A.	MRVE3	Construction
9	Fleury S. A.	FLRY3	Hospital Medical Services, Analysis and Diagnosis
10	Raiadrogasil S.A.	RADL3	Commerce and Distribution - Medicines
11	Brasilagro S. A.	AGRO3	Farming
12	São Martinho S. A.	SMT03	Food - Sugar and Alcohol

Each of the companies is part of the portfolio that reports the Bolsa-B3 as an Ibovespa indicator. In addition, these companies are the ones that denote having greater liquidity and greater trading volume when classified by sector and activity.

RESULTS

Initially, it is worth noting that before estimating equation 1, we proceeded to obtain the added economic value of the companies – EVA. The EVA values found indicate expected results for the case of agribusiness and mining with positive variations, whereas in the case of commerce the two analyzed companies have opposite results, with retraction in the case of MGLU3 and positive in the case of VIIA3. The result found for VIIA3 may be related to the internal changes experienced by the company during the crisis period, as the management was changed in the face of an old fraud in the balance sheets (Chief Executive Officer).

Also, with regard to EVA, in the case of mining and agribusiness, the appreciation of ore, as well as the appreciation of foreign currency, largely explains the positive behavior of EVA in these companies. In

addition, the China factor stands out, as this country is an important destination market for Brazilian exports to the agribusiness sector. Also, for the period under review, China was a major destination for ore exports⁷.

After obtaining and preliminary analyzing the companies, equation 1 was estimated (see table 1). The Sargan test (1958) shows the absence of heteroscedasticity in the estimated model. Furthermore, the lagged variables are valid instruments, since they are not correlated with the residuals. By Wald's test, the null hypothesis of all coefficients equal to zero is rejected at 1%. Through the results, it is verified that the size factor is decisive in explaining the indebtedness of companies, thus, the larger the company, the higher the level of indebtedness. Thus, hypothesis 1 is validated, noting that the level of leverage cannot always be seen as something negative, as the way in which these resources are used (good administration, for example) can help the company to further increase its value market.

In the case of added value, different results can be observed between the pre and pandemic periods. In the pre-pandemic period, positive variations in EVA would imply a reduction in the level of indebtedness, that is, adding value would not always imply an increase in leverage. In the pandemic period, however, the opposite is true, which indicates the increase in capital from third-party capital taken by companies in order to overcome the moment of crisis.

It should be noted that if the increase in indebtedness seen with financial risk implies adding value to companies, then it is clear that good management is being carried out. In the case of the study, when incorporating the pandemic period, what was observed was the strengthening of the working capital of companies and the gradual recovery of company profits, mainly in the mineral and oil, financial and agricultural sectors. This behavior indicates a general and gradual effect on the system, not implying something specific to a policy or economic shock.

On the ROE side, the result is expected, which helps to support the hypothesis described in the methodology. Thus, companies with profitability tend to have a lower level of indebtedness, which was observed in both periods analyzed. In other words, in a *ceteris paribus* condition, companies with profitability are expected to depend less on third-party capital and start to finance themselves with their own resources, regardless of cyclical moments in the economy.

With the gradual opening of the economy after the restrictions imposed to curb the pandemic, gradually all companies listed in the sectors under study reported profits. Namely, better yields were observed in the mining and agricultural sectors, the latter being a pillar sector in the Brazilian economy.

CONCLUSIONS

The objective of this work was to analyze the indebtedness level of publicly traded companies and how this change in the capital structure can be explained by factors such as size, ROE and EVA at different times in the economy. The object of study was the main publicly traded companies, taking them as a proxy of the income that the sectors of the economy had between the pre-pandemic and pandemic periods.

⁷ <http://comexstat.mdic.gov.br/pt/home>

Table 2: Results of estimating equation 1.

Variable	General	Pre-pandemic	Pandemic period
	Arellano-Bond one-step robust	Arellano-Bond one-step	Arellano-Bond one-step
ENDt-1	0.2975*** (0.1025)	0.4628* (0.2877)	0.7051*** (0.2452)
SIZE	0.8305*** (0.1026)	0.5356*** (0.1877)	0.6889*** (0.2399)
VEA	-0.1737** (0.8041)	-0.2324 (0.5949)	0.0308** (0.0011)
ROE	-0.0207** (0.0208)	-0.0354*** (0.087)	-0.3660** (0.1753)
AR (1)	-1.3612 P-valor = 0.1735	-0.3954 P-valor = 0.6925	-0.6699 P-valor = 0.5029
AR (2)	-0.2993 P-valor = 0.7647	- -	- -
Sargan test	219.532	3.4549	2.1128
Wald test	732.52***	36.55***	62.05***

Standard error in parentheses, *** significant to 1%; ** significant to 5%; * significant to 10%.

The profitability and size data were obtained from the balance sheets published by the companies and reported on the Economatica platform. The EVA value was calculated following the procedure discussed in the methodology. The incorporation of the EVA value in the study model was important since, from a theoretical point of view, it is understood that the crisis caused by covid-19, when characterized as a systemic risk, the behavior of companies disaggregated by sectors, should reflect the behavior of the economic sectors. In addition, this effect reveals that sectors of the economy were more sensitive, hoping that sectors linked to the sale of basic products such as food would be the least affected.

The results obtained through equation 1 and estimated by a dynamic panel denote different magnitudes according to the time of analysis. For example, there is a much greater effect in the ROE pandemic period, exerting a decrease in the level of indebtedness. For example, for the pandemic period, the 10% increase in the ROE of companies would encourage them to reduce the possibility of indebtedness by 3.6%. Another result that stands out is the value of the EVA coefficient in the pandemic period, which indicates that the companies under study generated value as they increased their leverage level.

The main contribution of the research is the study time and the method explored, the latter being little used in studies covering a short period of time, considering a structural break in the system. Considering the short study time and given the nature of the data, the method is well suited to research, allowing important results to be obtained that help market agents make decisions.

The main recommendation for future studies would be to analyze the companies in a disaggregated way and, before that, verify the magnitudes and effects of the coefficients by sector. For this to be possible, it would be necessary to have a longer period of study, that is, to wait for the next few years of the pandemic period in such a way that the method can capture the crisis event as a whole in each sector.

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