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# EFFECTS OF FINANCIAL SLACK ON COMPANY PERFORMANCE DURING THE COVID-19 PANDEMIC

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▪ Received: 06/04/2022 ▪ Approved: 09/11/2023 ▪▪ Second Approved Version: 12/15/2023

## ABSTRACT

This study analyzes the influence of financial slack on performance of B3 listed companies over the Covid-19 pandemic. Descriptive, documentary and quantitative research was carried out on data from 308 companies, from the second quarter of 2016 to the third quarter of 2020. The results reveal that the effects of slack on performance are inverted U-shaped, pointing to an intermediate level of slack as best practice. Contrary to expectations, there were not additional slack contributions on the pandemic time. When consuming the slack, companies lost profitability, more penalized during the Covid-19 pandemic. This is contrary to expectations about how the use of accumulated resources affects these moments. It contributes by discussing management's attention to identifying minimum and maximum slack limits, and risks of reducing slack.

**Keywords:** Financial Slack. Economic Performance. Pandemic.

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## **EFEITOS DA FOLGA FINANCEIRA NO DESEMPENHO DE EMPRESAS NO PERÍODO DA PANDEMIA DE COVID-19**

### **RESUMO**

Este estudo analisa a influência da folga financeira no desempenho econômico de empresas listadas na B3 durante a pandemia de Covid-19. Realizou-se pesquisa descritiva, documental e quantitativa, com dados de 308 companhias, do segundo trimestre de 2016 ao terceiro trimestre de 2020. Os resultados revelam que os efeitos da folga no desempenho ocorrem em forma de U invertido, apontando para um nível intermediário de folga como melhor prática. Contrariando o esperado, não foram encontradas contribuições adicionais da folga na pandemia. Ao consumir a folga acumulada, as companhias prejudicaram a rentabilidade, sendo ainda mais penalizadas durante a pandemia, contrariando expectativas dos efeitos do uso de recursos acumulados para tais momentos. Contribui ao discutir sobre a atenção da gestão em identificar limites mínimos e máximos de folga, e os riscos do consumo dos recursos acumulados.

**Palavras-Chave:** Folga Financeira. Desempenho Econômico. Pandemia

### **1 INTRODUCTION**

Although the seminal studies on financial slack occurred in the 1960s, there is currently a broad discussion on the topic due to its complexity of understanding, especially its relationship with economic performance, which is a subject of debate among researchers across the world (Pamplona et al., 2019). There is no consensus among researchers about the effect of financial slack on organizational performance (Daniel et al., 2004). According to the authors, the positive or negative relationship depends on how organizations will use surplus resources. There is a positive relationship between financial slack and economic performance when surplus resource drives proactive strategies or protects the company from threats. The negative relationship occurs due to the inefficiency caused by idle resources, cause performance problems, dysfunctional behaviors, without considering organizational objectives (Silva, 2019). Results demonstrate that the impact of slack can be positive up to a certain point and negative after that (Cardoso & Santos, 2020), an inverted U-shape relationship.

Even without consensus, it seems clear that financial slack affects the performance (Lee, 2012), and varies according to the economic environment in which the companies investigated are located (Wiersma, 2017). In particular, in periods of economic recession, the analysis of how financial slack affects corporate performance is an important lack of investigation. Latham and Braun (2008) state that economic recessions have occurred every five years since the Second World War, making it important to investigate the relationship between financial slack and organizational performance.

March (1979) states that organizations often prefer to accumulate unexploited resources instead of optimizing their structure. In periods of environmental turbulence, slack provides relative security to organizations (Tan & Peng, 2003), including economic recessions, situations in which slack resources have a positive relationship with corporate performance, as they reduce existing external impacts (Odum et al., 2019). Such resources become guarantees against unstable economic moments, improving organizational performance in times of crisis, and reducing it during moments of economic expansion (Pamplona et al., 2019).

Alessandri and Depperu (2014) argue that the impact of financial slack becomes stronger when economic conditions are unfavorable. During an economic crisis, companies tend to be threatened by a less generous environment, as access to external credit decreases drastically, and, thus, financial slack can provide a degree of normality, allow to continue the fundamental activities for organizational survival and success (Pamplona et al., 2017).

In a study with Brazilian companies, Beuren et al. (2014) identified that slack levels increased until the beginning of the economic recession in 2008, and after this period they reduced, demonstrating the consumption of resources. A cushion of resources, created in economic growth or stability periods, would act as a support to environmental instabilities, contributing to the organizational performance (Tan & Peng, 2003).

In this context, given the economic landscape due to the Covid-19 pandemic impacts on the global and Brazilian economy, new studies become relevant. In 2020, Brazil had a 4.1% drop in its GDP, the largest since the beginning of the historical series, moving from the 9th world economy in 2019 to the 12th (Alvarenga, 2021). As a definition, Prates (2009) states that the crisis emerges when an economy suffers a drop in GDP and, sometimes, even a contraction. In this sense, the question is what is the influence of financial slack on the economic performance of companies listed on B3, during the Covid-19 pandemic?

This work aims to analyze the influence of financial slack on the economic performance of companies listed on B3, during the Covid-19 pandemic. To achieve this objective, data from B3 listed companies were analyzed, from the second quarter of 2016 to the third quarter of 2020, using panel data regression.

The results reveal that, in periods prior to the crisis caused by the Covid-19 pandemic, the financial slack represented by the General Liquidity (GL), Current Liquidity Ratio (CLR) and Quick Ratio (QR) indexes have a positive relationship with decreasing growth rates up to a maximum limit, followed by a negative relationship with performance. This leads to the understanding that slack will not always contribute to business performance, in a curvilinear relationship inverted U-shaped. These results corroborate previous studies (Pamplona et al., 2017; Tang & Pen, 2003).

The study advances by identifying that the consumption of slack resources results in a negative effect on organizational performance. Such findings point to the need to maintain slack levels, under penalty of a drop in financial results, an

expectation contrary to the idea of benefits from using accumulated resources to mitigate effects on performance.

It also highlights that, during the pandemic period, the impact of maintaining financial slack levels followed the same flow prior to the crisis, without being changed upwards or downwards during the pandemic period. If maintaining slack had no additional effect during the crisis and, on the other hand, its reduction had an even heavier impact on ROA. The results demonstrate that reducing slack levels at the pandemic had an extra effect on reducing asset returns.

