



International Journal of Economics and Financial Research

ISSN(e): 2411-9407, ISSN(p): 2413-8533

Vol. 2, No. 3, pp: 55-64, 2016

URL: <http://arpgweb.com/?ic=journal&journal=5&info=aims>

The Financial Determinants of Corporate Cash Holdings: An Empirical Examination of Tunisians Listed Firms

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Abstract: This study investigates cash holding behavior of Tunisian firms over the period of 2003-2013. We attempted to identify the different determinants of the corporate cash holding. We are focusing on the importance of cash flow, the effect of the leverage, other liquid assets, the ability to access to capital markets and the growth opportunities. Our results show that both trade off theory and pecking order theory are important to explain the determinants of cash holding of Tunisian companies. Generally, the results of our study support the tradeoff theory of cash holding. The motif of precaution and transaction are important in explaining the determinants of cash for Tunisian companies. Leverage, managerial ownership, growth opportunities, size, cash flow and liquid assets are important determinants of cash holding of Tunisian companies.

Keywords: Leverage; Transactional motive; Precaution motive; Financial constraints.

JEL Classification: E41 – G30 – G32 – O55.

1. Introduction

In a world of increase of the capital costs and the related importance of opportunity cost to have excess cash; cash holding became a key element in the balance sheet of a company and in the problem of optimal allowance of the capital. In this context, Bates *et al.* (2009) discovered that the reserves of liquid assets doubled in the last three decades and that the average of the American companies can pay all of its debts with their cash holding. Dittmar *et al.* (2003) Nikolov and Whited (2014) and Pinkowitz *et al.* (2014) raised a narrow relation between this detention of cash and the value of the company. The study of the cash holding represents a considerable field of investigations allowing to explore several areas of research such as: agency problems, asymmetric information, transaction costs and other certain aspects joined within the framework of the financial policy and the corporate governance. The interests of our research consist in bringing new elements to the literature of the corporate cash holding and in solving the ambiguity of this choice. This study is a continuation of recent researches on the determinants of corporate cash holding Dittmar *et al.* (2003), Kalcheva and Lins (2007); Chen and Chuang (2008) and Harford *et al.* (2014). In fact, the previous literature established a mitigated opinion on the motivations of companies to holding cash as well as on the consequences of cash holding decision on the value of the firm. The objective of this article is to analyze the motivations of firms regarding detention of cash, to determine the different susceptible factors to influence the policy of corporate cash holding and to identify whether the companies adjust their reserves of cash towards a target ratio. Our contribution to the literature consists in the investigation of the financial determinant of corporate cash holding in emerging country. We employ both dynamic and static panel dated estimations. We control the endogeneity between dividend policies, capital structures and cash holding companies. We use various set of determinants that can affect corporate cash holding in Tunisia for the updated period of between 2003 and 2013. The results of our investigation indicate that leverage, liquidity, cash flow, growth opportunity and firm size impact cash holding companies. The remainder of this paper is organized as follows: in section 2 discuss the recovering literature; in section 3 we try to develops the hypotheses; in section 4 we present our data and the methodology; in section 5 we highlight the results; and finally section 6 we conclude the study.

2. Corporate Cash Holdings: Theory and Empirical Literature

The debate on motivations behind firms' cash holdings has been the object of several works and many explanations were proposed. This studies on the problem of detention of cash was presented initially by Keynes (1936) and followed by studies of Baumol (1952), Tobin (1956) and Miller and Orr (1966). These authors tried to explain companies need to maintain a minimum level of cash but meanwhile considering it as a non-strategic element. More recently several researches dealt with the exploration of the importance of the policy of cash holding by transposing the theories of pecking order and trade-off on corporate cash holding. Kim *et al.* (1998), Opler *et*

al. (1999) and Bates *et al.* (2009) among others highlighted the various issues and implications of the cash holding on the company. In this theoretical frame, several reasons for the decision of holding cash were put forward. Among these motivations, particularly the motives of transaction and precaution are approached by the literature as being the main reasons of corporate cash holding. In what follows we examine the literature on the motives for the cash holding. Then, we highlight the findings of the previous empirical studies.

