Revista Catarinense da CIÊNCIA CONTÁBIL

ISSN 2237-7662, Florianópolis, SC, v. 23. 1-16. e3508. 2024

https://doi.org/10.16930/2237-7662202435082

Available at http://revista.crcsc.org.br

OPPORTUNITY WINDOWS FOR IPOS: A STUDY OF BRAZILIAN TECHNOLOGY COMPANIES DURING THE PANDEMIC

JÚLIA VIEIRA REIS[1]
Federal University of Uberlândia
https://orcid.org/0000-0001-9411-1534
juliavieira010699@gmail.com

SAMITO MÁRIO CHIMOIO TAIMO
Federal University of Uberlândia
https://orcid.org/0000-0002-2991-9411
samitochimoio6@gmail.com

GILBERTO JOSÉ MIRANDA
Federal University of Uberlândia
https://orcid.org/0000-0002-1543-611X
gilbertojm@ufu.br

NEIRILAINE SILVA DE ALMEIDA
Federal University of Uberlândia
https://orcid.org/0000-0001-5687-9833
neirilaine@ufu.br

SABRINA SILVA DE SOUZA
Federal University of Uberlândia
https://orcid.org/0009-0000-2885-0910
sabrina.souza@ufu.br

ABSTRACT

This study investigates whether technology companies in Brazil used initial public offerings (IPOs) opportunistically as a source of financing during the Covid-19 pandemic. Using a quantitative approach, the study analyzed financial information from 16 companies, including 12 that conducted IPOs in the technology sector, based on data from the Economatica platform, covering the period from 2017 to 2022. Descriptive results showed that during "hot" market periods, companies exhibited lower financial leverage and higher Market-to-Book ratios and Size indices, whereas in "cold" market periods, they showed higher financial leverage and lower Market-to-Book ratios and Size indices. In the regression analysis of financial leverage, the only variables that showed statistical significance were Profitability and Tangibility. The lack of significance in other variables highlights the complexity of identifying consistent determinants for growth and financial leverage in the Brazilian context, as observed in previous studies by Mendes and Kayo (2004) and Steffen and Zanini (2014). The regression analysis on growth indicated that the period (hot/cold), Market-to-Book ratio, and Tangibility were statistically significant, suggesting that these variables influence the growth of the analyzed companies. The results suggest that the Equity Market Timing theory does not clearly apply to the Brazilian technology sector, both before and during the pandemic. External changes influence company financing, indicating the need to consider additional variables in future research.

Keywords: Equity Market Timing Theory. Capital Structure. Covid-19 Pandemic.

Edited in Portuguese and English. Original version in Portuguese.

Version of the article presented at the 9th UNB Congress of Accounting and Governance, November 8-10, 2023, in Brasília/DF.

[1] **Correspondence address:** Av. João Naves de Ávila, 2121 - 1F | Santa Mônica | 38408-100 | Uberlândia/MG | Brasil.

Received on 07/11/2024. **Revised on** 10/18/2024. **Accepted on** 12/02/2024 by Prof. Dr. Rogério João Lunkes (Editor-in-Chief). **Published on** 12/18/2024.

1 INTRODCTION

The Covid-19 pandemic brought about significant changes worldwide, and some of the consequences of these changes, particularly in terms of the impact on businesses, are still unknown. The pandemic led to a global health collapse and an economic downturn, affecting all sectors in some way (Santos et al., 2024).

The impact of the pandemic has been uneven across sectors (Global Innovation Tracker, 2021). While companies in software, information and communication technologies, hardware, pharmaceuticals, and biotechnology increased their investments in research, development, and innovation, businesses with models based on personal contact, such as transportation and tourism, faced severe restrictions and had to significantly reduce expenses (Global Innovation Tracker, 2021).

The Information Technology sector stood out as one of the most resilient during this period, with many companies entering the Brazilian stock market (Brasil, Bolsa, Balcão, 2021) in 2020 and 2021 (Santos et al., 2024). There was a boom in Initial Public Offerings (IPOs) in the sector, as the need for digital solutions and technological innovations became more evident. In 2020, five IPOs were made (Enjoei S.A., Livetech da Bahia Ind. e Com. S.A., Locaweb Serviços de Internet S.A., Méliuz S.A., and Neogrid Participações S.A.), and in 2021. eight IPOs (Bemobi Tech S.A., Getninjas S.A., Infracommerce Cxaas S.A., Mobly S.A., Multilaser Industrial S.A., TC S.A., and Westwing Comércio Varejista S.A.) were conducted, while only seven IPOs took place in the previous years, from 2000 to 2019 (BRQ Soluções em Informática S.A., Padtec Holding S.A., Positivo Tecnologia S.A., Quality Software S.A., Sinqia S.A., and Totvs S.A.) (Brasil, Bolsa, Balcão, 2021).

According to the Tech Report (2021), the Brazilian technology sector experienced remarkable growth, with 422.3 thousand active companies, a 25.1% increase from 2019. This growth is particularly noteworthy when compared to the mere 4.3 thousand companies that were established between 1966 and 2011 (Tech Report, 2021). In 2020, the technology sector generated a total revenue of R$ 426.9 billion, representing 5.6% of the national GDP (Tech Report, 2021).

Studies such as Baig and Chen (2022) show that although the number of IPOs increased in 2020, these IPOs faced greater informational uncertainty and volatility in post-IPO returns. This suggests that the pandemic did not positively influence the IPO market, highlighting the increased volatility of stocks from companies that went public during this period. Furthermore, long-term performance analysis of these companies remains a gap in existing research (Baig & Chen, 2022).

Santos et al. (2024) analyzed the economic and financial indices of technology companies, revealing significant increases in profitability indicators and a reduction in debt at the start of the pandemic. Moreover, the IPOs generated an increase in capital and a reduction in debt. However, the results indicate a subsequent decline in the sector's performance (Brasil, Bolsa, Balcão, 2023).

