THE IMPACT OF WORKING CAPITAL MANAGEMENT UPON COMPANIES' PROFITABILITY: EVIDENCE FROM EUROPEAN COMPANIES

JOANA FILIPA LOURENÇO GARCIA
FRANCISCO VITORINO DA SILVA MARTINS
ELÍSIO FERNANDO MOREIRA BRANDÃO

FACULDADE DE ECONOMIA, UNIVERSIDADE DO PORTO

U.PORTO

FEP FACULDADE DE ECONOMIA
UNIVERSIDADE DO PORTO

The Impact of Working Capital Management upon Companies'
Profitability: Evidence from European Companies

Joana Filipa Lourenço Garcia

Faculdade de Economia da Universidade do Porto

Phone: + 351 225 571 100

Fax: +351 225 505 050

Adress: Rua Dr. Roberto Frias

4200-464 Porto Portugal

Email: 090587030@fep.up.pt

Professor Doutor Francisco Vitorino Martins

Faculdade de Economia da Universidade do Porto

Professor Doutor Elísio Brandão

Faculdade de Economia da Universidade do Porto

2011

The Impact of Working Capital Management upon Companies' Profitability: Evidence from European Companies

Abstract

Companies can use working capital management as an approach to influence their profitability. This paper studies the impact of working capital management and its components upon the profitability of European companies. Cash Conversion Cycle is used as a comprehensive measure for working capital management and Gross Operating Profitability used as a measure for profitability. This study is based on a sample of 2,974 non - financial companies listed in 11 European Stock Exchanges for a period of 12 years: 1998 - 2009. The results of GLS and OLS regression analysis found a significant negative relationship between Receivables Collection Period, Inventory Conversion Period, Payables Deferral Period, Cash Conversion Cycle and profitability. This suggests that companies can improve their profitability by reducing the time span during which working capital is tied up within the company.

An inverse relationship between liquidity measured by Current Ratio and profitability was also found and an additional analysis revealed that different levels of liquidity lead to differentiated impacts of the Cash Conversion Cycle upon operating profitability.

Keywords: Working Capital Management, Corporate Profitability, Cash Conversion Cycle, European Countries

1 Introduction

Studies on corporate finance generally focus on main decisions like capital structure, dividend and capital budgeting. These issues imply the study of long term financial decisions and have been receiving greater attention from researchers. Working capital is also an important component in companies' financial decision making. However, it involves investment and financing in short term periods. Because of that working capital has been seen as secondary in financial literature compared to long term financing decisions.

Many studies try to show that optimal working capital management contributes in a positive way to the creation of value. Thus, we should not overlook an appropriate investment on working capital in financial decision making.

Financial objectives, such as sales and profit, are still a primary purpose for companies. In other words, increasing their market value is the main goal. Working capital management is a very important component of corporate finance because it directly affects companies' liquidity and profitability (Deloof, 2003; Eljelly, 2004; Raheman and Nasr, 2007). Therefore, efficient management of working capital is a fundamental part of the overall corporate strategy to create shareholder value. In general, companies try to keep an optimal level of working capital that maximizes their value (Deloof, 2003; Afza & Nazir, 2007).

In this paper, following the line of research of Raheman and Nasr (2007), we study the effects of working capital management upon the corporate performance of European companies. Previous research analyzed those effects within the context of a particular country. This paper´s contribution is to test the mentioned relationship at a broader level – by using a set of European companies.

To the best of our knowledge, we are not aware of any paper that examines the efficiency of working capital management of a set of European companies as a whole. Thus, our analysis is based on a sample of 2,974 non-financial companies from 11 European countries for a period of 12 years: 1998 – 2009. We estimate our regressions using the Generalized Least Squares (cross section weights) and Pooled Ordinary Least

Squares models. Our results are robust and find that working capital management significantly affects operating profitability of European companies.

We also analyze whether the different components of working capital management have a significant impact upon companies' profitability and how does that impact occur. Thus, this study helps examine the efficiency of European companies in managing their receivables, inventory and payables and so it contributes to companies' financial management policies as well as to the financial literature on this theme.

The analysis was also carried out by country during the period already mentioned.

Furthermore, we study the relationship between liquidity and profitability of the European companies as well as the interference that different levels of liquidity can have upon working capital management and its relationship with profitability.

Working capital management and its implications are addressed before we proceed to the next section.

Working capital management involves the decision on the amount and composition of current assets and how to finance such assets. Current assets include all those assets that in the normal course of business return to the form of cash within a short period of time, ordinarily within a year, and such temporary investment as may be readily converted into cash upon need (Raheman and Nasr, 2007).

Efficient working capital management involves planning and controlling current assets and current liabilities to prevent the risk of a company's inability to meet due short term obligations on the one hand, and to avoid excessive investment in these assets on the other hand (Eljelly, 2004). Many surveys have indicated that managers spend considerable time on day-to-day problems that involve working capital decisions (Raheman and Nasr, 2007). One reason for this is that current assets are short-lived investments that are continually being converted into other types (RAO, 1989). With regard to current liabilities, the company is responsible for paying these obligations on a timely basis. Taken together, decisions on the level of different working capital components become frequent, repetitive, and time consuming (Raheman and Nasr, 2007).

The way how working capital is managed can have a significant impact upon both the liquidity and profitability of the company (Shin and Soenen, 1998; Dong and Su, 2010). The ultimate goal of any company is to maximize profits. But, preserving its liquidity is also an important objective (Shin and Soenen, 1998; Raheman and Nasr, 2007). It is not a simple task for managers to make sure that in managing working capital, liquidity is maintained in day-to-day operations and that, simultaneously, business operations run efficiently and in a profitable manner (Zariyawati et al., 2009). Some decisions that tend to maximize profitability tend to minimize the chances of appropriate liquidity. Conversely, focusing almost entirely on liquidity will tend to reduce company's potential profitability (Mathuva, 2010). The dilemma in working capital management is to achieve the desired balance between liquidity and profitability. One of the objectives should not be achieved at the cost of the other because both have their importance. Hence, working capital management should be given proper consideration and will ultimately influence the company's profitability (Raheman and Nasr, 2007; Dong and Su, 2010).

Working capital has been regarded as the result of the time lag between the expenditure for purchasing raw materials and the collection from the sale of the finished good (Dong and Su, 2010). Thus, the Cash Conversion Cycle is a powerful measure for assessing how well a company is managing its working capital. The longer this time lag, the larger the investment in working capital (Deloof, 2003). Shorter cash conversion cycle could be associated to high profitability because the longer the cash conversion cycle the greater the need for expensive external financing. Therefore, by reducing the period that cash is tied up in working capital, companies can operate more efficiently (Nobanee and AlHajjar, 2009a).

Cash conversion cycle can be shortened by reducing the inventory conversion period via processing and selling goods more quickly; or by decreasing the receivables collection period via speeding up collections; or by lengthening the payables deferral period through slowing down payments to suppliers (Nobanee, 2009). This increases companies' efficiency of internal operations and results on higher profitability and higher market value.

Delaying payments to suppliers allows companies to assess the quality of the products that were bought, and can be an inexpensive and flexible source of financing. But we should bear in mind that late payment can have a very high implicit cost whenever early payment discounts are available. Since, money is also locked up in working capital, the greater the investment in current assets, the lower the risk but also the lower the profitability obtained (Falope and Ajilore, 2009).

From another point of view, longer cash conversion cycle might increase profitability. It can happen because large inventories and a generous trade credit policy may lead to high sales. Larger inventories decrease stock-out risks. Trade credit may stimulate sales because it allows customers to assess product quality before paying (Long, Maltiz and Ravid, 1993; and Deloof and Jegers, 1996). However, corporate profitability might also decrease with cash conversion cycle, if costs with higher investments in working capital are higher and rise faster than the benefits of holding more inventories and granting more inventories and trade credit to customers (Deloof, 2003). Moreover, shortening the cash conversion cycle could harm the companies´ profitability; reducing the inventory conversion period could increase the shortage cost; reducing the receivables collection period could make the companies lose their good credit customers; and lengthening the payable period could damage the companies' credit reputation. Shorter cash conversion cycle is associated with high opportunity costs, and longer cash conversion cycle is associated with high carrying costs (Nobanee, 2009).

