DETERMINANTS OF WORKING CAPITAL MANAGEMENT

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ABSTRACT

This paper analyzes the determinants of working capital management (WCM) for a sample of Spanish firms during the period 1997-2004. We find that firms have a target investment in working capital and that they take decisions in order to achieve this. The results appear to support the hypothesis that the working capital competes with investment in fixed assets for the funds of the firms when they have financial constraints. Finally, we also find that WCM depends on bargaining power and other financial factors such as the availability of internal finance, cost of financing and financial constraints.

KEYWORDS: Working capital, Net Trade Cycle, dynamic panel data, market imperfections, endogeneity.

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1. Introduction

Since the seminal work by Modigliani and Miller (1958) showing that a firm´s financial structure is irrelevant to investment, the literature on investment decisions has been enlarged by many theoretical and empirical contributions. It has shown that in the presence of market imperfections, firms may prefer one source of funds over another because of a wide cost-wedge between internal and external funding sources. Myers and Majluf (1984) show that firms present a preference for internal over external funds, and in the case of external funds, a company prefers debt before equities. In fact, Fazzari, Hubbard and Petersen, (1988) test the financing hierarchy hypothesis and suggest that the firms´ investment may depend on financial factors such as the availability of internal finance, access to capital markets or cost of financing.

The investment that firms make in current assets, as well as the current liabilities used, represents the main share of items on a firm´s balance sheet. In fact, in our sample they represent more than 50 per cent of the firms´ total assets and total liabilities. Decisions about how much to invest in receivable accounts and inventories, and how much credit to accept from suppliers, are reflected in the management of firms' working capital. This may have an important impact on the profitability and liquidity of the firm (Shin and Soenen, 1998), so firms have to evaluate the trade-off between expected profitability and liquidity risk before deciding the working capital policy to adopt.

Despite the importance of working capital management for the profitability of the firms (Smith, 1980; Soenen, 1993; Jose, Lancaster and Stevens, 1996; Shin and Soenen, 1998; Deloof, 2003; and Garcia and Martinez, 2007), there has been little work on the empirical determinants of the working capital management. Chiou, Cheng and Wu (2006) analyze firm characteristics and macroeconomic factors that might affect working capital management for companies from Taiwan. Kieschnick, Laplante and Moussawi (2006) also study the determinants of WCM, in this case, for a sample of US companies. However, these studies have several limitations. First, they do not control for endogeneity. Second, none of these existing empirical studies has shown the possible existence of a target level of the measures of working capital management, even though its existence appears to be evident. Several previous studies (Nadiri, 1969; Emery, 1984: Blinder, 1986, among others) have shown that firms have target or optimal levels for their individual components such as accounts receivable, inventories and accounts payable. Moreover, under imperfect capital markets, firms have to evaluate the trade-off between costs and benefits of maintaining a larger investment in working capital.

In this paper we attempt to extend the empirical research on working capital management in a number of ways. First, in contrast to the existing empirical studies, this paper adopts a dynamic framework, which assumes that firms have a target investment in working capital and that they adjust their current investment gradually over time because of adjustment costs. Second, we use panel data because it allows us to control for unobservable heterogeneity, making it possible to exclude biases deriving from the existence of individual effects. Third, we use two-step GMM estimator to avoid the problem of possible endogeneity. For example, several studies have shown how the measures of the working capital management affect profitability and firms´ sales. Finally, we present empirical evidence for a sample of Spanish firms in the context of the continental model, which is characterised by less-developed capital markets (La Porta, Lopez de Silanes, Shleifer and Vishny, 1997, 1998), low investor protection and high

concentration of ownership. It allows our results to be compared with others obtained for companies with different financial systems.

