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**The impact of working capital management upon Chinese manufacturing companies'
profitability**

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The Impact of Working Capital Management upon Chinese Manufacturing Companies' Profitability

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ABSTRACT: The purpose of this study is to investigate the impact of working capital management and its components upon the profitability of Chinese manufacturing companies. The impact of working capital management upon corporate profitability is assessed by the pooled regression type of panel data analysis. The cash conversion cycle is used as a comprehensive measure for working capital management, while the gross operating profitability is used as a measure for profitability. Using a sample of 874 Chinese manufacturing firms listed on Shanghai Stock Exchange for a period of six years from 2012 – 2017, the results of the regression analysis showed a significant negative relationship between the receivables collection period, inventory conversion period, payables deferral period, cash conversion cycle, and profitability. An inverse relationship between liquidity, which measured by current ratio, and profitability was also found. This suggests that manufacturing firms can improve their profitability by reducing the period during which working capital is tied up within the firm, and by keeping each different component to an optimum level.

Keywords: *working capital management; corporate profitability; cash conversion Cycle; Chinese manufacturing companies.*

Data Availability: *The data are publicly available from the sources identified in the paper.*

I. INTRODUCTION

Financial objectives, like sales and profit, are a primary purpose for the majority of companies. In other words, the ultimate goal of any company is to maximize profits. While the working capital management is an especially critical component of corporate finance, so the way how the working capital is managed can have a significant impact on the firm's profitability and risk, and consequently its value (Deloof 2003; Raheman and Nasr 2007). In general, firms try to keep an optimal level of working capital, which maximizes their value (Afza and Nazir 2007; Deloof 2003).

Working capital was regarded as the result of the time lag between the expenditure for purchasing raw materials and the collection from the sale of the finished good (Raheman and Nasr 2007). Thus, the cash conversion cycle is a robust measure for assessing how well a company is managing its working capital. Decisions about how much money to invest in inventory accounts, and how much credit is acceptable from suppliers, are reflected in the cash conversion cycle of the firm, which represents the average number of days between the date when the firm starts paying its suppliers and the date when it begins to collect payments from its customers. Previous studies have used measures based on the cash conversion cycle to analyze whether shortening this cycle has positive or negative effects on the profitability of the firm. Empirical evidence relating to working capital management and profitability, in general, supports the fact that a longer cash conversion cycle could increase profitability because it can lead to higher sales. However, corporate profitability might also decrease with the cash conversion cycle when the costs of higher investment in working capital rise faster than the benefits of holding more inventories and granting more trade credit to customers. This discussion of the importance of working capital management, its different components, and its effects on profitability will lead us to the problem statement, which we will be analyzing.

To analyze whether working capital management will affect the profitability of Chinese manufacturing firms, several objectives of this research have been developed, which will hopefully contribute towards a particularly important aspect of financial management known as working capital management. It is almost untouched in China, or extraordinarily little research has been done in this area. Therefore, this research is focusing on working capital management and its effects on profitability for a sample of Chinese manufacturing firms. This study extends previous studies using data about Chinese manufacturing firms and investigates the effects of working capital management upon the corporate performance of Chinese manufacturing companies. The results could be generalized to the manufacturing industries. This study can contribute to the literature on the relationship between working capital management and the firm's profitability in at least two ways. First, it focuses on Chinese manufacturing firms where recently only limited research has been conducted on such firms. Second, this study validates some of the previous authors' findings by assessing the relationship between working capital management and profitability of the sample firms. Thus, this study adds substance to the existing theory developed by previous authors.

The main objectives are to draw a conclusion about the relationship between working capital management and profitability of the Chinese manufacturing firms and to find out the effects of different components of working capital management on profitability. It also aims to establish a relationship between the two objectives of liquidity and profitability of the Chinese firm and to find out the relationship between debt used by the Chinese firm and the size of the Chinese firm and its profitability, respectively.

