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MASTERS' FINAL WORK
DISSERTATION

THE IMPACT OF WORKING CAPITAL MANAGEMENT ON FIRM PROFITABILITY IN DIFFERENT BUSINESS CYCLES: EVIDENCE FROM THE UNITED KINGDOM

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ABSTRACT

The economic and financial crisis that affected Europe has brought more importance to working capital policies. On this matter, in this paper we analyze the effects of each business cycle on the working capital management (WCM) – profitability relationship using a sample of 400 UK unlisted companies during the period between 2006 and 2014.

We find the impact of business cycle on the working capital – profitability to be more noticeable in economic downturns relative to economic booms.

Our results show that there is a statistical significant relationship between working capital management and firms' profitability, thus active working capital management should be included in firms' financial planning.

RESUMO

A crise económica e financeira que afectou a Europa entre 2008 e 2009 revestiu ainda de maior importância as políticas de gestão do fundo de maneio. Posto isto, na seguinte dissertação analisamos o efeito que cada ciclo económico tem na relação entre a rentabilidade e as políticas de gestão do fundo de maneio, usando uma amostra de cerca de 400 empresas do Reino Unido entre 2006 e 2014.

Concluímos que a relação entre o fundo de maneio e a rentabilidade é mais notória nos períodos de recessão quando comparada com os períodos de crescimento económico acentuado.

Os nossos resultados mostram uma relação estatística significativa entre o *working capital management* e a rentabilidade das empresas, devendo assim o *WCM* fazer parte do planeamento financeiro de uma empresa.

Palavras – chave: Gestão do fundo de maneio; Rentabilidade das empresas; Empresas não-cotadas

RESUMO

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AP – Account payables deferral period

AR – Account receivables conversion period

CCC - Cash conversion cycle

CR – Current ratio

DB – Dummy variable representing the boom period

DD – Dummy variable representing the downturn period

EBIT – Earnings before interests and taxes

GOI – Gross operating income divided by the difference between total assets and financial assets

INV – Inventory conversion period

ROA – Return on assets

UK – United Kingdom

WCM – Working capital management

1. INTRODUCTION

Finding a balance between profitability and liquidity tends to be one of the major challenges a company's manager struggles within a company's management. For some scholars, liquidity plays a more important role because a company with low liquidity has a better capacity to serve the economy than a company without liquidity (Chatterjee, 2012).

Mainly the studies of corporate finance focuses only on long term finance decisions such as capital structure, dividend policies and capital budgeting (Chatterjee , 2012).

In this context, the emergence of working capital management play an important role on finance's studies as it's mainly related with investment and financing in short term periods (Makori, 2013).

The main purpose of the following paper is to test the effects of an efficient working capital management on a company's profitability, more precisely on UK companies, non listed on stock exchanges.

Working capital is the combination between current assets and current liabilities. In current assets we can include cash, marketable securities, receivables and inventories while in current liabilities we only include short-term obligations that a company has to meet (Agha, 2014).

Working capital management is the capacity to manage efficiently the current assets and current liabilities by providing to the firm the maximum possible return.

The concept of working capital management can be defined as the management of short-term capital, having as main goal the company's profitability and company's growth value (Agha, 2014).

WCM has a direct positive outcome on a company's profitability and liquidity, where a perfect level of liquidity allows a firm to meet their short term obligations. By managing working capital, the main goal is to optimize liquidity and profitability without forgetting company's daily business operations.

An efficient working capital management would be easy to access if there was a perfect synchronization between the accounts receivables (clients) and the accounts payables (suppliers), but on a company's daily operations it's known that this fact almost never happens.

An efficient working capital management undergoes by an efficient management of all working capital components (receivables, payables, inventory and the use of cash for daily business operations) which its main goal is to make the maximum possible revenues.

Thus, an efficient working capital management is strictly related with an efficient management of the operating and cash cycle, which together represent the cash conversion cycle – main variable used on this paper to represent the working capital management - and it's represented in the figure below:
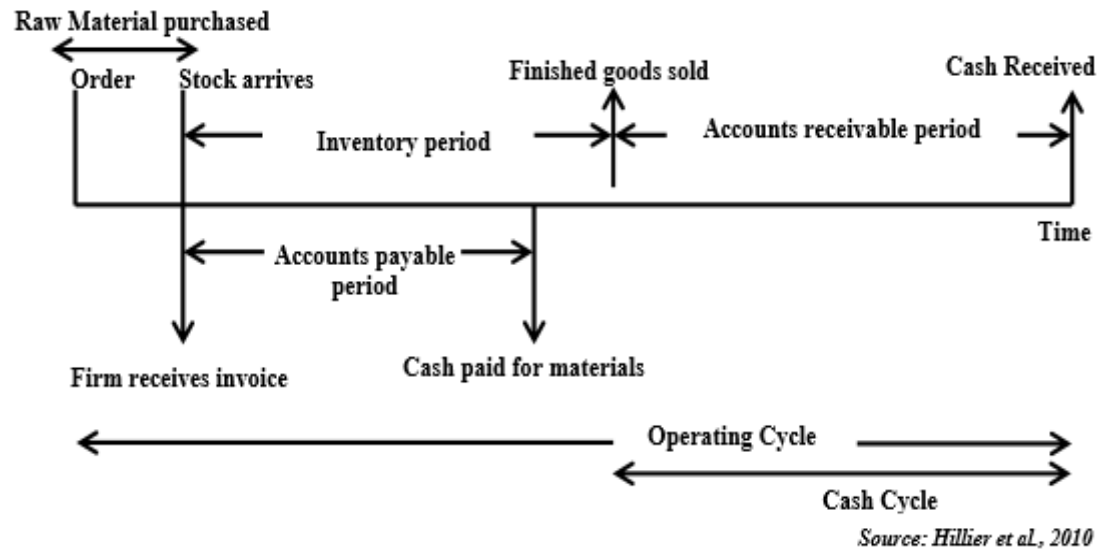
Figure 1 – Operating and cash cycle (Hillier et al, 2010)

We can define operation cycle as the time interval between the order of inventory and the date that cash is received. Meanwhile, cash cycle begins when companies pay suppliers for raw materials purchased and ends when cash is collected from customers (Hillier et al, 2010).

In this study we provide empirical evidence about the effects of WCM on non-listed UK firms' profitability and the importance of working capital policies. Moreover, we assess the existence of linear relationship between WCM and profitability.

We also analyze the effect of each business cycle on the relationship between working capital management and profitability.

