Do financial restricted companies use the cash flow for investment or for cash holdings?

Do financial restricted companies use the cash flow for investment or for cash holdings?

As empresas restritas financeiramente usam o fluxo de caixa para investimento ou para retenção de caixa?

Alberto Granzotto
Universidade Federal de Santa Maria (UFSM), Brasil
betorg@ymail.com
http://orcid.org/0000-0001-9181-4373

Fernanda Alves Lamberti
Universidade Federal de Santa Maria (UFSM), Brasil
lambert@hotmail.com.br
http://orcid.org/0000-0002-8220-0334

Igor Bernardi Sonza
Universidade Federal de Santa Maria (UFSM) , Brasil
igorsonza@gmail.com
http://orcid.org/0000-0001-5403-3279

Abstract:

The present paper aims to verify whether the most financially restricted companies use their cash flow for investment or for cash holdings. To this end, the cash flow sensitivity of investment as well as the cash flow sensitivity of cash for Brazilian publicly traded companies through the Threshold method is tested, given its classification in restricted and unrestricted companies. In this context, the models of Fazzari, Hubbard and Petersen (1984) and Almeida, Campello and Weisbach (2004) were applied, using as structural breaks the Dividends Paid, Total Assets, Z-score and KZ-index. The result of the analysis was not clear in relation to which behavior is predominant in Brazilian companies. Using the Total Asset as a Threshold, the model that was most representative was the one referring to investments in capital goods. But, considering the Z-score as a Threshold, the most representative model indicates that companies use more Cash Flow results for cash holdings. Dividends and KZ-index were not significant in the analysis.

Keywords: Investment, Cash, Cash flow, Financial constraints.

Resumo:

O presente trabalho tem como objetivo verificar se as empresas restritas financeiramente usam seu fluxo de caixa para investimento ou para retenção de caixa. Para tanto, é testada a sensibilidade do investimento ao fluxo de caixa, bem como a sensibilidade do caixa ao fluxo de caixa para as empresas brasileiras de capital aberto pelo método Threshold, dada a sua classificação em empresas restritas e irrestritas. Nesse contexto, foram aplicados os modelos de Fazzari, Hubbard e Petersen (1984) e Almeida, Campello e Weisbach (2004), utilizando as quebras estruturais dos Dividendos Pagos, do Total de Ativos, do Z-score e do KZ-index. O resultado da análise não ficou claro em relação ao comportamento predominante nas empresas brasileiras. Utilizando o ativo total como medida de restrição, o modelo mais representativo foi o referente aos investimentos em bens de capital. Porém, considerando o Z-score como um limiar, o modelo mais representativo indica que as empresas usam mais fluxo de caixa para reservas de caixa. Os dividendos e o índice KZ não foram significativos na análise.

Palavras-chave: Investimento, Caixa fluxo de caixa, Restrições financeiras.

redalyc.org
PDF generated from XML JATS4R by Redalyc
Project academic non-profit, developed under the open access initiative
69

1 INTRODUCTION

The studies of business finance have as an initial mark the paper of Modigliani and Miller (1958), in which they provided the basis for future studies on capital structure. Their findings presupposed that the market operated perfectly, without limitations, restrictions and informational asymmetry. However, according to Hubbard (FHP, 1998), this proposal of empirical work did not reflect the reality of the market, and it is necessary to contemplate such market imperfections.

The debate about financial constraints has its main focus on the fact that, due to information asymmetries (moral hazard and adverse selection), firms may face difficulties in attracting external resources (MYERS; MAJLUF, 1984; FAZZARI; HUBBARD & PETERSEN, 1998; ALMEIDA; CAMPELLO, 2007). As a consequence of these imperfections, there is dissimilarity between the cost of making the investment feasible through external and internal resources, causing these firms to be financially constrained, that is, not make investments (FAZZARI; HUBBARD; PETERSEN, 1988).

Thus, a company is considered financially constrained when it cannot finance its projects, due to lack of internal resources or financing difficulties (KAPLAN; ZINGALES, 1997). Similarly, Lamont, Polk and Saá-Requejo (2001) point out that the credit constraint is related to all impediments to the realization of investments desired by the company (lack of credit, excessive reliance on loans/financing, restriction on tangible assets). Thus, due to the restrictions, financial decisions, especially those related to investment and cash holdings, become sensitive to the availability of internal resources, that is, to cash flow (PERES; KIRCH,, 2017).

The cash flow sensitivity of investment and cash is widely debated in the literature, but separately. Studies such as Fazzari, Hubbard and Petersen (1988), Kaplan and Zingales (KZ, 1997), Kadapakkam et al. (1998) and Almeida and Campello (2007) address the issue of investments. Already, authors such as Baumol (1952), Miller and Orr (1966), Jensen (1986), Almeida, Campello and Weisbach (2004) have carried out studies on cash holdings. In addition, there are impasses in the definition of financial constraints, such as those seen in Kaplan and Zingales (1997), Lamont, Polk and Saá-Requejo (2001), Almeida, Campello and Weisbach (2004) among others.

Thus, it is noted that there is already evidence of the relationship between investment decisions and cash holdings, but this relationship is not found in the literature in order to understand which is more significant and at what level of financial constraint this fact occurs. This is one of the points where the present study stands out; therefore, it is proposed the comparison of such relations, already consolidated in the literature.

Thus, the present study aimed to verify whether financially restricted companies use their cash flow for investment or for retention by analyzing the cash flow sensitivity of the investment and the cash in Brazilian publicly-held companies, classifying them according with the financial constraint, in a non-arbitrary manner, between 2010 and 2015.

In order to avoid a misclassification of financially constrained firms, Hansen's Threshold method (1999) was used to analyze panel data with structural breaks, causing the financial constraints to be identified by the system, pointing to the specific moment of the existence of a structural break, assuming that there really are different behaviors between companies with and without financial restrictions. This method provides more precise results and allows us to identify which variable is more appropriate to classify companies considering the current Brazilian reality. As reference variables for the structural break, was used the dividends paid, suggested by Fazzari, Hubbard and Petersen (1988), the size (total assets) suggested by Almeida, Campelo and Weisbach (2004), the Z-score, created by Altman (1980) and KZ-index, developed by Kaplan and Zingales (1997).

This paper is subdivided into five sessions including this introduction. Session two presents the literature review, session three presents the methodological procedures, session four discusses the results and session five elucidates the final remarks.

2 FINANCIAL CONSTRAINTS: CONCEPTS AND HYPOTHESES

This session is subdivided into two parts: (i) The cash flow sensitivity of the investment; and, (ii) The cash flow sensitivity of cash.

2.1 CASH FLOW SENSITIVITY OF INVESTMENT

The behavior of investment decisions has been a subject of many debates in the financial literature. The understandings of the factors that influence and restrict such decisions are of great relevance, especially for developing economies such as Brazil (PELLICANI, 2011). As a pioneer in the analysis of investments in face of financial constraints, can consider the study of FHP (1988), in which they raise questions about when companies stop using internal sources of financing and begin to use sources obtained in the market to realize their investments.

Thus, these authors proposed that, when companies are facing financial constraints, investment decisions vary according to the availability of internal funds, that is, according to the Cash Flow. FHP (1988) considered the payment of Dividends as a reflection of the financial constraints faced by the company, as this occurs when there is cash surplus. In this context, financially restricted companies would pay zero dividends. Thus, the authors detected financial constraints by comparing the sensitivity of the investment to the cash flow of different subsamples, with dividend payments being their subdivision criterion.

