WORKING CAPITAL MANAGEMENT IN SMEs

Sonia Baños-Caballero[a], Pedro J. García-Teruel[b], Pedro Martínez-Solano[c]

[a] University of Murcia, Faculty of Economics and Business, Dpt. Management and Finance, Campus Universitario de Espinardo, 30100-Murcia (SPAIN), tel: +34 868 883798, fax:+34 868 887537, email: sbanos@um.es

[b] University of Murcia, Faculty of Economics and Business, Dpt. Management and Finance, Campus Universitario de Espinardo, 30100-Murcia (SPAIN), tel: +34 868 887828, fax:+34 868 887537, email: pjteruel@um.es

[c] University of Murcia, Faculty of Economics and Business, Dpt. Management and Finance, Campus Universitario de Espinardo, 30100-Murcia (SPAIN), tel: +34 868 883747, fax:+34 868 887537, email: pmsolano@um.es

Abstract

This paper analyzes the determinants of Cash Conversion Cycle (CCC) for small and medium-sized firms. It has been found that these firms have a target CCC length to which they attempt to converge, and that they try to adjust to their target quickly. The results also show that it is longer for older firms and companies with greater cash flows. In contrast, firms with more growth opportunities, and firms with higher leverage, investment in fixed assets and return on assets have a more aggressive working capital policy.

Keywords: Cash Conversion Cycle; working capital, market imperfections, SMEs.

JEL classification: G30, G31, G32.

***Acknowledgements*:** This research is part of the Project ECO2008-06179/ECON financed by the Research Agency of the Spanish government. Sonia Ban˜os-Caballero was in receipt of a FPU grant from the Spanish Government. The authors also acknowledge financial support from *Fundación CajaMurcia*. A version of this work has previously been published as Working Paper No. 457 of the Working Papers Collection of the Foundation of Savings Banks (FUNCAS).

Post-print version

*Baños-Caballero, S., García-Teruel, P. J. and Martínez-Solano, P. (2010), Working capital management in SMEs, **Accounting and Finance**, 50: 511-527*

(https://doi.org/10.1111/j.1467-629X.2009.00331.x)

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.[1]

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.

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

[1] 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%.

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 $(sales_1\text{-}sales_0) / sales_0$. 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.

INSERT TABLE 1

INSERT TABLE 2

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. Following Blundell and Bond (1998), 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[2]. 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.

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

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

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 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%.

[3] 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.

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.

INSERT TABLE 3

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.

REFERENCES

Berger, A. N. Udell, G. F., ´The Economics of Small Business: The Roles of Private Equity and Debt Markets in the Financial Growth Cycle´, *Journal of Banking and Finance,* Vol. 22,1998, pp. 613-673.

Berger, A., Klapper, F. Udell, G., ´The Ability of Banks to Lend to Informationally Opaque Small Business´, *Journal of Banking and Finance,* Vol 25,2001, pp. 2127-2167.

Blazenko, G. Vandezande, K., ´Corporate holdings of Finished Goods Inventories´, *Journal of Economics and Business,* 55, 2003,pp. 255-266.

Blinder, A. S. Maccini, L. J., ´The Resurgence of Inventory Research: What Have We Learned? *Journal of Economic Survey,* Vol. 5, 1991,pp. 291-328.

Blundell, R. W. Bond, S. R., ´Initial conditions and moment restrictions in dynamic panel data models´, *Journal of Econometrics,* Vol. 87, 1998, pp. 115-143.

Carpenter, R. E., Fazzari, S. M. Petersen B. C., ´Inventory investment internal-finance fluctuations and business cycle´, *Brooking Papers on Economic Activity,* Vol. 25, 1994,pp. 75-135.

Chiou, J. R., Cheng, L. Wu, H. W., ´The Determinants of Working capital Management´, *Journal of American Academy of Business,* vol. 10 , 2006,pp. 149-155.