In addition, the importance of this research for managers is justified, especially in economic recession periods, as organizations must observe the economic landscape for the correct dimensioning of corporate resources maintained in surplus to define the level of financial slack, in order to achieve the best performance (Pamplona et al., 2017). According to the authors, in negative periods (economic recession), financial slack can become even more important as a driver of organizational performance. The research also advances by segregating the effects of using slack, through the reduction of levels between quarters and discusses the risk of this decision for companies.

## **2 THEORETICAL FRAMEWORK**

### **2.1 Organizational and Financial Slack**

Organizational slack is a topic ingrained in applied social sciences and widely utilized in the literature on organizational theory and business strategy. Although consensus on its definition is lacking, most authors contend that slack comprises surplus resources that furnish organizations with both protection and opportunity (Moses, 1992).

The seminal work marking the inception of studies on organizational slack dates back to 1963, with the publication of 'A Behavioral Theory of the Firm' by Cyert and March. Regarded as a classic in the field, Cyert and March (1963) define slack as the variance between the resources at an organization's disposal and the payments required to sustain the coalition (Prietula & Watson, 2000).

According to the research conducted by Bourgeois and Singh (1983), as cited in Ilbay (2009), organizational slack is categorized into three types: available slack, recoverable slack, and potential slack, which represents the most prevalent classification in studies (Wiersma, 2017). Available slack encompasses resources that are unallocated due to not being committed to specific organizational activities, such as surplus liquidity. Recoverable slack arises when resources, previously absorbed in operations with excess costs, can be recuperated, for instance, through reductions in general expenses, salaries, and administrative costs. Lastly, potential slack refers to the organization's capacity to secure future resources external to its internal environment, including actions like obtaining additional loans, issuing shares on the market, or engaging in differentiated negotiations with suppliers (Ilbay, 2009).

Campos and Nakamura (2013) assert that the notion of organizational slack encompasses two corporate finance concepts: financial slack and liquidity. Liquidity denotes the capacity to swiftly convert assets into monetary resources with minimal discount concerning the intrinsic value of the asset. Financial slack, in turn, can be gauged through indicators reflecting the company's liquidity in both the short and long term (Campos & Nakamura, 2013).

For Ang and Straub (1998) and Mishina et al. (2004), financial slack refers to financial resources that exceed what is necessary to maintain the organization. It represents unused resources that can be sources of competitive advantages when used efficiently (Lee, 2011), being considered a long-term protection strategy for organizations (Trojan et al., 2020). To this end, companies increase their liquidity in order to take advantage of future opportunities, which have not yet been foreseen (Padilha, Silva, Silva & Gonçalves, 2017), and can provide growth and improved performance (Pamplona et al., 2017).

On the other hand, Tan and Peng (2003) argue that despite a positive correlation between financial slack and economic performance, organizations are constrained in their ability to convert all available resources into slack. Consequently, there exists a limit that optimizes organizational performance. In this context, Padilha et al. (2017) emphasize that surplus liquidity is often associated with negative consequences. While it presents opportunities, it is concurrently viewed as a form of resource and expense wastage, diminishing organizational results and performance. Excess liquidity may represent unused resources that escalate costs, potentially reducing an organization's profits (Leibenstein, 1969). This is linked to inefficiencies arising from idle resources and dysfunctional behaviors, disregarding organizational objectives (Silva, 2019).

This aspect may be associated with a state of excessive tranquility, wherein managers become complacent and lack the necessary sense of urgency when confronted with threats to the organization (Lu & Wong, 2019). Both inadequate levels of slack and excessive slack can yield unfavorable effects on a company's financial outcomes, with the impact of slack exhibiting a positive correlation up to a certain threshold, beyond which it turns negative (Cardoso & Santos, 2020).

Tang and Peng (2003) contend that organizational slack positively impacts performance up to a certain threshold. Beyond that point, the advantages of slack—such as addressing threats, capitalizing on limited market opportunities, and mitigating conflicts—are outweighed by its drawbacks, including manager irresponsibility and excessive exposure to costs and capital. This imbalance negatively affects corporate performance, demonstrating a curvilinear relationship, as illustrated by Paeleman and Vanacker (2015). Considering this evidence, it is plausible that the relationship between slack and performance is non-linear, resembling an inverted U-shape. In this context, both low and high levels of slack can be detrimental to results. Insufficient slack may limit the company's ability to seize opportunities, while excessive slack could lead to reduced efficiency, masking strategic errors (Pamplona et al., 2017), diverting managerial attention (Lu & Wong, 2019), and potentially squandering resources on projects driven by individual interests (Lee, 2011), as hypothesized:

**H1:** The relationship between financial slack and organizational performance is inverted U-shaped.

As a protective measure, companies accumulate resources during periods of growth, allowing them to fulfill their commitments during economic downturns (Heinzen et al., 2016). In this regard, financial slack can provide various advantages in alleviating recessive pressures on organizations. It serves to offer financial support in challenging economic climates, enabling the company to respond more effectively to such pressures. Additionally, financial slack provides flexibility in resource allocation and can be strategically employed to acquire necessary resources for competitive advantage and adaptation to the environment (Latham & Braun, 2008). Therefore, it becomes instrumental in mitigating adverse impacts on organizational performance caused by recessive environments.

In this context, the impact of financial slack on organizational performance is contingent upon the specific environmental conditions in which organizations operate (Padilha et al., 2017). Financial slack, by fostering flexibility, becomes a critical factor enabling survival in complex and dynamic environments (Heinzen et al., 2016). Latham and Braun (2008) provided empirical support for the advantages of financial slack, particularly in highly uncertain environments. Their study revealed that organizations entering a recessionary period with financial slack outperform those with fewer excess resources throughout the downturn. Moreover, these well-prepared organizations exhibit quicker recovery when economic growth resumes.

Similarly, according to Lee (2011), the advantageous impact of financial slack on the performance of companies, particularly during times of crisis, suggests that slack can confer competitive advantages to organizations, especially in periods of economic recession. The surplus resources offered by financial slack serve as effective mitigators of recessionary conditions. These excess resources become indispensable during times of crisis, as obtaining external resources becomes challenging (Latham & Braun, 2008).

