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Corporate Cash Holding: A Constraints' solving Tool to Access to External Financing: Evidence from Tunisian Listed Firms

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Abstract

The objective of this paper is to explore the corporate cash holding policy. Our focus is particularly on the relationship between cash holding and leverage. We will investigate this task in a particular context which is the Tunisian economy: Jasmine Revolution. We present evidence of a significant non-monotonic relationship between cash holding and leverage. Initially, a substitution effect between leverage and cash holding is found for a low level of leverage. Then, for a higher level of leverage, firms tend to hedge against the risk of potential financial distress by holding more cash (precautionary effect). Finally by investigating this relation between cash holding and leverage in a particular context of the Tunisian economy: Jasmine Revolution; we have shown that the precautionary effect is more persistent for Tunisian companies after the revolution.

JEL classification numbers: E41, O55, G30
Keywords: Leverage, Financial constraints, Growth opportunity

1 Introduction

Generally, the choice of company financing is to divide financial resources between internal and external ones. The objective of these companies is to afford to raise funds at lower cost to ensure their growth. In this spectrum of choice, attention has been paid previously to the various means of financing, while ignoring the potential role of corporate cash holding. Recently several studies have examined the interest and potential importance of cash holding for firms and its' role in solving the constraints of access to external financing (Pinkowitz and Williamson (2014) and Bates et al (2009), Ozkan and

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Ozkan (2004), Ferreira and Vilela (2004), Opler et al (1999) and Kim et al (1998)).They have taken into consideration the fact that firms take into account the different costs and advantage in their cash holding policy such the effects of asymmetric information, agency costs and the motivation of Keynes (1936).

The theoretical literature justifies corporate cash holding by supporting the argument that external funds are costly. Cash holding will finance firm's activities if other funding sources are not available or are prohibitively expensive. Theories even argue the hypothesis of substitutability between debt and cash holding. Several tested theoretical materials, including the study of Ferreira and Vilela (2004), Acharya and Almeida (2007), Han and Qui (2007) and Guney et al (2007) among others, studied the nature of the link between cash holding and leverage. The results of these studies are, overall, mixed and inconclusive. On the one hand, firms with access to debt markets may resort to borrowing as a substitute for holding liquid assets. On the other hand, high levels of debt may lead to over-indebtedness and asset substitution problems. Thereafter, we will try to explain the choice of corporate cash holding specifically analyzing the role of cash holding as a constraints' solving tool to access to external financing. We examine the nature of association between cash holding and leverage, as well as its impact on borrowing capacity. The aim of our research is to bring new evidence to the literature of cash holding policy. This study is part of the current research on the determinants of cash holdings (Guney et al (2007), Kalcheva and Lins, 2007, Harford et al (2008, 2014), Bates et al (2009), Pinkowitz et al (2014). However, our main contribution lies in the detailed analysis of the impact of leverage on cash holding. As mentioned above, the literature has documented a mixed review on the relationship between corporate cash holding and leverage. We will contribute to the literature by exploring the corporate cash holdings in a particular context of the Tunisian economy: Jasmine Revolution. We will use the set of variables that can affect cash holdings in Tunisia for a period of time between 2003 and 2013. We will present; among other things; analysis of two sub-periods before and after the revolution to highlight the impact of economic difficulties on the levels of cash holding. The empirical results of our analysis indicate a significant non-linear relationship between cash balances and leverage. Our results show a substitution effect between leverage and cash holding for low leverage and a precautionary effect for high levels of leverage. Our findings support that cash-flow; other liquid assets, firm size and growth opportunity affect significantly Tunisian corporate cash holding. The rest of this study is organized as follows: section 2 discusses the relevant literature; section 3 develops the hypotheses; in section 4 we present our data and the adopted methodology; section 5 highlights the empirical results; and finally section 6 concludes the study.