Following Shin and Soenen (1998), we use the Net Trade Cycle (NTC) as a measure of working capital management. NTC indicates the number of "days sales" the firm has to finance its working capital under ceteris paribus conditions. Our findings indicate that firms have a target Net Trade Cycle and they adjust their current Net Trade Cycle to their target gradually over time because of adjustment costs. Moreover, the speed of adjustment is relatively quick, which may be because being in disequilibrium is costly for this sample. On the other hand, the results reported in this study suggest that firms that are capable of generating more internal funds have a longer cycle. The results also lend support for Fazzari and Petersen´s (1993) argument that working capital competes with the investment in fixed assets for the funds of the firms when they suffer financial constraints. The hypothesis that companies with a greater bargaining power follow a more aggressive working capital policy is also supported by the findings of this paper. Finally, our results suggest that Net Trade Cycle also depends on other financial factors such as the cost of financing and financial constraints. Thus, we obtain that growth opportunities, probability of financial distress and cost of external financing negatively affect NTC. However, we do not find support for the hypothesis that leverage influences the measures of working capital management.

The remainder of this paper is organized as follows. The next section develops the hypotheses and reviews the previous studies on working capital management. In section 3 we describe the empirical model and data. We present our results in section 4 and relate them to earlier findings. Finally, the main conclusions are presented in Section 6.

2. Theoretical framework and hypotheses.

In perfect capital markets, investment decisions of a firm are independent of its financial situation (Modigliani and Miller, 1958). Since there is no capital rationing, firms can always obtain external financing without problem, so the firms´ investment should be driven only by expected future profitability and, therefore, should not be affected by the availability of internal funds. However, in imperfect markets, the firms´ investment may depend on financial factors such as the availability of internal finance, access to capital markets or cost of financing (Fazzari, Hubbard and Petersen, 1988). Under this situation, the working capital level held by companies may also be sensitive to these financial factors.

The Net Trade Cycle (NTC) and Cash Conversion Cycle (CCC) are the most popular measures of working capital management used in previous works, due to the criticism of static measures (Gitman, 1974; Kamath, 1989). Both of these measures are a dynamic measure of ongoing liquidity management, and they are closely correlated. The CCC is calculated as (accounts receivables/sales)*365 + (inventories/cost of sales)*365 - (accounts payable/purchases)*365 and shows the time lag between expenditure for the purchase of raw materials and the collection of sales of finished goods (Deloof, 2003). So, the longer this time lag, the larger the investment in working capital. The Net Trade Cycle (NTC) is basically equal to the CCC, but the three components (accounts receivable, inventories and accounts payable) are expressed as a percentage of sales, so indicating the number of "days sales" the firm has to finance its working capital (Shin and Soenen, 1998). According to these authors, this last measure provides an easy estimate for additional financing needs with regard to working capital expressed as a

function of the projected sales growth. They supported the use of the NTC to measure working capital management efficiency, since all three components are expressed as a percentage of sales which is more useful.

Increasing these cycles may positively affect firms´ profitability for two reasons. First, it may increase firms´ sales (Blinder and Maccini,1991; Smith, 1987; Emery, 1987; Deloof and Jegers, 1996; Petersen and Rajan, 1997; and Ng, Smith and Smith, 1999). These works show that firms´ sales increase when they increase their investment in inventories or trade credit granted. Second, Ng et al., (1999) and Wilner (2000) also demonstrate that firms may get important discounts for early payments which reduce their supplier financing. However, this benefit has to offset the costs of a larger investment in working capital when firms operate under imperfect capital markets. First, firms have a financing cost. Second, the main cost of holding a higher working capital level is the opportunity cost, because a firm may forgo other more productive investments in order to hold that level. Finally, and according to Soenen (1993), longer cycles might also lead companies to bankruptcy.

Hence, under imperfect capital markets, companies may have an optimal Net Trade Cycle that balances the costs and benefits of maintaining it and which maximizes their value. In addition, since a longer cycle indicates a need for additional capital, it may depend on agency costs, asymmetric information and financial distress, because these lead to a higher cost of financing external and credit rationing.