Baker and Wurgler's (2002) Market Timing Theory in the stock market suggests that companies adjust their capital structure based on stock market conditions, issuing shares when prices are high and repurchasing them when prices are low. This study applies the Equity Market Timing (EMT) theory to analyze the information technology sector, which saw a significant increase in the number of IPOs during the Covid-19 pandemic.

Given the above, the present study has the general objective of verifying whether technology companies acted opportunistically by using Initial Public Offerings (IPOs) as a source of financing during the Covid-19 pandemic. To achieve this purpose, the specific objectives were defined: (i) to identify the sources of financing used by the technology sector during and after the pandemic; (ii) to analyze the capital structure of Brazilian technology companies that conducted IPOs during the Covid-19 pandemic; (iii) to evaluate whether the technology companies acted opportunistically, according to the Equity Market Timing Theory.

The methodology employed was quantitative, and accounting data from 16 technology companies were used for the period from 2017 to 2022. The results indicate variations in financial leverage and Market-to-Book ratios depending on the analyzed period ("hot" or "cold"). Furthermore, the regression analysis revealed that the period (hot/cold), Market-to-Book ratio, and Tangibility are significant factors for the growth of the companies, while profitability and tangibility are significant for financial leverage. The results found indicate that the Equity Market Timing Theory does not clearly apply to the Brazilian context, highlighting the complexity of growth and financial leverage determinants in the country.

This research has practical, social, and theoretical justifications. In the practical realm, the results can serve as guidance and a benchmark for companies, specifically in the technology sector, that intend to conduct IPOs during periods considered as windows of opportunity, as it will be possible to observe the behavior of economic-financial data from companies in this sector during these times.

In the social realm, the Covid-19 pandemic had an impact on the technology sector, characterized by an initial increase in stock prices, followed by abrupt declines and mass layoffs after the high period, affecting employees, companies, and investors. In this context, investigating the strategies adopted by technology companies to adapt and survive in an environment of economic instability can help guide public policies and business strategies that promote sector innovation.

From a theoretical perspective, this research applies the Equity Market Timing Theory in a specific and highly impactful context in several areas: the Covid-19 pandemic. Thus, the goal is to obtain results with the potential to contribute to the improvement of the theory, providing a more detailed understanding of the impact of IPOs during periods considered as "windows of opportunity" (Baker & Wurgler, 2002) on the capital structure of technology companies in Brazil. This information has the potential to guide both business decisions and government policies, aiming to provide economic insights about technology companies in a challenging scenario.

The Theoretical Framework explores the Equity Market Timing Theory and the context of IPOs in the technology sector. The Methodology section describes the approach used in the research, the variables used and their classification, as well as the statistical techniques applied. The Results section presents the analyses obtained from descriptive statistics and regression. The Discussion compares findings with existing literature, and the Conclusion summarizes the main findings and proposes directions for future research.

2 THEORETICAL FRAMEWORK

2.1 Windows of Opportunity

Companies have various sources of financing for their operations and growth. The primary source is the cash generated by the company's operations, derived from sales and service revenues (Braga & Marques, 2001). This cash flow is essential to cover operational costs, continuous investments, and ensure the continuity of the business.

At certain times, companies may also turn to cash generated from investments, which involves the sale of assets such as property or equity stakes to obtain additional financial resources (Braga & Marques, 2001). This can be a particularly relevant strategy during periods of crisis for raising cash. However, when a company prefers not to dispose of its assets, it must resort to credit from new partners or third parties.

Financing through external resources, including bank loans, the issuance of debt securities, and the sale of shares, allows for the acquisition of additional capital for strategic activities such as expansion, mergers, acquisitions, and product development (Braga & Marques, 2001). The decision to go public is crucial in turbulent and uncertain economic scenarios, where companies

may adopt opportunistic strategies. The Equity Market Timing Theory suggests that companies may use an IPO as an opportunistic source of financing during market highs or lows, depending on the context (Rossi & Marotta, 2010).

Steffen and Zanini (2014) conducted a study with 113 executives to understand the reasons for going public in Brazil, highlighting the reduction of capital costs as a central factor. The IPO aims to provide easier access to resources, in line with the Market Timing Theory. Important determinants include: (i) general market conditions; (ii) sectoral context; and (iii) the need for capital to expand (Steffen & Zanini, 2014).

According to Ritter (1991), IPOs conducted during periods of high trading volume, known as "windows of opportunity," tend to show poor long-term performance. Ritter (1991) observed that, over a longer time horizon, the stock prices were found to be high during the time of an Initial Public Offering (IPO). This observation suggests that issuers of these stocks take advantage of what he calls the "window of opportunity," when stocks are overvalued, resulting in a lower cost of capital for financing new investments (Ritter, 1991).

Mendes, Basso, and Kayo (2009) support this view, stating that the issuance of shares during periods when managers perceive them as overvalued is known as the "window of opportunity." This should not only be related to information asymmetry but also to market deficiencies related to investor overconfidence.

2.2 Equity Market Timing Theory: Origin and Applications

The Equity Market Timing Theory, formalized and popularized by Baker and Wurgler (2002) in their paper "Market Timing and Capital Structure," provides a theoretical framework for these analyses. Baker and Wurgler (2002) examined the relationship between stock market timing, the ability to predict market movements, and the capital structure of companies. They proposed that companies tend to issue more shares when the market is overvalued and repurchase shares when the market is undervalued. According to the authors, this market timing strategy is based on the assumption that companies take advantage of favorable market conditions to raise capital or reduce the cost of capital.