In examining the correlation between slack and performance during periods of economic recession, Namiki's (2012) study focused on Japanese companies, revealing a substantial reduction in profit performance among the researched companies during the 2008 recession in Japan. Interestingly, the study found that managers who made more aggressive decisions, including reducing financial slack, achieved superior sales growth. This implies that maintaining excess financial slack does not always translate to future economic benefits.

Another pertinent investigation conducted by Pamplona et al. (2017) aimed to analyze the impact of financial slack on the economic performance of Brazilian companies between 1996 and 2015, particularly during periods of economic recession. The findings suggested a positive linear relationship between financial slack and the economic performance of Brazilian companies, highlighting the role of resource slack as a facilitator of business performance. However, the study also identified a point where excess slack resources started to have a negative impact on performance, indicating evidence of an optimal threshold for maintaining excess resources to maximize corporate performance.

In the context of the economic crisis triggered by the Covid-19 pandemic, Seven and Yilmaz (2021) observed that the Brazilian stock market experienced significant losses, nearing 50%, between February 19 and March 23, 2020. Faced with the challenges of containing the virus's spread, lockdowns in cities and regions, and the closure of non-essential activities and sectors that tended to generate crowds, emerged as the most effective, albeit short-term, measures to curtail the contagion curve. This situation led to a limited supply of products and services, generating market uncertainty (Rezende et al., 2020). Aligned with these circumstances, a study conducted by the Fundação Getúlio Vargas (FGV, 2020) revealed that despite the devaluation, the impact of Covid-19 on the stock market was mitigated by positive results accumulated in the 2019 financial year.

Costa (2021) conducted an analysis of the effects of the Covid-19 pandemic on the performance of companies across various sectors listed on B3, excluding those in the financial sector, with a total of 551 observations. The study aimed to compare performance indicators, including Asset Turnover (AT), Net Margin (NM), Return on Assets (ROA), and Return on Equity (ROE), between the pre-pandemic period (2019) and the pandemic period (2020). Descriptive statistics revealed that, on average, companies experienced lower values for AT, NM, and ROA during the year of the Covid-19 pandemic. However, sector-specific descriptive analyses demonstrated that not all sectors exhibited negative variations during the pandemic, compared to the pre-pandemic period.

Further analysis using the Student's t-test indicated no statistically significant relationships between performance differences in the two periods. Consequently, the study concluded that the Covid-19 pandemic did not lead to a significant change in the performance indicators of the companies under consideration. In this context, it is suggested that maintaining Financial Slack may have contributed to sustaining the performance of companies during the challenges posed by the Covid-19 pandemic.

In summary, the evidence suggests that the utilization of resources from financial slack plays a crucial role in enhancing company performance during adverse economic periods. The observed curvilinear effect between these elements implies that excessive resources may lead to reduced attention and delayed critical decisions. Based on these insights, two hypotheses are explored:

**H2:** The consumption of financial slack contributed to the performance of organizations during the drop in operations, caused by the Covid-19 pandemic.

**H3:** The relationship between financial slack and organizational performance had an inverted U-shape, during the drop in operations, caused by the Covid-19 pandemic.

### 3 METHODOLOGY

### 3.1 Design, pulation and sample

The current study is characterized as quantitative, documentary, and descriptive. It employed secondary data to test the proposed hypotheses through panel data regression, utilizing an econometric model constructed with the relevant variables. The research utilized quarterly data from B3 listed companies, specifically focusing on the period of the Covid-19 pandemic, in 2020. The chosen quarterly frequency was driven by the interest in identifying effects during this specific period.

For the selected timeframe, spanning from the second quarter of 2016 to the third quarter of 2020, data collected from the Economática database resulted in a dataset comprising 429 companies and 7,722 observations. Subsequently, 2,628 observations were excluded due to missing data on organizational slack, performance, size, and debt indicators. The final sample consisted of 308 companies in an unbalanced panel. After addressing missing data and atypical observations, the total number of observations analyzed amounted to 5,085.

### 3.2 Research variables and econometric model

To analyze the relationship between financial slack and performance, the variables described in Figure 1 were used. Organizational performance was measured by Return on Assets (ROA), used in previous research on the topic (Tan & Peng, 2003; Laffanchini & Braun, 2014; Latham & Braun, 2008; Pamplona et al., 2017).

Type	Name	Formula	Author(s)
Dep ends	ROA Return on Assets	$\frac{\text{Net Income}}{\text{Total Assets}} \times 100$	Tan e Peng (2003); Laffanchini e Braun (2014); Latham e Braun (2008)
	Independent	CR (SLACK*) Cash Ratio	$\frac{\text{Cash} + \text{Cash Equivalents}}{\text{Current Liabilities}}$
QR (SLACK) Quick Ratio		$\frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}}$	Pamplona et al. (2019)
CLR (SLACK) Current Liquidity Ratio		$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	Laffanchini e Braun (2014)
GL (SLACK) General Liquidity		$\frac{\text{Current Assets} + \text{NonCurrent Assets}}{\text{Liabilities}}$	Pamplona et al. (2019)
COV		Dummy, being 1 for the 2nd and 3rd quarters of 2020 and 0 in other cases.	Research proposition
R		Dummy, being 1 for reducing slack in t in relation to t-1, and 0 in other cases	Research proposition
Controle	SIZE Company size	$\text{Log}(\text{Total Assets})$	Pamplona et al. (2017)
	DEBT Debt	$\frac{\text{Liabilities}}{\text{Total Assets}}$	Bastos et al. (2009)



**Figure 1** – Research variables

\*SLACK: name of the variable represented by 4 different calculation forms, CR, QR, CLR and GL.

Source: prepared by the authors.

The variables related to financial slack were defined based on their interpretation through the utilization of liquidity indicators, representing a form of organizational slack. This approach aligns with the methodologies employed by Campos and Nakamura (2015), Heinzen et al. (2016), Pamplona et al. (2017), and other authors referenced in Figure 1. The COV variable corresponds to quarters most affected by measures restricting company operations. These measures, initiated in late March, were implemented by state decrees, exemplified by the State of São Paulo, which imposed restrictions from 03/24/2020 (Decree No. 64,881, 2020). Revenue data from the companies in the sample were scrutinized, revealing declines in sales during the second half of 2020, with a subsequent stabilization in the third quarter, as illustrated in Table 1.

