ISSN 1808-057X
DOI: 10.1590/1808-057x20211391.en

ORIGINAL ARTICLE

Cash liquidity and financial constraints in relation to the market performance of Brazilian companies*

Alice Carolina Ames[1]
https://orcid.org/0000-0002-8287-8831
Email: acames@furb.br

Rodolfo Vieira Nunes[2,3,4]
https://orcid.org/0000-0003-3075-2177
Email: rodolfonunes@usp.br

Tarcísio Pedro da Silva[1]
https://orcid.org/0000-0002-2370-791X
Email: tarcisio@furb.br

[1] Universidade Regional de Blumenau, Programa de Pós-Graduação em Ciências Contábeis, Blumenau, SC, Brazil
[2] Universidade de São Paulo, Faculdade de Economia, Administração e Contabilidade, Programa de Pós-Graduação em Administração, São Paulo, SP, Brazil
[3] Universidade do Estado de Minas Gerais, Fundação de Ensino Superior de Passos, Departamento de Administração, Passos, MG, Brazil
[4] Universidade Estadual do Maranhão, Departamento de Gestão do Agronegócio, Presidente Dutra, MA, Brazil

Received on 01.18.2021 – Desk acceptance on 01.27.2021 – 4th version approved on 12.10.2021
Editor-in-Chief: Fábio Frezatti
Associate Editor: Fernanda Finotti Cordeiro

ABSTRACT

This article aimed to verify the influence of cash liquidity and financial constraints on the market performance of Brazilian companies. According to pecking order theory, organizations choose retained earnings over debts or new share issuances, which may be linked to specific costs. However, trade-off theory highlights that taxes mean that financial policy and debt can be relevant to company value. Thus, this study aims to provide new insights on these topics and knowledge for investigating cash liquidity and financial constraints in relation to performance. The cash liquidity of organizations and financial constraints are important phenomena for performance, given that, in this study, there was an increase in performance. The results suggest that organizations choose to underinvest in the setting due to the difficulty of obtaining credit. Thus, there is an evident need for organizations to present liquidity so as not to lose investment opportunities. Despite the financial constraints, the organizations represent, to some extent, a good investment option, as they prefer excess cash to resources for new investments. The population of this study is formed of companies listed on the B3 S.A. – *Brasil, Bolsa, Balcão*. The analysis period corresponded to the years from 2014 to 2018 and the KZ index is calculated to classify the organizations regarding their level of constraint. Next, multiple linear regression was run, controlling for year and sector fixed effects. There is a need for organizations to present liquidity to attract new investors. However, companies that find themselves financially constrained can also represent a good investment option as they choose excess cash. In the market, there are some resistances regarding financially constrained organizations, but there may be considerable liquidity in them.

Keywords: cash liquidity, financial constraints, market performance, Brazilian stock market.

Correspondence address

Alice Carolina Ames
Universidade Regional de Blumenau, Programa de Pós-Graduação em Ciências Contábeis.
Rua Antônio da Veiga, 140 – CEP 89030-930.
Victor Konder – Blumenau – SC – Brazil

*Paper presented at the 23rd SemeAd, November of 2020.

1. INTRODUCTION

Regarding the financing choices of organizations, there is a tendency for them to decide on funding through internal resources. However, when choosing internal financing, organizations start from the source of retained earnings, consequently using low and high risk debts, in order to put an end to the issuance of shares (Mohammadi et al., 2018). Within this context, the company's cash liquidity can suffer impacts derived from that financing option. Also, it warrants mentioning that if the organization experiences of situation of uncertainty, which can be measured through stock volatility, cash liquidity can present a higher value as it mitigates conflicts between the interested parties (Im et al., 2017).

However, in that search to balance financial constraint, cash liquidity, and the amount for investments, there may occur an increase in cash flow problems and current expenditure that can lead to earnings warnings for organizations (Mohammadi et al., 2018). Regarding these warnings, there is an imbalance of accounts, which means it is important to analyze liquidity and constraints for a greater analysis and better visualization of the strategies adopted by organizations.

Thus, regarding the phenomenon of financial constraints, it is perceived that both the costs at the source of capital and the raising of resources and investment continuity are interconnected factors, primarily the company's cash liquidity, which means that where there are constraints or a lack of resources, organizations chose to use cash reserves for capital financing and to cover unexpected expenses (Morellec et al., 2014). In addition, financially constrained companies show a higher cash liquidity value, which may be a factor that demonstrates greater valuation by investors, even with financial constraints (Chan et al., 2013).

According to Chan et al. (2013), organizations that choose internal financing and excess cash liquidity have less probability of accessing the capital market, since the cash liquidity may be considered a source that benefits investment needs, both at the time and in the future. Thus, from verifying the market performance of organizations that experience financial constraints and analyzing cash liquidity, it can be highlighted that performance is greater or that the precepts of trade-off theory cause an increase in the company's value through the use of debt (Modigliani & Miller, 1963).

Specifically, the Brazilian setting presents characteristics such as low minority shareholder and creditor protection, as well as high ownership concentration, these being some of the characteristics that explain the high external financing costs (Crisóstomo et al., 2014). With regard to this, Pinkowitz et al. (2006) indicate that shareholder protection presents two important components: the legal rights linked to what the investors receive and the execution component related to the extent to which those limits are applied and duly respected. Also according to the aforementioned authors, the effects relating to the incentive of cash ownership feature with more intensity in countries with low protection, that is, the limitation between cash ownership rights and control is stronger in countries with little investor protection.

Likewise, when there are capital market constraints, there are onerous, restricted, or even unavailable sources of resources and organizations choose to use cash reserves for financing, to cover capital or loss expenses that can occur in their activities in order to avoid closing down due to inefficiencies (Morellec et al., 2014). Within this context, cash liquidity can bring benefits to organizations with regard to saving on transaction costs for fundraising, avoiding the liquidation of assets to mitigate default, and also to the availability of companies in financing investments through liquid assets (Loncan & Caldeira, 2014).

Consequently, it is necessary to evaluate the market performance of organizations, with the aim of verifying their situations regarding the profitability of investments (Wernke & Lembeck, 2004), in which organizations can seek external resources to finance their debts and their activities. In light of the above, the present study aims to provide new insights for explaining the topics addressed and to attribute knowledge, guided by the following research question: what is the influence of cash liquidity and of financial constraints on the market performance of Brazilian companies? Consequently, it aims to verify the influence of cash liquidity and financial constraints on the market performance of Brazilian companies. Therefore, the study seeks to analyze the impact of each one of these phenomena regarding the performance of organizations.