To answer our key questions, we used data from about 400 companies with a total of 29 380 observations.

The remaining sections are organized as follows. Section II reviews the literature on the relationship between working capital management and profitability. Section III exhibits hypotheses. Section IV, describes dataset and its construction. The empirical

methodology and results are described in section V, presenting our conclusions in section VI.

2. LITERATURE REVIEW

Working capital can be presented in many different ways. For example, Aravindam & Ramanathan defined working capital as the cash invested in company's daily operations. For instance, Tagduan & Nicolaescu (2011) defined working capital as the percentage of permanent capital used to finance company's current assets.

To analyze the working capital of a company, we can also find different ways to calculate: through the liquidity or through the origin of the capitals. In the first way, working capital is calculated by the difference between current assets and currents liabilities, which give us the possibility to acknowledge the amount of capital which is allocated to operating needs (Aravindan & Ramanathan, 2013).

The second way, to obtain the working capital is through the difference between permanent capitals (equity and non-current liabilities) and non-current assets. If the difference between those two figures is positive, it means that the company uses the excess of permanent capitals to finance its current assets. If it is negative, it means that a percentage of the non-current asset is being financed by the short period financing, which enhances company's bankruptcy risk (Mota, 2013).

Thus, for a company it's recommended to have the same maturity for capitals used to finance assets and for the assets themselves. Usually, the transformation of the assets into cash takes more time than is previously forecasted, which obliges the company to need a positive working capital (Martins et al, 2009).

2.1. WCM – DEFINITION

Focusing on the working capital management definition, WCM can be defined as the management between current assets and current liabilities, whereas the responsible manager tries to avoid excess expenditures in the firms' assets – over-investment – and the failure to meet financial obligations in short term – under investment. The best WCM will be the one able to reach the optimal balance of the account receivables, inventories and payables.

An optimal balance or level of WCM is documented by N. Aktas et.al (2015), where they conclude that firms which converge to this level tend to improve their stock and operating performance on the subsequent periods.

The optimal level of account receivables, inventories and payables is even more important to small firms (Long et al., 1993), because they have more limited access to the capital markets, which gives them fewer options to finance operations and meet obligations. Furthermore, when these companies need finance to invest in cash, inventory or accounts receivables, they usually seek short term bank loans. Therefore, these companies need to have on its accounts higher cash reserves (Enqvist et al, 2014).

It's also important to acknowledge that firms with excess cash holdings and weak shareholder rights are more vulnerable to market acquisitions (Enqvist et al, 2014). Following this, Aktas et al. (2015) found that the increment of dollars invested in net operating capital is less valuable than to have dollars held in cash.

Blinder and Maccini (1991) argue that over-investment in working capital management can have its advantages as larger inventories are a key factor in order to reduce supplier cost, prices fluctuations and potential losses within a situation of stock-out.

This over-investment can also increase the quality and lengthiness of the relation between companies and their customers. On the other hand, over-investment in working capital management can lead to firm value destruction for shareholders (Aktas et al, 2015), as too much money stuck in working capital means less money to other projects and investments (Ek and Guerin, 2011).

Concluding, past studies on working capital management and profitability tend to be divided in two different categories (García-Teruel et al, 2012). In one view, higher the investment in working capital management, higher will be the possibility that companies have to boost their sales and to find best discounts to pay to the supplier's sooner.

On the other view, in order to have higher WCM, you will need financing and consequently, financing expenses, which can lead to the possibility of bankruptcy. Both these categories will be studied later on the relationship between the working capital management policies and the firm value.

As to reach an optimal balance of WCM is not an easy task, the best solution for a firm with over-investment in WCM is to channel it to corporate investment, as the decrease in unnecessary working capital increases firm's financial flexibility in the short run, because unnecessary cash is released, and in long run, as the needs of financing daily operating activities decreases.

So, for firms with high levels of unnecessary working capital, it's expected a negative relationship between working capital and corporate investment. For those without excessive working capital investment, it's not expected a negative relation, as they don't have funds to channel (Aktas et al, 2015).

2.2. THE IMPORTANCE OF WCM IN FINANCE

In all finance literature, the notion of working capital management appears as an important feature of a company. According to Aktas et al. (2015), at the end of 2011, the investment in working capital in US companies reached a total amount of 4,2 trillions of dollars, which represented at time, 18% of their total assets and 24% of total sales. Deloof (2003) argues that for most of the Belgian firms, working capital management is a crucial point on its financial strategy, representing about 27% of total assets of all nonfinancial firms.

To acknowledge the importance that working capital has in a firm's management, we can think about the importance given by the CFO magazine – well know financial magazine, which publishes annually a study of corporate working capital management performance for countries all over the world (Enqvist et al, 2014).

Buchmann et al. (2008) also argues that working capital is left without any importance in some firms' management strategies, take into example a company that has diminished its cash reserves in order to fund a major acquisition in Asian market.

2.3. KEY FACTORS TO ACHIEVE A PERFECT LEVEL OF WORKING CAPITAL

It's important to highlight that in order to find the "perfect" level of working capital to have for a determined company, you have to take into account several factors, as the type of business, the company's dimension, the suppliers relation, the market where the company acts, the growth opportunities that the company could have and the operations' seasonality (Caballero et al, 2010).

In order to understand the relation between working capital and type of business, we should think about two different business sectors –industry and retail. Thus, a factory usually presents longer operation cycles and invests more cash in its current assets, needing an higher working capital. In the opposite side, we find retail companies that usually don't have the production phase, needing only to sell the products, which mean a lower working capital as they have a shorter operating cycle, when compared to industries (Nwankwo & Osho, 2010).

The market where a company acts is another element which influences the working capital of a company due to the competitiveness of the business. Thus, if the level of competitiveness is high, the company needs to have a greater inventory in order to meet the customer's demands, logically needing an higher working capital (Nwankwo & Osho, 2010).

The relation with suppliers is also a key factor to achieve a perfect level of working capital, because if your suppliers usually meet your demands in a timely manner, you won't need to have big inventory. On other hand, if the relation is not characterized by providing inventory according to the schedule, you will need to have an higher volume of inventory in order to avoid any stock rupture (Nwankwo & Osho, 2010).

The company's dimension is also important due to the relation between the company's size and its credibility. If a company is credible in the market, it will have an higher negotiation power towards the suppliers, which will be translated such as into cheapest prices but also into extended credit terms (Manoori & Muhammad, 2012). Thus, the company will have a smoother operational activity, needing a lower working capital.