While some researchers of previous studies investigated the impact of proper inventory management, others studied the management of accounts receivables trying to postulate an optimal way policy that leads to profit maximization (Afza and Nazir 2007; Raheman and Nasr 2007). In this study, the impact of working capital management upon corporate profitability was assessed by the pooled regression type of panel data analysis. The cash conversion cycle is used as a comprehensive measurement for working capital management and gross operating profitability used as a measure for profitability. Using a sample of 874 Chinese manufacturing firms listed on the Shanghai Stock Exchange for a period of six years from 2012 – 2017, the results of the regression analysis found a significant negative relationship between receivables collection period, inventory conversion period, payables deferral period, cash conversion cycle, and profitability. An inverse relationship between liquidity measured by the current ratio and profitability was also found. It suggests that companies can improve their profitability by reducing the period during which working capital is tied up within the company and by keeping each different component to an optimum level.

An optimal level of working capital would be that in which a balance between risk and efficiency is attained, and both carrying costs and opportunity costs are minimized. It requires continuous monitoring to maintain the proper level of the various components of working capital, i.e., cash receivables, inventory, and payables. However, it is not a simple task for managers to make sure that in managing working capital, liquidity is maintained while daily business operations run efficiently and profitably simultaneously (Zariyawati et al. 2009). The dilemma in working capital management is to achieve an optimal balance between liquidity and profitability. One of the objectives should not be achieved at the cost of the other because both have their importance. Therefore, efficient management of working capital is a fundamental part of the overall corporate strategy to create shareholder value. Moreover, working capital management should be given proper consideration and will influence the company's profitability (Raheman and Nasr 2007).

This study contributes to the literature on the relationship between the working capital management and the firm's profitability in at least two ways. First, it focuses on Chinese manufacturing firms where only limited research has been conducted on such firms recently. Second, this study validates some of the finding of previous authors by assessing the relationship between working capital management and the profitability of the sample firms. It finds out the relationship between debt used by the Chinese firm and the size of the Chinese firm and its profitability, respectively. Thus, this study adds substance to the existing theory developed by previous authors.

The remainder of our paper is organized as follows. In the next section, we briefly review relevant literature and develop hypotheses. In section three, we describe our methodology and sample. In section four, we present the empirical results of the main tests. In section five, we discuss the results of analysis. In section six, we conclude the findings of this study.

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Working capital management and companies' operating profitability

Lazaridis and Tryfonidis (2006) studied the relationship between working capital management and corporate profitability of listed companies in the Athens Stock Exchange. They conducted a cross-sectional study by using a sample of 131 listed companies for the period of 2001-2004. The results from the regression analysis suggest that there is a statistically significant relationship between profitability, which measured through gross operating profit, and the cash conversion cycle and its components, such as accounts receivables, accounts payables, and inventory. From those results analysis of annual data by using correlation and regression tests, these authors suggest that managers could create value for shareholders by correctly overseeing the cash conversion cycle and by keeping each different component of the conversion cycle at an optimum level.

H01: There is no relationship between efficient working capital management and profitability of Chinese manufacturing firms.

H11: There is a possible positive relationship between efficient working capital management and profitability of Chinese manufacturing firms. Firms more efficient in managing their working capital are expected to pose high level of profitability and vice versa.

Companies' liquidity and profitability

Raheman and Nasr (2007) selected a sample of 94 Pakistani firms listed on the Karachi Stock Exchange for six years from 1999-2004. They aimed to study the effects of different variables of working capital management, including receivable collection period, inventory collection period, payment deferral period, cash conversion cycle, and current ratio upon the gross operating profitability of Pakistani firms. They found that there was a significant negative relationship between the variables of working capital management and profitability of the firm, as mentioned above. Moreover, as the cash conversion cycle increases, it leads to decreasing the profitability of the firm. From this point, they suggest that managers can create a positive value for their shareholders by reducing the cash conversion cycle to a possible minimum level. Besides, they also found a positive relationship between the size of the company, measured by the natural logarithm of sales and profitability.

A similar study by Falope and Ajilore (2009) found similar results. Falope and Ajilore used a sample of 50 Nigerian quoted non-financial firms for the period 1996 - 2005. The study utilized panel data econometrics in a pooled regression in order for time-series and cross-sectional observations were combined and estimated. They found

a significant negative relationship between gross operating profitability and the receivable collection period, inventory collection period, payment deferral period, and cash conversion cycle for their sample. Moreover, they found no significant variations in the effects of working capital management between large and small firms.

