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**The relationship between working capital management and profitability**

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by

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### **ABSTRACT**

This paper studies the relationship between working capital management and profitability in Chinese listed companies for a period of 7 years from 2010 to 2016. We used a sample of 736 companies listed in the CSMAR- CSRC Industry Classification 2012 Edition. Working capital as a crucial component of corporate financial management affects the profitability of the firms. The goal of this research is to establish a relationship that is significant between the cash conversion cycle and profitability for Chinese listed companies. The outcomes of our study showed that there is a meaningful negative relationship between working capital management, which measured by cash conversion cycle, and profitability, which examined by gross operating profit. Simultaneously, managers can improve company performance in making profits by reducing the cash conversion cycle to a possible minimum level with a consideration of control factors, including company size, fixed financial assets ratio, financial debt ratio, and current ratio.

Keywords: Working Capital; Profitability; Firm Size; Fixed financial assets ratio; Financial debt ratio; Current ratio

JEL codes: G3, G32

## I.INTRODUCTION

Our research is trying to figure out the relationship between working capital management and profitability in a listed Chinese company, and whether the results will be consistent with the previous studies in other countries or not.

Nowadays, with various regulations in the global industry and complex trade situations, global businesses face certain potential uncertainties in the ordering process, and managers are under pressure to maintain a high level of profit when investors concern about their rewards. The profitability of a company is highly related to the stability that includes liquidity in short term and stability in the long term. The Chinese listed companies, which play a crucial role in the Chinese economy, suffer from various difficulties, for example, the inadequate qualified working labours, insufficient opportunities to develop, numerous competitors, limited investments to support researches, less advanced technology, and especially problems in managing, marketing, and financing. Thus, companies that can survive in the current economic environment are supposed to enhance at least their financing ability, which related to the management of working capital.

There are various researches that provide approaches to evaluate working capital management. Some of the researchers explore the influence of accurate or satisfying internal control of inventory, and others try to figure out the relationship between accounts receivable and profitability. All in all, researchers are supposed to find the factors that have an impact on profitability, which to guide management when they manage both internal and external controls. Based on previous studies, if a company owns effective working management, the performance of the company will be highly stimulated in specific ways. Results which are similar to this implies working capital management motivates better company performance, especially in making profits among daily business.

Companies are in high demand for working capital not only to start the business but also to maintain the galloping trend of its future development. Management of working capital is focused on the day-to-day business, which means that it concerns more on short term obligations than long term debts. At the same time, working capital management contains the management of current assets and

current liability. Cash as a critical component of existing assets represents the company's liquidity ability. Also, accounts receivables, accounts payables, inventories are vital factors that have an impact on the strength of working capital management. There is no denying that the ability of a company to receive accounts receivable in a relatively short period is higher; the company contains more cash inflows than the company with lower expertise. Moreover, accounts payable paid in the short term evaluate the company's ability to cover its short-term obligations.

Regarding the inventory, high levels of stock stimulate sales to a certain degree. However, there exists a situation that stocks stored in the warehouse for an extended period, which causes a high level of storage cost. Under this kind of circumstance, the period that the company can sell its inventory is another critical consideration to measure. On the other hand, profitability is tightly related to cash, accounts receivables, accounts payables, and inventories. The quality of the working capital management needs to be taken into consideration because poor quality management of working capital will bring risks to the operation, and influence the profitability of the company. All in all, there is a close relationship between working capital management and profitability. It is necessary to figure out the exact link to help managers to make decisions in a further operation.

In the previous studies, researchers select countries, industries, or stock exchanges as target sample pools, for example, India, UK, US, marketing industry, manufacturing industry, Athens Stock Exchange, and so on. Our study focuses on the Chinese listed company, and we want to examine whether there will be a consistency result with other countries.

It is widely acknowledged that the cash conversion cycle as a standard measurement of working capital management represents the period between the usage for purchasing raw materials and the time for gathering the finished goods. However, the time influences not only the profitability as various researchers said but also the investment amounts. The relationship between investment and cash conversion cycle is somewhat different from the relationship between profitability and cash conversion because a shorter period of cash conversion stimulates the sales, while longer time increases the investment amounts. All in all, we are supposed to consider the effects of other factors

related to both variables without ignoring the focus of crucial components.

Furthermore, working capital management in our study is measured by the cash conversion cycle. The cash conversion cycle includes measurements related to accounts receivable, inventory, and accounts payable. By evaluating several days of each component in the cash conversion cycle, we can analyze the effectiveness of working capital management. For profitability, gross operating profit is utilized to measure the company's ability to make profits. Other control variables, including current ratio, fixed financial assets ratio, financial debt ratio, company size, and fixed variables, jointly influence the profitability. After we observe 738 listed Chinese companies, we find that there is a significant negative relationship between the cash conversion cycle and gross operating profit, which indicates that when managers reduce the cash conversion cycle to a minimum level, the company's profits will be maximized to a certain degree. According to the empirical results, we find that the relationship between working capital management and profitability in Chinese listed companies is consistency with other studies.