**Table 1**  
Changes in revenue\* of sample companies

Period	t1	t2	t3	t4
2017 x 2016	12.7%	-0.9%	5.6%	4.1%
2018 x 2017	10.7%	7.6%	33.0%	29.0%
2019 x 2018	2.9%	15.1%	6.4%	29.3%
2020 x 2019	11.2%	<b>-21.1%</b>	<b>0.0%</b>	

Legend:\*(Revenue<sub>it</sub> /Revenue<sub>t-1</sub>) – 1; with values corrected by the Broad Consumer Price Index (IPCA)

Source: research data.

The variable R signifies the direction of variation in financial slack, assuming a value of 1 for periods where there is a reduction in slack and 0 for periods of increased slack, compared to the previous quarter. The model's control variables encompass company size (SIZE), general debt level (DEBT), and lagged organizational performance.

The variables were used in the study's econometric models, the first is linear and the second non-linear (quadratic), described as follows:

$$ROA_{it} = \beta_0 + \beta_1 * SLACK_{it-1} + \beta_2 * SLACK_{it-1} * R + \beta_3 * SLACK_{it-1} * COV + \beta_4 * SLACK_{it-1} * CD * R + \beta_5 * COV + \gamma Controls + \varepsilon \quad [1]$$

$$ROA_{it} = \beta_0 + \beta_1 * SLACK_{it-1} + \beta_2 * SLACK_{it-1}^2 + \beta_3 * SLACK_{it-1} * R + \beta_4 * SLACK_{it-1}^2 * R + \beta_5 * SLACK_{it-1} * COV + \beta_6 * SLACK_{it-1}^2 * COV + \beta_7 * SLACK_{it-1} * COV * R + \beta_8 * SLACK_{it-1}^2 * COV * R + \beta_9 * COV + \gamma Controls + \varepsilon \quad [2]$$

Being:

$ROA_{it}$ : the organizational performance of company i at time t;

$\beta_0$ : the model constant;

$\beta_1 \dots \beta_9$ : the parameters of the independent variables;

$SLACK_{it-1}$ : represents the financial slack variables, using the liquidity variables, of company  $i$  at time  $t-1$ ;

$COV$ : binary variable that represents the period of the Covid-19 pandemic;

$R$ : binary variable that represents periods in which there is a reduction in financial slack;

$\gamma Controls$ : control variables and their parameters;

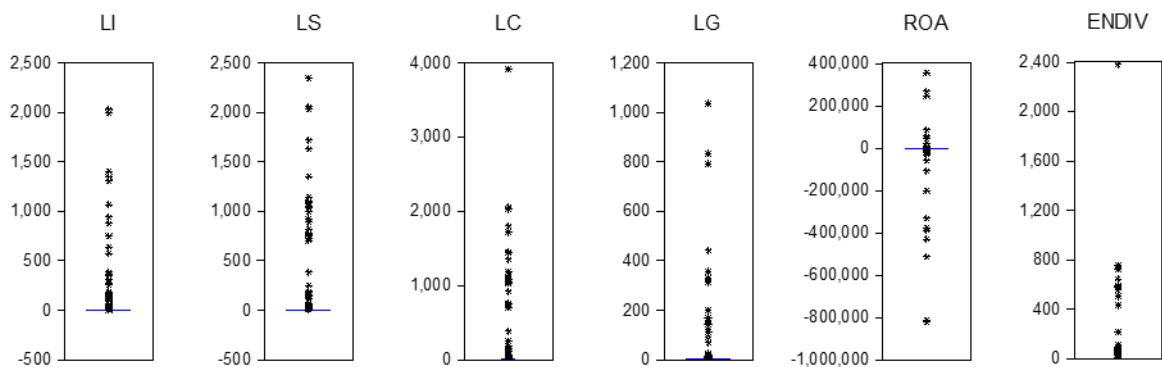
$\varepsilon$ : The model error parameter.

To calculate the variables and perform tests on the models, the procedures outlined in the following section were implemented.

### 3.2 Data collection, processing and analysis

The financial data, as depicted in Figure 1, were gathered from the financial statements of companies listed on B3, based on quarterly closures, utilizing the Economática database as of December 2020. This data was organized in Microsoft Excel and processed using Eviews 10, allowing the calculation and analysis of variable behavior.

Upon scrutinizing descriptive statistics and Box Plot graphs (see Figure 2), atypical observations were identified. To address this, the variables were winsorized at 5%, replacing both smaller and larger observations. It's important to note that this practice introduces a limitation to the research as it tends to normalize averages for periods before and during the pandemic. However, it is considered a beneficial step to mitigate the impact of atypical observations that could introduce bias to centrality measures.



**Figure 2** – Box Plot graphs – identification of outliers

Source: research data.

Subsequently, the data underwent analysis using descriptive statistical techniques and regression tests with panel data, executed in two ways: 1) to assess linear relationships between financial slack and organizational performance; 2) to evaluate non-linear, quadratic relationships. In both cases, the analyses of model adequacy included: a) the t-test for individual significance of the variables and the F-test for the joint significance of the model, at significance levels of 1%, 5%,

and 10%; b) examination of the model's explanatory power using the  $R^2$  measurement; c) evaluation of the presence of autocorrelation of errors using the Durbin-Watson (DW) test; d) analysis of the normal distribution of residuals, employing the Jarque-Bera (JB) test; e) implementation of the Hausman test (H) to determine whether to utilize fixed or random effects in period and company controls.

## 4 RESULTS

### 4.1 Descriptive statistics

The descriptive statistics for the variables utilized in this study are presented in Tables 2 and 3. These tables encompass the period from 2016t2 to 2020t1, capturing the period before the financial crisis induced by the Covid-19 pandemic, as well as during it, specifically in quarters t2 and t3 of 2020.

**Table 2**

Descriptive statistics of the variables – period 2016t2-2020t1 – n: 4,469

Variables	ROA	CR	QR	CLR	GL	SIZE	DEBT
Average	1.325	0.588	1.341	1.658	0.967	14.748	0.785
Median	1.532	0.377	1.120	1.363	0.809	14.856	0.633
Maximum	6.513	2.715	4.030	4.767	2.730	21.354	2.751
Minimum	-4.260	0.001	0.067	0.090	0.080	5.106	0.201
Standard Dev.	2.517	0.668	0.976	1.170	0.684	2.117	0.601
Symmetry	-0.295	1.810	1.239	1.142	1.138	-0.226	2.237
Kurtosis	3.150	5.979	4.212	3.881	3.703	3.478	7.501
Jarque-Bera	73.5	4,344.8	1,504.6	1,184.8	1,120.7	85.8	7,961.3
p-value JB	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Source: research data.

