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ESSAYS ON WORKING CAPITAL MANAGEMENT

ENSAYOS SOBRE GESTIÓN FINANCIERA DEL CAPITAL CIRCULANTE

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INTRODUCTION

The importance of short-term financial management in the firms is generally accepted and empirical research on this topic has received considerable attention. The current assets and liabilities represent an important share of items on a firm's balance sheet. In particular, the median value of current assets (current liabilities) to total assets is 69.78% (51.02%) for non-financial Spanish SMEs and 50.3% (34.8%) for non-financial quoted Spanish firms[1]. Given the importance of operating assets and liabilities for firms, there is growing literature analyzing trade credit granted and received by firms, inventory investment and cash holdings.

However, although previous literature indicates the importance of considering these operating assets and liabilities at the same time, most previous studies focus on them individually. As several previous works indicate, operating assets and liabilities influence each other and, hence, they must be ultimately managed jointly, rather than individually. Accordingly, this thesis analyzes the working capital requirement (WCR henceforth) of firms, defined as the sum of accounts receivable and inventories net of accounts payable. Specifically, this research examines the determinants of WCR, investigates the effect of WCR on firms' performance and analyzes the relation between WCR financing strategies and firms' performance. Finally, this thesis finishes analyzing how shareholders value the net working capital (NWC). In contrast to WCR, which is an operating concept that varies with the firm's activity level, the net working capital (current assets that are financed with long-term sources of finance) is a concept that depends on the firm's permanent components.

[1] Data obtained from the sample of Spanish firms used in chapter 1 and 2.

In addition, since firms' asymmetric information and financial constraints might also influence their WCR decisions, this research examines the WCR investment and financing decisions for both non-quoted SMEs and quoted firms.
Thus, this thesis tries to answer the following research questions:

1. What are the determinants of working capital requirement?
2. Do firms have target working capital requirement? What factors affect speed of adjustment?
3. Does WCR influence a firm's performance?
4. How do financial constraints affect the relation between WCR and firm value?
5. Does the way in which a firm finances its WCR affect its performance?
6. How do shareholders value the net working capital? Do firm financial characteristics affect the net working capital valuation?

In order to answer these questions, this thesis is organized into six chapters. Chapter I analyzes the determinants of WCR for a sample of Spanish small and medium-sized firms. Some studies suggest that current balance sheet items are sufficiently important to provoke management or markets into a continuous adjustment. As a consequence, and unlike previous works, this chapter develops a partial adjustment model that allows us to confirm whether SMEs have a target

WCR. Moreover, in contrast to previous studies, which focus on large firms, this uses a sample of SMEs due to the fact that an efficient working capital management is particularly important for these firms because of the financial constraints they face and difficulties they have in obtaining funding in the long-term capital markets.

Chapter II examines the speed at which firms adjust toward their target WCR. To our knowledge, this concern about working capital management has not been researched before. In order to do this we use a sample of quoted firms. This chapter also analyzes whether the speed of adjustment depends on a firm's characteristics such as its access to external finance and market power. The speed at which firms adjust their current WCR to their target depends on the relative costs of being off their targets compared to the cost of adjustment, so firms with lower adjustment costs adjust more rapidly. WCR can be adjusted by modifying the accounts receivable, inventories or accounts payable. Greater WCR needs to be financed and, hence, it might lead to more interest expenses and credit risk. In contrast, lower WCR could be detrimental to the sales of the firm. Accordingly, the speed of adjustment might not be equal across all firms and depend on both external finance constraints of a firm and its market power.

Chapter III aims to provide additional evidence on the relation between WCR and firm performance for a sample of SMEs. The idea that WCR affects a firm's profitability and risk is generally accepted and has recently received considerable attention. Previous studies, which have only analyzed a linear relationship between WCR and a firm's profitability, indicate that the lower the WCR the higher the profitability. However, these works ignore, for instance, the higher risk of loss of sales and interruptions in the production process that is related with low WCR. Thus,

the relation between WCR and a firm's profitability may, consequently, be concave rather than linear, and these opposing effects might be captured with a quadratic relationship. Accordingly, this chapter analyzes the relation between WCR and profitability taking into account the possible non-linearities of this relation in order to test this risk and return trade-off between different WCR strategies.

Chapter IV analyzes whether the relation between WCR and firm value is influenced by the financial constraints of a firm. Greater WCR allows firms to increase their sales and obtain greater discounts for early payments and, hence, may increase firms' value. Alternatively, larger WCR requires financing and, consequently, firms with greater WCR face additional financing expenses that might negatively affect their value. Since market imperfections increase the cost of outside capital relative to internally generated funds and may result in debt rationing and, taking into account that greater WCR needs to be financed, a firm's financial constraints could affect the relation between WCR and firm value. Thus, in this chapter we use a sample of non-financial quoted companies to contrast the effect of financial constraints on this relation. We use different variables to classify firms according to their financial constraints and bankruptcy risk.

Chapter V investigates the relation between WCR financing strategies and firm performance for a sample of SMEs. So far, there is no empirical evidence that analyzes the possible influence of WCR financing on firm performance. Investment in WCR might not be the only important concern for firms when they make their WCR decisions, because the way in which it is financed might also affect their performance. Indeed, the extended literature in corporate finance shows that a firm's value depends on its financing decisions. Additionally, it analyzes whether this

relationship between WCR financing and firm performance is influenced by a firm's ability to generate internal funds.

Chapter VI analyzes whether the way in which a firm finances its current assets influences its value. Although this chapter also examines the working capital management, unlike the previous chapters, the focus is on a longer-term decision. In particular, it examines whether the net working capital, which represents the current assets that are financed with long-term sources of finance, affects a firm's value. A greater net working capital, therefore, indicates that a higher proportion of current assets are financed with long-term funds, which allows firms to reduce both the refinancing and interest risk associated with short-term debt. Alternatively, less net working capital allows firms to reduce their financing costs, obtain credit condition benefits, mitigate agency costs and signal their positive prospects to their supplier of funds through frequent renewals of short-term debt. Additionally, this chapter also investigates whether the shareholders' valuation of net working capital depends on firm financial characteristics.

Finally, the main conclusions obtained from this thesis are presented in the last section.

CHAPTER I

WORKING CAPITAL MANAGEMENT IN SMEs

1. INTRODUCTION

Corporate finance literature has traditionally focused on the study of long-term financial decisions such as the structure of capital, investments, dividends and firm valuations. However, Smith (1980) suggests that working capital management is important because of its effects on a firm's profitability and risk, and consequently its value. Following this line of argument, some more recent studies have focused on how reduction of the measures of working capital improves a firm's profitability (Jose et al., 1996; Shin and Soenen, 1998; Deloof, 2003; Padachi, 2006; García-Teruel and Martínez-Solano, 2007a; and Raherman and Nasr, 2007).

However, much less attention has been given to the determinants of working capital management; a search of the literature identified only two previous studies (Kieschnick et al., 2006; and Chiou et al., 2006) focused on larger firms, but there is no evidence from SMEs, despite the fact that efficient working capital management is particularly important for smaller firms (Peel and Wilson, 1996; Peel et al., 2000). Most of an SME's assets are in the form of current assets, while current liabilities are one of their main sources of external finance, because of the financial constraints they face (Whited, 1992; and Fazzari and Petersen, 1993) and difficulties they have in obtaining funding in the long-term capital markets (Petersen and Rajan, 1997). The culmination of this line of argument is that working capital management may be crucial for the survival and growth of small companies, as exemplified by Grablowsky (1984) and Kargar and Blumenthal (1994). It should be mentioned that the average investment in tangible fixed assets in the sample used in this paper is

only 23.6% of their total assets, which demonstrates the importance of an efficient management of current assets.[2]

In order to measure working capital management, previous studies have used measures based on the Cash Conversion Cycle (Soenen, 1993; Deloof, 2003; Padachi, 2006; Garcia-Teruel and Martinez-Solano, 2007a). Longer Cash Conversion Cycles may increase the firm's sales and, consequently, their profitability, because of greater investment in inventories and trade credit granted. In addition, companies may get important discount for early payments if they reduce their supplier financing. However, keeping a high CCC also has an opportunity cost if firms forgo other more productive investments to maintain that level. The paper therefore develops a partial adjustment model to determine the firm characteristics that might affect the Cash Conversion Cycle in SMEs. It uses a panel of 4076 Spanish SMEs over the period 2001-2005.

We use a sample of Spanish SMEs because of the importance of working capital management for these firms. They operate in Spain, a banking oriented financial system where capital markets are less developed and banks play an important role (Schmidt and Tyrell, 1997). In this situation firms grant more trade credit to their customers, and at the same time receive more finance from their own suppliers (Demirguc-Kunt and Maksimovic, 2002). This suggests that Spanish SMEs have fewer alternative sources of external finance available, which makes them more dependent on short-term finance in general (García Teruel and Martínez Solano, 2007b), and on trade credit in particular.

[2] The average investment in tangible fixed assets for a sample of Spanish firms listed on the Spain Stock Exchange for the same period is 52.63%.

This study contributes therefore to the literature in several ways. First, unlike previous works, we develop a partial adjustment model that allows us to confirm whether SMEs have a target Cash Conversion Cycle. Secondly, from a methodological point of view, in contrast to previous studies, we improve research methods controlling for possible endogeneity, and demonstrate that endogeneity problems are crucial in analyzing the Cash Conversion Cycle, and this casts doubt on the results of some previous studies. Moreover, as has been pointed out above, this paper provides evidence on the determinants of the CCC for SMEs, where the capital market imperfections are more serious.

The findings for the present study are that SMEs have a target Cash Conversion Cycle, and they try to adjust their current Cash Conversion Cycle to their target quickly. The results also show that older firms and companies with larger cash flows maintain a longer CCC, while investment in fixed assets, growth opportunities, leverage and return on assets lead to it being shorter. Moreover, our results may be of interest for other SMEs established in countries with banking oriented financial systems, as is the case of most of the European Countries with the exception of UK among others.

The rest of this paper is organized as follows: Previous studies on the working capital management are reviewed in Section 2, and are linked to an analysis of the existing literature on market imperfections. Section 3 describes the sample used in analysis. The methodology employed is outlined in Section 4, and the results are discussed in Section 5. Finally, the main conclusions are presented in Section 6.

2. DETERMINANTS OF WORKING CAPITAL MANAGEMENT AND EXPECTED RELATIONSHIPS.

In perfect capital markets, investment decisions are independent of financing decisions and, hence, investment policy only depends on the availability of investment opportunities with a positive net present value (Modigliani and Miller, 1958) because companies have unlimited access to sources of finance and external funds provide a perfect substitute for internal resources. In this situation, a longer Cash Conversion Cycle would have no opportunity cost, because firms could obtain external funds without problems and at a reasonable price. However, internal and external finance are not perfect substitutes in practice. External finance, debt or new share issues, may be more expensive than internal finance because of market imperfections. In these circumstances, a firm's investment and financing decisions are interdependent, and firms may have an optimal Cash Conversion Cycle that balances costs and benefits and maximizes their value.

Specifically, a large CCC may increase a firm's sales and, consequently, its profitability for several reasons. First, larger inventories can prevent interruptions in the production process and loss of business due to the scarcity of products, can reduce supply costs and price fluctuations (Blinder and Maccini, 1991). Second, by extending greater trade credit the firm can increase its sales (Petersen and Rajan, 1997), because it allows customers to check that the merchandise they receive is as agreed (quantity and quality) and to ensure that the services contracted have been carried out (Smith, 1987). This argument was also supported by Deloof and Jegers (1996), who suggested that granting trade credit stimulates sales because it allows

customers to assess product quality before paying. It also helps firms to strengthen long-term relationships with their customers (Ng et al., 1999), and it incentivizes customers to acquire merchandise at times of low demand (Emery, 1987). Moreover, from the point of view of accounts payable, companies may get important discounts for early payments if they reduce supplier financing (Wilner, 2000; Ng et al., 1999). However, maintaining a high investment in working capital also has an opportunity cost if the firm forgoes other more productive investments to maintain that level and, as Soenen (1993) suggested, long Cash Conversion Cycles might be a primary reason why firms go bankrupt.

Taking the theories outlined above, and previous studies on working capital management, we explain firm characteristics that might determine Cash Conversion Cycle and how they may affect its length. Previous literature, such as Soenen (1993), Deloof (2003), Padachi (2006), Garcia-Teruel and Martinez-Solano (2007a), has measured the quality of working capital management based on the Cash Conversion Cycle. Taking all these considerations into account, the dependent variable used in the present analysis is calculated as (accounts receivables/sales)*365 + (inventories/purchases)*365 - (accounts payable/purchases)*365. The longer the cycle, the larger the funds invested in working capital, which indicates a need for additional capital. Accordingly, the Cash Conversion Cycle should be sensitive to internal resources, cost of external financing, capital market access and bargaining power with suppliers and customers.

Capacity to generate internal resources

Asymmetric information implies a higher cost for external sources of funds and credit rationing for firms, because it leads to a conflict of interests between shareholders and creditors (Myers, 1977). This conflict can lead to a problem of underinvestment, given the priority of creditors in case of bankruptcy. Moreover, shareholders also have incentives to issue new debt, which increases risk and lowers the value of existing debt. As a consequence, creditors demand a higher risk premium. Asymmetric information between insiders in the firm and outside potential investors, therefore, results in a higher cost for external sources of funds, so it makes firms give priority to resources generated internally over debt and new equity, according to the pecking order theory (Myers, 1984). In fact, Fazzari and Petersen (1993) demonstrated that working capital investment is sensitive to cash flow for US manufacturing firms. Their findings suggest that firms with a larger capacity to generate internal resources have higher current asset levels, which might be due to the lower cost of funds invested in working capital for these companies. Later, Chiou et al. (2006) also show the influence of cash flow on working capital management for companies from Taiwan. They found that cash flow has a positive influence on the net liquid balance but a negative influence on the working capital requirements, and they suggest that firms with greater cash flows have better working capital management.

The variable CFLOW was used in order to consider the capacity to generate internal resources, and it is calculated as the ratio of net profit plus depreciation to total assets. Cash flow was used because, according to several previous works, it is

the most appropriate variable for representing the capacity to generate internal resources. To date, empirical evidence offers different indications, so it is difficult to anticipate the direction of the effects of cash flow on the dependent variable.

Leverage

The cost of the funds invested in the Cash Conversion Cycle is higher in firms with a larger leverage, because, according to the theories indicated above, they have to pay a higher risk premium. In fact, the empirical evidence demonstrates a reduction in the measures of working capital management when firms increase their leverage (Chiou et al., 2006). Therefore, it is possible to anticipate a negative relationship between leverage ratio and Cash Conversion Cycle. *Leverage* (LEV) was measured using the ratio of debt to total assets.

Growth opportunities

Growth opportunities could also affect the firm's working capital management, as has been shown in various empirical studies (Nunn, 1981; and Kieschnick et al., 2006). This variable might affect trade credit granted and received by firms, as well as their investment in inventories.

Kieschnick et al. (2006) showed that future sales growth has a positive influence on a firm's Cash Conversion Cycle, and they suggest that firms might build up inventories in anticipation of future sales growth. Following this suggestion,

Blazenco and Vandezande (2003) showed that inventories were positively related to expected sales.

However, companies with higher growth options might have smaller Cash Conversion Cycle for two reasons. First, according to Cuñat (2007), high growth firms tend to use more trade credit as a source of financing for their growth, because they have more difficulty in accessing other forms of finance. Second, as Emery (1987) points out, companies might extend more credit to their customers to increase their sales in periods of low demand. These two theories are supported by Petersen and Rajan (1997).

Therefore, since these different considerations lead to opposite conclusions on the expected effect of growth options on investment in working capital, the expected relationship is not clear. SME's growth opportunities (GROWTH) were measured by the ratio $(sales_1-sales_0) / sales_0$. This measure was used because SMEs do not usually have market prices. This ratio measures past growth, and the assumption is that, according to Scherr and Hulburt (2001), firms that have grown well so far are better prepared to continue to grow in the future.

Size

Size is another variable that affects working capital management, according to empirical evidence. Kieschnick et al., (2006) showed a positive relationship between size and Cash Conversion Cycle for US corporations, and Chiou et al. (2006) also demonstrated that the working capital requirement increased with size. This may be because the cost of the funds used to invest in current assets decreases

with the size of the firm, since smaller firms have greater information asymmetries (Jordan, Lowe and Taylor, 1998; and Berger, Klapper and Udell, 2001), greater informational opacity (Berger and Udell, 1998) and are less followed by analysts. Moreover, according to the trade-off theory, they have a higher likelihood of bankruptcy, since larger companies tend to be more diversified and fail less often. This might affect the trade credit granted, because, according to Petersen and Rajan (1997) and Niskanen and Niskanen (2006), firms with better access to capital markets extend more trade credit. In fact, the latter showed that the size of the firm positively affects trade credit extended.

Whited (1992) and Fazzari and Petersen (1993) showed that smaller firms also face greater financial constraints, which also can increase their trade credit received, because they used this form of credit when other forms were unavailable (Petersen and Rajan, 1997) or had already been exhausted (Walker, 1991; Petersen and Rajan,1995; and Cuñat ,2007).

In short, the cost of funds invested in current assets is higher for smaller companies, so they might have lower accounts receivable and inventories. In addition, as has already been noted, these firms use more trade credit from their suppliers. Hence, it is expected that, as in previous research, size will positively influence the Cash Conversion Cycle maintained by companies. This factor is measured by the variable SIZE, defined as the natural logarithm of assets.

Age

The age of the firm was also included because it has been associated in the literature with a firm's sources of financing and trade credit. This variable have been used as a proxy for the time the firm may have known its customers and the firm's quality and reputation (Petersen and Rajan, 1997) as well as for the length of the relationship between suppliers and customers (Cuñat, 2007) and the firm's creditworthiness to suppliers of debt and equity (Niskanen and Niskanen, 2006).

Chiou et al. (2006) demonstrated that age has a positive influence on the working capital requirement, and this may be explained by the fact that older firms can get external financing more easily and under better conditions (Berger and Udell, 1998), so the cost of the funds used in this investment is lower in these companies. Thus, it is expected that there will be a positive relationship between age (AGE), calculated as the natural logarithm of age, and the Cash Conversion Cycle.

Tangible fixed Assets

The empirical evidence shows that investment in tangible fixed assets is another factor that could affect the firm's working capital management, for two reasons. On the one hand, Fazzari and Petersen (1993) demonstrated that fixed investment competes for funds with levels of working capital when firms have financial constraints, a finding that was supported later by Kieschnick et al. (2006), who also showed that fixed assets are negatively related to the Cash Conversion Cycle. On the other hand, intangible assets generate more asymmetric information

than tangible assets. Thus, firms with more tangible fixed assets might have lower costs when raising funds to invest in current assets and, hence, in this situation they might increase their Cash Conversion Cycle. The *investment in tangible fixed assets* of the firms (FA) is measured by the ratio *(Tangible fixed assets / total assets).* Because of these two contradictory lines of reasoning, the expected relationship between CCC and investment in fixed assets is not clear.

Return

Chiou et al. (2006) and Wu (2001) showed that a firm´s return also affects measures of working capital management. First, Wu (2001) showed that the working capital requirement and the performance of the firm have mutual effects. Subsequently, Chiou et al. (2006) found that the return on assets has a negative influence on measures of working capital management. This can be explained in two ways. First, because companies with better performance can get outside capital more easily, so they can invest in other more profitable investments (Chiou et al., 2006). Second, according to Shin and Soenen (1998), firms with higher returns have better working capital management because of their market dominance, because they have larger bargaining power with suppliers and customers. Petersen and Rajan (1997) also showed that companies with higher profitability receive significantly more credit from their suppliers. Thus, the variable *return on assets* (ROA), which is measured by the ratio Earnings Before Interest and Taxes over total assets, was introduced into the analysis and it is expected that this factor will have a negative effect on the Cash Conversion Cycle.

Industry

Several earlier studies have focused their analyses on differences in working capital management across industries (Hawawini et al., 1986; Weinraub and Visscher, 1998; Filbeck and Krueger, 2005; and Kieschnick et al., 2006). They show an industry effect on firms' working capital policies, which might be explained by differences in trade credit and investment in inventories across industries. Smith (1987) and Ng, Smith, and Smith (1999) suggested a wide variation in credit terms across industries but little variation within industries. Later, Niskanen and Niskanen (2006) also showed differences in the levels of accounts receivable and accounts payable between industries. Therefore industry dummy variables were introduced in the present analysis to control for sector of activity.

3. SAMPLE

3.1 Sample and data

The present study used panel data from non-financial Spanish SMEs. The principal source of information was the SABI (Iberian Balance Sheets Analysis System) database, which was developed by Bureau Van Dijk and contains accounting and financial information for Spanish firms.

Firms were selected that had complete data for the period 2001-2005, and which complied with the SME conditions, according to the requirements established

by the European Commission recommendation 2003/361/EC of 6 May, 2003, i.e. they had fewer than 250 employees, turned over less than 50 million euros and possessed less than 43 million euros worth of total assets. Firms with lost values, where the information was not available for the five consecutive years, and cases with errors in the accounting data were eliminated. Finally, a panel of 4076 Spanish SMEs was obtained.

Interest rate data were obtained from publications of the Information Bureau of the Spanish Annotated Public Debt Market, and information about Gross Domestic Product was collected from Eurostat.

3.2 Description of sample

Table 1 reports the sample distribution and the average and median Cash Conversion Cycle by industry. There are differences in the length of Cash Conversion Cycle across industries, which supports the argument put forward in previous studies that there is an industry effect on the firms' working capital policies. The manufacturing sector and wholesale trade sector were the two sectors with the longest Cash Conversion Cycle. In contrast, the mean Cash Conversion Cycle is negative in two sectors (services and transport). In table 2 we can also observe the importance of current assets and liabilities and working capital requirement for our sample by sector of activity.

Table 1. Structure of the sample

Industry	Number of firms	% firms	Observations	Average CCC	Median CCC
Agriculture and Mining	72	1.77%	360	52.36168	79.7933
Manufacturing	1899	46.59%	9495	105.0168	91.8148
Construction	310	7.61%	1550	34.61496	42.2560
Wholesale trade	895	21.96%	4475	97.61311	87.7145
Retail trade	425	10.42%	2125	57.48326	48.8921
Services	322	7.9%	1610	-143.1592	-27.88
Transport	153	3.75%	765	-124.3751	0.5559

Notes: Average CCC measures the average Cash Conversion Cycle; Median CCC measures the median Cash Conversion Cycle.

Table 2. Firm characteristics by sector of activity

	CA/TA		CL/TA		WCR	
	Mean	Median	Mean	Median	Mean	Median
Agriculture and Mining	0.53	0.55	0.38	0.35	0.26	0.25
Manufacturing	0.64	0.65	0.47	0.47	0.34	0.33
Construction	0.81	0.85	0.64	0.67	0.31	0.31
Wholesale trade	0.78	0.81	0.56	0.58	0.39	0.40
Retail trade	0.70	0.72	0.57	0.58	0.31	0.30
Services	0.47	0.45	0.39	0.35	0.18	0.12
Transport	0.53	0.51	0.44	0.43	0.19	0.18

Notes: This table shows the importance of current assets and liabilities in firms by sector of activity. CA/TA is the ratio current assets to total assets. CL/TA is the ratio current liabilities to total assets. WCR is the ratio accounts receivables plus inventories minus account payables to total assets.

Finally, a formal test was used to ensure that the multicollinearity problem was not present in the analysis. The Variance Inflation Factor (VIF) was calculated for each independent variable included in the model. Since the VIF was not greater than 3 in any cases, it can be concluded that collinearity was not a concern in the present sample (Studenmund, 1997).

4. METHODOLOGY

Taking as a starting point the theories described in Section 2, the hypotheses on factors that affect the Cash Conversion Cycle were tested using the panel data methodology. Panel data were used because of the advantages they provide. On the one hand, it is possible to control for unobservable heterogeneity, and this makes it possible to exclude biases deriving from the existence of individual effects (Hsiao, 1985). In addition, it makes it possible to develop a target adjustment model, which makes it possible to explain a firm's Cash Conversion Cycle in terms of its CCC in the previous period and its target CCC.

It is assumed that companies pursue a target level when they make their working capital management decisions, and that this level is a linear function of the explanatory factors defined above, so it can be expressed as:

$$CCC^*_{it} = \beta_0 + \beta_1 CFLOW_{it} + \beta_2 LEV_{it} + \beta_3 GROWTH_{it} + \beta_4 SIZE_{it} + \beta_5 AGE_{it} + \beta_6 FA_{it} + \beta_7 ROA_{it} + \varepsilon_{it} \quad (1)$$

Where ε_{it} is a random disturbance and β_k are unknown parameters to be estimated.

Firms will adjust their Cash Conversion Cycle (CCC) to achieve this target level (CCC*). However, the adjustment is not immediate because firms bear adjustment costs, so they will adjust their current levels according to the following expression:

$$CCC_{it} - CCC_{i,t-1} = \gamma (CCC^*_{it} - CCC_{i,t-1}) \; ; \; 0 < \gamma < 1 \quad (2)$$

Therefore, $(CCC^*_{it} - CCC_{i,t-1})$ is the adjustment required to reach the firm's target level, and the coefficient γ measures the speed of adjustment, and takes values between 0 and 1. If $\gamma = 1$, then $CCC_{it} = CCC^*_{it}$, so the firms immediately adjust their Cash Conversion Cycle to their target level. However, if $\gamma = 0$, then $CCC_{it} = CCC_{i,t-1}$, and this indicates that the costs of adjustment are so high that the firm does not adjust its Cash Conversion Cycle, and remains at the same level as in the previous period.

If Equation (1) is substituted into Equation (2), and the unobservable heterogeneity and the time dummy variables are included, the current Cash Conversion Cycle is determined by:

$$CCC_{it} = \gamma\beta_0 + (1 - \gamma)CCC_{i,t-1} + \gamma\beta_1 CFLOW_{it} + \gamma\beta_2 LEV_{it} + \gamma\beta_3 GROWTH_{it} + \gamma\beta_4 SIZE_{it} + \gamma\beta_5 AGE_{it} + \gamma\beta_6 FA_{it} + \gamma\beta_7 ROA_{it} + \eta_i + \lambda_t + \gamma\varepsilon_{it} \quad (3)$$

which can be rewritten as :

$$CCC_{it} = \alpha + \rho\, CCC_{i,t-1} + \delta_1 CFLOW_{it} + \delta_2 LEV_{it} + \delta_3 GROWTH_{it} + \delta_4 SIZE_{it} + \delta_5 AGE_{it} + \delta_6 FA_{it} + \delta_7 ROA_{it} + \eta_i + \lambda_t + \upsilon_{it} \quad (4)$$

where $\alpha = \gamma\beta_0$; $\rho = (1 - \gamma)$; $\delta_k = \gamma\beta_k$; and $\upsilon_{it} = \gamma\varepsilon_{it}$

This model for SMEs is estimated in Section 5, where CCC_{it} represents the level of Cash Conversion Cycle of firm i at time t; $CFLOW_{it}$ cash flow; LEV_{it} the leverage; $GROWTH_{it}$ growth opportunities; $SIZE_{it}$ the size; AGE_{it} the age; FA_{it} investment in fixed assets; and ROA_{it} return on assets. The variable η_i is the

unobservable heterogeneity or the firm's unobservable individual effects. This variable captures the particular characteristics of each firm as well as the characteristics of the sector in which it operates. The variable λ_t is a time dummy that changes in time but is equal for all firms in each of the time periods considered. This parameter is designed to capture the influence of economic variables that may affect the firm's Cash Conversion Cycle but which they cannot control. Finally, parameters υ_{it} are random disturbances.

5. RESULTS

Table 3 reports the results. A number of alternative estimates of the model proposed have been calculated. There were two reasons for doing this. On the one hand, it helps to explain some of the differences between the results found here and those found in previous research. On the other, the analysis can be made more robust by the introduction of industry dummies and macroeconomic factors like interest rates and growth of Gross Domestic Product.

Thus, in Columns (1) and (2) the results are reported for a static model using OLS estimation and fixed effects model respectively, as has been done in previous studies on the determinants of working capital management (Chiou et al., 2006; and Kieschnick et al., 2006). In the OLS estimation the results found here are very similar to those obtained by Chiou et al., (2006). These results do not change when the lagged dependent variable is introduced as an independent variable in Column (3) and the model is re-estimated using OLS estimation. In addition, this variable is

significant, so it might indicate, as suggested above, that firms' Cash Conversion Cycles depend on their level in the previous period and on firms' target Cash Conversion Cycles. However, the estimation by OLS is inconsistent even if the random disturbances are not serially correlated, given that $CCC_{i,t-1}$ is correlated with η_i. In addition, the intragroup estimator, which estimates the variables transformed into deviations from the mean, is also inconsistent, because (CCC_{it-1} - $\overline{CCC}_{it-1}$) is correlated with (υ_{it} - $\bar{\upsilon}_{it}$). Finally, the OLS estimation of first differences is inconsistent as a consequence of the correlation between ΔCCC_{it-1} and $\Delta \upsilon_{it}$, since CCC_{it-1} and υ_{it-1} are correlated. Moreover, this estimation does not control for endogeneity, although the endogeneity problem appears to be present in the analysis and could seriously affect the estimation results. Also, the Cash Conversion Cycle might influence the independent variables. For example, several studies have shown how the Cash Conversion Cycle can have a significant effect on measures of a firm's profitability and sales.

In order to avoid these problems of inconsistency and control for endogeneity, a method of instrumental variables was used in the estimations that follow. We use the two-step GMM (Generalized Method of Moments) estimator since, although the estimator of instrumental variables in one stage is always consistent, if the disturbances show heteroskedasticity, the estimation in two stages increases efficiency.

Column (4), therefore, shows the model described in section 4 estimated with the two-step GMM estimator proposed by Blundell and Bond (1998). Then, in

Column (5), this model is re-estimated, but with industry dummies, which take value 1 if the firm belongs to a specific sector and 0 otherwise. The results are similar to those obtained in Column (4), where there was no control by sector of activity[3]. Finally, short-term interest rates and growth in Gross Domestic Product were included in Column (6). The time dummies have been dropped in this regression to avoid the multicollinearity problem, since these dummies should capture the influence of interest rates and Gross Domestic Product growth. The results do not change. The m_2 statistic was used to test for the absence of second-order serial correlation in the first difference residuals. This statistic is always within an acceptable range, which indicates there is no second-order serial correlation. The results of the Hansen test for over-identifying restrictions are also shown, and indicate the absence of correlation between instruments and error term.

Thus, the comments below are associated with the results presented in columns 4 to 6 in table 3[4].

The results show a significant lagged dependent variable coefficient, which indicates that Spanish SMEs pursue a target Cash Conversion Cycle that balances the costs and benefits of maintaining it. In addition, the companies try to adjust their current CCC to their target quickly (their adjustment coefficient γ is 0.87). This might be explained by the fact that SMEs have large costs when they are off their target level because of their financial constraints and the difficulties in obtaining funding in the long-term capital markets. This appears to support the idea that good

[3] However, our findings indicate that industry provides significant additional explanatory power because the industry dummy variable coefficients are significant.