2 Literature

The decision of holding cash may be motivated by several considerations. Specifically firm are supposed holding cash because it allows them to invest more in investment opportunities. Corporate cash reserve allows company to survive in periods of low income or can be used when it is unable to access to external financing market. By studying the problem of excess debt, Myers (1977) has shown that this problem can be overcome by financial slack. These ideas were reinforced by the financial literature which has shown the importance of corporate cash holding policy by highlighting the cost savings that a company can realize compared to use of external financing market. The

literature on the cash holding policy introduced a new theoretical framework to explain the corporate cash holding: The Trade-Off Theory and The Pecking Order Theory.

2.1 Trade-Off Theory: An Explanatory Framework for Optimal Capital Structure

Various studies have tried to analyze the level of cash chosen by the firm and have advanced several theoretical models of optimal ratio. In fact, TOT is a model which grew up in the analysis of Keynes (1936) entitled liquidity demand. It highlights the costs and benefits of holding liquidity. It develops these advances according to the assumption of uncertainty and risk that a behavioral preference of money creates. Kim et al (1998) emphasize that the analysis of the firm's decision to invest in liquid assets requires careful consideration of costs and benefits of holding liquid assets. In fact, according to the trade off theory, managers determine optimal cash ratio by arbitrating between the costs and benefits of cash holding decision. The main cost of maintaining cash is the opportunity cost of capital invested in liquid assets (Opler et al 1999). The benefits related to detention of cash include: reducing the probability of financial distress, pursuing an investment policy where the firm is in financial difficulties and minimizing external capital issue costs or liquidation of existing assets. For Kim et al (1998), investment in liquid assets is costly because of its low income, however, due to the uncertainty of cash-flow and external financing cost, the firm may decide to hold positive amounts liquid assets. It is a matter of arbitration between carrying costs of cash holding and minimizing the benefits to resort to external financing if the internal generated funds are insufficient to fund future investment opportunities. At the optimum, the marginal costs are exactly filled by the marginal benefits of holding cash. Referring to Jensen (1986) and Stulz (1990), the central idea of TOT is to provide sufficient internal capital to managers to efficiently finance good projects but, it does not provide a lot of internal capital that would allow them to finance projects and acquisitions which will be beneficial to them at the expense of those of shareholders.

2.2 Pecking Order Theory: An Explanatory Framework of Preference of the Company's Financing Means

The theory of Myers and Majluf (1984) presents a choice of financing capital structure based on an order of preference of funding source. This hierarchy theory originated with Myers (1984) emphasizes the existence of information asymmetry between managers and outside investors on financing costs. This asymmetry increases the cost of external funding compared to funding through funds that are generated inside. A high information asymmetry between managers and investors is a proof that investors may not have sufficient resources to obtain relevant information to monitor managers (Warfield et al (1995)). Under this assumption, external financing is expensive because of the information held by top executives. Referring to Stiglitz and Weiss (1981) and Myers and Majluf (1984), the problem of asymmetric information between firms and investors leads to a premium between the cost of external and internal sources of financing. In this perspective, taking into account the problem of adverse selection and asset substitution pushes firms to follow a hierarchy funding to meet their needs. The company prefers to use internal funds relative to debt and debt against equity. This classification is motivated

by the consideration of asymmetric information and agency problems. Thus, firms with possible investment opportunities will have a preference to internal funding and a motivation to accumulate more cash reserves (Opler et al (1999)).