Based on the data presented in Tables 2 and 3, it is observed that the performance of companies, as measured by ROA, remains relatively consistent across the two periods under consideration in this study—both before the crisis induced by the pandemic and during the crisis. Specifically, companies exhibit an average quarterly ROA close to 1.3% during the studied periods.

**Table 3**

Descriptive statistics of the variables – period 2020t2-2020t3 – n: 616

Variables	ROA	CR	QR	CLR	GL	SIZE	DEBT
Average	1.259	0.790	1.460	1.772	1.002	14.915	0.804
Median	1.416	0.599	1.203	1.544	0.854	14.919	0.650
Maximum	6.513	2.715	4.030	4.767	2.730	21.371	2.751
Minimum	-4.260	0.001	0.067	0.090	0.080	8.538	0.201
Standard Dev.	2.639	0.734	1.016	1.160	0.680	2.130	0.603
Symmetry	-0.203	1.256	1.023	0.962	1.102	-0.072	2.209
Kurtosis	2.901	3.891	3.481	3.546	3.675	3.130	7.306
Jarque-Bera	4.5	182.3	113.4	102.6	136.3	1.0	977.0
p-value JB	0.106	0.000	0.000	0.000	0.000	0.617	0.000

Source: research data.

Regarding the financial slack indicators (CR, QR, CLR, and GL), the results indicate that companies operated with slightly lower levels of slack in the periods before the crisis compared to those observed during the crisis. This contradicts the expectation that companies would utilize their surplus resources during recessionary periods, thereby temporarily diminishing their levels of excess resources (Pamplona et al., 2017). This phenomenon may be associated with the anticipation of a short-term normalization of activities. Concerning the control variables, it is noteworthy that the size of a company is influenced by its capital structure (Brito et al., 2009). In other words, the larger the size of a company, the greater its debt potential (Silva & Vale, 2008). In the present study, it was observed that there was low variability in the logarithm of the companies' size during the two periods analyzed in the research.

Similarly, there is a small difference, on average, in the debt levels of companies before and during the crisis, with the debt being slightly higher during the crisis. To some extent, this behavior aligns with expectations, as companies in recessionary periods often seek additional resources from third parties to fulfill their commitments. However, it contradicts the anticipation of a reduction in credit availability to companies during economic recessions (Conceição, 2013), as crises typically lead to increased costs and extended timelines for companies seeking funds (Freitas, 2009). Finally, the analysis of the data distribution, using the Jarque-Bera test, indicated that the variables do not follow the normal model, with the exception of ROA and SIZE, in Table 3.

## 4.2 Relationship between slack and performance – linear model

Table 4 presents the test results for model [1].

**Table 4**

Linear regression tests – dependent variable: ROA – n: 5,085

Clearance Type: Ind. Variables	GL		CLR		CR		QR	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Const	3.231	0.012**	4.717	0.000*	4.553	0.000*	4.671	0.000*
SLACK	0.461	0.001*	-0.048	0.425	0.041	0.658	0.005	0.944
SLACK*R	-0.425	0.000*	-0.070	0.017**	-0.192	0.009*	-0.122	0.001*
SLACK *COV	0.427	0.002*	0.345	0.000*	0.078	0.559	0.286	0.005*
SLACK *COV*R	-0.513	0.000*	-0.331	0.000*	-0.002	0.992	-0.369	0.000*
COV	-0.302	0.037**	-0.336	0.028**	-0.109	0.355	-0.201	0.167
SIZE	-0.107	0.173	-0.166	0.032**	-0.163	0.036**	-0.166	0.032**
DEBT	-0.711	0.000*	-0.991	0.000*	-0.997	0.000*	-1.011	0.000*
R <sup>2</sup>	0.478		0.468		0.465		0.469	
F/p-value	15.798	0.000*	15.244	0.000*	15.051	0.000*	15.273	0.000*
D.W.	1.753	*	1.756	*	1.749	*	1.755	*
JB/p-value	2.056.1	0.000*	2.069.6	0.000*	2.072.4	0.000*	2.079.8	0.000*
Hausman/p-value	28.833	0.000*	29.367	0.000*	17.214	0.016*	29.544	0.000*

\*p-value<0.01; \*\*p-value<0.05

Source: research data.

The individual significance of the variables was assessed using the t-test, and the joint significance of the model was examined through the F-test at significance levels of 5% and 1%, indicating the overall significance of the regression. Concerning the explanatory power of the models, the linear regression estimation yielded  $R^2$  values ranging between 0.465 and 0.478, indicating a substantial level of explanation for the variance in the dependent variable, ROA. The analysis of autocorrelation in the residuals was conducted through the Durbin-Watson Test (DW). The values obtained in the linear model ranged between 1.749 and 1.756, suggesting an absence of autocorrelation issues at the 1% significance level.

To determine the most suitable modeling approach, the Hausman Test (H) was employed and found to be significant at the 1% level, recommending the fixed effects model as the most appropriate. Finally, the Jarque-Bera Test (JB) was employed to assess the normal distribution of residuals, revealing a p-value of 0.000 in all models, thereby rejecting normality. It's important to note that for statistical inference purposes, the assumption of normality becomes less critical in large datasets (Gujarati & Porter, 2011).

When examining the overall impact of SLACK on performance, the coefficients of the linear relationship indicate statistical significance only for General Liquidity (GL), which is positive. This suggests that commencing a period with higher levels of General Liquidity contributes positively to the financial outcome. It seems that maintaining slack levels, in three out of the four tests, did not significantly enhance business results outside the crisis period. The effects of maintaining slack were more consistent during the period of reduced operational activities in companies. During this constrained period caused by the Covid-19 pandemic, financial slack played a supportive role in the results of companies, except for Cash Ratio (CR). These findings highlight that companies able to sustain operational assets (e.g., customer financing and inventories), as represented by GL, CLR, and QR, achieved superior financial results, as assessed by the return on assets. In contrast, the emphasis on financial assets (high liquidity) does not seem to have significantly contributed during this particular period.