An optimal level of working capital would be that in which a balance between risk and efficiency is attained, and both carrying costs and opportunity costs are minimized. It requires continuous monitoring to maintain the proper level of the various components of working capital, i.e., cash receivables, inventory and payables, etc.

The reminder of this paper proceeds as follows. The next section presents the literature review. Section three deals with methodology, data, hypotheses and variables issues. Then section four presents the empirical results. Finally the last section discusses and concludes the findings of this study.

2 Literature Review

The effects of working capital management upon corporate performance have been the focus of a substantial amount of theoretical and empirical research for many years and in different environments. Traditional approach to the interaction between cash conversion cycle and profitability posits that relatively long cash conversion periods tend to decrease profitability (Samiloglu and Demirgunes, 2008). It means that reducing working capital investment would positively influence the companies' profitability by reducing the proportion of current assets in total assets. Most studies in this area show that companies can improve their profitability by shortening the cash conversion cycle because they found a strong negative relationship between these two variables. Various results were obtained when it comes to the relationship between different components of the Cash Conversion Cycle and corporate profitability.

Shin and Soenen (1998) are an example of such studies. By using a COMPUSTAT sample of 58,985 US company years covering the period 1975-1994, they found a strong negative relationship between the length of the company's net-trade cycle, used to measure efficiency of working capital management, and its profitability. In addition, shorter net trade cycles were associated with higher risk adjusted stock returns. Based on their findings, they suggest that one possible way to create shareholder value is to reduce company's Net-Trade Cycle.

Deloof (2003) discussed that most companies had a large amount of cash invested in working capital. It can therefore be expected that the way in which working capital is managed will have a significant impact upon those company's profitability. Using a sample of 1,009 large Belgian non-financial companies during the period 1992-1996, with correlation and regression tests, he found a significant negative relationship between gross operating income and the number of days of accounts receivable, inventories and accounts payable of Belgian companies. On the basis of these results, he suggested that managers could create value for their shareholders by reducing the number of days of receivables and inventories accounts to a reasonable minimum. The negative relationship between accounts payable and profitability is consistent with the view that less profitable companies wait longer to pay their bills.

Lazaridis and Tryfonidis (2006) studied the relationship between working capital management and corporate profitability of listed companies in the Athens Stock Exchange. They used a sample of 131 listed companies for the period 2001-2004. The results from the regression analysis suggest that there is a statistical significant relationship between profitability, measured through Gross Operating Profit, and the Cash Conversion Cycle. From those results, these authors claim that managers could create value for shareholders by handling correctly the cash conversion cycle and by keeping each different component to an optimum level.

In the Pakistan context, Raheman and Nasr (2007) selected a sample of 94 Pakistani companies listed on the Karachi Stock Exchange for a period of 6 years from 1999-2004 to study the effects of different variables of working capital management including Average Collection Period; Inventory Turnover in Days; Average Payment Period; and the Cash Conversion Cycle upon Net Operating Profitability. The results of this study showed that there was a strong negative relationship between the above mentioned variables of working capital management and companies' profitability. Besides, they also showed a positive relationship between the size of the company, measured by natural logarithm of sales, and profitability. A similar study by Falope and Ajilore (2009) found similar results upon a sample of 50 Nigerian quoted non-financial companies for the period 1996-2005. Furthermore, they found no significant variations in the effects of working capital management between large and small companies.

Zariyawati et al. (2009) also examined the relationship between working capital management and corporate profitability. Cash Conversion Cycle was used as a measured for working capital management and the study was based on panel data for 1,628 company-years for the period 1996-2006 from six different economic sectors listed in Bursa Malaysia. The coefficient results of Pooled OLS regression analysis provided a strong negative significant relationship between Cash Conversion Cycle and corporate profitability. This reveals that reducing cash conversion period results in increased profitability. Thus, company managers should work on shortening cash conversion cycle till optimal level is achieved.

Nobanee and AlHajjar (2009b) analyzed a sample of 2,123 Japanese non-financial companies listed in the Tokyo Stock Exchange for the period 1990-2004 and concluded

that company managers can increase profitability by shortening the cash conversion cycle, the receivables collection period and the inventory conversion period. The results also suggested that extending the payables deferral period could increase profitability. However, managers should be careful because extending the payables deferral period could damage the company's credit reputation and harm its profitability in the long run.

Mathuva (2010) studied the influence of working capital management components upon corporate profitability by using a sample of 30 companies listed on the Nairobi Stock Exchange (NSE) from 1993 to 2008. He used Pearson and Spearman's correlations, the Pooled Ordinary Least Square (OLS), and the fixed effects regression models to conduct data analysis. The findings of his study were that there is a highly significant negative relationship between accounts collection period and profitability. In regard to the relationship between profitability and the inventory conversion period or the average payment period, the results were positive and significant.

Gill et al. (2010) also studied the interaction between working capital management and profitability. A sample of 88 American companies listed on New York Stock Exchange for a period of 3 years from 2005 to 2007 was selected. They also found a significant relationship between those variables.

In summary, all the above studies tend to indicate that working capital management has an impact upon corporate profitability. The present paper also studies the relationship between working capital management and its effects upon profitability but for a range of different European countries and environments.

3   Methodology

This section presents the data and the hypotheses underlying the present study, as well as the variables and model specifications used.

3.1 Data and Sample

The sample is based on data obtained from the DataStream database which consists of financial statements from listed companies in various Europeans Stock Exchanges. For each year listed companies were selected from 11 European Stock Exchanges. Namely from the following: Euronext Amsterdam, Euronext Paris, Euronext Lisbon, Madrid Stock Exchange (MAD), Euronext Brussels, Frankfurt Stock Exchange, Athens Stock Exchange; London Stock Exchange; Warsaw Stock Exchange (GPW); Helsinki Stock Exchange and Milan Stock Exchange.

The selected companies belong to different economic sectors. Those belonging to the financial and securities sectors were excluded because their financial features and investment in working capital are substantially different from non-financial companies. Some companies with missing data were also removed from the sample.

Then, the different accounting variables needed for the study were extracted, by year and by company. The data set included yearly data on sales; cost of goods sold; accounts receivable; accounts payable; inventories; current assets; total assets; financial assets; current liabilities, and total debt. Some of these data were used to calculate the Receivables Collection Period, the Inventory Conversion Period, the Payables Deferral Period and the Cash Conversion Cycle.

Observations with illogical values, for instance, negative or nil values of sales, cost of goods sold, accounts receivable, accounts payable and inventories, were also excluded from the sample.

The following table presents the variables extracted from DataStream and the corresponding codes.

Table 1: DataStream Codes

Variables	DataStream Codes
Accounts Payable	WC03040
Accounts Receivable	WC02051
Cost of Goods Sold	WC01051
Current Assets	WC02201
Current Liabilities	WC03101
Inventories	WC02101
Sales	WC01001
Total Assets	WC02999
Total Debt	WC03255
Financial Assets	WC02250 + WC02256

Furthermore, some outlying values were eliminated. The elimination process applied consisted on the standardization of some variables by subtracting the respective mean and dividing by the respective standard deviation. Receivables Collection Period, Inventory Conversion Period, Payables Deferral Period and Cash Conversion Cycle were the standardized variables. Those variables which values were greater than 3.290527 were removed. The process was repeated once.

The values are in Euros for all years and countries with the exception of England and Poland. The values of these countries were converted into Euros by using their annual average exchange rates published by the European Central Bank.