The growth opportunities that some companies seek for, is also related with working capital, as bigger you become, more customers' demands you will have to meet, needing an higher volume of inventory, and thus a bigger working capital (Mathuva, 2013).

The seasonality of the operations refers to time periods where the demand for seasonal products is higher. It's expected that companies that produce and consequently sell these products, will need a greater working capital, in order to meet those demands. In the opposite way, when the demand is lower, they will need a lower working capital (Aravindan & Ramanathan, 2013; Nwankwo & Osho, 2010).

Concluding, it's easy to understand that the determination of the perfect level of working capital regarding the operational needs of the companies has many constraints within company's profile, its activity and the economic scenario. These constraints should be taken into account when we, in the following chapters, try to evaluate the pros and cons of having an higher or lower working capital (Pires, 2006).

2.4. WCM AND FIRMS' PROFITABILITY

It's straightforward to think about a linear relationship between working capital management and firms' profitability, as earlier studies on this area show.

The working capital investment can be defined as the possibility to achieve an optimal balance between profitability and risk, taking into account that decisions that boost profitability normally mean low levels of liquidity, and decisions that maximize liquidity usually lead to lower profitability. Following this two different approaches to

working capital investment, we can distinguish two different strategies/policies in what it takes to working capital management – conservative and aggressive policies.

2.5. WCM – CONSERVATIVE AND AGGRESSIVE POLICIES

In the aggressive working capital policy, WCM policy with more risk involved, implies a lower investment in working capital accounts which means lower levels of inventories, the shortening of trade credit to customers and also the postpone payment to suppliers. This policy means a greater profitability and also a greater risk for companies. This inverse relationship between working capital management and profitability is proved through the studies of Hager (1976), where the author stated that firms holding lower levels of working capital accounts tend to reduce the cost of holding unproductive assets, such as marketable securities. In contrary direction, these firms tend to increase their payables, thus reducing its financing needs.

For instance, Deloof (2003) points to a negative relationship between working capital management and profitability demonstrating that a reduction in accounts receivables and inventories – working capital accounts – increases profitability; as less profitable firms need more time to pay their financial obligations. By having lower working capital accounts, the firms will also have lower service costs on their inventory keeping.

In the opposite way, a conservative working policy implies an higher investment in working capital accounts – higher levels of inventories, extending more trade credit to customers and reducing supplier's financing – which translates into lower profitability and risk. However, Petersen et al. (1994), points to a greater profitability due to higher sales. These higher sales are directly related with the high levels of inventories, because

if you have more inventories, the operation cycle will not be interrupted and supply costs will be diminished. Along with this, the customers' fidelity will increase and the prices fluctuations will decrease. (Petersen et al,1994).

Regarding extended credit to customers, there's a positive association between that and firm's profitability, as clients will have a larger time lapse to check if the services were purchased accordingly with the contract, both in quantity and quality. According to Smith (1987), this extended credit also strengthens the relationship between buyer and seller, which increases sales in periods of low demands and reduction of transaction costs.

	Profitability	Risk	Accounts Payable	Inventories	Accounts Receivable	WCM Investment/ Length
Linear Relation						
Conservative Policy	Lower	Lower	Shorten	Higher levels	Extend	Higher Investment /Longer
Aggressive Policy	Higher	Higher	Extend	Lower levels	Shorten	Lower Investment/Shorter

Figure 2 – Linear relationship between profitability and working capital management policies (Gomes, 2013)

2.6.   INVENTORIES MANAGEMENT

In order to achieve the best possible management of working capital, a manager should be worried about the amount invested in inventories, the amount of credit to be conceded to clients and also the amount of credit to be asked from suppliers.

Mathuva (2013) argues that the level of investment in inventories should be decided taking into account company's operation cycle and its sales forecast. Hence, companies should have in stock enough inventories to continue its production cycle and also an adequate level of inventories for its business volume.

By choosing an high level of inventories, the company will be less profitable, as it will have more money invested in inventories and less money available to invest in business opportunities. Adding to this fact, more inventories also represents more difficulties because the product's rotation will be less fluid and the risk of stocks becoming obsolete will be higher (Caballero et al, 2012).

But a choice for an high level of inventories can be understood by some facts. First because it can be important to safeguard future sales; to safeguard any stock break; to avoid any interruption in the production cycle and finally, to avoid the risk of losing a client or a business (Deloof, 2003).

High volumes of inventory levels can also be important to avoid prices' fluctuation, as one company with an higher level of inventories, may find better prices and better business opportunities, as it will not have on its back any urgent need of buying to fulfill any client demand. This flexibility can be very important to reduce the supplying cost (Martins et al., 2009).

2.7. WCM AND FINANCING

The trade credit represents a time period granted between the supplying of goods/services and its payment. In one hand, when a company is a supplier, the trade credit is an investment in accounts receivables, representing the time period granted for a client to pay his debts. On the other hand, if a company is a client, the accounts payables represent financing obtained among its suppliers (Petersen et al, 1994).

The main reason why companies seek trade credit is due to flexibility inputted on treasury management (Caballero et al, 2010), as the financing's sources became more

diversified because the company will became independent from bank's financing (Danielson & Scott, 2000) or of access to capital markets (Peterson et al, 1994). Furthermore, trade credit will be a cheaper financing source (Deloof, 2003).

Despite the reduction of costs enhanced by trade credit, this financing source may represent higher prices for companies, specifically when a company waste prompt payment discounts. These discounts are usually used to promote a quicker payment from the clients.(Caballero et al, 2010).

Thus, in order not to lose prompt payment discounts, companies only resort to trade credit opportunity when they have restrictions on access to financing through banks or when any other cheaper financing source is not available, according to Danielson & Scott (2000).

On the opposite way, emerges the company as a supplier. By being a supplier, a company can find on trade credit, its way to growth sales. This growth may occur as, by extending the payments deadlines, the supplier will allow its buyer to experiment product before using it, reducing asymmetries between the information provided by the seller and buyer's feedback.

For example, Caballero et al. (2012) argued that trade credit concession is one key fact when a client needs to choose its supplier. Adding to this, trade credit can also contribute to foster the relationships between suppliers and clients.

Despite all advantages that concession of trade credit may arise on a company's life, it's also important to highlight its disadvantages. Thus, the sales growth has to offset the costs brought by this strategy, namely high amount of accounts receivables and the losses brought by bad debts.

