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The Effects of Leverage and the COVID-19 Crisis on Brazilian Company Investments

Duterval Jesuka, Michele Aparecida Cunha, Eunice Henriques Pereira Vilela, and Fernanda Maciel Peixoto

ABSTRACT

This study examines how financial and operational leverage, along with the COVID-19 crisis, influenced corporate investment during crises. Using panel data from 776 firms listed on Brazil's stock exchange (2010–2022) and fixed-effects regression models, we find that both leverage types and the pandemic significantly reduced investment levels. In contrast, firm growth and revenues positively affect investment decisions, while size and age also play important roles. The results indicate that highly leveraged firms with growth potential tend to reduce investments and rely more on operating revenues during crises. The study highlights the importance of cautious financial strategies for leveraged firms in emerging economies during pandemic shocks.

KEYWORDS

Financial leverage; operational leverage; investment behavior; Brazilian companies

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DOI: https://doi.org/10.59876/a-gk6b-zm2n

Duterval Jesuka, Ph.D
Federal University of Uberlândia
adm.duterval@gmail.com

Michele Aparecida Cunha, Ph.D
Federal University of Goiás
micheleapcunha@hotmail.com

Eunice Henriques Pereira Vilela, Ph.D
Federal University of Uberlândia
eunice.hvilela@gmail.com

Fernanda Maciel Peixoto, Ph.D
Federal University of Uberlandia
fmacielpeixoto@gmail.com

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This study examines how financial and operational leverage, along with the COVID-19 crisis, influenced corporate investment during crises. Using panel data from 776 firms listed on Brazil's stock exchange (2010–2022) and fixed-effects regression models, we find that both leverage types and the pandemic significantly reduced investment levels. In contrast, firm growth and revenues positively affect investment decisions, while size and age also play important roles. The results indicate that highly leveraged firms with growth potential tend to reduce investments and rely more on operating revenues during crises. The study highlights the importance of cautious financial strategies for leveraged firms in emerging economies during pandemic shocks.

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ACKNOWLEDGEMENTS

The authors gratefully acknowledge the financial support provided by the Coordination for the Improvement of Higher Education Personnel (CAPES) and the Research Support Foundation of the State of Minas Gerais (FAPEMIG). This funding was essential for the development and completion of this research.

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Les effets de l'effet de levier et de la crise de la COVID-19 sur les investissements des entreprises brésiliennes

RÉSUMÉ

Cette étude analyse l'influence du levier financier et opérationnel, ainsi que de la crise de la COVID-19, sur le comportement d'investissement en période de crise. À partir de données de panel portant sur 776 entreprises cotées à la bourse brésilienne entre 2010 et 2022, et en utilisant des modèles de régression à effets fixes, les résultats montrent que les deux types de levier et la pandémie ont réduit significativement les investissements. En revanche, la croissance et les revenus des entreprises ont un effet positif sur l'investissement, tandis que la taille et l'âge jouent également un rôle important. Ces résultats soulignent la nécessité d'une gestion prudente pour les entreprises fortement endettées dans les économies émergentes.

MOTS CLÉS

Effet de levier financier; effet de levier opérationnel; comportement d'investissement; entreprises brésiliennes

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Los Efectos del Apalancamiento y la Crisis del COVID-19 en las Inversiones de las Empresas Brasileñas

RESUMEN

Este estudio analiza la influencia del apalancamiento financiero y operativo, así como de la crisis de la COVID-19, en el comportamiento de inversión durante periodos de crisis. Utilizando datos de panel de 776 empresas cotizadas en la bolsa brasileña entre 2010 y 2022 y modelos de regresión con efectos fijos, los resultados muestran que ambos tipos de apalancamiento y la pandemia redujeron significativamente las inversiones. Por el contrario, el crecimiento y los ingresos empresariales influyen positivamente en la inversión, mientras que el tamaño y la edad de la empresa también desempeñan un papel relevante. Los hallazgos sugieren prudencia financiera para empresas altamente apalancadas en economías emergentes ante crisis sanitarias.

PALABRAS CLAVE

Apalancamiento financiero; apalancamiento operativo; comportamiento de inversión; empresas brasileñas

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Introduction

When an organization identifies promising investment opportunities, it often seeks financing to capitalize on them. The use of debt capital to finance investments, defined as leverage, has been discussed extensively since Modigliani and Miller's (1958) seminal work. Companies typically rely on two forms of leverage: financial leverage and operational leverage. Financial leverage refers to the use of external funds to invest in assets with higher expected returns (Paeleman *et al.*, 2024), while operational leverage stems from the cost structure of the firm, wherein fixed costs are spread over increasing revenue, thereby magnifying returns and growth potential (García-Feijóo *et al.*, 2024).

Although Modigliani and Miller (1958) introduced the concept of capital structure irrelevance, their propositions overlooked the firm's existing balance sheet, particularly its influence on investment decisions. Subsequent studies, such as Myers (1977, 1984) and Myers and Majluf (1984), demonstrated that high leverage can deter investment, particularly when firms are burdened with debt from earlier financing rounds, a dynamic encapsulated in the underinvestment theory.

Further, the liquidity effect, well documented by Lang *et al.* (1996) and Pagan and Robertson (1995) suggests that highly leveraged firms tend to underinvest even when facing attractive growth prospects, due to higher capital costs that benefit primarily creditors (Banerjee *et al.*, 2023). This phenomenon is explained by several capital structure theories, including the Pecking Order, Trade-Off, Market Timing, and Agency Theory (Harris & Raviv, 1991), all of which emphasize how firms establish leverage and investment strategies to optimize capital costs and returns (Shukla & Shaw, 2021).

Additionally, capital market inefficiencies influence firms' investment behavior and their financing choices (Beyer *et al.*, 2017). Sound financing decisions are thus essential to ensure operational sustainability, maximize returns, and manage risk (Boateng *et al.*, 2022). An optimal capital structure requires balancing internal and external resources while considering economic risk exposure, debt servicing capacity, liquidity, investor expectations, and firm valuation (Bajaj *et al.*, 2021).

In volatile environments, decisions related to financial and operational leverage are further influenced by macro-level forces such as political and economic instability (Schwarz & Dalmácio, 2021), climate-related regulations (Dang *et al.*, 2023), and environmental restrictions (Luo *et al.*, 2023). However, the interplay between leverage and investment, especially during crises in emerging markets, remains insufficiently explored.

The literature presents mixed evidence: some studies report a negative association between leverage and investment (Aivazian *et al.*, 2005; Lang *et al.*, 1996; Umutlu, 2009; Vo, 2019), while others find a positive relationship. Regarding operational leverage, research suggests it may also constrain investment (Cho, 2018; Jiao *et al.*, 2019; Glover, 2024), though this remains an underdeveloped area, particularly in emerging economies. For instance, Vo (2019) found that in Vietnam, firms with higher growth prospects exhibited a more pronounced negative relationship between leverage and investment, diverging from evidence in developed countries such as Canada (Aivazian *et al.*, 2005).

In many emerging economies, despite the rise in corporate leverage, capital market access remains limited, especially for small and medium-sized enterprises, which rely heavily on bank loans (Alter & Elekdag, 2020). These firms are also more exposed to agency problems and information asymmetries that contribute to under- or overinvestment (Vo, 2019).

The COVID-19 pandemic introduced a profound exogenous shock to capital structures globally. In Brazil, the crisis coincided with significant financial market volatility, comparable to the 2008–2009 global financial crisis (Caballero & Simsek, 2021). Despite this, coordinated policy responses helped ease credit access (Li *et al.*, 2020). Yet, firms in Brazil faced acute uncertainty and credit constraints, making financial leverage a critical determinant of investment

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behavior. Evidence shows that during such crises, highly leveraged firms often reduce investment to preserve liquidity or comply with debt covenants, a trend more pronounced in emerging markets due to higher borrowing costs and weaker financial systems (Ding *et al.*, 2019; Haque & Varghese, 2021; Rehman, Wu & Liu, 2024).

Understanding how leverage shaped investment behavior during the pandemic is essential for countries like Brazil (Amorim, Sales & Grecco, 2022; Franzotti & Valle, 2020). Accordingly, this study asks: How did financial and operational leverage influence the investment behavior of Brazilian firms during the COVID-19 pandemic? To address this question, we examine the relationship between financial and operational leverage and firm-level investments in Brazil from 2010 to 2022, with a focus on the pandemic period.

By distinguishing between financial and operational leverage, this study captures the distinct mechanisms through which these risk exposures influence investment behavior. Financial leverage, driven by debt usage, affects capital costs and financial flexibility (Rehman, Wu & Liu, 2024), while operational leverage, determined by cost structure, affects income volatility and operating risk (Schwarz & Dalmácio, 20210). These factors take on heightened importance during systemic shocks like COVID-19, where firms face simultaneous demand and liquidity challenges.

Consistent with prior studies (Ding *et al.*, 2019; Vo, 2019), we estimate separate regression models for financial and operational leverage to avoid conflating their effects and better isolate the specific constraints each type imposes on investment decisions. This modeling strategy recognizes that financial and operational risks may interact differently with firm-specific factors such as growth prospects and industry characteristics.

In the Brazilian context, characterized by structural credit constraints and macroeconomic volatility (Amorim, Sales & Grecco, 2022), our approach enables a more granular understanding of the determinants of corporate investment. This research contributes to the literature by separately analyzing the impacts of financial and operational leverage over a broad time horizon (2010–2022), while incorporating the unique dynamics introduced by the COVID-19 crisis.

It also fills a gap in the literature on emerging markets, where institutional environments and capital access differ significantly from those in developed economies. From a practical standpoint, the findings may assist financial managers in optimizing capital structures, support investors in evaluating firm-level risk, and inform public policy aimed at fostering productive investment amid economic instability.