A panel data set of 2,974 companies was used, resulting in a final sample of 22,381 company-year observations. The final sample includes companies from 32 different economic sectors.

3.2 Hypotheses

Once the aim of this study is to understand the relationship between working capital management and companies' operating profitability, the following hypothesis was assumed.

H01 (Null Hypothesis): There is no relationship between working capital management and operating profitability for European companies

Additionally the intention is to also analyze the relationship between companies' liquidity and profitability. Thus, the second hypothesis is as follows:

H02 (Null Hypothesis): There is no relationship between liquidity and operating profitability for European companies

3.3 Variables

The choice of variables was primarily guided by previous empirical studies, namely Raheman and Nasr (2007), and by the availability of data.

The table below summarizes all the variables that were used in this, along with their abbreviations and formulas.

Table 2: Formulas of Variables and Abbreviations

Variable	Abbreviation	Formula
Gross Operating Profitability	GOP	(Sales - Cost of Goods Sold) / (Total Assets - Financial Assets)
Receivables Collection Period	RCP	(Accounts receivable / Sales)*365
Inventory Conversion Period	ICP	(Inventories / Cost of Goods sold)*365
Payables Deferral Period	PDP	(Accounts payable / Cost of Goods sold)*365
Cash Conversion Cycle	CCC	RCP + ICP – PDP
Size of Companies	LnS	Natural Logarithm of Sales
Debt Ratio	DR	Total Debt / Total Assets
Current Ratio	CR	Current assets / Current liabilities
Financial Assets to Total Assets Ratio	FAR	Financial Assets / Total Assets

Gross Operating Profitability as measure of company profitability was used as dependent variable. It is defined as sales minus the cost of goods sold, and divided by total assets minus financial assets. Using this dependent variable instead of earnings before interest taxes depreciation and amortization (EBITDA), or profits before or after taxes is motivated by the fact that the intention is to associate operating "success" or "failure" with an operating ratio and relate this variable with other operating variables (e.g., Cash Conversion Cycle). Moreover, the intention is to exclude the participation of

any financial activity from operational activity that might affect overall profitability, thus financial assets are subtracted from total assets (Lazirdis and Tryfonidis, 2006).

With regards to independent variables, working capital management was measured by using the Receivables Collection Period corresponding to the number of days of accounts receivable; the Inventory Conversion Cycle corresponding to the number of days taken to convert inventories into sales; the Payables Deferral Period corresponding to the number of days of accounts payable, and the Cash Conversion Cycle.

Accounts receivable are customers who have not yet made their payment for goods or services, which company has already provided. The goal of debtor management is to minimize the time it takes to collect cash from customers. In this respect, the Receivables Collection Period, used as a proxy for the collection policy, is calculated as (Accounts receivable/Sales)*365.

Inventories are lists of stocks of raw materials, plus work in progress or finished goods waiting to be consumed in production or to be sold. The Inventory Conversion Period reflects the average number of days of stock held by a firm. It was used as a proxy for the inventory policy, and is calculated as (Inventories/Cost of goods sold)*365. Longer storage times represent a greater investment in inventories for a particular level of operations.

Accounts Payable are suppliers whose invoices for goods or services have been processed but who have not yet been paid. The Payables Deferral Period, used as a proxy for the payment policy, reflects the average time it takes companies to pay their suppliers. It is calculated as (Accounts payable/Cost of goods sold)*365.

The Cash Conversion Cycle is a proxy for working capital management efficiency. The Cash Conversion Cycle is calculated by subtracting the Payables Deferral Period the sum of the Inventory Conversion Period and the Receivables Collection Period. It has been interpreted as a time interval between the cash outlays that arise during the production of output and the cash inflows that result from the sale of the output and the collection of the accounts receivable.

Other variables theoretically postulated as to influence companies' profitability performance were also considered as control variables in the model. These include Size of Companies; Debt ratio used as a proxy for Leverage and is calculated by dividing Total Debt by Total Assets; and ratio of financial assets to total assets. Current ratio, which is calculated by current assets over current liabilities, was also included as a control variable and it reflects a traditional measure of liquidity.

3.4 Model Specifications

The impact of working capital management upon corporate profitability was tested by panel data methodology. The panel data methodology used has certain benefits like using the assumption that companies are heterogeneous, more variability, less colinearity between variables, more informative data, greater degree of freedom and more efficiency (Baltagi, 2001). In panel data regression, several cross-sectional units are observed over a period of time. This method is more useful in studying the dynamics of adjustment, and is better able to identify and measure effects that are simply not detectable in pure cross-sections or pure time-series data (Raheman & Nasr, 2007). Thus we can get more reliable estimates.

Consistent with previous studies, the impact of working capital management upon corporate profitability was modelled using the following regression equations:

$$GOP = \beta_0 + \beta_1(RCP_{it}) + \beta_2(CR_{it}) + \beta_3(DR_{it}) + \beta_4(LnS_{it}) + \beta_5(FAR_{it}) + \varepsilon \qquad \text{(I)}$$

$$GOP = \beta_0 + \beta_1(ICP_{it}) + \beta_2(CR_{it}) + \beta_3(DR_{it}) + \beta_4(LnS_{it}) + \beta_5(FAR_{it}) + \varepsilon \qquad \text{(II)}$$

$$GOP = \beta_0 + \beta_1(PDP_{it}) + \beta_2(CR_{it}) + \beta_3(DR_{it}) + \beta_4(LnS_{it}) + \beta_5(FAR_{it}) + \varepsilon \qquad \text{(III)}$$

$$GOP = \beta_0 + \beta_1(CCC_{it}) + \beta_2(CR_{it}) + \beta_3(DR_{it}) + \beta_4(LnS_{it}) + \beta_5(FAR_{it}) + \varepsilon \qquad \text{(IV)}$$

Where the subscript i refer to companies, t represents years, and ε is the error term. The variables are defined as described in table 2.

The equations specified above were estimated with Generalized Least Squares (cross section weights) and Pooled Ordinary Least Squares models. Both models were also run with sector, country and year dummies. The results of the fixed effects estimations are reported in addition. The E-views software was used to carry out the analysis.

Before running the regressions, descriptive statistics and correlation analysis were calculated. Correlation analysis shows the relationships between the different variables considered in the study. However, one must be careful when interpreting the correlation matrix because it presents simple bivariate correlations not taking into account other variables that may influence the results. Besides it doesn't allow identifying causes from consequences.

4   Empirical Results

The results from this study are presented in this section. Firstly the descriptive analysis is presented, followed by the Correlation analysis.

4.1 Descriptive Statistics

Table 3 presents the descriptive statistics of different variables considered in this research.

Table 3: Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
GOP	0.446074	0.304911	32.30418	-7.367600	0.616256	22381
RCP	95.51219	74.03830	2155.829	0.000000	83.60763	22381
ICP	81.34447	62.17033	713.4479	0.000000	89.35465	22381
PDP	75.79962	55.57951	673.7002	0.000000	73.88398	22381
CCC	101.0570	82.50170	2129.445	-596.6169	127.09921	22381
CR	1.936910	1.443687	173.7317	0.000000	2.879418	22381
DR	0.219687	0.198536	8.453125	0.000000	0.203582	22381
LnS	12.16316	12.00690	19.56011	1.609438	2.265329	22381
FAR	0.032571	0.007662	0.949376	-0.163853	0.072010	22381

The total number of observations is 22,381. Looking at table 3, we can see that Gross Operating Profitability is on average 45% of (Total Assets – Financial Assets). The Receivables Collection Period averages 96 days. The minimum amount of time taken by companies to collect cash from customers is 0 days while the maximum time is 2,156 days. On average, it takes 81 days to sell inventory, with a standard deviation of 89. On average, companies wait 76 days to pay their purchases. Here, the maximum time taken by companies is 674 days, and minimum time is 0 days. On average, the companies in this sample have a 101 days Cash Conversion Cycle. The median is 83 days.