2.3 Cash Holding and Leverage

The increase of cash holding in the balance sheet allows companies to overcome certain disadvantages of debt and also provide them with a rather crucial financial flexibility in a more volatile environment. In this context literature recommends different positions of cash relative to debt financing. Several studies suggest on one hand that cash holding have a positive relationship with debt (Williamson (1988) and Shleifer and Vishny (1992)). On the other hand they have a negative effect as documented by Morellec (2001) or even non-linear as in Myers and Rajan (1998) and Guney et al (2007)) on the firm debt capacity. The substitution effect between leverage and cash holding consists that firms seeking to maintain financial flexibility will further hold cash reserves against low levels of debt. Firms will prioritize funding their future growth prospects by capital set aside rather than resorting to a potentially harmful debt to the firm. The accumulation of cash reserves at a low level of leverage allows the company to increase its borrowing capacity and thus retain its ability to borrow in the future (Shleifer and Vishny (1992)). The precautionary effect is based on the idea that companies can issue long-term debt and hold cash (Hart and Moore (1995)) as a precaution. At a high level of leverage, firms are more likely to face financial distress and therefore will accumulate more cash reserves to minimize the risk of a costly bankruptcy. The risk of bankruptcy is especially higher for companies with high growth option (Williamson (1988)); and those that are characterized by a difficult and costly access to capital markets (Haris and Raviv (1991)). Furthermore access to external financing is conditioned by the level of informational asymmetries and agency costs. Myers and Majluf (1984) report that these information asymmetries generate phenomena of adverse selection and asset substitution (Jensen and Meckling (1976)) that affect access to external financing. These external resources will be clearly costly for the company with a high level of leverage. For precautionary reasons, these firms will be more motivated to maintain more cash to prevent a costly financial distress or bankruptcy. This cash will be used by managers who are seeking to avoid the risk of underinvestment (Opler et al (1999)). We expect that the relationship between cash holding and leverage is not monotonous. First, we predict a negative relationship (substitution effect) between leverage and cash holding. Secondly, we expect a positive relationship (precautionary effect). When leverage increases more firms will accumulate cash reserves to minimize the risk of financial distress or a costly bankruptcy.

3 Literature Review: Link between Corporate Cash Holding and Debt Capacity

Many works such as those of Kim et al (1998), Almeida et al (2004), Pinkowitz et al (2006), Acharya, Almeida and Campello (2013) and Harford et al (2014) have demonstrated empirically that cash holding policy is an important component of the financial structure of firms. It can help to guard against the risk of possible bankruptcy and minimize some costs related to debt. Studies analyzing the nature of the relationship

that may exist between cash and debt, studied the relationship between cash holding and leverage. They have examined their roles in reducing information asymmetry, agency costs and in finding investment opportunities. Kim et al (1998) and after Opler et al (1999) found a linear relationship between corporate cash holding and leverage. The authors reported that the majority of these variables which are empirically associated with high cash are known to be associated with a low level of debt (Mikkelson and Partch (2003) and Acharya, Almeida and Campello (2013)). Graham and Harvey (2001) argue that the most important factor affecting the debt policy is financial flexibility and good credit rating. They present evidence to the fact that the detained cash is negatively related to debt. They argue that firms emit debts only when internal funds are insufficient. Analyzing the case of firm's constraints which are generally characterized by a high level of leverage, Fazzari et al (1988) argue that these firms have more incentive to maintain more cash. Ozkan and Ozkan (2004) provided evidence that companies with higher leverage and seeking to reduce the risk of experiencing financial difficulties hold more cash. Jung and Kim (2008) present evidence of a positive association between cash holding and leverage in contrast to Opler et al (1999), Kim et al (1998) and Ozkan and Ozkan (2004). By studying the relationship between excessive corporate cash holding and leverage they show a positive relationship between cash excess and the change of leverage which is not primarily associated with the disciplinary role of debt.

Guney et al (2007) examined this association by taking into account the two positions of cash holding versus leverage. They analyze this association for a sample of 4069 companies in France, Germany, Japan, UK and the US over the period 1996-2000. For these authors, the relationship between liquid assets and leverage can be non-monotonic and implies that the marginal effect of the increase in leverage level depends on its current level. This non-monotonic relationship was justified by the fact that: firstly, there is a negative relationship (substitution effect) between leverage and cash holding. However, secondly, they illustrate a positive relationship (precautionary effect). When the level of leverage increases, firms will accumulate more cash reserves to minimize the risk of financial distress or a costly bankruptcy. Bates et al (2009) present a study of cash leverage relationship by making use of a different measure of leverage. They characterize this measure as more appropriate to reveal the real effect exerted by cash holding on the level of debt in the company. Using net debt (debt-cash reported to total assets) as a measure of leverage, they stated that there is a strong secular decrease in average of the leverage of their sample companies. Most of this decrease in net debt is explained by the increase in cash. Acharya, Almeida and Campello (2013) test a theory explaining how firm's exposure to the overall risk affects cash holding. These authors stated that cash and debt are not equivalent when there is uncertainty about future cash flow. They justify this conclusion by considering that firms issue risky debts against future cash flow. Then, studying the impact of systematic risk on the level of liquidity, the authors show that companies with high exposure to systematic risk have a higher cash ratio relative to credit lines and face higher costs on their lines and conclude that corporate liquidity reserves increase during periods of high global volatility. Harford et al (2014), examining the effect of the debt maturity on cash holding and leverage association, show that companies with debt with shorter maturities hold greater cash reserve to reduce the high costs they may incur if they have difficulties in refinancing their debt. Companies that tend to shorten (lengthen) the maturity of their debt; increase (decreases) their cash holding. They find that this inverse association between maturity of the debt and the level of cash of these liquid assets is more pronounced during periods when the conditions in the credit

