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Abstract

This paper examines the determinats of Cash Conversion Cycle (CCC) for small and medium-sized firms. It is found that these firms have a target CCC level to which they attempt to converge, and they try to adjust to their target level quickly. The results also show that this level is higher for older firms and companies with greater cash flows. In contrast with this, firms with more growth opportunities, and firms with higher leverage, investment in fixed assets and return on assets have lower CCC levels.

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

*JEL classification***:** G30, G31, G32.

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1. INTRODUCTION

The 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) suggested that working capital management is important because of its effects on the 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 the firm's profitability (Jose et al., 1996; Shin and Soenen, 1998; Deloof, 2003; Padachi, 2006; García-Teruel and Martínez-Solano, 2007; and Raherman and Nasr, 2007).

In contrast with these studies, 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 these firms 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, as exemplified by Grablowsky (1984) and Kargar and Blumenthal (1994), is that working capital management may be crucial for the survival and growth of small companies.

In order to measure the 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, 2007). Higher Cash Conversion Cycle levels 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, and therefore reduce 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, using a panel of 4076 Spanish SMEs over the period 2001-2005. Hence, this study contributes 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 level. Secondly, the study estimates the model using two-step General Method of Moments (GMM), which allows the researchers to control for possible endogeneity problems. 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 level, and they try to adjust their current Cash Conversion Cycle level to their target level quickly. The results also show that older firms and companies with larger cash flows maintain higher CCC levels, while investment in fixed assets, growth opportunities, leverage and return on assets have a negative influence on this level.

The rest of this paper is organized as follows: in Section 2 previous studies on the working capital management are reviewed, linked to an analysis of the existing literature on market imperfections. In Section 3 the sample used in analysis is described. 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 THE 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). In the neoclassical model, companies have unlimited access to sources of finance and investment, so firms with opportunities for profitable investment that exceed their available cash flow would not be expected to invest any less than firms with the same opportunities and higher cash flow, because external funds provide a perfect substitute for internal resources. In this situation, a larger Cash Conversion Cycle would not have an 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 a target level of Cash Conversion Cycle that balances costs and benefits and maximizes the value for the firm.

Specifically, a large CCC may increase the firm's sales, and consequently the profitability. This is the case for several reasons. First, larger inventories can prevent interruptions in the production process and loss of business due to the scarcity of products, while reducing supply costs and price fluctuations (Blinder and Maccini, 1991). Second, by extending greater trade 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 are carried out

(Smith, 1987). This argument was also supported by Deloof and Jegers (1996), who suggested that granting trade credit stimulated sales because it allowed 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, reducing supplier financing (Wilner, 2000; Ng et al., 1999). However, maintaining a high Cash Conversion Cycle also has an opportunity cost if the firm forgoes other more productive investments to keep that level and, as Soenen (1993) suggested, long Cash Conversion Cycles might be a primary reason why firms can go bankrupt.

According to the theories outlined above, and previous studies on working capital management, we explain firm characteristics that might determine level of Cash Conversion Cycle and how they may affect this level. Previous literature, such as Soenen (1993), Deloof (2003), Padachi (2006), Garcia-Teruel and Martinez-Solano (2007), 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:

$$\text{CCC} = \left(\frac{accounts\ receivable}{sales} x365\right) + \left(\frac{inventories}{purchases} x365\right) - \left(\frac{accounts\ payable}{purchases} x365\right)$$

The longer the cycle, the larger the funds invested in working capital, so it might be sensitive to market imperfections such as asymmetric information, agency conflicts or financial distress.

Capacity to generate internal resources

Asymmetric information implies a higher cost for external sources of funds and credit rationing for firms, because it leads a conflict of interests between shareholders and bondholders (Myers, 1977). Shareholders can decide not to carry out or to abandon investment projects with a positive net present value when the net present value of the investment is less than the amount of debt issued. Moreover, given the limited liability of shareholders, they might select investment projects of greater risk, because shareholders would benefit from the firm's higher value, while bondholder are the ones that would suffer the possible losses (Jensen and Meckling, 1976). On the other hand, shareholders have incentives to issue new debt that increases risk and lowers the value of existing debt.