A Teoria do *Equity Market Timing* também sugere que empresas com maior Leverage Companies with high financial leverage tend to raise funds from third parties, such as bank loans, when the company's market value is low (Baker & Wurgler, 2002). On the other hand, companies with low financial leverage seek external resources, such as issuing new shares, when the market value is high (Mendes, Basso & Kayo, 2009). Therefore, companies that follow market timing strategies tend to underperform compared to those that do not adopt such strategies (Baker & Wurgler, 2002).

This finding contradicted the traditional view that market timing could be a profitable strategy for companies. Baker and Wurgler (2002) demonstrated that although companies may benefit temporarily by issuing shares when prices are high, in the long run, these companies tend to have lower returns. These results suggest that stock market timing decisions have important implications for companies' long-term financial performance, as companies that try to "time the market" usually do not succeed consistently and may end up damaging their financial performance over time (Baker & Wurgler, 2002).

In this context, "financial performance" refers both to stock returns and profit generation, with investment and financing decisions being critical for generating shareholder value. Market timing can negatively impact both dimensions, harming shareholders in the short term, especially in terms of stock returns, and compromising long-term profitability due to financial decisions misaligned with the company's real needs (Perez, 2015). Baker and Wurgler (2002) established a link between the Equity Market Timing Theory and the concept of the "window of opportunity" in the context of corporate financing decisions. The opportunity window refers to a period when

market conditions are favorable for companies to make financial transactions, such as issuing shares or raising funds (Baker & Wurgler, 2002). Thus, the authors argued that companies that follow market timing strategies are alert to these opportunity windows.

For Baker and Wurgler (2002), knowing the date of the IPO allows for the examination of leverage behavior around this event. They observed that the IPO is an important financing decision and is related to the market-to-book ratio (market value/book value). This measure reflects the difference between the value perceived by the market and the book value of the company, meaning that when the market-to-book ratio is high, it indicates that the market is favorable toward the company, making it an opportune moment for conducting an IPO (Baker & Wurgler, 2002).

2.3 Post-IPO Stock Behavior

Alti (2006) examined the impact of market timing on capital structure, focusing on Initial Public Offerings (IPOs). The results show that companies conducting IPOs during "hot" periods issue more shares and reduce leverage compared to companies that issue during "cold" periods. However, after the IPO, companies from "hot" periods increase their leverage by issuing more debt and fewer shares than companies from "cold" periods (Alti, 2006). Notably, two years after the IPO, the effect of market timing on leverage diminishes, indicating that, over time, the difference in capital structure between companies that go public during "hot" or "cold" periods becomes less relevant (Alti, 2006).

A "hot" moment is characterized by a significant number of Initial Public Offerings (IPOs) in a given period, while a "cold" moment is the opposite, with few IPOs (Alti, 2006). This classification is based on the perception of managers that there is a window of opportunity in which the cost of equity capital is lower compared to other forms of financing. This perception leads to a concentration of IPOs during such periods (Alti, 2006).

Alti (2006) investigates the Equity Market Timing Theory and its implications on capital structure and profitability of companies, using an approach similar to that of Baker and Wurgler (2002). In addition to examining the behavior of companies in relation to "windows of opportunity," moments when the cost of equity capital is relatively low compared to other sources of financing, Alti's (2006) study addresses gaps left by traditional theories on determining companies' capital structure, such as the Trade-off Theory and the Pecking Order Theory. To fill these gaps, researchers have developed alternative approaches, including equity market timing.

Based on the analysis of the variables used in the research, Alti (2006) concluded that market timing has a positive effect on the volume of share issuances, especially primary issuances. However, the impact of these issuances on the companies' capital structure is temporary, reversing in just two years (Alti, 2006).

In this context, Rossi and Marotta (2010) conducted a study on the impact of behavior related to equity market timing on Initial Public Offerings (IPOs) and companies' capital structure, based on the studies of Baker and Wurgler (2002) and Alti (2006), using data from the Brazilian market between January 2004 and December 2007. The authors observed that companies adopted an opportunistic behavior, issuing a higher volume of shares during "hot" periods, indicating that they took advantage of times of higher demand and optimism in the stock market to conduct their IPOs (Rossi & Marotta, 2010).

Moreover, the authors found that this behavior was significant compared to alternative explanations and that its impact on the companies' capital structure was limited to the short term. Despite a significant reduction in leverage shortly after the IPO, the results indicated that this level tends to return to previous levels in some quarters after the issuance (Rossi & Marotta, 2010).

3 METHODOLOGICAL PROCEDURES

To achieve the objective of this research, which is to verify whether technology companies acted opportunistically by using Initial Public Offerings (IPOs) as a source of financing during a pandemic, this study uses economic and financial information from the period 2017 to 2022. The choice of this period allows for the examination of data both before and during the pandemic, covering three years prior to the onset of the pandemic and three years during the pandemic, with quarterly data.

The data were collected from the Economatica Platform, considering publicly traded companies listed on B3 (Brazil, Bolsa, Balcão) in 2022. belonging to the Information Technology (IT) sector, specifically in the sub-sectors of Computers and Equipment and Software and Services, which disclosed their annual financial statements on B3 from 01/2017 to 12/2022. This procedure was conducted with a sample of 16 companies, as listed in Table 2.

A total of 165 observations were obtained for the 16 companies that entered the sample. From this data, indicators were calculated for each company in the sample: financial leverage, growth, market-to-book ratio, profitability, tangibility, and size.

The research is based on the results of Rossi and Marotta (2010), who utilized the approaches of Baker and Wurgler (2002) and Alti (2006). The variables used in the regressions are similar to those employed by Alti (2006) and Baker and Wurgler (2002), as well as in other international studies, as they are considered determinants in financing decisions and the analysis of companies' capital structure. The variables are shown in Table 1.