market are restrained and refinancing risk is therefore higher.

4 Firm-specific Characteristics that affect Cash Holding Decision

In what follows, we present a brief discussion of the different determinants of cash holding policy.

4.1 Growth Opportunity

Literature stated that companies with high growth option associated to more risk of financial distress and bankruptcy (Williamson (1988)) or and a costly external financing (Haris and Raviv (1991) will hold more cash. Then we expect that growth opportunities positively affect cash holding. Following Pinkowitz and Williamson (2014) and Guney et al (2007) we use Market-to-book ratio to measure the growth opportunities.

4.2 Cash Flow and Variability of Cash Flow

Firms with high level of cash flows accumulates more cash (Bates et al (2009)) and are motivated to enlarge these cash reserve in an attempt to moderate the expected cost of luck of liquidity in case of a volatile cash flows. It can be costly to the firm to be short of funds if the she has to waste interesting investment opportunities. We suppose that cash flow and cash-flow variability affect positively cash holding. Following Ferreira and Vilela (2004) and Pinkowitz and Williamson (2014) the cash-flow variable is the sum of net income, depreciation and provisions. The variability of cash flow has a proxy the standard deviation on cash-flows.

4.3 Size

The large firms are supposed more diversified (Titman and Wessels, 1988) and characterized by less information asymmetry (Brennan and Hughes (1991)) compared to small firms. Therefore they are assumed to face less constraint in accessing the external funding resources. Small firm aren't immune to the risk of bankruptcy and the financial distress and can't easily access to external financing sources, consequently will try to maintain more cash reserve to finance their investments. We believe that size affect negatively cash holding. We choose to use, as a proxy for firm size, the natural log of total assets following Ferreira and Vilela (2004), Foley et al (2007) and Pinkowitz and Williamson (2014).

4.4 Other Liquid Assets

Most companies have, in addition to cash holding, other liquid assets easily convertible into cash and thus at a lower cost. Then we expect that there is a negative association between corporate cash holding and its other liquid assets. These assets can be considered substitutes for cash holding. Following Ozkan and Ozkan (2004); Pinkowitz and Williamson (2014), we use the proxy net working capital, minus the cash to total assets for other liquid assets.

4.5 Dividends

For the trade-off theory, the relation between dividend payments and cash holding should be negative. Al-Najjar and Belghitar (2011), Ozkan and Ozkan (2004) argue that companies that currently pay dividends can raise funds at lower costs and hold less cash because they are able to raise funds when needed by cutting dividends. Therefore, it is expected that companies that distribute dividends, compared to companies that do not hold less cash (Ferreira Vilela (2004), Al-Najjar (2013). Based on previous empirical findings we expect that there is an inverse association between dividends and cash holding. We use a dummy variable dividend DIVI, like Pinkowitz and Williamson (2014), Al-Najjar (2013) which take 1 if a company distribute dividends, 0 if not.

5 Methodology and Empirical Data

5.1 Data

To determine empirically the relationship between cash holding and leverage; we pick a sample of 30 Tunisian firms listed for 10 years period spanning from 2003 to 2013. The initial sample regroups all listed firms with available data over the period between 2001 and 2013. We excluded the financial firms and firms with observations firm-years missing from the sample. These criteria have resulted on a study period that stretches from 2003 to 2013.

