

**WORKING CAPITAL MANAGEMENT AND ITS
EFFECT ON THE PROFITABILITY OF CHINESE
LISTED FIRMS**

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Abstract

Working capital management is one part of the integrated corporate financial strategy. Efficient working capital management is expected to have a positive effect on companies' business. The study aims to investigate the main factors that impact working capital practices of some listed firms in China across different industries and their effect on the firms' performance. The sample contains more than 2000 listed companies in China during the 2010 to 2014 period. Cash Conversion Cycle (CCC) is used as a measure of working capital policy, while Gross Operational Income (GOI) is used as a measure of profitability. The main results of the study suggest that Chinese listed firms' working capital policy is different across industries and stable over the research period. Firms in China are prone to choose conservative working capital policy, which is shown to be positively associated to the firms' profitability in this sample. Like most previous studies, a negative relation is found between the working capital indicator CCC and the profitability indicator GOI, which means that while the overall financing policy is conservative, reducing the CCC can still make the firms profitability increase. Unlike most of the research, the leverage is positively related to the working capital indicator CCC, suggesting that working capital reduction could be an alternative way of financing.

JEL Classification: G31, G32

Key words: Working capital, determinants, profitability, China, listed firms

Resumo

A gestão do *working capital* é parte integrante da estratégia financeira de uma empresa. A gestão eficiente do *working capital* deverá ter um efeito positivo no desempenho das empresas. Neste estudo pretende-se investigar quais os principais determinantes na gestão do *working capital* quais os seus efeitos na performance de um conjunto de empresas cotadas Chinesas. A amostra contém mais de 2000 empresas cotadas na China durante o período de 2010 a 2014. O *Cash ConversionCycle* (CCC) é a medida utilizada na análise das políticas de *working capital*, enquanto o *Gross OperationalIncome* (GOI) é a medida de rentabilidade utilizada. Os principais resultados sugerem que as políticas de *working capital* seguidas diferem entre setores de atividade, embora se mantenham estáveis ao longo do período de análise. As empresas Chinesas tendem a seguir políticas de *working capital* conservadoras, o que está associado de forma positiva com a rentabilidade nas empresas em estudo. Embora no geral a política de financiamento seja conservadora, e tal como em muitos estudos anteriores, foi possível encontrar uma relação negativa entre o indicador de *working capital* CCC e o indicador de rentabilidade GOI, onde uma redução do CCC está associada à melhoria da rentabilidade. Ao contrário de estudos anteriores, o endividamento está positivamente relacionado com o *working capital*, sugerindo que as empresas podem reduzir o *working capital* como fonte alternativa de financiamento..

Classificação JEL: G32, G32

Palavras-Chave: *Working capital*, determinantes, rentabilidade, China, empresas cotadas

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List of abbreviations

| | | |
|------|---|--|
| AIP | – | Aggressive Investment Policy |
| AFP | – | Aggressive Financing Policy |
| CCC | – | Cash Conversion Cycle |
| CCER | – | China Center for Economic Research |
| COGS | – | Cost of Goods Sold |
| CSRC | – | China’s Securities Regulatory Commission |
| DIO | – | Days Inventory Outstanding |
| DPO | – | Days Payable Outstanding |
| DSO | – | Days Sales Outstanding |
| IHP | – | Inventory Holding Period |
| GDP | – | Gross Domestic Product |
| GOI | – | Gross Operating Income |
| GOP | – | Gross Operating Profitability |
| NWC | – | Net Working Capital |
| POT | – | Pecking Order Theory |
| PP | – | Percentage Point |
| SD | – | Standard Deviation |
| SHSE | – | Shanghai stock Exchange |
| SZSE | – | Shenzhen Stock Exchange |
| TFA | – | Tangible Fixed Assets |
| VIF | – | Variance Inflation Factor |
| WCM | – | Working Capital Management |

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1. Introduction

The chapter provides a brief overview of the research. It introduces the listed firms in China on its environment, the Working Capital Management (WCM) policies and the motivations to accomplish the study. The research objectives and the methodology are presented, the structure of the thesis is explained.

1.1 Problem statement and motivation

Emerging markets have made a great contribution to the world's economy, and the growth index like GDP in the emerging market is much higher than that in other areas in the world. China is one of the most powerful engines that drive the economy growth of the world. Although it belongs to the emerging markets, the Chinese economy is very promising, growing at a very attractive pace in recent years and it has become the world's second largest economic powerhouse. Al-Najjar (2013) argues that such emerging markets have a significant share in the world's economy, which qualifies them to catch up the sales level of the developed economies at lower costs and risks; as a result, suppliers are encouraged to invest in the emerging markets.

According to Gill et al. (2010), the concept of WCM is often discussed in relation to profitability. Because one of the goals of WCM is to increase profitability, it should make it attractive over time, in both good and harsh economic climates. Recent development since 2010 has been that general increases in revenue have required increasingly larger amounts of Net Working Capital (NWC). Knowing the experience from Western countries and comparing them with that in the developing countries like China in the situations of economic growth or recession, we developed a study plan on working capital field which is related to importance of the Chinese economy. With our background and language skill in both English and Chinese, we choose to study the Chinese enterprises and their working capital policy.

1.2 Objectives

The objectives of the thesis are:

- To investigate whether there is a significant difference among the working

capital practices of firms across different industries and controller types or not.

- To analyze whether aggressive or conservative working capital policies are relatively stable over time or not.
- To examine the impact of aggressive and conservative working capital policies on the profitability of the companies.
- To determine the impact of the determinants of working capital indicator and the management methods

1.3 Approaches

Different companies in each life cycle have different capital structures and working capital characteristics and there are many factors that influence their financial choice. Through a comparison of patterns of capital movement, the research will provide insight on how the companies manage their working capital. A detailed literature review is conducted first and publications from various sources such as books written by experts in the finance sector, scientific journals, websites, research reports were collected and studied.

A descriptive analysis is used in the first part the analysis to investigate the condition of the working capital situation of some listed firms in China. Next, in order to control unobservable heterogeneity and possible endogeneity problems, the coefficient matrix is used in our empirical research. In order to investigate which policy between aggressive and conservative policies is better related to the firms' profitability and the determinants of WCM and the WCM effect on the profitability of the listed firms in China, the model of fixed-effect regression is used. The ANOVA (F-test) is used in the model to test the stability across firms in different countries.

The analysis is conducted using a sample of Chinese listed firms downloaded from China Center for Economic Research (CCER) database. The data contains detailed financial information such as balance sheets, income statements, financial ratios, and descriptive information. Based on the analysis of the data and comparison with

existing analysis on different industry as well as developed market, the crucial role of working capital and the relation between working capital and corporate performance are highlighted in this thesis.

1.4 General framework

The thesis is organized into five chapters. Chapter 1 is a brief introduction of working capital and working capital management. Chapter 2 presents an overview of the development of the concept of working capital, and empirical researches conducted on working capital management and its effect on profitability. Chapter 3 describes the research sample from China Center for Economic Research (CCER) database and the methodology used in this research. Chapter 4 presents a descriptive analysis of the data and the findings obtained from the empirical approach. Results from the correlation analysis and the regression analysis of the collected data are presented. Chapter 5 presents a brief summary of the empirical results, the main conclusions of the thesis, and the recommendations for future studies.

2. Literature Review

2.1 An overview of the listed enterprises and the Chinese financial system

China's corporatization process started from ground zero in the mid-1980 and it developed rapidly in 1990s. The first stock companies appeared in 1984 (Xu and Wang, 1999). The Shanghai stock Exchange (SHSE) was inaugurated in December 1990, and the Shenzhen Stock Exchange (SZSE) opened in April 1991. The number of the listed companies has increased drastically since then, from 183 in 1993 to over 800 in 1998. Our research contains most of the listed firms in China, with more than 2,000 companies. Public listed firms form a small set of China's enterprises, whose timely financial statement publishing is required, and perhaps better performing enterprises are chosen to be listed on the two stock exchanges.

These companies undertook a restructuring process required by China's Securities Regulatory Commission (CSRS) before their initial public offering. According to the State Council of China, there are standards for the listed firms. The total share capital of a company should not be less than thirty million yuan; the operation time should be more than three years, and the last three consecutive years must be profitable. Formerly state-owned enterprises established by law alterations or newly founded ones whose main sponsor of state-owned enterprises after the implementation of the standard carry out by CSRS, can be calculated continuously as formerly state-owned ones. In addition, the shares issued to the public should amount to 25% or more of the total number of shares. In the condition that the total share capital is more than four hundred million yuan, the proportion of its public offering of shares to the public could be less, at least 10%. Lastly, the company must have no significant violations in the last three years, and its financial and accounting reporting practice is healthy.

According to Ayyagari and Maksimovic (2010), the financial sector in China consists of financial intermediaries such as commercial banks, security companies, insurance companies, and information consulting services and other intermediary agencies. The banking sector is dominated by four state-owned banks that began to follow the market rules in 1995. In the perspective of history, a large share of bank funding went

to the state-owned firms, and the private firms had to rely on alternative financing channels. Ayyagari and Maksimovic(2010) also pointed out that the inefficiency of Chinese bank lending should not be overstated, especially in recent years. A massive restructuring of the banking sector, which allows the entry of foreign banks to prepare the banks for equity listings and strategic sales, has occurred. While China’s banking system is extremely large, its equity and bond markets are smaller than that of most other countries, when measured by both market capitalization and the total value traded as a percentage of GDP.

2.2 Working capital definition and history

Working capital corresponds to the difference between current assets and current liabilities. It is the most vigorous part of a company’s capital structure, and it has a direct influence on the operation of the company. Current assets consist of three major components: accounts receivable, inventories, and cash and equivalents. Inventories are often divided further into materials, working-in-progress, and finished goods (Figure1). Current liabilities consist of accounts payable and debt due in less than one year.