Among the results, FHP (1988) observed that cash flow was significant for all the models tested. For the first group, that is, for the 49 companies that distributed smaller amounts of dividends (restricted), the authors verified a greater cash flow sensitivity of the investment. These results indicate that companies classified as restricted in relation to credit access are more sensitive, given the internal resources.

As Luo, Li and Zhang (2015) point out later, a large body of literature attempted to identify firms that are heavily affected by funding constraints, while another group of researchers cast doubt on whether the cash flow sensitivity of the investment; and reflects the constraints of financing by the companies. Among them is the study of Kaplan and Zingales (1997), in which they used the same companies as FHP (1988), reclassifying the sample and pointing out that only 15% were classified correctly as financially restricted.

In addition to this criticism, KZ (1997) find results that are adverse to that of FHP (1988), that is, a greater cash flow sensitivity of the investment to unrestricted companies, indicating that the cash flow sensitivity of the investment is not a good proxy for financial constraint. The authors argued that the remaining 85% of companies classified as restricted by FHP (1987) could increase their investments through external resources or cash reserves. In addition to the KZ (1997) notes, other critiques appear in relation to the variables used, such as the questions regarding the payment of dividends, and also Tobin's Q variable could be acting as a proxy for investment opportunities, affecting the results.

In order to answer these questions and get around the problems related to possible measurement errors in the investment opportunity variables (Tobin's Q), Almeida and Campello (2007), explore the role of asset tangibility in enterprise capacity external resources and propose a new identification strategy. In this sense, Almeida and Campello (2007) explored the role of asset tangibility in the firm's ability to obtain external resources. Thus, the authors propose that the cash flow sensitivity of the investment is an increasing function of the tangibility of the assets for companies considered restricted, being denominated by the authors as a multiplier effect of credit. Their results pointed out that financial constraints affect investment decisions, in a way similar to what was previously found, but now with improved results in relations the criticisms made to the studies of Fazzari, Hubbard and Petersen (1988), avoiding measurement errors in the Tobin´s Q variable.

In Brazil, empirical evidence also suggests that credit constraints play a key role in corporate investment decisions, but he results are divergent. Kirch et al. (2014) point out that the main caveat that can be made

to these studies in the Brazilian reality is the non-treatment of what has been one of the strongest criticisms of investment models that incorporate cash flows as a explanatory variable: measurement errors in the investment opportunities variable. This constraint casts doubt on the evidence that cash flows influence the demand for investments of Brazilian firms by increasing the internal availability of resources of firms with limited access to credit (KIRCH et al., 2014).

So, in order to get around this problem, Kirch, Procianoy and Terra (2014) aimed to test the relationship between credit and investment restrictions of Brazilian firms, using the strategy outlined by Almeida and Campello (2007). The results suggest that companies classified as non-restricted generally behave exactly as the neoclassical model predicts, i.e., the demand for investments is sensitive only to investment opportunities of firms. The companies classified as restricted, behave as the model of Almeida and Campello (2007) predicted, that is, the investments are sensitive to the internal cash flow, being in function of the tangibility of the assets. The authors argued that these results differ substantially from those evidenced in previous studies in Brazil and constitute original evidence of the existence of the multiplier effect of credit at the firm level.

Recently, some studies have advanced in identify in the cash flow sensitivity of investment by proposing its analysis through different time dimensions (short and long term), in the differentiation between investments and financiers and also in the maximizing / minimizing factors of firm financial constraints.

In this context, Peres and Kirch (2017) sought to identify the relationship between financial constraint and the allocation of internally generated financial resources (cash flow) in investment and no-investment (projects that do not self-configure as a real investment project) in the short and long term. The authors go further to identify that, considering different time dimensions, restricted and unrestricted companies receiving a positive shock in their cash flows retain cash in the contemporary period and al locate it intertemporally as well as in the short term the cash flow sensitivity of investment shows larger for restricted companies than for unrestricted companies, while in the long run it is larger for unrestricted companies. However in the aggregate (t, t-1, t-2) the credit constraint provides greater sensitivity to investment. These results demonstrate the importance of considering the differentiation that may exist when considering different temporal dimensions.

Additionally, another study that promotes a breakthrough in the literature is Silva (2017), as its ought to identify there lationship between credit restriction and borrowing by the National Bank for Economic and Social Development (BNDES). The authors found that there was financial constraint for both firms that financed their capital structure through BNDES and those that did not use this source of credit, but the magnitude of the constraint was greater for companies that borrowed from BNDES. Moreover, this study points out that in the 2008 financial crisis, the presence of BNDES financial resources in these companies contributed to reduce the financial constraint, while the non-borrowing companies were more constrained. These findings confirm the role of the development bank operating in companies that haves hown the greatest need for capital, as well as reducing financial constraints in times of crisis (SILVA, 2017).

Another restrictive fact in the analysis is the non-consideration of external shocks, where the effect of a negative exogenous shock can amplify the adverse effects of financial constraint on corporate investment (ALMEIDA; CAMPELLO, 2010). Such effects should be particularly severe for financially constrained firms, resulting in a further decline in investments for these firms (ie under conditions of uncertainty, such as in times of economic crisis, restricted firms may be even more susceptible to this sensitivity of the firm). cash flow investment) (KAPPEL et al., 2019).

Following this line, Kappel et al. (2019) sought to investigate the effects of economic crises on corporate investment decision-making in Brazilian firms from 1995 to 2015. The authors use the strategy that negative shocks to the external financing offer, coupled with the presence of financial frictions, can hinder investment if companies do not have sufficient financial slack to fund all attractive investment opportunities.

Thus, Kappel et al. (2019) identified results in line with the basic empirical strategy of Fazzari, Hubbard and Petersen (1988), that is, a dependency relationship between investment and cash flow for restricted

firms, while unrestricted firms do not signal market sensitivity. investment to cash flow. However, when analyzing the effect of the economic crisis, the authors reported a negative sensitivity of cash flow investment to restricted firms (interaction between cash flow and economic crises); whereas investments by unrestricted firms remain insensitive to cash flow in recessive periods, suggesting that economic downturns affect corporate investments and the effects are amplified for constrained firms.

Based on the development of the theoretical assumptions related to the cash flow sensitivity of the investment and in order to test the hypothesis of FHP (1988), the following hypotheses were developed:

H0: Brazilian companies classified as financially restricted have more cash flow sensitivity of investment than unrestricted companies.

2.2 THE CASH FLOW SENSITIVITY OF CASH

As mentioned before, the discrepancy between financing costs (internal and external) is a reflection of the probability of a firm's financial constraint. According to Zani (2005) and Chalhoub et al. (2015), the discussion about the factors that lead companies to retain a certain level of cash is increasingly frequent in the business finance literature. In this same context, Opler et al. (1999) questioned whether there is an optimal level of net assets to be maintained. These authors point out two main benefits of holding cash. First, the company saves transaction cost storaise funds and does not need to settle assets to make payments, and second, the company can use the net assets to finance its activities and investments if other sources of financing are not available or are excessive ly onerous. Thus, the costs of access to external resources lead firms to use cash and liquid assets as a reserve, avoiding the dependency on their access to the external market (OPLER et al., 1999).