Asymmetric Information and Agency conflicts

Asymmetric information and agency costs could lead to either underinvestment or overinvestment. On the one hand, given the limited liability of shareholders, they might carry out riskier investment projects (problem of overinvestment), because shareholders would benefit from the firm's higher value, while creditors would suffer the possible losses (Jensen and Meckling, 1976). On the other hand, the conflict between shareholders and creditors, according to Myers (1977), can also lead to a problem of underinvestment, because given the priority of creditors in case of bankruptcy, shareholders may 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. Consequently, firms have to pay a risk premium, which results in a higher cost for external sources of funds. In this sense, the pecking order theory of Myers (1984) states that firms give priority to resources generated internally over debt and new equity. Following this line, Stiglitz and Weiss (1981) and Myers and Majluf (1984) suggested that a shortage of internally generated funds may lead to firm underinvestment. This idea has been supported by several earlier studies that have demonstrated that the amount of corporate investment is affected by its internal financing (Fazzari et al., 1988; Carpenter, 1995; Kadapakkam, Kumar and Riddick, 1998; Hoshi, Kashyap and Scharfstein., 1991; Hadlock, 1998; Cleary, 1999; Moyen, 2004). The empirical evidence suggests it might be due, as we commented above, to the higher risk premium demanded because of asymmetric information and the agency conflicts. Greenwald et al., (1984), on the other hand, suggest that asymmetric information may also result in credit rationing in competitive markets, which might also affect the level of firms´ investment. Hence, and taking into account these hypothesis, *internal funds* should also positively influence the firms´ working capital investment, as is demonstrated by Fazzari and Petersen (1993).

Growth opportunities is another variable that might affect working capital management, because firms with higher growth perspectives have more severe agency conflicts between creditors and shareholders (Myers, 1977) and larger asymmetric information due to their value being largely determined by these growth perspectives (Myers and Majluf, 1984). Thus, we would expect these companies to have a shorter cycle. The results obtained by the empirical evidence, however, lead to opposite conclusions about the effects of this variable. Kieschnick et al., (2006) show that this variable positively influences Cash Conversion Cycle for US firms, while Chiou et al., (2006) do not find any relation between these variables.

These problems, on the other hand, are also sensitive to *leverage*, according to the existing literature. The results obtained by Krishnawami et al., (1999) appear to indicate that agency conflicts between shareholders and creditors decrease also with private debt, which predominates in Spain. In this line, to the extent that debt ratio acts as a proxy for the ability of the firms to obtain debt it would be expected that firms with higher leverage (greater ability to raise debt) will hold more investment in working capital.

Firm size is another factor influencing these agency costs. The agency problem between shareholders and creditors is expected to be attenuated by size (Smith and Warner, 1979), since smaller firms suffer more severe asymmetric information between insiders and outsiders (Jordan et al., 1998; and Berger et al., 2001), due to the fact that less public information is available to them. Thus, this factor would be expected to positively influence the length of this cycle. However, we should also mention that this variable has also been associated in the literature with the firm´s bargaining power with its suppliers and customers, showing that larger firms have a greater bargaining power, so they might have a shorter NTC. According to Long et al. (1993), Lee and Stowe (1993), and Pike, Cheng, Cravens and Lamminmaki (2005), smaller firms have to extend more credit to guarantee their products, given their lower reputations. In addition, they are offered less trade credit (Niskanen and Niskanen, 2006). With regard to the results obtained from the empirical evidence, they lead to contrary conclusions about the effect of this variable on the measures of working capital management (Moss and Stine (1993); Jose et al., (1996); Kieschnick et al., (2006) and Chiou et al., (2006).

Finally, we also expect *investment in fixed assets* to influence Net Trade Cycle. The problems of asymmetric information and agency conflict between shareholders and creditors are expected to be more serious for companies with lower fixed investment and greater intangible assets, because these latter assets cannot be easily valued by potential external investors and these firms would have a lower liquidation value of their assets. Thus, shareholders might decide to carry out greater risk projects in these firms if the liquidation value of their assets is lower than the debt value. Moreover, asset tangibility increases the value that can be recaptured by creditors in bankruptcy. Thus, we should expect a positive relation between this variable and the Net Trade Cycle. However, when firms operate under imperfect capital markets, they bear financial constraints, so this variable might compete with the working capital for firm´s capital in this situation, as is reported by Fazzari and Petersen (1993) and Kieschnick et al. (2006).