This paper implements the previous studies with the results of Chinese listed companies, and it stays the same with previous outcomes. We provide companies in China with a more proper direction when they pursue a higher level of profits and establish a foundation for future global industry researches. The exact formulas, models, and results are explained in the following text. Even though various researchers do the topic in their countries, the industry and the field are developing and expanding. Also, the managers and directors can receive guidance from the paper.

## **II.LITERATURE REVIEW**

Working capital management is defined as the “management of current assets and current liabilities, and financing these current assets” (Amarjit,2014). When working capital is known as the amount that companies invest in their current assets or the amount of the assets that are expected to be converted into cash within a year or less (Keown et al 2005). Also, from the accounting perspective, the working capital is calculated as current assets subtract current liabilities (Levy & Sarnat 1994).

According to Deloof (2003), there is a significant negative relationship between working capital management and profitability among the firms. While working capital as a factor that influences the liquidity of the company, to keep an appropriate balance between liquidity and profitability contributes to the successful management of working capital. Working capital management is essential because it has an impact on the firm's profitability and risk, which directly influences its value (Smith, 1980). In other words, preserving high levels of inventory prevent to pay a heavy price from possible occurrences that contain potential risk during the production process, or from loss of business activities related to products qualities, supply costs, and price fluctuations (Blinder and Manccini, 1991). All in all, the management of working capital is not concerning only on enhancing the profitability but also aiming at finding a balance between liquidity and profitability.

When current assets and current liabilities are two critical components of working capital, they are necessary to influence management ability working capital. Existing assets examine a company's liquidity or ability to cover short-term loans without additional cash flows. Furthermore, Fazzari & Petersen (1993) come up with three major components of current assets which are accounts receivable, inventories, and cash and equivalents. As for accounts payable, Brealey & Meyers (2006) define the accounts payable that the firm purchase raw materials and pay their bills later, and it is a critical component in the current liability, which measures the company's ability to recover their loan in specified time period when long-term debt is less risky than the short-term. For accounts receivable, it represents money due to a company in the short-term, and it is a current asset that measures a company's liquidity or ability to cover short-term obligations without additional cash flows.

The target of working capital management is to guarantee that companies can operate continuously and to recover both maturing short-term debt and upcoming operational expenses. Usually, working capital management is measured by the cash conversion cycle. The cash conversion cycle represents the period (measured in days) that a company takes to convert its investments in inventory and other resources into cash flows from sales. Cash conversion cycle conner on the period that related liquidity, which aids working capital management in balancing both liquidity and

profitability. It is undeniable that there are still other factors that will influence the ability of working capital management.

According to profitability, a company can use its resources to generate revenues over its expenses. In other words, this is a company's capability to make profits from its operations. When we try to measure profitability, we consider gross profit margin is equal to net sales revenue minus the cost of goods sold. Net sales are similar to total revenue minus returns, allowances, and discounts. Divide gross profit by net sales to find the gross profit margin in percentage terms. We consider gross profit margin as a measurement of profitability is because GPM is the first level of profitability, and it tells analysts how good a company is at creating a product or providing a service compared to its competitors.

Considering the research of Faulkender & Wang (2006) as a primary model and supplementing constraint variables to evaluate the management of working management, Kieschnick, LaPlante, & Moussawi (2009) express the relationship between corporate working capital management and firm value. Another study paper of Chatterjee (2010) examines the influences of working capital management related to the profitability of the listed companies in the London Stock Exchange (a sample of 30 UK companies for three years from 2006-2008). The findings are identical with those of previous studies: when the cash conversion cycle decreases, correspondingly, the profitability of the firm will increase; thus, managers can enhance better company performance for the shareholders by reducing the cash conversion cycle to a possible minimum level. Moreover, the researchers also figure out that there is a significant negative relationship between the liquidity and the profitability of the UK firms when there is a positive relationship between the size of the firm and its profitability.

As for Long et al. (1993), they come up with a theory of trade credit where unequal information related to the transaction make good companies expand their trade credit; then consumers are able to examine the quality before making decisions. They select a sample pool that includes companies from all field of industry which are accessible in COMPUSTAT, and they examine the effects from 1984 to 1987. They are aiming at finding the impacts draw on increasing trade credit by financing accounts

receivables which including measuring accounts payables and borrowing in the short term. There are several evaluations of trade credit which contain to decrease the influence of the variability.