2.1. Transaction Motive of Holding Cash

First introduced by Keynes in 1936, the transaction motive of holding liquid assets derived from costs related to the conversion of illiquid assets into cash. This transaction motive is defined as the need for cash for transactions during the business and personal exchanges. It stipulates that companies hold cash to fund daily transactions. In this context, Baumol (1952), Tobin (1956) and Miller and Orr (1966) highlighted the hypothesis of the existence of economies of scale in the issue of external funds encouraging firms to hold liquidity to avoid frequent and repetitive issuance of funds. The motivation of transaction costs implies that firms hold more liquidity in periods characterized by higher costs related to economic downturns. Firms with short liquidity can move towards the capital market, liquidate other assets, reduce investment and reduce their dividends or renegotiate existing financial contracts. However, all these operations are costly for the firm. The recourse to external capital market is associated with high issuance costs that often constrain firms from access to external funds, and thus motivate them to hold cash. Consequently, it can be expected that companies that face higher transaction costs, hold larger amounts of cash in their balance sheets.

2.2. Precautionary Motive of Holding Cash

According to Keynes (1936) precautionary liquidity reserves are maintained to cover expenses related to sudden unexpected transactions. Studies exploring the precautionary motives are based on the hypothesis that receipts and payments are not known with certainty. One of the most important contributions from the various studies of the precautionary motive was made by Miller and Orr (1966) who showed stochastic elements that underpin the demand for liquidity by advancing that net cash flow are completely stochastic. In this context, the precautionary demand for liquidity arises because firms are uncertain about payments that they might want or have to do Whalen (1966). The more a company has liquidity, the less likely it is to suffer the costs of illiquidity. The most important reasons for the decision is supposed to be the fact that the detention of cash can allow companies to invest more in investment opportunities Myers (1977). Almeida *et al.* (2004), testing the precautionary demand for cash, argue that financially constrained company invest in cash out of cash flow, while unconstrained company do not. Liquid assets in the possession of firm will allow it to survive in times of low income or can serve her when she is unable to access external financing market. Han and Qui (2007), in their test of the precautionary motive, developed a model based on the assumption of a continuous distribution of cash flow. They confirm that an increase in the volatility of cash flow increases the cash reserve of financially constrained company. Companies will hold cash to cover unexpected expenses and unspecified contingencies Myers (1984), Myers and Majluf (1984) Almeida *et al.* (2004), Bates *et al.* (2009) and Gill and Shah (2012).

2.3. Empirical Evidence

Several empirical studies assume that firms consider the motivations presented by Keynes (1936) the effects of asymmetric information and agency costs in their policy of cash holding. The level of cash held is sensitive to all changes related to theoretical benefits and costs of holding cash. Giving as an example the study of Kim *et al.* (1998) Opler *et al.* (1999), Mikkelson and Partch (2003) Strebulaev and Yang (2013) and Asmaa (2013) and Pinkowitz *et al.* (2014) who examine the reasons why firms hold liquidity and at what level Kim *et al.* (2011) and Hugonnier *et al.* (2015). Several empirical studies have reported an important increase in corporate cash holding over the time. Bates *et al.* (2009) Bates *et al.* (2011) Pinkowitz *et al.* (2014) among others have reported that American firms have a remarkable level of owned liquidity. Kim *et al.* (1998) and Opler *et al.* (1999) argue that the optimal amount of cash holding is determined by a trade-off between the advantage of minimizing the need for external financing and the low return earned on liquid assets. Their models predict that cash is increasing in the cost of external financing and the variance of future cash flows and return on future investment opportunities. While, it is declining with the yield gap between physical assets of the company and liquid assets. Then, Ferreira and Vilela (2004) ; Bates *et al.* (2009) trying to explain the motivations of firms for the cash holding suggest that the level of cash is positively affected by the investment opportunities and cash flows while it is negatively affected by the amount of other liquid assets, size and leverage. Bates *et al.* (2009) find in particular that the capital expenditures decline with liquidity and firms which do not pay ordinary dividends have the same average liquidity ratio as firms with dividend distributions. At the end of the sampling period, the authors suggest that average liquidity ratio of firms that do not pay dividends has more than doubled and the median has more than tripled. The authors explain this finding by the increase of the idiosyncratic risk where a precautionary motivation for holding liquidity. Conversely, Ferreira and Vilela (2004) find no evidence to support an effect of dividend payments and the maturity of the debt on cash holding policies.