Financial distress

We also introduce the variable *probability of financial distress* because the agency conflicts commented above are more pronounced for financially distress firms. The costs of financial distress arise when the

firm cannot meet its payment obligations either in the short or the long term. This can affect the Net Trade Cycle of firms, since companies with a greater probability of financial distress have more difficulties in obtaining capital. Given that a longer cycle indicates a need for additional capital, these firms might have a shorter NTC.

3. Method and Data

3.1. Method

Following the theories described in the previous section and considering the costs and benefits of keeping working capital, we assume that firms have a target Net Trade Cycle. Firms´current Net Trade Cycle may not always equal their desired cycle and, hence, firms might take time to adjust from actual to the desired cycle. This can be for several reasons. Nadiri (1969), for instance, suggests that firms cannot always estimate their sales accurately and with certainty, and hence neither their purchases; they do not accurately anticipate changes in monetary policy or in the rates of default and bad debts on their trade credit; and the discovery and collection of delinquent accounts take time and involve costs which may be distributed over time.

Like Shin and Soenen (1998), we use the Net Trade Cycle as dependent variable, which is calculated by the following expression: NTC= (accounts receivables/ sales)*365 + (inventories/sales)*365 - (accounts payable/sales)*365. Thus, it provides an easy estimate for additional financing needs with regard to working capital expressed as a function of the projected sales growth.

With regard to the independent variables, the capacity to generate *internal funds* is proxied by the variable cash flow (CFLOW), defined as the ratio of earnings before interest and tax plus depreciation to sales.

We use two proxies to measure the *growth opportunities*. $GROWTH_1$ is calculated by the ratio market-to-book value of assets ((market value of equity + market value of debt) / total assets), while $GROWTH_2$ is defined as the ratio market-to-book value of equity (market value of equity / book value of equity).

The ratio of total debt over total assets (LEV) is used as proxy for the *leverage*. We use the natural logarithm of assets ($SIZE_1$) and the natural logarithm of sales ($SIZE_2$) to measure the *size*. The *investment in fixed assets* (FA) of the firm is measured by the ratio tangible fixed assets over total assets.

The *likelihood of financial distress* (ZSCORE) is calculated according to the re-estimation of Altman´s (1968) model carried out by Bergley et al., (1996), given by the following expression:

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

where X_1 = Working capital / Total assets; X_2 =Retained earnings / Total assets; X_3 = Net operating profits /Total assets; X_4 = Market value of capital / Book value of debt; X_5 = Sales / Total assets. Thus, a higher ZSCORE implies a lower probability of insolvency.

Finally, taking into account the previous studies on the determinants of working capital management and the theories described in section 2, we also introduce the variables *cost of external finance* (FCOST) and *profitability* (PRO) as independent variables. We expect firms with a higher cost of external finance to hold a smaller NTC, since the cost of funds invested in it is higher. This cost is also measured by two proxies. The first ($FCOST_1$) is calculated by the ratio financial costs/(total debt - accounts payable). In the second one ($FCOST_2$) we do not eliminate accounts payable of the total debt. On the other hand, the empirical evidence demonstrates that return also negatively affects measures of working capital

management. The ratios earnings before interest and taxes over total asset (PRO_1) and earnings before interest and taxes over sales (PRO_2) are used in our analysis as proxies for this variable.

Thus, Net Trade Cycle can be explained by the following variables:

NTC*= f(internal resources, growth options, leverage, size, fixed assets, probability of financial distress, cost of external finance, profitability)

Firms may be very different from each other and there are other characteristics that might influence their Net Trade Cycle that are difficult to measure or hard to obtain, and which are not in our model. Therefore, we use panel data, because it allows us control for unobservable heterogeneity, making it possible to exclude biases deriving from the existence of individual effects (Hsiao, 1985). Additionally, we can also include time effects to capture the influence of economic factors that may also affect the length of Net Trade Cycle. Finally, it allows us examine a partial adjustment model to confirm whether firms pursue a target Net Trade Cycle.