Previous studies regarding working capital management have focused their analysis on large firms, with presence on stock markets when the management of current assets and liabilities is more important in the case of small and medium-size companies (Caballero et al, 2010), as these type of companies face more problems in terms of financing because they don't have access to stock markets and have limited access to bank's financing.

In this context, the objective of the current work is to provide empirical evidence about the effects of a working capital management for a panel made up of about 400 UK companies with no access to stock markets.

This work contributes to the literature on this area as it will analyze the relationship between working capital management and profitability on unlisted companies, which is a relevant gap on the literature analyzed before, and summed up along this chapter.

3. HYPOTHESES

The cash conversion cycle (CCC) will be the proxy used in our study to measure working capital management. Enqvist et al. (2014) defined it as the length of time between a company's expenditure for the procurement of raw materials and the collection of sales of finished goods.

Thus, an efficient working capital management is based on shortening the numbers of day's receivables and on delaying payments to suppliers. Despite this, Deloof (2003) states that low inventory levels, tight trade credit policies and utilizing obtained trade credit as a means of financing can increase risks of inventory stock-outs, decrease sales

stimulants and increase payables costs by losing cash discounts, as stated previously on this investigation.

We will thereby test a hypothesis of a negative relationship between the CCC and profitability, because the main challenge faced by the managers is to find a balance between liquidity and profitability.

Hypothesis 1a – There is a negative relationship between the cash conversion cycle and profitability.

According to Enqvist et al. (2014), the three components of CCC are estimated as follows:

No. of days accounts receivables = (Account receivables / Sales) x 365;

This variable represents the average number of days that a firm takes to collect payments from its customers. Hence, higher the value, higher will be the investment in accounts receivables. (Caballero et al, 2012)

No of days accounts payable = (Accounts Payables / Cost of Goods sold) x 365;

The numbers of days accounts payable is a variable defined as the average number of days that takes a firm to pay their suppliers. The higher the value, more days firms take to settle their debts. (Caballero et al, 2012)

No of days inventory = (Inventory / Cost of Goods Sold) x 365

This variable can be defined as the average number of days of stock held by the firm. (Caballero et al, 2012). As stated earlier on this paper, longer storage times reflect a greater investment in inventory

Within these three different variables, we calculate the cash conversion cycle – CCC. This variable is calculated as the number of days accounts receivable plus the number of days of inventory minus the number of days accounts payable (Caballero et al, 2012).

Thus, we will try to test the effects of each cash conversion cycle's component on a company's profitability.

Hypothesis 2a – There is a positive relationship between the payables deferral period and profitability.

Hypothesis 3a – There is a negative relationship between the receivables conversion period and profitability.

Hypothesis 4a – There is a negative relationship between the inventory conversion period and profitability.

Following the study of Enqvist et al. (2014), we will also study the effect promoted by the different economic states – downturn, boom and normal – on the relationship between working capital and profitability. This topic is very important, because working capital assessments by firms are usually driven by liquidity problems. It's also known that changes in macroeconomic states affect company's investments and financing.

For example, in poor economic states, companies face more problems to grow and to enhance its cash flows, being this linked with longer time for collecting account receivables and increased inventories conversion periods.

Due to the importance that working capital management may have in poor states of economy, we will test if the significance of the relationship between the cash conversion

cycle – and each account of it – grows during economic downturns. On the other hand, as investments grow in boom periods, we will test if the relation is less significant on this economic state:

Hypothesis 1b - The significance of the relationship between the cash conversion cycle and profitability increases during economic downturns.

Hypothesis 1c - The significance of the relationship between the cash conversion cycle and profitability decreases during economic booms.

Hypothesis 2b - The significance of the relationship between the account payables deferral period and profitability increases during economic downturns.

Hypothesis 2c - The significance of the relationship between the account payables deferral period and profitability decreases during economic booms.

Hypothesis 3b - The significance of the relationship between the account receivables conversion period and profitability increases during economic downturns.

Hypothesis 3c - The significance of the relationship between the account receivables conversion period and profitability decreases during economic booms.

Hypothesis 4b - The significance of the relationship between the inventory conversion period and profitability increases during economic downturns.

Hypothesis 4c - The significance of the relationship between the inventory conversion period and profitability decreases during economic booms.

4. DATA AND DESCRIPTIVE STATISTICS

4.1. SAMPLE AND DATA DESCRIPTION

The sample will include around 400 companies from the UK with observations from the last 9 years (2006 – 2014).

Our sample will only include companies not listed on stock exchanges, mainly because this was never studied before - the past studies within the working capital management and its relation with profitability only studied listed companies – and because these companies, with no access to capital markets, have a bigger responsibility to manage its working capital, as they are only dependent on banks' financing.

Following Shin and Soenen (1998), Deloof (2003) and Enqvist et al. (2014), the financial firms will also be excluded from our data set.

Another filter inputted in this search was the type of accounts to use. We have only selected companies with consolidated accounts. By using this filter, we will avoid to have parents and subsidiaries' accounts, having both accounts together.

Furthermore, we also excluded companies with less than 50 million EUR of total assets, which focus our study to medium and large companies.

After applying the filters mentioned above, we gathered about 400 companies to analyze, with the total of 29 380 observations.

The distribution of the number of observations per year follows on chart I on Appendix. 2006, 2007, 2008, 2010 and 2011 are the years with more observations available.

4.2. VARIABLES DESCRIPTION

In order to measure working capital management, we will use the cash conversion cycle (CCC) defined as:

CCC = (no. of Days account receivable + Number of days Inventory) – (No. of Days Payable)

By using CCC as the proxy for working capital management, we recognize the life expectancies of working capital components but also the fact that production, distribution and collection may be unsynchronized processes.

The CCC was also adopted by other recent studies such as Deloof (2003) and Caballero et al. (2010). As stated previously on this investigation, the CCC has three different components: Accounts receivables; Accounts Payables; Inventory.

Within these three different variables, we calculate the cash conversion cycle – CCC. This variable is calculated by the number of days accounts receivable plus the number of days of inventory minus the number of days accounts payable. (Caballero et al, 2007).

As per the paper of Caballero et al. (2010), we will use the return on assets (ROA) as the proxy for company's profitability. The ROA can be measured as the ratio of net income to total assets Enqvist et al. (2014). ROA's main advantage is its transparency, as it is not obscured by special items or by the capital structure of the company.