As a consequence, debtholders and new shareholders (who have less access to information about the firm than insiders) 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). Hence, the investments of some companies may be constrained by a shortage of internal funds. Indeed, Fazzari and Petersen (1993) demonstrated that working capital investment is sensitive to cash flow for US manufacturing firms. They found a positive relationship between working capital and cash flow, which suggests that firms with a larger capacity to generate internal resources have higher current asset levels. This 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 requirement. They suggested that firms with greater cash flows have better working capital management.

In order to consider the capacity to generate internal resources, the variable CFLOW was used, calculated as the ratio of net profit plus depreciation to total assets. Cash flow was used because it is the most appropriate variable for representing the capacity to generate internal resources, according to several previous works. 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 they have to pay a higher risk premium, according to the theories indicated above. 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. To measure the *leverage* (LEV) the ratio of debt to total assets was used.

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 lower Cash Conversion Cycle levels 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) pointed out, companies might extend more credit to their customers to increase their sales in periods of low demand. These two theories were supported by Petersen and Rajan (1997), who suggested that suppliers are willing to finance high sales growth firms by offering more credit and that firms with declining sales are forced to extend relatively more trade credit without getting any more support from suppliers.

Therefore, since these different considerations lead to opposite conclusions about the expected effect of growth options on investment in working capital, the expected relationship is not clear. The 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 generally 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 the size. It 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 asymmetries of information (Jordan, Lowe and Taylor, 1998; and Berger, Klapper and Udell, 2001), they have greater informational opacity (Berger and Udell, 1998) and they are not followed by analysts. Moreover, according to the trade-off theory, they have a greater probability of bankruptcy, since larger companies tend to be more diversified and fail less often. This might affect 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 authors showed that the size of the firm positively affected 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 they 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 level 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 with better conditions (Berger and Udell, 1998), so the cost of the funds used in this investment is lower in these companies. On the other hand, Petersen and Rajan (1997) also suggested that firms with better access to capital markets offer more trade credit and use less credit from their suppliers.

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. This 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, because intangible assets are not easily controlled or assessed by potential external investors, and they have a low residual value. Thus, firms with more tangible fixed assets might have lower costs for 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 the level of returns that the firm manages to secure affects measures of working capital management. First, Wu (2001) showed that the working capital requirement and the performance of the firm have effects on each other. And subsequently, Chiou et al. (2006) found that the return on assets had 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, 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) was introduced into the analysis and it is expected that this factor will have a negative effect on the Cash Conversion Cycle. It is measured by the ratio Earnings Before Interest and Taxes over total assets.

Industry

Several earlier studies have focused their analysis 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 showed an industry effect on firms' working capital policies, and this 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, in the present analysis industry dummy variables were introduced 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 contains accounting and financial information for Spanish firms, and was developed by Bureau Van Dijk.

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 comprising 4076 Spanish SMEs was obtained.

In addition, 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 2 reports the sample distribution and the average Cash Conversion Cycle by industry. There are differences in the Cash Conversion Cycle level across industries, which supports the argument that there is an industry effect on the firms' working capital policies as had been shown in previous studies. The manufacturing sector and wholesale trade sector were the two sectors with the highest Cash Conversion Cycle, with an average period of more than 105 and 97 days, respectively. Thus, manufacturing and wholesale trade firms take the longest time to generate cash. Hence, these firms need more resources to finance their working capital requirement. In contrast with this, the Cash Conversion Cycle is negative in two sectors (services and transport and public services). This might be explained by the fact that short storage times are common in these sectors.

Finally, a formal test was used to make sure 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. According to Studenmund (1997), a VIF value of 5 indicates that there may be a multicollinerity problem. Since the VIF was greater than 3 in no cases, and the average level was 1.50, it can be concluded that collinearity was not a concern in the present sample.