Natural Logarithm of sales; Debt Ratio; Current Ratio and Financial Assets to Total Assets were used as control variables. Current Ratio, a traditional measure of liquidity, is on average 1.94, with a standard deviation of 2.88. The mean of Debt Ratio, which is used to verify the relationship between debt financing and profitability, is 0.22, with a standard deviation of 0.20. The maximum debt financing used by a company is 8.45, which is uncommon but if we consider the hypothesis that companies can have negative equity, it may be possible. The natural logarithm of sales measures the size of the

company and allows checking its relationship with profitability. The mean of this variable is 12.16 and the standard deviation is 2.27. Lastly, information from descriptive statistics shows that the mean value of financial assets to total assets ratio is 0.032, with a standard deviation of 0.072. The share of financial assets in total assets records a maximum of 95% and a minimum of -16%.

It should be noted that the sample includes a diversity of countries and sectors, with their own characteristics, which influences results.

4.2 Correlation Analysis

Table 4 shows correlation coefficients of the dependent and independent variables. The purpose of this analysis, as already mentioned, is to find out the relationship between the different variables under consideration.

Table 4: Correlation Analysis

Correlation Profitability	GOP	RCP	ICP	PDP	CCC	CR	DR	LnS	FAR
GOP	1.00000								

RCP	-0.38721	1.000000							
	(0.0000)	---							
ICP	-0.06086	0.115784	1.00000						
	(0.0000)	(0.0000)	---						
PDP	-0.02627	0.250459	0.22075	1.000000					
	(0.0001)	(0.0000)	(0.000)	---					
CCC	-0.28223	0.593620	0.65086	-0.26135	1.000000				
	(0.0000)	(0.0000)	(0.000)	(0.0000)	---				
CR	-0.04998	0.054463	0.08638	-0.022357	0.109556	1.000000			
	(0.0000)	(0.0000)	(0.000)	(0.0008)	(0.0000)	---			
DR	-0.05099	0.001704	0.06234	0.052565	0.014397	-0.20294	1.00000		
	(0.0000)	(0.7988)	(0.000)	(0.0000)	(0.0313)	(0.0000)	---		
LnS	0.04099	-0.231067	-0.0303	-0.12064	-0.10321	-0.21357	0.16876	1.00000	
	(0.0000)	(0.0000)	(0.000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	---	
FAR	-0.06670	0.050007	-0.0213	0.022323	0.004908	-0.02652	0.06980	0.1010	1.000
	(0.0000)	(0.0000)	(0.001)	(0.0008)	(0.4628)	(0.0001)	(0.000)	(0.000)	---

The p-values are between parentheses.

Observing the frame, we can say that GOP is negatively related to RCP, ICP, PDP and CCC. Regarding RCP, the results from the correlation analysis shows a negative coefficient -0.387, with a p-value of 0.000. It indicates that there is a high significance at α =1%. The negative correlation between RCP and GOP suggests that an increase of the Receivables Collection Period will have a negative impact upon operating profitability. Correlation results between Inventory Conversion Period and Gross Operating Profitability also indicate the same type of result. The correlation coefficient is negative and is highly significant. The coefficient is -0.06 and the p-value is 0.000. It means that when the time span during which inventories remain within the company increases, profitability decreases. The negative coefficient presented by PDP in relation to GOP suggests that less profitable companies wait longer to pay their bills. The Cash Conversion Cycle also has a negative coefficient -0.28 and the p-value is 0.000, which is significant at α=1%. It implies that if the company is able to decrease its cash conversion cycle, it can improve its operating profitability.

The Current Ratio, in the analysis, has a significant negative relationship with GOP. The coefficient is -0.05 and the p-value is 0.000. It reveals the need of balance between liquidity and profitability because these two objectives have an inverse relationship. Company size, measured by the natural logarithm of sales, has a positive relation with profitability. Its correlation coefficient is 0.04, and it is highly significant at α = 1%. It shows that an increase in companies' size increases their profitability. The remaining control variables, in relation to GOP, also have negative and significant coefficients.

The results from the correlation analysis show that if companies are able to reduce the time that accounts receivable are outstanding, plus the time span during which inventories remain within the company, plus the time required for settling its accounts payable, then working capital management will be efficient since it will lead to increased operational profitability.

4.3 Empirical Models

This sub-section is divided into five parts. The first one provides the results of econometric analysis undertaken at European level. The second reveals the coefficient results of estimations by country. The third and fourth, show the details of the results from the first part. Finally, the fifth part presents an additional analysis.

4.3.1 European Context

To evaluate the impact of working capital management upon corporate profitability, Cash Conversion Cycle (as a comprehensive measure of working capital management), as well as other alternative proxies (RCP, ICP and PDP) for working capital management were regressed against Gross Operating Profitability. Accordingly, the regression models presented in sub-section 3.4 were estimated by the GLS method with cross section weights and Pooled OLS method with no weights. Sector, country and year dummies were additionally included. For comparison purposes fixed effects framework was also run. The regression results are reported in Table 5. For simplicity the dummy coefficients were not shown in this table.

Table 5: Relationship between WCM and profitability (1998-2009): GLS with cross section weights and pooled OLS methods

Dependent Variable: GOP (Gross Operating Profitability)

Independent Variables	GLS (Cross- section weights)				GLS (Cross- section weights)				Pooled OLS				Pooled OLS			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
Intercept	-0.009457	-0.10665***	-0.11202***	-0.07254***	0.800161***	0.388753***	0.335527***	0.503786***	0.001686	-0.081143*	-0.091517**	-0.060677	0.94747***	0.40379***	0.39368***	0.57238***
RCP	-0.000586***				-0.00245***				-0.00065***				-0.00290***			
ICP		-0.00012***				-0.00029***				-0.00023***				-0.00036***		
PDP			-0.00016***				-8.30E05***				-0.00019***				-0.00014**	
CCC				-0.00022***				-0.00097***				-0.00027***				-0.0013***
CR	-0.006679***	-0.00608***	-0.00609***	-0.00613***	-0.00928***	-0.01051***	-0.01070***	-0.00621***	-0.00822***	-0.00846***	-0.00909***	-0.00785***	-0.01069***	-0.01064***	-0.01191***	-0.0058***
DR	-0.053589***	-0.05464***	-0.05363***	-0.04647***	-0.20394***	-0.20391***	-0.26288***	-0.22772***	0.030540*	0.033867**	0.033630**	0.029670*	-0.14994***	-0.18376***	-0.19431***	-0.1566***
LnS	0.017202***	0.021609***	0.021501***	0.020684***	-0.00817***	0.010053***	0.012971***	0.005738***	0.017274***	0.020625***	0.019915***	0.020510***	-0.01311***	0.01252***	0.01216***	0.00597***
FAR	-0.006929	-0.022036**	-0.019222*	-0.025483**	-0.24737***	-0.51965***	-0.47648***	-0.40685***	0.025897***	-0.008307	0.003611	-0.002729	-0.34249***	-0.59535***	-0.58051***	-0.5535***
Sector dummy	yes	yes	yes	yes	no	no	no	no	yes	yes	yes	yes	no	no	no	no
Country dummy	yes	yes	yes	yes	no	no	no	no	yes	yes	yes	yes	no	no	no	no
Year dummy	yes	yes	yes	yes	no	no	no	no	yes	yes	yes	yes	no	no	no	no
R-squared	0.776329	0.803138	0.798716	0.890938	0.656834	0.303473	0.151981	0.351780	0.459552	0.456279	0.455801	0.457590	0.158106	0.015328	0.012866	0.087089
Adj. R-squared	0.775768	0.802644	0.798211	0.890664	0.656758	0.303317	0.151791	0.351635	0.458197	0.454915	0.454436	0.456229	0.157918	0.015108	0.012646	0.086885
F-Value	1383.628***	1626.343***	1581.860***	3256.536***	8565.348***	1949.732***	802.0040***	2428.522***	338.9730***	334.5328***	333.8890***	336.3046***	840.397***	69.6614***	58.3262***	426.899***
Observations	22381	22381	22381	22381	22381	22381	22381	22381	22381	22381	22381	22381	22381	22381	22381	22381

Notes: Symbols *, ** and *** denote significance at 10, 5 and 1% levels, respectively. The results were obtained by using the GLS with cross section weights and pooled OLS estimation methods.
Source: 1998-2009 survey data.