5.2 Methodology

We estimate linear and non-linear regression models where the independent variable cash is depend of a set of variables identified by the theory as decisive for the decision of holding cash. In this phase of analysis, we test the non-monotonous relationship between cash holding and leverage and we estimate a quadratic model that involves a turning point. In other words, as leverage increases, we expect: first, to observe a negative coefficient (a substitution effect) then, a positive effect (a precautionary effect) exerted by leverage on cash holding.

The equation of the panel regression is written as follows with X: Vector of used explanatory variables, β: regression coefficients, i: Firms, ξ: error terms and t: Years.

Model n°1

$$LIQI_{it} = c + \beta_1 ALIQ_{it} + \beta_2 LEVI_{it} + \beta_3 CROI_{it} + \beta_4 TAIL_{it} + \beta_5 DIVI_{it} + \beta_6 CFLO_{it} + \beta_7 VARI_{it} + \xi_t$$

With LIQI represents cash and marketable securities to total assets. ALIQ represents other liquid assets, LEVI: Leverage, CROI: Growth opportunities, Tail: size of the company, DIVI: dividends and CFLO: cash flow, VARI: volatility of cash flow. Subsequently, we introduce the variable $LEVI^2$ to capture non-monotonic relationship between leverage and cash holding to a higher level of leverage. The resulting model is written as follows:

Model N°2

$$LIQI_{it} = c + \beta_1 ALIQ_{it} + \beta_2 LEVI_{it} + \beta_3 LEVI^2 + \beta_4 CROI_{it} + \beta_5 TAIL_{it} + \beta_6 DIVI_{it} + \beta_7 CFLO_{it} + \beta_8 VARI_{it} + \xi_t$$

6 Empirical Results

The descriptive empirical results are as follows. We will proceed with a descriptive analysis of variables and analysis of their evolution through time. The correlation matrix between the different variables is presented in Table 1.

6.1 Descriptive Analysis

Table 1: Correlation matrix between the different determinants of cash holding

	LIQI	ALIQ	LEVI	TAIL	CROI	DIVI	EXPE	CFLO	VARI
LIQI	1.000000	-0.1349	-0.2827	-0.1024	0.0321	0.1600	0.0779	0.2481	0,0177
ALIQ	-0.1349	1.000000	-0,7124	-0.2479	-0.0445	0.3518	0.3231	0.3365	0.0122
LEVI	-0.2827	-0,7124	1.000000	0.1706	-0.0135	-0.4668	-0.4184	0.1029	-0.1067
TAIL	-0.1024	-0.2479	0.1706	1.000000	0.0133	-0.1211	-0.4184	0.1029	-0.1067
CROI	0.0321	-0.0445	-0.0135	0.0133	1.000000	0.0651	0.0121	0.2331	0.0292
DIVI	0.1600	0.3518	-0.4668	-0.1211	0.0651	1.000000	0.1777	0.3691	0.0283
EXPE	0.0779	0.3231	-0.4184	-0.4184	0.0121	0.1777	1.000000	0.3486	-0.0465
CFLO	0.2481	0.3365	-0.0224	0.1029	0.2331	0.3691	0.3486	1.00000	0.0340
VARI	0.0177	0.0122	-0.5609	-0.1067	0.0292	0.0283	-0.0465	0.0340	1.00000

The correlation coefficients in table 1 show that there is no apparent problem of collinearity between variables. Among correlations of different variables; we found that there is a positive and significant correlation between leverage and size. Companies of larger sizes have a higher debt capacity. The level of leverage increases with company's size. There is also a significant negative correlation between leverage and other liquid assets and between cash flow and leverage. Firms prefer to finance themselves primarily by internal funds before resorting to debt. The various descriptive statistics of averages related to all variables of our model are presented in Table 2. It shows the mean (Mean), the maximum (Max), the minimum (Min) and standard deviation (Std. Dev.).