The other profitability variable will be the Gross Operating Income, calculated as the EBIT - which is an operating indicator that discloses the company's results before the

payment of interests and taxes – divided by the difference between total assets and the financial assets. We will abbreviate this variable as GOI.

Following the papers of Enqvist et al. (2014), Deloof (2003) and Lazaridis & Tryfondis (2006); we included three different control variables:

a) Sales – Natural logarithm of sales

b) Current Ratio – Current assets / Current liabilities

c) Financial debt ratio – (short-term loans + long-term debt) / total assets

The sales variable will be important in order to control for the company size.

The current ratio explains company's ability to pay its financial obligations, variable that will also be essential for our regression model for controlling company's level of liquidity.

The financial debt was also included as control variable as this ratio indicates the extent of a company's leverage.

We also include two dummy variables on our study, DD and DB, where DD represents the periods of economic downturn and DB the periods of economic boom. First we calculated the average GDP variation between 2006 and 2014 – please check chart II on appendix, and then we considered the years with negative GDP as the downturn period and the ones with GDP higher than 2.5% as the boom period and the remaining years as normal period:

Downturn Years – 2008 and 2009

Normal Years – 2010, 2011, 2012 and 2013

Boom Years – 2006, 2007 and 2014

We also include dummy variables within company's sector and year's observation, controlling for fixed effects.

4.3.   DESCRIPTIVE STATISTICS

Table I presented on the appendix shows the descriptive statistics – mean, median, standard deviation, minimum and max – of the variables presented on the last chapter.

In our study, the average cash conversion cycle for UK companies, not listed on stock exchanges, is 13.31 days, which is substantially lower when compared with Spanish SMEs (76.3 days) and also the Belgian companies (44.5 companies). It is very lower when compared with Finish firms (108.8 days) and listed greek companies (189 days) – see (Deloof, 2003; Larazidis and Tryfonidis, 2006; Caballero et al, 2010).

Furthermore, the average account receivables period is 32.72 days which is lower when compared with the Finnish companies – 47.6 days and with large Belgian companies – 54.64 days.

Within the average accounts payables deferral, we find it very similar to Belgian and Finish firms – 56.77 days and 56.4 days respectively. For UK companies it's 67 days, which is relatively higher.

Within the inventory conversion period, our study shows an average very similar to the large Belgian firms – 47.59 days vs 46.62 days. When compared with Finish listed companies, our inventory conversion period is quite lower, as Finish companies present 117.6 days.

Regarding the return on assets, the average value for this profitability variable is higher for Finish Firms and Spanish – 8.4% and 7.9 % respectively. In our study, the average return on assets is 4.16% which is quite inferior when compared to the previous ones.

In an average non listed UK company, about 27% of the company's assets are financed with debt, which is a very low number when compared with Finish companies – 53% (Enqvist et al, 2014).

The UK companies also present a high volume of sales - an average of 230 540 thousand euros – which is considerably greater when we compare to the sale's volume of Finish companies – 9 619 thousands euros. This huge difference is related with the size of the companies analyzed on both studies – on our study we just analyzed medium and big companies while in the other study there is no filter regarding company's size.

4.4. PEARSON CORRELATION

Following the studies of Deloof (2003), Enqvist et al. (2014), in Table II of the Appendix, we present the bivariate Pearson Correlation between all the variables used in this study. The Pearson Correlation produces a sample correlation coefficient, *R,* which measures the strength and direction between pairs of continuous variables. In addition, this type of correlation evaluates whether there is statistical evidence for a linear relationship.

On a normal business cycle, the continuous variable ROA has a significant correlation with all the independent variables, besides the inventory conversion period and company's sales. In the downturn period, ROA only presents substantial correlation

with GOI, the account receivables period and the financial debt while in the boom period, it also presents significant correlation with the current ratio.

Regarding GOI, in the normal period, it has significant correlation with the CCC, all its components and with company's financial debt. While on the boom period, it has significant correlation with ROA, CCC, AP – account payables deferral period, AR – account receivables conversion period and also with the company's sales. On the downturn period the GOI does not show significant correlation with the account payables deferral period, maintaining the other significant correlations presented on the boom period.

Regarding the correlation between CCC and all other variables within the three different periods, we can see that the correlation between CCC and ROA is only significant on normal business cycles, denoting that the CCC is not correlated with company's profitability in boom and downturn periods.

There are also differences on the correlation between the CCC and the current ratio and the company's sales, as the correlation are only significant on downturn periods – CCC and current ratio – and not only significant on downturn and boom period – CCC and sales. This means that the CCC is only correlated with the company's liquidity on downturn periods and with sales on boom and downturn periods.

Regarding the components of CCC, the correlations between the account payables period and the other variables only differ from period to period within the ROA – it's only correlated on normal periods, GOI – it's not significantly correlated on downturn periods, inventory – it's not significant on boom periods and current ratio – not significant correlated on normal periods.

The correlations between the account receivables period is very similar along all the business cycles, except the correlations with the AP and current ratio, as both are not significantly correlated in downturn periods. It's also important to highlight that account receivables present significant and negative correlation, in all business cycles, with both profitability variables.

The last component of CCC – inventory conversion period – also presents some changes along the business cycles. For instance, the correlation between INV and the gross operating income is not statistically significant, meaning that the INV does not correlate with the income generated by a company, where we are facing a boom business cycle. On the other hand, it only shows significant correlation on normal business cycles with the AP and with the financial debt.

The INV – inventory conversion period - presents statistically significant correlations along all business cycles with the cash conversion cycle and with the company's liquidity – current ratio.

Regarding the control variables, they are all significantly correlated with each other, along all business cycles.

The financial debt shows noteworthy correlations with the return on assets, meaning that a company's profitability is linked with the capacity to meet their financial obligations. This control variable also presents significant correlations with the CCC and AR, along all business cycles.

For instance, the current ratio presents significant correlation with the AP, showing that company's liquidity is connected with the length of time a company takes to collect payments from its clients.

Concluding this topic within the Pearson correlation, the sales present significant positive correlations with the gross operating income and with the cash conversion cycle (besides the boom period).

On the other hand, it shows negative and significant correlations with the AP and INV, showing that the company's sales are strictly affected by the length of time a company takes to pay its debts to suppliers and also by the extent of time taken between the product's manufacturing and it sale.