From another perspective, Kim *et al.* (2011) were based on the specific nature of restaurant industry to explain the unusual cash holding policies. They presented a study which examines the determinants of cash holding for restaurant businesses. Their sample is divided between large and small restaurant businesses. The results are

generally in favor of trade-off cash holding theory. In particular they assume that precautionary and transaction motive are important in explaining the determinants of corporate cash holding for these restaurants. This study provides evidence that the size, leverage, investment opportunities, other liquid assets, cash flow, capital expenditures and dividends determine significantly the level of cash holding. In an international context, [Pinkowitz et al. \(2014\)](#) using a sample of companies in the United States, Germany and Japan, show that growth opportunities, cash flows, and research and development increase with increasing the level of corporate cash holding and that the coefficients of the variables, other liquid assets, dividends and firm size are all negative. [Gill and Shah \(2012\)](#) prove through a sample of 166 Canadian companies that cash flow, market-to-book ratio, leverage, firm size, the size of the board and the other liquid assets affect significantly the level of cash holding in Canadian firms. Recently [Al Najjar \(2013\)](#) and [Asmaa \(2013\)](#) examining the case of emerging countries show that the trade-off theory, the pecking order theory and agency theory are important in understanding the decisions of cash holding in developing countries. Evidences were advanced on the impact of leverage, the distribution of dividends, other liquid assets and size on the detention of cash.

[Gao et al. \(2013\)](#) show through the comparison of a matched sample of private and public companies that the agency costs are an important factor in the corporate cash holding. First, they show that on average private firms hold less than half of cash than public companies do. These authors find that the effect of the agency costs of public firms leads them to hold reserves of cash that are higher by about 4% of assets than are those of similar private companies. More recently, in an innovative study, [Oler and Picconi \(2014\)](#) propose an analysis that addresses both the excess and lack of cash in the assets of firms. They show that the level of cash is clearly declining in the company with the Market-to-book ratio, size, cash flow, other liquid assets, and age of the firms and increases significantly with sales growth, capital expenditures, variance of past cash flows, spending on research and development, and taxes on repatriated foreign income. The authors reported also that company that pay dividends hold significantly higher levels of cash. More recently, the study by [Zhang et al. \(2015\)](#) on a large sample of Chinese listed companies during 2001-2008, presents new evidence on how market value of cash is affected by the asymmetry of information between the parent company and its subsidiary. Their evidence shows that the cash holding policy within business groups is influenced by the asymmetry of information which leads to yield losses.

3. Hypotheses Development

In what follows we will examine the relationship between the different characteristics of the firm and the level of cash holding.

Leverage « LEVI » :

Theoretically, leverage is negatively related to cash; firms take to repay the debts by a part of cash flow and accumulate cash. They can maintain a lower level of leverage with a large cash reserve [Graham and Harvey \(2001\)](#). [Ozkan and Ozkan \(2004\)](#) stated that the leverage can act as an indicator of the ability of firms to issue debt and her flexibility. Therefore, many studies expected a negative association between the use of debt and cash holding. For example [Bates et al. \(2009\)](#), [Kim et al. \(1998\)](#) and [Ferreira and Vilela \(2004\)](#), [Chang and Wong \(2004\)](#); [Pinkowitz et al. \(2014\)](#) predicted an inverse association between the leverage and the cash holding. Firms that have a greater capacity to increase debt hold less cash. We suppose that the relationship between the leverage and cash holding is negative. We use the ratio of total debt divided by total assets as a measure of financial leverage variable after [Pinkowitz et al. \(2014\)](#), ([Chiang and Wang, 2011](#)), [Bates et al. \(2009\)](#), [Ozkan and Ozkan \(2004\)](#) and [Opler et al. \(1999\)](#)

Growth opportunity « CROI »:

Usually asymmetric information problems are more important for companies with a value determined by the growth options. It is then assumed that firms with high growth option are expected to face more risk of bankruptcy [Williamson \(1988\)](#) and a higher cost of external financing [Harris and Raviv \(1991\)](#). Accordingly, these companies will have more incentive to hold more cash to avoid a probable risk of financial distress. This positive relationship is thus based on the idea that external funding is qualified to be more costly for firms with greater growth opportunities [Pinkowitz et al. \(2014\)](#). Therefore, companies with greater growth opportunities accumulate more cash to avoid the need for costly external financing and therefore the possibility that they give up valuable investment opportunities [Myers \(1977\)](#). [Kim et al. \(1998\)](#) showed that companies with strong growth opportunities hold more cash. Very similar results are established by [Opler et al. \(1999\)](#), [Ozkan and Ozkan \(2004\)](#), [Bates et al. \(2009\)](#) and [Pinkowitz et al. \(2014\)](#). We suppose that firms with greater growth opportunities will accumulate more cash. As a proxy for growth opportunities, we use the Market to book ratio like [Guney et al. \(2007\)](#) [Ozkan and Ozkan \(2004\)](#) and [Pinkowitz et al. \(2014\)](#).