If there is a target Net Trade Cycle, firms should take the appropriate steps to achieve it. However, adjustment is not immediate because firms have to bear costs of adjustment, so they will adjust their current NTC according to the following expression:

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

where $NTC_{i,t}$ is the Net Trade Cycle in the period t, and $NTC^*_{i,t}$ is the target Net Trade Cycle, which is estimated from the following equation:

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

where $\varepsilon_{i,t}$ is a random disturbance and β_k are the unknown parameters to be estimated.

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

If we substitute equation (2) into equation (1) and we include the unobservable heterogeneity and the time dummy variables, the current NTC is determined by the following expression:

$$\begin{aligned} NTC_{i,t} = {} & \alpha + \rho NTC_{i,t-1} + \delta_1 CFLOW_{i,t} + \delta_2 GROWTH_{i,t} + \delta_3 LEV_{i,t} + \delta_4 SIZE_{i,t} \\ & + \delta_5 FA_{i,t} + \delta_6 ZSCORE_{i,t} + \delta_7 FCOST_{i,t} + \delta_8 PRO_{i,t} + \eta_i + \lambda_t + \upsilon_{i,t} \end{aligned} \qquad (3)$$

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

Parameter η_i captures other characteristics of firms which are not observable but which have a significant impact on the length of the Net Trade Cycle. These change across companies but remain fixed for a given firm through time. The variable λ_t, on the contrary, 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 factors that also may affect the length of this Cycle, but that firms cannot control. Finally, the parameters $\upsilon_{i,t}$ are random disturbances.

We use the instrumental variable estimation method to avoid the problem of endogeneity, which appears to be evident in our analysis, as several studies have shown. For example, the working capital management might affect profitability (Jose et al., 1996; Shin and Soenen, 1998; Deloof, 2003; and Garcia and Martinez, 2007) and firms´ sales (Blinder and Maccini, 1991; Smith, 1987; Emery, 1987; Deloof and Jegers, 1996; Petersen and Rajan, 1997; and Ng et al., 1999). If we do not control for endogeneity, it might seriously affect the estimation results. Arellano and Bond (1991) proposed the application of the General Method of Moment (GMM) to the equation in first differences. We use two-step GMM estimator because, although the estimator of instrumental variables in one stage is always consistent, if the disturbances show heteroskedasticity, the estimation in two stages increases efficiency.

3.2. Data

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

Our data consists of non-financial Spanish firms listed on the Spain Stock Exchange for the period 1997-2004. We have selected firms whose information is available for at least five consecutive years between 1997 and 2004. From this, we obtained a panel comprising 502 observations corresponding to 60 firms.

Table 1
Summary of Statistics

	Mean	Std. Dev	Min	Median	Max
NTC	115.19	96.506	-29.73	91.46	590.91
CFLOW	0.1687	0.1279	-0.053	0.1303	0.7371
$GROWTH_1$	1.3836	0.7360	0.5758	1.1650	5.5831
$GROWTH_2$	2.074	2.2875	0.1546	1.4696	2.0257
LEV	0.5833	0.1619	0.078	0.5986	0.9521
ASSETS	4,276,179	11,700,000	14,882	403,551	91,800,000
SALES	2,447,147	6,076,944	3,471	362,130.5	44,000,000
AF	0.5059	0.2172	0.0711	0.4967	0.9872
ZSCORE	0.3035	0.1575	0.0179	0.2899	0.7285
$FCOST_1$	0.0593	0.0411	0.0048	0.050	0.3772
$FCOST_2$	0.0411	0.02767	0.0025	0.0363	0.2206
PRO_1	0.0706	0.0509	-0.1222	0.0633	0.3181
PRO_2	0.1094	0.1070	-0.1443	0.0861	0.6975
GDP	0.0382	0.0079	0.024	0.036	0.05

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

Table 1 summarizes the descriptive statistics of our sample. If we observe the mean values, we can see that the mean Net Trade Cycle in our sample is 115.19 days. These firms have had positive growth perspectives during the selected research period and an investment in fixed assets over the total assets of 51.6%. They generate a cash flow of 16.9% over sales and present 58.3% of debt over total assets. Their profitability over assets and sales are 7% and 10.9%, respectively.