[4] We also re-estimated the model, excluding those companies from Services and Transport industry with negative Cycles, and eliminating those industries sectors with a negative average Cash Conversion Cycle (Services and Transport). In both cases we obtained the same results.

working capital management is very important for SMEs, as has been suggested by Grablowsky (1984), Kargar and Blumenthal (1994) and Peel and Wilson (1996).

The results for the rest of the variables are only partly consistent with previous studies. These differences in findings indicate that endogeneity problems and the unobservable heterogeneity of the firms are crucial in analysing the Cash Conversion Cycle and require proper econometric treatment.

It was found that firms with larger cash flows and lower leverage had longer Cash Conversion Cycles, and this might be explained by the fact that the cost of funds invested in the Cash Conversion Cycle are lower for these firms, since they have to pay a lower risk premium. In addition, it was found that the variable cash flow had a more important economic impact on Cash Conversion Cycle held by firms than leverage, although they are quite similar. In fact, the results indicate that an increase of one standard deviation in the cash flow produces an increase in the firms' CCC of 19.68% (over the mean), while an increase of leverage of one standard deviation reduces it by 17.27%.

In contrast with the results of Kieschnick et al. (2006), it was found that firms with more growth opportunities maintain a lower investment in working capital. This supports the hypothesis that these companies receive more trade credit from their suppliers (Cuñat, 2007) and that firms with declining sales offer more trade credit (Emery, 1987; and Petersen and Rajan, 1997). In addition, this variable was found to have the most important economic impact, because an increase in growth options of one standard deviation reduces firms' Cash Conversion Cycle by 72.04%.

With regard to the effects of size, previous studies of large firms (Jose et al., 1996; Chiou et al., 2006; Kieschnick et al., 2006) showed that this variable

significantly affected working capital management. However, our results reveal no influence on SME's Cash Conversion Cycle. This may be because the sample here is made up of homogeneous small companies of similar size.

It was found that older firms, which have better access to external capital, maintain longer Cash Conversion Cycles. Hence, it appears that firms with better access to the capital markets maintain a more conservative working capital policy because of their lower costs for financing and the trade credit used, along with their greater trade credit granted. Moreover, the economic significance of the influence of age on the Cash Conversion Cycle held by firms showed that, all other things being equal, an increase in the age of one standard deviation produced an increase in the CCC of 12.13%.

With regard to the effects of investment in fixed assets, the present study found, as had Fazzari and Petersen (1993), that it negatively influences firms' Cash Conversion Cycle. This supports the hypothesis, developed by those authors, that fixed investment competes for funds with levels of working capital when firms operate under financial constraints. In addition, it was found that this variable also has an important economic impact on Cash Conversion Cycles held by firms. The results indicate that an increase of one standard deviation in the investment in fixed assets reduces the length of CCC by 37.76%.

On the other hand, it was found, as expected, that return on assets is another variable which helps explain the Cash Conversion Cycle maintained by SMEs. The results show a negative relationship between these two variables. This result is in line with the larger bargaining power of firms with higher returns (Shin and Soenen, 1998), and their investment in other more profitable projects (Chiou et al., 2006).

The economic impact of this variable is also important, because an increase in return on assets of one standard deviation is associated with a reduction in Cash Conversion Cycle of 26.97%.

Finally, empirical evidence suggests that macroeconomic factors like interest rates and Gross Domestic Product should influence trade credit and investment in inventories. Smith (1987) and Walker (1991) argued that the state of the economy influences on the level of accounts receivable. Moreover, Michaelas et al. (1999) suggested that small businesses rely more heavily on short-term financing, which makes them more sensitive to macro-economic changes. On the other hand, Blinder and Maccini (1991) found that recessions are related to drastic inventory reductions, and other studies, such as Carpenter et al. (1994), and Kashyap et al. (1994) found a stronger impact of cyclical fluctuations on the inventories of small firms than on those of bigger ones. Hendel (1996), Carpenter et al. (1994), and Kashyap et al. (1994) argued that this result might be due to the larger short-term financing costs of small companies. However, the results of the present study show that interest rates and GDP growth have no effect on the Cash Conversion Cycle (column 6). This may be explained by the fact that the selected research period was short and that these two variables were quite stable over that period.

Table 3. Determinants of Cash Conversion Cycle in SMEs

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
CCC_{it-1}			0.0009***	0.1316***	0.1345***	0.1352***
			(3.39)	(13.49)	(13.86)	(14.18)
CFLOW	-804.6768***	-129.6009*	-803.2776***	192.7778***	150.7945***	148.2809***
	(-13.74)	(-1.81)	(-13.71)	(4.24)	(3.43)	(3.33)
LEV	-173.3686***	-191.5337***	-173.353***	-55.6023**	-47.5009**	-43.2655*
	(-12.69)	(-5.62)	(-12.69)	(-2.32)	(-2.02)	(-1.82)
GROWTH	0.1507	0.5764	0.0400	-15.8345***	-16.2631***	-16.3864***
	(0.16)	(0.76)	(0.04)	(-14.27)	(-14.85)	(-15.19)
SIZE	34.0953***	-7.9669	34.0947***	5.1759	10.6961	11.9525
	(8.69)	(-0.64)	(8.69)	(0.54)	(1.25)	(1.39)
AGE	20.4533***	3.2658	20.4867***	16.8378***	12.9063***	13.9831***
	(4.49)	(0.09)	(4.50)	(3.87)	(3.34)	(3.61)
FA	-197.0956***	-150.2926***	-196.6216***	-77.5858*	-144.3556***	-145.1155***
	(-13.87)	(-3.95)	(-13.84)	(-1.86)	(-3.96)	(-3.97)
ROA	235.8376***	19.2249	235.5186***	-206.4275***	-185.337***	-188.1373***
	(4.86)	(0.32)	(4.85)	(-5.22)	(-4.72)	(-4.73)
GDP						-335.3369
						(-1.31)
INT						-30.0601
						(-0.15)
Industry dummies	NO	NO	NO	NO	YES	YES
m_2				-1.23	-1.23	-1.23
Hansen Test				101.25 (90)	102.13 (90)	103.27 (91)
Observations	20380	20380	20380	20380	20380	20380

Notes: The dependent variable is the Cash Conversion Cycle; CFLOW the capacity to generate internal resources; LEV the leverage; GROWTH the growth opportunities; SIZE the size; AGE the age; FA investment in fixed assets; and ROA the return on assets. Column (1) shows the estimate by OLS; Column (2) by fixed effects; Column (3) introduces the lagged dependent variable as an independent variable and the model is estimated by OLS; Column (4) shows the 2-stage GMM estimator; Column (5) the 2-stage GMM introducing dummy industry variables; and Column (6) presents the 2-step GMM using the variables Gross Domestic Product growth and interest rate.
Z statistic in brackets.
* Indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1%. level
m_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as N(0,1) under null hypothesis of no serial correlation. Hansen test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments as Chi-squared. Degrees of freedom in brackets.

6. CONCLUSIONS

In this paper, a target adjustment model has been developed to investigate the characteristics of firms that might explain the length of Cash Conversion Cycle in small and medium-size enterprises. A sample of 4076 non-financial Spanish SMEs was used. The results show that these firms pursue a target Cash Conversion Cycle to which they attempt to converge. In addition, it was found that this adjustment is relatively quick, which might be explained by the fact that the costs of being far from the target Cash Conversion Cycle are significant for these firms because of the financial constraints under which they operate and the difficulties in obtaining funding in the long-term capital markets.

It can also be seen that the results are only partly consistent with previous studies, which demonstrates that the heterogeneity of firms and endogeneity problems are crucial in analyzing the Cash Conversion Cycle. The present study found that older firms and companies with greater cash flows maintain a longer CCC, while firms with larger leverage, growth opportunities, investment in fixed assets and return on assets maintain a more aggressive working capital policy. This appears to indicate that the cost of financing has a negative effect on firms' Cash Conversion Cycles. The results also suggest that a better access to capital markets for firms might increase their investment in working capital.

To conclude, this paper shows the importance of market imperfections for Cash Conversion Cycle management in SMEs, which affect the levels invested in

working capital. The evidence found may be of interest for SMEs operating within a bank-based financial system.

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CHAPTER II

THE SPEED OF ADJUSTMENT IN WORKING CAPITAL REQUIREMENT

1. INTRODUCTION

Since Smith (1980) suggested that working capital management is important because of its effects on a firm's profitability and risk, and consequently its value, the literature on working capital management has developed through empirical contributions. In particular, some more recent studies have focused on how investment in working capital affects a firm's performance (Jose et al., 1996; Shin and Soenen, 1998; Deloof, 2003; Padachi, 2006; García and Martínez, 2007; Raherman and Nasr, 2007; among others), while a more scant literature analyze the empirical determinants of this investment (Chiou, Cheng and Wu, 2006; Hill, Kelly and Highfield, 2010; and Baños, García and Martínez, 2010).

The current assets and liabilities represent an important share of items on a firm's balance sheet. Using a sample of Spanish firms, we find that the median value of current assets (current liabilities) to total assets is 50.3% (34.8%). The median value of working capital requirement (WCR), defined as the sum of accounts receivable and inventories net of accounts payable, to total assets is 21.2%. Given the importance of operating assets and liabilities for firms, there is a growing literature analyzing firms' short-term investment and financing decisions.

Although the most previous studies focus on the determinants of individual components of WCR (accounts receivable, inventories and accounts payable), Hill et al., (2010) indicate that operating assets and liabilities must be ultimately managed jointly rather than individually. Accordingly, this paper integrates the individual components to analyze the determinants of investment in WCR. In particular,

following Shin and Soenen (1998) we use the Net Trade Cycle (NTC) as a measure of WCR, which is calculated by the following expression: NTC= (accounts receivables/ sales)*365 + (inventories/sales)*365 - (accounts payable/sales)*365. It indicates the number of "sales days" the firm has to finance its working capital requirement (Shin and Soenen 1998), where the longer this cycle, the larger the WCR.

Unlike previous studies, using a partial adjustment model, we analyze the speed with which firms adjust toward their target WCR. Moreover, this paper also examines whether this speed of adjustment depends on a firm's characteristics such as its access to external finance and market power. To our knowledge, this is the first paper to carry out these analyses.

Our findings indicate that firms have a target WCR and that they adjust their current level to their target gradually over time because of adjustment costs. Moreover, we find that firms adjust relatively quickly, which supports the idea that current balance sheet items are easier to manipulate and, hence, could be changed quite easily, even in the short run. Finally, our findings indicate that the speed of adjustment is not equal across all firms and that firms with better access to external finance and greater bargaining power adjust more quickly, indicating that their costs of adjustment are low compared to the costs of being off their targets.

The remainder of this paper is organized as follows. The next section discusses substantive issues related to target WCR and adjustment costs. In section 3 we describe the empirical model, the method used to estimate the model and the data. Our results are presented in section 4. Section 5 then extends the model in Section 3

to test whether external finance constraints and bargaining power affect adjustment speed. Finally, the main conclusions are presented in Section 6.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

Lee and Wu (1988) and Peles and Schneller (1989) suggest that firms have target current balance sheet items. Specifically, they employ a partial adjustment model to show that financial ratios involving current balance sheet items are sufficiently important to provoke management or markets into a continuous adjustment.

Larger WCR may positively affect firms' performance for two reasons. First, it may increase firm's sales (Blinder and Maccini 1991; Smith 1987; Emery 1987; Deloof and Jegers 1996; Petersen and Rajan 1997; and Ng, Smith and Smith 1999). Second, firms can get important discounts for early payments by reducing their supplier financing (Ng et al., 1999; and Wilner, 2000). However, greater WCR also has costs. On the one hand, since a larger WCR needs to be financed, it may lead to more interest expenses and credit risk, which might also lead companies to bankruptcy (Soenen, 1993). On the other hand, keeping stock available also supposes costs, such as warehouse rent and security expenses, which tend to rise as inventories increase (Kim and Chung, 1990).

Accordingly, we expect that firms have a target WCR. However, a firm's current WCR may not always equal its desired WCR for several reasons. Nadiri (1969), for instance, suggests that firms cannot always estimate their sales accurately

and with certainty, and hence neither their purchases; they do not accurately anticipate changes in monetary policy or in the rates of default and bad debts on their trade credit; and the discovery and collection of delinquent accounts takes time and involves costs, which may be distributed over time. Peles and Schneller (1989) also suggest that firms might deviate from their target because of random or other temporary shocks, changes in the costs of production factors, or due to improvements in technology. Management should then take the appropriate steps to achieve the target WCR.

Peles and Schneller (1989) suggest that current balance sheet items are to a large extent under the firm's control and, hence, they are easier to manipulate and could be changed quite easily, even in the short run. However, we do not expect adjustment toward the target WCR to be immediate, because of costs of adjustment. Firms will adjust their WCR only if the benefits of doing so more than offset the costs of reducing the firm's deviation from target WCR.

WCR can be adjusted by modifying the accounts receivable, inventories or accounts payable. A greater WCR needs to be financed and, hence, it might lead to more interest expenses and credit risk. On the contrary, a lower WCR could be detrimental to the sales of the firm. Accordingly, we expect that speed of adjustment is not equal across all firms and depends on both the external finance constraints of a firm and its market power.

Since changes in WCR may be associated with changes in a firm's external finance, we expect faster speeds of adjustment for firms with a better access to external capital markets. To the extent a firm has better access to capital markets it could more easily modify its investment in accounts receivables and inventories as

well as its received trade credit. Similarly, firms with greater market power can also modify their WCR more easily, for two reasons (Hill et al., 2010). First, they can extend the credit terms received from their suppliers and hold less inventory with little repercussion on their relationships with suppliers. Second, firms with a greater market power can reduce the terms of trade credit granted to their customers without paying a large penalty in terms of a drop in sales. Thus, we expect also to see higher rates of adjustment for companies with both greater access to external finance and greater bargaining power.

3. METHOD AND DATA

3.1. Method

To analyze the determinants of WCR and how firms modify their WCR to move toward their target, this paper uses the following standard partial adjustment model:

$$NTC_{i,t} - NTC_{i,t-1} = \gamma(NTC^*_{i,t} - NTC_{i,t-1}) \quad 0 < \gamma < 1 \qquad (1)$$

where $NTC_{i,t}$ is the Net Trade Cycle in the period t, and $NTC^*_{i,t}$ is the target Net Trade Cycle. We use the NTC as a proxy for a firm's WCR. Specification (1) implies that firms may face costs of adjustment that may prevent immediate adjustment to a

firm's target. The coefficient γ measures the speed of adjustment, which is inversely related to adjustment costs, and takes values between 0 and 1. If $\gamma = 0$, then $NTC_{i,t} = NTC_{i,t-1}$, and the current Net Trade Cycle remains as in the previous period, indicating that companies bear high adjustment costs. If, in contrast, $\gamma = 1$, then $NTC_{i,t} = NTC^{*}_{i,t}$, and firms immediately adjust their Net Trade Cycle to their targets.

To model a target NTC, we use a set of variables that appear regularly in the literature as determinants of a firm's WCR (Hill et al., 2010; and Baños et al., 2010). The variables and their expected effects on the target NTC are as follows:

Cash Flow

The preference for funds generated internally (Myers, 1984) and the possible credit rationing (Greenwald, Stiglitz, and Weiss, 1984) due to asymmetric information and agency costs might affect the level of a firm's investment and, hence, its WCR. A positive cash flow allows firms to finance a positive WCR and, hence, we expect the capacity to generate internal funds to influence NTC positively. This variable is defined as the ratio of earnings before interest and tax plus depreciation to sales.

Cost of external financing

We expect firms with a higher cost of external finance to hold a smaller NTC, since they have to pay a greater interest rate to borrow and, hence, the cost of funds invested in WCR is higher. The *cost of external finance* is measured by two proxies. The first ($FCOST_1$) is calculated by the ratio interest expenses/(total debt - accounts payable). In the second ($FCOST_2$), we do not eliminate accounts payable from the total debt.

Growth opportunities

Firms with high growth opportunities use more trade credit as a source of financing (Petersen and Rajan, 1997; and Cuñat, 2007) and tend to grant less trade credit to their customers (Molina and Preve, 2009). Thus, we would expect these companies to have a lower WCR. We also use two proxies to measure the growth opportunities. $GROWTH_1$ is calculated by the ratio market-to-book value of assets ((market value of equity + book value of debt) / total assets), while $GROWTH_2$ is defined as the ratio market-to-book value of equity (market value of equity / book value of equity).

Size

Larger firms suffer less severe asymmetric information between insiders and outsiders (Jordan, Lowe and Taylor 1998; and Berger, Klapper, and Udell 2001)

because more public information is available to them. As a consequence, they have better access to capital markets and may find it easier to finance a positive WCR. Thus, size would be expected to positively influence WCR. However, because of their lower reputations, smaller firms have to extend more credit to guarantee their products (Long, Malitz, and Ravid 1993; Lee and Stowe 1993; and Pike, Cheng, Cravens and Lamminmaki 2005) and they are offered less trade credit (Niskanen and Niskanen 2006), which might cause them to increase their WCR too. Since these various considerations lead to opposite conclusions on the expected effect of size on WCR, the expected relationship is not clear. This variable is proxied by the natural logarithm of assets.

Fixed assets

Investment in fixed assets might compete with the WCR for a firm's capital when firms operate under imperfect capital markets, as reported by Fazzari and Petersen (1993), so a negative relationship between these variables might be expected. The investment in fixed assets of the firm is measured by the ratio tangible fixed assets over total assets[5].

[5] The tangible fixed assets are measured as a stock variable.

Probability of financial distress

The costs of financial distress arise when the firm cannot meet its payment obligations in either the short or long term. This can affect the WCR of firms, since companies with a greater probability of financial distress have more difficulties obtaining capital and, hence, are expected to have a lower WCR. The likelihood of financial distress (ZSCORE) is calculated according to the re-estimation of Altman's (1968) model carried out by Begley, Mings, and Watts (1996), where a higher ZSCORE implies a lower probability of insolvency[6].

Profitability

It is known that firms with a higher profitability can obtain funds more easily, but they also tend to receive significantly more credit from their suppliers (Petersen and Rajan 1997) and hold lower finished goods inventories (Blazenco and Vandezande 2003). In contrast, firms facing profitability problems tend to increase trade credit receivable prior to entering financial distress (Molina and Preve 2009). Thus, we expect firms with a greater profitability to hold a lower WCR. The ratios earnings before interest and taxes over total asset (PRO_1) and earnings before interest and taxes over sales (PRO_2) are used in our analysis as proxies for this variable.

[6] ZSCORE is defined as the following expression:

$$ZSCORE_{it} = 0.104*X_1 + 1.010*X_2 + 0.106*X_3 + 0.003*X_4 + 0.169*X_5$$

where X_1 = Working capital / Total assets; X_2 =Retained earnings / Total assets; X_3 = Net operating profits /Total assets; X_4 = Market value of capital / Book value of debt; and X_5 = Sales / Total assets.

Gross Domestic Product

The growth of Gross Domestic Product, which affects accounts receivable (Smith 1987; and Walker 1991), inventories (Blinder and Maccini 1991; Carpenter, Fazzari, and Petersen, 1994; and Kashyap, Lamont, and Stein, 1994), and accounts payable (Nilsen 2002) could also be a determinant of a firm's WCR.

Accordingly, a firm's target Net Trade Cycle is estimated by:

$$NTC^*_{i,t} = \beta_0 + \beta_1 CFLOW_{i,t} + \beta_2 FCOST_{i,t} + \beta_3 GROWTH_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 FA_{i,t} + \beta_6 ZSCORE_{i,t} + \beta_7 PRO_{i,t} + \beta_8 GDP + \varepsilon_{i,t} \quad (2)$$

where $\varepsilon_{i,t}$ is a random disturbance and β_k are the unknown parameters to be estimated. Substituting equation (2) into equation (1) and including the unobservable heterogeneity and the industry dummy variables, the current NTC is determined by:

$$NTC_{i,t} = \alpha + \rho NTC_{i,t-1} + \delta_1 CFLOW_{i,t} + \delta_2 FCOST_{i,t} + \delta_3 GROWTH_{i,t} + \delta_4 SIZE_{i,t} + \delta_5 FA_{i,t} + \delta_6 ZSCORE_{i,t} + \delta_7 PRO_{i,t} + \delta_8 GDP + \eta_i + \lambda_i + \upsilon_{i,t} \quad (3)$$

where $\alpha = \gamma\beta_0$; $\rho = (1-\gamma)$; $\delta_k = \gamma\beta_k$; *and* $\upsilon_{i,t} = \gamma\varepsilon_{i,t}$

Parameter η_i is the unobservable heterogeneity or the firm's unobservable individual effects. The variable λ_i is a dummy variable to control for industry effects. Finally, parameters $\upsilon_{i,t}$ are random disturbances.

We use the panel data methodology to estimate our model for two reasons. First, it allows us to control for unobservable heterogeneity and, therefore, eliminate the risk of obtaining biased results arising from this heterogeneity (Hsiao 1985). Second, panel data also allows us to avoid the problem of possible endogeneity, which appears evident in our analysis, as several studies have shown. In particular, previous literature shows that working capital management might also affect profitability (Jose et al. 1996; Shin and Soenen 1998; Deloof 2003; and Garcia and Martinez 2007) and firms' sales (Smith 1987; Emery 1987; Deloof and Jegers 1996; Petersen and Rajan 1997; and Ng et al. 1999). If we do not control for endogeneity, it might affect the estimation results. We therefore use the two-step System -GMM estimator proposed by Blundell and Bond (1998).

3.2. Data

The data for this analysis were obtained from three sources of information. First, data from financial statements have been taken from the SABI (Iberian Balance Sheets Analysis System) database, which was developed by Bureau Van Dijk. Second, the market value of equity was extracted from CNMV (Spanish Stock Exchange Commission). Finally, Gross Domestic product data were collected from the Bank of Spain.

Our data consist of non-financial Spanish firms listed on the Spanish Stock Exchange for the period 1997-2004. We have selected firms whose information is available for at least five consecutive years between 1997 and 2004, which is a

necessary condition to have a sufficient number of periods to be able to test for second-order serial correlation. We obtained a final panel comprising 60 firms. This sample is representative of the Spanish stock market, since the firms represent 83.52% of the total market value of non-financial Spanish firms. In fact, the *t* test (*p*-value is 0.3624) confirms that there are no significant differences between the mean market value of our sample and the mean market value of non-financial firms in the Spanish stock market for the period analyzed. Neither are there significant differences between our sample and the non-financial firms in the Spanish stock market for the *Net Trade Cycle* variable (*p*-value of *t*-test of -1.5076) and for the variable WCR to total assets (*p*-value of *t*-test of 0.5437).

Table 1 reports the median values of Net Trade Cycle by sector and year. We observe that the Net Trade Cycle differs between sectors, thus supporting the industry effect on the firms' working capital management suggested by earlier studies (Weinraub and Visscher 1998; Filbeck and Krueger 2005). The longest Net Trade Cycle during our period of analysis is found in retail trade (162.19 days). In contrast, transport and public services (37.99 days) has the shortest. On the other hand, we can see how the NTC has been reduced in all sectors from 1997 to 2004, except in agriculture and mining.

Table 1. Median values of Net Trade Cycle by year and sector

	1997	1998	1999	2000	2001	2002	2003	2004	1997-2004
Agriculture and Mining	53.36	61.34	219.93	187.08	173.19	185.38	181.28	135.22	72.85
Manufacturing	92.17	111.95	116.42	107.40	91.16	90.16	106.55	91.49	100.35
Construction	73.33	83.25	79.20	70.87	63.20	66.58	47.44	58.20	70.23
Wholesale trade	138.60	117.62	165.66	93.45	97.77	106.01	106.70	118.45	112.12
Retail trade	208.40	186.33	126.03	127.99	135.18	132.96	136.66	142.89	162.19
Services	132.05	160.19	96.45	88.61	85.87	59.77	79.59	83.87	89.78
Transport and public services	46.51	67.65	34.52	43.32	41.45	17.55	16.84	23.35	37.99
Total	90.12	96.9	97.51	92.73	88.19	89.70	85.80	84.98	91.46

Notes: The Net Trade Cycle is calculated as ((accounts receivable + inventories - accounts payable)/sales)*365

In table 2 we can observe the importance of current assets and liabilities as well as WCR by sector of activity. In addition, we also present the median values of the individual components of our dependent variable. The high value of current assets over the total assets in the majority of sectors indicates the importance of managing them efficiently. So, the largest investments in current assets over the total assets are in construction (72.7%) and retail trade (67.8%). With regard to the median periods by sector, we can see that firms dedicated to the agriculture and mining take least time to collect payments from their customers and are also the first to pay their suppliers. In contrast, firms from the construction sector grant their customers the longest payment period and take the longest to pay their suppliers. In relation to stock, storage time is longest in wholesale trade, while the shortest is in transport and public services.

Table 2. Firms' characteristics by sector of activity

	AR	INV	AP	CA/TA	CL/TA	WCR/TA
Agriculture and Mining	69.69	21.75	26.61	0.244	0.242	0.118
Manufacturing	104.34	59.47	54.52	0.456	0.325	0.229
Construction	176.05	37.42	146.72	0.727	0.595	0.155
Wholesale trade	77.16	88.83	50.28	0.573	0.576	0.313
Retail trade	152.21	73.54	49.23	0.678	0.245	0.465
Services	106.72	50.44	51.34	0.475	0.366	0.168
Transport and public services	93.41	6.87	66.94	0.165	0.245	0.035
Total	111.55	53.11	58.63	0.503	0.348	0.212

Notes: This table shows the median value of firms' characteristics by sector of activity. AR is the ratio (accounts receivable / sales)*365; INV the ratio (inventories / sales)*365; AP the ratio (accounts payable / sales)*365; CA/TA is the ratio current assets to total assets; CL/TA the ratio current liabilities to total assets; WCR/TA is the ratio accounts receivable plus inventories minus accounts payable to total assets.

Finally, table 3 summarizes the descriptive statistics of our sample and a correlation matrix is presented in Table 4. We can see that the mean (median) Net Trade Cycle in our sample is 115.19 days (91.46 days).

Table 3. Summary of Statistics

	Mean	Std. Dev	Min	Median	Max
NTC	115.19	96.506	-29.73	91.46	590.91
CFLOW	0.1687	0.1279	-0.053	0.1303	0.7371
$FCOST_1$	0.0593	0.0411	0.0048	0.050	0.3772
$FCOST_2$	0.0411	0.02767	0.0025	0.0363	0.2206
$GROWTH_1$	1.3836	0.7360	0.5758	1.1650	5.5831
$GROWTH_2$	2.074	2.2875	0.1546	1.4696	2.0257
ASSETS	4,276,179	11,700,000	14,882	403,551	91,800,000
FA	0.5059	0.2172	0.0711	0.4967	0.9872
ZSCORE	0.3035	0.1575	0.0179	0.2899	0.7285
PRO_1	0.0706	0.0509	-0.1222	0.0633	0.3181
PRO_2	0.1094	0.1070	-0.1443	0.0861	0.6975
GDP	0.0382	0.0079	0.024	0.036	0.05

Notes: NTC represents the Net Trade Cycle; CFLOW the cash flows generated by the firm; $FCOST_1$ and $FCOST_2$ the cost of external finance; $GROWTH_1$ and $GROWTH_2$ the growth opportunities; ASSETS the total assets in thousands of euro; FA the investment in fixed assets; ZSCORE the probability of financial distress; PRO_1 and PRO_2 the profitability; and GDP the Gross Domestic Product growth.

Table 4. Correlation matrix

	NTC	CFLOW	$FCOST_1$	$FCOST_2$	$GROWTH_1$	$GROWTH_2$	SIZE	FA	ZSCORE	PRO_1	PRO_2	GDP
NTC	1.000											
CFLOW	-0.046	1.000										
$FCOST_1$	-0.083*	-0.062	1.000									
$FCOST_2$	-0.017	0.088*	0.871***	1.000								
$GROWTH_1$	-0.045	0.218***	-0.008	-0.009	1.000							
$GROWTH_2$	-0.128***	0.098**	-0.128***	-0.150***	0.877***	1.000						
SIZE	-0.501***	0.283***	-0.114**	-0.033	-0.017	0.072	1.000					
FA	-0.308***	0.609***	-0.123***	0.133***	0.011	-0.090*	0.479***	1.000				
ZSCORE	0.433***	-0.411***	0.119**	0.009	-0.028	-0.021	-0.529***	-0.682***	1.000			
PRO_1	-0.139***	0.454***	0.046	0.047	0.385***	0.324***	0.046	0.025	0.179***	1.000		
PRO_2	-0.023	0.947***	-0.064	0.035	0.219***	0.094**	0.220***	0.447***	-0.297***	0.543***	1.000	
GDP	0.099**	0.077	-0.009	-0.010	0.068	0.044	-0.066	-0.081*	0.042	0.078	0.103**	1.000

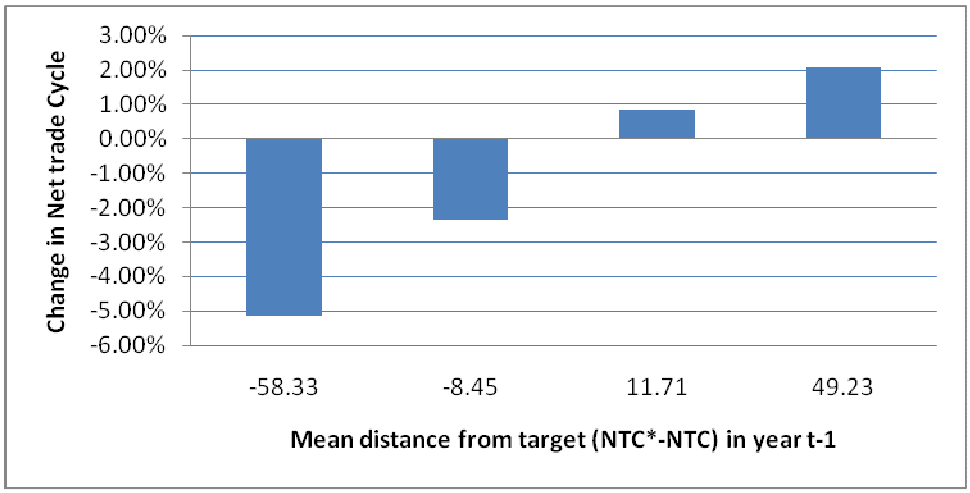
Notes: *Indicates significance at 10% level; **indicates significance at 5%level; and ***indicates significance at 1% level.