Cash-flow « CFLO » and cash-flow variability « VARI »:

The firms with higher amounts of cash flow will less face the risk of missing out investment opportunities and therefore avoid facing financial difficulties and the risk of bankruptcy. [Kim et al. \(1998\)](#) argue that cash flow provides an available source of cash for the financing of investments and debt repayment. In the context of the pecking order theory it is argued that cash reserve increases with cash flow. [Opler et al. \(1999\)](#) [Bates et al. \(2009\)](#), and [Pinkowitz et al. \(2014\)](#) among others, support that firms with higher cash flows accumulate more cash. In cases where companies have more volatile cash flows, cash holding would mitigate the cost of lack of liquidity. It can be costly to be short of cash if the company has to miss an interesting investment opportunities. For most existing studies a positive correlation exists between the cash holding and cash flow volatility [Pinkowitz et al. \(2006\)](#)

Faulkender and Wang (2006) and Ozkan and Ozkan (2004). We suppose that cash flow and cash flow variability positively affect cash. The CFLO variable is measured by the sum of net income and depreciation and provisions following Pinkowitz *et al.* (2014), Bates *et al.* (2009) and Ferreira and Vilela (2004). VARI is measured by the standard deviation on cash flows for the period of the study Bates *et al.* (2009), Guney *et al.* (2007), Ozkan and Ozkan (2004) and Opler *et al.* (1999).

SIZE « TAIL » :

The trade-off theory predicts an inverse relationship between the size and cash holding. Brennan and Hughes (1991) argue that large firms have less asymmetric information compared to small ones. These are assumed to face more constraints in accessing the external funding market. The large firms are more diversified in general (Titman and Wessels, 1988) and have less asymmetric information than small firms accordingly more immune to the risk of financial distress and bankruptcy. They are characterized by an easier access to external funds. Small firms, deprived of this privilege will try to accumulate more cash to finance their investments. The cost of external financing is lower for larger firms because of their economies of scale that are generated by large costs incurred by the fixed cost elements of the issuance of securities Mulligan (1997) and Bates *et al.* (2009). Pinkowitz *et al.* (2014) Foley and Hartzell (2007), Faulkender and Wang (2006), Pinkowitz and Williamson (2001) and Opler *et al.* (1999) suggest that size will be negatively related to cash. We assume an inverse relationship between firm size and cash holding. For our empirical investigation the proxy of size will be the natural log of total assets as a measure of the size like, Ferreira and Vilela (2004), Ozkan and Ozkan (2004) and Pinkowitz *et al.* (2014).

Other liquid assets « ALIQ » :

Most firms have, in addition to the cash holding, other forms of liquid assets that are readily convertible into cash at a low cost. Insofar as firms can use other liquid assets in addition to cash held when they are short of cash, the assets can be considered as substitutes for cash holding. Pinkowitz *et al.* (2014), Bates *et al.* (2009), Ozkan and Ozkan (2004) and Opler *et al.* (1999) also predicts the existence of an inverse relationship between cash and other liquid assets. We presume that there is an inverse relationship between other liquid assets and cash holding. We use as a proxy for other liquid assets the net working capital minus the cash divided by total assets.

Other control variables:

To control the potential effect of dividend policy on corporate cash holding, we use variable dividend, DIVI. To check the possibility that the corporate cash holding policy is not a simply function of its capital expenditures, we include EXPE variable. Based on the trade-off theory, the dividend payments should affect negatively the cash detention Pinkowitz *et al.* (2014) Al Najjar (2013), Bates *et al.* (2009), Ozkan and Ozkan (2004) and Opler *et al.* (1999). Dividend distribution is considered as a sign of maturity, stability and access to capital markets. The relationship capital expenditure "EXPE" with the cash holding could be positive or negative. It could reflect the behavior of active or passive companies. We use a dummy variable DIVI following Al Najjar (2013), Bates *et al.* (2009) which is equal to 1 if a company pays dividends for a given year, 0 if not. We use the CAPEX to measure the ratio of capital expenditure to total.