In summary, the contribution of financial slack is particularly evident in the context of broader slack during crisis periods, with General Liquidity playing a pivotal role. General Liquidity represents the interplay between various sets of assets and liabilities in relationships with third parties across different time frames. Conversely, in a short-term perspective, the indicator representing slack derived from more liquid assets, as measured by Cash Ratio, did not significantly contribute to performance. Contrary to expectations, companies that reduced levels of GL, CLR and QR levels experienced a reduction in ROA. This observation holds true for both the overall average, as indicated by SLACK\*R interaction, and the crisis period (SLACK\*COV\*R). In the crisis period, where the anticipation was that companies would consume financial slack resources to sustain operations and preserve results, this finding leads to the rejection of H2. The data points to the need to maintain slack levels as a factor in preventing adverse effects on performance.

Initially, the results obtained in this study align to some extent with the findings of Lee (2011), whose research identified positive linear coefficients, suggesting that

financial slack has a linear relationship and provides a competitive advantage to companies, while also helping to mitigate conflicts of interest. Despite the positive effects identified during the crisis period, it suggests that in less turbulent times, there are no discernible positive effects of slack on performance. This indicates that the maintenance of slack was necessary to avoid compromising return levels, and an additional contribution was identified only in the worst-case scenario.

The dummy variable representing the Covid-19 period (COV) exhibited a negative effect on ROA, suggesting that performance during those quarters was lower compared to others. Concerning the control variables – size and debt – it appears that both show predominantly negative and significant relationships.

## 4.2 Relationship between slack and performance – quadratic model

The results obtained suggest the possibility of exploring non-linear relationships, aligning with findings from Pamplona et al. (2019), who indicate the non-linear impact of slack on company performance. In a more contemporary approach, quadratic regressions are recognized for their enhanced explanatory power in measuring the relationship between financial slack and companies' economic performance. These results, highlighting a non-linear influence of slack on performance, are consistent with studies by Laffranchini and Braun (2014), Vanacker et al. (2017), and Rafailov (2017).

From this perspective, Tang and Pen (2003) and Zhong (2011) argue against assuming a linear effect of slack on performance. They suggest that there is a limit beyond which accumulating more resources becomes detrimental to organizational performance. It is reasonable to anticipate that as slack increases, management discipline may become less stringent, making it more likely for ill-advised projects, even those with negative net present value, to be financed (Lee, 2011). This dynamic could empower managers, potentially increasing their control (Altaf & Shah, 2017). Table 5 presents the results for quadratic regression, model [2].

**Table 5**

Quadratic regression tests – dependent variable: ROA – n: 5,085

Clearance Type: Ind. Variables	GL		CLR		CR		QR	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Const	2.269	0.080***	4.289	0.001*	4.554	0.000*	4.222	0.001*
SLACK	2.226	0.000*	0.306	0.085***	-0.083	0.762	0.422	0.040**
SLACK <sup>2</sup>	-0.692	0.000*	-0.087	0.015**	0.039	0.700	-0.128	0.010*
SLACK*R	-1.435	0.000*	-0.335	0.000*	-0.344	0.047**	-0.492	0.000*
SLACK <sup>2</sup> *R	0.533	0.000*	0.084	0.000*	0.089	0.320	0.140	0.000*
SLACK*COV	0.162	0.717	0.273	0.306	-0.405	0.323	0.040	0.896
SLACK <sup>2</sup> *COV	0.060	0.721	0.002	0.979	0.199	0.211	0.057	0.497
SLACK*COV*R	-1.411	0.000*	-0.541	0.011**	0.346	0.456	-0.565	0.026**
SLACK <sup>2</sup> *COV*R	0.486	0.008*	0.069	0.281	-0.176	0.437	0.068	0.442
COV	-0.089	0.699	-0.219	0.348	0.004	0.981	-0.019	0.932
SIZE	-0.098	0.209	-0.154	0.047**	-0.159	0.041**	-0.150	0.053***
DEBT	-0.465	0.018*	-0.914	0.000*	-0.995	0.000*	-0.936	0.000*
R <sup>2</sup>	0.489		0.470		0.465		0.471	
F/p-value	16.291	0.000*	15.177	0.000*	14.874	0.000*	15.244	0.000*

D.W.	1.769	*	1.764	*	1.752	*	1.762	*
JB/p-value	2.097.7	0.000*	2.051.3	0.000*	2.056.9	0.000*	2.043.5	0.000*
H/p-value	47.391	0.000*	40.686	0.000*	37.052	0.000*	41.539	0.000*

\*p-value<0.01; \*\*p-value<0.05; \*\*\*p-value<0.10

Source: research data.

The individual significance of the variables was verified using the t Test, and the joint significance of the model using the F Test, at levels of 10%, 5% and 1%. It is found that the regression is significant in the quadratic model. In relation to the explanatory power of the models, it appears that the R<sup>2</sup> of the tests presented a good level of explanation of the dependent variable, that is, the companies' performance is explained slightly less than 50% in each test, by the set of variables used. The autocorrelation analysis of the residues, verified by the Durbin-Watson (DW) test, resulted in significant values at 1%. The Hausman Test (H) was used to define the modeling to be applied, being significant at 1%, and indicating the fixed effects model as the most recommended. Regarding the normality of the distribution of residues, the Jarque-Bera Test (JB) was used, resulting in a p-value of 0.000, rejecting normality, that is, the residues do not present a normal distribution.

Concerning the control variables – size and debt – as observed in the linear model, they exhibited negative and significant coefficients, indicating a negative influence on financial performance (ROA). The time variable associated with the pandemic period (COV) did not independently have a negative effect on ROA; rather, its effects are linked to the interaction with the slack variables.

As for the model coefficients related to financial slack, it is observed that, in periods prior to the crisis caused by the pandemic, the GL, CLR and QR coefficients show a positive relationship (SLACK) with decreasing growth rates (SLACK2) up to a limit maximum, followed by a negative relationship with performance. This leads to the understanding that slack will not always contribute to better business performance. Slack helps performance up to a certain level and, after a certain point, the benefits of slack are exceeded by its harms (Pamplona et al., 2017), causing corporate performance to be negatively affected, with a relationship occurring in curvilinear shape (Tang & Pen, 2003).