5. EMPIRICAL METHODLOGY AND RESULTS

Following the models formerly applied by Enqvist et al. (2014), Deloof (2003) and Lazaridis and Tryfondis (2006), we estimate the following regression model to study the effects of the cash conversion cycle on company's profitability:

(1) Profitability = β0 + β1 CCC + β2 CR + β3 DEBT + β4 SALES + β5 D1 + B6 D2 + β7 (D1*CCC) + β8 (D2*CCC) + u

Where profitability is calculated separately by return on assets (ROA) and gross operating income divided by the difference between total assets and financial assets (GOI): CCC is Cash Conversion Cycle; CR is current ratio; DEBT is debt ratio; SALES is the natural logarithm of sales; DD is the recession variable; DB is the boom variable and u is an error term.

In order to check the influence that each component of the cash conversion cycle has on company's profitability, we re-estimate equation 1 for the two profitability variables, along with substituting CCC with the accounts payable deferral period, the accounts receivable conversion period and inventory conversion period.

Besides the coefficients of our regression models, we will present on our results the R squared which is the measure of the proportion of variance in the dependent variable that is explained by the independent variable.

5.1.   REGRESSION ANALYSIS

In table III and IV we estimate four different models:

(2) Model 1 - **Profitability = β0 + β1 CCC + β2 CR + β3 DEBT + β4 SALES + β5 (D1*CCC) + β6 (D2*CCC) + u (1)**

(3) Model 2 – **Profitability = β0 + β1 AP + β2 CR + β3 DEBT + β4 SALES + β5 (D1*AP) + β6 (D2*AP) + u**

(4) Model 3 – **Profitability = β0 + β1 AR + β2 CR + β3 DEBT + β4 SALES + β5 (D1*AR) + β6 (D2*AR) + u**

(5) Model 4 - **Profitability = β0 + β1 INV + β2 CR + β3 DEBT + β4 SALES + β5 (D1*INV) + β6 (D2*INV) + u**

The only difference between both tables is the profitability variable used – in table III we used return on assets as profitability proxy while in table IV we used the gross operating income.

For both models we expect a negative relation with the cash conversion cycle, the account receivables conversion period and the inventory conversion period. On the opposite way, we anticipate a positive relation with the account payables period.

The relationship between profitability and CCC is analyzed through the first model of table III and table IV presented on the appendix. Both show a negative and statistically significant relation between CCC and ROA and CCC and GOI – providing support to hypothesis 1a, hence, this result is in line with previous studies (Deloof, 2003; Caballero et al, 2010; Lazaridis and Tryfondis, 2006). Thus, we can conclude that companies can increase profitability by reducing the length of its CCC.

The empirical results also illustrate the influence that the business cycle may have on the relation between profitability and working capital management. For instance, the relation between GOI and the interactive dummy variables (CC* DD and CC*DB) show that the importance of WCM tends to be more significant on downturn periods and less significant on boom periods – displaying sustenance to hypothesis 1b and 1c.

On the other hand, despite the results of the relation between ROA and the interactive dummy variables be significant they show different conclusions from what we expected. By analyzing the relation between ROA and (CCC*DD), we can conclude that the significance decreases in downturn periods; we can also conclude the same thing by looking at the results within the interactive dummy variables (CCC*DB), providing support for hypothesis 1c and discrediting hypothesis 1b.

Model 2 in table III and IV tests the influence of account payable deferral period on profitability. Both results show a positive and significant relationship – providing support to hypothesis 2a - meaning that companies can increase profitability by

extending the time to pay their bills. We can then conclude that unlisted UK companies use trade credit as a source of financing, contrarily to Finish companies which use cash discounts on payables (Enqvist et al, 2014).

These results also differ from the ones obtained for Greek and U.S. listed companies, where no relationship between account payables and profitability was found (Lazaridis and Tryfondis, 2006).

Regarding the influence of economic states on a company profitability – account payables relation, we only find statistical significant results within the boom period – relationship between GOI and interactive dummy variable (DB*AP) – showing that the influence of AP on company's profitability slightly decreases with greater economic conditions – validating hypothesis 2c.

Within the relation between account receivables conversion period, we found very similar results on table III and IV. Both show a negative statistically significant relationship, which mean that more profitable companies shorten their account receivables conversion periods, providing support to hypothesis 3a. Then, we can infer that UK firms, without presence on stock exchanges, shorten trade credit to customers, characteristic of an aggressive WCM policy. This lack of flexibility among the customers can be quite harmful for the relation between the company and a customer.

Among our empirical results, we also find statistical evidence that both states of economy affect the relationship WCM – profitability. For instance, the ROA – (AR*DB) relationship shows that on economic booms the significance of account payables deferral period decreases. On the opposite way, we find that the relationship

between GOI and (AR*DB) shows that this significance decreases – providing support to hypothesis 3c.

The results presented within the interactive dummy variable (AR*DD) also show that the significance decreases on the relationship between the two profitability variables. The relationship between ROA and this last variable also lend some support to reject hypothesis 3b.

The results on the relationship between profitability and the inventories conversion period (INV) is provided by model 4 in table III and IV. The results don't support statistically evidence of a negative relationship between inventory conversion period and profitability. The empirical evidence, however, show that in poor economic states the aggregate relationship between GOI and INV is negative, showing that UK unlisted companies shorten their inventory conversion period in order to enhance their profitability – providing support to hypothesis 4b. By having low levels of inventories, the companies will also have lower service costs on their inventory keeping.

We didn't find any statistical evidence of the effects of the boom periods on the relationship between INV and profitability.

The relationships between the profitability variables and the control variables are quite different from each other, apart from the relationship with the current ratio – faintly positive, which shows that a greater margin of liquidity can improve firm's profitability.

The quantity of leverage a company uses in its operation – DEBT – presents a significant and negative relationship with ROA and a positive one with GOI. The same happens with the relationship between the firm's size and each profitability variable.

The dummy variables reflect changes in profitability along different economic stages. The recession dummy variable presents negative and statistically significant relationship with profitability in all models, besides model 4 where we didn't find any statistical evidence. Regarding the boom dummy variable, it presents positive and statistically significant relationship with profitability in all models, despite the model 2 of table III – ROA and AP.

6. CONCLUSIONS

Working capital management is usually identified by corporate financial executives as a very important performance factor of their firm. This importance is reflected by the prominent position given by CFO magazine and other financial publications. Consequently the relationship between working capital management and company's profitability is an usual topic of study within the financial area.

This study examines the relationship between working capital management and profitability on UK unlisted companies between 2006 and 2014 and also the effect of each business cycle on this association.