The execution of this study is thus warranted, given the characteristics that can influence performance relating to cash liquidity and constraints that impact market performance, due to the high instability of the Brazilian setting in the economic context, due to presenting a higher cost of capital compared with developed countries and, also, as it presents credit-constrained companies (Terra, 2003). Also regarding financial constraints, there is a higher concentration of studies in developed countries,

while the ones in developing countries have not received as much attention with regard to analyzing organizations (Crisóstomo et al., 2014).

In addition, it warrants mentioning the help in internal management and in obtaining future investors for decision making in relation to paying dividends or issuing shares, given financial constraints. In the literature, according to Mohammadi et al. (2018), there are companies in which cash liquidity is seen as one of the determining factors for the status of organizations as well as for the future. When there is high cash liquidity and growth prospects, organizations invest more internally in growth capacity. It can thus be seen that it is important to analyze the cash liquidity variables and the limitation situation of organizations that experience constraints in a developing economy, including to evaluate their performance.

It is verified in the literature, according to the predictions of pecking order theory, that organizations prefer retained earnings over debt or new share issuances, which may be connected to specific financing costs. In addition, tax advantages may be a factor that means that debt is a useful source of financing only in organizations that present low levels of indebtedness (Crisóstomo et al., 2014). On the other hand, trade-off theory includes corporate tax so that financial policy and debt may be relevant to company value (Iona et al., 2020). Thus, taking into consideration the analysis of these two theories and the phenomena studied, it is expected that, in Brazil, organizations present fewer constraints, given the characteristics of the market and the constant economic fluctuations due to macroeconomic factors, which can increase the complexity of the phenomena studied, as well as the weak investor protection; as they represent external shareholders, they do not receive the total value relating to the company's own liquid assets (Pinkowitz et al., 2006).

2. LITERATURE REVIEW

2.1 Trade-Off Theory and Pecking Order Theory

Two traditional theoretical paths compete in explaining decisions regarding the capital structure of organizations, namely trade-off theory and pecking order theory. The numerous studies of classic authors on finance indicate that the explanations of the theories are seen as contradictory and divergent in different basic points (Henrique et al., 2018). Trade-off theory is based on the aspects of tax savings connected to the use of debts and to the costs of default derived from indebtedness. Pecking order theory, in turn, is based on the order of preference relating to companies' internal and external resources, motivated by information asymmetry (Nakamura et al., 2007).

2.1.1 Trade-off theory

The basic premise of this concept is that there is an optimal capital structure (relationship between own and third-party capital) that enables company value to be optimized. According to the theory, in the view of Bastos and Nakamura (2009), organizations seek an optimal point of indebtedness, weighing up the aspects of tax benefits and financial costs.

Myers' (1984) study was pioneering in its trade-off analysis and the results highlighted that the greater the growth of company indebtedness, the greater the tax benefit would be, since it increases company value. This is possible since the benefit that is obtained through debt is tax-related, in that interest expenditure is tax-deductible. Despite all of the empirical research and the theoretical foundations, there is not yet a consensus in relation to the determinants of an optimal capital structure supported by trade-off theory (Henrique et al., 2018).

With relation to the topic of cash, trade-off theory highlights that companies choose an ideal cash liquidity pattern with the aim of maximizing value for the organization (Artica et al., 2019). This characteristic of the situation is confirmed based on two motives that require cash liquidity: transactions and precaution.

The transactions motive is correlated with the need for cash for institutions' current commercial transactions. Thus, companies will use cash to reduce their leverage level; if the indebtedness is restrictive, this situation can result in a negative relationship between cash and leverage (Almeida & Campello, 2007; Bates et al., 2009; Miller & Orr, 1966). The second motive, precaution, covers security regarding future cash, given a certain quantity of total resources. Thus, it is possible to observe that the greater the cash flow volatility, the greater the risks are that can cause an increase in retained cash (Han & Qiu, 2007; Kim et al., 1998).

2.1.2 Pecking order theory

This other theory involving the topic of capital structure formulates the hypothesis in which companies do not aim to achieve an ideal cash level; on the contrary, cash fluctuates as a result of financial receipts and payments.

For Myers (1984), the whole theoretical framework is based on the principle that there is information asymmetry in the market (imperfect markets) and that, in general, managers of organizations have better information about the conditions of companies compared to investors.

Thus, in the understanding of Nakamura et al. (2007), a basic premise would be to mitigate asymmetry costs, using the hierarchical order of resources to finance investments, since the need for cash liquidity is considered as result of market asymmetries. Hence, organizations come to use financing sources to meet cash demands, according to the following order: retained earnings, safe debt, risky debt, and share issuances (Artica et al., 2019).

This hierarchy regarding company financing sources is supported by the aspect that the internal sources of resources do not have transaction costs. In addition, the issuance of new debts signals positive elements to investors about the organization. However, the issuance of new shares signals negative information to the market by the company (Nakamura et al., 2007).

In summary, in pecking order theory, there is no optimal indebtedness point, that is, there should be no target capital structure (Henrique et al., 2018). However, for there to be indebtedness, it is necessary for there to be information asymmetry in relation to the market and to investment projects on the part of companies. And, finally, the hierarchy of the need for cash liquidity should take into account the costs of financing sources (Campos & Nakamura, 2015).

2.2 Cash Liquidity

The capital market features "frictions" that can be present in the costs of fundraising, of organizational survival, as well as of capital injection investments, in which these depend on the organization's cash liquidity (Morellec et al., 2014). From this perspective, a determining factor of cash liquidity are the costs of accessing external financing, given that companies with a good credit risk classification have lower transaction costs when financing debt and lower cash liquidity (Loncan & Caldeira, 2014).

Based on trade-off theory, companies define a cash liquidity level. Through marginal costs and benefits for maintaining cash, it is observed that, with cash resources, there is a reduction in the cost of raising external resources or in the liquidation of pre-existing assets, in which that availability has a smoothing effect between the company's sources and the use of funds (Ferreira & Vilela, 2004). With effect, cash liquidity should be balanced with the financial limitation of organizations and the amount available for investments, so that there is not an excessive increase in cash and in expenses, in order for organizations to continue being profitable (Mohammadi et al., 2018).

In the literature, studies seek to address the relationship between the cash liquidity of organizations and the financial restraints they may face. The study of Korajczyk and Levy (2003) highlighted significant findings that for companies with credit and cash constraints the macroeconomic conditions are primordial. Within the same line of approach, Almeida et al. (2006) found that in crisis cycles there is an increase in the cash level of organizations.

In an important study by Campello et al. (2011), the evidence indicates that lines of credit act as a financial buffer, with the aim of smoothing the impacts of a crisis. However, for companies with limited access to credit, this would imply the need to choose to use cash reserves or investment.