4. EMPIRICAL EVIDENCE

4.1. Convergence toward the target

Before estimating the model (3), we try to check whether firms modify their WCR to move towards their target. To do so, we follow Flannery and Rangan (2006), and Figure 1 shows firm's NTC decisions according to their deviation from their estimated target NTC. In particular, for each year between 1997 and 2004, we sort firms into quartiles on the basis of their deviations from target Net Trade Cycle (NTC*-NTC). These quartiles are represented on the horizontal axis in Figure 1. Thus, we can observe that the firms in Quartile 1 and Quartile 2 have a longer mean NTC than their target by a mean of 58.33 days and 8.45 days, respectively. Conversely, firms in Quartile 3 and Quartile 4 have a shorter mean NTC than their target by a mean of 11.71 days and 49.23 days, respectively, according to our model. The vertical axis represents the subsequent year's change in Net Trade Cycle, which should reflect the adjustment of firms towards their target if they actually follow a partial adjustment model. We find that firms in Quartile 1 and Quartile 2 reduce their NTC the following year by a mean of 5.15% and 2.34% respectively. Conversely, firms in Quartile 3 and Quartile 4 increase their NTC by a mean of 0.84% and 2.09%, respectively, during the subsequent year. Therefore, we find that firms adjust towards their targets over time. In other words, our findings are consistent with convergence.

Figure 1: Subsequent year's change in NTC



4.2. Determinants of working capital requirement and speed of adjustment

Table 5 shows the results of regressing Net Trade Cycle on the different variables explained above. To confirm the robustness of our results we present the estimation of equation (3) using alternative proxies for some independent variables. The m_2 statistic and the Hansen test also are presented. The m_2 statistic indicates there is no second-order serial correlation, and the Hansen Test shows the absence of correlation between instruments and error term. We also present the Variance Inflation Factor (VIF) for each independent variable. Our VIF tests are lower than 5, so there is no multicollinarity problem in our sample (Studenmund 1997). In all estimations we control for industry effects.

The results show that the coefficient of the lagged Net Trade Cycle is positive and significant at the 1% level in all the estimations made, which confirms that

companies have a target WCR and follow an adjustment process to reach this target[7]. We also find that this coefficient is roughly 0.4 in all the estimations made, indicating a speed of adjustment of $\gamma = 0.6$, which shows that firms actively pursue their target[8]. While adjustment costs hinder immediate rebalancing, this evidence supports the relatively rapid adjustment speeds documented in the literature for short-term financial management (Peles and Schneller (1989) for financial ratios entailing short-term balance sheet items; Ozkan and Ozkan (2004) for cash holdings; and Garcia and Martinez (2010) for accounts receivable; among others). This quick speed of adjustment might be explained by the fact that firms can modify their short-term financial decisions more easily than their long-term ones. In this line, Peles and Schneller (1989) indicate that current balance sheet items can be changed quite easily even in the short run because they are to a large extent under the firm's control and easier to manipulate. Lee and Wu (1988) also suggest that current items are expected to have lower costs of adjustment than long-term items. In the Spanish case, moreover, this quick speed of adjustment could also be explained by the fact that firms rely heavily on bank financing. WCR decisions reflect not only the desired WCR but also both the costs of deviating from the target investment and the costs of adjusting towards that target. Since a positive NTC needs to be financed, it indicates a need for funds that firms have to finance. Therefore, the speed of adjustment with which a firm adjusts towards its target NTC may also depend on the transaction costs to be faced. In Spain, firms operate in a banking-oriented financial system, where

[7] We also find a partial adjustment process when employing other more general measures of working capital as the ratio (current assets - accounts payable) / total assets; and the ratio ((current assets – accounts payable)/sales)*365.

[8] Following Flannery and Rangan (2006) we simulated 20 sets of panel data, each with 400 observations, and re-estimated our partial adjustment model for them. We obtained a mean speed of adjustment of 0.6326 and a standard deviation of 0.0118.

capital markets are less developed and banks play an important role (Schmidt and Tyrell 1997), so companies have great bank dependence. Indeed, as Miguel and Pindado (2001) state, given the relatively low level of development of the Spanish bond market, firms rely heavily on bank financing, which has lower transaction costs and may allow firms to adjust their actual NTC to their target better.

The results for the rest of the independent variables are consistent with our hypotheses. In particular, findings suggest that firms that are capable of generating more internal funds have a greater WCR. This investment is also greater when economic growth is higher. In contrast, our findings show that cost of external financing, growth opportunities, investment in fixed assets, probability of financial distress and profitability affect WCR negatively. However, we do not find support for the hypothesis that size influences the WCR held by firms. This result also holds if we estimate the model including the square of size (column 2)[9].

[9] The results presented in Table 5 are maintained when GDP is replaced by interest rate and when both variables are included in the model.

Table 5. Determinants of Net Trade Cycle

	(1)	(2)	(3)	(4)	(5)	VIF
NTC_{it-1}	0.3986***	0.3982***	0.3918***	0.4064***	0.4303***	1.58
	(3.79)	(3.80)	(3.73)	(3.77)	(4.27)	
CFLOW	241.693**	240.365**	242.014**	257.941**	454.435**	2.80
	(2.39)	(2.28)	(2.37)	(2.32)	(2.36)	
$FCOST_1$	-289.709***	-289.195***	-328.308***	-	-310.704***	1.03
	(-2.76)	(-2.79)	(-3.03)		(-2.62)	
$FCOST_2$	-	-	-	-250.953*	-	
				(-1.72)		
$GROWTH_1$	-14.585**	-14.423**	-	-15.2322**	-22.7312***	1.22
	(-2.28)	(-2.17)		(-2.41)	(-2.91)	
$GROWTH_2$	-	-	-4.357**	-	-	
			(-2.23)			
SIZE	-5.7109	-11.6391	-3.3226	-5.0272	-4.9016	1.68
	(-1.18)	(-0.24)	(-0.79)	(-1.15)	(-1.11)	
$SIZE^2$	-	0.2189	-	-	-	
		(0.12)				
FA	-85.205**	-85.1811**	-84.7424**	-82.1451**	-116.122**	2.70
	(-2.42)	(-2.19)	(-2.07)	(-2.15)	(-2.30)	
ZSCORE	166.236***	166.078***	174.656***	163.962***	113.393*	2.67
	(2.93)	(2.88)	(3.16)	(2.64)	(1.94)	
PRO_1	-436.086***	-435.319***	-472.546***	-456.867***	-	2.11
	(-3.07)	(-3.05)	(-3.31)	(-3.01)		
PRO_2	-	-	-	-	-377.504**	
					(-2.23)	
GDP	5.6666*	5.6302*	6.1676*	6.2451*	5.7667	1.04
	(1.75)	(1.73)	(1.90)	(1.78)	(1.52)	
Constant	130.245	169.891	88.882	107.906	134.192	
	(1.50)	(0.49)	(1.24)	(1.44)	(1.58)	
m_2	-0.51	-0.51	-0.51	-0.45	-0.46	
Hansen Test	51.04(287)	50.99(286)	51.58(287)	48.94(287)	53.18(287)	
Observations	442	442	442	442	442	

Notes: NTC represents the Net Trade Cycle; CFLOW the cash flows generated by the firm; $FCOST_1$ and $FCOST_2$ the cost of external finance; $GROWTH_1$ and $GROWTH_2$ the growth opportunities; SIZE the size; $SIZE^2$ the square of size; FA the investment in fixed assets; ZSCORE the probability of financial distress; PRO_1 and PRO_2 the profitability; and GDP the Gross Domestic Product growth.
Z statistic in brackets.
* Indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.
m_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as N(0,1) under null hypothesis of no serial correlation. The Hansen test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments as Chi-squared. Degrees of freedom in brackets.
VIF represents the Variance Inflation Factor for each independent variable.

5. IMPACT OF EXTERNAL FINANCE CONSTRAINTS AND BARGAINING POWER ON SPEED OF ADJUSTMENT

The results obtained in the previous section indicate that, although firms move towards their target Net Trade Cycle, they do not immediately offset deviations from targets because of adjustment costs. However, the model developed in the previous section assumes that all firms within the sample adjust at the same speed and it does not capture the possible differences in the speed of adjustment depending on the firm's characteristics.

In this section we examine the speed of Net Trade Cycle adjustment toward the target according to the ability of the firms to obtain external finance and to their bargaining power. The speed at which firms adjust their current NTC to their target depends on the relative costs of being off their targets compared to the cost of adjustment, so firms with lower adjustment costs adjust more rapidly.

NTC can be adjusted by modifying the accounts receivable, inventories or accounts payable. A greater NTC needs to be financed and, hence, it might lead to more interest expenses and credit risk. In contrast, a lower NTC could be detrimental to the sales of the firm.

Accordingly, we expect that speed of adjustment will not be equal across all firms and will depend on both external finance constraints of a firm and its market power. We expect that firms with more access to external capital markets will adjust more quickly because they could modify their NTC more easily. Since firms with greater market power could modify their NTC with little repercussion on their

relationships with suppliers, and could pay a lower penalty in terms of sales drop when they reduce the credit extend to their customers (Hill et al., 2010), we also expect these firms to have a greater speed of adjustment.

In order to compare the possible difference in the rate of adjustment, we define dummy variables that allow us to distinguish between firms according to their access to external finance and bargaining power. First, we use the financial constraint index constructed by Whited and Wu (2006), where a greater index means a firm has less access to external capital markets[10]. We create the Whited and Wu index dummy, $WWD_{i,t}$, which takes the value 1 for firm-year observations with better access to external finance, and 0 otherwise. To give robustness to our results, we use the 25th and 50th percentile as well as the mean value of the Whited and Wu index to distinguish firms according to their access to external finance. Secondly, as measure of bargaining power we use the ratio of a firm's annual sales to the total annual sum of sales in a given industry. This variable is used by Hill et al., (2010) as a proxy for a firm's ability to negotiate bilaterally as both customer and supplier, with a higher ratio indicating a greater bargaining power. Thus, we define the bargaining power dummy, $BPD_{i,t}$, which takes the value 1 for firm-year observations with a higher bargaining power, and 0 otherwise. We also successively use the 25th and 50th percentile, and the mean value of this variable in order to classify firms according to their bargaining power. We then allow these dummies to interact with the lagged

[10] The Whited and Wu (2006) index is given by:

$$-0.091CF_{it}- 0.062DIVPOS_{it}+0.021TLTD_{it}-0.044LNTA_{it}+0.102ISG_{it}-0.035SG_{it}$$

CF is the ratio of cash flow to total assets; DIVPOS is a dummy variable that takes the value of one if the firm pays cash dividends; TLTD is the ratio of the long-term debt to total assets; LNTA is the natural logarithm of total assets; ISG is the firm's industry sales growth; and SG is firm sales growth.

variable and obtain the following equations to capture those dynamics of NTC adjustments which cannot be captured by the model developed in section 3:

$$NTC_{i,t} = \alpha + (\rho_0 + \rho_1 WWD_{i,t})NTC_{i,t-1} + \delta_1 CFLOW_{i,t} + \delta_2 FCOST_{i,t} + \delta_3 GROWTH_{i,t} + \delta_4 SIZE_{i,t} + \delta_5 FA_{i,t} + \delta_6 ZSCORE_{i,t} + \delta_7 PRO_{i,t} + \delta_8 GDP_{i,t} + \eta_i + \lambda_t + \upsilon_{i,t} \quad (4)$$

$$NTC_{i,t} = \alpha + (\rho_0 + \rho_1 BPD_{i,t})NTC_{i,t-1} + \delta_1 CFLOW_{i,t} + \delta_2 FCOST_{i,t} + \delta_3 GROWTH_{i,t} + \delta_4 SIZE_{i,t} + \delta_5 FA_{i,t} + \delta_6 ZSCORE_{i,t} + \delta_7 PRO_{i,t} + \delta_8 GDP_{i,t} + \eta_i + \lambda_t + \upsilon_{i,t} \quad (5)$$

Therefore, in equation (4), ρ_0 and $(\rho_0+\rho_1)$ measure the speed of adjustment for firms with more difficulties to obtain external funds (i.e. when $WWD_{i,t}$ takes the value 0) and for firms with a better access to external capital markets (i.e. when $WWD_{i,t}$ takes the value 1), respectively. Since the smaller the coefficient on the lagged NTC, the faster the speed of adjustment, we expect ρ_0 to be higher than $(\rho_0+\rho_1)$. This would indicate that firms with more facilities to obtain external finance move towards their target more quickly. In equation (5), ρ_0 and $(\rho_0+\rho_1)$ measure the rate of adjustment of companies with lower bargaining power (i.e. when $BPD_{i,t}$ takes the value 0) and of firms with higher bargaining power (i.e. when $BPD_{i,t}$ takes the value 1), respectively. Thus, we expect ρ_0 to be greater than $(\rho_0+\rho_1)$, since it would confirm our hypothesis that firms with a greater bargaining power have lower costs of adjustment and, hence, move towards their target more quickly.

The results, presented in Table 6, are consistent with our hypothesis that speed of adjustment is not equal across all firms and that it depends on both access to external capital markets and firms' bargaining power. On the one hand, we find that estimated adjustment speed for firms with better access to external finance is significantly greater than that of firms with less access external capital markets, since in equation (4) the coefficient ρ_0 (which takes the value of 0.4428; 0.4388 and 0.4420, respectively) is significantly higher than the coefficient $\rho_0+\rho_1$ (0.147, 0.2619, and 0.2468) for the different estimations. This may indicate, as we commented above, that firms with a better access to external finance face lower costs of adjustment when we modify the individual components of WRC[11]. On the other hand, with regard to the influence of bargaining power on the rate of adjustment, we also find that firms with a greater bargaining power adjust more quickly due to their greater facilities to modify the individual components of WCR. We can see that, in equation (5) the coefficient ρ_0 (0.6248, 0.5390, and 0.5747, respectively) is significantly higher than the coefficient $\rho_0+\rho_1$ (0.2990, 0.2401, and 0.1912). Finally, we would like to mention that our results are maintained when we also include intercept effects of access to external finance and bargaining power (results not presented but available from the authors upon request).

[11] We also find that firms with a greater access to external capital markets adjust faster when we employ other measures of access to external finance such as size, interest coverage, and the deviation of a firm's debt ratio from the industry median.

Table 6. Impact of external finance constraints and bargaining power on speed of adjustment

	Access to finance			Bargaining power		
	25th	50th	Mean	25th	50th	Mean
NTC_{it-1}	0.4428*** (3.60)	0.4388*** (3.27)	0.4420*** (3.30)	0.6248*** (8.07)	0.5390*** (6.92)	0.5747*** (7.15)
WWD_{it}*(NTC_{it-1})	-0.2958*** (-3.19)	-0.1769* (-1.87)	-0.1952** (-2.01)			
BPD_{it}*(NTC_{it-1})				-0.3258*** (-4.69)	-0.2989*** (-3.82)	-0.3835*** (-5.14)
$CFLOW_{it}$	232.4827** (2.22)	233.0314** (2.17)	211.488** (2.00)	149.8908* (1.67)	195.7234* (1.84)	196.1008** (1.97)
$FCOST_{it}$	-291.8575** (-2.49)	-302.920*** (-2.66)	-281.8056*** (-2.57)	-213.3786** (-2.42)	-293.955*** (-2.56)	-297.3282** (-2.49)
$GROWTH_{it}$	-13.9950* (-1.75)	-14.3170** (-2.05)	-15.7468** (-2.39)	-12.3355** (-2.50)	-9.3707* (-1.93)	-10.2570** (-2.02)
$SIZE_{it}$	-1.9013 (-0.41)	-2.8702 (-0.54)	-2.7113 (-0.51)	-2.1843 (-0.52)	-1.4191 (-0.29)	-2.8383 (-0.70)
FA_{it}	-70.3224* (-1.75)	-89.1861** (-2.48)	-81.2214** (-2.45)	-71.9851** (-2.45)	-74.8660** (-2.22)	-81.7945** (-2.36)
$ZSCORE_{it}$	160.2623** (2.46)	146.966** (2.20)	147.5688** (2.12)	122.817*** (2.61)	141.0543*** (2.87)	101.6377** (2.09)
PRO_{it}	-359.8077** (-2.41)	-316.9105* (-1.84)	-287.4862 (-1.44)	-294.2971** (-2.22)	-388.8281** (-2.55)	-358.8499** (-2.16)
GDP	4.8597 (1.45)	4.0680 (1.16)	5.1633* (1.64)	4.3332 (1.27)	3.7516 (1.06)	4.5770 (1.28)
Constant	74.9487 (0.85)	106.9784 (1.16)	95.6616 (1.05)	108.0649 (1.53)	86.6483 (1.06)	105.8436 (1.61)
F	4.48	12.21	11.81	14.90	12.58	17.57
m_2	-1.11	-0.69	-0.81	-0.57	-0.71	-0.84
Hansen Test	48.37(287)	49.48(287)	49.77(287)	45.20(287)	47.10(287)	45.26(287)
Observations	442	442	442	442	442	442

Notes: NTC represents the Net Trade Cycle; $WWD_{i,t}$ is a dummy variable equals 1 for firm-year observations with better access to external finance; $BPD_{i,t}$ is a dummy variable equals 1 for firm-year observations with a higher bargaining power; CFLOW indicate the cash flows generated by the firm; FCOST the cost of external finance; GROWTH the growth opportunities; SIZE the size; FA the investment in fixed assets; ZSCORE the probability of financial distress; PRO the profitability and GDP the gross domestic product growth.

Z statistic in brackets.

F refers to an F test on the null hypothesis that the coefficient $\rho_0 + \rho_1$ is zero.

* Indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.

m_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as N(0,1) under null hypothesis of no serial correlation. The Hansen test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments as Chi-squared. Degrees of freedom in brackets.

6. CONCLUSIONS

This paper extends the empirical evidence on the WCR in several important dimensions, including the treatment of unobservable heterogeneity and endogeneity problems. We assume that firms have a target WCR and we examine the determinants of current WCR in the presence of adjustment costs. The proposed model is corroborated using a sample of non-financial Spanish companies over the period 1997-2004, which allows us to contribute to the debate on the usefulness of the partial adjustment model in understanding the firm's WCR decisions.

Our findings show that the speed with which firms adjust toward their target WCR is relatively quick, which is consistent with the idea that current balance sheet items could be changed quite easily, even in the short run, because they are to a large extent under the firm's control and are easier to manipulate. Moreover, we present evidence that the speed of adjustment is not equal across all firms. We find that both a firm's access to external capital markets and bargaining power affect how quickly it moves toward its target WCR.

The results also indicate that companies that are capable of generating more internal funds have greater WCR. Our findings also show that cost of external financing, growth opportunities, investment in fixed assets, probability of financial distress, and profitability negatively affect WCR. Finally, we also find that when economic growth is higher, companies have greater WCR.

Further research focused on similar studies in countries with different institutional characteristics and financial systems would appear appropriate, since the

speed of adjustment and the effect of explanatory variables on WCR might be different.

Additionally, considering the growing literature about the firm's excess cash holding and since our results suggest that the speed of adjustment is higher for firms with better access to external markets, it may also be of interest to analyze whether the speed of adjustment of WCR is related with excess cash. It could be expected that firms which hold an excess of cash will also adjust to their target WCR level more quickly. However, this is a research question which needs to be studied thoroughly.

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CHAPTER III

HOW DOES WORKING CAPITAL MANAGEMENT AFFECT SPANISH SMES PROFITABILITY?

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1. INTRODUCTION

The idea that working capital management affects a firm's profitability and risk is generally accepted and has recently received considerable attention. Smith (1980), for instance, suggests that working capital management is important because of its effects on a firm's profitability and risk, and consequently on its value. Specifically, a more aggressive working capital policy (low investment in working capital) is associated with a higher return and higher risk, while a conservative working capital policy (high investment in working capital) supposes lower return and risk.

Studies on working capital management and firm performance (Jose, Lancaster and Stevens 1996; Shin and Soenen 1998; Wang 2002; Deloof 2003; and Garcia-Teruel and Martinez-Solano 2007; among others) have analyzed a linear relationship between a firm's investment in working capital and its profitability. Their findings indicate that the lower the investment in working capital the higher the profitability. However, they ignore, for instance, the higher risk of loss of sales and interruptions in the production process that is related with low levels of working capital. There might, therefore, be a working capital level at which a reduction in working capital negatively affects a firm's profitability.

The relation between working capital and a firm's profitability may, consequently, be concave rather than linear, and might be better captured by a quadratic relationship. Unlike previous studies, this paper contributes to the literature by analyzing the relationship between investment in working capital and profitability

by taking into account the possible non-linearities of the working capital management-profitability relation in order to test this risk and return trade-off between different working capital strategies. In addition, to verify the robustness of our results, we employ a different approach. We follow Tong (2008) in testing this possible quadratic relation. The estimation method applied in this study was selected in order to avoid unobservable heterogeneity and possible endogeneity, because if we do not control for these problems, estimation results might be seriously affected. Specifically, panel data and the Generalized Method of Moments (GMM) are used to estimate our models.

We use a sample of small and medium sized Spanish firms for several reasons. Firstly, most previous studies have basically focused on large firms (Jose, Lancaster and Stevens 1996; Shin and Soenen 1998; Wang 2002; Deloof 2003). Secondly, SMEs are subject to important financial constraints (Whited 1992; Fazzari and Petersen 1993; and Audretsch and Elston 1997) and have difficulties in obtaining funding in the long-term capital markets (Walker 1989; Petersen and Rajan 1997; and Scholtens 1999), which means that an efficient working capital management is particularly important (Peel and Wilson 1996; Peel, Wilson and Howorth 2000). In this line, Grablowsky (1984) and Kargar and Blumenthal (1994) suggest that working capital management may be crucial for the survival and growth of small companies. Thirdly, the interest in studying Spanish firms stems from the fact that they operate in a banking-oriented financial system, where capital markets are less developed (Schmidt and Tyrell 1997). Our results may, therefore, also be of interest for other SMEs established in countries with similar financial systems, as indeed occurs in most European countries. Spanish firms have few alternatives for obtaining

external financing, which makes them more dependent on trade credit. Demirguc-Kunt and Maksimovic (2002) suggest that such firms grant more trade credit to their customers and at the same time receive more finance from their own suppliers. Indeed, according to the *European Payment Index Report* (2007)[12], the average term of payment for Spain is 67.40 days - one of the longest effective payment periods in European countries (Marotta 2001). Moreover, investment in inventories tends to be quite persistent in Spain (Benito 2005). He demonstrates that, in spite of their great bank dependence, Spanish firms have less sensitivity of inventories to liquidity than companies from the United Kingdom.

The results confirm our hypothesis that there is an inverted U-shaped relationship between working capital and profitability, which indicates that both high and low working capital levels are associated with a lower profitability. The relation between working capital and profitability is positive when firms hold low levels of working capital and becomes negative for higher levels of working capital. This allows us to confirm not only the greater profitability effect but also the greater risk effect for firms with low levels of working capital.

The remainder of this paper is organized as follows. Section 2 outlines the theoretical links between working capital policy and profitability. Section 3 describes the model employed to analyze the relationship between working capital and a firm's performance and the hypotheses to be tested. In Section 4, we describe the methodology and data used. The results are discussed in Section 5 and a robustness check is presented. Section 6 concludes the paper.

[12] European Payment Index is a report based on an annual written survey carried out by *Intrum Justia* in 25 European countries and involves several thousand companies.

2. WORKING CAPITAL POLICY AND PROFITABILITY

Lewellen, McConnel, and Scott (1980) showed that, under perfect financial markets, trade credit decisions do not influence firm value. However, capital markets are not perfect and the literature has demonstrated the existence of optimal levels of all individual components of working capital, such as accounts receivable (Emery 1984a; Nadiri 1969), inventories (Ouyang, Teng, Chuang, and Chuang 2005) and accounts payable (Nadiri 1969). Based on this idea, and taking into account the influence of working capital on both risk and profitability, we hypothesize that the relationship between working capital and firm profitability might be concave rather than linear.

As noted in the Introduction, the way in which a firm manages its working capital can have a significant impact on both the risk (risk of loss of business and interruptions of production process) and profitability. Specifically, working capital management practices that tend to enhance profitability tend to increase this risk and, conversely, practices that reduce the risk tend to decrease the performance expected.

Since an additional investment in inventories or accounts receivable is usually associated with greater sales, a positive relation between working capital and profitability might be expected. Larger inventories can prevent interruptions in the production process and loss of business due to scarcity of products and can also reduce supply costs and price fluctuations (Blinder and Maccini 1991). In addition, they allow firms to provide their customers with a better service and avoid high production costs arising from large fluctuations in production (Schiff and Lieber 1974). Granting trade credit also stimulates sales because it allows buyers to verify

product and services quality prior to payment (Smith 1987; Long, Malitz and Ravid 1993; and Lee and Stowe 1993) and, hence, it reduces the asymmetric information between buyer and seller. In addition, trade credit is an important supplier selection criterion when it is difficult to differentiate products (Shipley and Davis 1991; and Deloof and Jegers 1996); it is used as an effective price cut (Brennan, Maksimovic, and Zechner 1988; Petersen and Rajan 1997); it encourages customers to acquire merchandise at times of low demand (Emery 1987); it reduces transaction costs (Ferris 1981; and Emery 1987) and strengthens long-term supplier-customer relationships (Ng, Smith, and Smith 1999; Wilner 2000), to name but some of the advantages. Thus, a high investment in working capital can increase a firm's performance.

However, this additional investment in working capital may also adversely affect operating performance if the costs of a higher investment in working capital exceed the benefits of holding more inventories and/or of granting more trade credit to customers. Firstly, a firm might not assess the quality of the products bought before paying if it reduces its received trade credit period (Deloof 2003), which might negatively affect profitability. Secondly, Soenen (1993) suggests that high investments in working capital might also lead companies to bankruptcy, so their suppliers could cut off the supply of the regularly purchased merchandise (Cuñat 2007) or, in the case of non-payment, this could be recovered and sold to another customer. Thirdly, and from the point of view of inventories, keeping stock available also supposes costs such as warehouse rent, insurance and security expenses, which tend to rise as the level of inventory increases (Kim and Chung 1990). Finally, the

finance literature has demonstrated that an increase of investment in current assets would increase total assets without a proportional increase in profitability.

As a result of the costs and benefits of a higher investment in working capital, there may be an inverted U-shaped relationship between a firm's profitability and investment in working capital and, hence, firms might have an optimal working capital level that balances costs and benefits and maximizes their profitability. Specifically, we expect firms' profitability to rise as working capital increases until a certain working capital level is reached, given that the increased profitability will not offset the high risk borne. Conversely, beyond this optimum, due to the low return of current assets, we expect increases in working capital to be related with decreases in profitability. That is, we expect firm profitability and working capital to relate positively at low levels of working capital and negatively at higher levels.

The empirical evidence, however, is not consistent with the trade-off between profitability and risk hypothesis commented above (Jose, Lancaster and Stevens 1996; Shin and Soenen 1998; Wang 2002; Deloof 2003; and Garcia-Teruel and Martinez-Solano 2007; among others). These studies have analyzed a linear relationship between working capital and profitability, and their results suggest that firms can increase their performance by reducing their working capital levels. However, those findings ignore the risk of loss of sales and interruptions in the production process related with low levels of working capital, which might also be captured with a non-linear relation.

3. MODEL AND HYPOTHESES

This section describes the model employed for testing the main hypothesis mentioned in the previous section, that is, that there exists a concave relationship between a firm's operating profitability and investment in working capital. This would allow us to confirm that firms have an optimal working capital level at which their profitability is maximized.

We use the Cash Conversion Cycle (CCC) as measure of working capital management as it has been the most used measure in studies, given the criticism of static measures such as current ratio and quick ratio (Emery 1984b; Soenen 1993). This variable is calculated as (accounts receivable/sales)*365 + (inventories/purchases)*365 - (accounts payable/purchases)*365. Thus, CCC deals with the management of accounts receivable, the management of inventories and the trade credit received, with a shorter CCC meaning a more aggressive working capital policy. Previous literature indicates the importance of considering these three components at the same time, because they influence each other and firms' profitability and value. Schiff and Lieber (1974), for instance, indicate the importance of taking into account the interrelationship between inventory and accounts receivable policies.

To validate our hypothesis, we regress the firm's operating profitability against cash conversion cycle and its square. The inclusion of these two variables allows us to test both the profitability and risk effects commented above. Since previous studies find support for profitability persistence, a dynamic panel data model is used as in Goddard, Tavakoli, and Wilson (2005) and Feeny, Harris and

Rogers (2005). In addition, following Deloof (2003) and Garcia-Teruel and Martinez-Solano (2007) among others, we control for firm size, growth of sales and leverage. Our profitability model is as follows:

$$PRO_{i,t} = \beta_0 + \beta_1 PRO_{i,t-1} + \beta_2 CCC_{i,t} + \beta_3 CCC^2_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 GROWTH_{i,t} + \beta_6 LEV_{i,t} + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (1)$$

where $PRO_{i,t}$ is the profitability of firm i at time t; $CCC_{i,t}$ is the Cash Conversion Cycle of firm i at time t, and $CCC^2_{i,t}$ its square. $SIZE_{i,t}$ is the size of the firms, $GROWTH_{i,t}$ the growth of sales, and $LEV_{i,t}$ the leverage. The parameter λ_t is a time dummy variable, η_i is the unobservable heterogeneity or the firm's unobservable individual effects, and $\varepsilon_{i,t}$ is the random disturbance. Like Deloof (2003), we use two proxies to measure the profitability. PRO_1 is calculated by the gross operating income ((sales – cost of sales)/total assets); while PRO_2 represents the net operating income ((sales – cost of sales – depreciation & amortization)/total assets). We use these variables because they can reflect the operating activities of the firm better than the overall return on assets, and we relate them to the cash conversion cycle, which is another operating variable. The size (SIZE) is measured as the natural logarithm of sales; growth of sales (GROWTH) by the ratio $(sales_1\text{-}sales_0)/sales_0$; and leverage (LEV) as the ratio of debt to total assets. The parameter λ_t is a time dummy variable that changes in time but is equal for all firms in each of the time periods considered. This parameter is designed to capture the influence of economic factors that may also affect firms' profitability, but which companies cannot control. Finally, η_i is the

firm´s unobservable heterogeneity and captures the particular characteristics of each firm.

The quadratic relation proposed in equation (1) presents a breakpoint, which can be derived by differentiating the firm profitability variable with respect to the CCC variable and making this derivative equal to 0. On solving for the CCC variable, we obtain that this breakpoint is $CCC_{i,t} = (-\beta_2 / 2\beta_3)$. To verify our main hypothesis, this should be a maximum, since this would indicate that there is an inverted U-shaped relationship between working capital and profitability and, hence, firms have an optimal working capital level at which they maximize their operating performance. Since this will be a maximum only if the second partial derivate of the profitability with respect to the Cash Conversion Cycle variable $(2\beta_3)$is negative, β_3 should be negative.