Beyond this introduction, the paper is organized into five sections. The next section reviews the theoretical framework, followed by the methodology in Section 3, results and discussion in Section 4, and final considerations in Section 5.

Theoretical framework

Capital structure and firm leverage

Capital structure is a significant topic in business literature, albeit one rife with controversy. Durand (1952) and Modigliani and Miller (1958) were pioneers in contemplating capital structure, yet they espouse conflicting propositions regarding the relevance of financing decisions to a company's value. Durand (1952) advocates for the presence of an optimal capital structure, asserting that the cost of external capital remains steady until a certain level of debt is reached, beyond which the firm becomes increasingly susceptible to bankruptcy risk. Conversely, Modigliani and Miller (1958) propose that a company's assets are financed holds no bearing on its market value. They argue that the cost of capital is indistinguishable from any other debt, thereby negating the notion of an optimal capital structure. According to them, a company's market value hinges on the cash flow it generates and its associated risk, rather than its financing composition.

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This debate has spurred numerous theorists to offer explanations for financing decisions. Most studies focus on elucidating the factors influencing the determination of a company's financing mix based on anticipated cash flows (Bandyopadhyay & Barua, 2016; Harris & Raviv, 1991; Myers & Majluf, 1984). The significance of this discourse in finance stems from the absence of definitive answers regarding the optimal level of debt or capital structure that maximizes returns for both the company and its shareholders (Junqueira *et al.,* 2010). Each financing source entails pros and cons contingent on factors such as leveraging tax benefits (Kraus & Litzenberger, 1973), agency costs (Jensen & Meckling, 1976), and information asymmetries (Brealey *et al.,* 1977), among others. Efficiently amalgamating various capital sources reduces a company's financing costs and, consequently, enhances its value (Silva, 2012).

Therefore, one should select the capital structure that enhances the organization's financial performance (Nadeem *et al.,* 2015). In this context, leverage can serve to augment profits, market value, and share prices of organizations. The concept of leverage stems from the idea of achieving results disproportionately larger than the effort expended. Its significance parallels the capital structure of organizations (Nadeem *et al.,* 2015). Myers (1984) further emphasizes that a company's leverage shapes and delineates its capital structure.

Within the economic-financial landscape of organizations, two prominent types of leverage emerge: operational and financial. Financial leverage involves acquiring funds from external sources such as debentures, preferred shares, collective loans, among others, to finance company investments. These resources can facilitate production, sales, or profit increments (Aivazian *et al.,* 2005). Consequently, the company can potentially enhance its value, and yield returns to owners by leveraging resources at one rate and investing them at a possibly higher rate, albeit with increased associated risks (Albuquerque & Matias, 2013).

Conversely, operational leverage arises from fluctuations in sales revenue while maintaining fixed costs, leading to a higher percentage of gross profit (Novy-Marx, 2011). Novy-Marx (2011) defines it as a metric capturing the sensitivity of profits to changes in sales revenue, reflecting the relationship between a company's fixed and variable costs (Alaghi, 2012). According to Dantas *et al.* (2006), operational leverage is more pronounced in companies with a greater proportion of fixed operating costs relative to variable operating costs. This characteristic enables the amplification of operating profit through increased sales, thus functioning akin to a multiplier effect.

Leverage and investment

Corporate investment decisions are influenced by a wide range of factors, both internal and external to the firm. At the macroeconomic level, variables such as interest rates, inflation, GDP growth, and political volatility directly affect the cost of capital and the propensity of companies to invest, especially in emerging economies characterized by high institutional instability (Korajczyk & Levy, 2003; Cook & Tang, 2010).

Economic uncertainty, amplified in crisis contexts such as the Covid-19 pandemic, reduces the predictability of cash flow and increases risk aversion, leading companies to postpone investments even when faced with opportunities with positive returns (Graham *et al.*, 2024; Liu *et al.*, 2022). At the microeconomic level, specific attributes of companies, such as profitability, asset tangibility, age, governance structure, and industry, also shape their capital allocation decisions. Companies with higher profitability and more tangible assets tend to face fewer credit restrictions, which facilitates project financing (Vo, 2019; Belkhir *et al.*, 2016).

In addition, sector dynamics play a relevant role, since capital- or technology-intensive sectors, such as infrastructure or telecommunications, present different risk and investment patterns compared to more traditional sectors or sectors with less demand volatility (Grau & Reig, 2020; Kuroda *et al.*, 2019). Thus, understanding the relationship between leverage and investment requires an analysis that considers these structural and cyclical conditions.

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Financial literature establishes a link between financial leverage and a firm's investment level. Studies across various regions, predominantly in developed economies, have identified a negative correlation between these two variables (Aivazian *et al.,* 2005; Umutlu, 2009; Vo, 2019; King *et al*, 2021; Ahmad *et al.*, 2023). Analyzing Brazil from 2000 to 2011, Albuquerque and Matias (2013) also found a negative relationship between financial leverage and investments in developing economies.

Vo (2019) suggests that the relationship between financial leverage and investment can be explained by both the underinvestment and overinvestment theories. Underinvestment typifies companies with ample growth opportunities, while overinvestment primarily occurs in companies with limited opportunities (Pellicani & Kalatzis, 2019). Kwon *et al.* (2021) explain that managers often expand company scale, even at the expense of shareholder costs, leading to an overinvestment dilemma. To mitigate this issue, shareholders control free cash flow, prompting managers to increase debt issuance, thus reinforcing investment. Conversely, underinvestment, as described by Luo *et al.* (2023), arises when highly leveraged companies must prioritize debt repayment from generated free cash flow. Consequently, debt diminishes shareholders' participation in the benefits of potential investments and leads companies to reject projects with positive Net Present Value (NPV).

Myers (1977) delves into the potential externalities stemming from debt in the optimal investment strategy. He posits that highly leveraged companies are inclined to forego growth opportunities due to excessive debt. However, Vo (2019) contends that leverage could serve as a control mechanism, particularly for companies with limited growth prospects. Kamoto (2023) adds that a negative relationship exists between leverage and investment, notably pronounced in companies with scant growth opportunities.

King *et al.* (2021) observed a negative correlation between financial leverage and investment, which is less pronounced in companies with low growth prospects and subpar operational performance compared to those with high growth prospects and robust operational performance. Dang *et al.* (2023) reaffirm that companies with significant growth prospects tend to reduce financial leverage, aligning with Myers' (1977) hypothesis of employing low financial leverage to mitigate incentives for underinvestment. Aldrighi and Bisinha (2010) underscore that companies with promising investment prospects, but insufficient internal resources, rely on external financing for expansion. Consequently, imperfections in financial markets may lead potential fund providers to inadequately meet companies' financing needs, rendering profitable investment projects unviable.

Belkhir *et al.* (2016), in their investigation of studies on the relationship between financial leverage and investment, drew two primary conclusions. Firstly, certain factors such as capital structure, company size, and asset tangibility exhibit a positive correlation with corporate leverage across different countries or regions. Conversely, profitability tends to display a negative association with leverage rates in most cases. Secondly, country-specific factors play a significant role in determining leverage. Particularly, the nature and quality of a country's institutions influence optimal leverage, impacting the pace at which companies adjust their leveraging objectives (Belkhir *et al.*, 2016).

In Brazil, the correlation between financial leverage and investments was scrutinized by Albuquerque and Matias (2013), Kuroda and Albuquerque (2015), and Kuroda *et al.* (2019). Albuquerque and Matias (2013) uncovered a robust negative relationship between financial leverage and investment in Brazilian public companies. Kuroda and Albuquerque (2015) echoed this negative relationship, highlighting the necessity of considering factors such as high interest rates and the prevalence of short-term debt within the Brazilian context. Furthermore, Kuroda *et al.* (2019), in their analysis of the effects of financial leverage and debt maturity on investments in the Brazilian electricity sector, found that debt maturity negatively correlates with investment levels in companies with limited growth opportunities. Thus, reducing debt maturity emerges as a viable strategy to curb underinvestment, consistent with both underinvestment and overinvestment theories, which yield similar relationships among investment, financial leverage, and debt maturity. Nonetheless, these theories hold distinct implications for companies with varying growth prospects.

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Empirical literature has paid scant attention to the relationship between operating leverage and investment. Kahl *et al.* (2019) note the dearth of studies examining the link between operational leverage and corporate financial policies. Among the limited studies addressing operational leverage, most focus on its association with systematic risk (Lev, 1974; Mandelker & Rhee, 1984; Alaghi, 2012; Houmes *et al.*, 2012; Yao, 2019; Bouvard & Motta, 2019) or profitability (Gatsi *et al.*, 2013; Chen *et al.*, 2019; Grau & Reig, 2020).

Research suggests that operating leverage can diminish incentives for capital investments (Cho, 2018; Glover, 2024). Cho (2018) observed that heightened operational leverage hinders investment, contending that increased operational leverage may negate financial leverage, thereby diminishing the company's capacity to finance its investments. This phenomenon occurs as operating leverage rises with escalating fixed costs and dwindling variable costs (Ross *et al.*, 2005). Companies burdened with high fixed costs face heightened default risk relative to their financial leverage. Consequently, companies with substantial fixed costs should ideally maintain lower leverage ratios compared to those with lower fixed costs (Kahl *et al.*, 2019).

Jiao *et al.* (2019) found that elevated fixed operating costs deter capacity expansion and elevate liquidation risk post-expansion, thereby necessitating higher break-even points for investment projects. They assert that fixed operating costs behave akin to debt service and induce underinvestment akin to the excess debt dilemma. Additionally, they highlight that both financial leverage and operational leverage can curtail investment activities, with operational leverage attenuating the financial leverage-investment relationship. Specifically, the impact of financial leverage on investment is less pronounced for companies with higher operational leverage and more substantial for those with lower operational leverage. This is attributed to the influence of existing operating costs on wealth transfer in investments.