Opler et al. (1999) have identified that companies with large amounts of cash surplus have acquired it through the accumulation of internal funds. In this context, Almeida, Campello and Weisbach (2004) sought to capture the effect of financial constraints on the company's propensity to save money from cash flows (the cash flow sensitivity). Thus, the authors assume that the restricted firms should have a positive cash flow sensitivity of cash, while the cash retentions of the unrestricted companies should not present a systematic propensity to with hold cash, thisis due to the fact that the changes in liquidity should depend either on the current cash flow snor on future investment opportunities. Therefore, the great difference in implicit cash policies between restricted and unrestricted companies allowed to formula tean empirical prediction about the effect of the restrictions on the financial policies of the companies (ALMEIDA; CAMPELLO; WEISBACH, 2004).

These authors sought to detect the behavior of cash holdings to cash flow to companies classified as restricted, based on five criteria: (i) dividend policy; (ii) size of the asset; (iii) credit rating; (iv) commercial papers; and, (v) KZ index of Kaplan and Zingales (1997). The authors' intuitionis to try to capture if the demand for liquidity emerges as a way to en sure that the company will be ready to invest in an imperfect market, thatis, have there sources to finance projects even when the external costs of capture are high. For unrestricted companies, the relationship between these variables would benulldue to the lack of cash (ALMEIDA; CAMPELLO; WEISBACH, 2004; PERES; KIRCH, 2017).

As expected, the results foundby Almeida, Campello and Weisbach (2004) suggest that the cash flow sensitivity of cash is positive for restricted companies, thatis, restricted firms have greater cash holdings to finance future investments. The authors verified this relation for four of its five forms of classification for financial restriction, being the KZ index the only one to prove the opposite. Subsequently, some studies such as Acharya, Almeida and Campello (2007), Han and Qiu (2007) and Almeida, Campello and Weisbach (2011) extend the model proposed by Almeida, Campello and Weisbach (2004) confirming their results. Specifically, Acharya, Almeida and Campello (2007), improved the model of Almeida, Campello and Weisbach (2004) by considering the firm's hedge needs, cash policies and also debt.

In Brazil some studies such as those by Chalhoub et al. (2015), Byrro and Bressan (2016), Tortelli and Moraes (2016), Manoel (2016), Dutra et al. (2018),Kappel et al. (2019) sought to identify the determinants of cash retention as well as their relationship to credit crunch periods.

Initially, Chalhoub et al. (2015) Aimed at identifying the main sources of cash retention by publicly traded companies traded on B3 between 1995 and 2013. They find that the main source of cash withheld in Brazil is the operational cash flow for the entire sample and for both groups unrestricted and financially restricted firms. For the latter, the authors used the criterion of size (total assets) and sector (for each year and sector of the sample period) to classify the firms as restricted (3 deciles lower) and not restricted financially (3 deciles higher).In all estimates, there was a positive relationship between cash variation and net resources from the issue of shares, the variation in indebtedness and the operating cash flow, with the coefficients of the three sources quite close to each other. This fact indicates that there is a positive cash flow sensitivity of companies classified as restricted or unrestricted, that is, even firms that have unrestricted access to external (less restricted) financing depend on the generation of internal cash flow.

According to Byrro and Bressan (2016), we can observe in Brazil, in recent years, periods with different macroeconomic realities, in which these differences can be considered exogenous, allowing to identify more restricted and less financially restricted periods. Thus, in the same way as Almeida et al. (2004), Garbe (2015) and Dahrouge and Saito (2013), Byrro and Bressan (2016) also link the cash flow sensitivity model with macroeconomic factors, in which they attribute changes in cash policies arising from exogenous shock brought on by the 2008 financial crisis.

Still in the context of crisis, Dutra et al. (2018) point out that after the 2008 crisis, Brazilian firms had a considerable reduction in their cash level (similarly to US firms PINKOWITZ; STULZ; WILLIAMSON, 2015). Thus, by analyzing historical cash retention data, Dutra et al. (2018) found a rise in the pre-crisis period, reaching its peak in 2009, after which there was an abrupt fall and a smoothing from 2010 to 2015.

The influence of the 2008 crisis on credit restraint is tested by Manoel (2016), who showed that organizations' cash level is impacted by the level of their financial constraint, as well as by crisis contexts, where companies raised their reserves under such a scenario, corroborating with Dutra et al. (2018). Unlike Manoel (2016), Kappel et al. (2019), after dividing the sample into restricted and unrestricted, subdivide the sample again according to the median of net assets (i.e. restricted and more liquid, restricted and less unrestricted and more liquid, unrestricted and less liquid) suggest that the level of net assets does not exert an attenuating effect on the dependency relationship between investment and cash flow for restricted firms in times of crisis and for unrestricted firms, the level of net assets did not influence the relationships investigated, rejecting their initial hypotheses (KAPPEL et al., 2019). These results contradicted his hypothesis that retention acts as a moderating effect on the creditworthiness of restricted firms, given that in times of crisis there is greater caution and encouragement to accumulate reserves for future investments.

According to the authors, these results allow us to speculate that liquidity and cash generation inventories will be directed to withstand the commercial adversity of the crisis, reinforcing working capital investments, since investment in capacity expansion is only justified if there is commercial expansion (KAPPEL et al., 2019).

Finally, according to Almeida, Campello and Weisbach (ACW, 2004), there is evidence that cash flow sensitivity of cash systematically varies with proxies for financially constrained firms, which is less ambiguous and more consistent evidence of financial constraints than investment.

Based on the development of the theoretical assumptions related to the cash flow sensitivity of cash and to test the ACW (2004) assumption, the following hypothesis is formed:

H_1: *Brazilian companies classified as financially restricted have more cash flow sensitivity of cash than unrestricted companies*.

Finally, in order to compare the two models, the following hypotheses are formulated:

H_2: *Financially restricted companies use more their cash flow for investment in capital goods*;

H_{2A}: *Financially restricted companies use more their cash flow for cash holding.*

3 METHODOLOGICAL ASPECTS

The present study is characterized as descriptive-bibliographic with a quantitative nature. The sample consists of secondary and annual data covering Brazilian companies listed in B3, between 2010 and 2015. The sample consists of 95 companies or 570 balanced observations (the threshold only accepts balanced data). The software used is Stata-SE.

In this sense, to analyze the cash flow sensitivity of the investment and cash to Brazilian publicly traded companies, a descriptive statistics and a correlation analysis were made. Afterwards, OLS regressions were performed using the Threshold method developed by Hansen (1999), considering the possibility of heterogeneity in the coefficients of the equations. This method allows the separation of the sample to be done in a non-arbitrary way (unlike the other articles that explore the subject of financial constraints), allowing methodological advances in comparison with Fazzari, Hubbard and Petersen (1988) and Almeida et al. (2004).

To understand the method, first was defined the regression equations in its simplest form (1), considering the same number of variables required in the use of the method in this study.

$$Y_{it} = a_i + \beta_1 X_{it} + \beta_2 Z_{it} + \beta_3 W_{it} + \varepsilon_{it} \tag{1}$$

In (3), Y is the dependent variable, X, Z and W are the independent variables, α, β_1, β_2 and β_3 represent the coefficients of the regression equation and ε the error. The index i represents each cross-sectional unit, and t is the period considered. In this study two equations are used to apply the Threshold model, and the only difference between them is the dependent variable. In the first equation, the dependent variable is the Cash holdings (Δ Cash) on the Total Asset (TA) and in the second the CAPEX (Capital Expenditures) on Total Assets. In both cases, the independent variables are: Cash Flow, Tobin's Q and Total Assets. As Threshold variables for financial constraints, are considered the dividends paid, size (AT), Z-score and KZ-index.