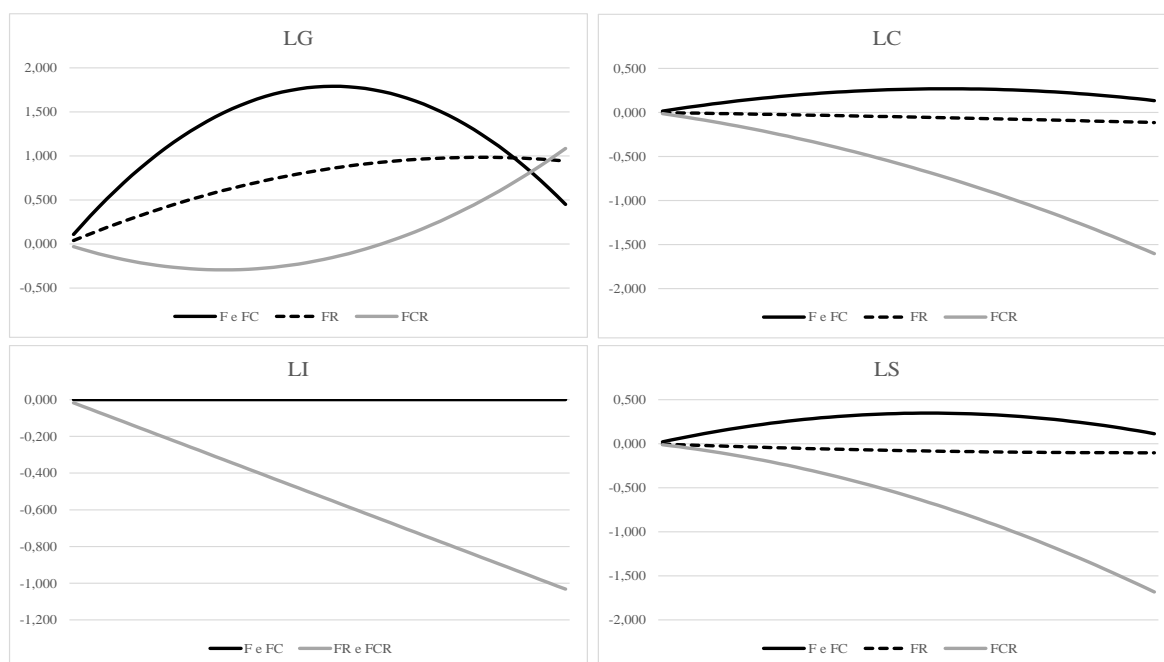
The negative relationship is supported by studies that contend that idle resource slack invites inefficiency and that managers' behavior can be detrimental to performance (Daniel et al., 2004). Additionally, excess resources are considered additional costs for organizations and are viewed as unnecessary expenses for companies (Tang & Pen, 2003). The elimination of such excess resources is argued to enhance corporate efficiency (Lee, 2011).

The study found that a reduction in all liquidity variables between quarters has a negative impact on companies' performance. The coefficients for SLACK\*R and SLACK<sup>2</sup>\*R indicate that the relationship is linear for Immediate Liquidity and non-linear for the others. These findings emphasize the importance of maintaining slack levels, as a failure to do so could lead to a decline in financial results, reinforcing the conclusions drawn from the linear models.

Regarding the crisis period caused by the pandemic, as explored in this study, no statistically significant coefficients were identified to confirm the

expectation of an additional positive relationship between financial slack and performance. In other words, during the two quarters analyzed, the relationship between slack and performance did not exhibit notable changes compared to non-crisis periods. The impact of maintaining financial slack levels followed a similar pattern as before, without significant alteration during the pandemic period. However, if maintaining slack had no additional effect during the crisis, the reduction of slack had an even more pronounced impact on ROA. The results indicate that reducing liquidity levels during the pandemic had an additional effect on diminishing asset returns, with non-linear relationships identified for General Liquidity (GL), Current Liquidity Ratio (CLR), and Quick Ratio (QR).

In a situation of financial slack during a crisis period, excess resources can serve to mitigate environmental uncertainties, ensuring that corporate obligations are met. Furthermore, financial slack empowers companies to make investments, fostering competitive advantages (Latham & Braun, 2008). Such resources maintained in excess during crises are deemed essential, especially when access to external resources becomes challenging (Pamplona et al., 2017). Therefore, the expectation is that financial slack provides a relative sense of security, utilized in periods of environmental turbulence (Tang & Pen, 2003), allowing companies to fulfill commitments, seize opportunities, and make strategic investments. However, in the examined sample, the effects observed before and during the crisis were consistent, positive for maintaining balances and negative for reducing slack levels. This suggests that security is derived from maintaining a balance in the volume of slack rather than the variation between its consumption and accumulation.



**Figure 3** Graphical representation of the effects of slack on performance – non-linear relationships



Caption: S – effect of the SLACK variable; SR – effect of reducing the SLACK variable; SC – effect of SLACK in the crisis period; SCR – effect of reducing the SLACK variable during the crisis period.

Source: prepared by the authors.

It is noteworthy that the quadratic coefficients measuring financial slack in this study indicate that the influence of excess resources has an inverted U-shaped effect on the organizational results. It begins with a low impact, grows at decreasing rates up to a certain point, beyond which it transitions from positive to negative. These results lead us to refrain from rejecting **H1** and **H3**. The graphical representation of the effects of slack on performance can be observed in the graphs in Figure 3.

In quadratic regressions, commonly employed in recent studies examining the relationship between slack and performance, there is a prevalent observation of a curvilinear relationship between the two variables. This suggests that there is a limit, and beyond that threshold, a higher level of resources becomes detrimental to organizational performance (Pamplona et al., 2019). In this study, the indicators General Liquidity (GL), Current Liquidity Ratio (CLR), and Quick Ratio (QR) exhibited this behavior throughout the analyzed period, including the crisis period. Notably, as illustrated in Figure 3, reductions in slack levels (SR and SCR) proved to be detrimental, both by having a negative impact on performance (CLR, CR, and QR) and by significantly diminishing the positive effects of GL.