With a study focused on the difficulty of accessing credit, Chan et al. (2013) showed that financially constrained companies have more cash liquidity, which indicates that investors attenuate valuing excess cash liquidity with constraints. Im et al. (2017), in turn, verified that when a company faces some type of uncertainty, it chooses to leave double the money in cash. Thus, a significant influence of the level of uncertainty on cash resources is affirmed. Morellec et al. (2014) indicated that cash resources increase with market competition and with financing constraints, and that the influence on companies' assets increases according to the competition.

The study of Artica et al. (2019), focused on Latin American companies, that is, on emerging countries, highlights that the determinants of cash liquidity for organizations in developing countries are impacted by macroeconomic elements and indicators. These findings are consistent with a premise of trade-off theory, which shows that even for developed economies, or developing ones, macroeconomic fluctuations influence the demand of organizations for cash in developed countries (Baum et al., 2006; Demir, 2009).

From analyzing the cost of capital for external financing, organizations that form part of the Brazilian setting, which represents an emerging economy, when compared to developed countries, present a higher cost for external financing (Terra, 2003). For that reason, it is presumed that the higher the cash liquidity, the greater the performance of organizations. In light of the above, the first hypothesis is formulated:

> H_1: cash liquidity positively influences the market performance of Brazilian companies.

It is thus understood that, when they choose to maintain cash liquidity, even when companies are credit constrained, there is concern about analyzing the influence of these phenomena on capital market performance, including because Brazil has the characteristic of low minority shareholder and creditor protection, as well as due to the high ownership concentration (Crisóstomo et al., 2014).

2.3 Financial Constraints

The understanding about financial constraints involves a number of explanations that seek to associate financial constraints with information asymmetry, with moral hazard, with contract costs, with transaction costs, and with excess debt (Hoberg & Maksimovic, 2015). However, within the perspective of environments in which there is political and economic uncertainty, given that the capital market is imperfect and the financial structure of organizations is marked by a high level of ownership concentration, access to credit is a prominent factor in the choice of financing source (Carvalho & Kalatzis, 2018). Therefore, an influence of uncertainty is observed within the scope of the organization so that decisions are taken, in the sense that this uncertainty derives from the possibility of there being financial constraint or not.

According to Portal et al. (2012), organizations are considered as being financially constrained when they choose investments that do not have internal and external financing sources, that is, those in which there is underinvestment and a reduction in the organization's value. Almeida et al. (2004) highlight that cash liquidity features among cash retention patterns, considering that variations occur in these patterns over the organizational business cycle, in which, when they are financially constrained, companies increase their cash retention.

Financial constraints can impact various sectors of organizations, but this study more specifically addresses the impact of cash liquidity regarding their performance. With regard to financing costs, which impact the financial constraint of organizations, in their study Fazzari et al. (1988) inferred that the impact of the cost relationships between internal and external sources of financing is not only dependent on the net present value of investments, that is, not only on how much they can "profit" with investments, but on how much these organizations have available in terms of internal resources for funding them.

Being subject to financial constraints can impact organizations' financing and investment choices, as well as their capital market performance. Almeida et al. (2004) indicate that the investment cash flow sensitivity of organizations should increase their tangibility, but only in financially constrained companies. According to Bassetto and Kalatzis (2011), companies with more volatility and more cash are more sensitive to the flow of investments, but more financially constrained. However, if organizations seek to maintain a lot of cash due to liquidity problems, with a view to future investment financing, they start with internal resources.

Lamont et al. (2001) reported that financially constrained companies have lower mean returns compared to non-constrained companies. However, it was not shown that the performance of constrained companies reflects credit conditions, monetary policy, or business cycles. Thus, financial constraints are expected to impact companies' market performance. Hence, the second hypothesis is formulated:

> H_2: financial constraints tend to positively impact the market performance of Brazilian companies.

However, it is important to highlight that the companies may have chosen cash liquidity as a means of prevention regarding uncertainties, and that factor may explain the differences between the impact of the constraint on performance, more specifically the companies' business strategies. Regarding business strategies, according to Cappa et al. (2019), this involves an organizational characteristic in which companies are defined according to practices carried out to achieve the main organizational objectives.

On the other hand, according to Chan et al. (2013), companies that are financially constrained have limited access to the capital market, that is, a lower probability of being included in that environment, in which cash liquidity can be beneficial for that type of organization in terms of financing its own investments and the need to maintain its activities. In addition, it is noted that the option of cash liquidity is primarily verified regarding the organization's constraint and the decision making of investors and shareholders in this type of organization.

3. RESEARCH METHOD

With the aim of verifying the influence of cash liquidity and of financial constraints on the market performance of Brazilian companies through financial and guarantee constraints, we present a descriptive and documental study using a qualitative approach to the problem, given that the data were collected using the Refinitiv database.

The population is formed of companies listed on the B3 S.A. – *Brasil, Bolsa, Balcão* (B3). The sample is obtained after excluding companies, besides financial ones, that did not have all the information for the models analyzed, thus totaling 130 companies classified in terciles, according to the level of constraint. The analysis period corresponded to the longitudinal cut from 2014 to 2018.

This study seeks to verify the influence of cash liquidity and financial constraints on the market performance of the companies listed on the B3. We chose to use the level of financial constraint of the organizations, even though in the literature there is no perfect consolidated criterion for classifying a company as being financially constrained (Henness et al., 2007; Maestro et al., 2007; Moyen, 2004; Rizov, 2004).

In the academic literature, some variables are traditionally used in defining and classifying organizations as constrained or not. Some of the most common ones are two indirect proxies (credit rating and dividend payment) and three endogenous indicators (size, age, and leverage), that is, derived from organizational characteristics. For Farre-Mensa and Ljungqvist (2016), there is a need to test whether the five traditional measures are really efficient in identifying whether organizations are financially constrained.

The research of Farre-Mensa and Ljungqvist (2016) presents results that are consistent with the established literature, thus, none of the five measures employed to categorize companies in situations of financial constraint are in fact efficient for that measurement. Much care and attention is suggested in the use and interpretation of the traditional endogenous measures of financial constraint, as these possible constraints can represent differences in growth policy and in financing based on the life cycle of companies.