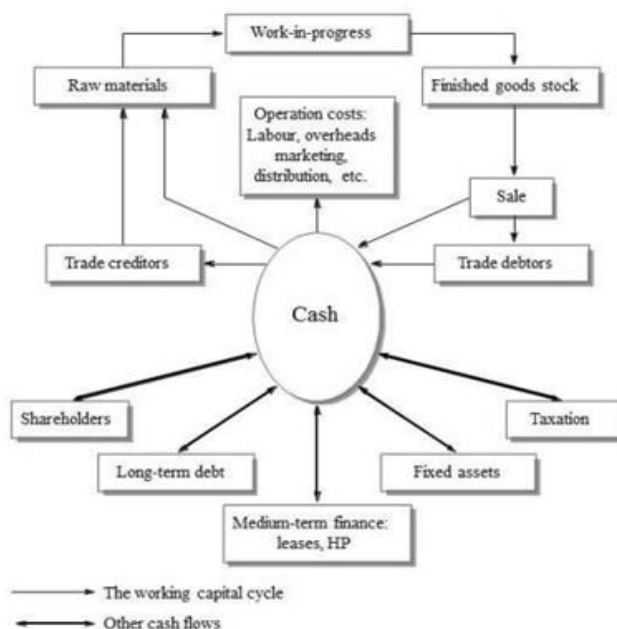


Figure 1 A typical working capital cycle (Source: Arnold, 2008)

Working Capital is a very common concept in corporate financial theory, and it is mentioned in the book of Wealth of Nations by Smith (1776) as an important element of a firm. The inventory is considered a current asset because it is expected to be converted into cash within the year. The company may have a reasonable stock management because the investments in inventory are usually translated into a substantial capital investment. Knight (1972) expanded the existing theory of inventory and stated that the inventory cost should be optimized through purchase and storage cost, which induces lots of researchers work on the inventory model later.

When talking about account receivables, trade credit (Figure1) has to be mentioned. Most transactions are not paid at the time of invoice, and the credit that a firm offers to their customers to extend the payment period is called trade credit. Meltzer (1960) is one of the pioneers in studying trade credit to understand the relation between monetary conditions and trade credit. Trade credit can be helpful in allowing customers to use the products before paying. In a firm's prospect, the operation cycle starts at buying raw materials from suppliers and ends when receiving payments after customers buy its products. The cash cycle is the process of paying suppliers until collecting money from customers. If there is no trade credit, the operation cycle equals exactly to the cash cycle. With trade credit, companies can attract more customers especially when the customers have many choices of the products. Love et al. (2007) noticed that worldwide firms increase their trade credits when a financial crisis occurs.

Regarding accounts payable, Deloof (2003) stated that delaying payments can be an inexpensive and flexible source of financing. This means that the existence of this component is associated with the financing policy of the current assets in a sense that it is possible to delay the payment to the firm's suppliers in order to postpone the cash outflow. Thus, it helps the firm to reduce its cash operating cycle. However, late payment of invoices can be very costly if the firm is offered a discount for early payment, which implies that the financial managers have to consider the opportunity cost of capital, like choosing between paying earlier and getting the discount at a

specific rate or postponing the payment and using the cash on an investment with an equal or higher rate of return.

Before 1970s, researches focused only on the optimization of each component of working capital. In the late 1980s, working capital management has become an integrated approach in the operation of companies. When talking about the ways of WCM now, the concept of Cash Conversion Cycle (CCC) has to be mentioned, which was first introduced by Richards and Loughlin (1980) see Figure 2. The CCC is the number of days between the expenditure of a firm's cash for the purchase of raw materials to produce the goods (products) for sale, and the collection of cash from the sale of the finished product. Ross et al. (2008) also describe the CCC as the difference between the operating cycle and the account payable period, which means that it is the time lag between the conversion of the product (as inventory) in receivable that will generate cash inflows and the period of account payable that will generate cash outflows. This concept combines account receivable, inventory and account payable. With just one indicator the overall condition of the firms' working capital management can be known. The CCC model is not connected to investments in general, but directly to a company's refining process of supplies (Gill et al., 2010). Because no component of the working capital is isolated from the other, decisions and actions regarding one component need to be coordinated with other parts that make up the total working capital (REL, 2013).

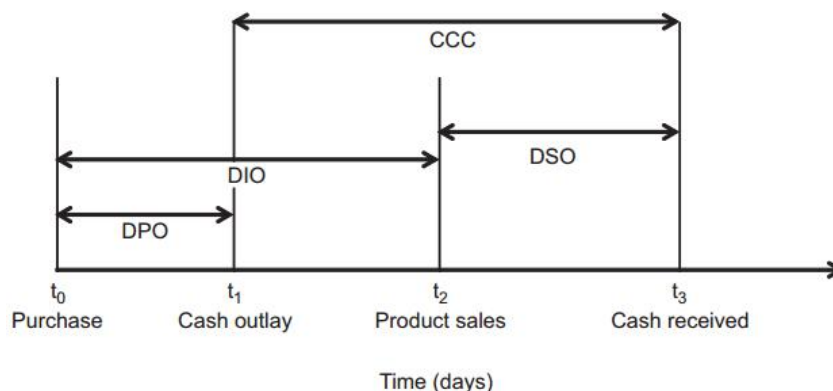


Figure 2 Cash conversion cycle (Richards and Laughlin, 1980)

DPO: Days Payable Outstanding; DSO: Days Sales Outstanding; DIO: Days Inventory Outstanding

2.3 The importance of managing working capital

Working capital management is referring to actions aimed at managing companies' working capital levels and thus does not refer to specific managing-model or framework. In contrast to long-term financial decisions, WCM deals with the issues of short-term financing. For example, deciding the level of credit a company gives to their clients, and how much credit they should demand from their suppliers is working capital management. These types of short-term financing decisions are important for the sustainability of the companies because they affect liquidity and profitability (Aravindan and Ramanathan, 2013). However, working capital is also important for a company's long-term financing because the indication of short-term survival strength and financial-health through short-term liquidity will impact the company's ability to gain attractive long-term financing. Because of the higher credit risk, a company with poor financial health is likely to have a higher cost of capital than a company with good finances (Penman, 2013). In some conditions, companies depending on working capital too much will face financial constrain even go bankrupt if the working capital condition are not as expected. Firms should take measures to manage working capital well.

Evidence reported by Fazzari and Petersen (1993) implies the reversibility of working capital: it may be temporarily negative if a firm consumes inventories faster than replacing them, or tightens credit policies resulting in lower-than-normal accounts receivable. They emphasize that liquidity is an important factor for working capital, where firms with weak liquidity do cut account receivables when confronted with tight money condition. In contrast, excess cash holdings and high investment in net operating working capital could indicate bad management quality if determined by the investment opportunities of the firm. Opler et al. (1999) indicated that firms could be holding too much cash in order to defend themselves from unwanted takeover attempts, and these firms could have high levels of investments in working capital.

Good working capital management increases cash flows, which results in less need for external financing; therefore, the probability of the default of the firm is reduced. Deloof (2003) used a sample of Belgian firms and found that firms can increase their profitability by reducing the debtors' collection period and the days-in-inventory period. Wang (2002) used a sample of Japanese and Taiwanese firms and found that a shorter cash conversion cycle would lead to a better operating performance. Baños-Caballero et al. (2012) proved that a target cash flow cycle exists in enterprises. When facing a shortage of working capital, enterprises will have the possibility to borrow money at a high interest rate to maintain regular operations, and this will affect the enterprise's ability to pay interests and dividends. However, high working capital level means that substantial amount of liquidity does not create more economic benefits, which implies that enterprises may lack investment opportunities and potential development will be influenced. Ding et al. (2012) used a panel of over 116,000 Chinese firms over the period between 2000 and 2007 to analyze the firms' conditions using working capital to mitigate the effects of financing constraints on their fixed capital investment. They found that higher working capital was not an indicator of poor working capital management efficiency, and they suggested that good working capital management might help firms to alleviate the effects of financing constraints on fixed investment.

2.4 Capital structure overview

The main focus of our research is on working capital. The previous section illustrates that short-term financing can also influence the firms' long-term finance. We focus on the theories that can have impact on the capital structure in this section.

2.4.1 Tradeoff theory

The tradeoff theory is related to the tax-based theory. It states that companies should seek to raise their debt level as much as possible when seeking an optimal level (Miller, 1988). However, some empirical studies (e.g., Kraus and Litzenberger, 1973) show that there is a tradeoff between tax shield advantage and leverage related costs, thus debt cannot be used as sources of financing indeterminately. Considering the

tradeoff between leverage and cost, firms will seek a target debt ratio that can balance debt tax shield and bankruptcy costs (Myers, 1984).

2.4.2 Pecking order theory

Pecking order theory is another major theory developed by Myers (1984). It states that firms prefer to finance first by retained earnings, then with riskless debt, then risky-debt, and finally with issuing new equity. Working capital is a readily available internal source of financing which can act as an alternative source of financing, especially for the purpose of fixed-investment smoothing to maintain a stable fixed-investment. External funds can be very costly due to flotation costs. The problem of asymmetric information is serious especially for financially constrained firms (Fazzarri and Petersen, 1993). Several empirical studies like Fama and French (1988) support the pecking order theory. It states that leverage is negatively related to profitability, and it is in accordance with the pecking order assumption that debt is only issued when internal funds are insufficiently to finance new investment.

2.4.3 Agency problem

Aside from the pecking order theory, the free cash flow hypothesis by Jensen (1986) is another theory that may have an influence on the working capital investments chosen by a firm. The theory emphasizes the agency costs of the free cash flow. According to the theory, managers would accumulate cash to increase the assets they can control and to gain discretionary power over their firm's investment decision (Ferreira and Vilela, 2004). According to Opler et al. (1999), in order to reduce the pressures on the managers and get more freedom to choose projects that make them happy, the managers prefer to hold more cash and high levels of investment in working capital. Managers would rather keep resources and tend to waste them on inefficient investment than pay out to shareholders. A discipline mechanism for managers would be to increase the debt level in the firm to reduce the free cash flow available, especially in firms with large cash flow and low growth opportunities.

2.5. Working capital across different industries

Studies aimed at analyzing the comparative performance management of different industries are not rare. Hawawini et al. (1986) pointed out that working capital policies are sensitive to industries, and are stable over time. After analyzing the working capital management policies of 32 non-financial industries in USA, Filbeck and Krueger (2005) highlighted that significant differences exist between industries in working capital practices. Moreover, these working capital practices change significantly within industries overtime. Chiou et al. (2006) suggested that in some industries firms are sensitive to the different impacts of economic events due to the different nature of operations. Other studies (e.g. Shin and Soenen, 1993; Maxwell et al., 1998; Weinraub and Visscher, 1998; Kieschnich et al., 2006) also show that an industry characteristics can impact the firms working capital policy.