4. METHODOLOGY AND DATA

4.1 Methodology

The estimation method was selected in order to avoid unobservable heterogeneity and the problem of possible endogeneity. Firms are heterogeneous and there are always characteristics that might influence their profitability that are difficult to measure or hard to obtain and which are not in our model. Hence, we use panel data to eliminate the risk of obtaining biased results (Hsiao 1985). We

eliminate the individual effect by taking first differences. Moreover, we use the instrumental variable estimation method to avoid the problem of endogeneity, which might be present in our analysis. We use the two-step generalized method of moments (GMM) estimator proposed by Arellano and Bond (1991) because, although the estimator of instrumental variables in one stage is always consistent, if the disturbances show heteroskedasticity, the estimation in two stages increases efficiency. Finally, we should mention that we also control for industry effects by introducing eight industry dummies.

4.2 Data

This study utilises a data panel of non-financial Spanish SMEs. The data were obtained from SABI (Iberian Balance Sheets Analysis System) database, developed by Bureau Van Dijk. This database contains accounting and financial information for Spanish firms.

The sample comprises small and medium-sized firms from Spain for the period 2002-2007. The selection of SMEs was carried out according to the requirements established under European Commission recommendation 2003/361/EC of 6 May, 2003, i.e. they had fewer than 250 employees, turned over less than 50 million euros and possessed less than 43 million euros worth of total assets. Finally, we eliminated firms whose information was not available for at least

five consecutive years[13], firms with lost values, cases with errors in the accounting data, and extreme values presented by all variables. We obtained an unbalanced panel of 1008 Spanish SMEs (5,862 firm-year observations).

Table 1 gives the mean values of Cash Conversion Cycle by sector and year. In addition, in the final column we present a t-statistic on the difference of means to determine if the mean length of CCC held by firms in 2002 differs significantly from that held in 2007. We conducted this test under the null hypothesis of equal means. Since t statistic takes the value 3.09, the null hypothesis is rejected and, hence, it indicates that Spanish SMEs have increased their investment in working capital during this period.

Table 2 provides summary statistics of the variables used in the estimations. A more detailed description of the sample by size and sector is also given in Appendix 1. In Table 3 we present the correlations of the variables used in our model. As in Deloof (2003) and Garcia-Teruel and Martinez-Solano (2007), we find that cash conversion cycle and leverage are negatively correlated with profitability. These studies suggest that this is consistent with the view that the cash conversion cycle may be too long and that shortening it might increase profitability. The negative relation between leverage and profitability might be due to the fact that SMEs have higher borrowing costs because of their greater information asymmetries (Jordan, Lowe and Taylor 1998), greater informational opacity (Berger and Udell, 1998) and higher likelihood of bankruptcy, according to the trade-off theory. Moreover, according to Benito and Vlieghe (2000), highly leveraged firms could

[13] A t-statistic on the difference of means indicates that this criterion for retaining data doesn't affect the mean values of the variables used in our study.

Table 1. Cash Conversion Cycle by year and sector

Industry	2002	2003	2004	2005	2006	2007	2002-2007	*t*
Agriculture and Mining	42.65	20.57	33.46	40.23	63.45	68.56	44.84	0.5060
Manufacturing	86.87	85.96	89.05	96.65	99.98	100.83	93.28	2.1586
Construction	38.11	37.41	35.05	40.85	47.53	65.31	44.01	2.0418
Wholesale trade	94.48	93.25	94.11	98.69	101.38	105.95	98.01	1.4721
Retail trade	64.54	58.65	66.08	72.10	71.77	78.95	68.70	1.4039
Services	-54.10	-35.64	-36.51	-34.44	-21.93	-43.70	-37.08	0.4009
Transport	-2.78	-20.51	-12.84	-9.94	-7.42	-1.29	-9.29	0.0777
Total	70.57	69.15	71.71	77.72	81.63	84.84	75.97	3.0915

Notes: This table shows the mean Cash Conversion Cycle by year and sector. The Cash Conversion Cycle is calculated as (accounts receivable/sales)*365 + (inventories/purchases)*365 - (accounts payable/purchases)*365.

t is the t-statistic in order to test whether the mean length of CCC held by firms in 2002 differs significantly from that held in 2007, under the null hypothesis of equal means.

Table 2. Summary statistics

	Mean	Standard deviation	Perc. 10	Median	Perc. 90
PRO_1	0.5020	0.2207	0.2493	0.4710	0.7957
PRO_2	0.4644	0.2119	0.2260	0.4315	0.7464
CCC	75.97	98.71	-25.12	69.86	197.79
SIZE	9.4252	0.5754	8.6883	9.4147	10.1968
GROWTH	0.0746	0.1665	-0.0938	0.0573	0.2589
LEV	0.6325	0.1839	0.3635	0.6536	0.8586

Notes: PRO_1 and PRO_2 denote the gross operating income and the net operating income, respectively. CCC is the Cash Conversion Cycle; SIZE is the size of the firm; GROWTH the growth of sales; and LEV the leverage.

have more financing constraints and this may impede undertaking valuable investments and, hence, harm their profitability. This result is supported by Goddard et al. (2005). Finally, like in Goddard et al. (2005), a negative correlation between size and profitability is also obtained. This could be for several reasons. First, a greater diversification might lead to a lower profitability, as is demonstrated by previous studies. Second, managers tend to expand firm size to achieve their own pecuniary and non-pecuniary interests, such as managerial benefits associated with a larger dimension (Stulz, 1990), since they receive a higher remuneration in larger firms (Conyon and Murphy, 2000) and other possible private benefits, such as the prestige of managing larger firms (Dyck and Zingales, 2004).

We also used a formal test to ensure that the multicollinearity problem is not present in our analyses. We calculated the Variance Inflation Factor (VIF) for each independent variable included in our models. The largest VIF value is 1.48, so there is no multicollinarity problem in our sample, because the value is far below 5 (Studenmund, 1997).

Table 3. Correlation matrix

	PRO_1	PRO_2	CCC	SIZE	GROWTH	LEV
PRO_1	1.0000					
PRO_2	0.9916***	1.0000				
CCC	-0.2166***	-0.1976***	1.0000			
SIZE	-0.1984***	-0.1842***	0.0361***	1.0000		
GROWTH	0.0016	0.0082	-0.0649***	0.1828***	1.0000	
LEV	-0.2201***	-0.2035***	-0.0896***	0.1707***	0.1387***	1.0000

Notes: PRO_1 and PRO_2 denote the gross operating income and the net operating income, respectively. CCC is the Cash Conversion Cycle; SIZE the size; GROWTH the growth of sales; and LEV the leverage.
*Indicates significance at 10% level;**indicates significance at 5%level; ***indicates significance at 1% level.

5. RESULTS

The results obtained from model (1) are presented in Table 4. The gross operating income (PRO_1) is used as dependent variable in column (1), while the net operating income (PRO_2) is used in column (2). Our findings indicate that β_3 is negative and significant in both equations, which confirms that firms have an optimal Cash Conversion Cycle that balances costs and benefits and maximizes operating performance[14]. In addition, it indicates, unlike previous studies, that profitability increases with the investment in working capital at low levels, and decreases at high levels. Thus, our results show the importance of also taking into account the risk of loss of business and interruptions in the production process in the working capital management-profitability relation using a non-linear relationship[15].

Since the cash conversion cycle is calculated as (accounts receivable/sales)*365 + (inventories/purchases)*365 – (accounts payable/purchases)*365, it can take both positive and negative values. A positive CCC indicates that it is a use of funds and, hence, needs to be financed (Kieschnick, LaPlante and Moussawi 2009). However, as in Baños et al (2009), we obtain that the mean CCC is negative for sectors such as service and transport, which indicates that working capital is a source of funds in these industries (Fazzari and Petersen 1993). Once we had found a concave relationship between CCC and profitability, and given the substantial differences in CCC across industries observed in Table 1, we also re-

[14] The inclusion in the model of the cost of financing as independent variable does not alter these results.

[15] Like Deloof (2003), we find that Cash Conversion Cycle does not affect firms' profitability when we estimate a linear relationship.

estimated the quadratic model by taking sub-samples by industry in order to check whether this result holds for them. Specifically, we selected from our sample those sectors with a similar CCC. Thus, we re-estimated the quadratic relationship for the following four sub-samples: Agriculture and Mining sector, Construction sector, Wholesale and Retail trade sector, and Service and Transport sector. The results obtained, which are presented in Table 5, indicate that the concave relationship between cash conversion cycle and profitability is also maintained for all sub-samples, except for the Agriculture and Mining sector, where the coefficients are not significant. However, this non significant result might be due to the scarce number of firms in this sector. Similarly, although the results are not presented in this paper, it should be noted that we also obtain this concave relationship when we take subsamples by size and age[16].

[16] In particular, we divided our sample according to mean size and age. Then, we estimated the model for both firms above and below mean values. We also estimated the model for firms above percentile 90 in order to check whether we obtain similar results for larger and older firms. The results show that there is also a concave relationship for these sub-samples.

Table 4. Estimation results of Cash Conversion Cycle-profitability relation

$$(PRO_1)_{i,t} = \beta_0 + \beta_1 PRO_{i,t-1} + \beta_2 CCC_{i,t} + \beta_3 CCC^2_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 GROWTH_{i,t} + \beta_6 LEV_{i,t} + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (1a)$$

$$(PRO_2)_{i,t} = \beta_0 + \beta_1 PRO_{i,t-1} + \beta_2 CCC_{i,t} + \beta_3 CCC^2_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 GROWTH_{i,t} + \beta_6 LEV_{i,t} + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (1b)$$

	Equation (1a)	Equation (1b)
$PRO_{i,t-1}$	0.4444***	0.4610***
	(6.95)	(7.18)
$CCC_{i,t}$	-0.0327***	-0.0312***
	(-2.94)	(-2.97)
$CCC^2_{i,t}$	-0.0070*	-0.0065*
	(-1.80)	(-1.74)
SIZE	0.0493	0.0565
	(1.01)	(1.22)
GROWTH	0.0381	0.0325
	(0.80)	(0.70)
LEV	0.1175	0.1202
	(0.95)	(1.02)
m_2	1.06	0.77
Hansen Test	63.70(50)	60.17(50)
Observations	3846	3846

Notes: The dependent variable is the gross operating income in equation (1a) and the net operating income in equation (1b). CCC is the Cash Conversion Cycle divided by 100 and CCC^2 its square; SIZE the size; GROWTH the growth of sales; and LEV the leverage. Time and industry dummies are included in the estimations, but not reported.
Z statistic in brackets.
*Indicates significance at 10% level;**indicates significance at 5%level; ***indicates significance at 1% level.
m_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as N(0,1) under null hypothesis of no serial correlation. Hansen test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments as Chi-squared. Degrees of freedom in brackets.

Table5. Sub-samples by industry: Estimation results of Cash Conversion Cycle-profitability relation

$$(PRO_1)_{i,t} = \beta_0 + \beta_1 PRO_{i,t-1} + \beta_2 CCC_{i,t} + \beta_3 CCC^2_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 GROWTH_{i,t} + \beta_6 LEV_{i,t} + \lambda_t + \eta_i + \varepsilon_{i,t}$$

	Agriculture and Mining sectors	Construction sector	Wholesale and Retail trade sectors	Service and Transport sectors
$PRO_{i,t-1}$	0.3440	-0.0136	0.0547	0.1878***
	(1.45)	(-0.34)	(0.68)	(5.50)
$CCC_{i,t}$	0.0225	-0.0546***	-0.0654**	-0.0189***
	(0.41)	(-6.03)	(-2.56)	(-3.92)
$CCC^2_{i,t}$	-0.0048	-0.0093**	-0.0130**	-0.0110***
	(-0.47)	(-2.42)	(-1.97)	(-9.88)
SIZE	0.0790	-0.1344***	-0.0339	-0.0319
	(0.82)	(-5.92)	(-1.28)	(-1.60)
GROWTH	0.1735*	0.0771***	0.0267	0.0925***
	(1.80)	(6.29)	(0.50)	(3.82)
LEV	-0.7767	-1.0048***	-0.3012*	-0.5986***
	(-7.49)	(-6.82)	(-1.83)	(-8.02)
m_2	-1.51	-1.27	-0.86	-1.28
Hansen Test	9.39(41)	51(41)	47.01(34)	50.19(50)
Observations	59	317	1351	365

Notes: The dependent variable is the gross operating income. CCC is the Cash Conversion Cycle divided by 100 and CCC^2 its square; SIZE the size; GROWTH the growth of the sales; and LEV the leverage. Time and industry dummies are included in the estimations, but not reported.
Z statistic in brackets.
*Indicates significance at 10% level;**indicates significance at 5%level; ***indicates significance at 1% level.
m_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as N(0,1) under null hypothesis of no serial correlation. Hansen test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments as Chi-squared. Degrees of freedom in brackets.

5.1. Robustness check

The model developed in section 3 is the most common empirical approach in testing the quadratic relation between two variables. The results obtained indicate that there is an inverted U-shaped relationship between investment in working capital and profitability, that is, firms have an optimal working capital level that maximizes

their profitability and, hence, their profitability should decrease when they move away from this optimal level.

Our main goal here is to give robustness to the results obtained from the first model by studying the relation between deviations on both sides of optimal working capital level and firm profitability. If an optimum exists, both below-optimal and above-optimal deviations from this should reduce firm profitability. We use a two-stage methodology motivated by Tong´s (2008) study, which allows us to verify the existence of a concave relation between working capital and firm profitability. In the first stage we obtain deviations from optimal CCC, while in the second stage we regress firm profitability against those deviations. If our hypothesis is verified, that is deviations negatively affect profitability, this would allow us to give robustness to the results obtained in the first model.

Stage 1:

Following Baños-Caballero et al. (2009), we use equation (2) as the benchmark regression for the determinants of Cash Conversion Cycle length in SMEs:

$$CCC^*_{i,t} = \delta_0 + \delta_1 CFLOW_{i,t} + \delta_2 LEV_{i,t} + \delta_3 GROWTH_{i,t} + \delta_4 SIZE_{i,t} + \delta_5 AGE_{i,t} + \delta_6 FA_{i,t} + \delta_7 ROA_{i,t} + \varepsilon_{i,t} \quad (2)$$

where $CCC^*_{i,t}$ represents the optimal Cash Conversion Cycle of firm i at time t; $CFLOW_{i,t}$ cash flow; $LEV_{i,t}$ the leverage; $GROWTH_{i,t}$ growth of sales; $SIZE_{i,t}$ the size; $AGE_{i,t}$ the age; $FA_{i,t}$ investment in fixed assets; $ROA_{i,t}$ return on assets; and $\varepsilon_{i,t}$ random disturbance. We calculate the CCC as (accounts receivables/sales)*365 +

(inventories/purchases)*365 - (accounts payable/purchases)*365; CFLOW is the ratio of net profit plus depreciation to total assets; LEV the ratio of debt to total assets; GROWTH the ratio $(sales_1\text{-}sales_0)/sales_0$; SIZE the natural logarithm of assets; AGE the natural logarithm of age; FA the ratio *(Tangible fixed assets/total assets)*; and ROA the ratio Earnings Before Interest and Taxes over total assets.

Firms´ current Cash Conversion Cycle, however, may not always equal their desired cycle for several reasons. Nadiri (1969) suggests that firms cannot always estimate their sales accurately and with certainty, and, hence, neither their purchases; they do not accurately anticipate changes in the opportunity cost of trade credit or in the rates of default and bad debts on their trade credit; the discovery and collection of delinquent accounts take time and involve costs which may be distributed over time; finally, disequilibrium in other assets of the firms, such as inventories, may also reflect this discrepancy. In this line, Sartoris and Hill (1983) indicate that when firms change their credit policy they can also have sources of uncertainty such as the fraction of sales paid with a discount, timing of payments, volume of sales, and the fractions of sales that are never paid by customers. Secondly, the difficulties firms have in order to access capital markets or their low bargaining power with customers and suppliers might lead firms to invest below or above their optimal working capital levels, respectively. Finally, the conflicts of interests between the main stakeholders (shareholders, managers and creditors) could also give rise to current working capital level not being equal to the desired level.

Based on this idea that firms' current CCC might not always equal their optimum, as in Tong (2008), we obtain the residuals from regression (2) and we use them as a proxy for the deviations from optimal Cash Conversion Cycle. Thus, once

we have identified the deviations from the optimal cycle in Stage 1, then in Stage 2 we analyze how these deviations affect a firm's profitability.

Stage 2:

Following Tong (2008), since the residuals can be either positive or negative, we define the variable $Deviation_{i,t}$ as the absolute value of the residuals obtained from equation (2), so this measures the deviations from optimal CCC. Moreover, to test our hypothesis, we also define a dummy variable, $AOD_{i,t}$, which is equal to 1 for positive residuals and 0 otherwise. Thus, $AOD_{i,t}$ is equal to 1 if actual CCC is greater than optimal CCC, and is equal to 0 if otherwise. We then allowed this dummy to interact with the Deviation variable. To test the effect of deviations from the optimum, we used the following profitability equations:

$$PRO_{i,t} = \alpha_0 + \alpha_1 PRO_{i,t-1} + \alpha_2 Deviation_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 GROWTH_{i,t} + \alpha_5 LEV_{i,t} + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (3)$$

$$PRO_{i,t} = \gamma_0 + \gamma_1 PRO_{i,t-1} + \gamma_2 Deviation_{i,t} + \gamma_3 (Deviation * AOD)_{i,t} + \gamma_4 SIZE_{i,t} + \gamma_5 GROWTH_{i,t} + \gamma_6 LEV_{i,t} + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (4)$$

All dependent and independent variables are the same as those specified in equation (1). We have eliminated only the CCC variable and its square, and we have inserted the Deviation variable and the interaction term. Therefore, in equation (3), the sign of α_2 indicates the effect of the deviations from optimum on firm performance, so we expect that $\alpha_2 < 0$, because this would indicate that the firm's profitability decreases when a firm moves away from its optimal CCC. In equation (4), γ_2 and $(\gamma_2 + \gamma_3)$

represent the influence of below-optimal deviations (i.e. when $AOD_{i,t}$ takes the value 0) and above-optimal deviations (i.e. when $AOD_{i,t}$ takes the value 1), respectively, on the firm's profitability. We expect that $\gamma_2 < 0$ and $(\gamma_2 + \gamma_3) < 0$, since this would indicate that both below-optimal and above-optimal deviations reduce the firm's profitability and, hence, that the firm's operating performance will increase until a certain working capital level is reached, after which the performance will start to decrease. Thus, firm managers should aim at keeping as close to the optimal cycle as possible and try to avoid any deviation (either positive or negative).

The results, which are presented in Table 6, are consistent with those obtained in the previous section. We find that a firm's profitability decreases when it moves away from its optimal CCC, since the coefficient of the Deviation variable (α_2) is negative and significant in equations (3a) and (3b). In equations (4a) and (4b), as we commented above, γ_2 indicates the effect of below-optimal deviations on operating performance, while $(\gamma_2 + \gamma_3)$ represents the influence of above-optimal deviations on this performance. We obtain that γ_2 is negative and significant in both equations. With regard to the coefficient $(\gamma_2 + \gamma_3)$, we obtain that it is also negative and significant in both equation (4a) and equation (4b). Therefore, the results show, as we expected, that both below-optimal and above-optimal deviations reduce firms' profitability and firm managers should aim to keep as close to the optimal cycle as possible and try to avoid any deviation (either positive or negative) from it. In addition, the difference in the negative impacts on firm profitability is not statistically significant between above-optimal and below-optimal deviations, since the coefficient of the interaction term (γ_3) is not significant.

Table 6. Estimation results of deviations from optimal Cash Conversion Cycle-profitability relation

$$(PRO_1)_{i,t} = \alpha_0 + \alpha_1 PRO_{i,t-1} + \alpha_2 Deviation_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 GROWTH_{i,t} + \alpha_5 LEV_{i,t} + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (3a)$$

$$(PRO_2)_{i,t} = \alpha_0 + \alpha_1 PRO_{i,t-1} + \alpha_2 Deviation_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 GROWTH_{i,t} + \alpha_5 LEV_{i,t} + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (3b)$$

$$(PRO_1)_{i,t} = \gamma_0 + \gamma_1 PRO_{i,t-1} + \gamma_2 Deviation_{i,t} + \gamma_3 (Deviation*AOD)_{i,t} + \gamma_4 SIZE_{i,t} + \gamma_5 GROWTH_{i,t} + \gamma_6 LEV_{i,t} + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (4a)$$

$$(PRO_2)_{i,t} = \gamma_0 + \gamma_1 PRO_{i,t-1} + \gamma_2 Deviation_{i,t} + \gamma_3 (Deviation*AOD)_{i,t} + \gamma_4 SIZE_{i,t} + \gamma_5 GROWTH_{i,t} + \gamma_6 LEV_{i,t} + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (4b)$$

	PRO_1		PRO_2	
	Equation (3a)	Equation (4a)	Equation (3b)	Equation (4b)
$PRO_{i,t-1}$	0.2560***	0.3055***	0.2814***	0.3299***
	(2.79)	(3.71)	(3.07)	(4.09)
Deviation	-0.0321**	-0.0328*	-0.0275*	-0.0298*
	(-2.14)	(-1.73)	(-1.90)	(-1.66)
(Deviation*AOD)		-0.0104		-0.0239
		(-0.31)		(-0.70)
SIZE	0.1115**	0.1045*	0.1068**	0.0188
	(2.00)	(1.93)	(2.02)	(0.29)
GROWTH	0.0188	0.0892	0.0157	0.1078*
	(0.29)	(1.46)	(0.26)	(1.84)
LEV	-0.0562	-0.0689	-0.0194	-0.0326
	(-0.40)	(-0.51)	(-0.14)	(-0.26)
F		2.74		3.94
m_2	-0.08	0.22	-0.23	-0.07
Hansen Test	45.88(41)	58.36(50)	43.89(41)	53.68(50)
Observations	3846	3846	3846	3846

Notes: The dependent variable in equations (3a) and (4a) is the gross operating income. The dependent variable in equations (3b) and (4b) is the net operating income. Deviation denotes the deviations from optimal CCC; (Deviation*AOD) the interaction term; SIZE the size; GROWTH the growth of sales; and LEV the leverage. Time and industry dummies are included in the estimations, but not reported.
Z statistic in brackets.
*Indicates significance at 10% level;**indicates significance at 5%level; ***indicates significance at 1% level.

F is the F-test for the linear restriction test under the null hypothesis Ho: $\gamma_2 + \gamma_3 = 0$ in equations (4a) and (4b).

m_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as N(0,1) under null hypothesis of no serial correlation. Hansen test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments as Chi-squared. Degrees of freedom in brackets.

6. CONCLUSIONS

This study offers new evidence on the relationship between working capital management and profitability by controlling for unobservable heterogeneity and possible endogeneity and, unlike previous studies, given the competing hypotheses

of the effect of an increase in working capital on firm's profitability, it analyzes a possible quadratic relation between these variables.

In contrast to previous findings, which indicate that the lower the investment in working capital the more profitability, our results show that there is a concave relationship between working capital level and profitability, that is, firms have an optimal working capital level that balances costs and benefits and maximizes their profitability. It allows us to confirm not only the greater profitability effect, but also the greater risk effect for firms with low levels of working capital. In addition, a robustness check demonstrates that firms' profitability decreases when they move away from their optimal working capital.

Overall, this paper highlights the importance of good working capital management for firms due to the cost of over-investment and under-investment in working capital. Our findings have potentially important implications for managers and in the literature on working capital management. On the one hand, they indicate that managers should aim to keep as close to the optimal cycle as possible and try to avoid any deviation (either positive or negative) in order to maximize firm´s profitability. On the other hand, we find that the relationship between working capital and profitability is concave rather than linear and, hence, a quadratic relationship should be used in subsequent studies.

As a limitation of our study, it should be noted that the mean size of the firms of our sample is higher than the mean size of the Spanish population of SMEs. This is due to the fact that in Spain smaller SMEs can elaborate an abridged financial statement, which presents less detailed information. Some information required for

this study (for example the value of accounts payable) is not, therefore, available for such firms.

APPENDIX 1

Table 7. Mean and median values of firms' characteristic by size and sector

Panel A (Small Firms)									
Small firms	Number of firms	PRO_1	PRO_2	CCC	LNSALES	EMPLOYEES	GROWTH	LEVERAGE	AGE
Agriculture and Mining	6	0.4603	0.4110	54.0463	9.1245	19.5143	0.0499	0.6271	15.4
		(0.4634)	(0.3953)	(44.4227)	(9.2233)	(18)	(0.0445)	(0.6926)	(15)
Manufacturing	154	0.4648	0.4224	85.7845	9.1882	34.3322	0.0762	0.6185	23.6509
		(0.4532)	(0.4068)	(76.4552)	(9.135)	(35.6667)	(0.0557)	(0.6381)	(21)
Construction	22	0.3456	0.3313	49.4326	9.3947	39.2385	0.1272	0.7022	19.3692
		(0.3163)	(0.3018)	(51.3559)	(9.33)	(44.1667)	(0.1153)	(0.735)	(19)
Wholesale trade	181	0.3826	0.3658	102.5029	9.4155	27.6727	0.0673	0.6592	22.1445
		(0.3517)	(0.3337)	(91.7410)	(9.3639)	(28.4)	(0.0499)	(0.6841)	(20)
Retail trade	54	0.4466	0.4240	63.5182	9.2671	34.1812	0.0639	0.6821	21.2168
		(0.4383)	(0.4143)	(53.2758)	(9.325)	(36.6667)	(0.0442)	(0.7053)	(19)
Services	7	0.5199	0.4661	-6.3258	9.2371	35.079	0.0509	0.5455	18.5526
		(0.4436)	(0.3756)	(8.0093)	(9.2033)	(35.8333)	(0.0514)	(0.5625)	(17.5)
Transport	13	0.5273	0.4607	0.0008	9.3125	34.1974	0.0639	0.6636	18.1579
		(0.5431)	(0.4529)	(12.3988)	(9.1857)	(35.1667)	(0.0479)	(0.655)	(18)
Total	437	0.4250	0.3961	83.6932	9.3065	31.6045	0.0725	0.6479	22.1485
		(0.4079)	(0.3751)	(71.5187)	(9.2598)	(33.3667)	(0.0512)	(0.6734)	(20)

Table 7 (continued). Mean and median values of firms' characteristic by size and sector

Panel B (Medium firms)									
Medium firms	Number of firms	PRO_1	PRO_2	CCC	LNSALES	EMPLOYEES	GROWTH	LEVERAGE	AGE
Agriculture and Mining	9	0.5319	0.4717	38.8775	9.4003	91.9815	0.0441	0.5011	24.0556
		(0.5559)	(0.5014)	(37.9381)	(9.4997)	(86.3333)	(0.0352)	(0.4456)	(17.5)
Manufacturing	305	0.5653	0.5144	96.9889	9.5217	95.737	0.0706	0.5953	26.3565
		(0.5363)	(0.4888)	(91.4651)	(9.5422)	(87.6667)	(0.0606)	(0.6087)	(23)
Construction	59	0.5883	0.5633	41.9934	9.3994	103.1272	0.1194	0.7318	21.4422
		(0.5079)	(0.4856)	(32.1841)	(9.384)	(87.6667)	(0.0967)	(0.7765)	(20)
Wholesale trade	79	0.4626	0.4362	87.8995	9.8003	84.1724	0.0666	0.6663	24.9246
		(0.4123)	(0.3845)	(86.2981)	(9.7995)	(74.3333)	(0.0596)	(0.6976)	(21)
Retail trade	42	0.4895	0.4608	75.2981	9.8018	75.0947	0.0646	0.6487	23.0576
		(0.4411)	(0.4233)	(63.2644)	(9.888)	(62)	(0.0488)	(0.6995)	(20)
Services	54	0.6466	0.5941	-40.8534	9.009	122.0774	0.0835	0.5554	21.5161
		(0.5880)	(0.5297)	(-47.6891)	(8.9436)	(112.6833)	(0.067)	(0.565)	(19)
Transport	23	0.6987	0.6315	-14.5281	9.4485	96.5259	0.0897	0.6615	23.3852
		(0.6676)	(0.5950)	(9.7566)	(9.4839)	(89.6667)	(0.0731)	(0.6684)	(21)
Total	571	0.5603	0.5161	70.2022	9.5156	95.8101	0.0762	0.6207	24.8014
		(0.5189)	(0.4768)	(68.5706)	(9.5568)	(86)	(0.0617)	(0.6416)	(21)

Notes: This table shows the mean (median) values of firms' characteristics by size and sector. Panel A presents values for small firms. Values for medium firms are in Panel B.

PRO_1 and PRO_2 denote the gross operating income and the net operating income, respectively. CCC is the Cash Conversion Cycle; LNSALES is the natural logarithm of sales; EMPLOYEES is the number of employees; GROWTH the growth of sales; LEVERAGE the leverage; and AGE the firm age.

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CHAPTER IV

WORKING CAPITAL MANAGEMENT, CORPORATE PERFORMANCE, AND FINANCIAL CONSTRAINTS

1. INTRODUCTION

The literature on investment decisions evolved through many theoretical and empirical contributions. A number of studies show a direct relation between investment and firm value (Chung, Wright & Charoenwong, 1998; Burton, Lonie & Power, 1999; McConnell & Muscarella, 1985). Additionally, since the seminal work by Modigliani & Miller (1958) showing that investment and financing decisions are independent, extensive literature based on capital-market imperfections has appeared that supports the relation between these two decisions (Fazzari, Hubbard & Petersen, 1988; and Hubbard, 1998). Finally, the literature documenting the sensitivity of investment to cash flow is large and growing (Pawlina & Renneboog, 2005; Guariglia, 2008; among others).

Despite the importance of the interrelations between the individual components of working capital when evaluating their influence on corporate performance (Kim & Chung, 1990; Sartoris & Hill, 1983; Schiff & Lieber, 1974), few studies of empirical evidence for the valuation effects of investment in working capital and, more specifically, the possible influence of financing on this relation exist.

Studies on working capital management fall into two competing views of working capital investment. Under one view, higher working capital levels allow firms to increase their sales and obtain greater discounts for early payments (Deloof, 2003) and, hence, may increase firms' value. Alternatively, higher working capital levels require financing and, consequently, firms face additional financing expenses,

which increase their probability of going bankrupt (Kieschnick, LaPlante & Moussawi, 2011). Combining these positive and negative working capital effects leads to the prediction of a nonlinear relation between investment in working capital and firm value. The hypothesis in this paper is that an inverted U-shaped relation may result if both effects are sufficiently strong.