The Threshold model investigates whether there are, and how many regimes exist in the range considered, where the coefficient can vary. To illustrate the model, it is assumed that there are two distinct regimes (a Threshold effect, evidenced in equations 2 and 3), forming the equation (4):

$$\delta_k = 1 \text{ when } W_{it} \leqslant \lambda \tag{2}$$

$$\delta_k = 0 \text{ When } W_{it} > \lambda \tag{3}$$

$$Y_{it} = a_i + \beta_1 X_{it} \, \delta_1\{W_{it}, \leqslant, \lambda\} + \beta_2 Z_{it} \, \delta_1\{W_{it}, \leqslant, \lambda\} + \beta'_1 X_{it} \, \delta_2\{W_{it}, >, \lambda\} + \beta'_2 Z_{it} \, \delta_2\{W_{it}, >, \lambda\} + \beta_3 W_{it} \, \delta_1\{W_{it}, \leqslant, \lambda\} + \beta'_3 W_{it} \, \delta_1\{W_{it}, \leqslant, \lambda\} + \varepsilon_{it} \tag{4}$$

Where λ is the parameter Threshold, β_1, β'_1, β'_2, β_3, and β'_3 the coefficients of the regression model.

The estimation of Threshold parameters λ follows the methodology proposed by Hansen (1999), in which it operates with successive applications of the Ordinary Least Squares method, and the selection of the parameters is given by the smaller sum of the square of the residuals. The test for the existence of a Threshold effect, that is, $\beta_1 \neq \beta'_1$ is used the Lagrange multiplier test statistic (LR), which is robust to heteroscedasticity and has its critical values determined by a bootstrap procedure. When the Threshold effect is statistically

relevant in equation (4), it is understood that there are two regimes, where the relations between the dependent variable and the independent ones are different. Otherwise, the most appropriate model is given by equation (1).

In the case of three or four regimes, the model structure is similar to (4), but with λ_1 and λ_2 or λ_1, λ_2 e λ_3 being the Threshold parameters, so that the LR test will be applied to determine which model is the most appropriate. In this case, there are three pre-defined regimes, used to classify the companies into financially restricted and unrestricted.

The Threshold method was used because it has the possibility to indicate the most significant structural breaks, which imply in better results, compared to the case where the breaks are pre-defined by the quartiles, so this is one of the points where this study presents an advance methodological approach.

To perform the data analysis, the equations of each model are considered, first the investments, and then the retention of cash and, in each equation, a different Threshold variable is used. Then, the R^2 of each equation is observed, in order to find which Threshold variable is more adequate, considering the Brazilian reality. Thus, at the end of this stage of analysis, an equation of each model listed as the most adequate is found. Such equations may have the same Threshold variable, or not. Table 1 provides a more detailed description of the variables used in the study.

The regression models are described in Equations (5) and (6).

TABLE 1
Variables of the model.

Table 1 – Variables of the model.		
Dependent Variables		
Variable	Equation	Authors
Cash Holdings	$\dfrac{Cash - Cash_{t-1}}{Total\ Assets}$	Almeida, Campello and Weisbach (2004),
CAPEX	$\dfrac{Capital\ expenditures}{Total\ Assets}$	Fazzari, Hubbard and Petersen (1988),
Independent Variables		
Variable	Equation	Authors
Cash Flow	$\dfrac{EBIT\ (1 - taxes) + Deprec}{Total\ Assets}$	Opler et al. (1999), Almeida, Campello and Weisbach (2004)
Tobin´s Q	$\dfrac{(MVE + PS + D)^1}{Total\ Assets}$	Fazzari, Hubbard and Petersen (1988), Kaplan and Zingales (1997), Kadapakkam et al. (1998), Almeida and Campello (2007)
Size	$ln\ (Total\ Assets)$	Almeida, Campello and Weisbach (2004)
Threshold Variables		
Variable	Equation	Authors
Z-score[2]	$Z = 1,2\left(\frac{CG}{AT}\right) + 1,4\left(\frac{LA}{AT}\right) + 3,3\left(\frac{LAIR}{AT}\right) + 0,6\left(\frac{VM}{PT}\right) + \frac{V}{AT}$	Altman (1984)
Dividends	$ln\ (Dividends\ Paid)$	Fazzari, Hubbard and Petersen (1988), Almeida
Size	$ln\ (Total\ Assets)$	Kadapakkam et al. (1998), Almeida, Campello and Wisbach (2004)
KZ-index[3]	$KZ = 1,002FC + 0,283Q + 3,139AL - 39,368D - 1,315\Delta Cx$	Kaplan and Zingales (1997)

Elaborated by the authors.
Legend: [1]Chung and Pruit (1994) equation, where MVE is the firm's share price multiplied by the number of common shares outstanding, PS is the settlement value of the preferred shares outstanding, and D is the

total debt (Current Liabilities minus current assets plus inventories and long-term debt); [2] CG: Working Capital; AT: Total Assets; LA: Accumulated Profits; LAIR: Profits before taxes; VM: market value; PT: Total Equity; V: Sales; [3] CF: Cash Flow; Q: Tobin's Q; AL: Leverage; D: Dividends Paid; ΔCx: Change in cash.

$$\text{Capex}_{it} = a_i + \beta_1 \text{CashFlow}_{it} + \beta_2 \text{Tobin's Q}_{it} + + \beta_3 \text{Size}_{it} + \varepsilon_{it} \quad (5)$$

$$\Delta \text{Cash}_{it} = a_i + \beta_1 \text{CashFlow}_{it} + \beta_2 \text{Tobin1sQ}_{it} + + \beta_3 \text{Size}_{it} + \varepsilon_{it} \quad (6)$$

The equation (5) refers to the investment model and Equation (6) refers to the cash holdings model. The analysis of the data is done in stages, first analyzing the equations referring to the investment model and afterwards, analyzes are made in the same structure, considering the cash retention model. Finally, a comparison is made using the representativeness of each equation, listing the most representative of each model.

4 ANALYSIS OF RESULTS

To better describe the results, the following section is divided into four parts, as follows: (i) Descriptive statistics and correlation; (ii) Analysis of the cash flow sensitivity of investment (iii) Analysis of the cash flow sensitivity of cash; and, (iv) Comparison between the cash flow sensitivity of investment and cash.

4.1 DESCRIPTIVE STATISTICS AND CORRELATION

As identified in the methodology, before the results, the correlation analysis between the variables is verified, and subsequently, the consistency of the data is verified through the descriptive statistics. By the analysis, no correlation greater than 0.7 is identified, that is, none of them is highly correlated with the others. This fact leads to the belief that all variables can be considered in the analysis.

TABLE 2
Descriptive Statistics.