4. METHODOLOGY

Taking as a starting point the theories described in Section 2, the hypotheses about factors that affect the Cash Conversion Cycle were tested using the panel data methodology.

Panel data were used because they provide some advantages. 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 their CCC in the previous period and the firm's 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, such that 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 to achieve this target level. However, the adjustment is not immediate because firms bear costs of adjustment, so they will adjust their current levels according to the following expression:

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

where:

CCC_{it} is the Cash Conversion Cycle in the period t, and

CCC^*_{it} is the target Cash Conversion Cycle.

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 introduced, 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 that they cannot control. Finally, the parameters υ_{it} are random disturbances.

5. RESULTS

5.1. Univariate Analysis

As a starting point for the analysis and before estimating the model proposed in Section 4, a univariate analysis was performed. This analysis makes it possible to determine whether there are significant differences in the explanatory variables used in the analysis in relation to the firms' Cash Conversion Cycle levels. Thus, the quartiles of the variable CCC, which have been constructed annually, were calculated, together with the mean values of the explanatory variables for each quartile. The results are presented in Table 3. In order to determine whether these differences were significant, the differences of means were evaluated using Student's t. The results for this test are shown in the last column. This test determines whether the mean values of the fourth quartile are significantly different from those of the first.

The mean values of all explanatory variables for firms with high Cash Conversion Cycle levels were significantly different from those for firms with lower Cash Conversion Cycle levels. As in previous studies, it was found that older and larger firms maintain a higher Cash Conversion Cycle level, while this level decreases with leverage, investment in fixed assets and return on assets. In contrast, the negative relationship obtained for growth opportunities and Cash Conversion Cycle is different

to the relationship obtained by Kieschnick et al. (2006)). Finally, the results indicate that the Cash Conversion Cycle is lower in firms with larger cash flows.

5. 2. Multivariate Analysis

In Table 4 we reports the results obtained in the multivariate analysis. 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 hand, the analysis can be made more robust by the introduction of industry dummies and macroeconomic factors such as 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 have been developed 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 the firms' Cash Conversion Cycles depend on their level in the previous period and the firms' target Cash Conversion Cycle levels. 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 $CCC_{\text{it-1}}$ and $\upsilon_{\text{it-1}}$ are correlated. In addition, this estimation does not control for endogeneity, despite the fact that the endogeneity problem appears to be present in the analysis, which could seriously affect the estimation results. Also, the Cash Conversion Cycle might influence the independent variables. For example, several previous studies have shown how the Cash Conversion Cycle can have a significant effect on measures of a firm's profitability.

In order to avoid these problems of the inconsistency and control for endogeneity, the method of instrumental variable estimation was used in the estimations that follow. Arellano and Bond (1991) proposed the application of the General Method of Moment (GMM) to the equation in first differences. The estimator of instrumental variables in one stage is always consistent, but if the disturbances show heteroskedasticity, the estimation in two stages increases efficiency. Hence, the estimations of the model are carried out using the 2-stage General Method of Moment (GMM).

In Column (4) the model proposed in Section 4 was estimated using the two-step General Method of Moment (GMM). Then, in Column (5) this model is re-estimated, but introducing 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. 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 in an acceptable

range, which indicates there is no second-order serial correlation. The results of the Hansen test for over-identifying restrictions also is shown, and that indicates the absence of correlation between instruments and error term.

The results show a significant lagged dependent variable coefficient, which indicates Spanish SMEs pursue a target Cash Conversion Cycle level that balances the costs and benefits of maintaining it. In addition, these companies try to adjust their CCC level to their target level 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 greater Cash Conversion Cycle levels, 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 levels held by firms than the 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 level of 19.68%, 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 lower Cash Conversion Cycle levels. 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, it was found that this variable has 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 showed that this variable significantly affected working capital management. First, Jose et al., (1996) suggest that larger firms tend to be more profitable and tend to have shorter Cash Conversion Cycles, while Chiou et al. (2006) and Kieschnick et al. (2006) found a positive relationship between size and working capital requirement and Cash Conversion Cycle, respectively. However, our results show this variable does not influence SME's Cash Conversion Cycle level. It may be because in the present study the sample is made up of homogeneous small companies of similar size.