4. Results

Table 2 shows the results from regressing Net Trade Cycle on the different variables explained above. To confirm the robustness of our results we present the estimation of equation (3) using alternative proxies for some independent variables. In addition, in column (6) we estimate the model including the Gross Domestic Product growth and eliminating the time dummies to avoid the multicollinearity problem, since these dummies should capture that information. The m_2 statistic and Hansen test also are presented. The m_2 statistic indicates there is no second-order serial correlation, and Hansen Test shows the absence of correlation between instruments and error term. We also present the Variance Inflation Factor (VIF) for each independent variable. Our VIF tests are lower than 5, so there is no multicollinarity problem in our sample (Studenmund, 1997). In all estimations we control for industry effects.

Table 2
Determinants of Net Trade Cycle

	(1)	(2)	(3)	(4)	(5)	(6)	VIF
NTC_{it-1}	0.3705***	0.3794***	0.3510***	0.4173***	0.4050***	0.4003***	1.58
	(26.95)	(26.33)	(29.22)	(34.07)	(33.40)	(42.20)	
CFLOW	237.44***	181.31***	175.26***	206.61***	332.85***	207.81***	2.86
	(4.82)	(3.04)	(3.29)	(3.25)	(2.99)	(5.03)	
$GROWTH_1$	-12.7981***	-	-15.4135***	-12.0809***	-20.99***	-16.7198***	1.23
	(-3.75)		(-5.58)	(-2.83)	(-5.64)	(-5.76)	
$GROWTH_2$	-	-4.6588***	-	-	-	-	
		(-2.77)					
LEV	2.1479	27.9474	9.1483	34.7871	46.4511	9.1026	2.12
	(0.07)	(0.80)	(0.25)	(1.03)	(1.30)	(0.47)	
$SIZE_1$	-8.7338***	-10.1825***	-	-7.7511***	-10.5788***	-8.9595***	2.29
	(-3.00)	(-2.59)		(-3.00)	(-3.81)	(-4.96)	
$SIZE_2$	-	-	-13.5618***	-	-	-	-
			(-4.83)				
AF	-101.90***	-93.845***	-77.041***	-51.963*	-73.2563***	-96.6829***	3.24
	(-4.25)	(-3.34)	(-2.99)	(-1.78)	(-3.00)	(-5.31)	
ZSCORE	184.28***	207.09***	181.01***	150.06***	110.17***	127.6166***	2.80
	(6.44)	(6.80)	(6.01)	(4.85)	(4.25)	(8.02)	
$FCOST_1$	-345.13***	-354.43***	-322.34***	-	-317.89***	-272.628***	1.07
	(-5.91)	(-5.31)	(-6.52)		(-5.21)	(-9.47)	
$FCOST_2$	-	-	-	-270.48***	-	-	
				(-3.60)			
PRO_1	-362.98***	-354.04***	-263.50**	-226.87**	-	-287.14***	2.21
	(-4.15)	(-3.61)	(-2.53)	(-2.59)		(-3.89)	
PRO_2	-	-	-		-249.05**	-	
					(-2.30)		
GDP	-	-	-	-	-	438.66***	
						(4.58)	
m_2	-0.58	-0.52	-0.59	-0.49	-0.51	-0.51	
Hansen Test	36.15 (221)	42 (221)	41.08 (221)	38.47 (221)	40.24 (221)	43.75 (223)	
Observations	442	442	442	442	442	442	442

Notes: NTC represents the Net Trade Cycle; CFLOW the cash flows generated by the firm; $GROWTH_1$ and $GROWTH_2$ the growth opportunities; LEV the leverage; $SIZE_1$ and $SIZE_2$ the size; AF the investment in fixed assets; ZSCORE the probability of financial distress; $FCOST_1$ and $FCOST_2$ the cost of external finance; PRO_1 and PRO_2 the profitability; and GDP the Gross Domestic Product growth.
Z statistic in brackets.
* Indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1%. level
m_2 is a serial correlation test of second-order using residuals of first differences, asymptotically distributed as N(0,1) under null hypothesis of no serial correlation. Hansen test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments as Chi-squared. Degrees of freedom in brackets.
VIF represents the Variance Inflation Factor for each independent variable.