Statistics	Capex	ash	CF	Tobin'sQ	T. Assets	Size	Dividends	Z-score	KZ
N	570	570	570	570	570	570	570	570	570
Mean	0.0547	0.0061	0.0768	0.7564	25.6285	1.4945	11044.7000	9.3482	-18.6333
Median	0.0534	0.0038	0.0539	0.4727	4.8723	1.5835	206.2600	8.6478	-1.6836
p10	0.0028	-0.0404	0.0071	0.1046	0.4566	-0.7843	0.0100	3.5001	-29.4499
p25	0.0256	-0.0138	0.0201	0.2343	1.1347	0.1264	0.0100	5.8413	-6.8954
p75	0.0812	0.0289	0.1121	0.9527	14.8462	2.6977	3931.3500	11.2099	-0.3026
p90	0.1121	0.0599	0.1822	1.6957	48.8521	3.8887	12853.5000	15.8371	-0.0038
Variance	0.0045	0.0032	0.0052	0.7501	8445.2750	3.4957	18064.9800	58.2608	5619.4300
Min	-0.5487	-0.2771	0.0000	0.0026	0.0165	-4.1036	0.0100	-17.4171	-835.2200
Max	0.4023	0.4409	0.3326	6.3778	931.562	6.8368	579233.5000	58.3684	2.8617
Sd	0.0669	0.0563	0.0723	0.8660	91.8981	1.8697	47223.4000	7.6328	74.9628
Skewness	-2.3049	0.4890	12.6698	2.7602	7.4428	-0.0653	7.7100	1.9461	-7.6628
Kurtosis	25.4348	14.8017	4.0731	12.8348	63.6986	3.3497	74.8800	13.1294	69.8524

In terms of descriptive statistics, as observed in Table 2, it is verified that there is a disparity between the mean and the median only in the variable Total Asset (TA), for that reason, it is necessary to transform this variable through the logarithm. The others presented these two indexes very close. Moreover, it is observed that the kurtosis of all variables is greater than 3, indicating that the distribution is leptokurtic. In the variables related to Capex and KZ-index, the asymmetric distribution is negative, where the mean is lower than the median, in the other variables, the asymmetric distribution is positive (when correcting the AT variable through the neperian logarithm, this variable presented asymmetry negative but very close to zero).

On average, capital expenditures represent 5.47% of TA, and cash holdings represents 0.61% of this variable. The cash flow of the companies represents 7.69% of the TA, and the market value represents 75.64% of the book value, indicating that the companies are undervalued in the market. The companies, on average, have assets around R$ 25 million, and they pay R$ 11 million in Dividends annually. It is evidenced that the companies with the most financial difficulties by the Z-score (below the 25th percentile) are those that have a value lower than 5.84 in this index, while those with less restricted ones (above the 75th percentile) are those that have this index above 11.21. The sample, in this index reached an average of 9.35, which indicates that the companies are in the gray zone, that is, in the middle between unrestricted and financially restricted. In the case of KZ-index, the analysis is inverse, companies that are below the 25th percentile (-6.89), are unrestricted and companies that are above the 75th percentile (-0.30) are the most restricted financially. In this index, Brazilian companies are, on average, unrestricted financially.

4.2 ANALYSIS OF THE CASH FLOW SENSITIVITY OF INVESTMENT

According to the methodology, the first part of the analysis considers investments in capital goods as a dependent variable, then, since it is intended to non-arbitrarily classify the financially restricted and unrestricted companies, applying a panel data model with structural breaks (Threshold). It is also considering the R^2 value of each regression equation, being the form of comparison between the equations in the last step of the analysis. Table 3 shows the structural breaks tested where fist column indicates the number of breaks (single, double or triple). In the second and the third one, were presented the sum of the squares of the residuals and the values of the possible structural breaks. The F-test and the p-value are presented in the fourth and fifth columns and, finally, the critical values at 10%, 5% and 1% are shown in the last columns.

It is observed that, in the first part of Table 3, referring to the variable Dividends, there are no significant p values, that is, there is no structural break. This result differs from Almeida and Campelo (2004), probably due to peculiarities of Brazil, since there is a convention of Brazilian companies to pay a minimum of 25% of the net profit in dividends, resulting from article 202 of Law 6404/76 (S.A. Law), bringing a certain stability to these values, for this reason, there will be no structural breaks for this variable.

In the second part, referring to total assets, there is one structural break in -16.12, significant to 1%, thus, companies whose the logarithm of total assets is less than -16.12 tend to be financially constrained, corroborating with Almeida and Campelo (2004) and Kadapakkam et al. (1998), who considered this variable as a consistent measure for the classification of companies into financially restricted and unrestricted.

In the third part, referring to the Z-score, there is one structural break, in 20.98, significant to 1%, therefore, two regimes can be identified. According to the definition of Altman (1984), the low Z-score indicates high risk of bankruptcy and the high Z-score indicates the low risk of bankruptcy, that is, the lower the Z-score, the greater the financial constraint faced by the company and vice-versa.

TABLE 3
Threshold of the investment model

Investment	RSSa	Thresholdb	F	p	10%c	5%c	1%c
Dividends							
Simple	0.8408	119.5040	9.4900	0.5667	18.9704	19.8707	20.1134
Double	0.8244	44.0960	11.2400	0.4400	22.2630	30.7167	61.8949
Triple	0.8118	34.3860	8.7100	0.6000	20.3339	24.3855	39.4731
Total Assets							
Simple	0.7657	-16.1210	65.7200	0.0000***	27.5009	33.5249	37.8214
Double	0.7214	-16.1210	34.6800	0.2600	79.5707	87.6425	110.3334
Triple	0.7010	29.1300	16.3900	0.5400	71.7715	86.2124	113.8584
Z-Score							
Simple	0.7864	209.8090	49.1500	0.0000***	19.5590	25.2436	30.4849
Double	0.7652	209.8090	15.6300	0.4200	58.0074	80.1696	85.2936
Triple	0.7491	-16.9430	12.1600	0.5000	54.7764	70.9666	90.3086
KZ-Index							
Simple	0.8351	0.0060	13.4100	0.3600	22.2121	30.3367	30.6780
Double	0.8168	0.1412	12.6600	0.3400	20.3807	25.2190	34.5909
Triple	0.8049	-136.7024	8.3600	0.7200	22.3352	24.4798	28.6104

Elaborated by the authors.
Legend: a: Sum of squares of residues; b: Threshold cut; c: Critical value at 10%,
5% and 1%. * - significance at 10%; ** - Significance at 5%; *** - Significance at 1%.

Finally, according to the definition of Kaplan and Zingales (1997), KZ-index indicates that the higher its value, the more financial difficulties the company presents. However, according to Table 3, there is no structural break for this variable and, therefore, this measure is not adequate to classify the companies in restricted or unrestricted. This result corroborates with the findings of Almeida and Campello (2004), who also did not find significance for this variable in any analysis.

TABLE 4
Threshold of the investment model

	Total Assets		Z-Score		
	0 Threshold	1o Threshold	0 Threshold	1o Threshold	
Constant	-0.0247 *		0.0023		
T	(-1.6800)		(0.1600)		
CF	0.6196	-0.1434 **	-0.1299 ***	-0.0515	
T	(1.1600)	(-3.2900)	(-2.9100)	(-0.2400)	
Tobin's Q	-0.0053	0.0137 **	0.0087	0.0317 **	
T	(-0.3800)	(2.4200)	(1.6300)	(2.3900)	
Size	-0.0602 ***	0.0465 ***	0.0366 ***	-0.0652 ***	
t	(-3.7900)	(5.5600)	(4.4700)	(-3.7700)	
R²	0.1100 F	12,2900***	R² 0,1000 F	9,9100***	

Elaborated by the authors.
Legend: * - significance at 10%; ** - Significance at 5%; *** - Significance at 1%.