Afza and Nazir (2007) investigated the relation between the aggressive and conservative working capital policies for 17 industries with a sample of 263 public companies listed on Karachi Stock Exchange (KSE). Using cross-sectional data in 1998 – 2003, they found significant differences among the firms' working capital investment and financing policies across different industries. Afza and Nazir (2008) made an attempt to investigate the relation between working capital management policies and a firm's profitability for a sample of 208 non-financial firms listed on KSE for the period of 1998 – 2005. Their study also found significant difference among the firms' working capital requirements and financing policies across different industries.

2.6 Two strategies to manage working capital: aggressive and conservative

Firms with an aggressive WCM policy have a low level of current assets as a percentage of total assets. Weinraub and Visscher (1998) discussed the issue of aggressive and conservative working capital management policies of the US firms in different industries, and found that when a firm chooses aggressive financing policy, it means that the risk is high, and managers might expect a high return on profit. Unlike

an aggressive policy, the conservative approach is to have plenty of current assets and cash in the bank, warehouses full of inventory, and payable all up to date. In this situation, the risk of short-term cash shortage is low, but the long-term profitability might be hurt. Garcia and Martínez (2007) indicated that the choice of working capital policies must be based on the evaluation of the “trade-off between expected profitability and risk”. Contrast to the result Weinraub and Visscher (1998) found, Afza and Nazir (2008) used panel data for the period of 1998 – 2005 to study the financial policies and their impact on the profit and found a negative relation between the firms’ profitability and the degree of aggressiveness of working capital investment and financing policies, they concluded the conservative working capital policy is positively related to firm’s profitability.

In China, articles on empirical research strategy in working capital are mainly from the Chinese Listed Companies working capital policy. Liu et al. (2001) illustrated that China's listed companies’ working capital management most belongs to the moderation policy type. Wu (2010) analyzed the ratio of current assets, current liabilities ratio, working capital requirement ratios and return on invested capital rate using cluster analysis and weighted average cluster analysis, and concluded that the current working capital management of the listed companies’ strategy is a high proportion of current assets to current liabilities ratio and working capital of the listed companies. The investment and financing working capital management policy are moderation type transition. Through empirical testing, Wu (2010) found that different sectors of working capital investment strategy and financing aggressiveness strategy are significantly different, and the aggressiveness of working capital investment strategies in different sectors are significantly stronger than some of the financing strategies. This difference over time shows some stability. China's listed companies in the implementation of aggressive working capital investment strategy will not necessarily be simultaneously selected to perform the conservative working capital financing strategy.

2.7 Working capital and profitability evidence

In Western countries, the research between working capital management and firms' profitability started at an earlier time and research results are relatively abundant. Most research used the empirical analysis approach with correlation analysis and regression analysis, using data from different countries and considering variables that can stand as proxies for the working capital management and firm's profitability. Because these studies used different research samples and analysis variables, they came to different conclusions.

The studies are classified by research sample and variables that indicate working management, enterprise performance indicators and research conclusions. As for the research sample, the existing research sample could be the whole country in all industries or a specific industry. Many researches used listed companies data; recently, small and medium-sized companies also attract attention. For the working capital indicators, the early research often used the net operating cycle as a variable to investigate the relation between profit and working capital. The operating cycle is the sum of days in inventory and days in accounts receivables.

Efficient cash management of a firm may increase the net present value of the cash flows and eventually a shorter CCC period which may result in higher profitability. In other words, a shorter CCC means reduced inventory days, reduced receivable days, and large payable days. Zariyawati et al. (2009) studied the correlation between WCM and the profitability of some Malaysian firms for 11 years from 1996 to 2006, a pooled ordinary least squares regression analysis shows that there is a significant negative correlation between CCC and a firm's profitability. Therefore, a firm's manager should consider carefully the reduction of the CCC with the intention of creating and maximizing profit for shareholders. Previous studies (e.g., Deloof 2003) also used operating profit as a dependent variable.

Several studies have recognized the relation between working capital and its influence on profitability. In most researches, the profitability and working capital management are negatively correlated (Shin and Soenen, 1998; Deloof, 2003). Similar studies are

conducted by Raheman and Nasr (2007), Zariyawati et al. (2009), Falope and Ajilore (2009), Dong and Su (2010), and Mathuva (2010), respectively on emerging markets in Pakistan, Malaysia, Nigeria, Vietnam, and Kenya. All these studies have found a significant negative relation between the CCC and a firm's profitability. This means that managers can create value for their firms by keeping their working capital to a minimum.

Although the profitability and working capital management are negatively correlated, as noticed in most research results, some studies came to opposite conclusions. Gill et al. (2010) used a sample of 272 America firms listed in the NYSE between 2005 and 2007, and found a positive relation between CCC and corporate profitability, a negative relation between receivable collection period and firms' profitability, and that there is no significant relation between Inventory Holding Period (IHP) with corporate profitability and no statistical association between accounts payables and firms' profitability. The study concluded that firms' profitability cannot be improved by reducing the accounts receivable period and by managing the CCC in a more efficient way. According to the analyses above, the relation between CCC and profit is still not clear, even though most researches approve the negative relation. There is unexpected effect such as less trade credit that will cause losing costumers only considering decreasing CCC if the cycle is driven too tight. There is a trade-off as it could create problems such as sales and customer relations for some departments in a company. It may not be possible to deliver the same customer satisfaction when placing a higher focus on reducing the CCC (Shin and Soenen, 1998).

A recent study of WCM and profitability by Baños-Caballero et al. (2012) showed a U-shape relation model between working capital and firm's profitability. They found a concave relation between cash conversion cycle and profitability. This is probably one of the most crucial findings in WCM and profit. Based on the model, it is expected that the optimal level of investment in working capital differs between firms.

2.8 Working capital determinants

This section focus on what factors can affect working capital management. Lazaridis

and Tryfonidis (2006) proposed that different variables of practices and external variables should be included in order to provide a strong relation between WCM and firms' performance. According to previous researches, there are a variety of factors that might affect working capital measures, such as leverage, sales growth, size, tangible fixed asset, GDP, etc. (Chiou et al., 2006; Kieschnick et al., 2006; Afza and Nazir, 2009; Baños-Caballero et al., 2010; Abbadi and Abbadi, 2013).

2.8.1 Leverage

When managing the cost of financing working capital, it is expected that companies with a higher leverage ratio have to pay a higher risk premium. If working capital is still available, it would be the first choice to use. Hence, a firm with more debt means that it has less internal financing and there could be less capital available for daily operation. According to Afza and Nazir (2008), a firm with rising debt ratio should pay more attention to its working capital to avoid it being stuck in the operating cycle. This is in accordance with the previous empirical evidence and pecking order theory. Lazaridis and Tryfonidis (2006) investigated the WCM and corporate performance of a sample of 131 listed firms in the Athens Stock Exchange during 2001 – 2004 and found that the firms' leverage are negatively related with the firms' profitability. Other studies (Chiou et al., 2006; Zariyawati et al., 2009; Baños-Caballero et al., 2010; Taleb et al., 2010; Abbadi and abbadi., 2013) also suggested a significant negative relation of the working capital when firms increase their leverage.

2.8.2 Sales growth

The variable that measures the sales growth can also affect the working capital management. Baños-Caballero et al. (2010) showed that this variable might affect trade credit granted and received by firms, as well as their investment in inventories. One of the implications of the pecking order theory is that a firm that expects more growth opportunities will need more capital in the future, which in turn will need more internal financing. A positive relation between CCC and sales growth is found by Kieschnick et al. (2006), who suggested that firms tend to keep inventories at a higher level to meet the future sales growth. The positive effect of growth on

inventory is confirmed by Chiou et al.(2006), Afza and Nazir (2008), Baños-Caballero et al. (2010), and Palombini and Nakamura (2011). however, firms with a higher growth rate probably use more trade credit to finance their growth. In such a situation, the firms will keep operating-related working capital at a relatively low level; thus, a negative relation between working capital and requirement is also possible (Chiou et al., 2006). Zariyawati et al. (2010) also pointed out this negative relation between working capital and the growth rate.

2.8.3 Size

The size of a firm has an influence on working capital policy and approach. Most of the previous researches (e.g., Chiou et al., 2006; Kieschnick et al., 2006) found a positive relation between working capital and firm size. This is probably due to the cost of financing, because smaller firms have greater information asymmetries and larger firms can afford relaxed receivables and inventories. The empirical researches conducted by Jordan et al. (1998), Berger et al. (2001), Baños-Caballero et al. (2010) also found a similar relation, which is in agreement with the conclusion obtained from the trade-off theory. This is because small firms have a large chance to face financial constraint compared with large firms, and they may want to increase the trade credit levels because other access of funding is hard (Petersen and Rajan, 1997). On the other hand, according to Kieschnick et al. (2006) a negative relation is also possible, because larger firms may have a greater bargaining power with suppliers and customers, and they can manage their cash conversion cycle better, have easy access to capital, and keep cash to a minimum. This will lead to a negative relation between working capital and firm size. Afza and Nazir (2008) and Zariyawati et al. (2010) found this negative relation in their studies.

2.8.4 Tangible fixed asset

The empirical evidence by some researchers such as Kieschnick et al. (2006) and Baños-Caballero et al. (2010) shows that tangible fixed assets is negatively related to working capital management. Baños-Caballero et al. (2010) pointed out two different views to illustrate the relation between tangible fixed assets and working capital

management. In one hand, the investment in fixed assets competes with the investment in working capital for the limited resources available; on the other hand, according to the information asymmetric problem, it is not easy for firms with more intangible assets to get funds. In other words, the firms with more tangible fixed assets will get funds easier or at a lower price, and this will enhance increased CCC.

2.8.5 GDP

Previous research such as that conducted by Chiou et al. (2006) suggests that GDP might be an external factor that influences working capital, especially during recessions. It is possible that a company can face problems when collecting receivables and selling off inventory, and this may result in a higher requirement of working capital needs. Hence, working capital investment should be kept to ensure smooth daily operation. According to the finding of Zariyawati et al. (2010) using data from Malaysia, GDP is positively related to working capital indicator, firms' investment in net operating working capital increased with better economic condition. Baños-Caballero et al. (2010) also tested the relation between working capital and GDP, but their significance level is not significant. It is concluded that the financing is abundant during the economic boom, and firms would not be very concerned about the level of working capital. Further research is still needed to verify this.