H02 : There is no relationship between liquidity and profitability of Chinese manufacturing firms.

H12: There may exist a negative relationship between liquidity and profitability of Chinese manufacturing firms. Firms with high level of liquidity are expected to post low level of profitability and vice versa.

Firm size and profitability

In order to assess the relationship between working capital management and corporate profitability, Deloof (2003) used a sample of 1,009 Belgian non-financial firms during the period 1992-1996. He discussed that most companies had a large amount of cash invested in working capital. It can be expected that how working capital is managed will have a significant impact on those company's profitability. With correlation and regression tests, Deloof found that there is a significant negative relationship between gross operating income and accounts receivable period, inventories, and accounts payable period of Belgian firms. From the study results, he suggests that managers could create value for their shareholders by reducing the number of days of accounts receivable and inventories accounts to a reasonable minimum. Besides, the negative relationship between accounts payable and operating profitability is consistent with the view that less profitable firms wait longer to pay their bills.

Shin and Soenen (1998) investigated the relationship between working capital management and value creation for shareholders. They used the net-trade cycle as a measure of working capital management. They examined this relationship by using correlation and regression analysis, by industry, and working capital intensity. With a COMPUSTAT sample of 58,985 US firm years covering the period 1975-1994, Shin and Soenen found a robust negative relationship between the length of the firm's net-trade cycle, used to measure the efficiency of working capital management, and its profitability. Besides, shorter net trade cycles were associated with higher risk-adjusted stock returns. Based on their findings, they suggest that one possible way to create shareholder value is to reduce the company's net-trade cycle.

H03: There is no relationship between the size of Chinese manufacturing firms and profitability.

H13: There may exists a positive relationship between the size of Chinese manufacturing firms and profitability. This may be due to the ability of large firms to reduce liquidity levels and cash gaps.

Debt and profitability

Ghosh and Maji (2003) attempted to examine the efficiency of working capital management of Indian cement companies from 1992 - 1993 to 2001 - 2002. They calculated three index values - performance index, utilization index, and overall

efficiency index to measure the efficiency of working capital management, instead of using some common working capital management ratios. By using regression analysis and industry norms as a target efficiency level of individual firms, Ghosh and Maji (2003) also evaluated the speed of achieving that target level of efficiency by individual firms during the period of study. The findings of the study indicated that some of the sample firms successfully improved efficiency during these years, while the Indian Cement Industry as a whole did not perform remarkably well during this period.

Eljelly (2004) examined the relationship between profitability and liquidity, which measured by the current ratio and cash gap on a sample of 929 joint-stock companies in Saudi Arabia using correlation and regression analysis. Eljelly found a significant negative relationship between the firm's profitability and its liquidity level, as measured by the current ratio. This relationship is pronounced for firms with high current ratios and long cash conversion cycles. At the industry level, however, he found that the cash gap as a measure of liquidity is of more importance than the current ratio that affects profitability. The firm size variable was also found to have a significant effect on profitability at the industry level. Therefore, Eljelly elucidated that the efficient liquidity management involves controlling and planning current assets and current liabilities in such a manner that eliminates the risk of inability to meet due short-term obligations and avoids excessive investment in these assets.

H04: There is no relationship between debt used by Chinese manufacturing firms and profitability.

H14: There is a possible negative relationship between debt used by Chinese manufacturing firms and profitability. Firms with high level of debt usage are expected to post low level of profitability and vice versa.

In summary, all the above studies provide us with a solid base and give us an idea regarding working capital management and its components. The results and conclusions of those researches have already conducted in the same area for different countries and the environment from different aspects. They tend to indicate that working capital management has an impact on corporate profitability, but there still is ambiguity regarding the appropriate variables that might serve as proxies for working capital management. Based on these researches done in different countries, the present study investigates the relationship between a set of such variables and the profitability of a sample of Chinese manufacturing firms.