Table 4 shows the coefficients of the equation CFs in the two regimes: 0 or 1 Thresholds. For the model based on Total Assets, the variable Cash Flow (CF) is not significant for the restricted companies, however, it is observed that the coefficient of the variable is positive, which indicates that the higher the CF, the more investments the company performs. The same occurs for the Tobin´s Q variable in the first regime, but with a negative sign, which indicates that the greater the growth opportunity of the company, the less capital investments it performs. For the variable Total Asset (TA), the coefficient is significant at 1% in the first regime, which indicates that, for financially restricted companies, a 1 percentage point increase in company size generates a decrease of 0.60 percentage points in capital goods investments. This inference was also reported by Fazzari, Hubbard and Petersen (1988) when finding a positive coefficient in the variable CF and negative in the Q variable of Tobin, in the case of restricted companies.

For the financially unrestricted companies, according to Table 4, the coefficient of the CF variable is significant at 1%, which indicates that, in the case of financially unrestricted companies, the increase of 1percentage point in the CF, generates a decrease of 1.43 percentage points in the investment in capital goods. These findings contradict both Kaplan and Zingales (1997) and Fazzari, Hubbard and Petersen (1988) results, which are positive for companies with financial constraints.

The coefficient of Tobin's Q for unrestricted companies was also significant at 5%, which indicates that the 1 percentage point increase in investment opportunities for companies with no financial restrictions, generates a 0.01 percentage points increase in investments in capital goods, corroborating the results of Kaplan and Zingales (1997) and Fazzari, Hubbard and Petersen (1988), who also found a positive coefficient for the Tobin´s Q. Finally, the coefficient of the variable TA is also significant at 1%, which indicates that, in companies without financial restrictions, the increase of 1 percentage point in its size, increases in capital goods by 0.05 percentage points.

Therefore, it can be seen that all results are opposite for restricted and unrestricted firms. For the restricted companies, the lower the TA, the more investments the company makes, while for the unrestricted companies, the higher the TA, the more the company makes investments. For CF and Tobin´s Q, the results are not clear, since the coefficients for the restricted firms are not significant, but even in these cases, the coefficients have opposite signs. This result corroborates with Kadapakkam et al. (1998), since the cash flow sensitivity of investment is significant only in the case of financially unrestricted firms, but if the signals and values of the coefficients are observed, it can be considered that the higher values indicate that the CF is higher for the restricted and Tobin's Q is higher for unrestricted firms, which indicates the same result found by Fazzari, Hubbard and Petersen (1988).

According to Table 4, for the model using Z-score, the restricted companies (first regime) presented a negative and significant relation to 1%, which indicates that, for companies with a financial constraint, the increase of 1 percentage point in the CF, generates a decrease of 0.13 percentage points in investments in capital goods, according with Fazzari, Hubbard and Petersen (1988), which found a positive coefficient for companies with greater financial constraints. For the Tobin´s Q, the coefficient for unrestricted firms is not significant. In the case of TA, the coefficient is significant at 1%, which indicates that the 1 percentage point increase in the size of companies with financial constraints increases capital goods investments by 0.04 percentage points.

In the second regime, that is, for companies that do not have financial restrictions, the CF is not significant, unlike the other variables. Tobin's Q is significant at 5%, which means that, for companies with no financial constraints, the 1 percentage point increase in investment opportunities generates a 0.03 percentage points increase in capital goods investments, according to the results found by Kaplan and Zingales (1997). The TA also presents a significant coefficient at 1%, which indicates that, for unrestricted companies, a 1 percentage point increase in size generates a decrease of 0.06 percentage point in capital goods investments.

Therefore, it is noted that the largest difference occurs in the variable referring to size where, in both coefficients, are significant and with opposite signs, showing that, for restricted companies, the higher

the TA, the larger the investments, and for unrestricted companies, the higher the TA, the smaller the investments. In the case of the other variables, it is noted that the higher the CF for companies with financial restrictions, the smaller the investments, a similar but not significant result was found for unrestricted companies. It is worth mentioning that the coefficient of CF for restricted companies is more than double the coefficient for unrestricted companies. Finally, it is perceived that, the greater the investment opportunities, both restricted and unrestricted companies invest more in capital goods, but only the second one was significant. This result is in line with Fazzari, Hubbard and Petersen (1988).

4.3 ANALYSIS OF THE CASH FLOW SENSITIVITY OF CASH

In order to analyze the cash flow sensitivity of cash, the same steps of subsection 4.2 were developed. Table 5 shows that, in the first part, referring to Dividends, there is no significant p value, that is, there is no structural break, proving, once again, that this is not a variable that presents significant breaks in the analysis of the Brazilian reality.

In the second part, using the logarithms of TA as determinant for the structural break, is identified that this variable has two breaks, that is, three regimes are found, that occur in -16.12 and -14.26, at 5% and 1% significance, respectively. According to the definition of Kadapakkam et al. (1998), the first interval will indicate companies with greater financial constraints, the second range, companies with few financial constraints and the third, with no financial constraints.

TABLE 5
Threshold of the cash holdings model

Cash holdings	RSSa	Thresholdb	F	p	10%c	5%c	1%c
Dividends							
Simple	10.1720	87.8960	12.7700	0.2200	16.7501	24.4120	37.7722
Double	10.0690	87.8960	5.8000	0.7000	17.7663	22.0856	36.4801
Triple	0.9955	57.8640	6.4800	0.8200	20.4302	25.6725	30.8514
Size							
Simple	13.7330	-16.1210	35.1900	0.0400 **	28.6813	35.0806	42.9976
Double	12.2360	-14.2600	69.0000	0.0000***	34.4070	45.8247	52.6444
Triple	11.9600	-13.2140	12.9800	0.3200	20.2597	24.1863	46.1832
Z-Score							
Simple	0.9619	270.6030	45.9200	0.0400**	25.6286	29.1513	53.8480
Double	0.9311	270.6030	18.7000	0.2000	37.1913	49.0097	83.5036
Triple	0.9072	73.6790	14.8400	0.3600	29.8791	54.2967	109,0776
KZ-Index							
Simple	10.2570	-136.7024	8.0200	0.5000	15.9421	17.0457	20.4517
Double	10.0460	0.0846	11.8600	0.3600	20.9523	24.1665	36.1068
Triple	0.9897	0.0622	8.4500	0.5200	19.0717	28.1259	50.3046

Elaborated by the authors.
Legend: a: Sum of squares of residues; b: Threshold cut; c: Critical value at 10%,
5% and 1%. * - significance at 10%; ** - Significance at 5%; *** - Significance at 1%.

In the third part, using the Threshold variable Z-score, a measure defined by Altman (1984), it is found that the most suitable model is with a structural break at point 27.06, at a significance level of 5%. As already

mentioned, the low Z-score indicates a high risk of bankruptcy and the high Z-score indicates a low risk of bankruptcy. In the last part, the KZ-index also did not present structural break, indicating that this variable is not propitious to be used in the model.