2.8.6 Industry factor

Many researchers studied the relation between industry and its working capital structure. Jordan et al. (1998) assumed that companies from the same industry have more in common with each other than companies from different industries. These industries tend to have a similar debt level over time. Michaela et al. (1999) stated that the industry effect is bigger on short-term debt ratio compared with long-term debt ratio in all industries.

2.8.7 Controller type

This is perhaps a special characteristic of Chinese firms. Debt financing in China is one of the most important approaches of corporate financing, the effect of a firm's controller type will reflect the firm's ability of financing. Under the conditions of

imperfect legal system and corporate governance, information asymmetry is a very serious problem in China. Strict monitoring and control from banks or other institutions are needed to reduce the high risk derived from information asymmetry (Ruan et al, 2014).

3. Empirical Research: Data Sample and Methodology

This chapter provides a description of the sample and variables which have been created to conduct the empirical analysis. The methodology and assumptions related to the research about working capital policy and its effect on profitability of some listed firms in China are also described.

3.1 Objective

The key objective of the study is to find the working capital policy and the effect of working capital management on profitability of Chinese listed firms across all industries, as well as the determinants that can affect working capital policy

3.2 Data Sample

The research sample is obtained from a Chinese economic and financial database of the China Center for Economic Research (CCER). The database, which contains more than 2000 firms in the lists from 2010 – 2014, is one of the largest databases that provide precise finance and economy data and it includes annual account reports of listed companies in China. Companies with complete financial data during this period were selected and there were more than 2000 firms in the observation. The data obtained include Sales Revenues, Costs of goods sold, Net Profit, Accounts Receivable, Inventories, Account Payables, Total Assets and Total Liabilities, Current Assets and Current Liabilities, Industry Type, and Controller Type, which are used to determine all the variables. The currency is Chinese Yuan.

After considering all the factors needed to analyze in the research, we chose Gross Operating Profitability, Cash Conversion Cycle, Aggressive Investment Policy, Aggressive Financial Policy, Leverage, Size, Total Fixed Assets, Growth, GDP (obtained from the website of the World Bank), Industry type and Controller type as variables. Most previous empirical studies use cross-sectional data and time series data for analysis. In this paper we use panel data to research listed companies working capital management policy, combine cross-sectional data and time information sequence data, and propose a model that can reflect variation in both between groups

and within group directions, and section to control the heterogeneity of individual units, while reducing the impact of multicollinearity between the variables to increase the freedom and efficiency. The model is an unbalanced panel data model because information is not available for all companies in all research years, some of the companies are new on the list or went through merger and acquisition during the research year. In order to ensure the accuracy of the data in the sample, a number of filters are applied. Observations of the companies with anomalies such as negative values in the total assets, cost of goods sold, current assets, fixed assets were eliminated. To avoid outliers in the sample that might impact the final result, 1% of values at the top and bottom presented by several variables were excluded. This is consistent with the previous studies such as Shin and Soenen (1998), Deloof (2003), Raheman and Nasr (2007). As a result of applying these filters, the sample ends up with 11866 observations for the research years.

3.3 Variables

3.3.1 Dependent variable

Previous studies use two dependent variables for two different models. One model aims to test the relation with the WCM and the firm's profitability. Profitability is measured as gross operating profitability, which is a kind of operating profitability related to operating assets. The weight of financial assets varies in different firms. The financial assets are excluded from total assets to avoid unstable factors that could affect firm overall profitability. The objective is to define this measure as dependent variable, passes to focus on the operational activity. Gross Operating Income is calculated as (Lazaridis and Tryfonidis, 2006):

$$\text{Gross Operation Income} = \frac{\text{Sales} - \text{Cost of goods sold}}{\text{Total assets} - \text{Financial assets}} \quad (1)$$

Another model uses Cash Conversion Cycle (CCC) as a measure of WCM efficiency. The CCC measures the number of days that funds are committed to inventories and account receivables, less the number of days payments to supplier are deferred

(Gitman, 1974). The object of this model is to explain the characteristics that might determine CCC. Accounts payables are taken as a proxy to determine the firm's payment policy to its suppliers. It is computed as account payables/cost of sales×365. In addition, a number of day's inventories are taken to determine the firm's inventory policy. It is calculated as inventories/cost of sales×365. Lastly, the firm's collection policy is determined as a proxy of the number of days in account receivable. It is computed as account receivable/turnover×365. This model illustrates the company's characteristics that might determine CCC. Previous empirical research by Shin and Soenen (1998) and Baños-Caballero et al.(2010) also chose CCC as a measure of working capital.

$$\text{Cash Conversion Cycle} = \frac{\text{Account Receivables}}{\text{Sales}} * 365 + \frac{\text{Inventories}}{\text{COGS}} * 365 - \frac{\text{Accountpayables}}{\text{COGS}} * 365 \quad (2)$$

3.3.2 Independent variables

Many factors have an impact on working capital management; hence, it is important to understand and analyze each factor that affects working capital measure.

First we analyze firm's cash policy. Aggressive Investment Policy (AIP) means the minimal level of investment in current assets versus fixed assets. In order to measure the degree of aggressiveness, the ratio of AIP equals to total current assets over total assets is used. If this ratio is low, it means that the firm has adopted aggressive investment policy and utilizes less proportion of liquid assets or keeps a small amount of cash in hand. If the ratio of current asset to total asset is high, it indicates the conservative investment policy of the firm (Afza and Nazir, 2008). Aggressive Financing Policy (AFP) utilizes higher levels of current liabilities and less long-term debt. In contrast, a conservative financing policy uses more long-term debt and capital. The degree of aggressiveness of a financial policy adopted by a firm will be measured by: AFP equals to total current liabilities over total assets. A higher ratio means relatively an aggressive policy (Afza and Nazir, 2008).

The factors that might have an impact on profitability are leverage, growth opportunities, liquidity, size, firm's age, cash conversion cycle, industry factor, gross domestic product etc. It is worthwhile to point out that there are two different analyses through the whole thesis, in this part the analysis is regard the variables as control variables that can influence profitability, in the later analysis, these variables are also used as determinant factors that can influence the working capital indicator CCC.

Leverage: A firm may have to use external funds when there is a lack of internal funds, and it has to pay for the cost of using external funds which is higher than using internal funds. The empirical evidence demonstrates a negative relation between profitability and leverage (Shin and Soenen 1998; Deloof 2003; Lazaridis and Tryfonidis 2006; Mathuva 2010; Zhang 2012). Hence, a significant negative relation is expected between profitability and leverage, which is measured as the value of a firm's long-term and short-term debts. The leverage ratio is calculated by total debts over total assets.

Sales Growth: Growth may affect the trade and trade credit received. When firms are in a business circle, they need to seek cash to meet the financial need; the firms can also increase their trade needs to promote their sales in periods of low demand (Baños-Caballero et al. (2010). This control variable is calculated by this year's sales minus previous year's sales divided by previous year's sales. The variable is used in studies like Shin and Soenen (1998), and Deloof (2003), Samiloglu and Demirgunes (2008). When a firm's sales growth increases, the profit is expect to grow as well. The research results from Deloof (2003) and Lazaridis and Tryfonidis (2006) proved the positive relation.

Size: Size, as a control variable, is another factor that can influence profitability. The relation between profitability and size is expected. Afza and Nazir (2008) found a negative relation between net operating profit and size. This is probably due to the high cost a large company has. The impact of size on profitability still needs to be explored. The variable is defined as the natural logarithm of sales, which is consistent with that by Baños-Caballero et al. (2010) and Abbadi and Abbadi (2013).

Tangible fixed assets: The tangible fixed assets and the profitability are positively related according to the researches of Lazaridis and Tryfonidis (2006) and Mathuva (2010). Baños-Caballero et al.(2010) illustrated that when compared with the intangible assets, the tangible fixed assets bring less asymmetric information and agency problems due to the difficulty in valuation of intangible assets. Tangible fixed assets are measured by the ratio of a firm's tangible assets to the value of its total assets.

GDP: Working capital management can be affected by many macroeconomic factors, and the growth in the Gross Domestic Product (GDP) is included in the analysis. The good impact of GDP will probably reflect in the firm's profitability. This control has been noticed by Garcia and Martínez (2007). The relation between GDP and GOP is expected to be positive, and it is easy to deduce that when an economic environment is good, a company has the potential to gain more. The empirical research by Mathuva (2010) confirmed the expectation.

3.4 Hypotheses

Several studies relate the effect between industries on working capital policies. Afza and Nazir (2008) studied emerging markets on Pakistan firms and came to a conclusion that there are significant differences among working capital investment and financing policies across different industries, and these significant differences are remarkably stable during the research time span. Hence, the first hypothesis of our research is expressed as:

H1 = There are differences among the working capital investment policies of firms across different industries, and the working capital policies are relatively stable over time.

As can be seen from the literature review, aggressive working capital means current assets are contained in low level of percentage in the total assets. More aggressive working capital policies are associated with a higher return and a higher risk while conservative working capital policies are concerned with a lower risk and a lower

return (Weinraub and Visscher 1998). On the contrary, Afza and Nazir (2008) suggested that managers could increase value if they adopt a conservative approach towards working capital investment and working capital financing policies. According to this, Hypothesis 2 is formed:

H2. = An conservative working capital policy is positively related to the firm's profitability.

Again, as can be seen from the literature review the effect of working capital management is related to the company's profitability (e.g., Shin and Soenen, 1998; Deloof 2003; Baños-Caballero et al. 2010). Although some researches reached different results on the relation between WCM and profitability, most researches come to a conclusion that WCM and profitability are negatively related. Baños-Caballero et al. (2010, 2012) suggested that there is an optimal level of working capital that balances the benefit and risk, and found that a concave relation exists between working capital and profitability. Thus, the following hypothesis is formed:

H3 = A firm pursues a target optimal level of CCC, and deviation on both sides of the optimal CCC reduces the firm's profitability.

Firms tend to seek internal finance before using debt and new equity because of high cost of using external funding caused by information asymmetric (Myers,1984). In other words, more debt tends to decrease internal resources and increase its funding costs. As a result, a negative relation between leverage and the CCC is expected. The negative relation was confirmed by some researchers such as Chiou et al. (2006), Raheman and Nasr (2007), and Baños-Caballero et al. (2010). When it comes to the relation between leverage and profitability, a new hypothesis is stated as follows:

H4 = Leverage is negatively related to CCC.