Table 1
Definition of Variables – Technology Sector Companies

Variable	Acronym	Definition	Classification
Financial Leverage	D/A	Debt-to-Total Assets Ratio	Dependent variable
Growth	Inv/A	Ratio of change in Permanent Assets to Total Assets	Dependent variable
Market-to-book	M/B	Market Value plus Net Debt to Total Assets Ratio	Explanatory variable
Profitability	EBITDA/A	EBITDA to Total Assets Ratio	Explanatory variable
Tangibility	AP/A	Permanent Assets to Total Assets Ratio	Explanatory variable
Size	Ln (Revenue)	Natural Logarithm of Net Revenue	Explanatory variable

Source: Adapted from Rossi Jr., J. L., & Marotta, M. (2010). Equity market timing: testing through IPOs in the Brazilian market. *Brazilian Review of Finance*, *8*(1), 85-101.

Financial leverage measures the degree of indebtedness of a company, i.e., the proportion of third-party capital in relation to equity. Growth (INV/A) represents the total investment in permanent assets in relation to the company's total assets. The explanatory variables clarify or predict the variation in financial leverage and growth, which are the dependent variables in the model. The market-to-book ratio compares a company's market value with its book value. Profitability (EBITDA) is a measure of operational profit before interest, taxes, depreciation, and amortization. Tangibility indicates the degree of tangible assets relative to the company's total assets, and **size** is measured by the logarithm of net revenue.

For data analysis, the companies were divided into two groups: those that conducted IPOs during a "hot" period and those that conducted IPOs during a "cold" period. "Hot" periods are characterized by a higher number of companies conducting IPOs, while "cold" periods are marked by a lower number or absence of IPOs.

Table 2 presents the IPO dates, by company, the common shares, and the classification of the periods as hot or cold. The "cold" years are those in which the number of IPOs was lower,

while the "hot" years are characterized by a higher number of IPOs. Based on this definition, it can be observed that of the six years considered in the study (2017 to 2022), two are classified as "hot" (2020 – 5 IPOs and 2021 – 7 IPOs) and four as "cold" (2017. 2018. 2019. and 2022 – no IPOs in these years). In other words, the first two years of the pandemic were considered "hot," while the three years prior and the third year after the pandemic began (2022) are considered "cold".

Table 2
Classification of Technology Sector Companies and IPO Dates

N	Company	Code	IPO Date	Common Shares	Period (Hot/Cold)
1	BEMOBI TECH S.A.	BMOB	01/15/2021	90.909.092.00	Hot
2	ENJOEI S.A.	ENJU	10/08/2020	200.243.184.00	Hot
3	INFRACOMMERCE CXAAS S.A.	IFCM	04/08/2021	386.660.978.00	Hot
4	INTELBRAS S.A.	INTB	01/12/2021	327.611.110,00	Hot
5	LIVETECH DA BAHIA IND. E COM. S/A	LVTC	03/11/2020	64.663.063.00	Hot
6	LOCAWEB SERVIÇOS DE INTERNET S.A.	LWSA	01/15/2020	594.090.098.00	Hot
7	MÉLIUZ S.A.	CASH	10/09/2020	865.180.443.00	Hot
8	MOBLY S.A.	MBLY	01/14/2021	106.489.904.00	Hot
9	MULTILASER INDUSTRIAL S.A.	MLAS	06/30/2021	820.539.225.00	Hot
10	NEOGRID PARTICIPACOES S.A.	NGRD	01/20/2020	238.662.330,00	Hot
11	PADTEC HOLDING S.A.	PDTC	06/08/2000	78.449.779.00	Cold
12	POSITIVO TECNOLOGIA S.A.	POSI	12/11/2006	141.800.000,00	Cold
13	SINQIA S.A.	SQIA	02/03/2014	87.941.972.00	Cold
14	TC S.A.	TRAD	07/13/2021	280.147.138.00	Hot
15	TOTVS S.A.	TOTS	03/09/2006	617.183.181.00	Cold
16	WESTWING COMERCIO VAREJISTA S.A.	WEST	01/19/2021	110.404.337.00	Hot

Source: Prepared by the authors.

It is noted that out of the 16 companies that conducted IPOs during this period, 12 of them made their emissions in years considered "Hot", representing 75% of the sample, while 4 companies conducted IPOs in years classified as "Cold", representing 25% of the sample (Table 2).

For both groups, descriptive statistics (mean, median, and standard deviation) of the variables of interest were presented to analyze and compare the behavior of these variables. Additionally, regression tests were conducted for the analysis of the capital structure, according to the following equation:

$$Yt = \alpha + \beta 1 Q/F + \beta 2 M/B + \beta 3\ EBITDA/A + \beta 4\ AP/A + \beta 5\ Ln\ receita + erro$$ [Equation 1: General Regression Test]

Yt represents the dependent variable (financial leverage / growth). The dummy variable "Hot" identifies periods considered Hot, taking the value 1 when a period is classified as Hot and

0 otherwise. Two models were used in the STATA software, each with Yt representing one of the dependent variables.