By analyzing the table it becomes clear that estimation results are more consistent when sector, country and year dummies are included either by the OLS method or the GLS method. Their R-squared are higher reflecting the increased explanatory power of model. Estimation by Pooled OLS assumes that model parameters as given by β are constant for all individuals in the sample. This assumption is quite restrictive. Introducing dummy variables in the models one can capture the natural differences (heterogeneity) among individuals.

When we use pooled data and cross sections greater than the time series, there may be a problem of heteroskedasticity (changing variation after a short period) (Raheman & Nasr, 2007). To counter this problem, the General Least Square model with cross section weights can be used. In the regressions applied on this study, the common intercept was calculated for all variables and assigned a weight.

Thus, taking into account issues of heteroskedasticity and heterogeneity of the observations, let's focus on the results of the GLS estimation with cross section weights and sector, country and year dummies.

For all estimated models the control variables were included. In Model I, the Receivables Collection Period in days was regressed against GOP. The results show that the coefficients for all variables considered are highly significant except for the FAR variable. In particular, the coefficient of the Receivables Collection Period is negative and is highly significant at $\alpha = 1\%$. It indicates that an increase or decrease in the number of days of accounts receivable will significantly affect profitability. As mentioned by Mathuva (2010), the result can be interpreted as the less the time it takes for costumers to pay their bills, the more cash is available to replenish inventory, hence the higher the sales realized leading to higher corporate profitability.

By looking at the coefficients of the Current Ratio and Debt Ratio, a significant negative relationship between them and GOP can be seen. Current ratio, as a measure of liquidity, has a negative coefficient which means that it has an inverse relationship with GOP. A leverage increase also implies a GOP decrease, as can be noted by the Debt Ratio coefficient. Logarithm of Sales (LnS) used as a proxy for company size presents a positive and significant coefficient, which is in agreement with most studies. This result

implies that an increase in sales has a positive impact on profitability, the same as saying that larger size leads to greater profitability.

The ratio of financial assets to total assets has a negative coefficient, however it is not significant.

The R-squared, which represents the proportion of the overall variance explained by the variables included in the equation model, is 78% with an F-value of 1384 which is highly significant.

The second regression (Model II) was run by using the Inventory Conversion Period in days as an independent variable instead of RCP. The ICP's coefficient is negative and highly significant. This means that increasing the time during which inventories remain in the company will adversely affect profitability. Current Ratio, Debt Ratio and FAR, significantly affect profitability and have negative coefficients. FAR's coefficient is significant at $\alpha = 5\%$. Inversely, the variable LnS has a positive and highly significant coefficient as in model I.

The adjusted R-squared is 80% and F-statistic is 1626 which reflects the highly significance of the model.

The third column of Table 5 presents the estimation results from model III with Payables Deferral Period as a measure of working capital management (independent variable). The other variables are the control variables used in previous regressions. The coefficient of PDP is negative and significant at $\alpha = 1\%$. The negative relationship between the Payables Deferral Period and profitability is consistent with some studies (Deloof, 2003, Lazaridis and Tryfonidis, 2006), which have interpreted that less profitable companies wait longer to pay their bills. Control variables are highly significant but the FAR variable is only significant at the level of 10%. The size of the company has a positive impact upon its profitability while the Current Ratio and the Debt Ratio have a negative influence. The F-Value is highly significant, with a value of 1582.

In the fourth model, we used the same control variables as in the previous models, and Cash Conversion Cycle as an independent variable. This model shows that the

relationship between the Cash Conversion Cycle and the Gross Operating Profitability is negative and statistically significant at the level of 1%. It implies that decreasing the cash conversion cycle will positively affect profitability. This is in line with previous research studies. The other variables in the model have the same signals as in previous regressions and are also significant. The R-squared is 89%.

Estimation results by the OLS and by the GLS methods without considering dummy variables for sector, country and year are similar. All measures for working capital management (RCP, ICP, PDP and CCC) present negative and significant coefficients. When the regressions are estimated either by the OLS or by the GLS method but taking account the dummy variables, those measures equally affect profitability in a negative and significant way. Current Ratio seems to have a negative impact upon operational profitability. Its coefficient is negative and significant whatever the estimation method. The coefficients signals for Debt Ratio and FAR differ from one and other estimation method.

Concerning our hypotheses, we conclude that our first null hypothesis (H01) is rejected. Thus, working capital management has a significant impact upon operating profitability of European companies. We also reject our second null hypothesis (H02). It was found that there is a negative relationship between liquidity, measured by Current Ratio, and operating profitability of European companies.

Although the results are highly significant we should emphasize the fact that the coefficients have low values, implying reduced variations in profitability.

The coefficient results from the OLS estimation method are higher than those obtained by the GLS estimation. Thereby, variations in operating profitability are more substantial.

Also for the purpose of comparison, fixed effects framework with fixed cross-section and fixed period was estimated and the results are presented on the next table.

Table 6: Relationship between WCM and profitability (1998–2009): Fixed Effects regression models (fixed cross-section and fixed period)

Independent Variables	Dependent Variable: GOP (Gross Operating Income)			
	I	II	III	IV
	Coeff.	Coeff.	Coeff.	Coeff.
Intercept	-0.293887***	-0.514386***	-0.514703***	-0.472616***
RCP	-0.000819***			
ICP		-0.000144**		
PDP			-9.03E-05	
CCC				-0.000324***
CR	-0.003036**	-0.003187**	-0.003396**	-0.002488*
DR	0.245676***	0.246727***	0.246165***	0.246326***
LnS	0.062229***	0.074861***	0.074529***	0.073061***
FAR	0.404350***	0.417053***	0.418006***	0.414919***
Sector dummy	no	no	no	no
Country dummy	no	no	no	no
Year dummy	yes	yes	yes	yes
R-squared	0.762921	0.761009	0.760966	0.761774
Adjusted R-squared	0.726377	0.724170	0.724121	0.725053
F-Value	20.87669***	20.65775***	20.65287***	20.74490***
Observations	22381	22381	22381	22381

Notes: Symbols *, ** and *** denote significance at 10, 5 and 1% levels, respectively. The results were obtained by using fixed effects regression models.
Source: 1998-2009 survey data

Table 6 shows that the Receivables Collection Period, the Inventory Conversion Period, the Payables Deferral Period and the Cash Conversion Cycle have negative coefficients such as in the results of Table 5. However, the PDP coefficient is not significant. Natural Logarithm of Sales and Current Ratio shows positive and negative coefficients, respectively. Both are significant although the Current Ratio coefficients are significant only at 5% or 10% level. Contrarily to the OLS and GLS estimations, the other control variables, DR and FAR, reveal positive and significant coefficients.

4.3.2 Countries

As a second step of this research study, we tested if there are significant differences among the countries in the sample in terms of the relationship Working Capital Management – Profitability. Table 7 presents the estimation results of Model IV, presented in 3.2 Section, for each country.