III. METHODOLOGY

The purpose of this research is to contribute towards a particularly important aspect of financial management known as working capital management concerning China. This paper shows the relationship between working capital management practices and its effects on the profitability of 874 Chinese manufacturing firms listed on the Shanghai Stock Exchange for a period of six years from 2012 – 2017. This section presents the data and the hypotheses underlying the present study, as well as the variables and model specifications used.

Data and Sample

The sample is based on data obtained from the China Stock Market and Accounting Research Data Base (CSMAR), which consists of financial statements and stock market information.

The different accounting variables needed for the study were extracted, by year and by company. The data set included yearly data on sales, the cost of goods sold, accounts receivable, accounts payable, inventories, current assets, total assets, financial assets, current liabilities, and total debt. Some of these data were used to calculate the receivables collection period, the inventory conversion period, the payables deferral period, and the cash conversion cycle.

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

Because of the limited access authority, the data in CSMAR is only available until 2017. A panel data set of 874 companies were used, resulting in a final sample of 23,910 company-year observations.

Variables

The choice of variables was primarily guided by previous empirical studies, namely Raheman and Nasr (2007), and by the availability of data. The table 1 summarizes all the variables that were used in this, along with their abbreviations and formulas.

TABLE 1
Formulas of Variables and Abbreviations

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

Gross operating profitability as a measure of firm profitability was used as the dependent variable. It is defined as sales minus the cost of goods sold and divided by

total assets minus financial assets. Using this dependent variable instead of earnings before interest taxes depreciation and amortization (EBITDA), or profits before or after taxes are motivated by the fact that the intention is to connect operating "success" or "failure" with operating ratio and relate this variable with other operating variables (e.g., cash conversion cycle). Moreover, the intention is to exclude the participation of any financial activity from operational activity that might affect overall profitability. Thus, financial assets are subtracted from total assets (Lazirdis and Tryfonidis 2006).

With regards to independent variables, working capital management was measured by using the receivables collection period corresponding to the number of days of accounts receivable; the inventory conversion cycle corresponding to the number of days taken to convert inventories into sales; the payables deferral period corresponding to the number of days of accounts payable, and the cash conversion cycle.

Accounts receivable are customers who have not yet made payment for goods or services, which the company has already provided for them. The goal of debtor management is to minimize the time it takes to collect cash from customers. In this respect, the receivables collection period, used as a proxy for the collection policy, is calculated as $(\text{accounts receivable}/\text{sales}) * 365$.

Inventories are lists of stocks of raw materials, plus work in progress or finished goods waiting for production or consumption. The inventory conversion period reflects the average number of days of stock held by a firm. It was used as a proxy for the inventory policy and is calculated as $(\text{inventories}/\text{cost of goods sold}) * 365$. Longer storage times represent a more significant investment in inventories for a particular level of operations.

Accounts payable are suppliers whose invoices for goods or services have been processed but who have not yet been paid. The payables deferral period, used as a proxy for the payment policy, reflects the average time it takes companies to pay their suppliers. It is calculated as $(\text{accounts payable}/\text{cost of goods sold}) * 365$.

The cash conversion cycle used as a comprehensive measure of working capital management is another independent variable and is measured by subtracting the payables deferral period the sum of the inventory conversion period and the receivables collection period. It was interpreted as a time interval between the cash outlays that arise during the production of output and the cash inflows that result from the sale of the output and the collection of the accounts receivable.

Other variables theoretically postulated to influence companies' profitability performance were also considered as control variables in the model. These include size (natural logarithm of sales), debt ratio, which is calculated by dividing total debt by total assets, used as a proxy for leverage, and the ratio of financial assets to total assets. Fixed financial assets are the shares in other firms, intended to contribute to the activities of the firm holding them by establishing a lasting and specific relationship and loans that were granted for the same purpose. For some firms, such assets are a significant part of their total assets. The current ratio was also included as a control variable. It reflects a traditional measure of liquidity.

All of the above variables have relationships that ultimately affect working capital management. It is expected that there is a negative relationship between operating

profitability on the one hand while the measures of working capital management (number of days' accounts receivable, inventories and accounts payable and cash conversion cycle), on the other hand. It is consistent with the view that the time lag between expenditure for purchasing the raw materials and collection of sales of finished goods can be too long, and that decreasing this time lag increases profitability.