Table 2: Descriptive statistics

	Obs	Mean	Std. Dev.	Min	Max
LIQI	330	0.1065948	0.1204387	0.0002486	0.6835111
ALIQ	330	0.0641659	0.316691	(1.428666)	0.7317906
LEVI	330	0.536832	0.3329487	0.0070132	2.41353
CFLO	330	0.0762734	0.0836256	(0.4063967)	0.4142204
CROI	330	1.43801	0.788497	0.0937619	6.762115
TAIL	330	11.08641	0.9390694	9.589029	14.29894
EXPE	330	0.0071366	0.1398359	(0.9416966)	0.8464454
DIVI	330	0.6636364	0.4707997	0	1
VARI	330	0.0695033	0.0521753	0	0.2687118

This table (2) presents descriptive statistics for all variables used in our estimation. It reveals that he level of cash holding in Tunisian firm is close to that reported in many studies. The average of cash ratio is 10.6% which is close to that reported for example by kim et al (1998) and Guney et al (2007). For example Guney et al states that the cash ratio has an average of 11% for UK companies. Harford et al (2014) stated that the average ratio cash holding varied between 8.5% and 13.9%. The leverage presents an average value of 53%. This average value varied between a maximum and minimum value about 7% and 24.1% respectively. This indicates that Tunisian firms rely more on debt than on other funding sources (equity). We observe also that firm of our simple ranges from highly leveraged company to relatively financially independent ones. Growth opportunities have an average value of 1.43 and size has an average value of 11.08 which range between a minimum value of 9.58 and a maximum value of 14.29.

6-2 Relation between Cash Holding and Leverage

Table 3: A non monotonic relation between cash holding and leverage

Variables LIQI	(1)	(2)
LEVI	-0.0859088	-0.2668999
	(-2.85)***	*(-5.22)****
$LEVI^2$	-	0.0868989
	-	*(4.24)*
ALIQ	-0.1552882	-0.1472927
	(-5,57)***	*(-5.21)****
CFLO	0.20518	0.2011739
	(2,97)***	*(2.98)****
TAIL	-0.0207284	-0.0155747
	(-2.27)***	*(-1.75)**
CROI	-0.0148037	-0.0225567
	(-1,14)	*(-2.89)****
DIVI	-0.002719	-0.0227353
	(-0,05)	*(-0.45)*
VARI	-0.0470833	-0.0467691
	(-0,67)	*(-0.68)*
C	0.4014948	0.4185521
	(3,85)***	*(4.16)****
	R-sq = 0.3928	R-sq = 0.5305

With LIQI: the cash holding Ratio: measured by cash and marketable securities to assets. LEVI ($LEVI^2$): Leverage is total debt to total assets. TAIL: The size of firm is natural log of assets. Aliq: Other liquid assets are net working capital minus the amount of cash to assets. VARI: Standard deviation of cash flow. CFLO: Cash flow net income plus depreciation, amortization and provisions. CROI: Growth opportunities are the Market-to-book ratio. DIVI: Dividends which are measured by a dummy variable. Significance levels are 1% ***, 5%** and 10% *

Table 3 report the regressions of fixed effect panel to predict cash holding level, using the variables described above. This table provides the results of two sets of estimation of model 1 and model 2. We find that cash holding significantly decreases with leverage, other liquid assets, size and growth opportunities and significantly increase with leverage to high levels of debt and cash flow ratio. We find no evidence that support a significant effect of dividends and cash flow variability on cash holding. Generally, our findings show that corporate cash holding policy is affected by factors specific to the Tunisian firm. The results show that the corporate decisions of leverage level influence their cash balances significantly and in a non-linear way. Specifically, we first observe an inverse association between leverage and cash holding. However, the relationship between the two variables was found to be positive at higher levels of leverage. These results support the idea that debt may initially be considered a substitute for cash holding. However, it seems that the probability of financial distress, which is a function of leverage; led companies to accumulate large cash reserves as a precaution to higher debt levels and this