Table 7: Relationship between WCM and profitability by country (1998-2009): GLS with cross section weights

Independent Variables	Dependent Variable: GOP (Gross Operating Profitability)										
	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV
	Belgium	England	Finland	France	Germany	Greece	Italy	Netherlands	Poland	Portugal	Spain
Intercept	-0.275791***	0.813309***	0.649446***	-0.085335***	0.402164***	0.309584***	0.396771***	0.442909***	-0.478407***	0.163400***	0.194781***
CCC	-0.000164***	-0.000678***	-5.84E-05	-0.000321***	-0.000230***	-0.000331***	-8.07E-05***	-0.000994***	0.000994***	-0.000234***	3.86E-06
CR	0.023792***	-0.039796***	-0.016731***	0.016526***	-0.006391***	-0.001072***	-0.018560***	0.016219***	0.055695***	0.008675	-0.004891
DR	-0.144951***	-0.122518***	-0.339304***	-0.150750***	-0.138287***	-0.099691***	-0.293209***	0.268142***	0.524804***	-0.142889***	-0.261556***
LnS	0.038413***	0.023806***	-0.014841***	0.026659***	-9.79E-06	-0.000347	0.003002**	-0.005922***	-0.070030***	0.000446	0.006966***
FAR	0.110914**	-1.016980***	-0.470773***	-0.241749***	-0.030573	0.289900***	-0.129294***	0.058391	-0.350909**	0.096856***	-0.153690***
Sector dummy	no	no	no	no	no	no	no	no	no	no	no
Year dummy	no	no	no	no	no	no	no	no	no	no	no
R-squared	0.608645	0.523253	0.312204	0.863934	0.097385	0.386742	0.213401	0.188785	0.693896	0.315753	0.334431
Adjusted R-squared	0.605658	0.522871	0.308758	0.863762	0.096408	0.385015	0.210729	0.184079	0.691648	0.304926	0.329915
F-Value	203.7347***	1369.740***	90.60230***	5029.978***	99.62775***	224.0013***	79.86940***	40.12062***	308.7461***	29.16426***	74.06451***
Observations	22381	22381	22381	22381	22381	22381	22381	22381	22381	22381	22381

Notes: Symbols *, ** and *** denote significance at 10, 5 and 1% levels, respectively. The results were obtained by using GLS with cross section weights estimation method.
Source: 1998-2009 survey data.

The results obtained were estimated by the GLS method with cross-section weights. The sector and year dummies were not included because some countries do not have sufficient observations to enable estimation with their consideration.

Observing the coefficient results of Model IV we may conclude that the Cash Conversion Cycle has strongly significant coefficients in all countries, with the exceptions of Finland and Spain. Regarding the signal of the coefficients, all the countries have a negative signal except Poland and Spain. This is consistent with results obtained in the first step of the study where all countries of the sample were included together.

The results seem to suggest that shortening the cash conversion cycle of the European companies under consideration leads an increased profitability. Curiously, the results for Poland suggest the opposite.

The relationship between the control variables and Gross Operating Profitability is not consistent for all countries in the sample.

In general, the results indicate that working capital management can be an approach to be used by companies to influence their profitability. Shortening the cash conversion cycle allows the optimization of capital lockup and process costs and thus companies' profitability increases.

4.3.3 Sector dummy

The companies involved in this research study belong to different economic sectors. The sample includes 32 different sectors. In order to observe differences between them, Table 8 presents the details of the sector dummy coefficients for model IV estimated by GLS not shown in Table 5. We must bear in mind that the coefficients were calculated in relation to a reference category that comprises the sector, the country and the year. Thus, interpretations should be made in relation to that category. The reference category refers to the "Aerospace & Defense" sector, to Belgium, and to 1998.

Table 8: Relationship between WCM and profitability (1998-2009): GLS with cross section weights method - sector dummy details

Independent Variables	Dependent Variable: GOP (Gross Operating Income)
	IV
	Coeff.
Intercept	-0.072547***
CCC	-0.000220***
CR	-0.006134***
DR	-0.046477***
LnS	0.020684***
FAR	-0.025483**
Alternative Energy	-0.090970***
Automobiles & Parts	0.055195***
Beverages	0.172626***
Chemicals	0.073549***
Construction & Materials	0.071228***
Electricity	-0.073291***
Electronic & Electrical Equipment	0.145456***
Fixed Line Telecommunications	0.011362
Food & Drug Retailers	0.023561***
Food Producers	0.081917***
Forestry & Paper	0.036924***
Gas, Water & Multiutilities	-0.126264***
General Industrials	0.075750***
General Retailers	0.306468***
Health Care Equipment & Services	0.106710***
Household Goods & Home Construction	0.146158***
Industrial Engineering	0.094342***
Industrial Metals & Mining	0.030297***
Industrial Transportation	-0.016374**
Leisure Goods	0.206357***
Mining	-0.345113***
Mobile Telecommunications	0.125148***
Oil & Gas Producers	-0.167613***
Oil Equipment & Services	0.067676***
Personal Goods	0.219004***
Pharmaceuticals & Biotechnology	0.057795***
Software & Computer Services	0.157424***
Support Services	0.205916***
Technology Hardware & Equipment"	0.091908***
Tobacco	-0.180327***
Country dummy	yes
Year dummy	yes
R-squared	0.890938
Adj. R-squared	0.890664
F-Value	3256.536***
Observations	22381

Notes: Symbols *, ** and *** denote significance at 10, 5 and 1% levels, respectively.

The sectors General Retailers, Personal Goods and Support Services are those with higher profitability in relation to the reference category. Their operating profitability is higher by 31%, 22% and 21%, respectively.

Considering the sectors in the Technologies and Communications area (Electronic & Electrical Equipment, Mobile Telecommunications, Software and Computer Services and Technology Hardware & Equipment sectors) we conclude that their operating profitability is higher than the reference category from 9% to 16%. However, the Fixed Line Telecommunications sector does not have a significant difference.

It is notable that the sectors Mining, Tobacco and Oil & Gas Producers sectors show estimates of operating profitability lower by 34%, 18% and 17%, respectively, compared to the reference category.

4.3.4 Time Period

Presently we have been seeing great changes in the economic climate. The economic crisis has hit many countries in the world and particularly in Europe. This has changed the conditions for European companies to go with their business. Thereafter, it is also interesting to study whether the economic changes over the last years had an impact on companies' profitability as measured by gross operation profitability.

The next table displays the details of year dummy coefficients of the GLS estimation omitted in Table 4.

Table 9: Relationship between WCM and profitability (1998-2009): GLS with cross section weights method – year dummy details

Independent Variables	Dependent Variable: GOP (Gross Operating Profitability)
	IV
	Coeff.
Intercept	-0.072547***
CCC	-0.000220***
CR	-0.006134***
DR	-0.046477***
LnS	0.020684***
FAR	-0.025483**
Sector dummy	yes
Country dummy	yes
1999	-0.017928***
2000	-0.014107***
2001	-0.029536***
2002	-0.027971***
2003	-0.037936***
2004	-0.028606***
2005	-0.057809***
2006	-0.055723***
2007	-0.062578***
2008	-0.103328***
2009	-0.137425***
R-squared	0.890938
Adj. R-squared	0.890664
F-Value	3256.536***
Observations	22381

Notes: Symbols *, ** and *** denote significance at 10, 5 and 1% levels, respectively.

The estimation results reflect the economic variation. As can be seen in Table 9, operating profitability has decreased significantly over the last three years when comparing with the reference category. The reference category is the same as mentioned in sub-section 4.3.3. Comparing with 1998, 2008 shows lower profitability for European companies by 10%. In 2009 the percentage is about 14% lower.

4.3.4 Additional Analysis

The Current Ratio was used as a measure of liquidity and showed negative coefficients in all regressions (Table 5 and Table 6). Results suggest that profitability and liquidity, the two main objectives for a company, have an inverse relationship. When the liquidity position is better, this adversely affects the company's profitability.