Hypothesis 1 (H1): There is a negative relationship between Financial Leverage and company Investment.

Hypothesis 2 (H2): There is a negative relationship between Operational Leverage and company Investment.

Leverage, investment, and the COVID-19 pandemic

Empirical evidence in the literature suggests that corporate leverage decisions are influenced by macroeconomic factors (Armanious & Zhao, 2024; Korajczyk & Levy, 2003; Cook & Tang, 2010). However, studies examining the impact of macroeconomic variables on corporate financing decisions have overlooked the effect of crisis conditions on the rate of capital structure adjustment. Crises can trigger liquidity shocks in organizations, thereby influencing capital structure decisions (Nguyen, 2023).

During the Covid-19 pandemic crisis, market volatility surged to levels comparable to those of the 2008-2009 global crisis (Caballero & Simsek, 2021). Nonetheless, banks, financial markets, and government policy interventions collectively facilitated accessibility to debt financing for companies (Li *et al.*, 2020). Revenue losses incurred by companies due to health restrictions made external financing a vital alternative for survival. Companies resorted to leveraging themselves, but confronted with cash flow declines, excessive debt emerged as a hindrance to investments (Carletti *et al.,* 2020). However, unlike other crises, the Covid-19 pandemic has impacted various industries disparately; while some companies suffered from social distancing requirements, others, such as those in the technology sector, thrived amid the restrictions (Armanious & Zhao, 2024). It is evident that in times of crisis, like the Covid-19 pandemic, firms endeavor to adjust their leverage levels in response to challenges posed by these volatile events. Literature substantiates this hypothesis from various perspectives.

The pecking order theory suggests that firms prioritize internal resources, such as their own capital, and resort to external financing only when internal resources are limited, especially during periods of crisis (Yıldırım & Çelik, 2021). Conversely, the traditional tradeoff perspective posits that companies can optimize their value by selecting an ideal level of financing that balances the benefits, including tax advantages, and the costs of debt (Fischer, Heinkel &

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Zechner, 1989). Consequently, companies tend to steer their decisions towards achieving an optimal leverage level (Liu *et al.*, 2024). Hence, during crises like the Covid-19 pandemic, firms may face heightened financial risks but can also access advantageous credit lines tailored to alleviate temporary difficulties, enabling them to adjust leverage levels to maintain an ideal balance and seize investment opportunities. The market timing theory complements this perspective by suggesting that firms actively manage their capital structure to capitalize on favorable market conditions (Ma *et al.*, 2024).

On the other hand, agency theory posits that managers may prioritize their own interests over those of shareholders. During crises, managers may be inclined to increase leverage to preserve cash reserves, despite the heightened risk of financial distress for the organization. However, shareholders may prefer more conservative strategies to safeguard the company's long-term financial health (Ji *et al.,* 2024). Moreover, signaling theory suggests that organizations may opt to decrease leverage levels during crises to signal a prudent risk management approach to the market. This could enhance investor confidence and facilitate future equity financing (Levy & Lazarovich-Porat, 1995).

During the COVID-19 pandemic, in addition to the impacts on leverage, many companies faced severe restrictions on the continuity of their activities, which resulted in a drop in revenues and increased uncertainty regarding the return on new investments. Graham *et al.* (2020) demonstrated that the increase in macroeconomic uncertainty resulted in a significant reduction in corporate investments, as managers began to prioritize liquidity and short-term survival. Jiang *et al.* (2021) observed that during the COVID-19 pandemic, there was a substantial reduction in investment spending, especially in sectors most impacted by health restrictions, which had reduced cash flow flexibility. Thus, the contraction in demand, disruptions in supply chains, and high uncertainty regarding the duration of the health crisis led companies to postpone or cancel expansion projects, prioritizing liquidity and short-term survival (Jiang *et al.*, 2021).

In addition, evidence indicates that high leverage, in times of crisis, can restrict companies' investment capacity. According to Xue, Luo and Liu (2024), highly leveraged companies showed greater investment inhibition and lower market value during the pandemic, which is consistent with the risk aversion theory, demonstrating that, in contexts with high economic uncertainty, the negative impact of leverage on investments is intensified. Thus, the literature points out that systemic crises, such as the one caused by SARS-CoV-2, have negative effects on investment levels, reinforcing the role of financial structures as critical determinants in companies' strategic decisions in times of crisis.

Hypothesis 3 (H3): There is a negative correlation between the SARS-CoV-2 crisis and corporate investment.

Methodology

Sample and data

In pursuit of examining the correlation between leverage and corporate investment within the Brazilian market context, we selected a sample comprising 776 publicly traded companies listed on B3 from 2010 to 2022. Excluded from consideration were insurance firms, given their unique financial and accounting characteristics, as well as entities with negative total assets and net equity. After this treatment, an unbalanced final sample was obtained consisting of a total of 10,075 firm-year observations. The analysis period aligns with the convergence of Brazilian accounting standards with international norms, commencing in 2010, and encompasses annual data availability up to the present study. Data acquisition relied on the Economática® database. Initial scrutiny unveiled outliers within the sample, which we addressed using the Winsorization technique at a 5% threshold, following the recommendation of Vo (2019).

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Study variables

The following describes the variables used in the study, and Table 1 presents the variables considered in this work, their measurement forms, expected signs, as well as the base studies.

Investment (INV): as the dependent variable, represents the firm's net investment. The variable was calculated following Vo's (2019) metric, subtracting the current year's fixed assets from the lagged fixed assets, adding to depreciation, and dividing by the previous year's fixed assets. Thus, the investment (INV) was calculated as follows:

$$\text{INV} = \frac{Investment_{i,t}}{K_{i,t-1}}$$

Where INV is the investment of firm i at time t, calculated by Fixed Assets (Property, Plant, and Equipment) - fixed assets at time t-1 + depreciation t; and $K_{i,t-1}$: represents the net fixed assets of firm i at time t-1.

Financial Leverage (FINLEV): There is no consensus on the relationship between debt and firm investment. According to Aivazian *et al.* Qiu (2005), during periods of stress and when market tensions tend to increase transaction costs and the problem of information asymmetry, financial leverage tends to exert a strong impact on companies' investment decisions. Similarly, in Lang *et al.* (1996), financial leverage was measured as the ratio of total debt (short-term debt + long-term debt) to total assets.

Operating Leverage (OPERLEV): Following Chen *et al.* (2018) and Jiao, Nishihara, and Zhang (2019), operating leverage is measured as the elasticity of EBIT to sales. Due to data limitations, we adopted a common proxy, calculating operating leverage as the ratio of the percentage change in EBIT to the percentage change in sales, averaged over a three-year rolling window. This approach captures the extent to which fixed costs magnify revenue changes, consistent with the interpretation by Mirza, Saeed, and Rizvi (2013) regarding risk and profitability across cost structures.

COVID-19: During crises, companies typically refrain from new investments to preserve financial stability. Caballero and Simsek (2021) discovered a notable adverse impact of the SARS-CoV-2 pandemic on corporate investment choices. Consequently, Brazilian firms are anticipated to exhibit similar behavior, given the country's heightened susceptibility to the effects of COVID-19.

Return on Assets (ROA): is defined as net income divided by total assets, indicating how efficiently a firm uses its assets to generate profit (Xue, Luo, & Liu, 2024). Higher operating leverage increases ROA sensitivity to sales changes, while higher financial leverage amplifies ROA fluctuations through interest expenses (Vo, 2019).

Tobin's Q (Q): According to the literature, more valued companies tend to increase their investments, as growth opportunities improve resource availability. Similar to Vo (2019), Tobin's Q was used to discover if there is a relationship between the value of companies and their investments. According to Chung and Pruitt (1994), Tobin's Q is calculated from the sum of the market value of stocks and the book value of total debt divided by the book value of total assets.

Insert Table 1 here

Dividends per Share (DIV): Bhaduri (2015) found that companies adjust their investment decisions to improve dividend payments. In this context, the variable dividends per share was included to verify possible relationships with the investments of Brazilian companies.

Cash Flow (CFL): According to Beladi *et al.* (2021), investment decisions tend to be more conservative and cautious due to cash flow uncertainty. However, it is highlighted that agency conflict arises when firms are more leveraged by investing in projects with a positive net present value that benefits creditors more than shareholders. To minimize this problem, shareholders adopt actions to limit the availability of free cash flow as a management control

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strategy (Islam *et al.*, 2020; Kumar *et al.*, 2019). Cash flow was calculated by the sum of After-Tax Profits and Depreciation divided by Total Assets.

Sales (SALES): Ding *et al.* (2019) and Vo (2019) highlight that companies with large sales volumes tend to be more cautious in their investment decisions, especially when their growth prospects are uncertain. Therefore, following Bhaduri (2014), lagged sales divided by lagged fixed assets were included in the model, expecting a negative relationship with investment.

Firm Size (SIZE): Financial theory argues that larger companies tend to be more valued, with more growth opportunities, and therefore invest more. Some studies have shown that large corporations have larger volumes of tangible assets, and as a result, they have fewer financial constraints to raise large amounts of capital and invest in their projects (Le & Phan, 2017). In this work, size was calculated by the natural logarithm of total assets.