The famous study which examines the relationship between the management of working capital and profitability done by Deloff (2003) provide us with a detailed model and approach to measuring variable in our study. The researcher gathers a sample pool with 1009 companies in Belgian, which are from non-financial industry, and he evaluates the effects from 1992 to 1996. Both correlation and regression methods are utilized in the study, and finally, he figures out the not only the relationship between an independent variable and dependent variable, but also the influence among the other constraint variables. The profitability is measured by the gross operating income while working capital management is measured by the time span of accounts receivable and inventories. Moreover, according to the results of the study, he concludes that there is a negative and significant relationship between working capital and profitability, and suggests that managers are supposed to reduce the time span which can help to motivate the profitability of the company.

In the research done by Shin and Soenen, they examine the working capital management in a different approach which is using the net trade cycle instead of using the cash conversion cycle. As we all know that cash conversion cycle contains the accounts receivable conversion cycle, accounts payable conversion cycle and inventories. Cash conversion cycle is used day's of accounts receivable plus day's of inventories and subtracts the days of accounts. NTC, which refers to net trade cycle, is similar to the cash conversion cycle, and the difference is that NTC utilizes a percentage of sales rather than three components. Also, they utilized the same method as Deloof does which are correlation and regression model, and they collect information from the COMPUSTAT, which including a sample pool of 58985 companies. They examine from 1975 to 1994, and as a result, they find that there is a negative relationship between two variables which are NTC and company profitability. The researchers also indicate that company performance can be enhanced by effective working capital management.

As for Ghosh and Maji, they are evaluating the same target variables, which are the management

of working capital and profitability. However, they are considering the cement industry in India, and they measure the effects from 1992 to 2001. Moreover, their model contains different measurements, including performance, utilization, and efficiency of WCM. Ratios analysis is not considered among their process, because they believe that it is a more convincing way to evaluate the independent variable and the dependent variable and to give suggestions to the local managers. They also obtain the correlation and regression model to evaluate the topic. Whether the working capital is effectively managing is their main concern, and how fast it will take to achieve the goal is also considered in the study.

Another research was done by Eljelly, whose topic is the relationship between liquidity and profitability. Ratio analysis, including the current ratio, CCC are utilized to measure the variables. Eljelly gathers the data with a sample pool including 929 firms which are located in Saudi Arabia. The researcher also uses the regression and correlation method to examine the hypothesis. There is no denying that the researcher comes up with the result that there is a negative and significant relationship between liquidity and profitability. Moreover, she also figures out that comparing to the current ratio, which has an impact on profitability, the CCC plays a more critical role in affecting liquidity.

Öz Y and Güngör B (2007) have research on what are the relationships among the profitability and inventory turnover ratio, receivables turnover ratio, payable deferral period and net trade cycle. They have a sample pool that contains the firms in the manufacturing sector listed on BIST in Turkey. As for their dependent variable, they choose gross profits ratio which measures the profitability of the company; meanwhile, the number of days accounts receivable, the number of days of inventory, the number of days accounts payable, and net trade cycle is considering as dependent variables. Moreover, control variables which are financial fixed assets, sales growth, and financial liabilities are aiming at establishing limitations for the main model. After they utilize the panel regression analysis, they analyze their results. They have a conclusion that there is a negative

relationship between profitability and inventory turnover ratio, receivables turnover ratio, payable deferral period and the net trade cycle, which lay a solid foundation for our research process.

Ching, Novazzi, and Gerab (2011) do research on examining the relationship between working capital management and profitability in Brazilian listed companies. Thus, their sample pool is specialized in Brazilian listed companies. They evaluate the dependent variables by considering the return on assets, return on sales and return on equity, and as for independent variables, cash conversion efficiency, debt ratio, days of working capital, days receivable and days inventory are utilized to figure out the relationships. A multiple linear regression model is used to find the empirical results. The results show that there is a negative relationship for return on assets and return on sales with days inventory. Furthermore, the return on assets has a negative relationship with the debt ratio.

Arunkumar and Radharamanan (2011) analyze the effects of working capital management on corporate profitability in Indian manufacturing firms. The sampling pool contains the manufacturing firms listed in the Centre for Monitoring Indian Economy, which has a representative data related to the topic. Dependent variables contain the profit before depreciation tax accounts return on assets, and at the same time, the independent variables contain debtors days, inventory days, creditors days, cash velocity, working capital policy, networking capital leverage, size, and current ratio. The study evaluates the model by using correlation analysis and panel regression analysis. The conclusion of the study is that there is a positive relationship between inventory days and debt days and profitability.