Model Specifications

The impact of working capital management upon corporate profitability was assessed by the pooled regression type of panel data analysis. The pooled regression is one where both intercepts and slopes are constant, where the cross-section firm data and time series data are pooled together in a single column, assuming that there is no significant cross-section or temporal effects. The panel data methodology used has certain benefits like using the assumption that companies are heterogeneous, more variability, less collinearity between variables, more informative data, a higher degree of freedom, and more efficiency (Baltagi 2008). In panel data regression, several cross-sectional units are observed over a period of time. This method is more useful in studying the dynamics of adjustment and is better able to identify and measure effects that are not detectable in pure cross-sections or pure time-series data (Raheman and Nasr 2007). Thus, we can get more reliable estimates.

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

$$GOP = \beta_0 + \beta_1(RCPit) + \beta_2(CRit) + \beta_3(DRit) + \beta_4(LnSit) + \beta_5(FARit) + \varepsilon \quad (I)$$

$$GOP = \beta_0 + \beta_1(ICPit) + \beta_2(CRit) + \beta_3(DRit) + \beta_4(LnSit) + \beta_5(FARit) + \varepsilon \quad (II)$$

$$GOP = \beta_0 + \beta_1(PDPit) + \beta_2(CRit) + \beta_3(DRit) + \beta_4(LnSit) + \beta_5(FARit) + \varepsilon \quad (III)$$

$$GOP = \beta_0 + \beta_1(CCCit) + \beta_2(CRit) + \beta_3(DRit) + \beta_4(LnSit) + \beta_5(FARit) + \varepsilon \quad (IV)$$

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

Analysis Used in Study

In this research, we have provided two types of data analysis; descriptive and quantitative.

Descriptive Analysis

Descriptive analysis is the first step in our analysis; it will help us describe relevant aspects of the phenomena of the cash conversion cycle and provide detailed information about each relevant variable. Research has already been conducted in our area of study, and much information is already on hand. Also, the Stata software has been used for the analysis of the different variables in this study.

Quantitative Analysis

In the quantitative analysis, there were two methods: The first was correlation models, which measures the degree of association between different variables under

considerations. Moreover, the second was regression analysis, which estimates the causal relationships between profitability variable, liquidity, and other chosen variables. Panel data in a pooled regression was used for this purpose of analysis while the Stata software was used to analyze financial data, especially in the case of pooled data.

IV. EMPIRICAL RESULTS

We have performed two types of analysis, descriptive and quantitative. The results of this study are presented in this section. Firstly, the descriptive analysis is presented, followed by the Correlation analysis.

Descriptive Statistics

Descriptive analysis in this study presents the average and standard deviation of the different variables of interest. It also shows the minimum and maximum values of the variables that help to get a picture of the maximum and minimum values a variable can achieve.

Table 2 presents descriptive statistics for 874 Chinese manufacturing firms for a period of six years from 2012 to 2017, resulting in a total of 23,910 firms year observations. The mean value of gross operating profitability is 11.1% of (Total Assets – Financial Assets), and the standard deviation is 11.5%. It means that the value of the profitability can deviate from mean to both sides by 30.8%. The maximum value of gross operating profitability is 21.3% for a company in a year, while the minimum is -57.5%.

TABLE 2
Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std.Dev.	Observation
GOP	0.111100	0.060483	21.298874	-0.574606	0.307740	23910
RCP	201.44939	88.39157	3984.2581	0	365.23232	23910
	9	6	27		8	
ICP	315.51593	135.8419	5045.6977	0	532.24995	23910
	1	00	11		6	
PDP	211.09299	102.6250	5090.9337	0	355.45634	23910
	4	02	60		5	
CCC	305.87233	128.6797	5961.5474	-	564.86784	23910
	6	05	43	908.24647	4	
				7		
DR	0.450135	0.427928	63.971206	0.000048	0.698884	23910
CR	2.451094	1.490412	328.00720	0	5.563198	23910
			5			
LnS	9.060914	9.069024	11.872877	4.814305	0.738674	23910
FAR	0.000109	0	0.380098	0	0.005358	23910