Large firms can get financing more easily compared with small firms because small firms have greater information asymmetries (Jordan et al., 1998). Hence, a positive relation between size and CCC is expected. Previous research results by Chiou et al.

(2006) support the observation. Large-scale firms have larger sales and higher costs than the small firms. In a regular business cycle it is expected that a firm gains more from its business operation, and the research of Lazaridis and Tryfonidis (2006) confirms the assumption. Hence, Hypothesis 5 states as:

H5 = Size is positively related to CCC.

Sales growth is important for a company because it might affect the trade credit granted and received by the firm. Kieschnick et al.(2006) pointed out a positive relation between sales growth and working capital, with a high inventory to meet future sales growth. Contrast to the positive relation, Baños-Caballero et al. (2010) suggested a negative relation between working capital and growth opportunity. This is probably due to the fact that a firm tends to use more trade credit as a form to increase their sales in a low demand period. Therefore, two hypotheses are formed below:

H6 = Sales growth is positively related to CCC.

Previous empirical researches mentioned in the literature review show a negative relation between tangible fixed assets and working capital measure. Fixed assets are harder to finance, because the payback period of this investment is longer. Similar results are found in Kieschnick et al. (2006) and Baños-Caballero et al. (2010). But according to Baños-Caballero et al. (2010), it is not possible to explain the result using information theory because a firm with higher levels of tangible fixed assets should have less costs when raising funds to invest in current assets. Therefore the tangible fixed assets should be positively related to CCC. This is opposite to the empirical result, and other theories need to be found to explain the previous research result. Based on the reasoning, Hypothesis 7 is stated as:

H7 = Tangible fixed assets are negatively related to CCC.

GDP as an external factor is a well-known economic indicator. According to Zariyawati et al. (2010), significant positive relation is found between working capital and GDP. Although some studies did not find a significant relation between working

capital and GDP (e.g. Baños-Caballero et al. 2010), a link between GDP and CCC does exist. Hence, the last hypothesis is stated as:

H8 = GDP is positively related to CCC.

3.5 Panel data methodology

The study analyzes the relation between profitability of listed firms in China and working capital efficiency by the Panel Data Methodology. According to Wooldridge (2009), a panel data set makes up with a time series for each cross-sectional member in the data set, which means that the set includes a given number of variables that are tracked over time. In this research, more than 2000 firms are in our yearly financial data from 2010 to 2014.

When processing data using the Panel Data Methodology, it is possible to use multiple observations within groups or between groups for the same variables to control unobserved factors, such as deviations between individual firms. It is also possible to monitor within deviation like change in results of different policies during the research period (Katchov, 2013).

3.6 The regression model

To test Hypothesis 2, working capital policy and its effect on profitability is reflected using the regression equation below. Afza and Nazir (2007) also used this method. It controls other economic changes in the macroeconomic factors such as firm size, tangible fixed assets, sales growth, and GDP. In Equation (3), to avoid multicollinearity problems derived from the high degree of correlation between leverage and AFP (with R^2 greater than 0.8 and the VIF test result higher than 5), the variable leverage is not included in the equation with AFP at the same time.

$$GOP_{it} = \beta_0 + \beta_1(TCA/TA)_{it} + \beta_2(TCL/TA)_{it} + \beta_3LNSize_{it} + \beta_4TFA_{it} + \beta_5Growth_{it} + \beta_6GDP_{it} + a_i + u_{it} \quad (3)$$

In Equation (4), the industry variable is added to see the difference in each industry; the controller type is also added as a special Chinese factor that can influence

profitability.

$$GOP_{it} = \beta_0 + \beta_1(TCA/TA)_{it} + \beta_2(TCL/TA)_{it} + \beta_3LNSize_{it} + \beta_4TFA_{it} + \beta_5Growth_{it} + \beta_6GDP_{it} + \beta_7Industrydummy + \beta_8Controllertype + a_i + u_{it} \quad (4)$$

To find the effect of efficiency of WCM on profitability, a regression model (Equation (5)) is built below. In this model, cash conversion cycle is the main determinant that will be tested. Leverage, firm size, total fixed assets and growth opportunity are also added in the equation as additional control variables.

$$GOP_{it} = \beta_0 + \beta_1CCC_{it} + \beta_2LEV_{it} + \beta_3LNSize_{it} + \beta_4TFA_{it} + \beta_5Growth_{it} + \beta_6GDP_{it} + a_i + u_{it} \quad (5)$$

In Equation (6), industry variable is added to check the difference between industries, and the controller type variable also added to check the controller type influence.

$$GOP_{it} = \beta_0 + \beta_1CCC_{it} + \beta_2LEV_{it} + \beta_3LNSize_{it} + \beta_4TFA_{it} + \beta_5Growth_{it} + \beta_6GDP_{it} + \beta_7Industrydummy + \beta_8Controllertype + a_i + u_{it} \quad (6)$$

CCC² is added in Equation (7), as Baños-Caballero et al. (2012) used Spanish firms and showed a non-linear relation between WCM and profitability, indicating a trade off between cost and benefit of investing in working capital.

$$GOP_{it} = \beta_0 + \beta_1CCC_{it} + \beta_2CCC^2_{it} + \beta_3LEV_{it} + \beta_4LNSize_{it} + \beta_5TFA_{it} + \beta_6Growth_{it} + \beta_7GDP_{it} + a_i + u_{it} \quad (7)$$

To test Hypotheses 4, 5, 6, and 7, another model is selected which uses CCC as a dependent variable. This model is guided by the model used by Baños- Caballero et al. (2012).

$$CCC_{it} = \beta_0 + \beta_1LEV_{it} + \beta_2LNSize_{it} + \beta_3TFA_{it} + \beta_4Growth_{it} + \beta_5GDP_{it} + a_i + u_{it} \quad (8)$$

In Equation (9), the industry variable and the controller type are added to check the difference in each industry and the controller influence, respectively.

$$CCC_{it} = \beta_0 + \beta_1LEV_{it} + \beta_2LNSize_{it} + \beta_3TFA_{it} + \beta_4Growth_{it} + \beta_5GDP_{it} + \beta_6Industrydummy_{it} + \beta_7Controllertype + a_i + u_{it} \quad (9)$$

In the above equations, i represents the company and t represents the time period. β is a coefficient that establishes the effect of the explanatory variables on the dependent variable. $(TCA/TA)_{it}$ corresponds to the Aggressive Invest Policy to the firms, $(TCL/TA)_{it}$ is the Aggressive Financial Policy to the firms, CCC_{it} is the cash conversion cycle, LEV_{it} is the debt that the company has to total assets, GDP_{it} is the world's gross domestic product annual growth rate, $LNSIZE_{it}$ is the company size, and $GROWTH_{it}$ is the sales growth. Each of these variables is calculated as previously mentioned. Variable a_i corresponds to the unobserved effect or unobserved heterogeneity and it is a constant for each firm, which is why it has no subscript t . Error u_{it} corresponds to the idiosyncratic error and it represents the unobserved factors.

The Hausman test is used to find the most suitable model between fixed-effects model and random model. It checks whether there is a significant difference between the fixed and random effect estimators. If the null is rejected, the probability associated with the difference must be below the significant level, and the fixed-effect must be used Katchov (2013). When choosing the fixed-effect model, it is assumed that the unobservable heterogeneity effect of the variables for each firm is constant over the research period.

4. Empirical Research: results

In order to understand if working capital management impacts on the profitability of

the Chinese listed firms, an empirical study is conducted in this chapter. Firstly, the main descriptive statistics for all variables and for the entire sample are analyzed to help the interpretation of the results. Secondly, the Pearson Correlation Coefficients are analyzed for the whole sample and variables with the purpose of understanding the possible relations that can be established between them. Lastly, a multivariate analysis using the Fixed Effect Regression is conducted to provide a better insight on which of the working capital management efficiency measure is more valuable to explain the profitability and understand the performance of the different working capital components that impact on efficiency.

4.1 Descriptive statistical analysis

To better understand the dispersion of the observed values, Table 1 presents the sample of firms in China according to its industry from 2010 to 2014. The sample composition changes through time due to the fact that some firms are entering and some are leaving the sample. There are 15 industries: agriculture; construction; culture, sports and entertainment; electricity, heat, gas; environment and public facility management; financial industry; mining; information, transmission, software and IT service; Wholesales and retail; leasing and business services; manufacture; scientific and technical services; transport and storage; social and technical services; complex. Manufacturers represent the highest proportion, accounting for 63.54% of all the samples. Agriculture and wholesale, as well as retail, are the next major proportions in the sample. The proportions remain mostly stable during the research period.

Table 1 Overall sample according to industry 2010 – 2014

| Industry | 2010 | 2011 | 2012 | 2013 | 2014 | Average |
|--------------|------|------|------|------|------|---------|
| Agriculture | 2.3% | 2.1% | 1.6% | 1.6% | 1.5% | 1.8% |
| Construction | 2.1% | 2.2% | 2.6% | 2.6% | 2.6% | 2.4% |

| | | | | | | |
|---|-------|-------|-------|-------|-------|--------|
| Culture, sports and entertainment | | | 1.0% | 1.1% | 1.0% | 0.6% |
| Electricity, heat, gas | 3.5% | 3.1% | 3.2% | 3.3% | 3.3% | 3.3% |
| Environment and public facility management | | | 1.0% | 1.1% | 1.2% | 0.7% |
| Financial industry | 5.0% | 4.5% | 0.1% | 0.1% | 0.2% | 1.8% |
| Mining | 2.3% | 2.2% | 2.7% | 2.8% | 2.8% | 2.6% |
| Information, transmission, software, and IT Service | 0.2% | 0.1% | 5.2% | 5.1% | 5.3% | 3.4% |
| Wholesale and retail | 9.2% | 8.7% | 6.7% | 6.7% | 6.3% | 7.4% |
| Leasing and business services | 0.9% | 1.2% | 0.9% | 0.8% | 0.9% | 0.9% |
| Manufacture | 61.4% | 62.1% | 64.5% | 64.4% | 64.6% | 63.5% |
| Scientific and technical services | 2.9% | 2.8% | 0.5% | 0.5% | 0.6% | 1.3% |
| Transport and storage | 7.3% | 8.2% | 3.5% | 3.3% | 3.3% | 4.9% |
| Social services | 2.9% | 3.0% | 5.6% | 5.6% | 5.2% | 4.6% |
| Complex | | | 0.9% | 0.9% | 0.9% | 0.6% |
| Total | 16.8% | 19.0% | 20.5% | 21.3% | 22.5% | 100.0% |

Table 2 shows the descriptive statistics of all the variables for the research period from 2010 to 2014. All the panel data is arranged in group by stock code and year, and the top and bottom 1% value in the sample are deleted to exclude the extreme values for each variable. This leads to a total number of observations of 11866 (consist of more than 2000 listed firms, except 1 or 2 missing number for GOP and CCC). For all the sample observations except for the variable growth, it has 9925 observations. This

is due to sales values unavailable for the year of 2009. The mean and median of the GOP is 14.5% and 12.3% respectively in the study, the minimum value is -0.7% and the maximum value is 51.9%. The research results match the results in Belgium by Deloof (2003), who found a mean of 12.2% and a median of 10.6% and in Pakistan by Afza and Nazir (2007), who found a mean of 13.3%. The overall deviation of the GOP is 0.099, according to Appendix 2, the deviation caused by each different stock is higher than the operating profit change for one stock in different years.