Econometric model

To examine the impacts of leverage and COVID-19 on the investments of Brazilian companies listed on B3, we constructed two multiple linear regression models, drawing from the research of Ding *et al.* (2019), Vo (2019), and Yıldırım and Çelik (2021). These models are differentiated by the incorporation of financial leverage in Model 1 and operational leverage in Model 2. Hence, Model 1 encompasses the Lagged of financial leverage (FLEV) as an independent variable and control variables, as indicated in the following equation:

$$INV = \beta_0 + \beta_1 \mathrm{FLEV}_{i,t-1} + \beta_2 COVID19_{i,t} + \beta_3 ROA_{i,t-1} + \beta_4 Q_{i,t-1} + \beta_5 FC_{it-1} + \beta_6 SALES_{i,t-1} + \beta_7 DIV_{i,t-1} + \beta_8 GROWTH_{i,t} + \beta_9 SIZE_{i,t} + \delta_i + \gamma_t + \varepsilon_{i,t}$$

Where:

$\mathrm{FLEV}_{i,t}$: financial leverage of firm i at time t-1

$COVID19_{i,t}$: effect of the Sars-Cov-2 pandemic crisis on firm i at time t

$ROA_{i,t-1}$: Return on Assets of firm i at time t

$Q_{i,t}$: Tobin's Q of firm i at time t-1

FC_{it}: cash flow of firm i at time t-1

$SALES_{i,t}$: net sales volume of firm i at time t-1

$DIV_{i,t}$: dividends paid per share by firm i at time t-1

$GROWTH_{i,t}$: sales growth of firm i at time t

$SIZE_{i,t}$: Size of firm i at time t

β_0: Constant

δ_i and γ_t: firm and time effects

$\varepsilon_{i,t}$: stochastic error term

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Model 2 included the Lagged operating leverage (OPLEV) as the independent variable, which was expressed by the following equation:

$$INV_{i,t} = \beta_0 + \beta_1 OPLEV_{i,t-1} + \beta_2 COVID19_{i,t} + \beta_3 ROA_{i,t-1} + \beta_4 Q_{i,t-1} + \beta_5 FC_{it-1} + \beta_6 SALES_{i,t-1} + \beta_7 DIV_{i,t-1} + \beta_8 GROWTH_{i,t} + \beta_9 SIZE_{i,t} + \delta_i + \gamma_t + \varepsilon_{i,t}$$

Where:

$OPLEV_{i,t-1}$: operational leverage of firm i at time t-1

Subsequently, following Ali *et al.* (2019), a second classification of the analyzed companies was conducted, separating them into companies with higher growth opportunity (Tobin' Q>1) and the other comprising those with lower growth opportunity (Tobin' Q<1).

Finally, equation 3 was developed to examine the interaction effect between financial leverage and operating leverage on firms' investment behavior. This specification aims to capture how the simultaneous presence of both forms of leverage influences investment decisions, recognizing that firms often face combined financial and operational risk. The interaction term (FLEV*OPLEV) allows testing whether the impact of one type of leverage on investment depends on the level of the other. This approach provides a more comprehensive view of how leverage structure affects investment sensitivity, especially under economic uncertainty such as the COVID-19 crisis. By including this model, the analysis enhances the understanding of how different leverage dimensions jointly shape firms' strategic investment choices.

$$INV_{i,t} = \beta_0 + \beta_1 FLEV * OPLEV_{i,t-1} + \beta_2 COVID19_{i,t} + \beta_3 ROA_{i,t-1} + \beta_4 Q_{i,t-1} + \beta_5 FC_{it-1} + \beta_6 SALES_{i,t-1} + \beta_7 DIV_{i,t-1} + \beta_8 GROWTH_{i,t} + \beta_9 SIZE_{i,t} + \delta_i + \gamma_t + \varepsilon_{i,t}$$

Results analysis

Descriptive statistics

Table 2 presents the descriptive statistics of the dependent and independent variables considered in this study. As can be observed, the average of the investment variable is 1.71, and the standard deviation is 5.31, considered relatively high. This result may be due to the disproportionality between the investment volume of large companies compared to the investment volume of smaller companies.

Insert Table 2 here

The financial leverage and operational leverage of the companies assumed average values of 1.48 and 1.9, respectively, while the means of Return on Asset, Tobin's Q, dividends per share, and cash flow to total assets were 1.23, 1.16, 0.77, and -0.053, respectively; in turn, the sales variable assumed an average value of 24.28. The average age of the companies is 19 years. The Pearson correlation between the variables is presented in Table 3. The results demonstrate that the independent variables, in general, have low correlations with each other, indicating a possible absence of multicollinearity among the regression factors.

Insert Table 3 here

Before defining the econometric models, we conducted the Variance Inflation Factors (VIF) test to fulfill the basic assumption of the classical regression model, which asserts the absence of multicollinearity among explanatory variables. The VIF test yielded an average value of 1.09, well below the threshold of 10, indicating the absence of multicollinearity issues in the model.

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Subsequently, we performed hypothesis tests including the Breusch-Pagan, Chow, and Hausman tests, all of which rejected their respective null hypotheses at the 1% significance level. This confirmed that the fixed effects model is the most appropriate for the regressions. Additionally, with p-value < 0.05, the Wooldridge test was significant, indicating that the set of explanatory variables jointly contributes to explaining the variation in the dependent variable, thereby confirming the overall relevance of the model. Furthermore, the test Wald for heteroscedasticity identified the presence of heteroscedasticity in the models, necessitating treatment through the application of White's robust standard error.

Effects of leverage and the COVID-19 crisis on firm investment

Table 4 displays the regression results linking financial and operating leverage, and their interaction with the investment behavior of companies listed on B3, alongside the expected signs as per this study. Models 1 and 2 reveal that financial leverage (FLEV) and operational leverage (OPLEV) exhibit a negative and statistically significant association, at the 1% and 5% levels, respectively, with the investment (INV) of Brazilian firms. These findings align with previous research by Vo (2019) and Guevara *et al.* (2022), who similarly noted that firms curtail their investment when facing higher levels of financial and operational leverage. In the Brazilian context, these results validate hypotheses 1 and 2 of the study, indicating a coherent strategy among indebted firms amidst the political-economic uncertainties stemming from the pandemic-induced crisis, prompting them to scale back investments.

While prior studies such as Umutlu (2009) and Vo (2019) anticipated a negative relation between leverage and investment, this study finds statistically significant evidence that Brazilian companies finance their investments through both debt and operational performance indicators. However, the negative relationship between cash flow and investment suggests that firms with stronger internal liquidity may adopt a more cautious or debt-reduction strategy during periods of uncertainty, such as the COVID-19 crisis, rather than allocating available cash to new investments.

This behavior may reflect a preference for preserving liquidity and maintaining solvency in a volatile environment. Similarly, the negative sensitivity of investments to sales can indicate that sales growth alone does not immediately translate into higher investment, as firms may prioritize financial stability over expansion when external risks are elevated. Cantor (1990) emphasized that highly leveraged firms exhibit investment rates that are particularly sensitive to fluctuations in sales and cash flow, reinforcing the nuanced relationship observed in this study.

The interaction term between financial leverage and operational leverage in Model 3 reveals a significant negative relationship with firm investment at the 5% level. This finding suggests that when both forms of leverage are high, firms tend to reduce their investment levels, possibly due to the compounded risk and financial constraints imposed by the dual burden of fixed financial and operational commitments. This result is consistent with Chen *et al.* (2019), who argue that high operating leverage increases sensitivity to revenue shocks, which, when combined with financial leverage, exacerbates underinvestment incentives. Similarly, Kahl, Lunn, and Nilsson (2019) highlight that firms may substitute between the two types of leverage to manage risk and that excessive exposure to both can deter investment due to heightened financial vulnerability.

As anticipated, the findings from models 1, 2, and 3 confirm the adverse impact of the COVID-19 pandemic crisis on investments by Brazilian companies, aligning with observations in emerging economies by Yıldırım and Çelik (2021) and Ma *et al.* (2024). Indeed, the SARS-CoV-2 pandemic significantly affected the Brazilian economy, prompting widespread job losses and the closure of numerous companies grappling with insufficient resources to sustain themselves financially in the short and long term. This dire financial strain, as highlighted by Liu *et al.* (2024), compelled companies to reduce investment levels as a survival strategy amid the economic and health uncertainties of the crisis period. Consequently, these results affirm hypothesis 3 of this study, underscoring the negative impact of the COVID-19 crisis on the investment decisions of Brazilian companies.

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Among the control variables, consistent with Beladi *et al.* (2021), Vo (2019), Guevara *et al.* (2022) and Jiao, Nishihara & Zhang (2019), return on assets (ROA), cash flow (CFL) exhibited a negative effect on investments, whereas sales (SALES) and firm size (SIZE) demonstrated positive and significant impacts at the 1% level. The data suggest that Tobin's Q (Q), dividend per share (DIV), and firm age (AGE) lack a statistically significant relationship with investment. This implies that higher dividends per share correspond to reduced resources available for investment. Notably, Tobin's Q did not exhibit significance.

Insert Table 4 here

Broadly, Brazilian companies exhibit a contrasting trend compared to their Vietnamese counterparts, as emphasized by Vo (2019). Vietnamese firms typically maintain conservative profiles, refraining from reinvesting their sales revenue into projects. Conversely, Brazilian companies significantly boost their investments, driven both by sales and firm size. This observation aligns with the findings of Guevara *et al.* (2022), who underscore that highly leveraged firms tend to display investment rates highly responsive to fluctuations in sales.

Leverage and COVID-19 impact on investment: Comparing high and low growth companies

Following the approach of Aivazian *et al.* (2005), Lang *et al.* (1996), and Umutlu (2009), the sample was divided into two subgroups: one comprising firms with higher growth opportunity (Tobin' Q>1) and the other comprising those with lower growth opportunity (Tobin' Q<1). The outcomes are presented in Table 5, where models 1 and 3 depict regressions for companies with greater growth opportunities, while models 2 and 4 depict regressions for companies with lesser growth opportunities.