According to Table 6, by the logarithm of TA as a Threshold, in all analyzes, the CF positively influences the cash holdings, regardless of the financial constraint, that is, the higher the CF of the companies, the higher the cash holdings, and for the most restricted companies this variable was not significant. In this sense, the increase of 1 percentage point in CF generates a 0.74 percentage points increase in cash variation for companies with few financial restrictions, at a significance level of 1%. For unrestricted companies, the 1 percentage point increase in this variable generates a 0.45 percentage points increase in cash retention, at 1% of significance. This result is in agreement with Almeida, Campello and Weisbach (2004), who found positive coefficients, however, were only significant in the case of companies with financial restrictions.

TABLE 6
Threshold of the cash holdings model

	Total Assets			Z-Score		
	0 Threshold	1o Threshold	2o Threshold	0 Threshold		1o Threshold
Constant	-0.0359			-0.0443	**	
t	(-1.6200)			(-2.8800)		
CF	0.4016	0.7430 ***	0.4528 ***	0.4724 ***		0.6655 ***
t	(1.3100)	(5.2100)	(8.8100)	(9.6400)		(4.6600)
Tobin's Q	0.0126	-0.1038 ***	0.0072	0.0051		-0.0234
t	(0.8500)	(-3.6800)	(1.0800)	(0.8400)		(-1.0400)
Size	0.0295 *	0.0649	0.0066	0.0068		0.1180 ***
t	(1.8000)	(1.4500)	(0.5600)	(0.7600)		(5.9200)
	R² 0.0900	F 13.0200***		R² 0.1400	F 22.7700***	

Elaborated by the authors.
Legend: * - significance at 10%; ** - Significance at 5%; *** - Significance at 1%.

In terms of investment opportunities, both for financially more restricted and the unrestricted, this variable is positively related to the cash holdings, but they were not significant. For the few restricted companies, the 1 percentage point increase in Tobin's Q leads to a 0.1 percentage points decrease in cash variation, at a significance level of 1%. This result was the opposite found by Almeida, Campello and Weisbach (2004), since the coefficient of Tobin's Q, using the logarithm of TA as a classification for restricted and unrestricted companies, was positive for all companies and significant only for companies with financial constraints.

Finally, for the size, an increase in TA generates an increase in the cash change for all regressions analyzed, and was only significant for the most financially constrained companies. This inference was also made by Almeida, Campello and Weisbach (2004), but with significance for all companies.

In addition, considering the Z-score as a threshold, for restricted companies, only the CF variable is significant at 1%, which indicates that the 1 percentage point increase in CF increases the cash holdings by 0.47 percentage points. For the variables related to investment opportunities and size, the coefficient is positive for companies with financial constraints, but it is not significant.

Considering the financially unrestricted companies, the coefficient for the CF variable was significant at 1% where, for these companies, the increase of 1 percentage point in the CF generates an increase of 0.67 percentage points in the cash holdings. The coefficient of Tobin's Q is negative but not significant. Finally, for size, the coefficient is positive and significant at 1%, indicating that, for companies without financial

restrictions, the increase of 1 percentage point in the TA generates an increase of 0.12 percentage point in the cash holdings.

4.4 COMPARISON BETWEEN THE CASH FLOW SENSITIVITY OF INVESTMENT AND CASH

After analyzing all the equations separately, the value of R^2 is used to verify which model was most representative to identify the predominant behavior in Brazilian companies. Considering the AT variable, the investment model presented a one and the model of the cash holdings two structural breaks. Table 4 shows that the value of R^2 is statistically higher at 5% in the capital goods investment model (11.17%) compared to the cash change model (8.85%), which may indicate that this is the most representative model, pointing out that a positive CF is destined for investment in capital goods for the restricted companies, since these firms have more difficulty obtaining third-party capital, corroborating with Fazzari, Hubbard and Petersen (1984) and contrary to the studies of Kaplan and Zingales (1997). For unrestricted companies, the opposite occurs, because they are more open to third-party capital, they end up investing less in their own resources from a positive CF.

The relationship between CF and cash holdings, considering TA as a structural break, showed curious results. Although all the regimes presented positive relations between these two variables, the results were presented an inverted U format, where the companies with few financial constraints presented higher withholdings in comparison to the more restricted and unrestricted companies, contrary to the studies of Almeida, Campello and Weisbach (2004) for the American context.

Comparing the two regressions, it can be seen that the most restricted companies use the results of the CF for both investments and cash retention, since they have more difficulties to obtain resources from third-parties. Unrestricted companies, however, choose to use for cash holdings more than for investments, since they can more easily obtain third-party resources.

Now, considering the Z-score as a structural break, in both models, the variable presented only one break. Based on the R^2 values related to the investment (9.89%) and the cash holdings (14.28%), it can be observed that the second model has a greater explanatory power, and this difference is significant at 5%. In this case, for both restricted and unrestricted companies, the higher the CF of the companies, the greater the cash holdings, and the proportion is higher for financially unrestricted companies.

This result contradicts the studies of Almeida, Campello and Weisbach (2004), who stated that companies with more financial restrictions opt to retain more cash, avoiding possible financial contingencies, since they have more difficulties in obtaining financing. Considering the Z-score in relation to investment, it can be seen that, for both restricted and unrestricted firms, the CF was negatively related to this variable, and the more restrictive companies end up investing relatively less, indicating that firms that have more gains, use less these resources for investments and more for cash holdings.

5 FINAL REMARKS

In order to analyze the cash flow sensitivity of the investment as well as the cash flow to cash, taking into account the financial constraint faced by the companies, four variables were used in order to classify, in a non-arbitrary way, the companies as financially restricted and unrestricted , through regressions by Hansen's Threshold method (1999). The results of the analyses performed separately were similar to those found by Fazzari, Hubbard and Petersen (1984), in the case of the relation with the investments in capital goods and those of Almeida, Campello and Weisbach (2004) in the case of the relation with the cash holdings.

However, in the end, the results of the analysis were not clear in relation to which behavior is predominant in Brazilian companies. Using the logarithm of Total Assets (TA) as the Threshold, the model that was most representative was related to investment in capital goods, not rejecting the H2 hypothesis. Thus, if this variable is taken into account as a classification, it can be understood that firms generally tend to make more investments instead of retaining cash and, according to the results, companies with financial constraints invest more in capital goods than companies without financial constraints, and for companies with restrictions, an increase in CF leads to an increase in investments, while for companies without financial constraints, an increase in CF leads to a reduction in investments. This result is similar to the findings of Fazzari, Hubbard and Petersen (1984), not rejecting the hypothesis H0.

Now, considering the Z-score as a Threshold, the most representative model indicated that companies use CF results more for cash holdings than for investing, an opposite result to that found with the use of the AT variable, not rejecting the hypothesis H2A. Considering the analysis of the cash retention, it is understood that both restricted and unrestricted companies have a significantly positive relationship between CF and cash holdings, and the magnitude of this variable is higher for unrestricted companies, which indicates that companies without financial restrictions carry more cash holdings as a result of a positive CF than the ones with financial constraints. This result corroborates the findings of Almeida, Campello and Weisbach (2004). Therefore, this result does reject the H1 hypothesis.

Taking into account the results presented, it is not possible to reach a unanimous conclusion regarding the use of CF results for cash holdings or for investment, since significant results were found for both situations, taking into account different threshold variables. The results presented some restrictions in terms of sample size, since the method requires balanced data and there is also the possibility of endogeneity between the variables of the model. For this reason, it is suggested, for future work, new analyzes considering a larger sample, searching for new variables to be used to perform the structural breaks.