The average and the median of CCC are 235.9 and 101.9 days, respectively. The difference between the mean and the median days shows that the sample distribution is not a normal distribution. The range between the minimum and the maximum variables is between -256.5 and 3677.8 days, and the standard deviation is 521.7, the high number of standard deviation illustrates an intense variation on working capital policies in the sample, and the variation caused by each different stock is higher than the CCC change for one stock in different years (see Appendix 2). The average of CCC of 235.9 days is larger than the finding from previous researches such as Deloof (2003) who obtained a mean of 44.5 days of CCC. This is probably due to the special economic condition in emerging market like China, large number of listed firms have a longer CCC compared with the firms in developed market, and especially the abnormally distributed firms can make the number of CCC even larger.

The Aggressive Investment Policy shows the total current assets is around 58.6% of the total assets, with a median of 60.6%. The range from the minimum to the maximum is from 0.080 to 0.975, and the deviation is 0.220. The Aggressive Financial Policy shows that the total current liabilities are around 35.7% of the total assets, the range from the minimum to the maximum is from 0.028 to 0.969, with a deviation of 0.202. These two indicators are similar to the results of Afza and Nazir (2008), although they explained all the data by the categories of industries, the absolute value levels from both studies are similar. For the leverage ratio, debt represents about 44.1% of the total assets with a standard deviation of 23.2%. The variable sales growth has a negative minimum value of -0.702 and a maximum value

of 8.202, with a standard deviation of 0.968. Total fixed assets represents about 22.6% of total assets with a standard deviation of 16.9%. The GDP has a decreasing trend from 10.5% in 2010 to 7.4% in 2014.

Table 2 Descriptive statistics of the variable 2010 – 2014

| Variable | Mean | Median | SD | min | max | N |
|----------|---------|---------|---------|----------|----------|-------|
| GOP | 0.145 | 0.123 | 0.099 | -0.007 | 0.519 | 11865 |
| CCC | 235.922 | 101.982 | 521.672 | -256.451 | 3677.793 | 11863 |
| AIP | 0.586 | 0.606 | 0.220 | 0.080 | 0.975 | 11866 |
| AFP | 0.357 | 0.336 | 0.202 | 0.028 | 0.969 | 11866 |
| LEV | 0.441 | 0.435 | 0.232 | 0.037 | 1.056 | 11866 |
| SIZE | 21.807 | 21.646 | 1.298 | 18.964 | 25.768 | 11866 |
| GROWTH | 0.254 | 0.106 | 0.968 | -0.702 | 8.202 | 9255 |
| TFA | 0.226 | 0.190 | 0.169 | 0.002 | 0.727 | 11866 |
| GDP | 0.084 | 0.077 | 0.012 | 0.074 | 0.105 | 11866 |

Table 3 below presents the average values of Aggressive Investment Policy (AIP), Aggressive Financial Policy (AFP) and debt ratios in different industries when using the whole sample. The average values of the AIP vary from the lowest of 24.1% for the electricity, heat, and gas to the highest of 80.2% for the financial industry. The average values of AFP shows a minimum value 24.3% for information transmission, software, IT services and a maximum value of 56.0% for construction. In addition, the average value of debt shows a minimum value of 27.7% for information transmission, software and IT services and a maximum value of 66.6% for construction. Moreover, the industries that have a higher current liability also tend to have a higher leverage when compared the data of AFP and Debt industry by industry.

Table 3 Average AIP AFP and Debt Ratio across industries

| Industry | Obs | AIP | AFP | DEBT |
|-----------------------------------|------------|------------|------------|-------------|
| Agriculture | 215 | 0.545 | 0.357 | 0.431 |
| Construction | 279 | 0.752 | 0.560 | 0.666 |
| Culture, sports and entertainment | 76 | 0.594 | 0.289 | 0.334 |

| | | | | |
|---|-------|------------|-----------|----------|
| Electricity, heat, gas | 384 | 0.241 | 0.311 | 0.584 |
| Environment and public facility management | 79 | 0.454 | 0.277 | 0.379 |
| Financial Industry | 212 | 0.802 | 0.452 | 0.631 |
| Mining | 294 | 0.409 | 0.296 | 0.425 |
| Information transmission, software and IT service | 388 | 0.710 | 0.243 | 0.277 |
| Wholesale and retail | 859 | 0.542 | 0.447 | 0.540 |
| Leasing and business services | 115 | 0.575 | 0.365 | 0.442 |
| Manufacture | 7473 | 0.592 | 0.348 | 0.413 |
| Scientific and technical services | 165 | 0.525 | 0.389 | 0.494 |
| Transport and storage | 590 | 0.578 | 0.282 | 0.384 |
| Social services | 539 | 0.720 | 0.415 | 0.569 |
| Complex | 69 | 0.519 | 0.408 | 0.529 |
| Total | 11866 | 0.586 | 0.357 | 0.441 |
| F | | 164.03 *** | 64.21 *** | 99.5 *** |

*Significant at the 10% level; **Significant at the 5% level; ***significant at the 1% level

Table 4 provides the AIP, AFP and Debt Ratio by Controller type, which are different from the category by controller type. According to the database categories, the controller type is divided by paid-in-capital each year of the following types of investor: the state; individuals; foreign investors, collective investors (investors represent communities in urban and rural areas, managed by local government), social group investors and Conference of Share Holding who are funded by voluntary

workers. Ding et al. (2012) used this category method in their study. From the sample it can be known that the private firms have the largest number, the state owned firms are at the second place, and other types of firms are very rare compared with the two previous categories. The estimates obtained suggest that companies operated by different controllers have on average significant different current ratio and debt ratio. The privately owned companies have the highest current assets while the conference of shareholding has the lowest. Moreover, the foreign and social group companies have low current liabilities while the state owned companies have the highest current liabilities. The state owned companies have a higher leverage level compared with the private and foreign companies. In summary, evidence is found at the statistically level that companies' current ratio and debt ratio are different for different controller types.

Table 4 Average AIP AFP and Debt Ratio by controller type

| Controller type | Obs | AIP | AFP | DEBT | TFA |
|------------------------|------------|------------|------------|-------------|------------|
| State Owned | 4768 | 0.521 | 0.401 | 0.528 | 0.269 |
| Privately Owned | 6586 | 0.634 | 0.320 | 0.379 | 0.195 |
| Foreign Owned | 226 | 0.599 | 0.299 | 0.373 | 0.231 |

| | | | | | |
|-----------------------------|-------|-------|-------|-------|-------|
| Collective Owned | 85 | 0.574 | 0.369 | 0.448 | 0.233 |
| Social Group Owned | 11 | 0.501 | 0.272 | 0.374 | 0.152 |
| Conference of Share Holding | 32 | 0.437 | 0.406 | 0.559 | 0.230 |
| Total | 11866 | 0.586 | 0.357 | 0.441 | 0.226 |

In Figure 3, the blue line above indicates AIP, which shows data from 2010 to 2014. The current assets account for more than 55% of the total assets. Even though a decreasing trend from 2011 to 2014 is seen in the figure, the lowest point is in 2014. Current assets are 56.2% of total assets, higher than 50%. According to Zhang (2012), the decreasing trend shows the movement of the business cycle. During economic booms, companies tend to choose to decrease current assets; in contrast, companies are willing to seek a more conservative approach and keep the current assets increasing when the economic environment is not promising. The red line in Figure 3 indicates the AFP, which shows the ratio of current liabilities to total assets. From 2010 to 2014, the weight of the current liabilities decreases from 37.0% to 35.4%. The number is even lower than the result of Chinese listed companies from 2002 to 2006, 40.6% to 50.7% (Zhang, 2012). Their current ratios (AIP) are between 52.4% and 50.1% from 2002 to 2006. According to Afza and Nazir (2008) it can be concluded that even though the change trend is approaching the aggressive trend in our research period, the firms in China still stay at a conservative working capital policy level. This is in agreement with Wu (2010) who also researches working capital in the listed firms, and states that companies in China prefer a conservative working capital policy.

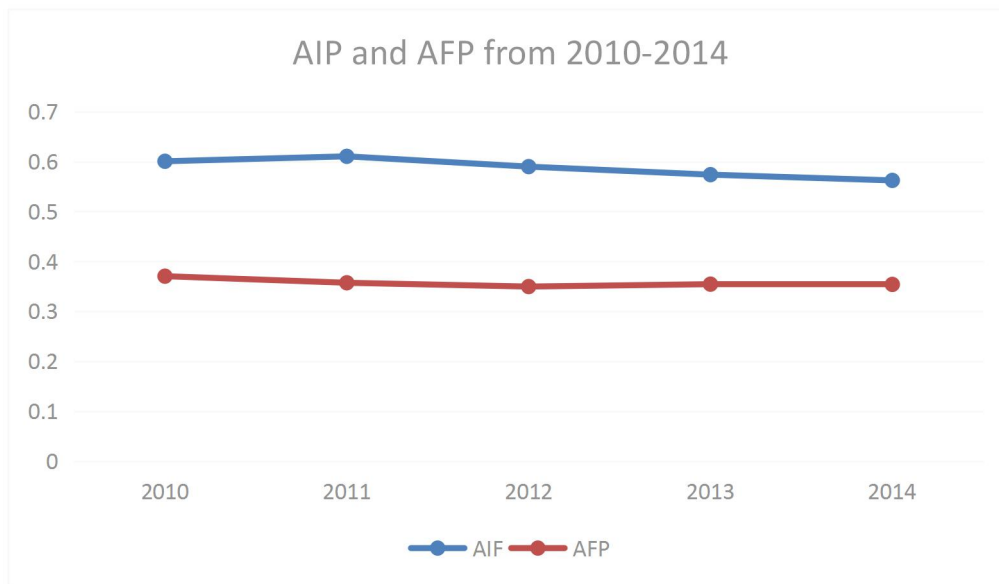


Figure 3 Average AIP and AFP (2010 - 2014)

The CCC is different in different industries and time periods, and this is consistent with Hypothesis 1. It can be seen from Table 5 that the average CCC in different industries varies largely, while within each industry the CCC remain stable during the research time (except special industry like financial industry change largely). The negative of working capital in financial industry illustrates that except for the financial industry, which has a totally different financial structure. No companies used working capital as a resource of funding during the research period. Fazzari and Pettersen (1993) illustrated that when the CCC is negative, it indicates that working capital is used as a resource of funding. On average, despite a small increase from 2010 to 2012, a decreasing trend of the CCC can be seen from Figure 4, for all industries from 2010 to 2014, this indicates that companies are becoming more efficient with their working capital. Electricity, heat, gas industry has the shortest CCC, while the financial industry has the longest.