It was found that older firms, which have better access to external capital, maintain higher levels of Cash Conversion Cycle. Hence, it appears that firms with better access to the capital markets maintain higher Cash Conversion Cycle levels because of their lower costs for financing and the trade credit used, along with their larger trade credit granted. Moreover, the economic significance of the influence of age on the Cash Conversion Cycle level 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 the firms' Cash

Conversion Cycle level. 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 Cycle levels held by firms. The results indicate that an increase of one standard deviation in the investment in fixed assets reduces the level 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). In addition, Blazenco and Vandezande (2003) suggested that firms with larger market-power hold lower finished goods inventories. 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 such as 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 companies. 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. 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.

6. CONCLUSIONS

In this paper, a target adjustment model has been developed to investigate the characteristics of firms that might explain the Cash Conversion Cycle level 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 level 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 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 higher CCC level, while firms with larger leverage, growth opportunities, investment in fixed assets and return on assets maintain a lower level of CCC. This appears to indicate that the cost of financing has a negative effect on firms' Cash Conversion Cycles, because it is larger for companies with greater cash flows and lower leverage. The results also suggest that better access to capital markets for firms might increase their investment in working

capital, because it reduces the cost of their funds and the trade credit used, and increases their trade credit granted. In addition, the results appear to indicate that firms with more growth options and greater return on assets receive more trade credit from their suppliers but extend less trade credit to their customers.

The results also indicated that some variables that might have been expected to have an influence on CCC levels did not. These included interest rates and GDP growth. This may be explained by the fact that the selected research period was short and these two variables were quite stable over those years. Similarly, contrary to what we had expected, size does not affect the levels of Cash Conversion Cycle.

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. However, given that there are important differences in financial systems, it would be informative to conduct similar studies in other countries.

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Table 1
Determinants of Cash Conversion Cycle maintained by SMEs.

Factor	Relation with Cash Conversion Cycle	Explanation
Capacity to generate internal resources	Positive/Negative	-Preference for internal financing -Better working capital management
Size	Positive	-Asymmetric information, financial constraints, probability of bankruptcy.
Leverage	Negative	-Higher risk premium.
Growth opportunities	Positive/Negative	-Larger investment in inventories -Greater trade credit used / lower trade credit granted.
Return	Negative	-Better access outside capital, market dominance.
Age	Positive	-Quality, reputation, solvency .
Tangible fixed assets	Positive/Negative	-Fixed investment competes for funds with working capital levels. -Lower asymmetric information.

Table 2
Structure of the sample

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

Notes: Average CCC measures the average Cash Conversion Cycle.

Table 3

Mean value of the explanatory variables by Cash Conversion Cycle quartiles

	First quartile	Second quartile	Third quartile	Forth quartile	t
CFLOW	0.09817	0.08144	0.07783	0.06619	22.375
LEV	0.62763	0.63416	0.60604	0.57332	13.240
GROWTH	0.0961	0.07851	0.14895	0.05031	4.069
SIZE	8.99762	8.96888	9.10984	9.29207	-23.554
AGE	2.98912	3.01509	3.07510	3.12972	-12.688
FA	0.31388	0.22681	0.21002	0.19315	31.644
ROA	0.07213	0.06865	0.06771	0.05676	9.222

Notes:

Mean values of the explanatory variables for each quartile of the variable CCC. Quartiles constructed annually. CCC 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 tangible fixed assets; and ROA the return on assets.

Table 4
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 fixes assets; and ROA the return on assets. Column (1) shows the estimate by OLS; Column (2) by fixed effects; Column (3) introduce 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.

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