Authors like Schiff & Lieber (1974), Smith (1980) and Kim & Chung (1990) suggest that working capital decisions affect firm performance. In this line, Wang (2002) finds that firms from Japan and Taiwan with higher values hold a significantly lower investment in working capital than firms with lower values. Kieschnick et al., (2011) study the relation between working capital management and firm value. They take Faulkender & Wang (2006) as their baseline valuation model and analyze how shareholders of US corporations value an additional dollar invested in net operating working capital by using a stock's excess return as proxy for firm value. Their results show that, on average, an additional dollar invested in net operating working capital is worth less than a dollar held in cash. They also find that an increase in net operating working capital, on average, would reduce the excess stock return and they show that this reduction would be greater for those firms with limited access to external finance. Since market imperfections increase the cost of outside capital relative to internally generated funds (Greenwald, Stiglitz, & Weiss, 1984; Jensen & Meckling, 1976; Myers & Majluf, 1984) and may result in debt rationing (Stiglitz & Weiss, 1981), Fazzari, Hubbard & Petersen (1988) suggest that firms' investment may depend on financial factors such as the availability of internal finance, access to capital markets or cost of financing. Fazzari & Petersen (1993)

suggest in their analysis that investment in working capital is more sensitive to financing constraints than investment in fixed capital.

However, while the above study focuses on the influence of an additional investment in working capital on firm value, our paper examines the functional form of the relation between investment in working capital and corporate performance. Given that financing conditions might play an important role in this relation, we also study whether firms' financing constraints affect the above relation. To our knowledge, our paper is the first to analyze the functional form of this relation as well as the possible influence of financial constraints on it.

We use non-financial companies from the United Kingdom. UK capital markets are well developed (Schmidt & Tyrell, 1997) and present more than 80 per cent of daily business transactions on credit terms (Summers & Wilson, 2000). In fact, Cuñat (2007) indicates that trade credit represents about 41% of the total debt and about half the short term debt in UK medium sized firms.

This study contributes to the working capital management literature in a number of ways. First, we offer new evidence on the effect of working capital management on corporate performance, by taking into account the possible non-linearities of this relation. Second, the paper investigates the relation between investment in working capital and firm performance according to the financing constraints of the firms. Third, we estimate the models by using panel data methodology in order to eliminate the unobservable heterogeneity. Lastly, we use the Generalized Method of Moments (GMM) to deal with the possible endogeneity problems.

Our results indicate that there is an inverted U-shaped relation between working capital and firm performance. That is, investment in working capital and corporate performance relate positively at low levels of working capital and negatively at higher levels. We also find that the results hold when firms are classified according to a variety of characteristics designed to measure the level of financial constraints borne by firms. The findings show that the optimum is sensitive to the financing constraints of the firms and that under each of our classification schemes optimal working capital level is lower for those firms that are more likely to be financially constrained.

The structure of the paper is as follows. The next section develops the predicted concave relation between working capital and corporate performance and outlines the possible influence of financing conditions on this relationship. In section 3 we describe our empirical model and data. We present our results in section 4 and analyse how the optimum changes between firms more or less likely to face financing constraints. Section 5 concludes.

2. WORKING CAPITAL, CORPORATE PERFORMANCE AND FINANCING

2.1 Working capital and corporate performance

The investment in receivable accounts and inventories represents an important proportion of a firm's assets, while trade credit is an important source of

funds for most firms. Cuñat (2007) reports that trade credit represents about 41% of the total debt and about half the short term debt in UK medium sized firms.

There is substantial literature on credit policy and inventory management, but few attempts to integrate both credit policy and inventory management decisions, even though Schiff & Lieber (1974), Sartoris & Hill (1983), and Kim & Chung (1990) do show the importance of taking into account the interactions between the various working capital elements (i.e. receivable accounts, inventories and payable accounts).

Lewellen, McConnel, & Scott (1980) demonstrate that under perfect financial markets, trade credit decisions do not serve to increase firm value. However, capital markets are not perfect and, consequently, several papers demonstrate the influence of trade credit and inventories on firm value (see, for instance, Emery, 1984; Bao & Bao, 2004). The idea that working capital management affects firm value also seems to enjoy wide acceptance, although the empirical evidence on the valuation effects of investment in working capital is scarce.

There are various explanations for the incentives of firms to hold positive working capital. Firstly, a higher investment in extended trade credit and inventories might increase corporate performance for several reasons. According to Blinder & Maccini (1991), larger inventories can reduce supply costs and price fluctuations and prevent interruptions in the production process and loss of business due to scarcity of products. They also allow firms better service for their customers and avoid high production costs arising from high fluctuations in production (Schiff & Lieber 1974). Granting trade credit, on the other hand, might also increase a firm's sales, because it can serve as an effective price cut (Brennan, Maksimovic, & Zechner 1988; Petersen

& Rajan 1997); it encourages customers to acquire merchandise at times of low demand (Emery 1987); it strengthens long-term supplier-customer relationships (Ng, Smith, & Smith 1999; Wilner 2000); it allows buyers to verify product and services quality prior to payment (Smith 1987; Long, Malitz & Ravid 1993; and Lee & Stowe 1993). Hence, it reduces the asymmetric information between buyer and seller. Indeed, Shipley & Davis (1991), and Deloof & Jegers (1996) suggest that trade credit is an important supplier selection criterion when it is hard to differentiate products. Emery (1984) suggests that trade credit is a more profitable short-term investment than marketable securities. Secondly, working capital may also act as a stock of precautionary liquidity, providing insurance against future shortfalls in cash (Fazzari & Petersen, 1993). Finally, from the point of view of accounts payable, Ng et al., (1999) and Wilner (2000) also demonstrate that a firm may obtain important discounts for early payments when it reduces its supplier financing.

However, there are also possible adverse effects of investment in working capital which may lead to a negative impact on firm value at certain working capital levels. Firstly, keeping stock available supposes costs such as warehouse rent, insurance and security expenses, which tend to rise as the level of inventory increases (Kim & Chung, 1990). Secondly, since a greater working capital level indicates a need for additional capital, which firms must finance, it involves financing costs and opportunity costs. On the one hand, companies that hold a higher working capital level also face more interest expenses as a result (Kieschnick et al., 2011) and, therefore, more credit risk. As working capital increases, it is more likely that firms will experience financial distress and face the threat of bankruptcy. This gives firms with high investment in working capital incentives to reduce working

capital levels and minimize the risk of financial distress and costly bankruptcy. On the other hand, keeping high working capital levels means that money is locked up in working capital (Deloof, 2003), so large investment in working capital might also hamper the ability of firms to take up other value-enhancing projects.

These positive and negative working capital effects indicate that the working capital decisions involve a trade-off. Consequently, we expect firms to have an optimal working capital level that balances these costs and benefits and maximizes their value. Specifically, we expect corporate performance to rise as working capital increases until a certain working capital level is reached. Conversely, we expect that, beyond this optimum, the relation between working capital and performance will become negative.

2.2 Investment in working capital and financial constraints

If the results verify the hypothesis that there is an inverted U-shaped relation between working capital and performance of a firm, one would expect the optimal level of investment in working capital to differ between firms more or less likely to face financing constraints. Modigliani & Miller (1958) argue that in a frictionless world, companies can always obtain external financing without problems and, hence, their investment does not depend on the availability of internal capital. Once capital market imperfections (i.e., informational asymmetries and agency costs) are present, capital market frictions increase the cost of outside capital relative to internally generated funds (Jensen & Meckling, 1976; Myers & Majluf, 1984; Greenwald,

Stiglitz, & Weiss, 1984).Consequently, external capital does not provide a perfect substitute for internal funds. Stiglitz & Weiss (1981) also describe how asymmetric information may result in debt rationing. These studies suggest that one of the consequences of market imperfections is distortions in a firm's investment decisions. In this line, Fazzari, Hubbard & Petersen, (1988) suggest that the firms' investment may depend on financial factors such as the availability of internal finance, access to capital markets or cost of financing.

Fazzari & Petersen (1993) suggest that investments in working capital are more sensitive to financing constraints than investments in fixed capital. Accordingly, since a positive working capital level needs financing, one would expect the optimal level of working capital to be lower for more financially constrained firms. In this line, empirical evidence demonstrates that investment in working capital depends on a firm's financing conditions (Hill, Kelly & Highfield, 2010 among others). Specifically, they show that firms with greater internal financing capacity and capital market access hold a higher working capital level.

To test the effect of financial constraints on the optimal level of working capital, we estimate the optimal working capital investment for various firm subsamples, partitioned on the basis of the likelihood that firms have constrained access to external financing. There are several measures in previous studies to separate firms that are suffering from financial constraints from those that are not, but it is still a matter of debate as to which measure is the best. Thus, we classify firms according to the following proxies for the existence of financing constraints:

Dividends. Following Fazzari et al., (1988) we use this variable to identify a firm's degree of financial constraints. Financially constrained firms tend not to pay dividends (or to pay lower dividends) to reduce the probability of raising external funds in the future. Thus, we first split the data into zero-dividend and positive-dividend groups. We expect that zero-dividend firms are the most likely to face financial constraints. Accordingly, non-dividend paying (dividend paying) companies are financially constrained (unconstrained). Secondly, following Gilchrist & Himmelberg (1995), Hubbard, Kashyap & Whited (1995); Almeida, Campello & Weisbach (2004), and Faulkender & Wang (2006), we also categorize firms according to their dividend payout ratio (measured by dividends/net profit). Thus, we consider that firms with a dividend payout ratio above the sample median are less financially constrained than those with a payout ratio below the sample median.

Cash Flow. We have also categorized firms according to their cash flow, similar to the approach by Moyen (2004), which suggests that, unlike the dividends, this variable allows one to focus on the firm's beginning-of-the-period funds, since dividends also take into account the investment and financial decisions taken by the firms during that period. This variable is defined as the ratio of earnings before interest and tax plus depreciation to total assets. Firms with a cash flow above the sample median are assumed to be less likely to face financing constraints.

Size. Many studies use this variable as an inverse proxy of financial constraints (Devereux & Schiantarelli, 1990; Carpenter, Fazzari & Petersen, 1994; Gilchrist & Himmelberg, 1995, Almeida, Campello & Weisbach, 2004, Faulkender

& Wang, 2006; Carpenter & Guariglia, 2008; Spaliara, 2009) following the notion that smaller firms face higher informational asymmetry and agency costs and, hence, will be more financially constrained. In this line, Whited (1992) indicates that larger firms have better access to capital markets, so they face lower borrowing constraints and lower costs of external financing. Therefore, we separate firms according to their size, measured by the natural logarithm of sales, and we consider firms with size above (below) the sample median to be less (more) likely to be financially constrained.

Cost of external financing. Fazzari et al., (1988) consider firms as constrained when external financing is too expensive. Thus, firms are also more or less likely to face financial constraints when considering their external financing cost, calculated by the ratio financial expenses/total debt. In particular, companies with costs of external financing above (below) the sample median are more (less) likely to be financially constrained.

Whited and Wu Index. We also group our companies according to the external finance constraints index constructed by Whited and Wu (2006), which is a linear combination of six factors: cash flow, a dividend payer dummy, leverage, firm size, industry sales growth, and firm sales growth. A greater index means a firm has less access to external capital markets. Thus, we consider a firm as being more (less) financially constrained when its WW index is above (below) the median value of this index in our sample.

Finally, we also classify firms according to two measures for bankruptcy risk that a firm presents (interest coverage and Z-score) because a firm in financial distress is more likely to face a higher degree of financial constraints:

Interest coverage. This variable is a common measure of a firm's bankruptcy risk and financial constraints (see, for example, Whited, 1992; and Guariglia, 2008). Firms go into two groups on the basis of their interest coverage ratio, which comes from the calculation of the ratio earnings before interest and tax to financial expenses. The greater this ratio, the fewer problems the firm would have in repaying its debt and the firm's earnings before interest and tax would cover the interest payment. Hence, companies that have an interest coverage ratio below (above) the sample median are more (less) likely to be financially constrained.

Z-score. We also consider Z-score in order to capture the probability of financial distress of firms, which can also influence a firm's access to credit and, therefore, might limit its investment. We use the re-estimation of Altman's (1968) model by Begley, Mings, & Watts (1996). Thus, firms with below-median scores (low Z-score) are financially constrained, while above-median firms (high Z-score) are financially unconstrained.

3. MODEL AND DATA

3.1 Specification of the model and Methodology

According to the previous section, there are reasons which justify that the relation between working capital and firm performance may be non-monotonic. Specifically, we expect a concave relation to exist. In order to test the proposed functional form, we analyse a quadratic model. Following Shin & Soenen (1998), we use the Net Trade Cycle (NTC) as a measure of working capital management. We regress corporate performance against Net Trade Cycle (NTC) and its square (NTC^2). Additional variables are also present in the performance regression model to control for other potential influences on the performance of the firm. Specifically, the variables are firm size (SIZE), leverage (LEV), opportunities growth (GROWTH), and return on assets (ROA). Therefore, we estimate the following model:

$$Q_{i,t} = \beta_0 + \beta_1 NTC_{i,t} + \beta_2 NTC^2{}_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 GROWTH_{i,t} + \beta_6 ROA + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (1)$$

where $Q_{i,t}$ is the corporate performance. Following Agrawal & Knoeber (1996); Himmelberg, Hubbard & Palia (1999); Thomsen, Pedersen & Kvist (2006), King & Santor (2008), Tong (2008), Beiner, Schmid & Wanzenried (2011), Florackis, Kostakis & Ozkan (2009), and Wu (2011) among others, the calculation of corporate performance is the ratio of the sum of the market value of equity and the book value of debt to the book value of assets. This variable mitigates most of the shortcomings

inherent in accounting profit ratio, since accounting practices affect accounting profit ratios and capital market valuation appropriately incorporates firm risk and minimizes any distortions introduced by tax laws and accounting conventions (Smirlock, Gilligan & Marshall, 1984). Perfect & Wiles (1994) demonstrate that the improvements over this variable obtained with the estimation of Tobin's q based on replacement costs are limited.

According to Shin & Soenen (1998), NTC comes from: NTC= (accounts receivable/ sales)*365 + (inventories/sales)*365 - (accounts payable/sales)*365. Hence, it is a dynamic measure of ongoing liquidity management that provides an easy estimate for additional financing needs with regard to working capital (Shin & Soenen, 1998), with a shorter NTC meaning a lower investment in working capital. We use this variable to avoid the deficiencies of traditional liquidity ratios such as current ratio and quick ratio.

We measure firm size (SIZE) as the natural logarithm of sales; leverage (LEV) by the ratio of total debt to total assets; growth opportunities (GROWTH) is the ratio (book value of intangibles assets / total assets); and the measurement of return on assets (ROA) is through the ratio earnings before interest and taxes over total assets. The parameter λ_t is a time dummy variable that changes in time but is equal for all firms in each of the time periods considered. This parameter aims to capture the influence of economic factors that may also affect corporate performance but which companies cannot control. η_i is the unobservable heterogeneity or the firm's unobservable individual effects, so we can control for the particular

characteristics of each firm. Finally, $\varepsilon_{i,t}$ is the random disturbance. We also control for industry effects by introducing industry dummy variables.

The coefficients on net trade cycle variables allow us to determine the inflection point in the net trade cycle-corporate performance relation, because this comes from: $-\beta_1 / 2\beta_2$. Since we expect NTC and corporate performance to relate positively at low levels of working capital and negatively at higher levels, the hypothesis is that β_2 is negative, because it would indicate that firms have an optimal working capital level that balances the costs and benefits of holding working capital and maximizes their performance.

We tested our hypothesis on the effect of working capital management on firm performance with the panel data methodology, because of the benefits it provides. First, it allows us to control for unobservable heterogeneity and, therefore, eliminate the risk of obtaining biased results arising from this heterogeneity (Hsiao 1985). Firms are heterogeneous and there are always characteristics that might influence their value that are difficult to measure or are hard to obtain, and which are not in our model (Himmelberg et al., 1999). Second, panel data also allows us to avoid the problem of possible endogeneity, which might be present in our analyses and could seriously affect the estimation results. The endogeneity problems arise because it is possible that the observed relationships between firm performance and firm-specific characteristics reflect not only the effect of independent variables on a firm's performance but also the effect of corporate performance on those variables. Shocks affecting performance are also likely to affect some other firm-specific characteristics. We therefore estimated our models using the two-step generalized

method of moments (GMM) estimator based on Arellano & Bond (1991), which allows us to control for endogeneity by using instruments. Specifically, we have used all the right-hand-side variables in the models, lagged up to four times, as instruments in the difference equations. We use this estimator because, although the estimator of instrumental variables in one stage is always consistent, when the disturbances show heteroskedasticity, conducting the estimation in two stages increases efficiency.

3.2 Data and summary statistics

The data in this paper are from the Osiris database. The sample comprises non-financial quoted firms from the United Kingdom for the period 2001-2007.

The information was refined. Specifically, we eliminated firms with lost values, cases with errors in the accounting data and extreme values presented by all variables. We also required firms to have presented data for at least five consecutive years. This left an unbalanced panel of 258 firms (1606 observations). A *t* test confirms that there are no significant differences between the mean NTC of our sample (56.48) and the mean NTC of non-financial quoted firms from the United Kingdom (54.85) for the period analyzed (p-value is 0.7808). Neither are there significant differences (p-value of 0.3071) between the mean Market to Book ratio of our sample (1.49) and the mean Market to Book ratio for non-financial quoted firms from the United Kingdom (1.48).

Table 1 reports some descriptive statistics for corporate performance, net trade cycle, and the control variables. Market to book ratio is on average 1.48, while the median is 1.30. The mean Net Trade Cycle is 56.47 days (median is 52.29 days). On average debt finances 56.87% of total assets, the mean growth opportunities ratio is 0.21, and mean return on assets is only 5.59% (median is 6.87%). Table 2 displays correlations among variables used in the subsequent analyses. In addition, we used a formal test to ensure that the multicollinearity problem is not present in our analyses. Specifically, we calculated the Variance Inflation Factor (VIF) for each independent variable in our models. The largest VIF value is 2.87, which confirms that there is no multicollinarity problem in our sample, because it is far from 5 (Studenmund 1997).

Table 1. Summary statistics

	Mean	Standard deviation	Perc. 10	Median	Perc. 90
Q	1.4874	0.7343	0.8675	1.3098	2.2711
NTC	56.4772	54.4139	-1.8250	52.2906	107.6327
SIZE	12.1233	2.0233	9.5025	12.1041	14.8708
LEV	0.5687	0.1774	0.3300	0.5717	0.8048
GROWTH	0.2119	0.1950	0.0141	0.1592	0.5157
ROA	0.0559	0.1182	-0.0498	0.0687	0.1571

Notes: Q represents the corporate performance; NTC the Net Trade Cycle; SIZE is the natural logarithm of total sales; LEV the leverage; GROWTH the growth opportunities; and ROA the return on assets.

Table 2. Correlation matrix

	Q	NTC	SIZE	LEV	GROWTH	ROA
Q	1.0000					
NTC	0.1478***	1.0000				
SIZE	0.0138	-0.1818***	1.0000			
LEV	-0.0229	-0.2126***	0.3118***	1.0000		
GROWTH	0.0116	-0.0371	-0.0435*	-0.1347***	1.0000	
ROA	0.2562***	0.1032***	0.3065***	-0.0007	-0.1545***	1.0000

Notes: Q represents the corporate performance; NTC the Net Trade Cycle; SIZE the size; LEV the leverage; GROWTH the growth opportunities; and ROA the return on assets.
*indicates significance at 10% level; **indicates significance at 5%level; and ***indicates significance at 1% level.

4. EMPIRICAL EVIDENCE

4.1 Effects of working capital management on firm performance

The results obtained from equation (1) appear in Table 3. Consistent with predictions, they confirm a large and statistically significant inverted U-shaped relation between corporate performance and working capital[17], since the coefficient for the NTC variable is positive ($\beta_1 > 0$), and that for its square is negative ($\beta_2 < 0$) [18]. Therefore, our findings indicate that at working capital levels below the optimal level the effects of higher sales and discounts for early payments dominate and, hence, working capital has a positive impact on firm performance. Conversely, the opportunity cost and financing cost effects dominate when the firm has a working capital level above this optimum and, consequently, the relation between working capital and firm performance becomes negative. The coefficients for net trade cycle variables allow us to determine for our sample the turning point in the relationship between performance of firms and net trade cycle. Specifically, we find a turning point of 66.95 days.

[17] We also find an inverted U-shaped relation between firm performance and each individual component of Net Trade Cycle (accounts receivable to sales ratio, inventories to sales ratio and accounts payable to sales ratio).

[18] We also find this concave relation between working capital and firm performance when using the Ordinary Least Squares (OLS) and the Two-Stage Least Squares (2SLS) estimation method. These results hold when we use measures of accounting profitability (earnings before tax over sales, net profit over sales, and earnings before interest and taxes over sales) to measure a firm's performance.

Table 3. Estimation results of net trade cycle-firm performance relation

NTC	0.0391**
	(2.41)
NTC^2	-0.0292***
	(-5.90)
SIZE	-0.0470
	(-1.41)
LEV	0.4843***
	(4.49)
GROWTH	1.0798***
	(6.31)
ROA	-0.0395
	(-0.43)
m_2	-0.74
Hansen Test	108.28
	(102)
Observations	1606

Notes: The dependent variable is the corporate performance; NTC is the Net Trade Cycle divided by 100 and NTC^2 its square; SIZE the size; LEV the leverage; GROWTH the growth opportunities; and ROA the return on assets. Time and industry dummies are included in the estimations, but not reported.
Z statistic in brackets.
*indicates significance at 10% level;**indicates significance at 5%level; and ***indicates significance at 1% level.
m_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as N(0,1) under null hypothesis of no serial correlation. Hansen test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments as Chi-squared. Degrees of freedom in brackets.

4.2 Financial constraints and optimal working capital level

Once we have verified that firms have an optimal working capital level that maximizes their performance, our aim is also to explore the possible effect of financing on this optimal level. As we commented above, asymmetric information between the firm and the capital market may result in credit rationing (Stiglitz &

Weiss, 1981) and a wedge between the costs of internal and external financing (Jensen & Meckling, 1976; Myers & Majluf, 1984; and Greenwald, Stiglitz, & Weiss, 1984), because insufficient information lowers the market's assessment of the firm and of its projects and raises the firm's cost of external financing. Thus, since a higher working capital level needs financing, which would mean additional expenses, we expect firms more likely to face financial constraints to have a lower optimal working capital level than those that are less likely.

In order to test whether or not the optimal working capital level of more financially constrained firms differs from that of less constrained ones, equation 1 is extended by incorporating a dummy variable that distinguishes between firms more likely to face financing constraints and those that are less likely according to the different classifications commented on above. Specifically, DFC is a dummy variable that takes a value of 1 for firms more financially constrained, and 0 otherwise. Thus, we propose the following specification:

$$Q_{i,t} = \beta_0 + (\beta_1 + \delta_1 DFC_{i,t})NTC_{i,t} + (\beta_2 + \delta_2 DFC_{i,t})NTC^2{}_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 GROWTH_{i,t} + \beta_6 ROA + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (2)$$

All dependent and independent variables are as previously defined. By construction, the expression $-\beta_1 / 2\beta_2$ measures the optimal working capital investment of less financially constrained firms. The optimum of more financially constrained firms comes from $-(\beta_1 + \delta_1)/2(\beta_2 + \delta_2)$.

Table 4 shows the regression results for more financially constrained and less financially constrained firms categorized using the different classification schemes commented on above. Our findings provide evidence of the role of financing in the

working capital-firm performance relation. Although the concave relation between working capital and firm performance always holds, the optimal investment in working capital depends on the financing constraints borne by firms. In addition, different classifications of financial constraints lead to a consistent result. When financing conditions are present in the analysis, the results indicate that the optimal level of working capital is lower for those firms more likely to be financially constrained. This may be mainly because of the higher financing costs of those firms and their greater capital rationing, since the lower the investment in working capital, the lower the need for external financing.

Therefore, the approach we propose here allows us to understand why the level of financial constraints borne by a company influences its investment in working capital decisions. Specifically, it would allow us to justify the results of Hill et al., (2010), that investment in working capital depends on internal financing resources, external financing costs, capital market access and financial distress of the firms. Their findings suggest that internal financing capacity and capital market access positively influence investment in working capital. Conversely, they find that firms with higher cost of external financing and financial distress hold a lower working capital level.

Table 4. Financial constraints and net trade cycle-firm performance relation

	Financial constraints criteria							
	Dividend Paying grouping	Payout ratio grouping	Cash flow grouping	Size grouping	External financing cost grouping	Whited and Wu Index grouping	Interest coverage grouping	Z-score grouping
NTC	0.3260***	0.1091***	0.1982***	0.1751***	0.0324**	0.2724***	0.2025***	0.1879***
	(6.50)	(3.32)	(5.92)	(2.77)	(2.26)	(5.93)	(5.11)	(4.69)
NTC*DFC	-0.3306***	-0.0804***	-0.1812***	-0.1825***	-0.0457*	-0.2650***	-0.1824***	-0.1557***
	(-6.39)	(-2.81)	(-6.00)	(-2.97)	(-1.76)	(-5.87)	(-5.10)	(-3.97)
NTC^2	-0.1358***	-0.0530***	-0.1047***	-0.0862***	-0.0198***	-0.1832***	-0.0998***	-0.1006***
	(-7.48)	(-3.27)	(-7.83)	(-3.53)	(-5.14)	(-4.51)	(-7.56)	(-7.29)
NTC^2*DFC	0.1227***	0.0367**	0.0832***	0.0672***	-0.0241***	0.1666***	0.0892***	0.0787***
	(6.77)	(2.36)	(6.38)	(2.79)	(-2.81)	(4.10)	(5.81)	(5.73)
SIZE	-0.0315	-0.0520**	-0.0911***	-0.0448*	-0.0497**	-0.0255	-0.0603***	-0.0602***
	(-1.54)	(-2.32)	(-4.25)	(-1.79)	(-2.25)	(-1.06)	(-2.70)	(-2.59)
LEV	0.5044***	0.4682***	0.5908***	0.3841***	0.4917***	0.5861***	0.6720***	0.5212***
	(8.20)	(6.28)	(7.58)	(5.28)	(7.57)	(6.97)	(7.95)	(7.52)
GROWTH	0.7552***	0.4060***	0.8067***	1.0104***	0.7432***	0.7972***	0.6460***	0.8110***
	(7.21)	(3.65)	(6.96)	(7.16)	(5.96)	(5.94)	(5.75)	(5.88)
ROA	0.0601	0.1107	-0.0393	0.0950	0.0984	0.1320*	-0.0893	0.0566
	(1.05)	(1.60)	(-0.57)	(1.31)	(1.37)	(1.76)	(-1.20)	(0.81)
F_1	0.19	5.67	1.83	0.35	0.18	0.32	2.44	6.50
F_2	26.36	23.86	30.36	36.68	27.13	18.54	5.64	52.45
m_2	-0.57	-0.51	-0.51	-0.73	-0.64	-0.56	-0.65	-0.61
Hansen Test	142.45 (136)	143.81 (136)	133.26 (136)	139.34 (136)	143.98 (136)	144.14(128)	137.20 (136)	133.24 (136)
Observations	1606	1606	1606	1606	1606	1606	1606	1606

Notes: The dependent variable is the corporate performance; NTC is the Net Trade Cycle divided by 100 and NTC^2 its square; SIZE the size; LEV the leverage; GROWTH the growth opportunities; and ROA the return on assets. DFC is a dummy variable equals 1 for firms more likely to be financially constrained and 0 otherwise. Time and industry dummies are included in the estimations, but not reported. Z statistic in brackets. F_1 is a F-test for the linear restriction test under the following null hypothesis: H_0: $(\beta_1+\delta_1)=0$. F_2 is a F-test for the linear restriction test under the following null hypothesis: H_0: $(\beta_2+\delta_2)=0$.

*indicates significance at 10% level; **indicates significance at 5%level; and ***indicates significance at 1% level.

m_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as N(0,1) under null hypothesis of no serial correlation. Hansen test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments as Chi-squared. Degrees of freedom in brackets.

5. CONCLUSIONS

The aim of this paper is to provide empirical evidence for the relation between working capital and corporate performance. Although few studies empirically examine whether there is an association between investment in working capital and firm value, the idea that working capital management influences firm value enjoys widespread acceptance. We use a panel data model and employ the GMM method of estimation, which allows us to control for unobservable heterogeneity and for potential endogeneity problems.

In contrast to previous findings, our main contribution here is to study the functional form of the above-mentioned relation. This analysis, which the literature has not considered previously, reveals that there is an inverted U-shaped relation between working capital and corporate performance, which implies that there exists an optimal level of investment in working capital that balances costs and benefits and maximizes a firm's performance.

This supports the idea that at lower levels of working capital managers would prefer to increase the investment in working capital in order to increase firms' sales and the discounts for early payments received from its suppliers. However, there is a level of working capital at which a higher investment begins to be negative in terms of value creation due to the additional interest expenses and, hence, the higher probability of bankruptcy and credit risk of firms. Thus, firm managers should aim to keep as close to the optimal level as possible and try to avoid any deviations from it that destroy firm value.

Following Fazzari & Petersen (1993) and Hill et al., (2010), who suggest that investment in working capital is sensitive to firms' capital market access, we also analyze whether financing constraints influence the optimal level of investment in working capital. Our findings indicate that, although the concave relation between working capital and firm performance always holds, the optimal working capital level of firms that are more likely to be financially constrained is lower than that of less constrained firms. In addition, this result is robust to various proxies of financial constraints. It justifies the impact of internally generated funds and the access to external financing on companies' working capital investment decisions that previous studies reported.

There are several implications of our study which may be relevant for managers and research on investment in working capital. First, our results suggest that managers should be concerned about working capital, because of the costs of moving away from the optimal working capital level. Managers should avoid negative effects on firm performance through lost sales and lost discounts for early payments or additional financing expenses. Second, our findings extend the research on the relevance of a good working capital management and suggest that future studies on working capital should control for financial constraints.

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CHAPTER V

WORKING CAPITAL REQUIREMENT FINANCING AND SMEs PERFORMANCE

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1. INTRODUCTION

Since Smith (1980) suggested that working capital management is important because of its effects on a firm's profitability and risk, and consequently its value, the literature on investment in working capital requirement (WCR) has been extended. In particular, Chiou, Cheng and Wu (2006), Baños, Garcia and Martinez (2010), and Hill, Kelly and Highfield (2010) analyze the determinants of WCR for firms. The influence of WCR on firm performance has also been demonstrated by a number of publications (Jose, Lancaster and Stevens, 1996; Shin and Soenen, 1998; Wang, 2002; Deloof, 2003; Garcia and Martinez, 2007; and Baños, Garcia and Martinez (2012); among others).

Investment in WCR, however, might not be the only important concern for firms when they make their working capital decisions, because the way in which it is financed might also affect their performance. Indeed, an extended literature in corporate finance shows that a firm's value depends on its financing decisions. Although a lot of literature demonstrates the influence of investment in WCR on firms' performance, there is no empirical evidence that also analyzes the possible influence of working capital requirement financing on their performance. Hence, this paper examines whether the kind of financing used by firms to finance their WCR affects their performance, where WCR is defined as current assets net of accounts payable. Since a positive WCR needs to be financed, it indicates a need for funds that firms have to finance. Firms can finance a high proportion of their WCR with long-term sources of funds, that is, they can use a less risky WCR financing strategy,

which allows them to reduce both the refinancing and interest risk. Alternatively, firms that use a risky WCR financing strategy, that finances a high proportion of their WCR with short-term funds, might reduce their financing costs, obtain credit condition benefits, mitigate agency costs and signal their positive prospects to market. We also investigate whether this relationship between WCR financing and firm performance is influenced by a firm's ability to generate internal funds.