On our study, we analyzed a period of time where Europe was affected by a massive financial crisis, fact that gives even more importance to our study because the efficient working capital management played a very important role along these years, since companies studied on this dissertation saw their main financing partner – banks - fighting against the crisis, placing more hurdles to lend money.

We used the cash conversion cycle to measure the working capital management which can be defined as the length of time between companies buying raw materials and the

collection of sales of finished goods. We used two measures to profitability, return on assets and gross operating income.

We documented a negative and significant relationship between both profitability variables and CCC, meaning that more profitable companies tend to take less time to buy, produce and sell the products. Within the business cycles, we found more significance on the relationship between CCC and GOI on downturn periods and less significance on boom periods. Regarding the relationship with ROA, the variable (CCC*DD) tends to be less significant on downturns.

On the relationship between account payables deferral period and profitability, we find empirical evidence of a positive relationship, meaning that companies need to postpone their payments, using trade credit as financing, in order to be more profitable. We only find statistical evidence to support hypothesis that the significance of the relationship between profitability and variable (CCC*DB) decreases on boom periods.

Within the account receivables period, we found statistical evidence to confirm that companies that short their credit to customers tend to be more lucrative. Regarding the effect of business cycles, we found that the significance between profitability and this working capital account decreases on downturn periods.

The inventory conversion period didn't show any statistical evidence of relationship with both profitability variables. However, we found statistical evidence to assure that the significance between the inventory conversion period and profitability increases during economic downturns.

Overall, our results showed that the working capital management should be taken into account to invest as a suitable administration of this variable can lead to better operating results. Hence, our study has highlighted even more the importance that an efficient working capital management may have on a company's administration.

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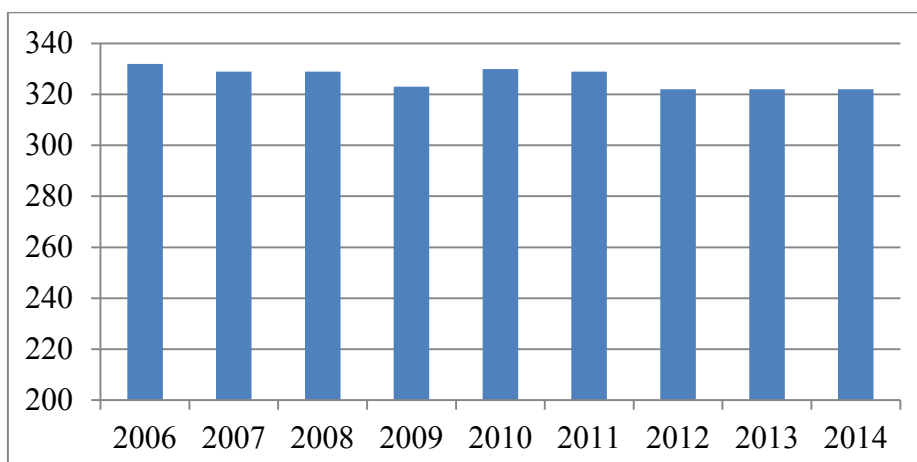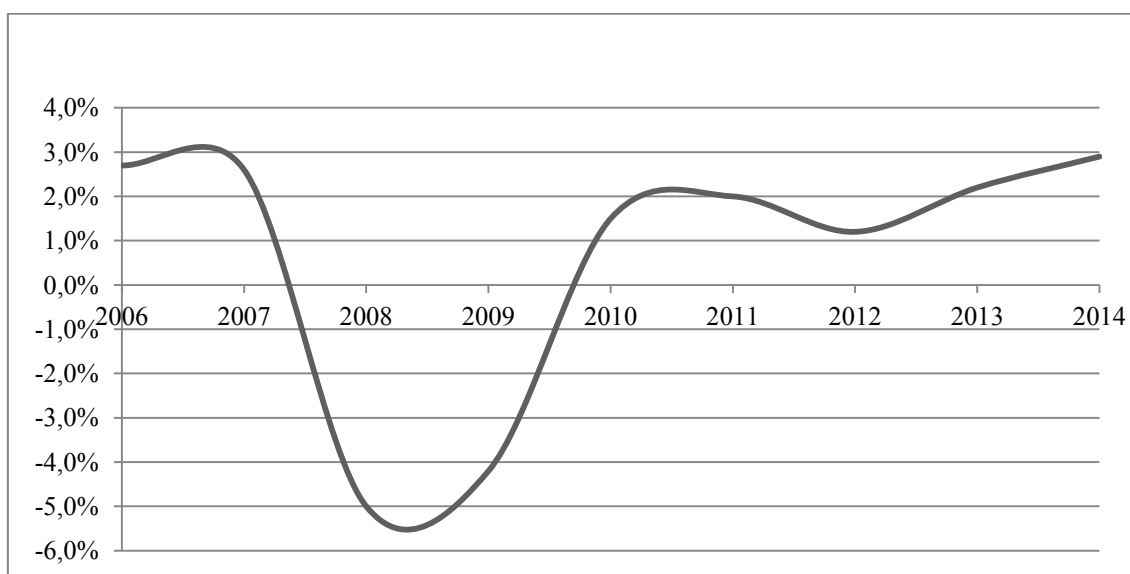# 8. APPENDIX

Chart I – Number of observations per year

Chart II – UK GDP evolution between 2006 and 2014

Source: http://ec.europa.eu/eurostat

Table I - Descriptive statistics

	Mean	Median	Std Dev	Min	Max
AR	32.72	27.14	23.93	0	197.36
AP	67	55.22	61.43	0	679.45
INV	47.59	30.49	53.07	0	295.89
CCC	13.31	11.74	82.01	-498.99	414.81
ROA	4.16	3.48	53.07	-25.26	33.93
GOI	0.16	0.06	0.31	-2.24	2.29
EBIT	9064.07	4928.66	16991.1	-94131.43	128319.84
CR	1.66	1.26	1.38	0.03	13.21
Debt	0.27	0.22	0.24	0	1.35
Sales	230540.01	121438.2	306460.28	1744.45	1886257.15

Descriptive statistics for key variables with the total of 29380 observations.