It is noteworthy that the results of the present study align with the findings of Tang and Pen (2003) and Paeleman and Vanacker (2015), who also observed a quadratic relationship between the variables in the form of an inverted U-shaped. In other words, both low levels and excessively high slack rates are detrimental to business performance. On the contrary, intermediate levels of excess resources positively impact organizational results, suggesting the importance of moderation in maintaining financial slack. Similarly, the perspective presented by Vanacker et al. (2016) emphasizes the necessity for organizations to have an adequate level of slack, as too little slack can create organizational problems, and too much slack may also prove unsustainable. The findings underscore the importance of maintaining slack levels in organizations, avoiding reductions, potentially linked to the stability of support in operational elements such as financing inventories and customers.

Concerning intermediate levels of financial slack leading to lower economic performance during a crisis period, this occurrence may be attributed to the fact that when slack is at a moderate level, managers perceive fewer risks as their organizations operate satisfactorily (Dallabona & Beuren, 2012). This situation may lead managers to become complacent and lack the necessary sense of urgency required to address threats to the company.

However, the reduction in General Liquidity (GL) during the quarters of operational restrictions had the opposite, U-shaped effect. This can be explained by considering that companies with low levels of this broader slack respond more promptly to environmental disturbances related to the recession, potentially slowing economic decline. Companies with lower levels of surplus resources

demonstrate a quicker and more effective response to the environment as the recession progresses and may be more conducive to an eventual recovery (Latham & Braun, 2008).

Those companies with higher levels of slack had more opportunities to utilize it in the short term. In such cases, elevated levels of financial slack can ensure that the organization maintains a certain level of stability and has the capacity to invest in areas it deems most appropriate, including innovation (Santos et al., 2018). Therefore, heightened levels of excess resources enable the company to invest without excessive risk and in areas deemed ideal for the prevailing circumstances (Trojan et al., 2020). This capacity may have played a role during the necessary response to the effects of declining demand caused by the pandemic.

With the necessity for swift actions during the crisis, prompted by reductions in mobility and, consequently, demands in some segments, the utilization of extra resources may have facilitated innovation. This ability to innovate could have helped companies remain competitive, grow, and extend their reach into new markets (Sakaki & Jory, 2019). Investment in research and development stands as one of the pivotal corporate activities driving the viability and growth of companies (Zhou, Yan & Liu, 2019). Therefore, in a highly competitive global economy, innovation is widely considered a key success factor (Rajapathirana & Hui, 2018). Evidence underscores that companies with high financial slack demonstrate better performance and market value, and they play a significant role in influencing gross profit (Trojan et al., 2020).

## 5 CONCLUSION

This study aimed to analyze the influence of financial slack on the economic performance of companies listed on B3 during the Covid-19 pandemic. To achieve this objective, a descriptive, quantitative, and documentary research approach was employed, relying on secondary data sourced from the financial statements of companies listed on B3, accessed through the Economática database. The study period spanned from the second quarter of 2016 to the third quarter of 2020, encompassing a sample of 308 companies in an unbalanced panel. After addressing missing data and atypical observations, the total number of observations analyzed amounted to 5,085.

The linear regression model indicated that slack predominantly contributed to the improvement in business results during the Covid-19 pandemic period. The quadratic regression model exhibited superior explanatory power concerning the relationship between financial slack and economic performance, aligning with studies that adopted a more contemporary perspective on the subject. On average, organizational slack levels contributed positively to organizational performance throughout the analyzed period.

In general, the graphical analysis of the effects illustrated that the contribution occurred in an inverted U-shape. The quadratic coefficients indicate that low levels of slack are unfavorable, while intermediate levels of slack contributed to the return of assets. However, from a certain point onwards, the influence of excess resources shifts from positive to negative, presenting a

parabola-shaped relationship. In other words, both low and high levels of slack harmed business performance throughout the period, and this behavior remained consistent during the pandemic period. The findings suggest that managers need to identify the optimal range for maintaining organizational slack, between a minimum that avoids shortages and a maximum that prevents excess, ensuring constant management attention and maximizing impacts on performance.

In particular, the study advances by demonstrating risks to performance when the company chooses or needs to reduce levels of slack. The impacts identified in the tests reveal negative effects on ROA and a reduction in the size of positive effects. Overall, the companies in the sample benefit from balanced levels of slack, emphasizing the importance of managers paying attention to intermediate levels of slack, seeking to maintain the volume of slack, and considering recovery in the event of the use of accumulated resources.

Considering the results found, the importance of understanding the behavior of slack and its relationship with a company's performance is highlighted. This information contributes to improving management practices and enhances decision-making by managers, enabling them to focus efforts on better utilizing the available resources in their organizations. The study underscores that managers should aim for a healthy volume of slack for their companies, taking into account four key aspects: 1) intermediate level – an intermediate level exists where liquidity indices show better relationships with profitability; 2) inverted U-shaped behavior – the behavior is inverted U-shaped, meaning that as slack moves from a low level and begins to grow, the gain rates are higher and decrease until they may invert, starting a negative cycle with ROA; 3) consumption of spare resources – consuming spare resources, especially in times of crisis, may have the opposite impact to what was expected, reducing performance. This might be necessary due to a reduction in credit supply; 4) resuming intermediate levels: in situations where slack has been significantly consumed, resuming intermediate levels should be a priority on managers' agenda.

Effective slack management plays a crucial role in guiding organizational decisions by defining the levels at which slack is recognized as a practice capable of generating benefits for the company. The research discusses the average effects of slack levels during a period of economic stability in the country and highlights the effects during a critical moment caused by the pandemic. This emphasizes differences in the relationship between slack and performance.

In this context, the perspective of the managers in determining the volume of slack becomes crucial for improving organizational performance. Maximizing slack is justified by the need for surplus resources to address threats, leverage opportunities, and prevent irresponsible managerial behavior. At the same time, it is essential to limit slack sufficiently to avoid exposure to exaggerated capital costs associated with excess slack (Daniel et al., 2004).

The research has certain limitations in its analysis of organizational slack, financial slack, and liquidity indices, as well as its focus on a broader measure of performance through asset profitability (ROA), without delving into effects on performance metrics like Return on Equity (ROE) or market performance such as share prices or Tobin's Q. For future research on this topic, it is recommended to

explore the impact of recoverable and potential financial slack on organizational performance during the pandemic period. This would enable a more comprehensive analysis, and the results could complement those of the current research. Additionally, future studies could consider cross-country comparisons to provide further insights into the effects of slack on economic performance.

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