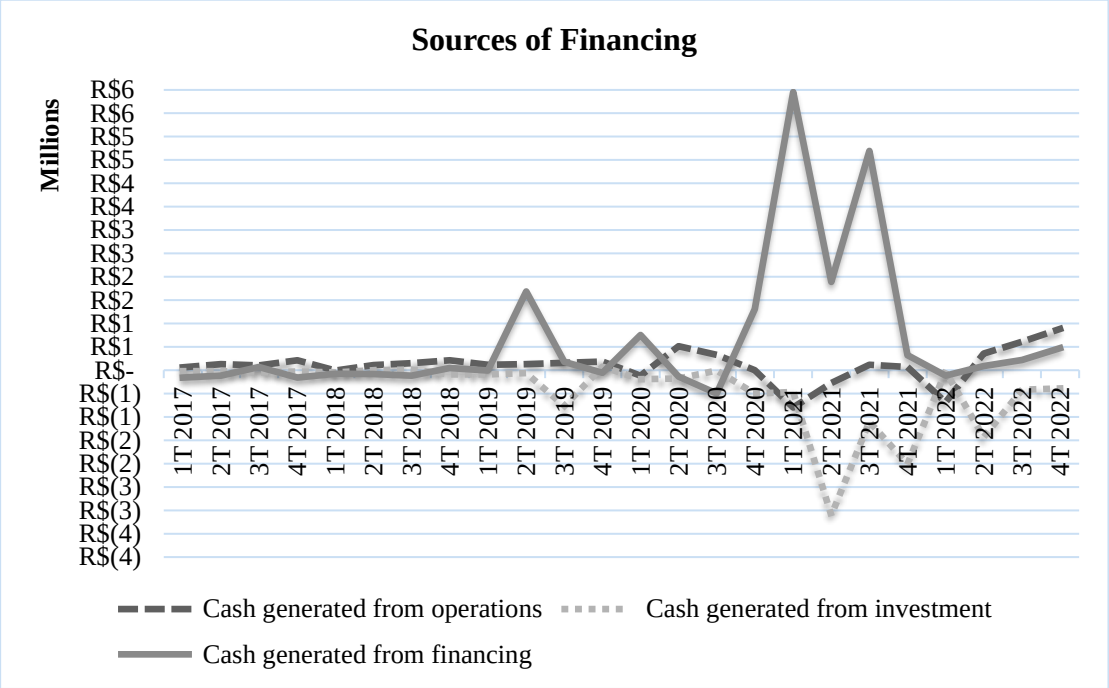
The data were collected from Economatica, with the information initially processed in Excel. First, the quarterly financial statements of technology sector companies were extracted. Subsequently, the calculation of the dependent and explanatory variables presented in Table 1 was carried out. Finally, multiple linear regression tests were performed using panel data for each of the dependent variables. The data were analyzed using STATA software. After testing the assumptions (absence of multicollinearity, absence of residual autocorrelation, homoscedasticity, and normal distribution of residuals), robust standard errors were used for coefficient estimation to mitigate potential issues of heteroscedasticity, non-normality, and residual autocorrelation.

4 RESULTS

The analysis of the financing sources used by the companies under investigation, based on the data extracted from the cash flow statements, shows a higher intensity of financing in the years 2020 and 2021. as illustrated in Figure 1.

Figure 1

Sources of Financing – Technology Sector Companies – 2017 a 2022



Source: Prepared by the authors.

Until the first quarter of 2019. the cash flows generated by operations, investments, and financing were comparable. From the first to the second quarter of 2019. financing cash flow increased slightly, while investment cash flow experienced a slight decline in the second quarter of 2019. This trend continued in the following quarters, particularly worsening in the first quarter of 2021. with a small recovery afterward. These cash flow patterns reflect the difficulty faced by companies in acquiring external financing and investment sources during specific periods, reinforcing the ideas of Steffen and Zanini (2014).

The financing cash flow stands out, especially in the third quarter of 2020, a period coinciding with a large number of IPOs conducted in the sector (Table 2), indicating the possibility of opportunistic behavior by companies in the sector.

A decline is observed in the second quarter of 2021. coinciding with a reduction in cash due to investments, possibly indicating difficulties in accessing external financing sources. Between the second and third quarters of 2021. there is an increase in financing cash flow, stock issuance, followed by subsequent declines in all three types of cash flow. This fluctuation aligns with the Theory of Equity Market Timing, showing that companies might have been taking advantage of stock issuance opportunities to raise funds, as discussed in previous studies (Alti, 2006; Rossi & Marotta, 2010; Baig & Chen, 2022).

Cash generated by operating activities remained relatively constant between periods, with a slight decline in the early quarters of 2021 and 2022. Starting from the second quarter of 2022. it surpassed cash generated from external financing and investment sources, indicating that companies were able to increase cash through their operational activities. This supports the notion that IPOs may be influenced by market conditions and the prospects of reducing capital costs, as discussed by Steffen and Zanini (2014).

4.1 Capital Structure

4.1.1 Descriptive Data of the Sample

Capital structure is an important driver in the context of the Equity Market Timing Theory, as the theory suggests that companies may attempt to time the market. In this way, they will issue shares when the market or their shares are overvalued and repurchase shares when they are undervalued (Baker and Wurgler, 2002).

Table 3 provides a description of the results, including means, medians, and standard deviations of the research variables, considering the indicators calculated for each of the quarters evaluated in the sample period.

Table 3

Analysis of the Mean, Median, and Standard Deviation of the Variables for Technology Sector Companies

Variable	2017	2018	2019	2020	2021	2022	Total
			Mean				
Leverage	0.6157	0.5562	0.5203	0.4548	0.3775	0.4305	0.4497
Crescimento	0.0018	0.0002	0.0420	0.0230	0.0571	0.0138	0.0277
MTB	1.3566	1.2675	1.5978	2.3455	1.7980	0.8215	1.4431
Profitability	0.0651	0.0217	0.0204	0.0205	0.0113	0.0115	0.0186
Tangibility	0.3776	0.3781	0.3326	0.2392	0.2663	0.3475	0.3131
Size	18.1852	19.1878	19.2461	18.7638	18.8826	19.2282	18.9756
			Median				
Leverage	0.5251	0.4845	0.5657	0.4692	0.3793	0.4052	0.4605
Crescimento	-0.0045	-0.0031	0.0022	0.0020	0.0175	0.0016	0.0024
MTB	1.5631	1.6392	1.7891	2.1349	1.3844	0.5857	1.2646
Profitability	0.0247	0.0279	0.0185	0.0209	0.0192	0.0194	0.0202
Tangibility	0.4539	0.4506	0.3286	0.2264	0.2085	0.3247	0.3191
Size	19.8939	20.0049	20.0430	18.5226	18.4007	19.3011	19.0320
			Standard Deviation				
Leverage	0.1699	0.1222	0.1942	0.1991	0.2060	0.1874	0.2006
Crescimento	0.0256	0.0169	0.0761	0.0501	0.0907	0.0596	0.0693
MTB	0.8265	0.7571	1.0497	1.7433	1.3194	0.6511	1.2183
Profitability	0.1469	0.0150	0.0137	0.0221	0.0311	0.0263	0.0503
Tangibility	0.2179	0.2188	0.1984	0.1342	0.1703	0.1963	0.1894
Size	2.7460	1.3367	1.2306	1.1840	1.2378	1.2355	1.4324

Source: Prepared by the authors.