In this sub-section we study the interference that different levels of liquidity can have upon the relationship working capital management and profitability. The way a company manages its working capital and its impact upon operating profitability may be influenced by many factors. The higher or lower levels of existing liquidity can be one of those factors.

For the purpose of this complementary analysis the variable Current Ratio was divided into three groups – Current Ratio I, Current Ratio II and Current Ratio III. Percentiles were considered for the partition. The following model was then run:

$$GOP = \beta_0 + \beta_1(CCC_{it}) + \beta_2(CRI_{it}*CCC_{it}) + \beta_3(CRIII_{it}*CCC_{it}) + \beta_4(DR_{it}) + B_5(LnS_{it}) +$$
$$+ \beta_6(FAR_{it}) + \varepsilon \qquad\qquad (V)$$

Where the subscript i refer to companies, t represents years and ε is the error term. The variable CRI is Current Ratio I and it corresponds to the first percentile (25%). The variable CRIII is Current Ratio III and it corresponds to the last percentile (75%). The remaining variables are defined as described in Table 2.

Current Ratio I represents companies with low liquidity levels while Current Ratio III represents companies with higher liquidity values. Their Current Ratios are lower than 1,090596 and higher than 2,037854, respectively. The Current Ratio II group comprises the observations which Current Ratios are situated between 1,090596 and 2,037854.

Table 10 shows the coefficient results for the GLS estimation method with cross section weights of model V. Sector, country and year dummies were included.

Table 10: Relationship between WCM and profitability (1998-2009): GLS with cross section weights - different levels of liquidity

Independent Variables	Dependent Variable: GOP (Gross Operating Profitability)
	V
	Coeff.
Intercept	-0.072764***
CCC	-0.000214***
CRI*CCC	-0.000181***
CRIII*CCC	6.70E-05***
CR	-0.006394***
DR	-0.033908***
LnS	0.021311***
FAR	-0.011962
Sector dummy	yes
Country dummy	yes
Year dummy	yes
R-squared	0.806241
Adjusted R-squared	0.805737
F-Value	1601.428***
Observations	22381

Notes: Symbols *, ** and *** denote significance at 10, 5 and 1% levels, respectively. The results were obtained by using GLS with cross section weights estimation method.
Source: 1998-2009 survey data.

The results indicate that the Cash Conversion Cycle has a negative impact upon profitability. However, this impact is more negative on companies with low liquidity levels.

Thus, these results show that different levels of liquidity lead to differentiated impacts of working capital management upon companies' profitability.

5 Conclusions

This paper studied the relationship between working capital management and operating profitability in 2,974 companies listed on 11 European Stock Exchanges, from 1998 to 2009. The results provided evidence that the Cash Conversion Cycle, as a measure of working capital management, negatively affects Gross Operating Profitability. A negative and significant relationship between the Receivables Collection Period, Inventory Conversion Period, Payment Deferral Period and profitability was also found. This indicates that companies can increase their profitability by shortening receivables, inventory and payables periods. These findings are in line with many previous studies, namely with those of Raheman and Nasr (2007), and Deloof (2003).

In general, the results from our analysis suggest that companies can rethink their corporate financial management in order to boost their growth and subsequently the creation of value for shareholders. Companies can direct their efforts towards their own resources and bypass certain financial problems. By optimizing the time span during which working capital is tied up in the company can be a way to improve profitability. On the one hand, reducing that time releases liquidity which in turn affects the company´s financial position. On the other hand, working capital management enables other forms of financing because those financiers who focus on balance sheet structures will invest on companies with solid positions and reducing the capital lockup contributes towards that.

Concerning the relationship between company size (measured by the natural logarithm of sales) and profitability, the results indicate that as size increases, operating profitability tends to increase. Current Ratio and Debt Ratio presented negative impacts upon companies' profitability. The results of Financial Assets to Total assets were not significant.

At a country level the relationship between working capital management and profitability is negative and significant for all countries in the sample except for Poland, Finland and Spain.

The findings also allowed us to check that the present economic environment had an impact upon companies´ profitability. In recent years, the operating profitability of European companies has been decreasing.

Additionally we studied whether different levels of liquidity lead to differentiated impacts of the Cash Conversion Cycle upon operating profitability. The analysis indicated that such impact is more negative for companies whose liquidity ratios are low.

Future research could make an in-depth and extended analysis on the impact of working capital management upon profitability. For instance, a research study at sector level within the European context could be undertaken. The concept of factoring and credit default of customers may interfere with the way companies manage their working capital. Further studies could also address these issues.

In sum, the findings from this study suggest that companies can improve their profitability by reducing their cash conversion cycle.

References

Baltagi, Badi (2001), Econometric Analysis of Panel Data, John Wiley & Sons, Chichester.

Deloof M. (2003), "Does working capital management affect profitability of Belgian firms?" Journal of Business Finance and Accounting, Vol. 30: 573-588.

Deloof M., and M. Jegers (1996), "Trade Credit, Product Quality, and Intragroup Trade: Some European Evidence". Financial Management 25: 945-968

Dong, Huynh Phuong and Jhy-tay Su (2010), "The Relationship between Working Capital Management and Profitability: A Vietnam Case", International Research Journal of Finance and Economics, Issue 49, pp.59-67.

Eljelly A. (2004), "Liquidity-profitability tradeoff: an empirical investigation in an emerging market". International Journal of Commerce and Management, 14: 48-61.

Falope OI, Ajilore OT. (2009), "Working capital management and corporate profitability: evidence from panel data analysis of selected quoted companies in Nigeria". Research Journal of Business Management, 3: 73-84.

Gill et al. (2010), "The relationship between working capital management and profitability: Evidence from the United States". Business and Economics Journal, Vol. 10

Lazaridis I, Tryfonidis D. (2006.), "Relationship between working capital management and profitability of listed companies in the Athens stock exchange". Journal of Financial Management and Analysis, 19: 26-25.

Long M.S., I.B. Malitz and S.A Ravid (1993), "Trade Credit, Quality Guarantees, and Product Marketability". Financial Management 22: 117-127

Mathuva D. (2009), "The influence of working capital management components on corporate profitability: a survey on Kenyan listed firms". Research Journal of Business Management, 3: 1-11.

Nazir, Mian Sajid and Talat Afza (2009), "Working Capital Requirements and the Determining Factors in Pakistan", Journal of Applied Finance, Vol. 15, Issue 4, pp. 28-38

Nobanee and AlHajjar (2009a), "Working capital management, Operating cash flow and Corporate performance" home page, in http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1471236 accessed on January 21, 2011

Nobanee and AlHajjar (2009b), "A note on working capital management and corporate profitability of Japanese firms" home page, in http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1433243 accessed on June 16, 2011

Nobanee (2009), "Working capital management and Firm's Profitability: An optimal Cash Conversion Cycle" home page, in http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1471230 accessed on September 7, 2010

Raheman A, Nasr M. (2007), "Working capital management and profitability – case of Pakistani firms". International Review of Business Research Papers, 3: 279-300.

Rao, R. K. S. (1989), Fundamentals of Financial Management, 3rd Ed. Macmillan publishers, pp 550-644

Samiloglu F., Demirgunes K. (2008), "The effect of working capital management on firm profitability: Evidence from Turkey". The International Journal of Applied Economics and Finance 2: 44-50

Shin HH, Soenen L. (1998), "Efficiency of working capital management and corporate profitability". Financial Practice and Education, Vol. 8: 37-45.

Zariyawati et al. (2009), "Working Capital Management and Corporate Performance: Case of Malaysia", Journal of Modern Accounting and Auditing, Vol. 5, Issue 11, pp. 47-54.