Model 1 results reveal that financial leverage significantly and negatively influences the investment decisions of companies with greater growth prospects. This suggests that high-growth firms are susceptible to debt levels, as the obligations associated with financial leverage can constrain their ability to invest. Even though these firms have substantial growth opportunities, the need to manage risk and maintain financial stability during uncertain periods, such as the COVID-19 crisis, may lead them to moderate or delay investment despite high potential returns.

Additionally, regarding the control variables (growth, sales, and firm size), they exhibit a positive relationship, indicating that higher growth and sales opportunities, as well as larger firm size, are generally associated with increased investment levels in these companies. Overall, these results highlight a trade-off between growth potential and financial leverage, emphasizing that access to debt can both enable and restrict investment depending on the firm's risk profile and market conditions.

Conversely, in Model 2, for companies with lower growth prospects, financial leverage also exhibits a negative and statistically significant relationship with investment, indicating that capital structure decisions influence investment behavior even among firms with limited growth opportunities. Meanwhile, sales (SALES) and size (SIZE) continue to play pivotal roles in supporting investment levels.

In models 3 and 4, it becomes evident that operational leverage diminishes investment levels for companies with both greater and lesser growth opportunities, while sales (SALES) and size (SIZE) continue to exert positive impacts on their investment behavior. The negative effect is more pronounced among high-growth Brazilian firms, suggesting that those with higher fixed operating costs, such as wages, rent, and production infrastructure, face greater difficulty expanding investments when revenues fluctuate. In Brazil's context, where economic volatility and structural costs are relatively high, firms with elevated operating leverage become more risk-averse, as fixed costs amplify earnings variability and reduce financial flexibility. Consequently, high-growth firms may postpone or scale back investments to avoid exacerbating operational risk, prioritizing stability and liquidity preservation over rapid expansion during periods of uncertainty.

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Notably, Tobin's Q exhibited a negative and statistically significant relationship (at the 5% level) with the investment of companies possessing the highest growth potential. This counterintuitive result suggests that, during the COVID-19 crisis, firms with high market valuations may have chosen to conserve resources or reduce risk exposure, rather than increase investment, despite their growth prospects. In other words, even companies with high growth potential appear to have adopted a cautious investment strategy in response to heightened uncertainty in the economic environment.

Interestingly, the COVID-19 pandemic crisis continues to demonstrate a statistically significant relationship with investment decisions in both subsamples. This finding suggests that, regardless of the opportunity for growth, the Covid 19 continues to significantly influence the investment, showing conservative strategies of the Brazilian firms during the pandemic.

Insert Table 5 here

These results partly support the findings of Aivazian *et al.* (2005), Vo (2019), and Ding *et al.* (2019), indicating that companies with greater growth prospects and longer market presence, despite having stronger cash flow, can access market resources to finance their investments. However, the negative effect of leverage on these firms suggests that high-growth companies are more vulnerable to the risks associated with indebtedness, especially during periods of economic uncertainty. Because these firms typically have higher investment commitments and rely more on external capital to sustain expansion, increased leverage can amplify financial pressure and reduce flexibility in allocating resources to new projects.

In contrast, firms with fewer growth opportunities tend to depend mainly on internal funds and adopt more conservative financial policies, which shield them from the adverse effects of high leverage. Thus, leverage "hurts" high-growth firms more precisely because their ambitious investment strategies make them more exposed to the tightening effects of debt obligations and capital market volatility.

Given the lack of theoretical consensus on the relationship between dividend payment and company investments, the findings of this study appear to align with Bhaduri (2015), who similarly found no significant relationship between dividend payment and investment levels among Indian companies. Consequently, it is inferred that companies with both higher and lower growth opportunities opt not to distribute dividends, thereby increasing their investment capacity. Although the negative effect of COVID-19 reflects corporate investment behavior during a specific atypical crisis, it is not appropriate to generalize this finding to other crises, as the pandemic represents a unique event with distinct characteristics.

Conclusion

This study investigated the relationship between financial and operational leverage and corporate investment in Brazilian firms, with a particular focus on the effects of the COVID-19 crisis. Based on a panel dataset of 776 companies listed on B3 from 2010 to 2022, fixed effects regressions revealed that both financial and operational leverage are negatively associated with investment decisions, an effect that intensified during the pandemic. In contrast, firm size and sales growth had a positive influence on investment behavior, while Tobin's Q, firm age, and dividend payments were not statistically significant.

A complementary analysis segmented the sample into firms with high and low growth opportunities. The results indicate that high-growth firms tend to be more constrained by both financial and operating leverage when making investment decisions. Despite having greater access to external financing and stronger operational performance, these firms appear more vulnerable to the tightening effects of debt obligations and high fixed costs, particularly during periods of economic uncertainty. In contrast, firms with weaker growth opportunities rely more heavily on internal cash flow and adopt more conservative financial policies, which may mitigate the adverse impact of leverage on their investment

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behavior. These patterns suggest that leverage exerts a stronger limiting effect on investment among high-growth firms, highlighting the importance of financial structure in shaping corporate investment dynamics in Brazil.

These findings provide empirical support for the underinvestment hypothesis, particularly in the context of an emerging market. The evidence indicates that firms facing high leverage, whether financial or operational, may forgo profitable investment opportunities due to risk aversion or funding constraints. This behavior is exacerbated in economies like Brazil, where institutional fragilities, limited capital market depth, and macroeconomic instability amplify the cost of external financing and intensify agency conflicts between managers, shareholders, and creditors. Thus, the study extends existing theories by contextualizing them within environments of structural vulnerability and economic volatility, such as those highlighted during the COVID-19 pandemic.

From a practical perspective, the results offer valuable insights for various stakeholders: Corporate managers should carefully monitor their firm's capital structure and cost commitments. High levels of leverage may limit strategic flexibility, particularly in downturns, and hinder long-term value creation. Investors and shareholders can use leverage and cost structure indicators as proxies for firm resilience and risk exposure, especially in evaluating firms' preparedness for future shocks. Policymakers are encouraged to design countercyclical credit mechanisms and financial relief programs that support firms with viable investment projects but limited access to funding, particularly small and medium-sized enterprises, which are often the most vulnerable during crises.

Moreover, using alternative measures for investment, leverage, and firm characteristics, including governance-related variables, could refine the analysis. Exploring non-linear or threshold effects, or employing event-study methodologies, may also reveal short- and long-term effects of systemic shocks on firm investment dynamics. In conclusion, this study contributes to a better understanding of how leverage shapes investment behavior in emerging markets under conditions of uncertainty. By integrating theory with empirical evidence from a global crisis, the study provides a foundation for future academic research and offers actionable insights for firm-level financial planning and public policy aimed at strengthening economic resilience.

Despite its contributions, the study presents some limitations. First, industry-specific dynamics were not explicitly modeled, which could influence investment behavior across sectors, especially during the COVID-19 period. Future research could address this by incorporating industry dummies or interaction terms to better capture sectoral heterogeneity. Second, the econometric approach relied on linear fixed-effects models. Future studies could improve robustness by applying dynamic panel methods, such as the Generalized Method of Moments (GMM), to better control for endogeneity and time-dependent factors in investment behavior.

Finally, the study did not present a detailed descriptive analysis of the sample's industry composition, which limits the interpretation of potential sector-specific effects, particularly relevant given that some industries, such as technology or healthcare, may have been disproportionately impacted during the COVID-19 crisis. We also acknowledge the limitation of the absence of macroeconomic control variables such as GDP growth, inflation, and interest rates, which could have further contextualized firms' investment decisions amid the COVID-19 crisis. We recommend that future research incorporate such variables to provide a more comprehensive analysis of how external economic conditions interact with firm-level factors like leverage in shaping investment behavior. And can also include a breakdown of firms by sector and adopt industry-specific variables or interaction terms to assess heterogeneous effects across different economic activities.

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References

Ahmad, M. M., Hunjra, A. I., & Taskin, D. (2023). Do asymmetric information and leverage affect investment decisions? *The Quarterly Review of Economics and Finance*, 87, 337-345. https://doi.org/10.1016/j.qref.2021.05.001

Aivazian, V. A., Ge, Y., & Qiu, J. (2005). The impact of leverage on firm investment: Canadian evidence. J. *Corporate Finance*. 11 (1), 277–291. https://doi.org/10.1016/S0929-1199(03)00062-2

Alaghi, K. (2012). Operating leverage and systematic risk. *African Journal of Business Management*, 6(3), 1095. https://doi.org/10.5897/AJBM11.2266

Albuquerque, A. A., & Matias, A. B. (2013). Identificando a relação entre alavancagem financeira e investimento nas empresas brasileiras de capital aberto. *Revista Contemporânea de Economia e Gestão,* 11(2). https://www.redalyc.org/pdf/5707/5707 65358005.pdf

Aldrighi, D. M., & Bisinha, R. (2010). Restrição financeira em empresas com ações negociadas na Bovespa. *Revista Brasileira de Economia*, 64(1), 25-47. https://doi.org/10.1590/S0034-71402010000100002

Ali, F., Fareed, Z., Khan, T. M., & Raza, H. (2019). Impacts of leverage on investment: A brief view of Pakistani listed firms. *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies*, 10(17), 1-8. https://doi.org/10.14456/ITJEMAST.2019.233

Alter, A., & Elekdag, S. (2020). Emerging market corporate leverage and global financial conditions. *Journal of Corporate Finance*, 62, 101590. https://doi.org/10.1016/j.jcorpfin.2020.101590

Amorim, J. Q., Sales, G. A., & Grecco, M. C. P. (2022). COVID-19 and its impacts on financing and investment policies. *RAM. Revista de Administração Mackenzie*, *23*(2), eRAMF220225. https://doi.org/10.1590/1678-6971/eRAMF220225.en