Cuñat, V., ´Trade Credit: Suppliers as Debt Collectors and Insurance Providers´, *Review of Financial Studies* 20, 2007, pp.491-527.

Deloof, M., ´Does Working Capital Management Affect Profitability of Belgian Firms?´, *Journal of Business, Finance and Accounting*, Vol. 30, 2003, pp. 573-587.

Deloof, M. Jegers, M., ´Trade Credit, Product Quality, and Intragroup Trade: Some European Evidence´, *Financial Management* 25,1996, pp.33-43.

Demigurc-Kunt, A. Maksimovic, V., "Firms as Financial Intermediaries: Evidence from Trade Credit Data", *World Bank Working Paper*, 2002.

Emery, G. W., 'An Optimal Financial Response to Variable Demand', *Journal of Financial and Quantitative Analysis*, Vol. 22, 1987, pp. 209-225.

Fazzari, S. M. Petersen, B., ´Working Capital and Fixed Investment: New Evidence on Financing Constraints´, *Rand Journal of Economics*, Vol. 24, 1993, pp. 328-342.

Filbeck, G. Krueger, T. M., ´An Analysis of Working Capital Management Results across Industries´, *Mid-American Journal of Business*, Vol. 20, No. 2, 2005,pp. 11-18.

Garcia-Teruel, P. J. Martinez-Solano, P., ´Effects of Working Capital Management on SME Profitability´, *International Journal of Managerial Finance*, vol. 3, 2007a, pp. 164-177.

García-Teruel, P. J. Martínez-Solano, P., ´Short-term Debt in Spanish SMEs´, *Internacional Small Business Journal*, Vol. 25, 2007b, pp. 579-602.

Grablowsky, B. J., ´Financial Management of Inventory´, *Journal of Small Business Management*, Vol. 22, 1984,pp. 59-65.

Hawawini, G., Viallet, C. Vora, A., ´Industry Influence on Corporate Working Capital Decisions´, *Sloan Management Review*, Vol. 27, 4, 1986,pp. 15-24.

Hendel, I., ´Competition under financial distress´, *Journal of Industrial Economics,* Vol. 44, 1996, pp. 309-324.

Hsiao C., ´Benefits and Limitations of Panel Data´, *Econometrics Review,* Vol. 4, 1985, pp.121-174.

Jordan, J., Lowe, J. Taylor, P., ´Strategy and Financial Policy in UK Small Firms´, *Journal of Business Finance and Accounting,* Vol. 25, 1998,pp. 1-27.

Jose, M. L., Lancaster, C. Stevens, J.L., ´Corporate Return and Cash Conversion Cycle´, *Journal of Economics and Finance*, Vol. 20, 1996,pp. 33-46.

Kargar, J. Blumental, R. A., ´Leverage impact on Working Capital in Small Business´, *TMA Journal*, 14 , 1994,pp. 46-53.

Kashyap, A. K., Lamont, O. A. Stein, J. C., ´Credit conditions and the cyclical behavior of inventories´, *Quarterly Journal of Economics,* Vol. 109, No.3, 1994,pp. 565-592.

Kieschnich, R., LaPlante, M. Moussawi, R., ´Corporate Working Capital management: Determinants and Consequences´, Working Paper, 2006.

Michaelas, N., Chittenden, F. Poutziouris, P., ´Financial Policy and Capital Structure Choice in UK SMEs: Evidence From Company Panel Data´, *Small Business Economics,* Vol. 12, No. 2, 1999,pp. 113-130.

Modigliani, F. Miller, M.H., ´The cost of capital, corporation finance and the theory of investment´, *American Economic Review,* Vol. 48, 1958,pp. 261-297.

Myers, S.C., ´Determinants of corporate borrowing´, *Journal of Financial Economics,* Vol. 5, 1977,pp. 147-175.

Myers, S.C., ´The capital structure puzzle´, *Journal of Finance*, Vol. 39, No.3, 1984,pp. 575-592.