Table 5 Average CCC by year and industry

| Industry | 2010 | 2011 | 2012 | 2013 | 2014 | 2010-2014 |
|----------|------|------|------|------|------|-----------|
| | | | | | | |

| | | | | | | |
|--|---------|---------|---------|---------|---------|---------|
| Agriculture | 279.86 | 312.01 | 339.84 | 360.21 | 367.3 | 125.85 |
| Construction | 160.23 | 196.42 | 190.73 | 182.58 | 200.24 | 187.63 |
| Culture, sports and entertainment | | | 84.63 | 88.32 | 123.83 | 98.78 |
| Electricity, heat, gas | 54.35 | 56.13 | 91.73 | 25.76 | 18.80 | 48.64 |
| Environment and public facility management | | | 461.94 | 226.42 | 233.08 | 303.40 |
| Financial industry | 1600.72 | 1683.45 | 686.47 | -33.87 | -52.14 | 1552.98 |
| Mining | 44,32 | 56.27 | 160.13 | 101.22 | 74.13 | 92.40 |
| Information transmission, software | 177.78 | 165.09 | 160.40 | 141.22 | 147.97 | 150.12 |
| Wholesale and retail | 111.37 | 135.78 | 175.44 | 96.82 | 132.66 | 130.18 |
| Leasing and business services | 309.55 | 63.23 | 90.53 | 147.81 | 134.80 | 94.83 |
| Manufacture | 143.86 | 155.55 | 92.68 | 167.27 | 177.08 | 168.59 |
| Scientific and technical services | 432.49 | 341.5 | 46.84 | 68.57 | 103.37 | 317.85 |
| Transport and storage | 152.78 | 194.84 | 141.31 | 100.69 | 122.01 | 153.18 |
| Social services | 104.97 | 127.15 | 1558.44 | 1478.66 | 1518.86 | 1187.71 |
| Complex | | | 593.53 | 365.17 | 363.27 | 440.65 |
| TOTAL | 215.82 | 226.18 | 268.12 | 229.57 | 236.55 | 235.90 |

*Significant at the 10% level; **Significant at the 5% level; ***significant at the 1% level

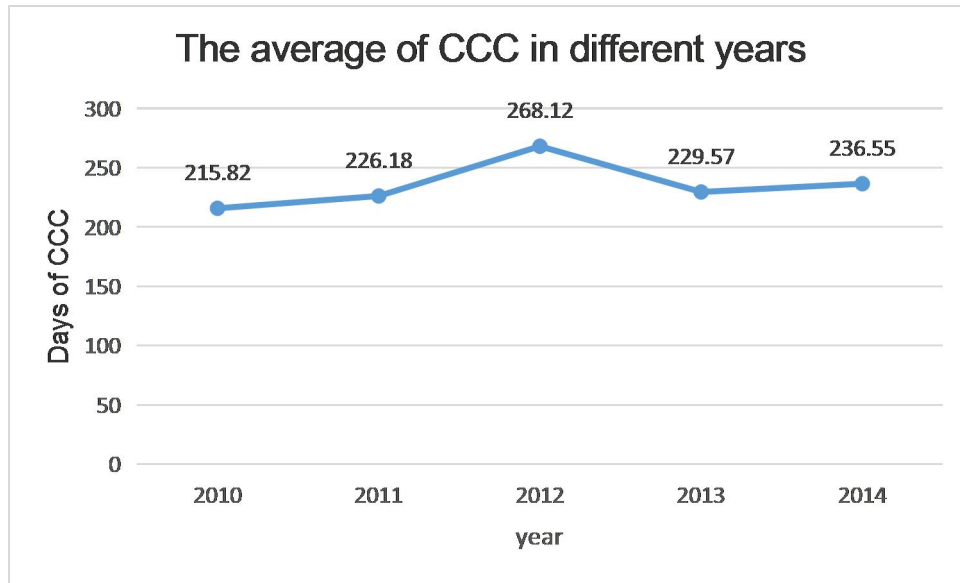


Figure 4 Average CCC (2010 - 2014)

Table 6 presents the average values of CCC for different controller types. The situation of the control type of the firms is complex. During the research time, the CCC of the state owned firms and private firms remained stable while other types of the firms change in different trends as can be seen in the table. Compared with other types of controllers, foreign owned firms have a longer CCC period. This suggests that companies with foreign ownership manage their working capital less efficiently. The difference of CCC in each type of controller is significant in terms of the significance level. Hence, it can be concluded that there are differences in CCC between different types of controllers. This is in agreement with Ding et al. (2012). The average CCC is 235.9 days, which is larger than the average of 96.8 days obtained by Claessens et al. (2012) from 7722 listed companies in 42 developed countries and emerging markets; it is also larger than the average of 90.0 days obtained by Gill et al. (2010) for some US firms over the period of 2005–2007. The long time span between the disbursement and collection of cash probably indicates poorer working capital management.

Table 6 Average CCC by year and controller type

| Controller type | 2010 | 2011 | 2012 | 2013 | 2014 | 2010-2014 |
|--------------------------------|-------------|-------------|-------------|-------------|-------------|------------------|
| State Owned | 197.75 | 197.81 | 252.69 | 201.87 | 218.19 | 213.52 |
| Privately Owned | 232.71 | 243.87 | 274.45 | 236.25 | 240.89 | 245.96 |
| Foreign Owned | 274.39 | 330.50 | 314.80 | 391.19 | 388.62 | 339.23 |
| Collective Owned | 233.22 | 275.80 | 212.90 | 180.23 | 242,20 | 229.14 |
| Social Group Owned | 63.8 | 63.31 | 355.79 | | 68.27 | 145.83 |
| Conference of Share Holding | 33.78 | 35.36 | 48.29 | 181.65 | 751.34 | 298.90 |
| Total | 215.82 | 226.18 | 268.12 | 229.57 | 236.55 | 235.90 |
| F | 0.62*** | 1.69*** | 0.75*** | 3.22*** | 4.28*** | 5.60*** |

*Significant at the 10% level; **Significant at the 5% level; ***significant at the 1% level

4.2 Correlation analysis

Table 7 shows the Pearson correlation effects of the dependent variables and explanatory variables. The purpose of this research is to verify the relation between different variables considered in our research, as Baños-Caballero et al. (2010), Deloof (2003) did in their research. The highest correlation between these variables is 0.879, between leverage and aggressive financial policy. This means that firms with a high level of debt also have a higher amount of current assets. There is a negative relation between CCC and GOP, which is consistent with the study of Baños-Caballero et al. (2010). It shows that reducing the time span between purchasing raw materials and collecting sales of finished goods can improve profitability. Aggressive investment policy is positively connected with the GOP, while the aggressive financial policy is negatively connected with the GOP, as

demonstrated in the research by Afza and Nazir (2008). CCC is positively correlated with leverage, and this is inconsistent with Hypotheses 4; however, it can only be used as an indicator for the relation among the variables, and it does not provide reliable sign of association. Further study is needed to address this issue.

The control variable size is negatively related to the dependent variable of GOP. This is probably due to the fact that bigger firms in China have more cost that might lead to a decrease of profit. The control variable sales growth shows a positive relation with the dependent variables GOP, and this is consistent with the results by Deloof (2003), Shin and Soenen (1998), and Falope and Ajilore (2009). The GDP is positively related to the dependent variable GOP. This makes sense because the profit should be good if the overall economic environment is good; the whole company's profit should also be good under favorable conditions.

Table 7 Correlation coefficients

| | GOP | CCC | AIP | AFP | LEV | SIZE | GROW | GDP |
|------|-----------|----------|-----------|----------|----------|-----------|----------|-----|
| GOP | 1 | | | | | | | |
| CCC | -0.177*** | 1 | | | | | | |
| AIP | 0.173*** | 0.326*** | 1 | | | | | |
| AFP | -0.151*** | 0.049*** | 0.091*** | 1 | | | | |
| LEV | -0.272*** | 0.105*** | -0.106*** | 0.879*** | 1 | | | |
| SIZE | -0.079*** | 0.057*** | -0.147*** | 0.248*** | 0.432*** | 1 | | |
| GROW | 0.075*** | -0.023** | 0.046*** | 0.049*** | 0.049*** | -0.011 | 1 | |
| GDP | 0.027** | -0.007 | 0.049*** | 0.035*** | 0.019* | -0.056*** | 0.064*** | 1 |

*Significant at the 10% level; **Significant at the 5% level; ***significant at the 1% level

4.3 Hausman test and Variance Inflation Factor (VIF) for equation

It is seen from the Hausman test that the fixed-effect is better than the random model, and the result shows that all the models passed the F-test. The purpose of using the Hausman test is to find which estimation model, the fixed effect or the random effect model, is more suitable for the research, Zariyawati et al. (2010) also used the Hausman test in their research. As can be seen from Table 8, all the null hypothesis is rejected at the 1% significant level, and the unobservable individual effect can be treated as fixed effect.