4. Data and Methodology

4.1. Data

In order to empirically determine the various determinants of cash holding; we select a sample of 30 Tunisian companies listed for the 10-year period between (2003 to 2013). Our initial sample consists of all firms for which data are available in the period from 2001 to 2013. Our data were constructed as follows: first, all financial firms were excluded from the sample. Second, the observations firms-years missing for any variable in the model during the period type were excluded from all of these firms. These criteria have provided a study period between 2003 to 2013 for a total of 330 observations.

4.2. Methodology

The first step of our empirical analysis is to determine whether companies have a target cash levels. As with Ozkan and Ozkan (2004) and Opler *et al.* (1999), we examine first whether the cash revert to the mean and assume that if they do not, we can reject the hypothesis that firms have target cash levels. We test the hypothesis by estimating a first order autoregressive model for each firm of our sample. After testing whether if firms have target cash levels and checking the existence of a simple partial adjustment mechanism; we estimate linear regression models where the cash ratio is a function of variables that the theory identifies as decisive for cash balances. We try at first, through a static analysis, to identify the various determinants of cash holding policy and the nature of relationship between the characteristics of the company and cash holding. The Model 2 might arise as the first order condition in an optimization problem of the level of corporate cash holding i in period t . This model has a static regression over the period. Static analysis assumes that firm i in period t does not rebalances its actual liquidity ratio from one period to another which mean that the model does not depend on lagged values of the cash ratio. We move in a second step to motivate the dynamic model (model 3). The static model used in the previous phase implicitly assumes that firms can instantly adjust to the target level of cash following the changes in the characteristics of the firm and / or random shocks. In this phase, we will adopt a similar approach to Ozkan and Ozkan (2004). This approach recognizes that the adjustment process can take place involving a delay in the adjustment related to changes in the target. The existence of transaction costs and other adjustment costs could explain this possibility of delays in the adjustment process and cause the current cash levels.

We test the existence of a partial adjustment mechanism given by the following model:

Model 1

$$\Delta(LIQI_{it}) = c + \beta\Delta(LIQI_{it-1}) + \xi_t$$

With ϵ_t is (iid), Δ is a first difference operator the distribution, LIQI variable is defined as cash and marketable securities over assets. The value of the adjustment coefficient (β) is between 0 and 1, it captures the ability of firms to adjust their target cash levels. If (β) = 1, the result is that companies are able to immediately adjust their cash position which implies zero adjustment costs. On the other hand, if (β) = 0, the model implies that the adjustment costs are so huge that companies cannot change their existing cash holding. To better understand the behavior of our sample firms in terms of cash holding we will apply these models explaining the dependent variable (LIQI) in function of its determinants.

Model 2

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

Model 3

$$LIQI_{it} = c + \beta_1 LIQI_{i(t-1)} + \beta_2 ALIQ_{it} + \beta_3 LEVI_{it} + \beta_4 CROI_{it} + \beta_5 TAIL_{it} + \beta_6 DIVI_{it} + \beta_7 CFLO_{it} + \beta_8 VARI_{it} + \eta_i + \delta_t + \xi_t$$

LIQI represents cash ratio, ALIQ represents other liquid assets, LEVI: leverage CROI: Growth opportunities, TAIL: the size of the firm, CFLO: cash flow, VARI: the volatility of cash flow and DIVI: dividends, η_i and δ_t represent unobservable effects related to the firm and time effects. We assume that the effects specific differ among firms and but are fixed for a particular company over time and have a significant effect on the cash holding. The time effects vary over time but are the same for all companies in a given year. We will use the generalized method of moments (GMM). This estimator can solve problems related to the possibility that the variables specific to companies are not strictly exogenous and the estimators can be correlated with past and current values of the component of disturbance.

4.3. Descriptive and Empirical Results

In table 1 we present the descriptive empirical results of all variables of our models. This table shows the Mean, the minimum (Min), the maximum (Max) and standard deviation (Std. Dev).