Quayyum(2012) suggests that the research topic which is the relationship between working capital management and the profitability should examine the situation of the manufacturing corporations listed on the Dhaka Stock Exchange in Bangladesh. For the study, Quayyum selects return on asset and net profit margin as the dependent variables, while receivables collection period, inventory turnover period, payable deferral period, cash conversion cycle, current ratio and quick

ratio are independent variables. Through the single regression analysis, Qayyum concludes that working capital management has influences on profitability.

Muhammad, Jan, Ullah (2012) have an analysis related to working capital management and profitability, and they have a sample pool that examines the data of firms of textile industry of Pakistan. For the dependent variables, profitability is evaluated, and for independent variables, cash management, account receivables, inventory and account payables are examined by the model. According to the regression model, they figure out that cash, account receivables and inventory except accounts payables have a positive relationship with profitability.

Aksoy (2013) examines the company's performance, and the study has a sample pool that contains manufacturing firms listed on BIST in Turkey. In the research, dependent variables are measured by return on assets and Tobin-q, and independent variables are measured by the cash conversion cycle, inventory conversion period, account receivable period, accounts payable period and current ratio. Through the panel regression analysis, we can find that there is a negative relationship between the return on assets and the account receivable period and cash conversion cycle has a positive relationship with the current ratio.

According to Ukaegbu (2014), the research topic is the significance of working capital management in determining firm profitability and evidence from developing economies in Africa. The sample pool in the study is manufacturing firms in Egypt, Kenya, Nigeria and South Africa. In the study of Ukaegbu's paper, dependent variables contain net operating profit, and independent variables have a number of days accounts payable, a number of days inventories, the number of days accounts receivables and cash conversion cycle. By evaluating the panel regression analysis, cash conversion cycles have a negative relationship with the net operating profit.

As for Toroman and Sönmez (2015), in their research paper, the sample pool is related to the firms in the retail sector listed on BIST in Turkey. They are using the panel regression analysis to examine the independent variable which is the gross profit variable, and the independent variables are inventory turnover ratio, receivables turnover ratio, payable deferral period, and net trade cycle.

From their observations and analysis, they conclude that the existence of firms' profitability-working capital components tradeoff is invalid.

Afande (2015) has a research topic called the relationship between working capital management and profitability of cement companies in Kenya. There is no denying that the sample is aiming at Kenya, but the target companies are cement companies. The study contains dependent variables which are the profitability of the company, the independent variables, which is the cash conversion cycle, and the control variables, which are sales growth, depth ratio and current ratio. Afande establishes a multivariate regression model and concludes that the cash conversion cycle has a negative impact on the companies' profitability.

Kandpal (2015) researches on the topic called working capital management in select construction companies. Moreover, the study has a sample pool of Indian construction companies. In the research, the dependent variables in the main model are measured by the return on assets, and the independent variables are evaluated by the quick ratio, current ratio, debts turnover, and creditors turnover. Kandpal utilizes a correlation and regression analysis. After Kandpal analyzes the empirical results, the conclusion is that there is a negative relationship between working capital ratio and the companies' performance.

Shahzad, Fareed, and Zulfiqar (2015) try to find the impact of working capital management on the firm's profitability, and they have a case study on a specific industry. The specific industry is the manufacturing and conglomerates listed companies in Nigeria. In their research, they choose to return on assets and return on equity to be the dependent variables, the average payment period, average collection period and inventory turnover period to be the independent variables, and the companies' size and leverage to be the control variables. Through the panel regression analysis, the components of the working capital, which excepts inventory turnover have a significant influence on companies' profitability. Moreover, there is a negative relationship between average collection period and profitability according to the observations and analysis.

In conclusion, by analyzing the papers and studies, we are able to figure out that there is a common phenomenon that when researchers analyze the profitability, they often use the gross profit ratio to evaluate the level of profitability. However, when concerning with the working capital management, various measurements but cash conversion cycle remains the biggest proportion. Moreover, the literature review indicates that working capital management draws a certain degree of impact on the profitability of the firm. Managers of the companies are supposed to enhance the profitability level by reducing the cash conversion cycle. Learning the various studies, our paper is based on the previous researches. The current study explores the relationship between working capital management and the profitability of Chinese listed companies by using gross profit ratio as an independent variable, and cash conversion cycle as the dependent variable.

The following table presents the definitions and theoretically predicted signs.

*Table: Proxy variables definition and predicted relationship.*

Proxy	Variables Definitions	Predicted sign
AR	Accounts receivables divided by sales and multiplied by 365 days	+/-
AP	Accounts payables divided by cost of goods sold and multiplied by 365 days	+/-
INV	Inventory divided by cost of goods sold and multiplied by 365 days	+/-
CCC	No. of days A/R plus No. of days inventory minus No. of days A/P	+/-
FD	Short-term loans plus long-term loans divided by the total assets	+/-
FFA	Fixed financial assets divided by the total assets	+/

AR = Accounts receivables  
 AP = Accounts payables  
 INV = Inventory  
 CCC = Cash conversion cycle  
 LnS = Firm size  
 FD = Financial debt ratio  
 FFA = Fixed financial asset ratio

### **III.HYPOTHESIS**

There is a negative relationship between working capital management and profitability in Chinese listed companies.