We use a sample of non-financial Spanish SMEs for two reasons. First, Peel and Wilson (1996) and Peel, Wilson and Howorth (2000) suggest that an efficient working capital management is particularly important for small and medium-sized firms due to the greater difficulties they have in obtaining funding on the long-term capital markets (Petersen and Rajan, 1997) and, hence, their greater dependence on trade credit and bank credit as major sources of debt. Second, Spain, as occurs in most European countries, has a banking-oriented financial system, where capital markets are less developed and banks play an important role (Schmidt and Tyrell 1997). Thus, in the Spanish case, there is a large fraction of bank-dependent SMEs (Carbó, Rodriguez and Udell, 2009). Our results may also be of interest for other SMEs established in countries with similar financial systems.

To our knowledge, this is the first paper to analyze how the WCR financing strategy selected by firms affects their performance. The findings confirm the importance of the way in which a firm finances its WCR due to its influence on its performance. Hence, according to our results, investment in WCR should not be the only important concern for firms when they make their working capital decisions; the way in which this investment is financed should also be considered. In addition,

analyses reveal that a firm's cash flow and market power affects the WCR financing-performance relationship.

The rest of this paper is organized as follows. Section 2 links WCR financing and performance. Section 3 describes the empirical model and data. The results are presented in Section 4. Section 5 analyzes how the ability to generate internal funds of a firm affects the WCR financing-performance relationship. Finally, section 6 concludes the paper.

2. WORKING CAPITAL REQUIREMENT FINANCING AND FIRM PERFORMANCE

Since Modigliani and Miller (1958) proved that, under perfect and frictionless capital markets, the choice between debt and equity financing has no effects on the firm's value or on the cost or availability of capital, much research effort has been directed at understanding firms´ capital structure decisions and the corresponding effects on firm value. More recently, since Stiglitz (1974) suggested that the terms of debt were also irrelevant under perfect capital markets, researchers have also tried to explain the debt maturity structure (see, for instance, Stohs and Mauer, 1996; Ozkan, 2000; Antoniou, Guney and Paudyal, 2006; among others).

A positive WCR needs to be financed and, hence, a greater WCR indicates a need for additional capital that firms have to finance. Given the differences in costs and risks between the various sources of finance available to firms, the way in which a firm finances its WCR might affect its performance.

Our study indicates that Spanish SMEs use a high proportion of total short-term debt over their total debt (83.82%). This is consistent with the small business finance literature, which shows that SMEs rely heavily on short-term financing. According to Walker (1989), since small firms rarely obtain long term debt or equity in traditional financial markets, they rely on trade credit and bank credit as major sources of debt. In this line, Hughes (1997) indicates that small firms have a much greater reliance on short-term bank loans in financing their assets than large companies. In the Spanish case, moreover, the financial system is dominated by credit institutions, where banks play an important role (Schmidt and Tyrell, 1997) and there is a large fraction of bank-dependent SMEs (Carbó, Rodriguez and Udell, 2009).

Although short-term bank debt enjoys several advantages, it also introduces significant risks. Thus, the influence of a higher percentage of WCR financed with short-term bank debt on firm's performance may be positive or negative.

Greater short-term debt might positively influence a firm's performance for several reasons. First, as Jun and Jen (2003) indicate, nominal rate of short-term debt is lower than that of long-term debt, due to default and inflation premiums, which tend to increase as debt maturity lengthens. Second, Jun and Jen (2003) also suggest that short-term debt adapts more easily to a firm's financial needs. Third, Petersen and Rajan (1994) indicate that short-term debt facilitates bank relations between the firm and the lender due to frequent renewals and, hence, firms might obtain credit condition benefits. Fourth, short-term debt can mitigate agency conflicts between shareholders and debtholders. Empirical evidence confirms that firms can use short-term loans to solve the problem of underinvestment because management is more

frequently monitored due to periodic credit renewal (see, for example, Myers, 1977; Barclay and Smith, 1995; and Ozkan, 2000). In the case of SMEs, the problem of underinvestment could be a particularly severe problem (MacMahon, 2003). Finally, as Flannery (1986) and Kale and Noe (1990) note, firms with high-quality investment projects use short-term loans to transmit their positive prospects to the market.

However, more short-term bank debt could also negatively affect firm performance due to an increase in both refinancing and interest risk. Firms might face difficulties in renewing their short-term loans or they might have to pay higher interest rates on new loans, which would negatively affect their performance.

Given these positive and negative effects of short-term bank debt, a greater use of short-term bank debt to finance a firm's WCR might positively or negatively affect its performance. When a low percentage of WCR is financed with short-term bank debt, riskier WCR financing may increase firm's performance because the positive influence of short-term bank debt is expected to outweigh the negative influence. In particular, firms might reduce their interest costs, obtain credit condition benefits, mitigate agency costs and signal their positive prospects to suppliers of funds. In contrast, when firms finance a high percentage of their WCR with short-term bank debt, risky WCR financing might negatively affect firm's performance due to interest and refinancing risk. Thus, at sufficiently high percentages of WCR financed with short-term bank debt, the negative influence of short-term bank debt is expected to be the dominant factor.

Therefore, we expect a positive relation between the proportion of short-term bank debt used to finance a firm's WCR and its performance when a low percentage

of WCR is financed with short-term bank debt. However, we expect this relation to be negative when firms finance a high percentage of their WCR with short-term bank debt.

3. MODEL AND DATA

3.1 Model and Methodology

To analyze the relationship between WCR financing and a firm's performance we use the variable WCF as a measure of the WCR financing. This is calculated by the following ratio: short-term bank debt / WCR; where WCR is defined as current assets minus accounts payable. A greater WCF means riskier WCR financing, since it measures the percentage of WCR that is financed with short-term bank debt.

Thus, to test both the possible positive and negative effects of WCF on performance, we regress the firm's performance against WCF variable and its square. Additional variables are also included in the performance regression model to control for other potential influences on the performance of the firm. In particular, we include the firm size, sales growth, leverage and return on assets. Thus, we estimate the relation between WCR financing and firm's performance using the following regression:

$$ROE_{i,t} = \beta_0 + \beta_1 WCF_{i,t} + \beta_2 WCF^2_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GROWTH_{i,t} + \beta_5 LEV_{i,t} + \beta_6 ROA + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (1)$$

where $ROE_{i,t}$ is the return on equity, which is defined as net profit / equity; $WCF_{i,t}$ is the WCR financing; and $WCF^2_{i,t}$ its square. The inclusion of these two variables allows us to test both the positive and negative effects commented above. $SIZE_{i,t}$ is measured by the natural logarithm of sales; $GROWTH_{i,t}$ is calculated by the ratio $(sales_{i,t} - sales_{i,t-1})/sales_{i,t-1}$; *LEV* is defined as the ratio of total (long-term+short-term)debt to total assets; and $ROA_{i,t}$ is measured by the ratio earnings before interest and taxes over total assets. Parameter λ_t is a time dummy variable that changes in time but is equal for all firms in each of the time periods considered. This parameter is designed to capture the influence of economic factors that may also affect firm performance, but which firms cannot control. η_i is the unobservable heterogeneity or the firm's unobservable individual effects, so we can control for the particular characteristics of each firm. Finally, $\varepsilon_{i,t}$ is the random disturbance. We also control for industry effects by introducing industry dummy variables.

Since our aim is to analyze the effect of WCR financing on firms' performance, we only include in our analyses those observations which have a positive WCR and, hence, the need to be financed. The coefficients on WCF and WCF^2 variables obtained from equation (1) allow us to determine the breakpoint in the WCR financing-firm performance relation, which can be calculated by the following expression: $-\beta_1 / 2\beta_2$. Given the positive and negative effects of short-term bank debt mentioned in the previous section, we expect a concave relationship

between WCF and return on equity. To verify our hypothesis, this inflection point should be a maximum and, hence, β_1 is hypothesised to be positive and β_2 negative.

We use the panel data methodology to estimate our model because of the benefits it provides. First, it allows us to control for unobservable heterogeneity and, therefore, eliminate the risk of obtaining biased results arising from this heterogeneity (Hsiao 1985). Firms are heterogeneous and there are always characteristics that might influence their performance that are difficult to measure or hard to obtain, and which are not in our model (Himmelberg, Hubbard, and Palia, 1999). Second, panel data also allows us to avoid the problem of possible endogeneity. We estimated our models using the two-step generalized method of moments (GMM) estimator based on Arellano and Bond (1991), which allows us to control for endogeneity by using instruments.

3.2 Data and Summary statistics

The study uses a data panel of non-financial Spanish SMEs. The data were obtained from the SABI (Iberian Balance Sheets Analysis System) database, which was developed by Bureau Van Dijk and contains accounting and financial information for Spanish firms.

The sample comprises small and medium-sized firms from Spain for the period 1997-2007. The selection of SMEs was carried out according to the requirements established by European Commission recommendation 2003/361/EC of 6 May, 2003, i.e. they had fewer than 250 employees, turned over less than 50

million euros a year and possessed less than 43 million euros worth of total assets. The information obtained was refined. Specifically, we eliminated firms with lost values, cases with errors in the accounting data and extreme values presented by all variables. In addition, we also required firms to have presented data for at least five consecutive years. Finally, we obtained an unbalanced panel of 1,062 firms (7,557 observations).

Table 1 reports descriptive statistics on return on equity, WCF and the control variables. Table 2 provides Pearson correlations for variables in equation (1). Moreover, to ensure that the multicollinearity problem is not present in our analysis, we calculated the Variance Inflation Factor (VIF) for each independent variable included in our model (results not presented but available from the authors upon request). Since the largest VIF value is far from 5, it can be concluded that multicollinearity is not a concern in the present sample (Studenmund, 1997).

Table 1. Summary statistics

	Mean	Standard deviation	10th	Median	90th
ROE	0.0821	0.1241	-0.0275	0.0777	0.2124
WCF	0.4766	0.3773	0.050	0.4323	0.8958
SIZE	9.3068	0.6012	8.6021	9.2841	10.1023
GROWTH	0.0798	0.1710	-0.0948	0.0626	0.2695
LEV	0.6243	0.1890	0.3478	0.6513	0.8509
ROA	0.0578	0.0515	0.0038	0.0524	0.1235

Notes: ROE represents the return on equity; WCF is the ratio short-term bank debt / WCR; SIZE is the size; GROWTH the sales growth; LEV the leverage; and ROA the return on assets.

Table 2. Correlation matrix

	ROE	WCF	SIZE	GROWTH	LEV	ROA
ROE	1.0000					
WCF	-0.0308***	1.0000				
SIZE	0.0950***	0.0305***	1.0000			
GROWTH	0.2259***	0.0739***	0.1239***	1.0000		
LEV	0.0641***	0.5393***	0.1672***	0.1597***	1.0000	
ROA	0.7589***	-0.1313***	0.0448***	0.1804***	-0.1809***	1.0000

Notes: ROE represents the return on equity; WCF is the ratio short-term bank debt / WCR; SIZE is the size; GROWTH the sales growth; LEV the leverage; and ROA the return on assets.
***indicates significance at 1% level.

4. EMPIRICAL EVIDENCE

4.1. Univariate analyses

Table 3 provides preliminary insights into the relationship between WCR financing and return on equity. The sample is sorted annually into quartiles based on the WCR financing. Specifically, WCF_1 consists of firms with the lowest level of WCF ratio, while WCF_4 includes firms with the highest WCF ratio. Thus, Table 3 reports mean and median values for return on equity across WCF quartiles.

Consistent with our hypothesis, results suggest a non-monotonic relationship between WCR financing and return on equity. We find that the mean and medium return on equity first increase and then decline with the WCF ratio. The mean ROE increases from 0.066 in WCF_1 to 0.097 in WCF_3. However, for the highest level of *WCF*, we find a reversal in pattern for return on equity, since the mean decreases to 0.070 for the last quartile. The median ROE has a similar pattern.

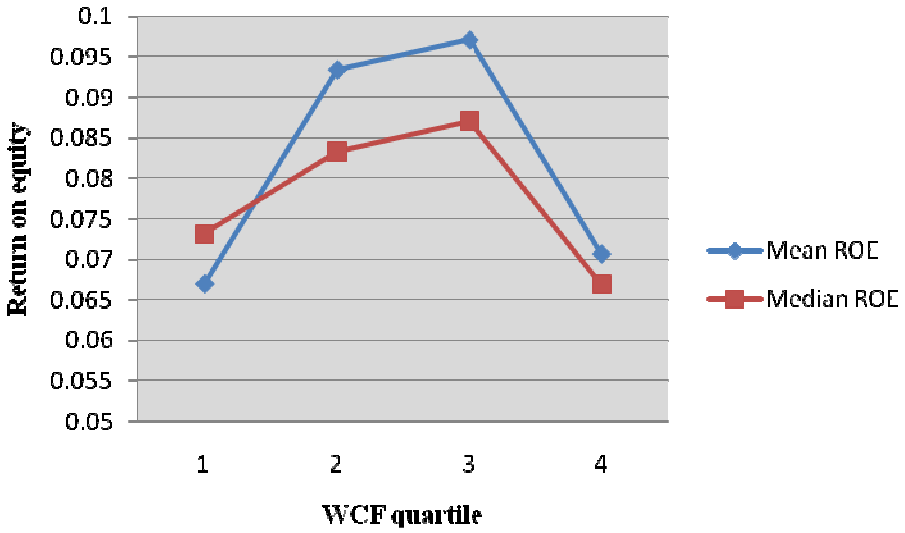
Table 3. Working capital requirement financing and Return on Equity

	ROE mean	ROE median
WCF_1	0.0669	0.0731
WCF_2	0.0934	0.0833
WCF_3	0.0971	0.0871
WCF_4	0.0706	0.0669

Notes: This table reports mean and median values for return on equity across WCF quartiles. The sample is sorted annually into quartiles based on their WCF ratio. Specifically, WCF_1 consists of firms with the lowest level of WCF ratio, while WCF_4 includes firms with the highest WCF ratio.

We illustrate this non-monotonic relationship between WCR financing and return on equity in Figure 1, which shows the mean and median ROE across the WCF quartiles. Quartiles are represented on the horizontal axis. The vertical axis represents the mean and median ROE. The results seem to indicate that the use of short-term bank debt to finance a firm's WCR positively affect its performance. However, at sufficiently high percentages of WCR financed with short-term bank debt, the negative influence of short-term bank debt outweighs the positive influence and, hence, riskier WCR financing negatively affects a firm's performance.

Figure 1. Working capital requirement financing and Return on Equity



Notes: This figure reports the mean and median return on equity across WCF quartiles. The sample is sorted annually into quartiles based on the WCF ratio. WCF is the ratio short-term bank debt / WCR.

4.2. Multivariate analyses

Whereas the conclusions in the above section are based on a univariate analysis, we now explore the effect of the WCR financing on firms' performance by estimating the model (1) proposed in Section 3. The results obtained are presented in Column (1) of Table 4. Our findings indicate that β_1 is positive and β_2 is negative, and both coefficients are significant, which confirms that there is a concave relationship between WCF and firm's performance. When a low percentage of WCR is financed with short-term bank debt, firms may increase their performance with riskier WCR financing due to the advantages associated with short-term bank debt.

Specifically, firms might reduce their interest costs, obtain credit condition benefits, mitigate agency costs and signal their positive prospects to suppliers of funds.

In contrast, when firms finance a high percentage of their WCR with short-term bank debt, riskier WCR financing negatively affects a firm's performance because the negative influence of short-term bank debt outweighs the positive influence. Although firms enjoy several advantages with short-term debt, it also introduces interest and refinancing risk, which can in turn cause high financial distress costs (Jun and Jen, 2003). Thus, at sufficiently high WCF levels, the negative influence of riskier WCR financing is the dominant factor[19]. Our results suggest that, for our sample, the WCF-firm performance relationship has a breakpoint of around 1.29.

In Column (2), following Ghosh and Moon (2010), we use an alternative research design based on spline regressions to give robustness to the results obtained from equation (1). Specifically, we estimate the following model:

$$ROE_{i,t} = \beta_0 + \beta_1 WCF_{(0,\ 1.29)\,i,t} + \beta_2 WCF_{(1.29,\ Max)\,i,t} + \beta_3 SIZE_{i,t} + \beta_4 GROWTH_{i,t} + \beta_5 LEV_{i,t} + \beta_6 ROA + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (2)$$

where we replace the *WCF* variable and its square (WCF^2) with $WCF_{(0,\ 1.29)}$ and $WCF_{(1.29,\ Max)}$. We use the breakpoint obtained from equation (1) to divide *WCF* into low and high range categories. In particular, $WCF_{(0,\ 1.29)}$ equals *WCF* if *WCF* lies between 0 and 1.29; and 1.29 otherwise. $WCF_{(1.29\ ,Max)}$ equals *WCF* minus 1.29 if

[19] We also obtain this concave relationship between WCF and firm's performance if we measure the WCF variable by the ratio short-term bank debt/(accounts receivable + inventories - accounts payable).

WCF is greater than 1.29, and 0 otherwise. All the other variables are the same as those specified in equation (1).

Consistent with the findings obtained in Column (1), the results obtained from equation (2) indicate that there is a concave relationship between the variable WCF and a firm's performance, since the coefficient on $WCF_{(0,\ 1.29)}$ is positive and significant, but that on $WCF_{(1.29\ ,\ Max)}$ is negative and significant. They indicate that a riskier WCR financing strategy has a positive influence on performance at low levels of the WCF ratio, but that this effect becomes negative at high levels.

Table 4. Estimation results of working capital requirement financing-performance relationship

	Eq. (1)	Eq. (2)
$WCF_{i,t}$	0.0448***	
	(10.95)	
$WCF^2_{i,t}$	-0.0173***	
	(-21.58)	
$WCF_{(0,\ 1.29)}$		0.0254***
		(9.36)
$WCF_{(1.29,\ Max)}$		-0.0469***
		(-60.24)
SIZE	-0.0298***	-0.0363***
	(-4.37)	(-5.81)
GROWTH	0.0172***	0.0199***
	(5.88)	(7.93)
LEV	0.2721***	0.2780***
	(12.75)	(19.14)
ROA	2.0384***	2.0880***
	(73.93)	(110.39)
m_2	-1.12	-1.12
Hansen Test	344.33(324)	348.40(324)
Observations	7557	7557

Notes: The dependent variable is the firm performance; WCF is measured by the ratio short-term bank debt / WCR; SIZE the size; GROWTH the sales growth; LEV the leverage; and ROA the return on assets. $WCF_{(0,\ 1.29)}$ equals *WCF* if *WCF* lies between 0 and 1.29; and 1.29 otherwise. $WCF_{(1.29,\ Max)}$ equals *WCF* minus 1.29 if *WCF* is greater than 1.29, and 0 otherwise.
Time and industry dummies are included in the estimations, but not reported.
Z statistic in brackets.
*indicates significance at 10% level, **indicates significance at 5%level, and ***indicates significance at 1% level.
m_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation. Hansen test is a test for over-identifying restrictions distributed asymptotically under the null hypothesis of validity of instruments as Chi-squared. Degrees of freedom in brackets.

Additionally, to give greater robustness to our results, and since the WCR financing strategy selected by firms might differ across industries, we have also re-estimated the quadratic model by taking sub-samples by industry in order to check whether the concave relationship between WCF and firm's performance is maintained for them. In particular, we have re-estimated the quadratic relationship

for the following five sub-samples: Agriculture and Mining; Manufacturing; Construction; Wholesale and Retail trade; and Service and Transport. The results obtained are presented in Table 5. They confirm this concave relationship between WCF and performance for all sub-samples, except for the Agriculture and Mining sector, where the coefficients are not significant. However, this non significant result might be due to the small number of firms in this sub-sample.

5. WORKING CAPITAL REQUIREMENT FINANCING AND ABILITY TO GENERATE INTERNAL FUNDS

Having found that there is a percentage of WCR financed with short-term bank debt beyond which the relation between WCF and performance becomes negative, this section explores whether the breakpoint of this WCF-performance relationship depends on a firm's ability to generate internal funds.

Firms with a greater ability to generate internal finance may meet their payment obligations more easily and, consequently, they might obtain more short-term bank loans and better credit conditions, that is, they would have a lower refinancing and interest risk. Thus, one could expect that these firms can finance a greater portion of their WCR with short-term bank debt (without harming their performance).

In order to test our new hypothesis, we classify firms on the basis of their ability to generate internal funds and we estimate the breakpoint of the WCF-performance relation for these sub-samples. We use two proxies for the ability to

Table 5. Sub-samples by industry: Estimation results of working capital requirement financing-performance relationship

	Agriculture and Mining sectors	Manufacturing sector	Construction sector	Wholesale and Retail trade sectors	Service and Transport sectors
$WCF_{i,t}$	0.1157	0.0614***	0.0480***	0.0428***	0.0230***
	(0.60)	(20.74)	(3.37)	(18.56)	(6.49)
$WCF^2_{i,t}$	-0.0230	-0.0356***	-0.0072***	-0.0088***	-0.0094***
	(-0.53)	(-38.24)	(-2.76)	(-10.26)	(-8.80)
SIZE	-0.0922	-0.0306***	0.0443***	-0.0320***	0.0019
	(-0.38)	(-8.85)	(3.59)	(-14.78)	(0.17)
GROWTH	0.0892	0.0052**	-0.0045	0.0483***	0.0376***
	(1.03)	(2.25)	(-1.03)	(34.78)	(5.46)
LEV	-0.2190	0.2497***	0.1715***	0.1529***	0.2352***
	(-0.42)	(26.08)	(3.76)	(28.32)	(9.11)
ROA	1.7897	1.9397***	2.3312***	2.3811***	2.1427***
	(1.57)	(129.09)	(19.37)	(207.52)	(82.89)
m_2	1.20	-1.76	-0.13	-0.86	0.22
Hansen Test	3.79(127)	344.11(324)	50.45(321)	321.13(324)	70.92(321)
Observations	144	3735	503	2569	606

Notes: The dependent variable is the firm performance; WCF is measured by the ratio short-term bank debt / WCR; SIZE the size; GROWTH the sales growth; LEV the leverage; and ROA the return on assets. Time and industry dummies are included in the estimations, but not reported.
Z statistic in brackets.
*indicates significance at 10% level, **indicates significance at 5%level, and ***indicates significance at 1% level.
m_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation. Hansen test is a test for over-identifying restrictions distributed asymptotically under the null hypothesis of validity of instruments as Chi-squared. Degrees of freedom in brackets.

generate internal funds. First, we use the cash flow variable, measured by the ratio net profit plus depreciation to total assets, with a higher ratio meaning a greater ability to generate internal funds. Second, following Demirguc-Kunt and Maksimovic (1998), we have also categorized firms according to their market power. They indicate that firms that have sufficient market power or that face high demand could generate sufficient cash flow. Following Hill et al., (2010), we measure the market power (MP) as the lagged ratio of a firm's annual sales to the total annual sum of sales in a given industry. This is a proxy for a firm's ability to negotiate bilaterally as both customer and supplier, with a higher ratio indicating a greater bargaining power and, hence, a greater ability to generate internal funds.

In order to test whether or not the breakpoint of the WCR financing-performance relation varies according to the ability to generate internal funds, equation (1) is extended by incorporating a dummy variable that distinguishes between firms with more and less ability to generate internal financing. Specifically, DUM is a dummy variable that takes a value of 1 for firms with a greater ability to generate internal funds than the sample median, and 0 otherwise.

Thus, we estimate the following model:

$$ROE_{i,t} = \beta_0 + (\beta_1 + \delta_1 DUM_{i,t})WCF_{i,t} + (\beta_2 + \delta_2 DUM_{i,t})WCF^2_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GROWTH_{i,t} + \beta_5 LEV_{i,t} + \beta_6 ROA + \lambda_t + \eta_i + \varepsilon_{i,t} \quad (3)$$

All dependent and independent variables are as previously defined. By construction, the expression $-\beta_1 / 2\beta_2$ measures the breakpoint of the WCF-performance relation for firms with a lower ability to generate internal funds. The breakpoint of this relation for firms with a greater ability is captured by the expression $-(\beta_1 + \delta_1)/2(\beta_2 + \delta_2)$.

The results, which are presented in Table 6, confirm again our hypothesis that the relationship between WCF and performance is concave. In addition, we also find that, for the firms with a greater ability to generate internal funds, the percentage of WCR financed with short-term bank debt beyond which riskier WCR financing starts to affect a firm's performance negatively is greater. That is, our findings indicate that these firms can finance a greater percentage of their WCR with short-term bank debt without harming their performance, which may be due to their lower refinancing and interest risk, given that they are expected to obtain short-term bank debt more easily and better credit conditions.

Table 6. Working capital requirement financing and ability to generate internal funds

	Cash Flow	Market Power
WCF	0.0100***	0.0331***
	(3.33)	(9.23)
WCF*DUM	0.0268***	-0.0054
	(12.97)	(-1.58)
WCF^2	-0.0123***	-0.0161***
	(-20.89)	(-14.50)
WCF^2*DUM	0.0025***	0.0022**
	(4.18)	(2.01)
SIZE	-0.0267***	-0.0028
	(-6.01)	(-0.71)
GROWTH	0.0186***	0.0192***
	(8.41)	(8.22)
LEV	0.2823***	0.2802***
	(24.94)	(26.11)
ROA	2.0488***	2.0821***
	(124.08)	(145.49)
F_1	124.81	99.12
F_2	205.35	627.74
m_2	-0.87	-1.23
Hansen Test	482.98(432)	492.31(432)
Observations	7557	7557

Notes: The dependent variable is the firm performance; WCF is measured by the ratio short-term bank debt / WCR; SIZE the size; GROWTH the sales growth; LEV the leverage; and ROA the return on assets. DUM is a dummy variable equals 1 for firms with a greater ability to generate internal funds. Time and industry dummies are included in the estimations, but not reported. Z statistic in brackets. F_1 is a F-test for the linear restriction test under the following null hypothesis: H_0: $(\beta_1+\delta_1)=0$.

F_2 is a F-test for the linear restriction test under the following null hypothesis: H_0: $(\beta_2+\delta_2)=0$.

*indicates significance at 10% level, **indicates significance at 5%level, and ***indicates significance at 1% level.

m_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as N(0,1) under null hypothesis of no serial correlation. Hansen test is a test for over-identifying restrictions distributed asymptotically under the null hypothesis of validity of instruments as Chi-squared. Degrees of freedom in brackets.

6. CONCLUSIONS

This paper analyzes the relationship between WCR financing and firms' performance for a sample of small and medium-sized firms. Although there is a large amount of literature that studies the effect of the investment in WCR on firm's performance, the possible influence of the WCR financing on the performance is a topic that has not yet been explored. Hence, this paper examines whether the way in which a firm finances its WCR also influences its performance. To control for unobservable heterogeneity and for possible endogeneity problems, we use a panel data model and employ the two-step generalized method of moments (GMM) estimator.

Our findings indicate that investment in WCR should not be the only important concern for firms when they make their WCR decisions, but that WCR financing should also be considered. In particular, our results show that a suitable WCR financing strategy can help firms to increase their performance. For low percentages of WCR financed with short-term bank debt, riskier WCR financing might increase a firm's performance due to the advantages associated with short-term bank debt. Specifically, firms might reduce their interest costs, obtain credit condition benefits, mitigate agency costs and signal their positive prospects to suppliers of funds. However, for high percentages of WCR financed with short-term bank debt, riskier WCR financing might negatively affect firm's performance because of greater interest and refinancing risk. Moreover, additional analyses reveal

that this WCR financing-performance relationship depends on a firm's ability to generate internal funds.

Since financing options and methods are quite different between small and large firms, due to their differences in ownership structure, flexibility and taxes (Heyman, Deloof, and Ooghe, 2003), further research focused on quoted companies or different financial systems could be interesting.

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CHAPTER VI

NET WORKING CAPITAL AND SHAREHOLDERS' VALUATION: DO FIRMS' FINANCIAL CHARACTERISTICS MATTER?

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1. INTRODUCTION

The importance of short-term investment and financing decisions is generally accepted and empirical research on this topic has received considerable attention. Sartoris and Hill (1983) suggested that part of the reason for past neglect of short-term financial management decisions could be attributed to the academic focus on market efficiency. The current assets represent an important share of items on a firm's balance sheet. In particular, the mean (median) value of current assets to total assets is 39.15% (36.58%) for our sample of Spanish quoted firms. Given the importance of operating assets and liabilities for firms, there is a growing literature analyzing trade credit granted and received by firms, inventory investment, cash holdings and working capital requirement.

Although several studies demonstrate the influence of a firm's working capital requirement (WCR) on its performance (Jose, Lancaster and Stevens, 1996; Shin and Soenen, 1998; Wang, 2002; Deloof, 2003; Garcia and Martinez, 2007; and Baños, Garcia and Martinez (2012); among others), to our knowledge, there is no empirical evidence that analyzes the possible influence of net working capital (NWC) on a firm's value. In contrast to WCR (defined as the sum of accounts receivable and inventories net of accounts payable), the net working capital (NWC) can be defined as long-term funds minus fixed assets, that is, it represents the current assets that are financed with long-term sources of finance. Thus, while the WCR represents a short-term decision of firms, the net working capital is a consequence of longer-term decision-making by firms.

Given that the extended literature on corporate finance shows that financing decisions affect a firm's value, we analyze here whether the way in which a firm finances its current assets influences on its value. A greater net working capital indicates that a higher proportion of current assets are financed with long-term funds, which allows firms to reduce both the refinancing and interest risk associated with short-term debt. Alternatively, less net working capital allows firms to reduce their financing costs, obtain credit condition benefits, mitigate agency costs and signal their positive prospects to their supplier of funds through frequent renewals of short-term debt. If these benefits associated with short-term debt outweigh its greater risk, shareholders may negatively value the net working capital of a firm.

In order to test the possible effect of net working capital on a firm's value, following Fama and French (1998) we employ cross-section regressions of firm value on earnings, investment and financing variables. The findings confirm the importance of how a firm finances its current assets due to the influence of this on its value. Specifically, we find that net working capital is negatively valued by shareholders. These results could be due to the fact that the advantages of using short-term debt outweigh the disadvantages of the greater refinancing and interest risk associated to short-term funds.

Based on this idea, we also investigate whether the shareholders' valuation of net working capital depends on firm financial characteristics. Given the advantages associated to short-term funds, shareholders should value the net working capital in those firms with lower refinancing and interest risk more negatively. In particular, we analyze whether this negative effect of net working capital on a firm's value depends on its leverage, payout ratio, cash flow and probability of financial distress.

Our results indicate that shareholders value the net working capital in firms with a better financial situation more negatively.