AR is account receivables period; AP is account payables deferral period; INV is inventory conversion period; CCC is cash conversion cycle; ROA is return on assets; GOI is gross operating income divided by the difference between total assets and financial assets; EBIT is earnings before interests and taxes; CR is current ratio; Debt is debt ratio; Sales is natural logarithm of sales

Table II - Pearson correlation for key variables

	Economy cycle	ROA	GOI	CCC	AP	AR	INV	CR	Debt	Sales
ROA	Normal		,232**	-,072**	,101**	-,093**	0,053	,096**	-,326**	-0,015
	Downturn		,207**	-0,068	0,071	-,079*	0,012	0,018	-,307**	0,025
	Boom		,273**	-0,058	0,059	-,100**	0,019	,129**	-,364**	0,002
GOI	Normal	,232**		-,170**	,064*	-,156**	-,111**	-0,014	0,047	,500**
	Downturn	,207**		-,105*	0,014	-,131**	-,099*	-0,037	0,045	,543**
	Boom	,273**		-,102**	,080*	-,142**	-0,01	0,035	-0,042	,492**
CCC	Normal	-,072**	-,170**		-,654**	,337**	,598**	-0,024	-,088**	0,044
	Downturn	-0,068	-,105*		-,686**	,324**	,633**	-,080*	-,139**	,113**
	Boom	-0,058	-,102**		-,666**	,301**	,672**	-0,033	-,119**	,086**
AP	Normal	,101**	,064*	-,654**		,095**	,137**	,170**	-0,022	-,214**
	Downturn	0,071	0,014	-,686**		0,066	0,056	,205**	0,075	-,270**
	Boom	0,059	,080*	-,666**		,132**	0,033	,190**	,072*	-,225**
AR	Normal	-,093**	-,156**	,337**	,095**		,158**	-,174**	-,170**	-0,033
	Downturn	-,079*	-,131**	,324**	0,066		,145**	-0,063	-,188**	-0,005
	Boom	-,100**	-,142**	,301**	,132**		,182**	-,098**	-,116**	0
INV	Normal	0,053	-,111**	,598**	,137**	,158**		,244**	-,080**	-,170**
	Downturn	0,012	-,099*	,633**	0,056	,145**		,142**	-0,048	-,135**
	Boom	0,019	-0,01	,672**	0,033	,182**		,204**	-0,055	-,120**
CR	Normal	,096**	-0,014	-0,024	,170**	-,174**	,244**		-,135**	-,198**
	Downturn	0,018	-0,037	-,080*	,205**	-0,063	,142**		-,083*	-,199**
	Boom	,129**	0,035	-0,033	,190**	-,098**	,204**		-,138**	-,153**
Debt	Normal	-,326**	0,047	-,088**	-0,022	-,170**	-,080**	-,135**		-,173**
	Downturn	-,307**	0,045	-,139**	0,075	-,188**	-0,048	-,083*		-,187**
	Boom	-,364**	-0,042	-,119**	,072*	-,116**	-0,055	-,138**		-,267**
Sales	Normal	-0,015	,500**	0,044	-,214**	-0,033	-,170**	-,198**	-,173**	
	Downturn	0,025	,543**	,113**	-,270**	-0,005	-,135**	-,199**	-,187**	
	Boom	0,002	,492**	,086**	-,225**	0	-,120**	-,153**	-,267**	

Pearson correlation for the key variables, for the total of 29380 observations. ROA is return on assets; GOI is gross operating income divided by the difference between total assets and financial assets; CCC is cash conversion cycle; AP is account payables deferral period; AR is account receivables period; INV is inventory conversion period; CR is current ratio; Debt is debt ratio; Sales is natural logarithm of sales; ** denotes the 10% significance level while * denotes the 5% significance level. Normal, Downturn and Boom

Table III – Linear regression model with ROA as profitability's proxy

Coefficient estimate	Expected sign	Model 1	Model 2	Model 3	Model 4
Constant		10,612***	9,319***	13,467***	10,553***
DD	-	-1,041*	-,866**	,279	,470
DB	+	,635**	,293	,758***	,613*
CCC	-	-,008***			
(CCC*DD)	-	-,006**			
(CCC*DB)	+	-,005**0			
AP	+		,006*		
(AP*DD)	+		,005		
(AP*DB)	-		,004		
AR	-			-,044***	
(AR*DD)	-			-,027*	
(AR*DB)	+			-,036***	
INV	-				-,001
(INV*DD)	-				-,002
(INV*DB)	+				-,001
CR		,113	,095	,007	,142
Debt		-8,934***	-8,887***	-9,463***	-8,793***
Sales		-,335***	-,275**	-,442***	-,346***
R-Squared		0,39	0,41	0,41	0,38

The table represents results from estimate the following regression model from the years of 2006 to 2014, for a total number of 29380 observations:

Profitability = β0 + β1 CCC + β2 CR + β3 DEBT + β4 SALES + β5 DD + β6 DB + β7 (CCC*DD) + β8 (CCC*DB) + u

Where profitability is measured by return on assets (ROA); CCC is cash conversion cycle; AP is accounts payable deferral period; AR is accounts receivable conversion period; INV is inventory conversion period; CR is current ratio; DEBT is debt ratio ; Sales is the natural logarithm of sales; * denotes 10% significance level while ** denotes 5% and *** 1%

Table IV – Linear regression model with GOI as profitability's proxy

Coefficient estimate	Expected sign	Model 1	Model 2	Model 3	Model 4
Constant		,715***			
DD	-	-,215***			
DB	+	,244***			
CCC	-	-,002**			
(CCC*DD)	-	-,215***			
(CCC*DB)	+	-,001**			
AP	+		,003***		
(AP*DD)	-		-,007		
(AP*DB)	-		,001***		
AR	-			-,005***	
(AR*DD)	+			-,007**	
(AR*DB)	-			-,007***	
INV	-				,004
(INV*DD)	+				-,002**
(INV*DB)					0
CR		,103***	,088***	,094***	,103***
Debt		,567***	,608***	,530***	,608***
Sales		,646***	,675***	,636***	,649***
R-squared		0,58	0,59	0,57	0,57

The table represents results from estimate the following regression model from the years of 2006 to 2014, for a total number of 29380 observations:

Profitability = β_0 + β_1 CCC + β_2 CR + β_3 DEBT + β_4 SALES + β_5 DD + β_6 DB + β_7 (CCC*DD) + β_8 (CCC*DB) + u

Where profitability is measured by GOI which is gross operating income divided by the difference between total assets and financial assets; CCC is cash conversion cycle; AP is accounts payable deferral period; AR is accounts receivable conversion period; INV is inventory conversion period; CR is current ratio; DEBT is debt ratio ; Sales is the natural logarithm of sales; * denotes 10% significance level while ** denotes 5% and *** 1%;