#### IV.METHODOLOGY

A multivariate regression model is utilized to analyze the relationship between working capital management and profitability (Francis 2010). The main multivariate regression model is as follows:

$$\text{Profitability} = b_0 + b_1\text{CCC}(t) + b_2\text{CR}(t) + b_3\text{FDR}(t) + b_4\text{CS}(t) + b_5\text{FFAR}(t)$$

Where: CCC refers to cash conversion cycle, CR represents current ratio, FDR is considered as financial debt ratio, CS shows the company size, FFAR is fixed financial assets ratio,  $b_0$  is the intercept of the equation,  $b_i$  is the coefficients of  $X_t$  variables, and  $t$  is the time=1,2,3,4...years.

To stay the same with previous researches, formulas about working capital management and profitability were gathered from Lazaridis and Tryfonidis's (2006) study. They use yearly cross-sectional data and measured the variables in the following equations.

Working capital management as one of the studying objects is measured by the cash conversion cycle (Ioannis & Dimitrios 2006). The cash conversion cycle is a key independent variable that contains the influences from accounts receivables, accounts payables, and inventory. A short time span of the cash conversion cycle expresses the time (measured in days) it takes for a company to convert its investments in inventory and other resources into cash flows from sales. On the contrary, a longer period of time of cash conversion cycle indicates that the company's ability to transfer money is limited and need managements. Cash conversion cycle is tightly related to the three components which are No of Days A/R, No of Days Inventory, and No of Days A/P. Each part of the cash conversion cycle needs to be concerned when managers are making decisions according to the day-to-day business transactions. The following equation describes this measurement:

$$\text{Cash Conversion Cycle} = \text{No of Days A/R} + \text{No of Days Inventory} - \text{No of Days A/P} \quad (1)$$

The components of the cash conversion cycle are as follows (Ioannis & Dimitrios 2006):

$$\text{No of Days A/R} = \text{Accounts Receivables/Sales} * 365 \quad (2)$$

$$\text{No of Days Inventory} = \text{Inventory/Cost of Goods Sold} * 365 \quad (3)$$

$$\text{No of Days A/P} = \text{Accounts Payables/Cost of Goods Sold} * 365 \quad (4)$$

According to Deloof (2003), the period between the expenditure for the purchases of raw materials and the collection of sales of finished goods, which belongs to the cash conversion cycle is a big factor to measure working capital management. Shin and Soenen (1998) discover the relationship between a measure of the cash conversion cycle and corporate profitability, which implies that managers can create value for their shareholders by reducing the cash conversion cycle to a reasonable minimum. Thus, the cash conversion cycle as a popular and reliable measurement of working capital management lays a solid foundation for the analysis and observations. Data and variables need to be calculated accurately and effectively.

Another control variable selected is that of company size measured through the natural logarithm of sales (Deloof 2003). Company size is an essential control variable because it implies the influence drawn by the different size of the companies. The extent of the company size will impact the company performance in a certain degree mentioned in the previous studies, according to the literature review.

As for the fixed financial assets ratio, it concerns with the efficiency of the performance a company behaves by considering its fixed assets to generate sales. It is an efficiency ratio which focuses on the effectiveness of operating and managing. For the main model, fixed financial assets ratios is a control variable that helps to control the trend and express the real relationship between the dependent variable and the independent variable. The equation is as follows:

$$\text{Fixed Financial Assets Ratio} = \text{Fixed Financial Assets/Total Assets} \quad (5)$$

Besides, the financial debt ratio, which aims at creating a relation between the external financing of the firm and its total assets is as follows (Ioannis & Dimitrios 2006):

$$\text{Financial Debt Ratio} = (\text{Short Term Loans} + \text{Long Term Loans})/\text{Total Assets} \quad (6)$$

The financial debt ratio is related to short-term loans, long-term loans, and the total assets of a company. By evaluating the financial debt ratio, we are able to take the influences from financial statements into account according to the main model. Financial statements have a significant impact on companies' performance; thus, it is a wise choice to consider the financial debt ratio as a control variable that helps the main model to measure more accurately.

Moreover, current ratios, which refers to evaluate the short-term liquidity of the company related to the working capital management, is as follows:

$$\text{Current ratios} = \text{Total current assets} / \text{Total current liabilities} \quad (7)$$

The current ratio, which is a key measurement in financial ratios is related to the current assets, current liabilities. It is a control variable help us to take more financial ratios into consideration in order to draw an effective conclusion in the analysis.