The structure of the paper is as follows. The next section presents the possible relation between the net working capital and firm value in more detail, as well as the effect of firm financial characteristics on the net working capital valuation. Section 3 describes the data used. In Section 4, we discuss the empirical methodology we use to test the relation between net working capital and firm value, and report the results. In Section 5, we examine whether the value of net working capital varies with firm financial characteristics. We conclude in Section 6.

2. SHAREHOLDERS' VALUATION OF NET WORKING CAPITAL AND FIRM FINANCIAL CHARACTERISTICS

Correia, Flynn, Uliana and Wormald (2000) indicate that working capital policies are based on two fundamental decisions: the appropriate level of investment in current assets, and how it should be financed. The idea that net working capital affects a firm's value is generally accepted. Indeed, in 1972, Weston and Brigham suggested that current assets should be increased to the point where marginal returns on increases in those assets would just equal the costs of funds required to finance such increases. Moreover, given the lower cost of current liabilities, they indicate that firms should use short-term funds in place of long-term debt to finance current assets while their use allows firms to reduce their average cost of capital. While a lower net working capital (i.e. a greater amount of current assets are financed with

short-term funds) increases the return of a firm, it has also a greater risk. In particular, short-term debt is related to refinancing and interest risk (Diamond, 1991; and Jun and Jen, 2003).

As Merville and Tavis (1973) suggested, firms should take into account the interrelationships between short-term investment and borrowing decisions. They propose a model whose goal is to maximize the expected value of the investment in current assets and to minimize the costs of financing. This indicates that the way in which a firm finances its current assets might affect its value. Although long-term funds enjoy several advantages, they also introduce significant costs for firms that might negatively affect their value.

A firm with a greater net working capital (a higher proportion of its current assets financed with long-term funds) may have a lower refinancing and interest risk (Diamond, 1991; and Jun and Jen, 2003), because it avoids difficulties in renewing its short-term loans or paying higher interest rates on new loans. A greater net working capital might, therefore, be positively valued by shareholders.

However, while the benefits of using long-term funds could lead to increased market valuations, firms should also consider the advantages associated to the short-term sources of finance. Nominal rate of short-term debt is lower than that of long-term debt due to default and inflation premiums, which tend to increase as debt maturity lengthens (Jun and Jen, 2003). Also, short-term debt adapts more easily to a firm's financial needs (Jun and Jen, 2003). Petersen and Rajan (1994) state that, due to frequent renewals of short-term debt, short-term debt facilitates bank relations between the firm and the lender and, as a consequence, firms might obtain credit condition benefits. On the other hand, as short-term debt comes up for frequent

renewal, Stulz (2000) states that it can be an extremely powerful tool in monitoring management. Rajan and Winton (1995) show, moreover, that short-term debt gives lenders the flexibility to effectively monitor managers with minimum effort. Finally, Flannery (1986), and Kale and Noe (1990) note that firms with high-quality investment projects use short-term loans to transmit their positive prospects to the market.

Taking into account these positive and negative effects of long-term funds, the shareholders' valuation of net working capital should depend on firms' financial characteristics. Given the advantages associated to short-term funds, shareholders should value the net working capital in those firms with a better financial situation less, as these are expected to present lower refinancing and interest risk. The benefits that these firms may obtain using more short-term debt are expected to outweigh the refinancing and interest risk associated with this kind of funds.

3. DATA

This study uses a sample of non-financial quoted firms from Spain for the period 1998-2007. The data were obtained from the SABI (Iberian Balance Sheets Analysis System) database, which was developed by Bureau Van Dijk and contains accounting and financial information for Spanish firms. The market value of equity and dividend data were extracted from the Spanish Stock Exchange.

The information was refined. Specifically, we eliminated firms with lost values, cases with errors in the accounting data and extreme values presented by all

variables. This left a sample of 58 firms. This sample is representative of the Spanish stock market, since the *t* test (*p*-value is 0.2080) confirms that there are no significant differences between the mean market value of our sample and the mean market value of non-financial firms in the Spanish stock market for the period analyzed. In fact, the *t* test (*p*-value is -1.0005) also indicates that there are no significant differences between the mean value of our dependent variable and the mean value of this variable for non-financial firms in the Spanish stock market for the period analyzed. Neither are there significant differences between our sample and the non-financial firms in the Spanish stock market for the variable net working capital to total assets (*p*-value of *t*-test of -0.6356).

4. SHAREHOLDERS' VALUATION OF NET WORKING CAPITAL

4.1. Value regression specification

In this section, we introduce the approach we use to test whether the way in which a firm finances its current assets affects its value. In particular, we use the valuation model proposed by Fama and French (1998), which uses cross-section regressions of firm value on earnings, investment and financing variables. We include the net working capital as independent variable in this model in order to estimate the relation between net working capital and firm value. Additionally, we use one-year differences instead of two-year differences in order to reduce the number of observations lost. Thus, our basic regression specification is as follows:

$$V_{i,t} = \beta_0 + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dA_{i,t} + \beta_5 dA_{i,t+1} + \beta_6 RD_{i,t} + \beta_7 dRD_{i,t} + \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} + \beta_{12} D_{i,t} + \beta_{13} dD_{i,t} + \beta_{14} dD_{i,t+1} + \beta_{15} dV_{i,t+1} + \beta_{16} NWC_{i,t} + \beta_{17} dNWC_{i,t} + \beta_{18} dNWC_{i,t+1} + \lambda_t + \varepsilon_{i,t} \quad (1)$$

where X_t is the level of variable X in year t divided by the level of assets in year t; dX_t is the change in the level of X from year t − 1 to year t ($X_t - X_{t-1}$) divided by assets in year t; dX_{t+1} is the change in the level of X from year t to year t+1 ($X_{t+1} - X_t$) divided by assets in year t; V is the market value of the firm calculated as the sum of the market value of equity, the book value of short-term debt, and the book value of long-term debt; E is earnings before interest and taxes; A is total assets; RD is research and development expense; I is interest expense; D is total common dividends paid; and NWC is net working capital defined as long-term sources of finance minus fixed assets. The parameter λ_t is a time dummy variable that changes in time but is equal for all firms in each of the time periods considered. We include this dummy to capture macroeconomic and time trend effects. When research and development expense is missing, we set it to zero.

Although these valuation regressions do not specify a functional form resulting directly from a theoretical model, they are well suited for our purpose because they explain cross-section variation in firm values well.

Additionally, like Pinkowitz, Stulz and Williamson (2006), we use two alternative specifications of the model (1). Specifically, we first re-estimated the model without including the level of net working capital ($NWC_{i,t}$):

$$V_{i,t} = \beta_0 + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dA_{i,t} + \beta_5 dA_{i,t+1} + \beta_6 RD_{i,t} + \beta_7 dRD_{i,t} + \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} + \beta_{12} D_{i,t} + \beta_{13} dD_{i,t} + \beta_{14} dD_{i,t+1} + \beta_{15} dV_{i,t+1} + \beta_{16} dNWC_{i,t} + \beta_{17} dNWC_{i,t+1} + \lambda_t + \varepsilon_{i,t} \quad (2)$$

Second, we re-estimated the model without including the lag and lead of net working capital changes ($dNWC_{i,t}$ and $dNWC_{i,t+1}$, respectively), that is, we only include the level of net working capital as independent variable:

$$V_{i,t} = \beta_0 + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dA_{i,t} + \beta_5 dA_{i,t+1} + \beta_6 RD_{i,t} + \beta_7 dRD_{i,t} + \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} + \beta_{12} D_{i,t} + \beta_{13} dD_{i,t} + \beta_{14} dD_{i,t+1} + \beta_{15} dV_{i,t+1} + \beta_{16} NWC_{i,t} + \lambda_t + \varepsilon_{i,t} \quad (3)$$

We estimate all the equations using the fixed effects method to capture unobservable firm effects, since Breusch-Pagan (Breusch and Pagan, 1980) test rejects the null hypothesis that there is no unobserved heterogeneity.

4.2. Robustness check

To give additional robustness to our results, and following Pinkowitz, et al., (2006), we split the change in total assets into its cash and noncash components, and estimate the three specifications commented above in this new valuation model:

$$V_{i,t} = \beta_0 + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dNA_{i,t} + \beta_5 dNA_{i,t+1} + \beta_6 RD_{i,t} + \beta_7 dRD_{i,t} + \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} + \beta_{12} D_{i,t} + \beta_{13} dD_{i,t} + \beta_{14} dD_{i,t+1} + \beta_{15} dV_{i,t+1} + \beta_{16} dL_{i,t} + \beta_{17} dL_{i,t+1} + \beta_{18} NWC_{i,t} + \beta_{19} dNWC_{i,t} + \beta_{20} dNWC_{i,t+1} + \lambda_t + \varepsilon_{i,t} \quad (4)$$

$$V_{i,t} = \beta_0 + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dNA_{i,t} + \beta_5 dNA_{i,t+1} + \beta_6 RD_{i,t} + \beta_7 dRD_{i,t} + \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} + \beta_{12} D_{i,t} + \beta_{13} dD_{i,t} + \beta_{14} dD_{i,t+1} + \beta_{15} dV_{i,t+1} + \beta_{16} dL_{i,t} + \beta_{17} dL_{i,t+1} + \beta_{18} dNWC_{i,t} + \beta_{19} dNWC_{i,t+1} + \lambda_t + \varepsilon_{i,t} \quad (5)$$

$$V_{i,t} = \beta_0 + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dNA_{i,t} + \beta_5 dNA_{i,t+1} + \beta_6 RD_{i,t} + \beta_7 dRD_{i,t} + \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} + \beta_{12} D_{i,t} + \beta_{13} dD_{i,t} + \beta_{14} dD_{i,t+1} + \beta_{15} dV_{i,t+1} + \beta_{16} dL_{i,t} + \beta_{17} dL_{i,t+1} + \beta_{18} NWC_{i,t} + \lambda_t + \varepsilon_{i,t} \quad (6)$$

where NA is net assets defined as total assets minus liquid assets; and L is liquid assets holdings. The rest of the variables are as previously defined.

4.3. Results

This section contains results of regressions proposed in the previous section to test the possible effect of net working capital on a firm's value. Table 1 presents the results obtained. In the first three columns, we show the results obtained from the three different specifications of the first model proposed (equations (1) to (3)). The results obtained from the three specifications of the second model proposed (i.e. when the change in total assets is split into its cash and noncash components) are presented in the last three columns (equations (4) to (6)). We find that the coefficient

on the net working capital variable ($NWC_{i,t}$) is negative and significant in all regressions proposed, which indicates that shareholders seem to value the net working capital negatively. Moreover, we find that our results are not sensitive to the specification we use. When we eliminate the level of net working capital as an independent variable of our model and only include the changes in net working capital (equation (2) and (5)), we also observe the negative effect of net working capital on a firm's value.

For our data set, therefore, it seems to hold that the shareholders value the advantages of using short-term debt more than the lower refinancing and interest risk associated to long-term sources of finance. A greater proportion of current assets financed with short-term debt might allow firms to reduce their interest costs, obtain credit condition benefits, mitigate agency costs and signal their positive prospect to market. The reason shareholders negatively value the net working capital might be explained by the sample used in this study. We use quoted firms and they have less difficulties than small and medium-sized firms in obtaining funding on capital markets (Petersen and Rajan, 1997) and, hence, they have a lower refinancing and interest risk.

Table 1. Shareholders' valuation of net working capital

	Eq. (1)	Eq. (2)	Eq. (3)	Eq. (4)	Eq. (5)	Eq. (6)
Intercept	3.18***	2.79***	3.08***	2.40***	2.03***	2.59***
	(6.59)	(5.98)	(6.56)	(4.64)	(4.06)	(5.05)
E_t	-11.51***	-12.11***	-13.84***	-11.04***	-11.53***	-13.90***
	(-3.16)	(-3.29)	(-3.85)	(-3.02)	(-3.13)	(-3.87)
dE_t	0.52	0.87	1.38	-0.04	0.31	0.94
	(0.15)	(0.24)	(0.39)	(-0.01)	(0.09)	(0.26)
dE_{t+1}	-7.52***	-8.44***	-9.69***	-7.26**	-8.08***	-9.44***
	(-2.61)	(-2.91)	(-3.42)	(-2.52)	(-2.80)	(-3.32)
dA_t	0.16	0.09	0.18			
	(0.25)	(0.15)	(0.28)			
dA_{t+1}	1.69***	1.72***	1.86***			
	(4.76)	(4.80)	(5.22)			
dNA_t				-0.24	-0.31	-0.19
				(-0.36)	(-0.46)	(-0.28)
dNA_{t+1}				1.62***	1.65***	1.90***
				(4.26)	(4.29)	(5.06)
RD_t	6.40	8.23*	6.01	7.22*	8.94**	6.01
	(1.49)	(1.92)	(1.41)	(1.68)	(2.08)	(1.40)
dRD_t	-3.82	-3.98	-4.82	-3.66	-3.82	-4.41
	(-0.87)	(-0.90)	(-1.09)	(-0.83)	(-0.86)	(-1.00)
dRD_{t+1}	-2.03	-0.95	-1.23	-1.61	-0.63	-1.22
	(-0.67)	(-0.31)	(-0.40)	(-0.53)	(-0.21)	(-0.40)
I_t	19.62	20.94	17.49	19.76	20.96	17.98
	(1.34)	(1.42)	(1.18)	(1.35)	(1.42)	(1.21)
dI_t	3.85	4.80	4.61	5.52	6.40	5.64
	(0.39)	(0.49)	(0.47)	(0.56)	(0.65)	(0.57)
dI_{t+1}	14.58*	16.33*	12.10	15.45*	17.09**	12.36
	(1.74)	(1.93)	(1.43)	(1.85)	(2.03)	(1.47)
D_t	21.35***	21.47***	22.21***	21.62***	21.79***	22.33***
	(12.76)	(12.69)	(13.37)	(12.75)	(12.74)	(13.06)
dD_t	5.96***	6.10***	6.58***	5.97***	6.10***	6.69***
	(8.81)	(8.94)	(10.07)	(8.74)	(8.87)	(10.17)
dD_{t+1}	15.41***	15.60***	16.38***	15.85***	16.10***	16.64***
	(9.16)	(9.17)	(9.79)	(9.32)	(9.39)	(9.73)
dV_{t+1}	-0.42***	-0.42***	-0.39***	-0.43***	-0.44***	-0.39***
	(-12.28)	(-12.10)	(-11.96)	(-12.42)	(-12.35)	(-11.94)
dL_t				2.11	2.13	1.53
				(1.55)	(1.54)	(1.23)
dL_{t+1}				1.87**	2.01**	1.47*
				(2.30)	(2.45)	(1.81)
NWC_t	-3.22***		-1.94*	-2.97**		-2.01*
	(-2.75)		(-1.87)	(-2.52)		(-1.90)
$dNWC_t$	1.31	-0.06		0.50	-0.78	
	(1.19)	(-0.07)		(0.41)	(-0.71)	
$dNWC_{t+1}$	-1.80***	-1.45**		-2.09***	-1.82***	
	(-2.93)	(-2.39)		(-3.25)	(-2.84)	
R^2	0.63	0.62	0.62	0.63	0.63	0.62

We estimate regressions using the fixed effects method. X_t is the level of variable X in year t divided by the level of assets in year t; dX_t is the change in the level of X from year t − 1 to year t ($X_t - X_{t-1}$) divided by assets in year t; dX_{t+1} is the change in the level of X from year t to year t+1 ($X_{t+1} - X_t$) divided by assets in year t; V is the market value of the firm, calculated as the sum of the market value of equity, the book value of short-term debt, and the book value of long-term debt; E is earnings before interest and taxes; A is total assets; NA is net assets, which is defined as total assets minus liquid assets; RD is research and development expense; I is interest expense; D is total common dividends paid; L is liquid assets holdings; and NWC is net working capital. Time dummies are included in the estimations, but not reported. Z statistic in brackets. *indicates significance at 10% level; **indicates significance at 5%level; and ***indicates significance at 1% level.

5. NET WORKING CAPITAL VALUATION AND FIRM FINANCIAL CHARACTERISTICS

Once we have found that shareholders negatively value the net working capital of a firm, we try in this section to explore whether this negative effect of the net working capital on a firm's value depends on its financial characteristics. As we commented above, this negative effect of net working capital might be due to the low refinancing and interest risk of firms used in our sample. For shareholders, hence, the benefits that these firms may obtain using more short-term debt might outweigh the refinancing and interest risk associated with this kind of funding. If this is the reason for the results obtained in the previous section, we would expect shareholders to value the net working capital more negatively in firms with a better financial situation, which present a lower refinancing and interest risk.

In order to test this new hypothesis, we allow the net working capital coefficients to vary depending on firm financial characteristics. We create dummy variables that take a value of 1 for firms with worse financial situation, and 0 otherwise. We use four different variables to classify our sample according to their financial situation:

Leverage. Firms with a lower leverage than their industry are thought to have better access to capital markets and a better financial situation. For each year, we compare a firm's leverage, measured as the sum of long-term debt and short-term debt over total assets, with the median leverage of its industry. Thus, we assign those

firms with a greater (lower) leverage than the median leverage of its industry as firms with a worse (better) financial situation.

Payout ratio. The payout ratio is measured as total dividends over net profit. For each year, we sort firms according to their annual payout ratios and classify those firms whose payout ratios are lower (greater) than the median payout ratio as firms as having a worse (better) financial situation.

Cash flow. This variable is defined as the ratio of net profit plus depreciation to sales. Moyen (2004) suggests that, unlike dividends, this variable allows one to focus on the firm's beginning-of-the-period funds, since dividends also take into account the investment and financial decisions taken by the firms during that period. Firms with a cash flow below (above) the sample median are assumed to have a worse (better) financial situation.

Z-score. We also consider Z-score in order to capture the probability of financial distress of firms. We use the re-estimation of Altman's (1968) model by Begley, Mings, & Watts (1996). A higher ZSCORE implies a lower probability of insolvency. Thus, firms with below-median scores (low Z-score) are assumed to have a worse financial situation, while above-median firms (high Z-score) are classified as firms with better financial situation (firms less financially constrained).

$$ZSCORE_{it} = 0{,}104*X_1 + 1{,}010*X_2 + 0{,}106*X_3 + 0{,}003*X_4 + 0{,}169*X_5$$

where X_1 = Net working capital / Total assets; X_2 =Retained earnings / Total assets; X_3 = Net operating profits /Total assets; X_4 = Market value of capital / Book value of debt; and X_5 = Sales / Total assets.

In order to test whether the negative effect of net working capital on firm value depends on these firm characteristics, equations (1) to (6) defined previously are extended by incorporating the DUM variable, which is a dummy variable that takes a value of 1 for firms with worse financial situation, and 0 otherwise. In particular, all the variables of net working capital ($NWC_{i,t}$, $dNWC_{i,t}$ and $dNWC_{i,t+1}$) are multiplied by the DUM variable. For example, in the case of the first regression, it would be as follows:

$$\begin{aligned} V_{i,t} = {} & \beta_0 + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dA_{i,t} + \beta_5 dA_{i,t+1} + \beta_6 RD_{i,t} + \beta_7 dRD_{i,t} \\ & + \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} + \beta_{12} D_{i,t} + \beta_{13} dD_{i,t} + \beta_{14} dD_{i,t+1} \\ & + \beta_{15} dV_{i,t+1} + (\beta_{16} + \delta_1 DUM_{i,t}) NWC_{i,t} + (\beta_{17} + \delta_2 DUM_{i,t}) dNWC_{i,t} \\ & + (\beta_{18} + \delta_3 DUM_{i,t}) dNWC_{i,t+1} + \lambda_t + \varepsilon_{i,t} \end{aligned} \qquad (1b)$$

All dependent and independent variables are as previously defined. For brevity, we do not present the rest of the regressions, although they are estimated and the results obtained are presented in Tables 2 to 5. With these regressions we can investigate whether shareholders' valuation of net working capital is related to firms' financial situation. In particular, for the equation (1b), while the coefficients β_{16} , β_{17} and β_{18} measure the effect of net working capital on a firm value in firms with a better

financial situation, the coefficients $(\beta_{16}+\delta_1)$, $(\beta_{17}+\delta_2)$ and $(\beta_{18}+\delta_3)$ capture the effect of net working capital on the firm value for firms with a worse financial position.

Table 2 presents the results of estimating these six regressions using the leverage variable to classify firms according to their financial situation. We find that the negative effect of net working capital on a firm's value is more important for those firms with a lower leverage than their industry's median leverage (i. e. firms with a better financial situation) than for those with a worse position. The coefficients $NWC_{i,t}$ and $dNWC_{i,t+1}$ are negative and significant for firms with lower leverage than their industry's median leverage (i. e. when the DUM variable takes a value 0). However, according to the *F* test, for those firms with greater leverage than their industry's median leverage, none of the coefficients of net working capital ($(\beta_{16}+\delta_1)$, $(\beta_{17}+\delta_2)$ and $(\beta_{18}+\delta_3)$) are significant.

When we allow net working capital coefficients to vary according to the payout ratio, the results show that this negative effect is more important for those firms whose payout ratios are greater than the median payout ratio (see Table 3), that is, for firms with a better financial situation, since neither are significant none of the coefficients of net working capital ($NWC_{i,t}$, $dNWC_{i,t}$ and $dNWC_{i,t+1}$) for those firms with lower payout ratio than the median ratio according to the F test. The results of the regressions that use the cash flow variable as the proxy for financial situation of a firm are presented in Table 4. They indicate that this negative effect is stronger for firms with a cash flow above the sample median. Neither are any of the coefficients of net working capital significant for those firms with lower cash flow. Finally, Table 5 shows that firms with a lower probability of financial distress have also a stronger

negative effect of net working capital on firm value. We observe again that none of the coefficients of net working capital are significant for those firms assumed to have a worse financial situation.

Therefore, according to our results, the value of net working capital varies according to the financial position of a firm, measured by its leverage, payout ratio, cash flow, and probability of financial distress. Specifically, we find that there is a stronger negative relation between net working capital and firm value for firms with a better financial situation than for other firms. While the coefficients of the net working capital variable $NWC_{i,t}$ and $dNWC_{i,t+1}$ are negative and significant for firms with lower refinancing and interest risk (i.e. firms with a better financial situation), none of the coefficients of net working capital ($NWC_{i,t}$, $dNWC_{i,t}$ and $dNWC_{i,t+1}$) are significant for those firms with worse financial situation. We find these results for all the variables used as proxies of a firm's financial situation and for all the specifications of the two valuation models used in this paper. This seems to confirm our hypothesis that shareholders value less those firms that use long-term funds to finance their current assets when they do not have difficulties in obtaining financing in capital markets.

6. CONCLUSIONS

In this paper, we examine how shareholders value the way in which a firm finances its current assets by using cross-section regressions of firm value on earnings, investment and financing variables. The findings confirm the importance of the way in which a firm finances its current assets, because of its influence on its

value. In particular, we find that net working capital is negatively valued by shareholders, which is consistent with the hypothesis that, for firms of our sample, the advantages of using short-term debt outweighs the greater refinancing and interest risk associated to short-term debt.

We also focus on how the value of net working capital varies with firm financial characteristics. Additional analyses indicate that this negative effect of net working capital on a firm's value is stronger in firms with a better financial situation than in others, which indicates that shareholders value less those firms that use long-term funds to finance their current assets when they do not have difficulties in obtaining financing in capital markets.

In order to give more robustness to our hypotheses, further research might be interesting focusing on the effect of net working capital on a firm's value for small and medium-sized firms or in the actual financial crisis, where firms have more difficulties in obtaining funding in capital markets.

Table 2. Net working capital valuation and firm leverage

	Eq. (1b)	Eq. (2b)	Eq. (3b)	Eq. (4b)	Eq. (5b)	Eq. (6b)
Intercept	3.12***	2.70***	3.15***	2.39***	2.00***	2.66***
	(6.38)	(5.82)	(6.60)	(4.60)	(4.00)	(5.13)
E_t	-10.67***	-11.07***	-13.86***	-10.43***	-10.81***	-13.92***
	(-2.92)	(-3.01)	(-3.85)	(-2.85)	(-2.93)	(-3.88)
dE_t	-0.37	0.41	0.93	-0.83	0.03	0.46
	(-0.10)	(0.12)	(0.26)	(-0.23)	(0.01)	(0.13)
dE_{t+1}	-6.54**	-7.02**	-9.78***	-6.59**	-7.07**	-9.53***
	(-2.23)	(-2.38)	(-3.45)	(-2.24)	(-2.40)	(-3.35)
dA_t	-0.12	-0.08	0.08			
	(-0.19)	(-0.12)	(0.12)			
dA_{t+1}	1.45***	1.49***	1.83***			
	(3.90)	(4.01)	(5.09)			
dNA_t				-0.46	-0.40	-0.30
				(-0.65)	(-0.56)	(-0.43)
dNA_{t+1}				1.42***	1.47***	1.87***
				(3.61)	(3.70)	(4.96)
RD_t	7.55*	9.29**	5.87	8.00*	9.68**	5.84
	(1.76)	(2.18)	(1.37)	(1.85)	(2.25)	(1.36)
dRD_t	-3.52	-3.81	-4.62	-3.35	-3.67	-4.20
	(-0.80)	(-0.86)	(-1.04)	(-0.76)	(-0.83)	(-0.95)
dRD_{t+1}	-1.41	-0.70	-1.09	-1.10	-0.44	-1.08
	(-0.47)	(-0.23)	(-0.36)	(-0.36)	(-0.15)	(-0.35)
I_t	16.82	19.87	15.72	16.94	20.06	16.09
	(1.14)	(1.36)	(1.05)	(1.15)	(1.37)	(1.07)
dI_t	5.62	6.07	4.98	6.82	7.11	6.02
	(0.58)	(0.62)	(0.50)	(0.70)	(0.72)	(0.61)
dI_{t+1}	15.01*	17.14**	11.57	15.51*	17.60**	11.78
	(1.79)	(2.04)	(1.37)	(1.85)	(2.10)	(1.39)
D_t	21.24***	21.24***	22.30***	21.48***	21.50***	22.42***
	(12.68)	(12.62)	(13.39)	(12.60)	(12.56)	(13.09)
dD_t	5.71***	5.81***	6.57***	5.75***	5.85***	6.68***
	(8.33)	(8.42)	(10.05)	(8.28)	(8.38)	(10.16)
dD_{t+1}	15.35***	15.31***	16.54***	15.76***	15.73***	16.81***
	(9.09)	(9.06)	(9.82)	(9.18)	(9.17)	(9.78)
dV_{t+1}	-0.44***	-0.44***	-0.39***	-0.45***	-0.45***	-0.39***
	(-12.51)	(-12.48)	(-11.93)	(-12.55)	(-12.55)	(-11.93)
dL_t				1.53	1.55	1.39
				(1.10)	(1.10)	(1.12)
dL_{t+1}				1.57*	1.71**	1.42*
				(1.91)	(2.07)	(1.75)
NWC_t	-3.54**		-2.68**	-3.50**		-2.82**
	(-2.51)		(-1.98)	(-2.48)		(-2.06)
(NWC_t * $DUM_{i,t}$)	1.54		1.34	1.64		1.47
	(0.94)		(0.85)	(1.00)		(0.93)
$dNWC_t$	0.98	0.05		0.17	-0.72	
	(0.62)	(0.03)		(0.10)	(-0.43)	
($dNWC_t$ * $DUM_{i,t}$)	-0.05	-0.19		0.23	0.15	
	(-0.02)	(-0.09)		(0.10)	(0.07)	
$dNWC_{t+1}$	-2.99***	-2.83***		-3.02***	-2.87***	
	(-3.75)	(-3.53)		(-3.72)	(-3.52)	
($dNWC_{t+1}$ * $DUM_{i,t}$)	3.11**	3.46***		2.54*	2.83**	
	(2.34)	(2.63)		(1.85)	(2.08)	
F_1	1.81		1.16	1.55		1.11
F_2	0.39	0.01		0.07	0.18	
F_3	0.01	0.40		0.19	0.00	
R^2	0.64	0.63	0.62	0.64	0.63	0.62

We estimate regressions using the fixed effects method. The definitions of the variables in the regressions are given in Table 1. Time dummies are included in the estimations, but not reported. Z statistic in brackets. F_1 refers to an F test on the null hypothesis that the sum of the coefficients of the variables NWC_t and (NWC_t*$DUM_{i,t}$) is zero. F_2 refers to an F test on the null hypothesis that the sum of the coefficients of the variables $dNWC_t$ and ($dNWC_t$*$DUM_{i,t}$) is zero. F_3 refers to an F test on the null hypothesis that the sum of the coefficients of the variables $dNWC_{t+1}$ and ($dNWC_{t+1}$*$DUM_{i,t}$) is zero. *indicates significance at 10% level; **indicates significance at 5%level; and ***indicates significance at 1% level.