Armanious, A., & Zhao, R. (2024). Stock liquidity effect on leverage: The role of debt security, financial constraint, and risk around the global financial crisis and Covid-19 pandemic. *International Review of Financial Analysis*, 92, 103093. https://doi.org/10.1016/j.irfa.2024.103093

Ashraf, D., Felixson, K., Khawaja, M., & Hussain, S. M. (2017). Do constraints on financial and operating leverage affect the performance of Islamic equity portfolios? *Pacific-Basin Finance Journal*, 42, 171–182. https://doi.org/10.1016/j.pacfin.2017.02.009

Bajaj, Y., Kashiramka, S., & Singh, S. (2021). Application of capital structure theories: A systematic review. *Journal of Advances in Management Research*, 18(2), 173–199. https://doi.org/10.1108/JAMR-01-2020-0017

Bandyopadhyay, A., & Barua, N. M. (2016). Factors determining capital structure and corporate performance in India: Studying the business cycle effects. *The Quarterly Review of Economics and Finance*, 61, 160-172. https://doi.org/10.1016/j.qref.2016.01.004

Beladi, H., Deng, J., & Hu, M. (2021). Cash flow uncertainty, financial constraints, and R&D investment. *International Review of Financial Analysis*, 76, 101785. https://doi.org/10.101 6/j.irfa.2021.101785

Belkhir, M., Maghyereh, A., & Awartani, B. (2016). Institutions and corporate capital structure in the MENA region. *Emerging Markets Review*, 26, 99-129. https://doi.org/10.1016/j.ememar.2016.01.001

Banerjee, S., Mitra, A., & Mohanti, D. (2023). Leverage and corporate investment – a cross-country analysis. *Investment Management and Financial Innovations*, 20(3), 126-136. https://doi.org/10.21511/imfi.20(3).2023.11

Belkhir, M., Maghyereh, A., & Awartani, B. (2016). Institutions and corporate capital structure in the MENA region. Emerging Markets Review, 26, 99–129. https://doi.org/10.1016/j.ememar.2016.01.001

Beyer, B., Downes, J., & Rapley, E. T. (2017). Internal capital market inefficiencies, shareholder payout, and abnormal leverage. *Journal of Corporate Finance*, 43, 39-57. https://doi.org/10.1016/j.jcorpfin.2016.12.009

Bhaduri, S. N. (2014). The Empirical Relationship between Dividend and Investment: Evidence from an Emerging Economy, India. *Review of Market Integration*, *6*(2), 146-174. https://doi.org/10.1177/0974929214564715

Boateng, P. Y., Ahamed, B. I., Soku, M. G., Addo, S. O., & Tetteh, L. A. (2022). Influencing factors that determine capital structure decisions: A review from the past to present. *Cogent Business & Management*, 9(1), 2152647. https://doi.org/10.1080/23311975.2022.2152647

Bouvard, M., & de Motta, A. (2019). Operating Leverage, Coordination Failures, and Systematic Risk. In Paris, December 2018, *Finance Meeting EUROFIDAI-AFFI.*

Caballero, R. J., & Simsek, A. (2021). A model of endogenous risk intolerance and LSAPs: asset prices and aggregate demand in a "COVID-19" shock. *The Review of Financial Studies*, 34(11), 5522-5580. https://doi.org/10.1093/rfs/hhab036

Cantor, R. (1990). Effects of Leverage on Corporate Investment and Hiring Decisions. *Federal Reserve Bank of New York Quarterly Review*, *15*(2), 31-41.

Carletti, E., Oliviero, T., Pagano, M., Pelizzon, L., & Subrahmanyam, M. G. (2020). The COVID-19 shock and equity shortfall: Firm-level evidence from Italy. *The Review of Corporate Finance Studies,* 9(3), 534-568. https://doi.org/10.1093/rcfs/cfaa014

Chen, Z., Harford, J., & Kamara, A. (2019). Operating leverage, profitability, and capital structure. *Journal of financial and quantitative analysis*, 54(1), 369-392. https://doi.org/10.1017/S0022109018000595

Cho, D. (2018). Downward Wage Rigidity, Corporate Investment, and Firm Value. *Corporate Investment and Firm Value* (September 3, 2018).

Chung, K. H., & Pruitt, S. W. (1994). A simple approximation of Tobin's q. *Financial management*, 23(3) 70-74. https://doi.org/10.2307/3665623

Cook, D. O., & Tang, T. (2010). Macroeconomic conditions and capital structure adjustment speed. *Journal of Corporate Finance,* 16(1), 73-87. https://doi.org/10.1016/j.jcorpfin.2009.02.003

Dang, V. A., Gao, N., & Yu, T. (2023). Climate policy risk and corporate financial decisions: Evidence from the NOx budget trading program. *Management Science*, 69(12), 7517-7539. https://doi.org/10.1287/mnsc.2022.4617

Dantas, J. A., Medeiros, O. R., & Lustosa, P. R. B. (2006). Reação do mercado à alavancagem operacional: um estudo empírico no Brasil. *Revista Contabilidade & Finanças*, 17(41), 72-86. https://doi.org/10.1590/S1519-70772006000200006

Ding, S., Knight, J. & Zhang, X. (2019). Does China Overinvest? Evidence from a panel of Chinese firms, *The European Journal of Finance*, 25:6, 489-507. https://doi.org/10.1080/1351847X.2016.1211546

Eicke, L., Apergi, M., Goldthau, A., Kurniawan, J., Schuch, E., & Weko, S. (2023). Resource exporter or R&D champion? Leverage points and transition pathways for the Chilean energy sector. *Energy for Sustainable Development*, 76, 101257. https://doi.org/10.1016/j.esd.2023.101257

Fischer, E. O., Heinkel, R., & Zechner, J. (1989). Dynamic capital structure choice: Theory and tests. *The journal of finance*, 44(1), 19-40. https://doi.org/10.1111/j.1540-6261.1989.tb02402.x

Franzotti, T. D. A., & Valle, M. R. D. (2020). The impact of crises on investments and financing of Brazilian companies: an approach in the context of financial constraints. *BBR. Brazilian Business Review*, *17*(2), 233-252. https://doi.org/10.15728/bbr.2020.17.2.6

García-Feijóo, L., Jensen, T. K., & Koch, P. D. (2024). Operating Leverage and Stock Returns under Different Aggregate Funding Conditions. *The Accounting Review,* 1-31. https://doi.org/10.2308/TAR-2022-0051 .

Gatsi, J. G., Gadzo, S. G., & Akoto, R. K. (2013). Degree of financial and operating leverage and profitability of insurance firms in Ghana. *Intern. Business and Management, 7(2), 57-65.*

Glover, K. (2024). A comment on the relationship between operating leverage and financial leverage. *Finance Research Letters*, *67*, 105522. https://doi.org/10.1016/j.frl.2024.105522

Graham, J. R., Ikeda, N., Inoue, K., & Yamasaki, T. (2024). Uncertainty, corporate investment, and hiring: The case of COVID-19. *Economics Letters*, *244*, 112025. https://doi.org/10.1016/j.econlet.2024.112025

Guevara, J. F., Maudos, J., & Salvador, C. (2022). Firms' investment, indebtedness, and financial constraints: Size does matter. *Finance Research Letters*, 46, 102240. https://doi.org/10.1016/j.jimonfin.2020.102288

Grau, A., & Reig, A. (2021). Operating leverage and profitability of SMEs: Agri-food industry in Europe. Small Business Economics, 57(1), 221-242. https://doi.org/10.1007/s11187-019-00294-y

Haque, S. M., & Varghese, M. R. (2021). *The COVID-19 impact on corporate leverage and financial fragility*. *International Monetary Fund*. Working Paper No. 2021/265. Pages: 51

Harris, M., & Raviv, A. (1991). The theory of capital structure. *The Journal of Finance*, *46*(1), 297-355. https://doi.org/10.1111/j.1540-6261.1991.tb03753.x

Houmes, R. E., MacArthur, J. B., & Stranahan, H. (2012). The operating leverage impact on systematic risk within a context of choice: An analysis of the US trucking industry. *Managerial Finance*, 38(12), 1184-1202. https://doi.org/10.1108/03074351211271283

Huang, R., & Ritter, J. R. (2005). Testing the market timing theory of capital structure. *Journal of Financial and Quantitative Analysis*, *1*, 221-246.

Islam, S. U., M., Meo, M. S., & Usman, M. (2022). The relationship between corporate investment decision and firm performance: Moderating role of cash flows. *Journal of Public Affairs*, 22(2), e2445. https://doi.org/10.1002/pa.2445

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305-360.

Ji, K. M., Wang, J., Boccardo, L., Brown, H., Wong, I. A., & Wu, J. (2024). Interactive effects of financial leverage with asset-light strategies: The agency theory perspective. *International Journal of Hospitality Management*, 116, 103619. https://doi.org/10.1016/j.ijhm.2023.103619

Jiang, J., Hou, J., Wang, C., & Liu, H. (2021). COVID-19 impact on firm investment—Evidence from Chinese publicly listed firms. *Journal of Asian Economics*, *75*, 101320. https://doi.org/10.1016/j.asieco.2021.101320

Jiao, F., Nishihara, M., & Zhang, C. (2019). Operating Leverage and Underinvestment. *Journal of Financial Research*, 42(3), 553-587. https://doi.org/10.1111/jfir.12188

Junqueira, L. R., de Oliveira, J. L., Bressan, A. A., & Bertucci, L. A. (2010). Alavancagem financeira como estratégia de financiamento do processo de crescimento de empresas brasileiras de capital aberto no período 1995-2002. *Revista Economia & Gestão*, 10(23), 23-39. https://doi.org/10.5752/P.1984-6606.2010v10n23p23

Kahl, M., Lunn, J., & Nilsson, M. (2019). Operating leverage and corporate financial policies. In the AFA 2012 *Chicago Meetings Paper*.