in an attempt to reduce to minimum risk of costly bankruptcy. These results join those of Guney et al (2007) who provide evidence of a nonlinear effect of leverage on cash holding. The regression model (1) shows that leverage estimated coefficient of (-0085) with a t-statistic of (-2.85) which indicate a significant negative effect of leverage level on the cash maintaining decision of Tunisian firms. This negative effect suggests that company can maintain financial flexibility for a lower leverage due to large reserves of cash. It suggests also an unused debt capacity. Relying on cash to finance the opportunity of investment, company has no reason to borrow. These findings are consistent with previous studies advanced. Recently Bliss et al (2014) argue that the financial flexibility affect financing choices. For the author companies choose to borrow less to keep the option of borrowing in the future. Al Najjar (2013) stated a negative relation between leverage and cash holding and exhibit that leverage can be considered as a substitute for cash holding.

The introduction of variable LEVI2 in the model is used to determine if there is a nonlinear relationship between liquidity and leverage detention of Tunisian companies. Indeed, the observed result supports our hypothesis of the existence of a non-monotonic relationship. The estimated coefficients of the variable and the LEVI2 are respectively (-0.26) and (0.086) with each t statistic (-5.22) (4.24). The increase in level of leverage influences positively and significantly the cash holding of Tunisian companies. In summary, the results show that corporate debt decisions, significantly, affect their cash balances in a nonlinear way. Firms with problems of access to external financing markets will accumulate more cash to cover against a possible risk of financial distress or bankruptcy. This finding shows that cash holding cannot be the strict negative debt. Debt is considered as a more stable and predictable characteristic of a firm relative to cash that vary periodically. In conclusion, we report that at a low level of leverage, Tunisian companies do not hold cash (negative effect: substitution effect) compared to a high level of leverage where they will accumulate more cash (positive effect: effect caution). The cash flow has a positive and significant impact on liquidity held in both regressions. The estimated coefficients have a value of 0.20 and t-statistic of a respective value of 2.97 and 2.98. These positive and significant values mean that cash holding tends to increase with the increase of level of cash flow. This positive and significant relationship result is consistent the findings of Opler et al (1999), who stated that when the cash-flows are high company will be inclined to build up reserves of cash to finance new profitable projects and deal with future eventuality. The regression results of other variables show that the variable size has a negative and significant coefficient. Small firms will keep more liquid assets compared to large firms. The literature had established that distress level of risk is high among small firms versus large firms. Consequently small firm will hold cash by precaution. For example Asmaa (2013), Pinkowitz et al (2014) and Ozkan and Ozkan (2004) shows that this negative relation is consistent with the trade-off theory and that there are economies of scale in the detention of cash which mean that Large firms will keep less cash compared. The other liquid assets ALIQ variable has a negative and significant coefficient on cash holding. A firm can use other liquid assets to cover the luck of internal cash-flow. They can be recognized as substitutes for cash holding. Companies can rely on these assets to finance their activities because they can be easily converted to cash. The negative and significant relationship observed between cash holding and growth opportunities shows that company facing an increase in growth opportunities will tend to reduce its cash holding levels. This advance is consistent with free cash-flow theory which argues that company tends to hold lee cash for fear of their diversion by leaders

who seek for control and entrenchment.

6.3 Relationship between cash holding and leverage before and after the Jasmine revolution

We will eventually try to study the particularity of the Tunisian market marked by revolution. Table 4 presents an analysis of the cash holding policy before and after the revolution and also a robustness check of our results. We opted for the constitution of two periods of three years each. The first period will be spread from 2008 to 2010, and the second will run from 2011 to 2013.