The cash conversion cycle used as a proxy to check the efficiency in managing working capital is, on average, 306 days, and the standard deviation is 565 days. Firms

receive payment against sales after an average of 201 days, and the standard deviation is 365 days. The minimum time taken by a company to collect cash from receivables is 0 days, while the maximum time for this purpose is 3984 days. It takes average 316 days to sell inventory with a standard deviation of 532 days. Here, the maximum time taken by a company is 5046 days, which is a considerable period to convert inventory into sales. Firms wait an average of 211 days to pay their purchases with a standard deviation of 355 days. Here, the minimum time taken by a company is 0 days, which is unusual, and the maximum time taken for this purpose is 5091 days.

To check the relationship between firm size and profitability, the natural logarithm of sales is used as a control variable. The mean value of the log of sales is 9.01, while the standard deviation is 0.74. The maximum value of the log of sales for a company in a year is 11.87, and the minimum is 4.81.

In the same way, to check the liquidity of the companies, the current ratio, as a traditional measure of liquidity, is used. The average current ratio for Chinese manufacturing firms is 2.45, with a standard deviation of 5.56. The highest current ratio for a firm in a particular year is 328.01 times, and in the same way, the minimum ratio for a firm in a year is 0.00.

To check the debt financing and its relationship with the profitability of the debt ratio, which is obtained by dividing the total debt of the company by the total assets, is used as a control variable. The average debt ratio for Chinese manufacturing companies is 45%, with a standard deviation of 70%. The maximum debt financing used by a company is 63 times, which is unusual but may be possible if the equity of the company is negative. The minimum level of the debt ratio is 45%.

Lastly, the information from descriptive statistics shows that the mean value of financial assets to total assets ratio is 0.011%, while the standard deviation is 0.536%. The share of financial assets in total assets presents a maximum of 38% and a minimum of 0%.

Quantitative Analysis

For quantitative analysis, we used two methods. At first, correlation is used to measure the degree of association between different variables under consideration. We have been able to identify many important variables associated with working capital management. As multiple variables are influencing our problem, we have identified the crucial factors associated with working capital management. Pearson and Spearman's correlations are calculated for all variables used in the study, starting with Pearson's correlation results.

Pearson's Correlation Coefficient Analysis

Pearson's Correlation analysis is used for data to see the relationship between variables such as those between working capital management and profitability. Table 3 shows the correlation coefficients of the dependent and independent variables. The purpose of this analysis, as already mentioned, is to find out the relationship between the different variables under consideration.

TABLE 3
Correlation Analysis

	GOP	RCP	ICP	PDP	CCC	DR	CR	FAR	LnS
GOP	1								
RCP	-0.1186	1							
ICP	-0.10019	0.463503	1						
PDP	-0.12052	0.716049	0.576776	1					
CCC	-0.09525	0.632727	0.878998	-0.37718	1				
DR	-0.002051	0.008231	0.018738	0.071915	-0.02223	1			
CR	-0.03796	0.024577	0.007606	-0.06513	0.017928	-0.11463	1		
FAR	-0.00452	0.004326	-0.00201	0.001162	0.003961	0.006512	-0.0073	1	
LnS	1.157159	-0.30429	-0.27862	-0.27365	-0.28708	0.0031356	-0.08304	-0.01315	1

Regarding the frame, we can say that GOP is negatively related to RCP, ICP, PDP, and CCC. Observing RCP, the results from the correlation analysis show a negative coefficient -0.119. Correlation results between the ICP and GOP also indicate the same type of result. The correlation coefficient is -0.100, which is negative and highly significant. The negative coefficient -0.121 is presented by PDP to GOP, while the CCC also has a negative coefficient -0.10.

The current ratio, in the analysis, has a significant negative relationship with GOP. The coefficient is -0.04. Company size, which measured by the natural logarithm of sales, has a positive relationship with profitability, and its correlation coefficient is 0.16. The remaining control variables, to GOP, also have negative and significant coefficients.

Regression Analysis

We used regression analysis to investigate the impact of working capital management on corporate profitability. Table 4 reports the results of the four regression models of the study.