Kamoto, S. (2023). Investment decisions and financial leverage under a potential entry threat. *Journal of Banking & Finance*, 154, 106944. https://doi.org/10.1016/j.jbankfin.2023 .106944

King, T., Loncan, T., & Khan, Z. (2021). Investment, leverage, and political risk: Evidence from project-level FDI. *Journal of Corporate Finance*, 67, 101873. https://doi.org/10.1016/j.jcorpfin.2020.101873

Korajczyk, RA & Levy, A. (2003). Escolha da estrutura de capital: condições macroeconómicas e restrições financeiras. *Jornal de economia financeira*, 68 (1), 75-109.

Kraus, A., Litzenberger, R.H., 1973. A state preference model of Optimal Financial Leverage. *Journal of Finance*. 9, 911–922. https://doi.org/10.2307/2978343

Kuroda, A. M., & Albuquerque, A. A. (2015). Theoretical essay about the relation between financial leverage and investment in Brazilian companies. *Revista de Gestão, Finanças e Contabilidade*, *5*(4), 06-25. http://dx.doi.org/10.18028/2238-5320/rgfc.v5n4p6-25

Kuroda, A., Moralles, H. F., & Albuquerque, A. A. D. (2019). Os efeitos da alavancagem financeira e da maturidade da dívida nos investimentos de empresas do setor elétrico brasileiro. *Revista Brasileira de Gestão de Negócios*, 21(3), 563-581. https://doi.org/10.7819/rbgn.v21i3.4004

Kumar, S., Verma, A., & Vijaya Kumar, C. V. R. S. (2019). Does Leverage Influence Firms' Investment Decisions? The Case of BSE 500 Index Companies. *SJCC Management Research Review*, 26–40. https://doi.org/10.35737/sjccmrr/V9/i1/2019/145544

Kwon, S., Ahn, JH & Kim, GH (2021). O impacto da intervenção dos acionistas no sobreinvestimento do fluxo de caixa livre por CEOs excessivamente confiantes. *Revisão Internacional de Análise Financeira*, 75, 101751.

Lang, L., Ofek, E., & Stulz, R. (1996). Leverage, investment, and firm growth. *Journal of Financial Economics*, *40*(1), 3-29. https://doi.org/10.1016/0304-405X(95)00842-3

Levy, H., & Lazarovich-Porat, E. (1995). Signaling theory and risk perception: An experimental study. *Journal of Economics and Business*, 47(1), 39-56. https://doi.org/10.1016/0148-6195(94)00022-6

Li, L., Strahan, P. E., & Zhang, S. (2020). Banks as lenders of first resort: Evidence from the COVID-19 crisis. *The Review of Corporate Finance Studies*, 9(3), 472-500. https://doi.org/10.1093/rcfs/cfaa009

Liu, L., Zhao, Z., Zhang, M., & Zhou, D. (2022). Green investment efficiency in the Chinese energy sector: Overinvestment or underinvestment?. *Energy Policy,* 160, 112694. https://doi.org/10.1016/j.enpol.2021.112694

Liu, Y., Wu, K., Ruan, S., & Kassar, M. (2024). Supplier concentration and the speed of capital structure adjustment. *Pacific-Basin Finance Journal*, 85, 102328. https://doi.org/10.1016/j.pacfin.2024.102328

Luo, P., Tan, Y., Yang, J. & Yao, Y. (2023). Subinvestimento e estrutura de capital ideal sob restrições ambientais. *Jornal de Dinâmica Econômica e Controle*, 157, 104761.

Ma, P., Li, C., & Wang, X. (2024). Why do undervalued firms repurchase shares? Evidence based on the market-timing effect in China. *Global Finance Journal*, 59, 100926. https://doi.org/10.1016/j.gfj.2023.100926

Mandelker, G. N., & Rhee, S. G. (1984). The impact of the degrees of operating and financial leverage on systematic risk of common stock. *J. Financ. and Quant. Analysis*, 19(1), 45-57. https://doi.org/10.2307/2331000

Medeiros, O. R., & Daher, C. E. (2008). Testando teorias alternativas sobre a estrutura de capital nas empresas brasileiras. *Revista de Administração Contemporânea*, 12(1), 177-199. https://doi.org/10.1590/S1415-65552008000100009

Michaely, R., & Moin, A. (2022). Disappearing and reappearing dividends. *Journal of Financial Economics*, 143(1), 207-226. https://doi.org/10.1016/j.jfineco.2021.06.029

Miller, M. H. (1977). Debt and taxes. *The Journal of Finance*, 32(2), 261-275. https://doi.org/10.2307/2326758

Mirza, N., Saeed, M. S., & Rizvi, K. A. (2013). The pricing of size, book-to-market, and financial leverage in Euro stocks. *Economic research-Ekonomska istraživanja*, 26(2), 177-190. https://doi.org/10.1080/1331677X.2013.11517615

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporate finance, and the theory of investment. *The American Economic Review*, 48(3), 261-297. https://www.jstor.org/stable/1809766

Myers, S. C. (1984). The capital structure puzzle. *The journal of finance*, 39(3), 574-592.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187-221. https://doi.org/10.1016/0304-405X(84)90023-0

Nadeem, M., Ahmad, R., Ahmed, A., Ahmad, N., Batool, S. R., & Rehman, K. U. (2015). The effect of leverage on the financial health of the firms: a study from the cement industry of Pakistan. *Industrial Engineering Letters*, 5(5), 123-127.

Nawazish, M., Saeed, M. S., & Rizvi, K. A. (2013). The pricing of size, book-to-market, and financial leverage in Euro stocks. *Economic research*, 26(2), 177-190. https://doi.org/10.1080/1331677X.2013.11517615

Nguyen, H. (2023). REIT capital structure strategy in the aftermath of hurricanes. *Journal of Climate Finance*, 4, 100014. https://doi.org/10.1016/j.jclimf.2023.100014

Novy-Marx, R. (2011). Operating leverage. *Review of Finance*, *15*(1), 103-134.

Paeleman, I., Guenster, N., Vanacker, T., & Siqueira, A. C. O. (2024). The consequences of financial leverage: Certified B Corporations' advantages compared to common commercial firms. *Journal of Business Ethics,* 189(3), 507-523. https://doi.org/10.1007/s10551-023-05349-5

Pagan, A. R. & Robertson, J. C. (1995). Resolving the Liquidity Effect, *Federal Reserve Bank of St. Louis Review*, pp. 33-54. https://doi.org/10.20955/r.77.33-54 .

Pellicani, A. D., & Kalatzis, A. E. G. (2019). Ownership structure, overinvestment and underinvestment: Evidence from Brazil. *Research in International Business and Finance*, 48, 475-482. https://doi.org/10.1016/j.ribaf.2018.10.007

Phan, Q. T. (2018). Corporate debt and investment with financial constraints: Vietnamese listed firms. *Research in International Business and Finance*, *46*, 268-280. https://doi.org/10.1016/j.ribaf.2018.03.004

Rehman, O. U., Wu, K., & Liu, J. (2024). COVID-19 exposure, financial flexibility, and corporate leverage adjustment. *International Review of Economics & Finance*, 96, 103651. https://doi.org/10.1016/j.iref.2024.103651

Ross, S. A., Westerfield, R. W., & Jaffe, J. F. (2005). *Corporate finance* (7th ed.). New York, NY: McGraw-Hill/Irwin.

Schwarz, L. A. D., & Dalmácio, F. Z. (2021). The relationship between economic policy uncertainty and corporate leverage: Evidence from Brazil. *Finance Research Letters*, 40, 101676. https://doi.org/10.1016/j.frl.2020.101676

Silva, S. d. (2012). Estrutura de capitais: teste às teorias do trade off versus pecking order. Dissertação de Mestrado em Finanças registada à Escola de Economia e Gestão da Universidade do Minho, Minho.

Shukla, AK and Shaw, TS (2021). Impacto da alavancagem no investimento das empresas. *Semanal Econômico e Político,* 56 (35), 45.

Umutlu, M. (2009). Firm leverage and investment decisions in an emerging market. *Quality & Quantity, 44(5), 1005–1013.* https://doi.org/10.1007/s11135-009-9250-y

Vo, X. V. (2019). Leverage and Corporate Investment: Evidence from Vietnam. *Finance Research Letters*, *28*, 1-5. https://doi.org/10.1016/j.frl.2018.03.005

Xue, S., Luo, Z., & Liu, Y. (2024). The impact of leverage on investment and firm value during the COVID-19 pandemic: Evidence from Chinese listed firms. *International Journal of Financial Engineering*, *11*(03), 2341001.