Table 4: Determinants of cash holding before and after the revolution

Variable	(1)	(2)
LIQI	2008_2010	2011_2013
LEVI	-0.2941229	-0.3897065
	(-4.89)***	*(-5.48)****
$LEVI^2$	0.0938185	0.0854005
	(4.36)***	*(3.43)****
ALIQ	-0.1404584	-0.2413988
	(-4.26)***	*(-5.64)****
CFLO	0.1522708	0.0752963
	(1.99)**	*(0.89)*
TAIL	-0.0149843	-0.0171587
	(-1.42)	*(-1.17)*
CROI	-0.0205102	-0.0017731
	(-2.58)***	*(-0.17)*
DIVI	0.0095141	-0.0272088
	(0.86)	*(-2.24)***
EXPE	-0.0211192	0.0094814
	(-0.71)	*(0.38)*
VARI	-0.0175652	0.0339558
	(-0.24)	*(0.44)*
C	0.4129775	0.4967061
	(3.41)	*(2.97)*
	R-sq : 0.4605	R-sq : 0.8076

With LIQI: the cash holding Ratio: measured by cash and marketable securities to assets. LEVI ($LEVI^2$): Leverage is total debt to total assets. TAIL: The size of firm is natural log of assets. Aliq: Other liquid assets are net working capital minus the amount of cash to assets. VARI: Standard deviation of cash flow. CFLO: Cash flow net income plus depreciation, amortization and provisions. CROI: Growth opportunities are the Market-to-book ratio. DIVI: Dividends which are measured by a dummy variable. EXPE: Capital expenditure is the CAPEX. Significance levels are 1% ***, 5%** and 10% *

Tunisia was marked by the advent of the Arab Spring. The Tunisian revolution (Jasmine Revolution) occurred in 2010 marked the country's economic context. Since high

pressures weigh on the rythm of economic activity and the financial balances in connection with the disturbances that hindered the activity of production and export of goods and services in key sectors. This impact was strongly reflected by the contraction of bank liquidity, which had a direct effect on the financing of Tunisian firms after the revolution. The lack of liquidity and the economic problems due to the loss of foreign and local markets took a picture of a systemic risk which affected all sectors without exception. The banks are more risk averse. Firms have found themselves facing a funding problem affected by the regressions of internal fund and the lack of external fund. The deteriorating of security and economic conditions in the country result are in a deregulation of customer demand, disruption of the supply chains and the production and supply. In such context we assume that the Tunisian companies are predisposed to hold more cash after the revolution.

Table 4 shows that both regression coefficients have the same signs except for dividend payment. We note that certain variables have gained significance. Yet, others saw their significances lowered. The level of cash is more sensitive to leverage, coefficients increased from (-029) to (-038). Similarly for other liquid assets, coefficient rose from (-0.14) to (-0.24). Other liquid assets represent a substitute for cash holding. Our results show that firms facing a banking risk will tend to hold more cash as a precaution. The coefficient of LEVI2 variable is positive and significant for both periods. We note that the precautionary effect is persistent after the revolution. Seeing their debt capacity reduced, Tunisian companies accumulate more cash. The highlighted fact in these results is the change in the sign of DIVI variable. This variable presented a positive sign and a non significant t-statistic at the first regression. However at the second regression it has a negative coefficient and a significant t-statistic. This conclusion is in line with the advances of the trade-off theory that predicts a negative relationship between dividend payments and cash holding. In other words, companies that distribute dividends are able to raise funds at lower costs. Companies in need for liquidity will resort to reducing their dividend payments (Al-Najjar and Belghitar, 2011). These statements lead us to conclude that Tunisian companies facing a potential shortage of liquidity will resort to reducing their dividends.

7 Conclusion

We have attempted to examine the cash holding policy of Tunisian firm and tried to determine the nature of association between leverage and cash holding. We believe that our analysis can enrich the understanding of motivation of corporate cash holding. First, our study provided a detailed analysis on the relationship between cash holding and leverage. Our results suggest that the level of debt issued by the firm plays an important role in cash holding policy. They reflect a non-monotonic relationship. We find that Tunisian firms accumulate more cash when the level of leverage increases. The found non-monotonic relationship suggests initially a substitution effect between cash holding and leverage for a low level of leverage. Then, for a higher level of leverage, firms will hedge against the risk of potential financial distress by holding more cash (precautionary effect). Secondly, we have shown that the precautionary effect is more persistent for Tunisian companies after the revolution. This finding is consistent with the economic difficulties of the Tunisian country.

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