Table 3. Net working capital valuation and payout ratio

	Eq. (1b)	Eq. (2b)	Eq. (3b)	Eq. (4b)	Eq. (5b)	Eq. (6b)
Intercept	2.95***	2.68***	3.04***	2.25***	1.98***	2.57***
	(6.19)	(5.85)	(6.50)	(4.46)	(4.06)	(5.03)
E_t	-11.43***	-11.87***	-13.94***	-11.14***	-11.45***	-13.98***
	(-3.20)	(-3.29)	(-3.90)	(-3.12)	(-3.18)	(-3.92)
dE_t	0.38	0.83	0.89	-0.35	0.15	0.33
	(0.11)	(0.24)	(0.25)	(-0.10)	(0.04)	(0.09)
dE_{t+1}	-6.99**	-7.37***	-10.04***	-6.59**	-6.88**	-9.78***
	(-2.47)	(-2.58)	(-3.56)	(-2.33)	(-2.42)	(-3.46)
dA_t	-0.08	0.01	-0.05			
	(-0.13)	(0.00)	(-0.07)			
dA_{t+1}	1.36***	1.38***	1.81***			
	(3.81)	(3.82)	(5.09)			
dNA_t				-0.53	-0.44	-0.47
				(-0.79)	(-0.65)	(-0.67)
dNA_{t+1}				1.37***	1.38***	1.83***
				(3.61)	(3.62)	(4.89)
RD_t	7.94*	10.46**	5.36	8.70**	11.06***	5.37
	(1.87)	(2.48)	(1.26)	(2.04)	(2.62)	(1.26)
dRD_t	-4.61	-5.89	-3.82	-4.44	-5.72	-3.32
	(-1.06)	(-1.35)	(-0.86)	(-1.03)	(-1.32)	(-0.75)
dRD_{t+1}	-0.40	0.43	-0.93	-0.01	0.70	-0.89
	(-0.13)	(0.14)	(-0.31)	(-0.00)	(0.23)	(-0.29)
I_t	20.08	21.42	18.11	20.95	22.13	18.54
	(1.40)	(1.48)	(1.23)	(1.47)	(1.54)	(1.26)
dI_t	5.57	5.87	5.47	7.43	7.54	6.71
	(0.58)	(0.61)	(0.56)	(0.78)	(0.78)	(0.68)
dI_{t+1}	16.46**	18.05**	13.01	17.51**	18.92**	13.31
	(2.00)	(2.17)	(1.55)	(2.13)	(2.29)	(1.59)
D_t	22.10***	21.87***	22.44***	22.18***	22.00***	22.57***
	(13.37)	(13.17)	(13.56)	(13.33)	(13.17)	(13.26)
dD_t	5.56***	5.58***	6.61***	5.61***	5.63***	6.71***
	(8.25)	(8.19)	(10.18)	(8.31)	(8.27)	(10.26)
dD_{t+1}	15.92***	16.04***	16.36***	16.24***	16.42***	16.61***
	(9.65)	(9.62)	(9.84)	(9.78)	(9.81)	(9.78)
dV_{t+1}	-0.45***	-0.45***	-0.38***	-0.46***	-0.47***	-0.39***
	(-12.87)	(-12.89)	(-11.91)	(-13.03)	(-13.17)	(-11.84)
dL_t				1.85	1.95	1.49
				(1.38)	(1.45)	(1.21)
dL_{t+1}				0.90	1.09	1.37*
				(1.09)	(1.31)	(1.70)
NWC_t	-4.16***		-3.56***	-3.91***		-3.74***
	(-2.97)		(-2.78)	(-2.76)		(-2.83)
(NWC_t * $DUM_{i,t}$)	3.09*		3.21**	3.08*		3.29**
	(1.92)		(2.13)	(1.91)		(2.17)
$dNWC_t$	0.69	-1.28		-0.19	-2.00	
	(0.47)	(-0.96)		(-0.12)	(-1.38)	
($dNWC_t$ * $DUM_{i,t}$)	0.74	2.54		0.88	2.61	
	(0.35)	(1.28)		(0.41)	(1.32)	
$dNWC_{t+1}$	-2.90***	-2.80***		-3.16***	-3.13***	
	(-4.20)	(-4.03)		(-4.48)	(-4.41)	
($dNWC_{t+1}$ * $DUM_{i,t}$)	4.33***	4.49***		4.61***	4.72***	
	(3.55)	(3.69)		(3.70)	(3.80)	
F_1	0.57		0.07	0.35		0.12
F_2	0.85	0.77		0.19	0.17	
F_3	1.79	2.63		1.66	2.08	
R^2	0.65	0.64	0.62	0.66	0.65	0.63

We estimate regressions using the fixed effects method. The definitions of the variables in the regressions are given in Table 1. Time dummies are included in the estimations, but not reported. Z statistic in brackets. F_1 refers to an F test on the null hypothesis that the sum of the coefficients of the variables NWC_t and (NWC_t*$DUM_{i,t}$) is zero. F_2 refers to an F test on the null hypothesis that the sum of the coefficients of the variables $dNWC_t$ and ($dNWC_t$*$DUM_{i,t}$) is zero. F_3 refers to an F test on the null hypothesis that the sum of the coefficients of the variables $dNWC_{t+1}$ and ($dNWC_{t+1}$*$DUM_{i,t}$) is zero. *indicates significance at 10% level; **indicates significance at 5%level; and ***indicates significance at 1% level.

Table 4. Net working capital valuation and cash flow

	Eq. (1b)	Eq. (2b)	Eq. (3b)	Eq. (4b)	Eq. (5b)	Eq. (6b)
Intercept	3.07***	2.68***	3.09***	2.29***	2.00***	2.57***
	(6.28)	(5.71)	(6.58)	(4.41)	(3.99)	(5.00)
E_t	-11.41***	-11.75***	-13.99***	-10.86***	-11.11***	-14.04***
	(-3.13)	(-3.19)	(-3.89)	(-2.97)	(-3.02)	(-3.91)
dE_t	0.37	0.40	1.54	-0.34	-0.30	1.07
	(0.10)	(0.11)	(0.43)	(-0.09)	(-0.08)	(0.30)
dE_{t+1}	-7.36**	-8.09***	-9.86***	-7.15**	-7.78***	-9.60***
	(-2.54)	(-2.78)	(-3.47)	(-2.48)	(-2.69)	(-3.37)
dA_t	0.11	0.11	0.12			
	(0.17)	(0.16)	(0.18)			
dA_{t+1}	1.58***	1.61***	1.84***			
	(4.37)	(4.40)	(5.16)			
dNA_t				-0.35	-0.37	-0.27
				(-0.50)	(-0.53)	(-0.38)
dNA_{t+1}				1.50***	1.52***	1.88***
				(3.88)	(3.90)	(5.00)
RD_t	6.67	9.03**	5.71	7.76*	9.94**	5.71
	(1.54)	(2.10)	(1.33)	(1.77)	(2.30)	(1.33)
dRD_t	-4.18	-5.15	-4.51	-4.20	-5.11	-4.08
	(-0.94)	(-1.15)	(-1.01)	(-0.94)	(-1.15)	(-0.92)
dRD_{t+1}	-1.48	-0.57	-1.05	-0.93	-0.11	-1.03
	(-0.48)	(-0.19)	(-0.34)	(-0.30)	(-0.04)	(-0.34)
I_t	19.31	20.75	17.26	19.59	20.93	17.76
	(1.32)	(1.41)	(1.17)	(1.34)	(1.42)	(1.20)
dI_t	5.07	5.59	4.96	6.94	7.42	6.03
	(0.52)	(0.57)	(0.50)	(0.71)	(0.75)	(0.61)
dI_{t+1}	15.32*	16.80**	12.21	16.37*	17.74**	12.48
	(1.83)	(1.99)	(1.45)	(1.95)	(2.11)	(1.48)
D_t	21.60***	21.59***	22.34***	21.86***	21.88***	22.45***
	(12.88)	(12.78)	(13.40)	(12.88)	(12.82)	(13.10)
dD_t	5.74***	5.85***	6.57***	5.74***	5.85***	6.68***
	(8.32)	(8.41)	(10.06)	(8.27)	(8.37)	(10.15)
dD_{t+1}	15.63***	15.69***	16.52***	16.08***	16.20***	16.76***
	(9.27)	(9.24)	(9.84)	(9.45)	(9.47)	(9.78)
dV_{t+1}	-0.44***	-0.43***	-0.39***	-0.45***	-0.45***	-0.39***
	(-12.33)	(-12.21)	(-11.98)	(-12.50)	(-12.49)	(-11.95)
dL_t				2.21	2.32	1.50
				(1.59)	(1.65)	(1.21)
dL_{t+1}				1.67**	1.76**	1.43*
				(2.03)	(2.13)	(1.75)
NWC_t	-3.82***		-2.54**	-3.49**		-2.63**
	(-2.83)		(-2.12)	(-2.57)		(-2.14)
(NWC_t * $DUM_{i,t}$)	2.04		1.45	1.92		1.45
	(1.34)		(1.00)	(1.26)		(0.99)
$dNWC_t$	1.37	-0.44		0.02	-1.66	
	(0.86)	(-0.30)		(0.01)	(-0.98)	
($dNWC_t$ * $DUM_{i,t}$)	-0.48	0.60		0.36	1.36	
	(-0.23)	(0.30)		(0.17)	(0.65)	
$dNWC_{t+1}$	-2.31***	-2.05***		-2.65***	-2.46***	
	(-3.34)	(-2.95)		(-3.68)	(-3.40)	
($dNWC_{t+1}$ * $DUM_{i,t}$)	1.93	2.41*		2.07	2.51*	
	(1.39)	(1.74)		(1.49)	(1.82)	
F_1	1.44		0.65	1.13		0.77
F_2	0.38	0.01		0.07	0.05	
F_3	0.10	0.09		0.22	0.00	
R^2	0.63	0.62	0.62	0.64	0.63	0.62

We estimate regressions using the fixed effects method. The definitions of the variables in the regressions are given in Table 1. Time dummies are included in the estimations, but not reported. Z statistic in brackets. F_1 refers to an F test on the null hypothesis that the sum of the coefficients of the variables NWC_t and (NWC_t*$DUM_{i,t}$) is zero. F_2 refers to an F test on the null hypothesis that the sum of the coefficients of the variables $dNWC_t$ and ($dNWC_t$*$DUM_{i,t}$) is zero. F_3 refers to an F test on the null hypothesis that the sum of the coefficients of the variables $dNWC_{t+1}$ and ($dNWC_{t+1}$*$DUM_{i,t}$) is zero. *indicates significance at 10% level; **indicates significance at 5%level; and ***indicates significance at 1% level.

Table 5. Net working capital valuation and probability of financial distress

	Eq. (1b)	Eq. (2b)	Eq. (3b)	Eq. (4b)	Eq. (5b)	Eq. (6b)
Intercept	3.34***	2.75***	3.17***	2.47***	2.00***	2.67***
	(6.83)	(6.00)	(6.55)	(4.81)	(4.03)	(5.15)
E_t	-10.27***	-10.93***	-13.81***	-10.07***	-10.67***	-13.85***
	(-2.86)	(-3.01)	(-3.84)	(-2.79)	(-2.92)	(-3.86)
dE_t	0.99	1.41	1.29	0.39	0.87	0.77
	(0.28)	(0.40)	(0.36)	(0.11)	(0.25)	(0.21)
dE_{t+1}	-4.59	-6.07**	-9.73***	-4.67	-6.17**	-9.47***
	(-1.55)	(-2.04)	(-3.43)	(-1.57)	(-2.08)	(-3.33)
dA_t	-0.53	-0.30	0.06			
	(-0.80)	(-0.46)	(0.09)			
dA_{t+1}	1.21***	1.33***	1.84***			
	(3.28)	(3.57)	(5.14)			
dNA_t				-0.83	-0.55	-0.39
				(-1.18)	(-0.81)	(-0.55)
dNA_{t+1}				1.22***	1.32***	1.87***
				(3.10)	(3.33)	(4.99)
RD_t	8.92**	10.72**	5.91	9.20**	10.93**	5.86
	(2.09)	(2.52)	(1.38)	(2.14)	(2.54)	(1.37)
dRD_t	-2.91	-3.18	-4.70	-2.77	-3.11	-4.21
	(-0.67)	(-0.73)	(-1.06)	(-0.64)	(-0.71)	(-0.95)
dRD_{t+1}	-1.25	-0.43	-1.11	-0.99	-0.22	-1.06
	(-0.42)	(-0.14)	(-0.36)	(-0.33)	(-0.07)	(-0.35)
I_t	17.18	18.80	17.34	17.60	19.07	17.85
	(1.20)	(1.29)	(1.17)	(1.22)	(1.31)	(1.20)
dI_t	5.09	5.74	4.63	6.32	6.82	5.76
	(0.53)	(0.59)	(0.47)	(0.66)	(0.70)	(0.58)
dI_{t+1}	14.73*	16.43**	12.02	15.35*	16.96**	12.28
	(1.79)	(1.98)	(1.42)	(1.86)	(2.04)	(1.46)
D_t	21.09***	21.11***	22.20***	21.25***	21.34***	22.31***
	(12.79)	(12.62)	(13.35)	(12.64)	(12.53)	(13.05)
dD_t	5.52***	5.70***	6.56***	5.57***	5.75***	6.67***
	(8.21)	(8.39)	(10.03)	(8.17)	(8.33)	(10.15)
dD_{t+1}	15.07***	14.96***	16.49***	15.40***	15.35***	16.80***
	(9.05)	(8.89)	(9.81)	(9.08)	(8.96)	(9.79)
dV_{t+1}	-0.44***	-0.44***	-0.39***	-0.45***	-0.45***	-0.39***
	(-12.93)	(-12.70)	(-11.94)	(-12.89)	(-12.72)	(-11.95)
dL_t				0.98	1.24	1.47
				(0.71)	(0.89)	(1.18)
dL_{t+1}				1.19	1.52*	1.38*
				(1.45)	(1.84)	(1.70)
NWC_t	-4.99***		-2.67*	-4.97***		-3.05**
	(-3.13)		(-1.89)	(-3.10)		(-2.11)
(NWC_t * $DUM_{i,t}$)	3.52*		1.36	3.71*		1.91
	(1.85)		(0.76)	(1.94)		(1.06)
$dNWC_t$	3.17	0.34		2.39	-0.43	
	(1.65)	(0.20)		(1.18)	(-0.24)	
($dNWC_t$ * $DUM_{i,t}$)	-2.06	-0.01		-1.85	0.25	
	(-0.94)	(-0.01)		(-0.84)	(0.12)	
$dNWC_{t+1}$	-3.64***	-3.20***		-3.65***	-3.24***	
	(-4.66)	(-4.12)		(-4.60)	(-4.09)	
($dNWC_{t+1}$ * $DUM_{i,t}$)	4.62***	4.43***		4.18***	3.90***	
	(3.63)	(3.51)		(3.19)	(2.97)	
F_1	1.08		0.98	0.78		0.72
F_2	0.80	0.08		0.16	0.02	
F_3	0.99	1.60		0.25	0.39	
R^2	0.65	0.63	0.62	0.65	0.64	0.62

We estimate regressions using the fixed effects method. The definitions of the variables in the regressions are given in Table 1. Time dummies are included in the estimations, but not reported. Z statistic in brackets. F_1 refers to an F test on the null hypothesis that the sum of the coefficients of the variables NWC_t and (NWC_t*$DUM_{i,t}$) is zero. F_2 refers to an F test on the null hypothesis that the sum of the coefficients of the variables $dNWC_t$ and ($dNWC_t$*$DUM_{i,t}$) is zero. F_3 refers to an F test on the null hypothesis that the sum of the coefficients of the variables $dNWC_{t+1}$ and ($dNWC_{t+1}$*$DUM_{i,t}$) is zero. *indicates significance at 10% level; **indicates significance at 5%level; and ***indicates significance at 1% level.

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CONCLUSIONS

The main aim of this research is to contribute to a better understanding of short-term financial management. Current assets and liabilities represent an important share of items on a firm's balance sheet, so the importance of these decisions is generally accepted. However, despite the fact that previous literature indicates the importance of considering these operating assets and liabilities at the same time and of their being managed jointly rather than individually, most previous works focus on these operating assets or liabilities individually. Accordingly, this research studies the working capital requirement (WCR) of firms, defined as the sum of accounts receivable and inventories net of accounts payable. In particular, it analyzes the determinants of WCR and it uses a partial adjustment model to examine whether firms have a target WCR level. Moreover, it studies the speed at which firms adjust toward their target WCR level and investigates whether this speed of adjustment depends on a firm's characteristics such as its access to external finance and market power. This research also analyzes the effect of WCR on firms' performance and studies whether the relation between WCR and firm value is sensitive to a firm's financial constraints and bankruptcy risk. There is also a focus on WCR financing strategies by studying whether the way how firms finance their WCR affects their performance. Finally, this thesis finishes by analyzing whether the way in which a firm finances its current assets affects its value. In particular, this studies the shareholders' valuation of net working capital (NWC). All of these concerns about working capital management have been analyzed in this dissertation, which is structured along six chapters.

The findings indicate that firms with greater cash flows and older firms maintain greater WCR levels. Alternatively, firms with larger leverage, more growth

opportunities, greater investment in fixed assets, larger profitability, greater cost of external financing, and higher probability of financial distress have lower WCR levels. Moreover, unlike previous studies, this thesis presents evidence that both SMEs and quoted firms have a target WCR level and they adjust their current WCR to their target relatively quickly, which appears to support the idea that a good working capital management is very important for firms, as has been suggested in the literature. This result is also consistent with the idea suggested by several previous works that current balance sheet items are easier to manipulate and could be changed quite easily, even in the short run. This thesis also analyzes whether this speed of adjustment depends on a firm's characteristics, such as its access to external finance and market power. To the extent a firm has better access to capital markets it could more easily modify its investment in accounts receivables and inventories as well as its received trade credit. Similarly, firms with greater market power might also modify their WCR more easily because their actions have less repercussion on their relationships with suppliers and on their sales. Results indicate that the speed of adjustment is not equal across all firms and that firms with better access to external finance and greater bargaining power adjust more quickly, indicating that their costs of adjustment are low compared to the costs of being off their targets.

With regard to the effect of WCR on firms' performance, in contrast to previous research, which only analyzes a linear relation between these variables, this thesis examines a possible non-linear relation between these two variables. Specifically, this contributes to the literature by analyzing an inverted U-shaped relation in order to test the risk and return trade-off between different WCR strategies. Unlike previous findings, which indicate that the lower the WCR level the

more profitability, our results show that there is a concave relationship between WCR and profitability. Moreover, this result is obtained for both SMEs and quoted firms. That is, WCR and firm performance relate positively at low levels of WCR and negatively at higher levels. It allows us to confirm not only the greater profitability effect, but also the greater risk effect for firms with low WCR levels. On the other hand, although greater WCR allows firms to increase their sales and obtain greater discounts for early payments, it also requires greater financing and, consequently, additional financing expenses.

In addition, since external capital does not provide a perfect substitute for internal funds and asymmetric information may result in debt rationing, the relation between WCR and firm value should differ between firms more or less likely to face financing constraints. In this line, analyses carried out in this thesis reveal that the breakpoint of the relation between WCR and firm value is greater for those firms that are less likely to be financially constrained, that is, firms less likely to be financially constrained can have greater WCR without harming their performance. This may be mainly because of the lower financing costs of those firms and their lower capital rationing. It justifies the impact of internally generated funds and the access to external financing on firms' WCR that has been previously reported.

Additional analyses reveal that how SMEs finance their WCR also affects their performance. Since a positive WCR needs to be financed, it indicates a need for funds that firms have to finance. Firms can finance a high proportion of their WCR with long-term sources of funds, which allows them to reduce both the refinancing and interest risk associated with short-term debt. Alternatively, firms that finance a high proportion of their WCR with short-term funds might reduce their financing

costs, obtain credit condition benefits, mitigate agency costs and signal their positive prospects to market. Results show that a suitable WCR financing strategy can help firms to increase their performance. For low percentages of WCR financed with short-term bank debt, a larger proportion of this WCR financed with short-term funds might increase a firm's performance due to the advantages associated with short-term bank debt. In contrast, for high percentages of WCR financed with short-term bank debt, a larger proportion of this WCR financed with short-term funds might negatively affect a firm's performance because the negative influence of short-term bank debt outweighs the positive influence. Moreover, this WCR financing-performance relationship depends on a firm's ability to generate internal funds. In particular, findings indicate that firms with a greater ability to generate internal funds can finance a greater percentage of their WCR with short-term bank debt without harming their performance, which may be due to the lower refinancing and interest risk of these firms, given that they are expected to obtain short-term bank debt more easily and better credit conditions.

Finally, the relation between net working capital (current assets that are financed with long-term sources of finance) and firm value is also examined. The thesis ends with an analysis of the NWC, which, unlike WCR, is a long-term concept because it depends on the firm's permanent components. In addition, taking into account the positive and negative effects of short-term funds, this study also examines whether the shareholders' valuation of net working capital depends on firm financial characteristics.

The findings confirm the importance of the way in which a firm finances its current assets due to its influence on its value. In particular, it finds that net working

capital is negatively valued by shareholders, that is, it seems that for shareholders the advantages of using short-term debt outweigh the greater refinancing and interest risk associated to short-term funds. Additional analyses indicate that this negative effect of net working capital on a firm's value is stronger in firms with a better financial situation than in others, which indicates that shareholders value less those firms that use long-term funds to finance their current assets when they do not have difficulties in obtaining financing in capital markets.

SUMMARY IN SPANISH
(RESUMEN EN ESPAÑOL)

La gestión financiera a corto plazo tiene una gran importancia para las empresas, ya que la inversión que realizan en activos corrientes, y los recursos que utilizan con vencimiento inferior a un año, constituyen la mayor parte de las partidas de su balance. Los activos corrientes (pasivos corrientes) representan, en media, el 67.15% (50.64%) del activo de las pequeñas y medianas empresas (PYMEs) españolas, y el 49.41% (38%) para las empresas cotizadas españolas. Esta importancia queda reflejada en los numerosos estudios que se han realizado en los últimos años sobre los activos y pasivos a corto plazo. En concreto, estos trabajos se han dedicado al análisis de aspectos relacionados con el crédito comercial concedido a los clientes, financiación recibida por parte de los proveedores, inversión en inventarios o niveles de tesorería de las empresas.

La literatura previa sugiere que los diferentes componentes de los activos y pasivos operativos de la empresa se encuentran interrelacionados entre sí, y los directivos los gestionan de forma conjunta. No obstante, la mayoría de los trabajos empíricos existentes sólo se centran en el análisis de alguno de estos componentes de forma individual, sin tener en cuenta su influencia sobre el resto, ni su efecto conjunto sobre el resultado de la empresa. Por este motivo, esta Tesis Doctoral tiene como propósito el estudio de la gestión de los activos y pasivos corrientes de forma conjunta. En concreto, se centra en el análisis de las Necesidades Operativas de Fondos (en adelante NOF) de la empresa. Esta variable, ampliamente utilizada en la literatura, se define como la inversión en clientes e inventarios menos la financiación obtenida de los proveedores. De este modo, las NOF representan la inversión neta en activos corrientes derivada de las operaciones de la empresa.

Más concretamente, esta investigación estudia los factores determinantes del nivel de NOF que mantienen las empresas, y examina el efecto de las distintas estrategias de inversión y financiación de las NOF en su valor. Además, el tamaño de la empresa también puede afectar a las decisiones relacionadas con sus NOF, al incidir sobre sus niveles de asimetría informativa y restricciones financieras. Por ello, el estudio de las NOF también se ha realizado para muestras de distinto tamaño. En concreto, se han estudiado de forma independiente estas decisiones para empresas cotizadas y para PYMES.

En particular, esta Tesis pretende responder las siguientes cuestiones:

1. ¿Qué factores determinan las necesidades operativas de fondos de la empresa?
2. ¿Tienen las empresas un nivel objetivo de necesidades operativas de fondos? ¿De qué depende su velocidad de ajuste?
3. ¿Influyen las necesidades operativas de fondos de la empresa en su resultado?
4. ¿Cómo afectan las restricciones financieras a la relación entre NOF y valor?
5. ¿Afecta la financiación de las NOF al resultado de la empresa?
6. ¿Cómo valoran los accionistas el capital circulante de la empresa? ¿Depende dicha valoración de su situación financiera?

En los seis capítulos que constituyen esta Tesis Doctoral se intenta dar respuesta a estas cuestiones.

El primer capítulo analiza los determinantes de las NOF de las empresas, y contribuye a la literatura previa en dos aspectos importantes. En primer lugar, se

emplea un modelo de ajuste parcial para comprobar si las empresas tienen un nivel de NOF objetivo. Dada la importancia de los activos y pasivos corrientes de la empresa, se ha demostrado que sus directivos tienden a ajustar dichas partidas de forma continua. En segundo lugar, y a diferencia de todos los trabajos previos destinados al estudio de los determinantes de las NOF, este capítulo utiliza una muestra de PYMEs. La literatura previa demuestra que una buena gestión del capital circulante es especialmente importante para este tipo de empresas dado sus mayores restricciones financieras y dificultades para obtener financiación en los mercados de capitales a largo plazo. Los resultados confirman que las PYMEs tienen un nivel objetivo de inversión en NOF, y cuando se alejan de dicho nivel, toman las decisiones oportunas para recuperarlo. Este ajuste se produce de forma relativamente rápida, lo que parece indicar que las PYMES soportan elevados costes cuando se alejan de su nivel objetivo. Finalmente, también se observa que las NOF son mayores en empresas más antiguas y con mayor generación de flujos de caja. Por el contrario, las empresas con mayor endeudamiento, mayores oportunidades de crecimiento, mayor inversión en activos fijos y mayor rentabilidad presentan menores NOF.

En el capítulo dos, se estudia la velocidad de ajuste de las NOF a partir de una muestra de empresas cotizadas. Los resultados obtenidos en el capítulo anterior revelan que las PYMEs ajustan rápidamente sus NOF al nivel objetivo. Estos resultados indican que todas las empresas de la muestra, en media, realizan el ajuste a la misma velocidad, sin tener en cuenta sus características. Sin embargo, la velocidad de ajuste depende, tanto de los costes que soporta la empresa por alejarse de su nivel objetivo, como de los que incurre por intentar acercarse al mismo. Consecuentemente, serán las empresas con menores costes de ajuste las que

modifiquen más rápidamente sus NOF. En concreto, este capítulo analiza si la velocidad de ajuste depende del acceso a la financiación y poder de mercado de la empresa.

Las NOF pueden ser modificadas ajustando el crédito concedido a los clientes, la inversión en inventarios, o la financiación obtenida de proveedores. Mayores NOF necesitan ser financiadas, y por tanto, suponen mayores gastos por intereses y mayor riesgo de crédito. Por el contrario, menores NOF podrían reducir las ventas de la empresa. Por tanto, las empresas con mejor acceso a la financiación podrían modificar más fácilmente las partidas que componen sus NOF. De la misma forma, empresas con mayor poder de mercado pueden cambiar los términos de crédito comercial concedido y recibido, con menor perjuicio para sus ventas y relaciones con proveedores. Los resultados obtenidos confirman que la velocidad de ajuste es mayor en empresas con un mejor acceso a la financiación y mayor poder de mercado.

El tercer capítulo tiene como objetivo examinar la relación entre NOF y rentabilidad de la empresa. La literatura previa muestra la existencia de una relación negativa entre NOF y rentabilidad. Es decir, las empresas consiguen una mayor rentabilidad cuanto menor es su inversión en NOF. Sin embargo, estos resultados no tienen en cuenta el impacto sobre los niveles de riesgo soportados por la empresa. En concreto, menores NOF podrían estar asociadas con una caída en las ventas, o con posibles interrupciones en los procesos de producción como consecuencia de la escasez de productos. Dado que todos estos trabajos previos sólo han analizado la existencia de una relación lineal entre ambas variables, en este capítulo, y para poder capturar también el mayor riesgo asociado a bajos niveles de NOF, se contrasta la

posible existencia de una relación no monótona entre NOF y rentabilidad. A partir de una muestra de PYMES, los resultados confirman que existe una relación cóncava entre NOF y rentabilidad, es decir, la relación entre ambas variables es positiva para bajos niveles de NOF, y negativa cuando la inversión es muy elevada. De esta forma, este resultado permite confirmar no sólo la mayor rentabilidad asociada a bajos niveles de inversión en NOF, sino también el mayor riesgo de dicha estrategia.

En el cuarto capítulo se investiga si la relación entre las NOF y el valor de la empresa se ve afectada por sus restricciones financieras. Mayores niveles de NOF permiten a las empresas incrementar sus ventas y obtener mayores descuentos por pronto pago, por lo que dicha estrategia podría afectar de forma positiva a su valor. Sin embargo, esa mayor inversión requiere financiación, y por tanto, va unida a mayores gastos financieros y riesgo de crédito, lo que podría afectar negativamente al valor de la empresa. Teniendo en cuenta estas consideraciones, y al igual que en el capítulo previo para el caso de las PYMEs, también se espera una relación cóncava entre NOF y valor para el caso de las empresas cotizadas. Por otro lado, dado que las NOF requieren ser financiadas, la relación entre NOF y valor de la empresa podría depender de la facilidad para acceder a la financiación externa. Los resultados confirman que existe una relación cóncava entre NOF y valor. Además, utilizando diferentes medidas para clasificar a las empresas en función de su acceso a la financiación, los resultados indican que las empresas con menores restricciones financieras pueden mantener mayores NOF sin que esta mayor inversión vaya en detrimento de su valor. Esto podría ser consecuencia de los menores costes de financiación y el menor racionamiento de crédito de este tipo de empresas.

El quinto capítulo estudia si la estrategia de financiación de las NOF afecta a la rentabilidad de la empresa. Hasta ahora, sólo se ha analizado los efectos de la inversión en las NOF, pero no hay evidencia empírica que contraste si la estrategia seguida para financiar dicha inversión influye también sobre el valor. Aquellas empresas que financian una elevada proporción de sus NOF con fuentes de financiación a largo plazo tienen un menor riesgo de refinanciación y de tipo de interés. No obstante, financiar una elevada parte de sus NOF con fondos a corto plazo permitiría a las empresas reducir sus costes de financiación, obtener mejores condiciones crediticias, reducir los conflictos de agencia, y señalizar sus perspectivas positivas al mercado. Para una muestra de PYMEs españolas, los resultados obtenidos demuestran que una adecuada estrategia de financiación de las NOF también puede ayudar a la empresa a mejorar su resultado. En concreto, cuando las NOF están financiadas mayoritariamente con recursos a largo plazo, un incremento en la deuda a corto plazo podría afectar de forma positiva sobre la rentabilidad de la empresa como consecuencia de las ventajas asociadas al uso de ese tipo de deuda. Por el contrario, si un elevado porcentaje de las NOF está financiado con deuda a corto plazo, una mayor financiación con este tipo de deuda podría influir negativamente en el resultado de la empresa, dado el riesgo que conlleva el endeudamiento a corto plazo. Finalmente, en este capítulo también se plantea si estos resultados se ven afectados por la capacidad de la empresa para generar recursos internos. Estos análisis adicionales revelan que aquellas empresas con mayor capacidad para generar fondos internos pueden financiar un mayor porcentaje de sus NOF con deuda a corto plazo sin que esto afecte de forma negativa a su resultado. Es

decir, este tipo de empresas podría beneficiarse en mayor medida de las ventajas asociadas al endeudamiento a corto plazo.

Para terminar, el sexto capítulo de esta Tesis se centra en el estudio del capital circulante o fondo de maniobra de la empresa. A diferencia de las NOF, el fondo de maniobra (activos circulantes financiados con recursos a largo plazo) no depende del nivel de actividad de la empresa, sino que viene determinado por las decisiones que los directivos toman a largo plazo, y está relacionado con la estructura básica de financiación de la empresa. En concreto, este capítulo se destina a analizar la relación existente entre el capital circulante de la empresa y su valor. Un mayor capital circulante indica que una mayor proporción de los activos corrientes de la empresa están financiados con recursos a largo plazo. Si se tienen en cuenta las ventajas y desventajas asociadas a las diferentes fuentes de financiación disponibles para la empresa, la financiación de los activos corrientes también debe afectar a su valor. Además, la valoración del capital circulante podría también depender de la situación financiera de la empresa. En particular, dado el menor coste y los beneficios asociados al uso de deuda a corto plazo, el fondo de maniobra podría ser valorado de forma negativa por los accionistas, salvo en aquellas situaciones donde la empresa necesita disponer de recursos permanentes para reducir su elevado riesgo. A partir de una muestra de empresas españolas cotizadas, los resultados indican que los accionistas valoran negativamente el capital circulante de la empresa, es decir, prefieren que sus empresas financien una mayor proporción de sus activos corrientes con recursos financieros a corto plazo, dadas las ventajas asociadas a este tipo de financiación. Además, el efecto negativo es mayor en aquellas empresas con menores dificultades para obtener financiación.