Finally, profitability as the independent variable is measured by gross operating income, which is considered as sales minus cash costs of goods sold and is divided by total assets minus financial assets (Deloof 2003). Among the previous studies, large amounts of papers utilize gross profit ratio as the independent variable. It is undeniable that the gross profit ratio is popular and quite reliable to measure the profitability of the company. According to the explanations mentioned above, the equation is as follows:

$$\text{Gross Operating Profit} = (\text{Sales} - \text{Cost of goods sold}) / (\text{Total Assets} - \text{Financial Assets}) \quad (8)$$

The purpose of the research is to evaluate the relationship between working capital management and profitability. We are supposed to explain each control variables, and how to measure them in detailed. Gross profit ratio is considered as the independent variable in the main model of the thesis, cash conversion cycle is utilized to measure the working capital management as a dependent variable, and fixed financial assets ratio, financial debt ratio, current ratio, current ratio and company size are regarding as control variables of the model. In this quantitative research study, the correlation method is utilized to examine the relationship with a cross-section analysis. We are supposed to build

a foundation for future examination of the two main objects and figure out the relationship between working capital management and profitability.

## **V.EMPIRICAL RESULTS**

The topic is the relationship between working capital management and profitability of the listed Chinese company. According to the literature review, we have discussed the methods, models and approaches that can help us to evaluate variables properly; thus, we consider a prevalent model which shows in the methodology. After we decide the main model, the formulas that measuring the gross operating profits, cash conversion cycle which including accounts payable conversion, accounts receivable conversion, and inventory conversion, fixed financial assets ratio, current ratio and financial debt ratio. To measure the independent variable, which reflects the management level of working capital, the cash conversion cycle is measured as an independent variable. Simultaneously, profitability is regulated by the gross operating profit ratio as the dependent variable. Fixed financial assets ratio, financial debt ratio, current ratio, and company size are four control variables to help set limitations. Moreover, we also include the fixed effects of years dummies and industry dummies. By utilizing a comprehensive model that contains certain constraint variables and necessary effects, our empirical results will be calculated and analyzed more properly.

According to the following descriptive statistics (Table 1), it is clear that each variable has its attributes related to the outcomes. The table shows the detailed descriptive information about variables. There are gross operating profit ratio, cash conversion cycle, company size, fixed financial assets ratio, financial debt ratio, and current ratio. The total observation amount is around 41420, which includes data that date from 2010 to 2016. A longer period of time and a large amount of sample are utilized to ensure the accuracy of the outcomes. The gross operating profit ratio, which has 40558 observations, is ranged from 0 to positive 2.38, with an average number of 0.096. Cash conversion cycle contains 41464 observations, and it has a maximum value of 500 and a minimum value 161.3. Overall the average cash conversion cycle calculated around 161.3 days. For the fixed

financial assets ratio, there is a maximum rate with positive 0.53(mean0.002). The company size variable includes 41451 observations, and it is ranged from 7.59 to 25.79. The average firm size in the industry around 20.5. As for fixed financial assets ratio, there are 41419 observations. It is ranged from the 0 to 0.53, which is within the normal level. For the financial debt ratio, which has a mean value of 0.143, ranges from 0 to 1.64, while current ratios are standing for an average number of 4.247, which varies from 0 to 12223.45. The attributes of each variable in descriptive statistics are in a normal range, for example, the cash conversion cycle, in the previous descriptive tables, the Deloof has a time period that is around 120, which is similar to our outcomes. By comparing the cash conversion cycle range, we are supposed to ensure the reliability and the accuracy of the method, model, data, and analysis.

**Table1-Descriptive Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
gprr	40558	.096	.085	0	2.38
cccr	41454	161.3	127.016	0	500
sizet	41451	20.502	1.669	7.59	25.79
ffarr	41419	.002	.014	0	.53
fdrr	41454	.143	.147	0	1.64
crr	41412	4.247	89.398	0	12223.45

Note: gprr=gross operating profit ratio; cccr=cash conversion cycle; sizet=company size; ffarr= fixed financial assets ratio; fdrr: financial debt ratio; crr: current ratio

Simultaneously, a matrix of correlations aids in figuring out the relationship between the dependent variable and the independent variable. There is a negative relationship between gross operating profit and cash conversion cycle. The result shows consistency with the concept that when the cash conversion cycle decrease, the liquidated ability of the company is increasing. Also, when there is a negative relationship between two variables, the cash conversion cycle negatively affects profitability. Meanwhile, from the observation of the matrix, we can conclude that the profitability is related to the financial debt ratio, which means that lower financial debt ratio contributes to better company performance. This means that measuring the cash conversion cycle to a low value by working capital management can help a company with higher profits.