Thus, we chose to initially evaluate at what level of constraint the organizations find themselves, using the KZ index, which was proposed by Lamont et al. (2001), based on the results of Kaplan and Zingales (1997). Regarding that index, it warrants mentioning that it separates the samples between constrained and unconstrained firms. In addition, the present study is based on that of Carvalho and Kalatzis (2018), who used the aforementioned model and distinguish between two groups through division into terciles. For this, the calculation of the KZ index is initially shown below.

$$KZ_{j,t} = -\left(1.0019^{*}\frac{CF_{j,t}}{K_{j,t-1}}\right)+\left(0.2826^{*}\,Q_{j,t}\right)+\left(3.1391^{*}\frac{D_{j,t}}{TC_{j,t}}\right)-\left(39.3678^{*}\frac{Div_{j,t}}{K_{j,\,t-1}}\right)-\left(1.3147^{*}\frac{Cash_{j,t}}{K_{j,t-1}}\right) \quad (1)$$

In the model in equation 1, *KZ* represents the organization's financial constraint; *t* is the year; *j* is the company; *K* is fixed assets; *CF* is operating cash flow (EBIT), plus depreciation, amortization, and depletion (EBIDTA); *Q* is the Tobin's Q estimate calculated by $\frac{(MV+TL)}{TA}$, in which *MV* is identified as the market value of the shares, *TL* is total liabilities, and *TA* is total assets; *D* refers to total liabilities; *TC* is total capital, which represents total assets; *Div* is total dividends paid; and *Cash* is total cash or cash equivalents.

Following their separation and according to the KZ index, Figure 1 represents the division of the organizations. The first tercile includes the non-financially constrained organizations and the third tercile includes the constrained organizations, separated by year, according to the Lamont et al. (2001) model. In addition, the classification of the organizations using the value of the KZ index also enables the creation of a dichotomous variable, where 1 refers to the observation of a constrained organization and 0 refers to an unconstrained organization.

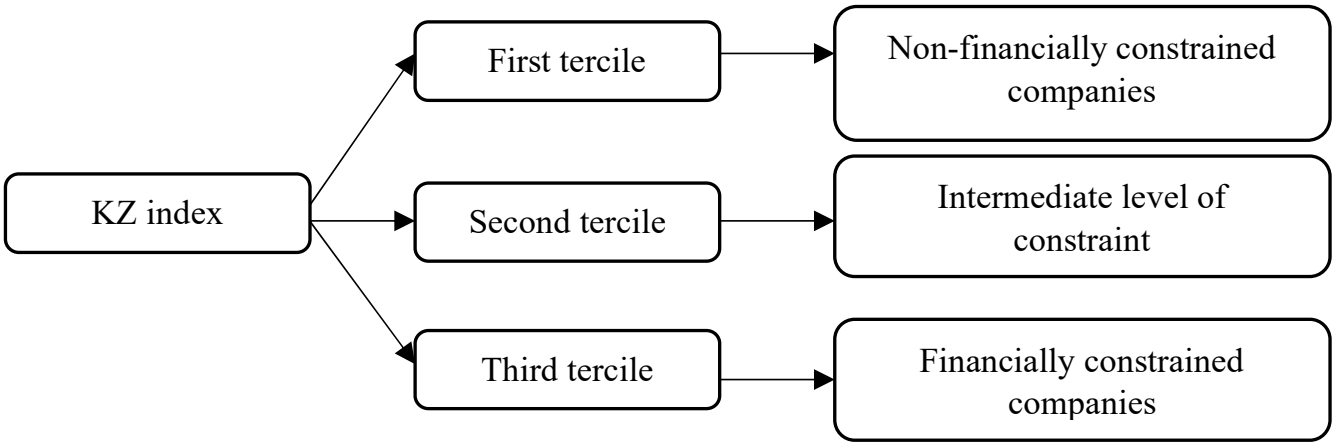

Figure 1 *Grouping of organizations according to financial constraint*
Source: *Carvalho and Kalatzis (2018).*

With effect, through the classification of the companies according to the level of constraint, the KZ index used here enabled the employment of a binary variable, with the aim of classifying the organizations as financially constrained or unconstrained. After the classification of the organizations regarding financial constraint, Table 1 is subsequently presented to better visualize the research and better explain the quantity of organizations in each classification.

Table 1
Population and research sample

Panel A – Sample design		
Country	**Population**	**Companies**
Brazil	495	130
Panel B – Sample by terciles according to the KZ index		
Tercile	**Companies**	**Intraquantile interval**
First	43	from -196392692.87 to 3.35
Second	43	
Third	44	
Total sample	**130**	

Source: *Elaborated by the authors.*

It should be stressed that for this study only the organizations classified in the first and third terciles were used, classified as financially constrained and unconstrained organizations.

After dividing the organizations in terms of financial constraints, we used the variables presented in Table 2.

Table 2
Variables used in the study

Variable	**Formula or description**	**Authors**
Dependent		
Market performance	Market-to-book (MTB)	Kuan et al. (2012), Crisóstomo et al. (2014)
Explanatory		
Financial constraints (FinC)	$KZ_{j,t} = -\left(1.0019^{*}\frac{CF_{j,t}}{K_{j,t-1}}\right)+\left(0.2826^{*}Q_{j,t}\right)+\left(3.1391^{*}\frac{D_{j,t}}{TC_{j,t}}\right)-\left(39.3678^{*}\frac{Div_{j,t}}{K_{j,t-1}}\right)-\left(1.3147^{*}\frac{Cash_{j,t}}{K_{j,t-1}}\right)$	Carvalho & Kalatzis (2018)
Cash liquidity (LIQ)	$\frac{Cash\ and\ short\ term\ investments}{Total\ assets}$	Mohammadi et al. (2018)

Table 2
Cont.

Variable	Formula or description	Authors
Control		
Company size (SIZ)	LN of total assets	Kuan et al. (2012)
Leverage (LEV)	$\frac{Total\ liabilities}{Total\ assets}$	Kuan et al. (2012), Morellec et al. (2014)
Profitability (PROF)	$\frac{Earnings\ Before\ Interest\ and\ Taxes\left(EBIT\right)}{Total\ Assets}$	Im et al. (2017)

Source: *Elaborated by the authors.*

After the collection, the data were classified and tabulated using an electronic spreadsheet. Next, to fulfill the study objective, we calculated the KZ index to classify the organizations regarding their level of constraint. Subsequently, we carried out the calculation using multiple linear regression, controlling for year and sector fixed effects, using the Stata software, in which equation 2 was run. Equation 2 tests the influence of cash liquidity (LIQ) and of financial constraints (FinC) on the market performance of the companies measured by the market-to-book (MB). The empirical model is presented below.

$$PERF_{it} = \beta_0 + \beta_1 FinC_{it} + \beta_2 LIQ_{it} + \beta_3 SIZE_{it} + \beta_4 CE_{it} + \beta_5 TANG_{it} + \beta_6 PROF_{it} + \Sigma SectorFixedEffect + \Sigma YearFixedEffect + \varepsilon \quad (2)$$

With the aim of controlling problems related to heteroscedasticity, an OLS (ordinary least squares) regression was run with robust standard errors and controlling for sector and year fixed effects. To classify the organizations, we used the classification based on the Global Industry Classification Standard (GICS), which consists of a fixed effects control variable collected from Thomson Reuters Eikon. In addition, we ran the variance inflation factor (VIF) test to verify the multicollinearity between the variables and checked the autocorrelation according to the Durbin Watson test, both highlighted in the results tables.