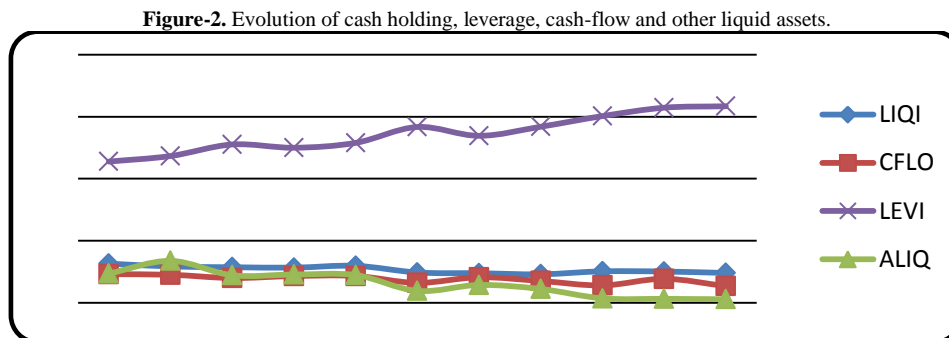
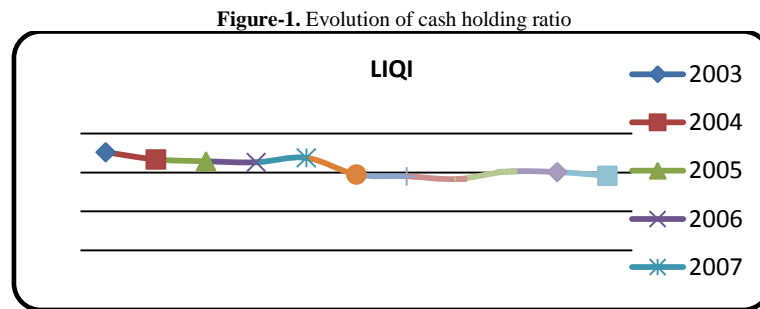
Table-1. Descriptive statistics of the determinants of cash holding

	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

Table 1 presents a descriptive statistics for all major variables used in our analysis. It reveals that the average cash proportion is 10.6%. This value is close to that announced for French, British and American companies. For example, Kim *et al.* (1998) stated that the average value of cash holding ratio is 8.1%. However, the study of Opler *et al.* (1999) shows that the cash average ratio is estimated at 17%. The study of Guney *et al.* (2007) reported a cash holding ratio of an average of 12% for French companies and 11% for British companies. The high level of average cash holding ratio in Tunisian companies shows a corporate motivation to accumulate cash. Other liquid assets have an average value of 6% and a maximum of 73% and a minimum of (14.2%). The average for a cash flow has a value of 7.6%. The leverage in turn has an average value of 53% and a maximum and minimum value of 7% and 24.1% respectively. The state of Tunisian firms ranges between highly leveraged firms and relatively financially independent companies. Growth opportunities have a maximum of 6.76 and a minimum of 0.095 and an average

value of 1.43. As for the size, Tunisian companies have an average size of 11.08 and a minimum and a maximum of a respective value of 9.58 and 14.29.

Figure 1 shows the evolution of cash ratio over the period of the study, and Figure 2 shows the evolution of the cash ratio in parallel with that of the leverage, cash flow and other liquid assets. The evolution of cash holding levels over the period of calculation shows a deterioration of cash holding from 2008 to record an increase from 2010.



As shown in Figure 1 and Figure 2, the cash holding presents a rising trend from 2003 continues until the year 2008, when there is a slight decrease in cash holding, coinciding with the credit crisis. At the same time, the ability of the debt is growing until 2008, when it began to decrease significantly to recover lately from 2010. We can observe that sometimes corporate cash holding increase when firms have less debt capacity. Firms are holding more liquidity and vice versa. Figure 2 provides also evidence of the substitution effect between cash holding and other liquid assets. During the entire period of the sample, firms in the top quintile of other liquid assets held less cash. A positive relationship was observed between the cash holding and cash flow. The companies hold more cash when it releases more cash flow. Lower cash flow was recorded during 2011 marked by the Tunisian revolution.

4.3.1 Target Cash Holding Level

The results of the estimation of the first order autoregressive model are presented in Table 2 as follows:

Table-2. Target cash holding level

Variable dépendante : $\Delta(LIQI)$			
Variable	Coefficient		t-Statistic
C	-0.0026787		-1.00
AR (1)	0.4955505		21.75
R-squared	0.6383		
F-statistic	472.93		
Prob (F-statistic)	0.0000		

Autoregressive coefficient (β) is equal to 0.4955505. This coefficient is significant at 1% indicating that the level of future cash holding depends on the current one and supporting the idea that firms adjust to a target cash ratio. Our results are consistent with those of Ozkan and Ozkan (2004). These authors report a positive and significant estimated target adjustment coefficient with value of 0.54. Our model involves that changes in cash holding can be explained by the current cash position deviation from the target levels.