For all estimated models, the control variables were included. The model I aims at examining the relationship between the GOP and the RCP. The results show that RCP affects the profitability of the company negatively, and the coefficient is highly significant. The overall explanatory power of the model is relatively high that the adjusted-R square is equal to 0.342. The control variables are all significant and show the expected signs.

Model II examines the relationship between the GOP and the ICP in the presence of the same three control variables. The ICP is highly significant and shows the expected negative sign. The adjusted-R square of the model is equal to 0.322, and all control variables are significant and show the expected signs.

Model III examines the relationship between the GOP and the PDP with all control variables included in the regression model. As with the previous two working capital management measures, the coefficient on the PDP is significant and negative, and the value of the coefficient is near zero. All control variables except for FAR are significant. The adjusted-R square of the model is equal to 0.334.

TABLE 4
Regression Analysis

Dependent Variable: GOP (Gross Operating Profitability)				
Independent Variables	Model I	Model II	Model III	Model IV
RCP	-0.000*** (-11.236)			
ICP		-0.000*** (-8.892)		
PDP			-0.000*** (-11.786)	
CCC				-0.000*** (-8.214)
DR	-0.008*** (-2.966)	-0.008*** (-2.882)	-0.006** (-2.228)	-0.009*** (-3.226)
CR	-0.003*** (-7.06)	-0.003*** (-7.37)	-0.002*** (-6.637)	-0.003*** (-7.566)
FAR	-0.003* (-9.773)	-0.003* (-9.565)	-0.003 (-9.552)	-0.003* (-9.639)
LnS	0.058*** -20.676	0.061*** -21.823	0.058*** -21.003	0.061*** -21.92
Constant	-0.402*** (-15.547)	-0.429*** (-16.733)	-0.405*** (-15.796)	-0.434*** (-16.903)
Observations	23,910	23,910	23,910	23,910
Adj.R-sq	0.342	0.322	0.334	0.314

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

The final model includes the cash conversion cycle, which is the summary indicator of the effects of the previous three measures. The coefficient on the CCC is highly significant and negative. All control variables are significant and show the expected signs. The adjusted-R square of the model is equal to 0.314.

V. DISCUSSION

Regarding our hypotheses, we conclude that our Alternate hypothesis H11 that working capital management significantly affects the profitability of Chinese manufacturing firms is the one to be accepted; and therefore, we reject null hypothesis H01. In the same way, we accept our research hypotheses H12 that there is a negative relationship between liquidity and profitability of the firm; therefore, we reject null hypotheses H02. It is found that in China, the current ratio is the most crucial liquidity measure that affects profitability. The Chinese manufacturing firms must set a trade-off between these two objectives so that neither the liquidity nor profitability suffers. We also accept our research hypotheses H13 regarding size and profitability. As the size

measured in terms of the natural logarithm of sales increases, it will lead to an increase in the profitability of the firm; therefore, we reject null hypotheses H03. We do accept our research hypotheses H14 concerning the debt financing that when the debt financing increases, profitability goes down; therefore, we reject null hypotheses H04 here also. It is interpreted that debt financing will affect the financial cost, which will lead to decreasing profitability.

In general, the results from the correlation analysis show that if companies can reduce the time that accounts receivable are outstanding, plus the period during which inventories remain within the company, plus the time required for settling its accounts payable, then working capital management will be efficient since it will lead to increased operational profitability. Meanwhile, the regression results can be interpreted that working capital management affects the profitability of the company. If the firm can manage its working capital effectively, it can lead to increased profitability. We can also interpret that liquidity and profitability move in opposite directions. Moreover, there is a need to maintain a trade-off between these two objectives of the firm. The size of the firm has a direct positive relationship with its profitability. If the size, which measured in terms of the log of sales, increases, it will lead to an increase in the profitability of the firm. It is further interpreted that if the firm increases its debt financing, it will lead to decreasing the profitability of the firm in terms of the financial cost.