3.1 Additional Tests

As an additional test, this study was based on the premise, according to Mohammadi et al. (2018), that when aiming to balance financial constraints, cash liquidity, as well as the amount of investments, organizations can suffer from cash problems and increased expenses, which will consequently affect long-term profitability. In addition, according to trade-off theory, organizations seek an optimal point of indebtedness to weigh up the tax benefit and financial cost aspects (Bastos & Nakamura, 2009). Also, according to Artica et al. (2019), organizations may choose a cash liquidity pattern with the aim of increasing the organization's value.

On the other hand, pecking order theory denotes that there should not be an optimal point of indebtedness (Henrique et al. 2018), but that this is necessary so that there is informational asymmetry regarding the market relationship and investment projects by the company. With effect, by focusing on the relationship between cash liquidity and financial constraints that organizations may face, we seek to verify the impact of these factors on the performance of the organizations that may be financially constrained.

According to Mohammadi et al. (2018), when there is no equilibrium between the financial constraint and the amount of investments of the organization, problems can be verified in cash liquidity and increased current expenses, due to the financing or regarding the opportunity cost, in which the organization's profitability could be threatened. Therefore, as an additional test, equation 3 is highlighted, which operationalizes the interaction between the phenomena of cash liquidity and financial constraints in relation to market performance.

$$PERF_{it} = \beta_0 + \beta_1 FinC_{it} + \beta_2 LIQ_{it} + \beta_3 \left(FinC_{it} * LIQ_{it}\right) + \beta_4 SIZE_{it} + \beta_5 CE_{it} + \beta_6 TANG_{it} + \beta_7 PROF_{it} + \Sigma SectorFixedEffect + \Sigma YearFixedEffect + \varepsilon \quad (3)$$

Note that equation 3 seeks to highlight the interaction between the phenomena studied, as well as cash liquidity and financial constraint. In addition, this analysis is complementary, as it is based on the assumption that there may be a joint effect of the aforementioned variables over market performance. However, that is not the focus of this study, but an advance in the analysis, merely taking into consideration the effects subsequent to the main analysis of this study.

4. RESULTS ANALYSIS

This section addresses the results related to the findings. Initially, we present the descriptive statistics of the research variables and the results of the multiple linear regression (OLS). The descriptive analysis is shown in Table 3.

Table 3
Descriptive statistics of the variables

Variables	Minimum	Maximum	Mean	Median	Standard deviation
Market-to-book	0.0187783	5.205975	0.8954137	0.6246436	0.8091519
Cash liquidity	0.0014741	0.8702986	0.1431867	0.1090276	0.1199114
Company size	16.06135	25.54019	21.27122	21.37020	1.725994
Leverage	0.0065747	1.201139	0.5576086	0.5708610	0.2046878
Profitability	-0.1370455	-0.1370455	0.0771276	0.07020115	0.0798527
Observations: 435					

Source: *Elaborated by the authors.*

According to Table 3, the perceived value index that composes the mean performance of the organizations has a high value compared to the minimum and maximum extremes, which present discrepant values. In addition, it can be observed that the mean cash liquidity of the organizations does not reach 1, which indicates, as Mohammadi et al. (2018) postulate, that there is an equilibrium between financial constraint and the amount available for investments, so excessive cash costs do not occur and there is also profitability on the part of the organizations.

It was observed, through the SIZE variable, that the organizations are, on average, large-sized, which may even indicate the relationship between financial constraint and the variation in cash retention. Depending on the level of business and of investment of the organizations, some may choose the strategy of increasing cash retention, considering the context and the opportunities that may benefit performance. Also, according to Mohammadi et al. (2018), cash liquidity may be seen an indicative regarding the future of organizations, since if there are growth prospects, organizations invest internally in their growth capacity.

However, it warrants mentioning the low mean profitability of the organizations, which may be indicative of their low investment and the negative values between the minimum and maximum. Thus, it is evident that the organizations are not highly leveraged and they do not choose financing much, which may be explained by the cash retention, but that they also do not present high profitability to continue developing activities and investing. This may be linked to the idea that financially constrained organizations choose to underinvest and to reduce their market value (Portal et al., 2012).

The Spearman and Pearson correlations were elaborated, seeking to measure the intensity and direction of the relationship between the variables, not specifically the cause and effect relationship, but the relationship of association between the variables. Table 4 presents the results of the Spearman correlation in the upper triangle and those of the Pearson correlation in the lower triangle.

Table 4
Spearman and Pearson correlations between the variables

	FinC	MB	LIQ	SIZ	LEV	PROF
Financial constraint (FinC)	1	0.249**	0.009	0.030	-0.105*	0.215**
Market-to-book (MB)	0.129***	1	0.229**	-0.101*	-0.400**	0.501**
Cash liquidity (LIQ)	0.002	0.211***	1	-0.142**	0.102*	0.081
Company size (SIZ)	-0.006	-0.123**	-0.240***	1	0.357**	-0.005
Leverage (LEV)	-0.096**	-0.315***	-0.025	-0.351***	1	0.023
Profitability (PROF)	0.158***	0.346***	-0.029	0.025	0.013	1

****, ** = correlation significant at 1 and 5%, respectively.*
Source: *Elaborated by the authors.*

As observed in Table 4, there is an evident correlation between the variables. It is verified that in both the Spearman correlation and in the Pearson correlation, there is a relationship between the dependent variable MB and the independent one, namely financial constraint and cash liquidity, as well as the control variables, which correspond to company size, leverage, and profitability.

It is denoted that the independent variables, financial constraint and cash liquidity, are statistically significant at the 1% level in relation to market performance. Regarding the control variables, it is verified that only SIZE presented a significant correlation at the 5% level with the dependent variable and that the others presented significance at the 1% level. In addition, we observe a negative correlation between leverage and financial constraints and market performance with company size. This said, it is observed that the cash liquidity of the organizations may be influenced by their strategies regarding retaining financing.

With relation to the findings, it is presumed, from an initial analysis, that the market performance variable market-to-book is positively related to financial constraints and to cash liquidity. However, the Spearman and Pearson correlations present only an association between the variables. Therefore, to answer the research question, the regression model analysis was conducted. The results are presented in Table 5. The first column covers the independent and explanatory variables and, at the end, there are the results for the VIF and Durbin-Watson tests for the model tested.