**Table2-Matrix of correlations**

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) gp <sub>prt</sub>	1.000					
(2) cc <sub>crt</sub>	-0.117	1.000				
(3) siz <sub>et</sub>	0.308	-0.163	1.000			
(4) ff <sub>art</sub>	0.033	-0.017	-0.018	1.000		
(5) fd <sub>rt</sub>	-0.212	-0.026	0.166	-0.079	1.000	
(6) cr <sub>t</sub>	-0.005	-0.007	-0.036	0.005	-0.031	1.000

Note: gp<sub>prt</sub>=gross operating profit ratio; cc<sub>crt</sub>=cash conversion cycle; siz<sub>et</sub>=company size; ff<sub>art</sub>=fixed financial assets ratio; fd<sub>rt</sub>: financial debt ratio; cr<sub>t</sub>:current ratio

Following is the regression, where profitability is regressed against fixed financial assets, financial debt, cash conversion cycle, and years dummy variables and industry dummy variables:

**Table3-Regression of profitability on cash conversion cycle and control variables**

VARIABLES	(1) gp <sub>prt</sub>
cc <sub>crt</sub>	-0.000*** (-15.477)
siz <sub>et</sub>	0.018*** (69.762)
ff <sub>art</sub>	0.161*** (4.790)
fd <sub>rt</sub>	-0.159*** (-50.960)
cr <sub>t</sub>	-0.000 (-1.611)
Constant	-0.284*** (-46.170)
Observations	40,490
R-squared	0.195
Year FE	YES
Industry FE	YES
Adj. R-sq	0.194
Robust t-statistics in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	

Note: gp<sub>prt</sub>=gross operating profit ratio; cc<sub>crt</sub>=cash conversion cycle; siz<sub>et</sub>=company size; ff<sub>art</sub>=fixed financial assets ratio; fd<sub>rt</sub>: financial debt ratio; cr<sub>t</sub>:current ratio

R-squared means the amount of variance of dependent variable explained by the independent variable, and the R-squared in the table is 0.195, which represents that 19.5% of the total variation in profitability in the first model can be explained by the cash conversion cycle, fixed financial assets

ratio, financial debt ratio, and current ratio. This regression equation shows that there is a significant negative relationship between cash conversion cycle and profitability, which is consistent with the concept that a decrease in the cash conversion cycle will contribute to better company performance. Company is supposed to generate more profits by reducing the cash conversion cycle. There are specific impacts that the cash conversion cycle cause to effect profitability, which refers to working capital management has a particular influence on profitability.

## **VI.CONCLUSION AND LIMITATIONS**

### ***Conclusion***

According to the introduction, our aim of the research is figuring out the relationship of the working capital management and the cash conversion cycle. Because the galloping development of the industry and society, company managers are under heavy pressure to improve the company performance, especially the profitability, which is the essential outcomes that shareholder care about. Rewards are highly related to profitability. Moreover, there are various regulations that limit the actions of companies. The situation motivates the managers to find an effective way to enhance their ability to manage the business transactions, and in order to help the company to make profits. Under this kind of circumstance, based on the topic that is related to the profitability and the company performance, a lot of researches study the relationship between working capital management and profitability, which indicates that working capital management might also be useful management for Chinese listed companies to enhance their profitability.

Moreover, for the previous study, we can find out that their target industry or countries are foreign countries and foreign industries. Thus, we are going to focus on our sample pool which is the listed Chinese company. First, we want to examine whether there is a relationship between working capital management and profitability in China. Second, we want to figure out whether our consequences stay the same with the outcomes in other papers which related to different countries or different industries.

Based on the previous study, we find that the gross profit ratio is usually considered as the measurement of profitability. So, the gross profit ratio is a dependent variable in our main model. For the independent variable, we choose the cash conversion cycle as a measurement, because cash conversion cycle is related to No of Days accounts receivable, No of Days Inventory, and No of Days accounts payable. Cash conversion cycle helps to measure the ability of working capital management. Considering the control variables, fixed financial assets ratio, financial debt ratio, current ratio, and company size are utilized to control the main model and try to set limitation to the equation. Methods and formulas are generated from previous studies.

The empirical results explain three perspectives related to the variables. First, in the descriptive statistics, the span of the variables is inaccurate range by comparing with previous studies, which ensure the accuracy of the data from the observation. Second, for the correlation matrix among each of the variables, there is a negative relationship between working capital management and gross profit ratio. Also, according to the regression table, there is a significant relationship between the management of working capital and profitability.