Niskanen, J. Niskanen, M., ´The Determinants of Corporate Trade Credit Polices in a Bank-dominated Financial Environment: the Case of Finnish Small Firms´, *European Financial Management* 12, 2006,pp.81-102.

Ng, C. K., Smith, J. K. Smith, R. L., ´Evidence on the Determinants of Credit Terms Used in Interfirm Trade´, *Journal of Finance* 54, 1999, pp.1109-1129.

Nunn, K., ´The Strategic Determinants of Working Capital: A Product-Line Perspective´, *Journal of Financial Research* 4, 1981, pp. 207-219.

Padachi, K., ´Trends in Working Capital Management and its Impact on Firms´ Performance: An Analysis of Mauritian Small Manufacturing Firms´, *International Review of Business Research Papers*, Vol. 2, 2006, pp. 45-58.

Peel, M. Wilson, N., ´Working Capital and Financial management practices in the small firm sector´, *International Small Business Journal*, Vol. 14, 1996, pp.52-68.

Peel, M. J., Wilson, N. Howorth, C., ´Late Payment and Credit Management in the Small Firm Sector: Some Empirical Evidence´, *International Small Business Journal* 18, 2000, pp.17-37.

Petersen, M. Rajan, R., ´The effect of credit market competition on lending relationships´, *Quarterly Journal of Economics*,Vol. 110, No. 2, 1995, pp.407-443.

Petersen, M. Rajan, R., ´Trade Credit: Theories and Evidence´, *Review of Financial Studies* 10, 1997, pp.661-691.

Raheman, A. Nasr, M., ´Working Capital Management And Profitability - Case Of Pakistani Firms´, *International Review of Business Research Papers*, Vol. 3, 2007, pp.275-296.

Scherr, F.C. Hulburt, H. M., ´The Debt Maturity Structure of Small Firms´, *Financial Management*, Vol. 30, 2001, pp.85-111.

Schmidt, R. Tyrell, M., "Financial Systems, Corporate Finance and Corporate Governance", *European Financial Management*, Vol. 3, 1997, pp. 333-361.

Shin, H. H. Soenen, L., ´Efficiency of Working Capital and Corporate Profitability´, *Financial Practice and Education* 8, 1998, pp.37-45.

Smith, K., ´Profitability versus liquidity tradeoffs in working capital management´, in Smith, K.V. (Ed.), *Readings on the Management of Working Capital, West Publishing Company,* St Paul,MN, 1980, pp.549-62.

Smith, J. K., ´Trade Credit and Informational Asymmetry´, *Journal of Finance* 42, 1987, pp.863-872.

Soenen, L., ´Cash Conversion Cycle and corporate profitability´, *Journal of Cash Management*, Vol. 13, No.4, 1993, pp.53-57.

Studenmund, A. H., ´Using Econometrics´. A Practical Guide (Addison-Wesley), 1997.

Walker, D., ´An empirical analysis on financing the small firm´, R. Yazdipour (Ed.), *Advances in Small Business Finance*, 1991, pp. 47-61.

Weinraub H. J. Visscher, S., ´Industry Practice Relating to Aggressive Conservative Working Capital Policies´, *Journal of Financial and Strategic Decision*, Vol. 11, No. 2, 1998, pp. 11-18.

Whited, T. M., ´Debt, Liquidity Constraints, and Corporate Investment: Evidence From Panel Data´, *Journal of Finance*, Vol. 47, 1992, pp. 1425-1460.

Wilner, B. S., ´The Exploitation of Relationships in Financial Distress: The Case of Trade Credit´, *Journal of Finance* 55, 2000, pp.153-178.

Wu, Q. S., ´The Determinant of Working Capital Management Policy and Its Impact on Performance´. *National Science Council Project*, 2001.

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		WKR	
	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. WKR is the ratio accounts receivables plus inventories minus account payables to total assets.

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 variables 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.