Table 5
Financial constraint and cash liquidity in relation to market performance

Variables	Dependent variable: market performance	
	Coefficient	*T* statistic
Constant	-0.6647237	-1.22
FinC	0.1591552**	1.96
LIQ	1.452546***	3.80
SIZ	0.0625397***	3.22
LEV	-1.136904***	-7.51
PROF	3.208063**	2.56
Sector and year fixed effects	Yes	
R^2	39.37	
Significance of the model	0.0000***	
VIF	1.18-1.51	
DW	2.043872	
N_O	435	
N_F	87	
N_C	1	

DW = Durbin-Watson; FinC = financial constraints; LEV = leverage; LIQ = cash liquidity; N_C = number of countries; N_F = number of firms; N_O = number of observations; PROF = profitability; SIZ = size; VIF = variance inflation factor.
, **, * = significance at 10, 5, and 1%, respectively.*

Source: *Elaborated by the authors.*

The results shown in Table 5 reveal that there is positive relationship between both financial constraints and cash liquidity and market performance. From this perspective, the findings contradict Chan et al. (2013), by determining that, in this study, financially constrained organizations present lower cash liquidity and that, in the Brazilian setting, there is no increase in the value of the risk premium by investors. However, it is denoted that organizations that experience constraints present a lower market value and, consequently, have difficulties in capital market performance and, for that reason, they choose internal financing.

In addition, Mohammadi et al. (2018) corroborate the perspective that cash liquidity is one of the determinants for the status of organizations, which may even by linked to the continuity of the business. That said, a positive relationship is verified between financial constraints and cash liquidity, generally due to organizations choosing to hold more money in cash because of the constraints and due to the influence of competition in the market, in which there is an increase in assets to maintain activities (Morellec et al., 2014). Organizations can use the mechanism of holding more in cash with the aim of seeking financing through internal resources, avoiding, for example, high rates for loans and to signal a positive value to investors. However, considering the stage of constraint, organizations can even hold excess stocks and resources, and this may be seen as future profitability, which may impact the increase in the level of cash liquidity.

It is observed that, during the period analyzed, the organizations vary cash liquidity, depending on the life cycle, as well as the amount available for financing investments. Thus, according to Mohammadi et al. (2018), when there is no equilibrium between constraints and investments, organizations present risks regarding cash liquidity, in which internal and opportunity costs and expenses are increased, which can consequently negatively affect the profitability of the organizations, as they are to some extent unable to meet the need for capital and, in relation to their investments, they are unable to maintain a level of cash liquidity that can honor their commitments.

However, it warrants mentioning that the results found primarily have particular characteristics regarding the context analyzed, given that, specifically in Brazil, company investment depends on cash liquidity, both on the part of the internal management and in the availability of credit, in which greater cash flow sensitivity is verified (Crisóstomo et al., 2014). From this perspective, according to Almeida et al. (2004), the cash flow sensitivity of organizations should increase their tangibility, but only in organizations that experience credit constraints, that is, that experience some financing constraint.

In Table 5, it is also possible to identify, through the Durbin-Watson test, that the independence of the errors does not present a correlation between the residuals (Marôco, 2011). Subsequently, the Shapiro-Wilk test was run with the aim of verifying the normality of the data: a non-normal distribution of the residuals was identified, as there was significance at the 1% level. The multicollinearity (VIF) test indicates that there was an absence of multicollinearity in the data analyzed in the present study, as no values higher than 5 were observed to confirm multicollinearity between the variables analyzed (Hair et al., 2009).

To confirm these initial results, an additional analysis was carried out of the interaction between cash liquidity and financial constraints, with the aim of analyzing the joint effect over market performance. Note that the financial constraint variable will be presented at a 5% level (Table 6).

Table 6
Interaction between financial constraint and cash liquidity

Variables	Dependent variable: market performance		Table 5 – Financial constraint and cash liquidity in relation to market performance	
	Coefficient	***t* statistic**	**Coefficient**	***t* statistic**
Constant	-0.3991573	-0.73	-0.6647237	-1.22
FinC	-3.96e-08	-0.32	0.1591552**	1.96
LIQ	1.782984***	5.69	1.452546***	3.80
FinC*LIQ	1.25e-06**	2.16		
SIZE	0.0609935***	2.78	0.0625397***	3.22
LEV	-1.169473***	-6.64	-1.136904***	-7.51
PROF	3.281842***	7.85	3.208063***	2.56
Sector and year fixed effects	Yes		Yes	
R^2	39.69		39.37	
Significance of the model	0.0000***		0.0000***	

Table 6
Cont.

Variables	Dependent variable: market performance		Table 5 – Financial constraint and cash liquidity in relation to market performance	
	Coefficient	*t* statistic	Coefficient	*t* statistic
VIF	1.17 - 3.88		1.18 - 1.51	
DW	2.030548		2.043872	
N_O	435		435	
N_F	87		87	
N_C	1		1	
Join F test				
LIQ + FinC*LIQ	16.20***			
FinC + FinC*LIQ	3.33**			

*DW = Durbin-Watson; FinC = financial constraints; FinC*LIQ = financial constraints * cash liquidity; LEV = leverage; LIQ = cash liquidity; N_C = number of countries; N_F = number of firms; N_O = number of observations; PROF = profitability; SIZE = size; VIF = variance inflation factor.*

, **, * = significance at 10, 5, and 1%, respectively.*

Source: *Elaborated by the authors.*

It is observed that the interaction between the financial constraint variable and cash liquidity (FinC*LIQ) was positive and significantly related with market performance at the 5% level, which reveals that the interaction enhances the positive relationship of the phenomena with market performance. So, it is understood that financially constrained companies choose more cash liquidity, with a view to investment and more internal financing, which corroborates Mohammadi et al. (2018), in that when there is no equilibrium between constraint and investments, organizations have more cash liquidity risks. In addition, as highlighted in Table 5, cash liquidity positively influences the performance of organizations, even when they experience financial constraints, which confirms the precepts of the trade-off theory of Modigliani and Miller (1963).

In addition, as indicated in the study of Artica et al. (2019), when access to external financing is impacted, companies can choose to hold cash as a form of protection against financial constraints, which similarly prevent investment opportunities. Also, according to Almeida et al. (2007), given the state of financial constraint, there is an endogenous relationship with the tangibility of assets, that is, the effects of tangibility can impact both cash flow sensitivity and the status of constraint. Finally, according to the understanding of Artica et al. (2019), by employing trade-off theory, companies choose retained cash liquidity, a major part as a form of precaution, so that it can also serve as security regarding potential financial constraints.

In addition, questions regarding the context the companies form part of should also be considered. According to the aforementioned author, companies operating in the Latin American context tend to suffer the impact of macroeconomic variations, with regard to the determinants of cash liquidity. So, the macroeconomic factors can be seen as proxies regarding the economic state variables, in which they influence organizations both in mutations that occur in cash flows and in the risk-adjusted discount rate (Gosnell & Nejadmalayeri, 2010).