Recent FEP Working Papers

Nº 437	Marta Rodrigues Monteiro, Elísio Fernando Moreira Brandão and Francisco Vitorino da Silva Martins, "*A Panel Data Econometric Study of Corporate Tax Revenue in European Union: Structural, Cyclical Business and Institutional Determinants*", November 2011
Nº 436	João Rebelo Barbosa and Rui Henrique Alves, "*Divergent competitiveness in the eurozone and the optimum currency area theory*", November 2011
Nº 435	Álvaro Almeida and José Pedro Fique, "*Evaluating Hospital Efficiency Adjusting for Quality Indicators: an Application to Portuguese NHS Hospitals*", November 2011
Nº 434	Octávio Figueiredo, Paulo Guimarães and Douglas Woodward, "*Firm-Worker Matching in Industrial Clusters*", October 2011
Nº 433	Susana Assunção, Rosa Forte and Aurora A.C. Teixeira, "*Location Determinants of FDI: a Literature Review*", October 2011
Nº 432	António Brandão, Luís Guimarães and Carlos Seixas, "*The Relationship between Trigger Price and Punishment Period in Green and Porter (1984) Game made Endogenous*", October 2011
Nº 431	Argentino Pessoa, "*The Cluster Policy Paradox: Externalities vs. Comparative Advantages*", October 2011
Nº 430	Susana Assunção, Aurora A.C. Teixeira and Rosa Forte, "*Do Countries' Endowments of Non-renewable Energy Resources Matter For FDI Attraction? A Cross-country Econometric Analysis*", October 2011
Nº 429	Óscar Afonso and Armando Silva, "*Non-scale endogenous growth effects of subsidies for exporters*", September 2011
Nº 428	Mariana Dias and Aurora A.C. Teixeira, "*Geopolítica e International Business: uma tentativa de síntese e proposta de enquadramento teórico para aplicação prática*", September 2011
Nº 427	Carina Silva and Aurora A.C. Teixeira, "*Empreendedorismo político local em Portugal. Uma análise exploratória*", September 2011
Nº 426	Marta Couto and Aurora A.C. Teixeira, "*Festivais de Música de Verão em Portugal: determinantes da participação e a identificação dos seus patrocinadores*", September 2011
Nº 425	Luis Carvalho and Aurora A.C. Teixeira, "*Where are the poor in International Economics?*", September 2011
Nº 424	Maria Inês Veloso Ferreira and Aurora A.C. Teixeira, "*Organizational Characteristics and Performance of Export Promotion Agencies: Portugal and Ireland compared*", September 2011
Nº 423	Pedro Cosme Costa Vieira, "*Está na hora de Portugal sair da Zona Euro*", September 2011
Nº 422	Márcia Daniela Barbosa Oliveira and João Gama, "*How we got Here? A Methodology to Study the Evolution of Economies*", July 2011
Nº 421	Vitor M. Carvalho and Manuel M. F. Martins, "*Macroeconomic effects of fiscal consolidations in a DSGE model for the Euro Area: does composition matter?*", July 2011
Nº 420	Duarte Leite, Pedro Campos and Isabel Mota, "*Computational Results on Membership in R&D Cooperation Networks: To Be or Not To Be in a Research Joint Venture*", July 2011
Nº 419	Sandra T. Silva, Isabel Mota and Filipe Grilo, "*The Use of Game Theory in Regional Economics: a quantitative retrospective*", June 2011
Nº 418	Marisa R. Ferreira, Teresa Proença and João F. Proença, "*An Empirical Analysis about Motivations among Hospital Volunteers*", June 2011
Nº 417	Marlene Grande and Aurora A.C. Teixeira, "*Corruption and Multinational Companies' Entry Modes.Do Linguistic and Historical Ties Matter?*", June 2011
Nº 416	Aurora A.C. Teixeira, "*Mapping the (In)visible College(s) in the Field of Entrepreneurship*", June 2011
Nº 415	Liliana Fernandes, Américo Mendes and Aurora A.C. Teixeira, "*A weighted multidimensional index of child well-being which incorporates children's individual perceptions*", June 2011

Nº 414	Gonçalo Faria and João Correia-da-Silva, "*A Closed-Form Solution for Options with Ambiguity about Stochastic Volatility*", May 2011
Nº 413	Abel L. Costa Fernandes and Paulo R. Mota, "*The Roots of the Eurozone Sovereign Debt Crisis: PIGS vs Non-PIGS*", May 2011
Nº 412	Goretti Nunes, Isabel Mota and Pedro Campos, "*Policentrismo Funcional em Portugal: Uma avaliação*", May 2011
Nº 411	Ricardo Biscaia and Isabel Mota, "*Models of Spatial Competition: a Critical Review*", May 2011
Nº 410	Paula Sarmento, "*The Effects of Vertical Separation and Access Price Regulation on Investment Incentives*", April 2011
Nº 409	Ester Gomes da Silva, "*Portugal and Spain: catching up and falling behind. A comparative analysis of productivity trends and their causes, 1980-2007*", April 2011
Nº 408	José Pedro Fique, "*Endogenous Response to the 'Network Tax'*", March 2011
Nº 407	Susana Silva, Isabel Soares and Carlos Pinho, "*The impact of renewable energy sources on economic growth and CO2 emissions - a SVAR approach*", March 2011
Nº 406	Elena Sochirca and Sandra Tavares Silva, "*Efficient redistribution policy: an analysis focused on the quality of institutions and public education*", March 2011
Nº 405	Pedro Campos, Pavel Brazdil and Isabel Mota, "*Comparing Strategies of Collaborative Networks for R&D: an agent-based study*", March 2011
Nº 404	Adelaide Figueiredo, Fernanda Figueiredo, Natália P. Monteiro and Odd Rune Straume, "*Restructuring in privatised firms: a Statis approach*", February 2011
Nº 403	Cláudia M. F. Pereira Lopes, António Cerqueira and Elísio Brandão, "*The financial reporting quality effect on European firm performance*", February 2011
Nº 402	Armando Silva, "*Financial constraints and exports: evidence from Portuguese manufacturing firms*", February 2011
Nº 401	Elena Sochirca, Óscar Afonso and Pedro Mazeda Gil, "*Directed technological change with costly investment and complementarities, and the skill premium*", January 2011
Nº 400	Joana Afonso, Isabel Mota and Sandra Tavares Silva, "*Micro credit and Territory - Portugal as a case study*", January 2011
Nº 399	Gonçalo Faria and João Correia-da-Silva, "*The Price of Risk and Ambiguity in an Intertemporal General Equilibrium Model of Asset Prices*", January 2011
Nº 398	Mário Alexandre Patrício Martins da Silva, "*A Model of Innovation and Learning with Involuntary Spillovers and absorptive capacity*", January 2011
Nº 397	Fernando Governo and Aurora A.C. Teixeira, "*Marketing and technology sophistication as hidden weapons for fostering the demand for 'art house' cinema films: a cross country analysis*", January 2011
Nº 396	Liliana Fernandes, Américo Mendes and Aurora A.C. Teixeira, "*A review essay on child well-being measurement: uncovering the paths for future research*", December 2010
Nº 395	David Nascimento and Aurora A.C. Teixeira, "*Recent trends in the economics of innovation literature through the lens of Industrial and Corporate Change*", December 2010
Nº 394	António Brandão, João Correia-da-Silva and Joana Pinho, "*Spatial competition between shopping centers*", December 2010
Nº 393	Susana Silva, Isabel Soares and Óscar Afonso, "*E3 Models Revisited*", December 2010
Nº 392	Catarina Roseira, Carlos Brito and Stephan C. Henneberg, "*Innovation-based Nets as Collective Actors: A Heterarchization Case Study from the Automotive Industry*", November 2010
Nº 391	Li Shu and Aurora A.C. Teixeira, "*The level of human capital in innovative firms located in China. Is foreign capital relevant*", November 2010
Nº 390	Rui Moura and Rosa Forte, "*The Effects of Foreign Direct Investment on the Host Country Economic Growth - Theory and Empirical Evidence*", November 2010

www.fep.up.pt