The results show that the coefficient of the lagged Net Trade Cycle is positive and significant at the 1% level in all the estimations made. Hence, our hypothesis on the dynamic nature of working capital management is not rejected and we contribute to the existing literature on working capital management, finding that companies have a target Net Trade Cycle and follow an adjustment process to reach this target. In addition, this coefficient is roughly 0.4 in all the estimations made, indicating a relatively quick

speed of adjustment $(\gamma = 0.6)$ which appears to support the idea that the costs of being away from target cycles are significant for our sample and that a good working capital management might be very important for them.

The adjustment process is a trade-off between the adjustment costs towards a target cycle and the costs of being in disequilibrium. Our findings indicate that the costs of being in disequilibrium are greater than the adjustment costs. One possible reason might be the importance of bank credit for Spanish companies. The financial system of the European Union is classified as a bank-based system, except for the UK where capital markets are well developed (Schmidt and Tyrell, 1997). Thus, Spain has a banking oriented financial system with an important role played by the banks.

As we expected, we find that firms have a larger Net Trade Cycle when they are capable of generating more internal funds, so supporting the argument of Fazzari and Petersen (1993) that the investment in working capital might be constrained by a shortage of internal funds. In addition, we obtain that this variable has the largest economic impact on the dependent variable. Thus, we obtain that an increase of one standard deviation in the variable internal funds increases the NTC by 41.8% (over the mean).

Unlike the empirical evidence, and as we also expected, our results show that the coefficient of growth perspectives is significant and negative. Hence, we obtain that companies with larger growth perspectives have a shorter Net Trade Cycle, supporting the idea that these firms tend to use more trade credit as a source of finance for their growth (Petersen and Rajan, 1997; and Cuñat, 2007), while companies with sales declines tend to extend more credit to their customers so as to increase their sales (Emery, 1987; and Petersen and Rajan, 1997). Moreover, the economic significance of the influence of this variable on the Net Trade Cycle shows that, all other things being equal, an increase in the growth options of one standard deviation produces a reduction in the NTC of 13%.

With regard to the effects of leverage on Net trade Cycle, none of the coefficients estimated for this variable are significant. Consequently, we cannot provide any empirical support for the argument that firms that are capable of obtaining more external financing have a longer Net Trade Cycle. Similarly, we cannot provide any empirical support for the Chiou et al. (2006) argument that debt ratio negatively affects the measures of working capital management. These authors suggest that their results are due to the fact that according to the pecking order theory firms only raise their debt ratio when their internal capital is depleted, so they tend to have a more efficient working capital management in this situation.

The coefficient of the variable size is negative and significant in all estimations at the 1% level, which demonstrates that larger firms have a shorter Net Trade Cycle, even though they should have fewer difficulties in obtaining funding and less financial constraints. This result might be interpreted as meaning that these firms have a larger bargaining power with suppliers and customers, so they have a more efficient working capital management. Although smaller firms have less access to capital markets they have to extend more credit to guarantee their products, given their lower reputations (Long et al., 1993; Lee and Stowe, 1993; and Pike et al., 2005), while they are offered less trade credit (Niskanen and Niskanen, 2006). In addition, the economic impact of this variable is relevant, since if it decreases by one standard deviation the dependent variable increases over its mean by 23.19%.

We also observe, as in other studies, that the investment in fixed assets has a negative effect on the Net Trade Cycle, despite the fact that firms with a higher fixed investment also have a better access to capital

market. This result appears to support the argument developed by Fazzari and Petersen (1993) that the working capital competes with the investment in fixed assets for the funds of the firms when they have financial constraints. With regard to the economic effect on the dependent variable, an increase of one standard deviation in the variable fixed assets reduces the Net Trade cycle by 30.5%.