Yildırım, D., & Çelik, A. K. (2021). Testing the pecking order theory of capital structure: Evidence from Turkey using a panel quantile regression approach. *Borsa Istanbul Review*, 21(4), 317-331. https://doi.org/10.1016/j.bir.2020.11.002

Tables

Table 1. Study variables

Variables	Symbol	Metrics	Expected Sign	Author Base
Net Investment	INV	(Fixed Assets – Lagged Fixed Assets + Depreciation) / Lagged Fixed Assets		Aivazian, Geb and Qiu (2005); Ding, Knight and Zhang (2019); Vo (2019)
Financial Leverage	FLEV	Short-Term + Long-Term Debt/Total Assets	+	Aivazian, Geb and Qiu (2005); Lang et al. (1996); Vo (2019)
Operating Leverage	OPLEV	% Δ EBIT / % Δ Sales	+	Chen et al. (2018); Jiao, Nishihara, and Zhang (2019); Mirza, Saeed, and Rizvi (2013)
CRISIES	COVID19	Dummy variable assuming during the Sars-Cov-2 pandemic, and 0 otherwise.		Caballero and Simsek (2021); Yıldırım and Çelik (2021)
Return on Assets	ROA	Net Income / Total Assets		Aivazian, Geb and Qiu (2005); Franzotti & Valle (2020); Jiao, Nishihara & Zhang (2019)
Tobin' Q	Q_TOBIN	(Market Value + Total Liabilities) / Total Assets		Islam, Meo and Usman (2020); Le and Phan (2017)
Dividend per Share	DIV	Dividends Payout / Market Price of Shares	+/-	Michaely and Moin (2022); Islam, Meo and Usman (2020)
Cash Flow	CFL	Cash Flow / Total Assets	+	Kumar, Verma and Kumar (2019); Islam, Meo and Usman (2020); Vo (2019)
Growth	GROWTH	(Total Sales from the previous year − Total Sales from the current year) /Total Sales from the current year	+	Beladi, Deng and Hu (2021) Le and Phan (2017)
ROA	SALES	Lagged Net Sales / Lagged Fixed Assets	-	Aivazian, Geb and Qiu (2005) Ding, Knight and Zhang (2019); Vo (2019)
Firm Size	SIZE	Natural Logarithm of Total Assets	+	Le and Phan (2017)

Source: Prepared by the authors

Table 2. Descriptive statistics

Variables	Observations	Mean	St. Deviation	Min	Max
INV	3982	1.3065	3.3084	-0.5625	15.5422
FLEV	5151	1.4861	5.3242	-15.9177	20.2293
OPLEV	5152	1.9013	2.9756	-4.5696	11.1686
ROA	2,413	1.2295	5.8651	-2.7885	34.364
Q_Tobin	3688	1.1635	0.9568	0.1806	4.7799
CFL	4831	-0.0534	0.3021	-1.5926	0.2301
GROWTH	4317	0.0779	0.4794	-0.9511	2.0426
SALES	4575	24.219	62.0537	0	335.125
SIZE	5180	14.286	2.7744	4.9007	18.3184
DIV	7343	0.7775	2.8003	0	16.0855
AGE	7779	19.131	9.7342	0	36

Note: INV – Investment; FLEV - Financial leverage; OPLEV - operational leverage; ROA - Return on Assets; Q_Tobin – Tobin's Q; CFL- Cash Flow; GROWTH – Growth opportunity; SALES - Sales; SIZE - Firm Size; DIV - dividend per share; AGE - age of the firm. Source: Research results.

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Table 3. Pearson correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
INV (1)	1.00											
FLEV (2)	-0.003	1.00										
OPLEV (3)	-0.05*	0.012	1.00									
COVID19 (4)	0.007	0.03*	0.004	1.00								
ROA	0.0127	0.0072	-0.06*	0.0315	1.00							
Q_Tobin (5)	0.015	-0.017	-0.015	-0.018	0.15*	1.00						
DIV (6)	-0.008	0.048*	-0.04*	-0.043*	-0.01	-0.024	1.00					
CFL (7)	0.22*	0.033*	0.106*	0.1227*	-0.48*	-0.030	0.077*	1.00				
GROWTH (8)	0.24*	0.007	-0.005	-0.0034	-0.02	0.041*	-0.015	-0.012	1.00			
SALES (9)	0.49*	0.057*	-0.05*	-0.053*	0.128*	0.045*	-0.05*	0.062*	0.029	1.00		
SALES (10)	0.09*	0.062*	0.130*	0.1523*	-0.49*	-0.23*	-0.04*	0.607*	0.108*	0.041*	1.00	
AGE (11)	-0.05*	-0.021	0.003	-0.0016	0.102*	-0.09*	0.052*	0.092*	-0.07*	-0.06*	-0.1*	1.00

Note: INV – Investment; FLEV - Financial leverage; OPLEV - operational leverage; COVID19: Covid19 Crisis; ROA - Return on Assets; Q_Tobin – Tobin's Q; CFL- Cash Flow; GROWTH – Growth opportunity; SALES - Sales; SIZE - Firm Size; DIV - dividend per share; AGE - age of the firm. * p-value < 0.05. Source: Research results.

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Table 4. Impacts of leverage on company investment for the general sample

Variables	Expected signal	Model 1	Model 2	Model 3
FLEV	(-)	**-0.0162** (0.0066)**		
OPLEV	(-)		**-0.0377** (0.0176)**	
FLEV*OPLEV	(-)			**-0.0017** (0.0011)**
COVID19	(-)	**-4.3983*** (0.2783)**	**-4.4095*** (0.2783)**	**-4.4148*** (0.2783)**
ROA		**-0.0617* (0.0361)**	**-0.0636* (0.0368)**	**-0.0626* (0.0371)**
Q_Tobin	(+)	0.0296 (0.1012)	0.0303 (0.1023)	0.0287 (0.1014)
CFL	(-)	**-1.2475*** 0.4136)**	**-1.2423*** (0.4138)**	**-1.2386*** (0.4139)**
GROWTH	(+/-)	**0.8946*** (0.0988)**	**0.8962*** (0.0988)**	**0.8977*** (0.0989)**
SALES	(+)	**0.0271*** (0.0008)**	**0.0271*** (0.0008)**	**0.0271*** (0.0008)**
SIZE	(+)	**0.1061*** (0.0279)**	**0.1064*** (0.0280)**	**0.1046*** (0.0279)**
DIV	(+)	0.0093 (0.0203)	0.0081 (0.0203)	0.0081 (0.0203)
AGE	(+)	-0.0038 (0.0025)	-0.0035 (0.0026)	-0.0052 (0.0037)
Constant		**-1.2028*** (0.3128)**	**-1.2317*** (0.3410)**	**-1.2223*** (0.3238)**
Observations		2953	2954	2953
R^2		0.333	0.332	0.332
F Test		**163.38*** **	**163.2*** **	**171.25*** **
VIF		1.04	1.04	1.09
Hausmann		**139.03*** **	**134.30*** **	**134.30*** **
Industry		Yes	Yes	Yes
Year		Yes	Yes	Yes

Note: INV – Investment; FLEV - Financial leverage; OPLEV - operational leverage; COVID19: Covid19 Crisis; ROA - Return on Assets; Q_Tobin – Tobin's Q; CFL- Cash Flow; GROWTH – Growth opportunity; SALES - Sales; SIZE - Firm Size; DIV - dividend per share; AGE - age of the firm. *. **. *** Indicate significance level at 10%, 5% and 1% respectively. Source: Research results.

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Table 5. Impacts of leverage and the COVID-19 Crisis on investment: High-growth versus low-growth opportunities

Variables	High-Growth	Low-Growth	High-Growth	Low-Growth	High-Growth	Low-Growth
	Modelo1	Modelo2	Modelo3	Modelo4	Modelo3	Modelo4
FLEV	-0.0580*** (0.0177)	-0.0032* (0.0087)				
OPLEV			-0.0361** (0.0291)	-0.0163* (0.0155)		
FLEV* OPLEV					-0.0012** (0.0039)	-0.0022* (0.0018)
COVID19	-2.7882*** (0.4661)	-5.4432*** (0.3536)	-2.8362*** (0.4680)	-5.4464*** (0.3532)	-2.8255*** (0.4682)	-5.4533*** (0.3533)
ROA	-0.0515 (0.0341)	-0.1259** (0.0514)	-0.0607* (0.0339)	-0.1252** (0.0513)	-0.0575* (0.0340)	-0.1249** (0.0513)
Q_Tobin	-0.2603*** (0.0831)	0.5861** (0.2478)	-0.2706*** (0.0835)	0.5979** (0.2478)	-0.2673*** (0.0835)	0.5827** (0.2476)
CFL	-0.8438 (0.6345)	-1.5388*** (0.5506)	-0.8779 (0.6374)	-1.5193*** (0.5506)	-0.8960 (0.6390)	-1.5282*** (0.5505)
GROWTH	1.3646*** (0.1680)	0.5738*** (0.1215)	1.3515*** (0.1687)	0.5761*** (0.1214)	1.3529*** (0.1688)	0.5775*** (0.1214)
SALES	0.0287*** (0.0012)	0.0278*** (0.0009)	0.0281*** (0.0012)	0.0278*** (0.0009)	0.0283*** (0.0012)	0.0279*** (0.0009)
SIZE	0.0667 (0.0454)	0.1546*** (0.0314)	0.0629 (0.0456)	0.1550*** (0.0314)	0.0602 (0.0456)	0.1542*** (0.0314)
DIV	0.0017 (0.0379)	0.0268 (0.0233)	-0.0039 (0.0383)	0.0261 (0.0232)	0.0007 (0.0381)	0.0268 (0.0232)
AGE	-0.0029 (0.0080)	-0.0015 (0.0054)	-0.0025 (0.0080)	-0.0013 (0.0054)	-0.0028 (0.0080)	-0.0012 (0.0054)
Constant	2.9945*** (0.8377)	3.1429*** (0.5867)	3.0743*** (0.8417)	3.1552*** (0.5864)	3.0382*** (0.8418)	3.1547*** (0.5866)
Observations	1099	1852	1099	1853	1099	1852
R^2	0.372	0.298	0.369	0.298	0.474	0.430
VIF	1.05	1.07	1.05	1.07	1.05	1.07
F Test	90.32***	73.12***	89.39***	75.37****	98.48***	79.41****
Hausmann	98.04***	111.04***	100.27***	110.69***	101.18***	115.49***
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes

Note: INV – Investment; FLEV - Financial leverage; OPLEV - operational leverage; COVID19: Covid19 Crisis; ROA - Return on Assets; Q_Tobin – Tobin's Q; CFL- Cash Flow; GROWTH – Growth opportunity; SALES - Sales; SIZE - Firm Size; DIV - dividend per share; AGE - age of the firm. *. **. *** Indicate significance level at 10%, 5% and 1% respectively. Source: Research results.