The analysis of Table 3 reveals variations in the descriptive data of the variables analyzed between the periods prior to the pandemic (2017, 2018, and 2019) and during the pandemic (2020, 2021, and 2022). Although no IPOs occurred in 2022, the descriptive results for that year align with those obtained in the years with a higher number of IPOs. Regarding financial leverage (AF), the average showed a decline during the analyzed period, which intensified during the pandemic and slightly increased post-pandemic in 2022. This decline is evidenced by both the average and the median, indicating a consistent reduction. This result aligns with the principles of the Equity Market Timing Theory, as companies used IPOs as a source of financing, thereby reducing financial leverage. These findings are consistent with the studies by Alti (2006) and Rossi and Marotta (2010).

The Market-to-book ratio shows an increase during the pandemic compared to previous years and the year following the peak IPO period. Higher averages and medians during the pandemic suggest that companies perceived their shares as overvalued and thus issued more equity. However, the increased standard deviation of the Market-to-book ratio during the pandemic indicates higher volatility in this index. The inverse relationship between the Market-to-book averages and medians and financial leverage aligns with the results of Baker and Wurgler (2002), who suggest that companies with higher Market-to-book values tend to have lower leverage, preferring equity issuance as a funding source due to perceived overvaluation.

The profitability of the companies showed a declining trend over the years, from before to during the pandemic. The average profitability decreased from 2.0651 in 2017 to 0.0115 in 2022. This reduction suggests that companies faced challenges in maintaining operational efficiency during the pandemic, possibly due to changes in sector demand or increases in operating costs.

In terms of growth, there was an increase during the pandemic. The average growth was close to zero in 2017 and 2018 and rose to an average of 0.0571 in 2021. This indicates that, despite adverse conditions due to the pandemic, companies sought to increase their investment levels. This finding aligns with the results of Rossi and Marotta (2010), who found an inverse relationship between growth and financial leverage in the companies analyzed.

The Size variable showed variations over the years. There were increases in the average and median until 2019, followed by a reduction in 2020 and new increases in 2021 and 2022. The reduction in 2020 may reflect the initial impacts of the pandemic, while the increases in subsequent years may indicate recovery or expansion strategies adopted by the companies. The standard deviation of Size consistently decreased after 2017, showing reduced variation among companies over time.

Tangibility, in turn, showed a downward trend until 2021, with a recovery in 2022. This pattern may indicate that companies temporarily reduced their reliance on tangible assets to sustain operations, returning to equilibrium after the pandemic's critical period.

Thus, there is evidence that Brazilian technology companies took advantage of market conditions during the pandemic to conduct IPOs, reduce financial leverage, and increase equity capital. The rise in MTB during the pandemic, coupled with the decline in leverage, suggests that companies benefited from perceived market overvaluation to improve their capital structure.

Table 4 presents the correlation coefficients between the research variables.

Table 4
Pearson Correlation Test – Technology Sector Companies – 2017 to 2022

	Financial leverage	Growth	Hot/Cold	MTB	Profitability	Tangibility	Size
Financial leverage	1						
Growth	-0,085	1					
Hot_Cold	-0.3058***	0.2826***	1				
MTB	-0.2752***	0.2117***	-0.0257	1			
Profitability	0.4475***	-0.1447*	-0.1638**	0.1343*	1		
Tangibility	-0.1648**	0.0125	-0.1342*	0.2752***	0.0253	1	
Size	0.3725***	-0.1144	0.019	-0.0815	0.4267***	-0.2630***	1

Note: *p<0.10; **p<0.05;***p<0.01
Source: Prepared by the authors.

Regarding the dependent variables, it is noteworthy that Size and Profitability exhibit a positive correlation with Financial Leverage, indicating that larger and more profitable companies tend to take on more debt in their capital structure. Similarly, the Hot/Cold period, Market-to-Book (MTB), and Tangibility are inversely correlated, suggesting that companies with accelerated growth, higher MTB, and more tangible assets tend to use less debt financing.

The Market-to-Book variable and the dummy representing the Hot/Cold period have a positive correlation with the Growth variable, while Profitability shows a negative correlation with this dependent variable. This indicates that companies with a higher MTB ratio and those operating in more specific periods (Hot periods) tend to exhibit higher growth rates. On the other hand, more profitable companies tend to prioritize financial stability and the distribution of earnings, possibly focusing more on efficiency or returns to shareholders over growth.

Moreover, it is observed that the variables in the model do not have coefficients higher than 0.80. which may indicate that there are no issues of multicollinearity in the model (Gujarati & Porter, 2011).

4.1.2 Regression Test - Financial Leverage and Growth

Table 5 contains the regression test performed to analyze the relationship between the explanatory variables of the research and the dependent variable, Financial Leverage

Table 5
Regression Test – Dependent Variable – Financial Leverage – Technology Sector Companies – 2017 to 2022

	Dependent Variable *Financial Leverage*
Hot_Cold Period	0.0026 (0.0500)
Market-to-Book	-0.0141 (-0.6300)
Profitability	-0.4689* (-1.9200)
Tangibility	0.3640** (2.1700)
Size	-0.0384 (-1.6100)
Constante	1.0923** (2.6000)
Observations	165
R^2	0.2533

Note. *p<0.10; **p<0.05;***p<0.01
Robust standard errors
Source: Prepared by the authors.