In sum, the results indicate that an increase in constraints and in cash liquidity of organizations increases their performance, even if they present difficulties in accessing the capital market due to them experiencing constraints. In addition, the size of organizations is positively and statistically related to their performance, such as profitability. However, the leverage of organizations presented a negative relationship with performance, which may be linked to the idea that organizations choose to underinvest in the setting analyzed due to difficulty obtaining credit. Thus, this study extends the results on the influence of factors such as constraints and cash liquidity on the market performance of organizations in the Brazilian setting, since the findings are consistent regarding the positive relationship of these variables in the relationship.

5. CONCLUDING REMARKS

This study aimed to verify the influence of cash liquidity and financial constraints on the market performance of the Brazilian companies listed on the B3. Thus, we carried out descriptive research, using a documental procedure and quantitative approach in the analysis. The sample comprised 87 companies classified as financially constrained and not. For the analysis, we chose to use multiple linear regression (OLS) with the aim of examining the influence of other variables, such as constraint and cash liquidity, on the performance of the organizations, using variables linked to organizational characteristics as a control, also with year and sector fixed effects.

The results indicated that there is a positive relationship between the financial constraints and cash liquidity of the companies, confirming the premises adopted and corroborating the studies of Almeida et al. (2004), Chan et al. (2013), Im et al. (2017), Morellec et al. (2014), and Portal et al. (2012). This may be linked to the fact that, as it is a factor analyzed by investors, cash liquidity indicates future prospects for the organization and may be seen as a form of protection regarding possible constraints; thus, hypotheses H_1 and H_2 of this study are not rejected. In addition, companies that have constraints may choose to retain cash, which can positively impact their performance. Moreover, it is necessary to take into consideration the environment of low shareholder protection in Brazil, in which there is a certain discount regarding liquid assets in this setting, as well as the fact that financially constrained companies are involved, which may maintain higher levels of stocks and resources, possibly signaling an improvement in cash liquidity indices. However, it is worth highlighting that this study analyzed a setting that is characterized by an emerging economy and that the values regarding cash liquidity, for example, are lower, but they explain the positive relationship with market performance.

The conclusion of the study is relevant, as this result may be related with the need for organizations to present cash liquidity so as not to lose investment opportunities, which denotes a strategy used by organizations with the aim of presenting liquidity, where by jointly considering these factors, despite them being financially constrained, the organizations represent, to some extent, a good investment option by choosing excess cash rather than resources for new investments. That said, the Brazilian market specifically presents some resistances regarding organizations with financial constraints, but if there is considerable cash liquidity, there is positive market performance.

However, it is observed that external factors can influence the environment studied, given that research is already examining the cost of capital, the impacts of taxes, and the choice of the source of financing. According to the context, this analysis can provide new insights, primarily in emerging economies, as they influence the global market and, consequently, the macroeconomic factors that can impact market performance. Nonetheless, as the present study was based on a developing economy, internal factors regarding monetary policy and government regulations influence this highly unstable market.

In spite of that, this study has some limitations that should be considered in the development of future research, such as by adding macroeconomic factors to the analysis to verify the influence of fluctuations in them on the relationship, as well as increasing the period examined with the aim of capturing variances in the factors over time. As the study was based on a developing economy, it would be interesting to compare the influence of the indicators analyzed here in different economies, but with similarities regarding macroeconomic fluctuations. Finally, other studies could deepen the research using moderation regarding the influence of internal factors on the relationship studied.

REFERENCES

Almeida, H., & Campello, M. (2007). Financial constraints, asset tangibility, and corporate investment. *Review of Financial Studies*, *20*(5), 1429-1460. https://doi.org/10.1093/rfs/hhm019

Almeida, H., Campello, M., & Liu, C. (2006). The financial accelerator: Evidence from international housing markets. *Review of Finance*, *10*(3), 321-352.

Almeida, H., Campello, M., & Weisbach, M. S. (2004). The cash flow sensitivity of cash. *The Journal of Finance*, *59*(4), 1777-1804.

Artica, R. P., Brufman, L., & Saguí, N. (2019). Por que as empresas latino-americanas retêm muito mais caixa do que costumavam reter? *Revista Contabilidade & Finanças*, *30*(79), 73-90. https://dx.doi.org/10.1590/1808-057x201805660

Bassetto, C. F., & Kalatzis, A. E. (2011). Financial distress, financial constraint and investment decision: Evidence from Brazil. *Economic Modelling*, *28*(1-2), 264-271.

Bastos, D. D., & Nakamura, W. T. (2009). Determinantes da estrutura de capital das companhias abertas no Brasil, México e Chile no período 2001-2006. *Revista Contabilidade & Finanças*, *20*(50), 75-94. https://doi.org/10.1590/S1519-70772009000200006

Bates, T. W., Kahle, K. M., & Stulz, R. M. (2009). Why do U.S. firms hold so much more cash than they used to? *The Journal of Finance*, *64*(5), 1985-2021. https://doi.org/10.1111/j.1540-6261.2009.01492.x

Baum, C. F., Caglayan, M., Ozkan, N., & Talavera, O. (2006). The impact of macroeconomic uncertainty on non-financial firms' demand for liquidity. *Review of Financial Economics*, *15*(4), 289-304. https://doi.org/10.1016/j.rfe.2010.06.004

Campello, M., Giambona, E., Graham, J. R., & Harvey, C. R. (2011). Liquidity management and corporate investment during a financial crisis. *The Review of Financial Studies*, *24*(6), 1944-1979.

Campos, A. L. S., & Nakamura, W. T. (2015). Rebalanceamento da estrutura de capital: endividamento setorial e folga financeira. *Revista de Administração Contemporânea*, *19*(número especial), 20-37. https://doi.org/10.1590/1982-7849rac20151789

Cappa, F., Cetrini, G., & Oriani, R. (2019). The impact of corporate strategy on capital structure: Evidence from Italian listed firms. *The Quarterly Review of Economics and Finance*, *76*(2), 379-385. https://doi.org/10.1016/j.qref.2019.09.005

Carvalho, F. L., & Kalatzis, A. E. G. (2018). Earnings quality, investment decisions, and financial constraint. *Revista Brasileira de Gestão de Negócios*, *20*(4), 573-598.

Chan, H. W., Lu, Y., & Zhang, H. F. (2013). The effect of financial constraints, investment policy, product market competition and corporate governance on the value of cash holdings. *Accounting & Finance*, *53*(2), 339-366.

Crisóstomo, V. L., Iturriaga, F. J. L., & González, E. V. (2014). Financial constraints for investment in Brazil. *International Journal of Managerial Finance*, *10*(1), 73-92.