4.3.2. Determinants of Cash Holding: Static Estimation

Table-3. Determinants of cash holding: Static Estimation

Variables LIQI	
LEVI	-0.0859088
	(-2.85) ^{***}
ALIQ	-0.1552882
	(-5,57) ^{***}
CFLO	0.20518
	(2,97) ^{***}
TAIL	-0.0207284
	(-2.27) ^{***}
CROI	-0.0148037
	(-1,14)
DIVI	-0.002719
	(-0,05)
VARI	-0.0470833
	(-0,67)
C	0.4014948
	(3,85) ^{***}
	R-sq = 0.3928

With LIQI: cash holding Ratio: as cash and marketable securities over assets. LEVI: leverage measured by total debt to total assets. CFLO: is the cash flow measured by net income, depreciation, amortization and provisions. TAIL: The size of firm is equal to the natural log of total assets. VARI: the standard deviation of cash flow over the period of the study. CROI: measuring growth opportunities which are equal to the Market-to-book ratio. DIVI: Measuring dividends which are measured by a dummy variable. Aliq: other liquid assets that is equal to the ratio of net working capital minus the amount of cash divided by total assets. Significance levels are respectively 1%^{***}, 5%^{**} and 10%^{*}

Table 3 presents the regressions of the panel fixed effects to predict cash holding levels over the period 2003-2013, using the independent variables described above. The independent variables were observed in the same year as the dependent variable. We find that cash holdings significantly decrease with leverage, size, growth opportunities and other liquid assets. It significantly increases with cash flow ratio and leverage. Dividends and cash flow variability do not present significant coefficients. Overall, our results suggest that factors specific to the Tunisian enterprises play an important role in determining corporate cash holding decisions. The positive sign of the cash flow coefficient is consistent with the advanced of the pecking order theory. Size and other liquid assets affect on cash holding which comply with the advances of trade-off theory. The negative sign of Leverage coefficient is consistent with the advanced of the pecking order and free cash flow theory. Growth opportunities present a negative relationship with the liquid assets which is consistent with the advances of agency theory and free cash flow theory. The results support that companies debt decisions significantly influence their cash balances. Specifically, we exhibit an inverse relationship between leverage and cash holding. The regression suggests that the leverage level has a significant negative effect on the corporate cash holding in Tunisia. The estimated coefficient is (-0085) with a t-statistic (-2.85). This result of a negative relationship between cash reserves and leverage mention that company can keep financial flexibility due to large reserves of cash and a lower leverage. Furthermore, there is no reason to borrow for the company that is able to hold cash since the cash will allow it to finance more cheaply. The recent study by Bliss *et al.* (2014) for example, show that the financial flexibility plays an important role in the financing choices when companies choose to have low leverage and preserve the possibility of borrowing in the future. The cash flow in turn exerts a positive and significant linear impact on cash holding. The cash flow ratio has coefficients with a value of 0.20 and a t-statistic of a value of 2.97. This significant positive value means that cash holding increases with the level of cash flow. This conclusion is consistent with the advanced of pecking order theory which argues that a high cash flows will be used by firms to finance new profitable investments, to repay debt, pay dividends and finally to accumulate cash. The VARI variable has a negative but insignificant effect on the level of cash holding. The regression results of the other variables show that the size coefficient is negative and significant. It admits the values of (-0.020). This negative relationship leaves us to suggest that the cash holding tends to decline with firm size. This result is in the line with the model of demand money by companies of Miller and Orr (1966) and the theory of trade-off. Large companies hold less cash compared to small ones. Small firms are facing higher costs of raising funds which encourages them to hold more cash compared to large firms. Another argument can be made for this, is that the distress level of risk is lower among large versus small firms. Large firms are less prone to asymmetric information problems. The ALIQ variable is characterized by a negative and significant coefficient in cash holding. Firms can use other liquid assets outside cash to cover the cash-flow deficit. These assets can be

considered as substitutes for cash holding. The coefficients obtained are (-0.14). This suggests that the cash holding level tends to decrease with other liquid assets. This result is consistent with the predictions of the trade-off theory which postulates that other liquid assets can be easily converted to cash, and thus they represent a substitute for cash. A non-significant and negative relationship is detected between the cash holding and opportunities of growth. This result is not consistent with our hypothesis. It may show that as far as the firm is facing an increase in its growth opportunities, they will tend to reduce their levels of cash holding which is consistent with the free cash flow theory. The DIVI variable has a negative, but not significant effect on liquidity.