In the analysis of the assumptions for Financial Leverage, the absence of normality and problems with autocorrelation of the residuals were detected. Therefore, this model was estimated with robust standard errors correction.

The regression tests indicate that the variable "Hot/Cold" does not have a statistically significant effect on Financial Leverage. The coefficient is small (0.0026) and the p-value is high (0.9590), suggesting that, in the context of this model, there is insufficient evidence to claim that changes in the "Hot/Cold" variable have a relevant impact on Financial Leverage.

The variable "Size" (ln of net revenue) also did not prove significant, with no evidence that this variable influenced Financial Leverage during this period. This result suggests that, contrary to expectations, the increase in the Size of companies is not directly associated with variations in Financial Leverage. Therefore, it cannot be confirmed that larger companies, having more access to financial resources, rely less on debt to finance their activities, as suggested in previous studies (Mendes, Basso & Kayo, 2009).

Similar results are observed for the Market-to-Book (MTB) variable, where no statistical significance was found in the test. This result contrasts with the findings of Baker and Wurgler (2002), where the authors argue that companies with higher Market-to-Book values tend to reduce their Financial Leverage, opting to raise funds through issuing shares, possibly due to the perception that they are overvalued.

For Tangibility of assets, the coefficient was positive and significant. Statistically, it can be stated that Tangibility impacts Financial Leverage. This indicates that companies with a higher proportion of tangible assets tend to have higher levels of Leverage.

Finally, the Profitability variable had a negative and significant coefficient. According to Perez (2015), financial decisions that are misaligned with the real needs of the organization can compromise financial performance, affecting both short-term returns to shareholders and Profitability in the long term, especially when influenced by market timing practices (Perez, 2015).

Table 6 contains the regression test performed to analyze the relationship between the explanatory variables of the research and the dependent variable Growth:

Table 6

Regression Test – Dependent Variable – Growth – Technology Sector Companies – 2017 to 2022

	Dependent Variable
	Growth
Hot_Cold Period	0.0273** (2.6300)
Market-to-Book	0.0236*** (5.6300)
Profitability	-0.0494 (0.3900)
Tangibility	0.2772*** (6.8600)
Size	--0.0133 (-1.1200)
Constant	0.1445 (0.6700)
Observations	165
R^2	0.2037

Note. *p<0.10; **p<0.05;***p<0.01
Robust standard errors
Source: Prepared by the authors.

In the analysis of the assumptions for the dependent variable Growth, the absence of normality and issues with heteroscedasticity were detected. Therefore, the model was estimated with the correction of robust standard errors.

In the regression test for the dependent variable Growth, the "Hot" and "Cold" variables showed statistical significance, which aligns with the results of other authors. The "Hot/Cold"

variable was significant, confirming expectations based on the studies of Baker and Wurgler (2002), who suggest that periods of high and low market activity influence companies' capital structures. Similarly, the Market-to-Book ratio also showed statistical significance, corroborating Baker and Wurgler's (2002) findings, which highlight the importance of this variable in financing decisions.

Similarly, the Tangibility variable also showed statistical significance. The significant relationship between Tangibility and growth suggests that companies with more tangible assets have easier access to financing and, therefore, can invest in growth, aligning with the findings of Alti (2006) and Baker and Wurgler (2002). Profitability, although showing an inverse relationship with growth, did not present significance, contradicting Rossi and Marotta (2010), who state that more profitable companies tend to reinvest in growth. Finally, the company Size was also not significant, unlike Lowry (2003), who suggests that larger companies have easier access to capital markets.

These results indicate that the determinants of capital structure in Brazil may differ from those in more developed markets, highlighting the need to consider contextual and structural factors specific to the Brazilian context. Mendes, Basso, and Kayo (2009), who replicated the study by Baker and Wurgler (2002) in the Brazilian context, did not obtain the same results observed for U.S. companies. According to the authors, the failure to prove the hypotheses may be attributed to the large differences between the capital markets of the two countries.

In Brazil, the capital market is less developed, with fewer companies involved and lower liquidity, which may cause the stock price to not reflect the intrinsic value of the companies (Mendes, Basso, and Kayo, 2009). Therefore, the authors emphasize that the market value may not be a good indicator of capital structure in Brazil, highlighting the need for further research using alternative variables and theories to better understand the variation in capital structure among Brazilian companies.

5 CONCLUSION

Given the significant increase in technology companies that conducted IPOs during the Covid-19 pandemic, this study aimed to analyze whether these companies exhibited opportunistic behavior by taking advantage of a window of opportunity to carry out their capital openings. Additionally, the study examined the financing sources of the companies from 2017 to 2022 and the companies' capital structure under the lens of the Equity Market Timing Theory.

The analysis of cash flows revealed a significant increase in cash generated from financing in the third quarter of 2020, coinciding with a large number of IPOs in the technology sector. This pattern suggests opportunistic behavior from companies that took advantage of a favorable market period to raise funds through IPOs. The correlation with the increase in IPOs during a market appreciation period aligns with the Equity Market Timing Theory.

Regarding the descriptive statistics results, financial leverage decreased during the pandemic, while Market-to-Book increased, which aligns with the Equity Market Timing Theory. Profitability declined over the period, reflecting possible operational challenges, and growth increased during the pandemic, indicating higher investment. Company size varied, with recovery after 2020, and Tangibility showed slight recovery in 2022.