Researchers in the previous study concludes that there is a negative relationship between working capital management and profitability. Our outcomes stay the same with the statement. The results indicate that the cash conversion cycle has a negative impact on a company's profitability, which means that a short cash conversion cycle will generate more profits compared to the more extended cycle periods. Company managers can make decisions and plans related to the profitability regarding the concept that tries to reduce the cash conversion cycle. Considering the other factors, including the current ratio, fixed financial assets ratio, financial debt ratio, and company size, the results are more convincing to take into consideration. Primarily, there is a significant negative relationship between two variables, which shows that the crucial impact working capital management has on profitability. From what we have discussed above, we conclude that profitability can be promoted if the company manages working capital more efficiently.

### ***Limitations***

This paper is somehow limited because of the sample pool of Chinese listed companies and insufficient periods. The results of the research are only able to be utilized to Chinese listed companies from 2010-2016, which are similar to those that were contained in the study.

## APPENDIX

Formulas:

Cash Conversion Cycle = No of Days A/R+ No of Days Inventory – No of Days A/P (1)

No of Days A/R = Accounts Receivables/Sales\*365 (2)

No of Days Inventory = Inventory/Cost of Goods Sold\*365 (3)

No of Days A/P = Accounts Payables/Cost of Goods Sold\*365 (4)

Fixed Financial Assets Ratio = Fixed Financial Assets/Total Assets (5)

Financial Debt Ratio = (Short Term Loans + Long Term Loans)/Total Assets (6)

Current ratios = Total current assets / Total current liabilities (7)

Gross Operating Profit = (Sales – Cost of goods sold)/(Total Assets – Financial Assets )(8)

Tables:

*Table : Proxy variables definition and predicted relationship.*

Proxy	Variables	Definitions
Predicted sign		
AR		Accounts receivables divided by sales and multiplied by 365 days
+/-		
AP		Accounts payables divided by cost of goods sold and multiplied by 365 days
+/-		
INV		Inventory divided by cost of goods sold and multiplied by 365 days
+/-	CCC	No. of days A/R plus No. of days inventory minus No. of days A/P
+/-		
FD		Short-term loans plus long-term loans divided by the total assets
+/-	FFA	Fixed financial assets divided by the total assets
+/-		

AR = Accounts receivables

AP = Accounts payables

INV = Inventory

CCC = Cash conversion cycle

LnS = Firm size

FD = Financial debt ratio

FFA = Fixed financial asset ratio

**Table 1-Descriptive Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
gp <sub>prt</sub>	40558	.096	.085	0	2.38
cc <sub>crt</sub>	41454	161.3	127.016	0	500
siz <sub>et</sub>	41451	20.502	1.669	7.59	25.79
ff <sub>art</sub>	41419	.002	.014	0	.53
fd <sub>rt</sub>	41454	.143	.147	0	1.64
cr <sub>t</sub>	41412	4.247	89.398	0	12223.45

Note: gp<sub>prt</sub>=gross operating profit ratio; cc<sub>crt</sub>=cash conversion cycle; siz<sub>et</sub>=company size; ff<sub>art</sub>= fixed financial assets ratio; fd<sub>rt</sub>: financial debt ratio; cr<sub>t</sub>:current ratio

**Table 2-Matrix of correlations**

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) gp <sub>prt</sub>	1.000					
(2) cc <sub>crt</sub>	-0.117	1.000				
(3) siz <sub>et</sub>	0.308	-0.163	1.000			
(4) ff <sub>art</sub>	0.033	-0.017	-0.018	1.000		
(5) fd <sub>rt</sub>	-0.212	-0.026	0.166	-0.079	1.000	
(6) cr <sub>t</sub>	-0.005	-0.007	-0.036	0.005	-0.031	1.000

Note: gp<sub>prt</sub>=gross operating profit ratio; cc<sub>crt</sub>=cash conversion cycle; siz<sub>et</sub>=company size; ff<sub>art</sub>= fixed financial assets ratio; fd<sub>rt</sub>: financial debt ratio; cr<sub>t</sub>:current ratio

**Table3-Regression of profitability on cash conversion cycle and control variables**

VARIABLES	(1) gp <sub>prt</sub>
cc <sub>crt</sub>	-0.000*** (-15.477)
siz <sub>et</sub>	0.018*** (69.762)
ff <sub>art</sub>	0.161*** (4.790)
fd <sub>rt</sub>	-0.159*** (-50.960)
cr <sub>t</sub>	-0.000 (-1.611)
Constant	-0.284*** (-46.170)
Observations	40,490
R-squared	0.195
Year FE	YES
Industry FE	YES
Adj. R-sq	0.194

Robust t-statistics in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Note: gp<sub>prt</sub>=gross operating profit ratio; cc<sub>crt</sub>=cash conversion cycle; siz<sub>et</sub>=company size; ff<sub>art</sub>= fixed financial assets ratio; fd<sub>rt</sub>: financial debt ratio; cr<sub>t</sub>:current ratio

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