REFERENCES

ALMEIDA, H.; CAMPELLO, M. Financial constraints, asset tangibility, and corporate investment. The Review of Financial Studies, v. 20, n. 5, p. 1429-1460, 2007.

ALMEIDA, H; CAMPELLO, M. Financing Friction sand theSubstitution between Internal and External Funds. Journal of Financial and Quantitative Analysis, v. 45, n. 3, p. 589-622, 2010.

ALMEIDA, H.; CAMPELLO, M.; WEISBACH, M. S. The cash flow sensitivity of cash. The Journal of Finance, v. 59, n. 4, p. 1777-1804, 2004.

ALTMAN, E. I. A further empirical investigation of the bankruptcy cost question. The Journal of Finance, v. 39, n. 4, p. 1067-1089, 1984.

BAUMOL, W. J. The transactions demand for cash: An inventory theoretic approach. The Quarterly Journal of Economics, v. 66, n. 4, p.545-556, 1952.

BYRRO, L. M. N.; BRESSAN, A. A. A Sensibilidade do Caixa ao Fluxo de Caixa nas Companhias Abertas Brasileiras: Uma Análise do Período Pré e Pós-Crise de 2008. Revista de Finanças Aplicadas, v. 7, n. 2, p. 1-32, 2016.

CHALHOUB, L.; KIRCH, G.; TERRA, P. R. S. Fontes de caixa e restrições financeiras: evidências das firmas listadas na BM&FBovespa. Revista brasileira de finanças, v. 13, n. 3, p. 470-503, 2015.

CHUNG, K.; PRUITT, S. A simple approximation of Tobin's Q. Financial Management, v. 2, n. 3, p. 70-74, 1994.

DAHROUGE, F. M.; SAITO, R. Políticas de Cash Holdings: Uma Abordagem Dinâmica das Empresas Brasileiras. Revista Brasileira de Finanças (Online), v. 11, n. 3, pp. 343–373 2013

DUTRA, V. R.; SONZA, I. B.; CERETTA, P. S.; GALLI, O. C. Determinantes da Retenção de Caixa em Empresas Brasileiras: uma Análise Pós-Crise de 2008. Revista de Educação e Pesquisa em Contabilidade, v. 12, n. 3, p. 364-379, 2018.

FAZZARI, S.M.; HUBBARD, R.G.; PETERSEN, B.C. Financing Constraintsand Corporate Investment. Brooking Paperson Economic Activity, v. 1, n 1, p. 141-195, 1988.

GARBE, H. D. S. Retenção de caixa e liquidez nas companhias brasileiras: uma análise do período pré e pós-crise do subprime. Dissertação (Mestrado) - Universidade Presbiterana Mackenzie, 78 p., 2015.

HAN, S.; QIU, J. Corporate precautionary cash holdings. Journal of Corporate Finance, v. 13, n. 1, p. 43–57, 2007.

HANSEN, L. P. Large sample properties of generalized method of moments estimators. Econometrica: Journal of the Econometric Society, v. 50, n. 4, p. 1029-1054, 1982.

HUBBARD, G. Capital Market Imperfections and Investment. The Journal of Economic Literature, 193-227, 1998.

JENSEN, M. C. Agency costs of free cash flow, corporate finance, and takeovers. The American economic review, v. 76, n. 2, p. 323-329, 1986.

KADAPAKKAM, P. R.; KUMAR, P. C.; RIDDICK, L. A. The impact of cash flows and firm size on investment: The international evidence. Journal of banking & Finance, v. 22, n. 3, p. 293-320, 1998.

KAPLAN, S. N., & ZINGALES, L. Do investment-cash flow sensitivities provide useful measures of financing constraints?. The quarterly journal of economics, v. 112, n. 1, p. 169-215, 1997.

KAPPEL, R. S.; SCHÖNERWALD, C. E. S.; SMANIOTTO, E. N.; ZANI, J.; ZANI, T. B. Decisão de Investimento: Efeitos da Restrição Financeira e das Crises Econômicas. In: XIX Encontro Brasileiro de Finanças (EBFin), 2019, Rio de Janeiro, Anais.

KIRCH, G.; PROCIANOY, J. L.; TERRA, P. R. S. Restrições financeiras e a decisão de investimento das firmas brasileiras. Revista Brasileira de Economia, v. 68, n. 1, p. 103-123, 2014.

LAMONT, O.; POLK, C.; SAÁ-REQUEJO, J. Financial constraints and stock returns. The review of financial studies, v. 14, n. 2, p. 529-554, 2001.

LUO, Q.; LI, H.; ZHANG, B. Financing constraints and the cost of equity: evidence on the moral hazard of the controlling shareholder. International Review of Economics & Finance, v. 36, p. 99-106, 2015.

MANOEL, A. A. S. Políticas de Caixa no Brasil: Um estudo considerando Restrições Financeiras e Governança Corporativa. 2016, 101 f. Dissertação (Mestrado em Contabilidade Financeira e finanças) - Faculdade de Economia, Administração e Contabilidade de Ribeirão Preto/USP, Ribeirão Preto, 2016

MILLER, M. H.; ORR, D. A Model of the Demand for Money by Firms. The Quarterly journal of economics, v. 80, n. 3, p. 413-435, 1966.

MODIGLIANI, F.; MILLER, M. H. The Cost of Capital, Corporation Finance, and Theory of Investment. American Economic Review, v. 49, n. 4, p. 655-669, 1958.

MYERS, S. C.; MAJLUF, N. S. Corporate financing and investment decisions when firms have information that investors do not have. Journal of financial economics, v. 13, n. 2, p. 187-221, 1984.

OPLER, T.; PINKOWITZ, L.; STULZ, R.; WILLIAMSON, R. The determinants and implications of corporate cash holdings. Journal of financial economics, v. 52, n. 1, p. 3-46, 1999.

PELLICANI, A. D. (2011). Governança corporativa e restrição financeira nas decisões de investimento, p. 110, Tese (Doutorado) Universidade de São Paulo, São Paulo, 2011

PERES, A.; KIRCH, G. Restrições ao Crédito e o Uso dos Recursos Internos nas Firmas Brasileiras Revista Brasileira de Finanças(Online), v. 15, n. 3, p. 313-357, 2017.

PINKOWITZ, L.; STULZ, R. M.; WILLIAMSON, R. Do U.S. firms hold more cash than foreign firms do?. Review of Financial Studies, v. 29, n. 2, p. 309–348, 2015.

SILVA, W. E. Empréstimos do BNDES e a restrição financeira das empresas brasileiras de capital aberto, p. 88, Dissertação (Mestrado), Universidade de São Paulo, 2017.

TORTOLI, J. P.; DA COSTA MORAES, M. B. Fatores de Impacto sobre o Saldo de Caixa: Um Estudo em Empresas Brasileiras Não Financeiras de Capital Aberto. Revista Brasileira de Finanças, v.14, n. 1 p. 125-150, 2016.

ZANI, J.; PROCIANOY, J. L. Restrição financeira e a política financeira da firma: A variação na estocagem de liquidez determinada pelo status financeiro e pela sua geração de caixa operacional. In: Encontro Brasileiro de Finanças (EBFin), 2005, São Paulo, Anais.