Based on the results from regression tests, for the dependent variable financial leverage, the Hot/Cold, Size, and Market-to-Book (MTB) variables did not have statistical significance, so it cannot be said that they had a relevant impact on leverage during the analyzed period. On the other hand, Tangibility had a positive and significant coefficient, indicating that companies with a higher proportion of tangible assets tend to be more leveraged. Profitability presented a negative and significant coefficient, indicating that more profitable companies have lower leverage, possibly due to less need for external financing.

For the dependent variable growth, the results indicate that the Hot/Cold, Market-to-Book, and Tangibility variables were statistically significant, highlighting that, during the analyzed period, the relationship between market value and book value, as well as the proportion of tangible assets, influenced the growth of companies. On the other hand, the Profitability and Size variables did not show significance, suggesting that these factors did not directly impact growth in the analyzed context, possibly due to the specific characteristics of the Brazilian market.

The lack of full confirmation of the Equity Market Timing Theory in the Brazilian context suggests that other factors, such as the regulatory environment, the economic cycle, and specific characteristics of the Brazilian capital market, should be considered for a deeper understanding of the companies' capital structure.

To further understand the behavior of technology companies regarding capital structure and the use of IPOs, it is recommended to: expand the sample of companies, including different sectors and IPO periods; use other sectors with high IPO rates to compare the findings with the reality of the technology sector; explore other factors that may influence capital structure, such as the regulatory environment, the economic cycle, and industry-specific characteristics; perform comparative analyses between countries to understand the differences in market dynamics; analyze a post-pandemic period to verify how the companies' capital structure evolves in later contexts.

REFERENCES

Acate Tech Report (2021). Panorama de Tecnologia do estado de Santa Catarina. https://www.techreportsc.com/grandeza

Alti, A. (2006). How persistent is the impact of market timing on capital structure?. *The Journal of Finance, 61*(4), 1681-1710. https://doi.org/10.1111/j.1540-6261.2006.00886.x

Baig, A. S., & Chen, M. (2022). Did the COVID-19 pandemic (really) positively impact the IPO Market? An Analysis of information uncertainty. *Finance Research Letters, 46*, 102372. https://doi.org/10.1016/j.frl.2021.102372

Baker, M., & Wurgler, J. (2002). Market timing and capital structure. *The journal of finance, 57*(1), 1-32. https://doi.org/10.1111/1540-6261.00414

Braga, R., & Marques, J. A. V. D. C. (2001). Avaliação da liquidez das empresas através da análise da demonstração de fluxos de caixa. *Revista Contabilidade & Finanças, 12*, 06-23. https://doi.org/10.1590/S1519-70772001000100001

Brasil, Bolsa, Balcão. (2021). Ações. https://www.b3.com.br/pt_br/produtos-e-servicos/negociacao/renda-variavel/empresas-listadas.htm

GII - O Global Innovation Tracker. Índice Global de Inovação (2021) Acompanhando a inovação durante a crise do COVID-19. Índice Global de Inovação 2021: Quais são os países mais inovadores?. https://www.wipo.int/wipo_magazine/pt/2021/03/article_0002.html#:~:text=A%20Su%C3%AD%C3%A7a%20continua%20a%20ser,coloca%20entre%20os%20cinco%20primeiros

Gujarati, D. N., & Porter, D. C. (2011). *Econometria básica* (5a ed.). AMGH.

Lowry, M. (2003). Por que o volume de IPO flutua tanto? *Journal of Financial Economics, 67*(1), 3-40. https://doi.org/10.1016/S0304-405X(02)00230-1

Mendes, E. A., Basso, L. F. C., & Kayo, E. K. (2009). Estrutura de capital e janelas de oportunidade: testes no mercado brasileiro. *RAM. Revista de Administração Mackenzie, 10*, 78-100. https://doi.org/10.1590/S1678-69712009000600006

Perez, M. M. (2015). Métricas de retorno e a geração de valor ao acionista. *Unisanta Law and Social Science*, *4*(2), 189-202.

Ritter, J. R. (1991). The long-run performance of initial public offerings. *The journal of finance, 46*(1), 3-27. https://doi.org/10.1111/j.1540-6261.1991.tb03743.x

Rossi Jr, J. L., & Marotta, M. (2010). Equity market timing: testando através dos IPOs no mercado brasileiro. *Brazilian Review of Finance*, *8*(1), 85-101. https://doi.org/10.12660/rbfin.v8n1.2010.1349

Santos , T. C. L. ., Marques, A. V. C., & Miranda, G. J. . (2024). Enquanto uns choram outros vendem lenços: indicadores econômico-financeiros das empresas do setor de tecnologia da informação em tempos de incerteza. *Revista Ambiente Contábil 16*(1), 22-41. https://doi.org/10.21680/2176-9036.2024v16n1ID31211

Steffen, H. C., & Zanini, F. A. M. (2014). Opening or not capital in Brazil: an practice analysis of perception of financial executives. *Brazilian Review of Finance, 12*(4), 597-642. https://doi.org/10.12660/rbfin.v12n4.2014.28823

CONTRIBUTIONS OF THE AUTHORS

Roles	1ª author	2º author	3º author	4ª author	5ª author
Conceptualization	♦	♦	♦	♦	♦
Data Curation	♦	♦	♦		♦
Formal Analysis	♦	♦	♦	♦	♦
Funding Acquisition	Does not apply				
Investigation	♦	♦	♦	♦	♦
Methodology	♦	♦	♦	♦	♦
Project Administration	♦		♦		
Resources	Does not apply				
Software		♦		♦	♦
Supervision		♦		♦	
Validation		♦		♦	
Visualization	♦	♦	♦	♦	
Writing – Original Draft	♦	♦	♦		
Writing – Review & Editing	♦	♦	♦	♦	

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding this submitted work.

This work was carried out with the support of the Coordination for the Improvement of Higher Education Personnel - Brazil (CAPES), the Foundation for Research Support of the State of Minas Gerais (FAPEMIG), and the National Council for Scientific and Technological Development (CNPq).