Demir, F. (2009). Financial liberalization, private investment and portfolio choice: financialization of real sectors in emerging markets. *Journal of Development Economics*, *88*(2), 314-324. https://doi.org/10.1016/j.jdeveco.2008.04.002

Farre-Mensa, J., & Ljungqvist, A. (2016). Do measures of financial constraints measure financial constraints? *Review of Financial Studies*, *29*(2), 271-308.

Fazzari, S. R., Hubbard, G., & Petersen, B. (1988). *Financing constraints and corporate investment* [Working Paper]. National Bureau of Economic Research.

Ferreira, M. A., & Vilela, A. S. (2004). Why do firms hold cash? Evidence from EMU countries. *European Financial Management*, *10*(2), 295-319.

Gosnell, T., & Nejadmalayeri, A. (2010). Macroeconomic news and risk factor innovations. *Managerial Finance*, *36*(7), 566-582.

Hair, J. F., Jr., Black, W. C, Babin, B. J., Anderson, R. E., & Tatham, R. L. (2009). *Análise multivariada de dados* (6th ed.). Bookman.

Han, S., & Qiu, J. (2007). Corporate precautionary cash holdings. *Journal of Corporate Finance*, *13*(1), 43-57. https://doi.org/10.1016/j.jcorpfin.2006.05.002

Hennessy, C. A., Levy, A., & Whited, T. M. (2007). Testing Q theory with financing frictions. *Journal of Financial Economics*, *83*(3), 691-717.

Henrique, M. R., Silva, S. B., Soares, W. A., & da Silva, S. R. (2018). Determinantes da estrutura de capital de empresas brasileiras: uma análise empírica das teorias de Pecking Order e Trade-Off no período de 2005 e 2014. *Revista Ibero-Americana de Estratégia*, *17*(1), 130-144. https://doi.org/10.5585/ijsm.v17i1.2542

Hoberg, G., & Maksimovic, V. (2015). Redefining financial constraints: A text-based analysis. *The Review of Financial Studies*, *28*(5), 1312-1352.

Im, H. J., Park, H., & Zhao, G. (2017). Uncertainty and the value of cash holdings. *Economics Letters*, *155*(1), 43-48.

Iona, A., De Benedetto, M. A., Assefa, D. Z., & Limosani, M. (2020). Finance, corporate value and credit market freedom in overinvesting US firms. *Corporate Governance*, *20*(6), 1053-1072. https://doi.org/10.1108/CG-05-2020-0196

Kaplan, S. N., & Zingales, L. (1997). Do investment-cash flow sensitivities provide useful measures of financing constraints? *The Quarterly Journal of Economics*, *112*(1), 169-215.

Kim, C. S., Mauer, D. C., & Sherman, A. E. (1998). The determinants of corporate liquidity: Theory and evidence. *Journal of Financial and Quantitative Analysis*, *33*(3), 335-359. https://doi.org/10.2307/2331099

Korajczyk, R. A., & Levy, A. (2003). Capital structure choice: Macroeconomic conditions and financial constraints. *Journal of Financial Economics*, *68*(1), 75-109.

Kuan, T. H., Li, C. S., & Liu, C. C. (2012). Corporate governance and cash holdings: A quantile regression approach. *International Review of Economics & Finance*, *24*, 303-314.

Lamont, O., Polk, C., & Saaá-Requejo, J. (2001). Financial constraints and stock returns. *The Review of Financial Studies*, *14*(2), 529-554.

Loncan, T. R., & Caldeira, J. F. (2014). Estrutura de capital, liquidez em caixa e valor da empresa: estudo de empresas brasileiras cotadas em bolsa. *Revista Contabilidade & Finanças*, *25*(64), 46-59.

Maestro, M. H., De Miguel, A., & Pindado, J. (2007). Modelo de inversión basado en la ecuación de Euler con límite máximo de endeudamiento: evidencia empírica internacional. *Cuadernos de Economía y Dirección de la Empresa*, *30*, 93-128. http://dialnet.unirioja.es/servlet/revista?codigo¼354

Marôco, J. (2011). *Análise estatística com o SPSS Statistics* (5a. ed.). Report Number.

Miller, M., & Orr, D. (1966). A model of the demand for money by firms. *The Quarterly Journal of Economics*, *80*(3), 413-435. https://doi.org/10.2307/1880728

Modigliani, F., & Miller, M. H. (1963). Corporate income taxes and the cost of capital: A correction. *The American Economic Review*, *53*(3), 433-443.

Mohammadi, M., Kardan, B., & Salehi, M. (2018). The relationship between cash holdings, investment opportunities and financial constraint with audit fees. *Asian Journal of Accounting Research*, *3*(1), 15-27.

Morellec, E., Nikolov, B., & Zucchi, F. (2014). *Competition, cash holdings, and financing decisions* [Working Paper]. Social Science Research Network.

Moyen, N. (2004). Investment-cash flow sensitivities: Constrained versus unconstrained firms. *The Journal of Finance*, *59*(5), 2061-2092.

Myers, S. (1984). The capital structure puzzle. *The Journal of Finance*, *39*(3), 575-592. https://doi.org/10.1111/j.1540-6261.1984.tb03646.x

Nakamura, W. T., Martin, D. M. L., Forte, D., Carvalho Filho, A. F. D., Costa, A. C. F. D., & Amaral, A. C. D. (2007). Determinantes de estrutura de capital no mercado brasileiro: análise de regressão com painel de dados no período 1999-2003. *Revista Contabilidade & Finanças*, *18*(44), 72-85. https://doi.org/10.1590/S1519-70772007000200007

Pinkowitz, L., Stulz, R., & Williamson, R. (2006). Does the contribution of corporate cash holdings and dividends to firm value depend on governance? A cross-country analysis. *The Journal of Finance*, *61*(6), 2725-2751. https://doi.org/10.1111/j.1540-6261.2006.01003.x

Portal, M. T., Zani, J., & da Silva, C. E. S. (2012). Fricções financeiras e a substituição entre fundos internos e externos em companhias brasileiras de capital aberto. *Revista Contabilidade & Finanças*, *23*(58), 19-32.

Rizov, M. (2004). Firm investment in transition: Evidence from Romanian manufacturing. *Economics of Transition*, *12*(4), 721-746.

Terra, M. C. T. (2003). Credit constraints in Brazilian firms: Evidence from panel data. *Revista Brasileira de Economia*, *57*(2), 443-464.

Wernke, R., & Lembeck, M. (2004). Análise de rentabilidade dos segmentos de mercado de empresa distribuidora de mercadorias. *Revista Contabilidade & Finanças*, *15*(35), 68-83.