These findings are in confirmation with previous findings that there is a strong negative relationship between the measures of working capital management including the average collection period, inventory turnover in days, average payment period and cash conversion cycle with corporate profitability (Lazaridis and Tryfonidis 2006; Raheman and Nasr 2007; Deloof 2003; Falope and Ajilore 2009; Mathuva 2009).

Limitation

This study is limited to the sample of Chinese manufacturing industry firms. The findings of this study could only be generalized to manufacturing firms similar to those that were included in this research. In addition, because of the limited access authority, the data in CSMAR is only available until 2017. the sample size is small.

Reliability and Validity

The sample of this paper is based on data obtained from the CSMAR, which is an official database that consists of financial statements and stock market information. Moreover, the research methodology of this paper is assessed by the pooled regression type of panel data analysis. It contains more variability, less collinearity between variables, and a higher degree of freedom and more efficiency. Moreover, it is better able to identify and measure effects that are not detectable in pure cross-sections or pure time-series. Thus, we can get more reliable estimates. The regression equations are consistent with previous studies, so the reliability of this paper can be further enhanced.

This paper also has strong internal and external validity. Previous empirical studies primarily guided the choice of variables. Furthermore, the assumptions are generated from various previous studies that have already shown that the relationship among

variables does exist. Therefore, this research conducts the same assumptions from the early beginning.

The variance inflation factor (VIF) was used to detect multicollinearity in regression analysis. As a rule of thumb, a VIF value that exceeds 5 or 10 indicates a problematic amount of collinearity (Kassambara 2018), and if it is less than 10, it is ok. Table 5 shows the variance inflation factor statistics for this paper. The mean VIF is 1.58, which is far less than 10, so the results are acceptable.

TABLE 5
Variance Inflation Factor Statistics

Variable	VIF	1/VIF
RCP	3.01	0.332440
PDP	2.14	0.466461
CCC	1.74	0.575660
LnS	1.14	0.873536
CR	1.03	0.973335
DR	1.02	0.977957
FAR	1.00	0.999749
Mean VIF	1.58	

Theoretical Contribution

To analyze “Does Working Capital Management Affect Profitability of Chinese Manufacturing Firms?”, several objectives of this research which will hopefully contribute towards a particularly important aspect of financial management known as working capital management have been developed. It is almost untouched in China, or extraordinarily little research has been done in this area. Therefore, this research is focusing on working capital management and its effects on profitability for a sample of Chinese manufacturing firms, which extends previous studies using data about Chinese manufacturing firms and investigates the effects of working capital management upon the corporate performance of Chinese manufacturing companies. The results could be generalized to the manufacturing industries.

This study contributes to the literature on the relationship between working capital management and the firm’s profitability in at least two ways. First, it focuses on Chinese manufacturing firms where only limited research has been conducted on such firms recently. Second, this study validates some of the findings of previous authors by assessing the relationship between working capital management and the profitability of the sample firms. It finds out the relationship between debt used by the Chinese firm and the size of the Chinese firm and its profitability, respectively. Thus, this study adds substance to the existing theory developed by previous authors.

VI. CONCLUSION

This paper studied the relationship between working capital management and operating profitability in 874 Chinese manufacturing firms listed on the Shanghai Stock Exchange for a period of six years from 2012 – 2017, because of the limited access

authority, the data in CSMAR is only available until 2017. The results provided evidence that the cash conversion cycle, as a measure of working capital management, negatively affects gross operating profitability. A cynical and significant relationship between the receivables collection period, inventory conversion period, payment deferral period, and profitability were also found. It indicates that companies can increase their profitability by shortening receivables, inventory, and payables periods. Previous research predicts a robust negative relationship between the measures of working capital management, including the average collection period, inventory turnover in days, average payment period, and cash conversion cycle with corporate profitability (Deloof 2003; Eljelly 2004; Shin and Soenan 1998). Our results are in line with these findings.

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

There is much to be done about working capital in China in the future. We suggest that further research be conducted on the same topic with different companies and extending the years of the sample. The scope of further research may be extended to the working capital components management, including cash, marketable securities, receivables, and inventory management. Moreover, a research study at a sector level within the Chinese context could be undertaken. The concept of factoring and credit default of customers may interfere with the way companies manage their working capital. Further studies could also address these issues.

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