4.3.3. Corporate Cash Holding Determinants: Dynamic Estimation

Table-4. Analysis of the adjustment of cash holding: GMM

Variables LIQI	
LIQI _{t-1}	0.3021366 (2.90) ^{***}
LEVI	-0.3056558 (-2.35) ^{**}
ALIQ	-0.3128751 (-2.51) ^{**}
CFLO	0.0158459 (0.06)
TAIL	0.1985754 (2.64) ^{***}
CROI	-0.0281835 (-1.10)
DIVI	0.079231 (2,31) ^{**}
EXPE	0.1063644 (-0.54)
VARI	-0.0609297 (-0.41)
Sargan test OR : chi2 (8) = 23.70 Prob > chi2 = 0.003 Sargan test EG : chi2 (7) = 23.70 Prob > chi2 = 0.001	

With LIQI: cash holding Ratio: as cash and marketable securities over assets. LEVI: leverage measured by total debt to total assets. CFLO: is the cash flow measured by net income, depreciation, amortization and provisions. TAIL: The size of firm is equal to the natural log of total assets. VARI: the standard deviation of cash flow over the period of the study. CROI: measuring growth opportunities which are equal to the Market-to-book ratio. DIVI: Measuring dividends which are measured by a dummy variable. Aliq: other liquid assets that is equal to the ratio of net working capital minus the amount of cash divided by total assets. EXPE: Capital expenditure is measured by the CAPEX Significance levels are respectively 1%^{***}, 5%^{**} and 10%^{*}

Table 4 shows the dynamic model estimations. The introduction of LIQI_{t-1} variable allows us to take account of delays in adjusting to changes in the target cash level. The adjustment coefficient K is given by $(1-\beta_1)$, it is equal to 0.7 which provides evidence that the dynamic nature of our model is not rejected. Firms adjust their cash holdings relatively quickly in an attempt to reach the target cash ratio. From a general point of view, the results of static and dynamic models are quite similar for all variables except some variables that are gaining significance. The majority of the coefficients remain the same sign. We find that the adjustment coefficient target has positive and significant values with a t-statistic of 2.90 which supports the view that firms could adapt their cash level to a target via an adjustment process of cash ratio. Cash holding depends more on changes in cash flows for prior periods because managers cannot observe the performance of the industry for the current period. Low volatility in the previous period will result a lower expected negative impact and therefore less cash holding in the current period and vice versa. The mechanisms adopted for the adjustments will depend on the actual state of corporate cash reserves. To reduce levels of cash holding, firms can opt to increased dividends payment or capital expenditures and conversely reduce them when they have insufficient cash reserves. The results are also very favorable for a negative relationship between debt (LEVI) and cash holding previously established. The ALIQ variable as expected exerts a significant negative effect on corporate cash holding decisions. An interesting result follows from the estimated coefficient of the variable TAIL, which is positive and significant. This positive coefficient suggests that there may be other factors that affect how firms' size influences their cash holding decisions. We argue that it is possible that large companies

were able to generate high cash flows which allow them to accumulate more cash. Also, we can argue that since large firms have greater growth opportunities; they may choose to hold higher levels of cash Ozkan and Ozkan (2004). The variable growth keeps its negative effect on cash holding. This result is consistent with the free cash flow theory which predicts that firms tend to reduce their cash reserves for fear of its diversion by managers who seek for control and entrenchment. We also state that cash holding increases with the payment of dividends. The DIVI variable has a significant effect on cash holding. Indeed, firms that distribute dividends may be forced to reduce or cut their dividends when they lack cash. Thus, they will maintain large amount of cash enabling them to avoid such situation.

5. Conclusion

In this article we have tried to examine the cash holding decision of Tunisian firms trying to identify the various determinants of cash holding. We used a sample of listed companies over a period from 2003 to 2013. Our analysis is distinguished by two characteristics that we believe they allow to enrich the understanding of the motivation of the firm to hold cash. We tried to determine if firm determine the optimal level of cash holding. The first expert revealed that there is a simple adjustment process to a target level. Thereafter, we proceeded in a second time to a dynamic analysis. Our results show that there are significant dynamic effects in determining the cash holding level of Tunisian firms. Other liquid assets have a negative and significant effect, confirming their role as substitute identified by the theory. We also found that large companies and those with high levels of growth opportunities tend to maintain less liquidity. This last finding is consistent with the free cash flow theory predictions that emphasizes that companies hold less cash for fear of diversion by managers.

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