As we expected, we find that firms with a higher probability of insolvency have a shorter NTC, since the ZSCORE sign is positive and significant at the 1% level in all the estimations carried out. The agency conflicts are more pronounced for these firms, so they have more difficulties in obtaining capital. So, they tend to have larger accounts payable (Niskasen and Niskasen, 2006), because suppliers tend to lend to them when banks do not (Cuñat, 2007). In addition, this also could be interpreted as meaning that firms with a large probability of insolvency tend to extend less credit to their customers and might have a lower investment in inventories. This variable has the second most important economic impact (around 40%).

The coefficient of the variable that measures the cost of external capital is also negative and significant, which demonstrates that the Net Trade Cycle also depends on the cost of financing, as we suggested above. In fact, our results indicate that an increase of one standard deviation in the cost of external finance reduces NTC by 19.6%.

Our results show, as the empirical evidence, that firms with a higher profitability have a shorter Net Trade Cycle. It is known that these firms can obtain funds more easily, but that, like larger firms, they also have greater bargaining power with suppliers and customers (Shin and Soenen, 1998). Hence, this result appears to support the idea that these firms tend to receive significantly more credit from their suppliers (Petersen and Rajan, 1997) and hold lower finished goods inventories (Blazenco and Vandezande, 2003), while firms facing profitability problems tend to increase trade credit receivable prior to entering financial distress (Molina and Preve, 2006). There is also a relevant economic impact since an increase in one standard deviation in this variable involves a reduction in the Net Trade Cycle of 25.5%.

Finally, in column 6 we include the Gross Domestic Product growth, since this variable could affect the individual components of the Net Trade Cycle, such as accounts receivable (Smith, 1987; and Walker, 1991), inventories (Blinder and Maccini, 1991; Carpenter et al., 1994; and Kashyap et al., 1994), and accounts payable (Nilsen, 2002). Our results show that the Gross Domestic Product growth positively influences the length of the Net Trade Cycle, which demonstrates that when economic growth is higher companies have a longer Net Trade Cycle. However, we should mention that at only 4.9% this variable has the smallest economic impact.

5. Conclusions

This paper extends empirical evidence on the working capital management in several important dimensions, including the treatment of unobservable heterogeneity and endogeneity problems. Unlike previous studies, we assume that firms have an optimal working capital level and we examine the determinants of current WCM in the presence of adjustment costs. Net Trade Cycle is used as a measure of working capital management. The proposed model is corroborated using a sample of non-financial Spanish companies over the period 1997-2004. Our findings are consistent with the view that firms adjust their current Net Trade Cycle to the target NTC gradually over time due to the presence of adjustment costs.

The results also suggest that the Net Trade Cycle depends on the firm´s bargaining power with its suppliers and customers as well as on financial factors such as the availability of internal finance, cost of financing and financial constraints. Our results indicate that companies that are capable of generating more internal funds have a longer cycle, which is consistent with the argument of Fazzari and Petersen (1993) that the investment in working capital might be constrained by a shortage of internal funds. On the contrary, this cycle is shorter for firms with greater profitability and larger firms, which appears to provide support to the argument that companies with a greater bargaining power hold a more aggessive working capital policy. Investment in fixed assets negatively influences the length of this cycle, so the argument of Fazzari and Petersen (1993) that the working capital competes with the investment in fixed assets for the funds of the firms when they have financial constraints is also consistent with these results. Our findings also show that growth opportunities, probability of financial distress, and cost of external financing negatively affect Net Trade Cycle. Unlike earlier studies, our results suggest that Net Trade Cycle does not depend on the leverage. Finally, we obtain that when economic growth is higher, companies have a longer Cycle.

Further research focused on similar studies in countries with different institutional characteristics and financial system would seem to be appropriate, since the speed of adjustment and the effect of explanatory variables on NTC might be different. Such research could focus on the analysis of the stability of the speed of adjustment when a longer time period is available.

6. References

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