Table 8 F-test and Hausman test for all equations

| Regression Equation | F-Test | Hausman test |
|----------------------------|---------------|---------------------|
| | Prob > F | Prob > Chi2 |
| 3 | *** | *** |
| 4 | *** | *** |
| 5 | *** | *** |
| 6 | *** | *** |
| 7 | *** | *** |
| 8 | *** | *** |
| 9 | *** | *** |

*Significant at the 10% level; **Significant at the 5% level; ***significant at the 1% level

When independent variables are highly correlated in a multiple regression analysis, it is difficult to identify the contribution of each variable in predicting the dependent variable because the highly correlated variables are predicting the same variance in the dependent variable. Some statisticians consider that correlation coefficients above 0.70 indicate multicollinearity and others state that correlation coefficients above 0.90 indicate multicollinearity. It is subjective when using only the correlation coefficient to indicate multicollinearity. Multicollinearity can also be assessed by examining tolerance and the Variance Inflation Factor (VIF). A test for multicollinearity in an ordinary least square regression analysis. To make sure our models do not have a serious multicollinearity problem, a VIF test is conducted. The rule of thumb is that a VIF-score of 10 or higher means that there is a high multicollinearity (Ray, 2012).

The multicollinearity test showed that all regression models have the VIF to verify whether one independent variable has a high correlation with the remaining independent variables or not. As Table 9 shows, the VIF values range between 1 and 2.21, which is much less than 10. This means that no multicollinearity exists between independent variables in the regression models.

Table 9 VIF scores for the equations

| Equation 3 | VIF | Equation 5 | VIF | Equation 8 | VIF |
|------------|------|------------|------|------------|------|
| AIP | 2.21 | LEV | 1.27 | LEV | 1.25 |
| TFA | 2.16 | SIZE | 1.24 | SIZE | 1.24 |
| SIZE | 1.10 | TFA | 1.15 | TFA | 1.02 |
| AFP | 1.10 | CCC | 1.13 | Growth | 1.01 |
| GDP | 1.01 | growth | 1.01 | GDP | 1.01 |
| Growth | 1.01 | GDP | 1.01 | | |
| Mean VIF | 1.43 | Mean VIF | 1.14 | Mean VIF | 1.11 |

4.4 Empirical regression models

4.4.1 Working capital and profitability model

Equation (3) and (5) are the bases of working capital management and profitability, table 10 shows the main fixed effect regression results. Equation (3) focuses on the working capital policy and Equation (5) uses the indicator of cash conversion cycle.

AIP: It is seen from the result obtained from Equation (3) that the Aggressive Investment Policy (AIP) is significantly positive related with the Gross Operating Profit (GOP). This result is in accordance with the result of Afza and Nazir (2007, 2008), Al-Mwalla (2012), Vahid et al. (2012), and Shan et al. (2015). The positive coefficient of AIP indicates a negative relation between the degree of aggressiveness of investment policy and GOP. As the TCA/TA ratio increases, degree of aggressiveness decreases, and the gross operating profit increases (Afza and Nazir, 2007, 2008). Therefore, there is negative relation between the relative degree of aggressiveness of working capital investment policies and gross operating profit.

AFP: Aggressive Financial Policy (AFP) is significantly negatively related with the Gross Operating Profit. This result is in line with the result of Afza and Nazir (2007, 2008). The higher the TCL/TA ratio is, the more aggressive the financing policy will be. This leads to lower gross operating profit. Therefore, we can conclude that a conservative financing policy is positively related to the firms' profitability.

Both AIP and AFP prove Hypothesis 2 which states that a conservative working capital policy is positively related to the firms' profitability can be accepted, the result implies that the listed firms in China will in general get more profit if they follow conservative policy of financing working capital. Their conservative working capital policy will inevitably have higher current assets such as the account receivable and inventory, and lower current liabilities such as the accounts payable. The result is in accordance with Wu (2010) who also researched the listed firms following the conservative working policy in China.

CCC: In Equation (5), the result that the variable CCC is significantly negatively related to the gross operating profit, with p value less than 0.01. It shows that a firm with a shorter cash conversion cycle can have a higher profit, confirming that a decrease in the cash conversion cycle will produce more profits for a firm. This result is in accordance with previous research results by Shin and Soenen (1998), Deloof (2003), and Baños-Cabllero et al. (2010).

Both the working capital policy and the Cash Conversion Cycle can reflect the working capital condition in China. Statistically, the conservative working capital policy and a lower Cash Conversion Cycle will increase the profitability of the listed firms in China. The conservative working capital policy and a lower CCC policy seem to be in conflict, for the conservative working capital policy will inevitably bring more current assets and less current liabilities, and, according to the definition of the CCC, it should increase, The result might explain probably why the cash conversion cycle in Chinese listed firms is higher than the CCC in other countries, especially when compared with the developed ones.

In the perspective of the control variables, the variable leverage in Equation (5) measures a firm's debt level and its relation to profitability. The regression result shows a negative relation between leverage and profit. Statistically, gross operating profits decrease as the debt ratio increases. The result is highly significant, supported by findings from Myers (1984), Shin and Soenen (1998), and Deloof (2003), who predicted a negative relation between leverage and profitability.

Size presents a negative relation with the GOP. Because size is proxied by the natural logarithm of total assets, when the assets increase 1%, the GOP ratio decreases 0.636 pp in Equation (3) and 0.422 pp in Equation (5). The results suggest that the bigger a company is, the less efficient it is, and non-financial assets generate less operational profit. This is not in line with the previous studies conducted by Afza and Nazir (2009) and Vahid et al. (2012), who found that the size of a firm had a positive effect on the firm's performance. The negative relation between size and profitability probably shows that large numbers of the listed firms in China are already mature so that expanding the business does not bring much profit.

The growth variable is significantly positively correlated with GOP for both Equation (3) and (5). Coefficient β means that an increase of 1 pp in the growth variable will lead to an increase of 0.976 pp in GOP for Equation (3), and 0.815 pp in GOP for Equation (5). The growth in sales increases the performance of firms. Shin and Soenen (1998) and Deloof (2003) also concluded that sales growth had a positive relation to changes in accounting measures of profitability.

Variable GDP has a significant positive relation with GOP. When GDP increases 1 pp, the GOP ratio increases on average 0.330 for Equation (3), and 0.353 for Equation (5). The result suggests that the Chinese GDP can influence the operating profitability of listed firms in China.

In order to test the non-linear relation pointed out by Baños-Caballero et al. (2012), the square of CCC as a variable is added in Equation (7). Regression is conducted to see if there is an inverted U-shaped relation between CCC and the dependent variable.

It can be seen from Table 10 that CCC square is highly non-significant in the fixed effect model, and the same conclusion that Baños-Caballero et al. (2012) obtained cannot be found. The result did not suggest that firms pursue an optimal target of CCC, and thus hypothesis 3 is rejected.

4.4.2 WCM's determinants model

According to the results generated from WCM's determinants model (Equation (8)), each CCC's determinant might have different relation and significance with the explanatory variable CCC. The impacts throughout the variables and relation with the explanatory variables are discussed below. In table 11, the expected and observed impacts of the determinants on CCC are shown.

Leverage: The relation between CCC and leverage in Equation (8) is significantly positive, with a β value of 113.665. This result suggests that firms with longer CCC prefer to hold more leverage, which is not in accordance with Hypothesis 4 stating that debt is negatively related to the CCC (Chiou et al. 2006; Raheman and Nasr 2007; Baños-Caballero et al. 2010; Abbadi and Abbadi 2013). It does not match with the result expected by the pecking order theory. The cost of funds invested in the CCC is higher in the companies with a larger leverage; in this case, they have to pay a higher risk premium, and a negative relation is expected. In the current research, it can be noticed that when firms have high working capital they also have higher debt at the same time. This is probably a special condition of the emerging markets in which many firms want to enlarge the scale of the companies in order to get more profits.

Size: There is a significant positive relation between size and CCC at the significance level, which is in accordance with Hypothesis 5. Previous studies by Chiou et al. (2006), Kieschnick et al. (2006), and Baños-Caballero et al. (2010) showed similar results. It is in line with the hypothesis, because the cost of funding current assets decreases with the increase of the size of the firms. Small firms have a great difficulty in financing due to the information asymmetries, and large firms can afford to have relaxed receivables and inventories. In addition, their high levels of sales require

larger investments in working capital. According to the literature review, agency problem between shareholders and creditors can also influence the working capital because large firm managers want to keep all the cash in the company instead of giving dividend or using debt.

Growth: Growth is negatively related to CCC. Coefficient beta in Equation (8) is -65.615, which suggests a decrease CCC induced by an increase of growth. The negative relation illustrates that growth of sales does not bring more working capital to a firm. This is probably due to the economic environment in China; some firms use trade credits as a source of financing to finance their growth. (Baños-Caballero et al., 2012). Petersen and Rajan (1997) also pointed out that companies might extend more credits to their customers to increase their sales when they want sales to keep growing.

TFA: The variable that measures the effect of a firm holding tangible assets is significantly negatively related to CCC, which is in accordance with the previous results by Fazzari and Petersen (1993), Kieschnick et al. (2006), and Baños-Caballero et al. (2010). It can be seen from table 10, an increase of TFA will lead to the decrease of the cash conversion cycle. The negative relation is also confirmed by Baños-Caballero et al. (2010), showing that working capital can be a source of funding. The investments compete with each other for the limited funds available. Given the preference for higher returns, the working capital does not need to support it if the fixed assets is at a high level.

GDP: There is no significance in the GDP's coefficient as stated by Equation(8). The P value is 0.954, which is much higher than 0.05. The coefficient is negatively related with CCC and is not significant at the 5% level of significance. The insignificant result is in line with the conclusion by Baños-Caballero et al. (2010). Previous researches by Smith (1987) and Walker (1991) suggest that macroeconomic factors like GDP should influence trade credit and investment in inventories and account receivables. Blinder and Maccini (1991) found that recessions are related to drastic inventory reductions. Based on the analysis result above, it can be seen that this study

did not find significant relation between working capital indicator and GDP. This may be due to the good economic condition during the research period, or the selected research period is short and these two variables are quite stable over the study period.

Table 10 Regression result – all industry firms

| | Euationl 3 | Euation 5 | Euaqtion 7 | Equation 8 |
|-------------|-------------------|------------------|-------------------|-------------------|
| Variables | GOP | GOP | GOP | CCC |
| AIP | 0.034*** | | | |
| AFP | -0.0404*** | | | |
| CCC | | -0.0000255*** | -0.0000253*** | |
| CCC_Sq | | | -6.07e-36 | |
| Leverage | | -0.068*** | -0.067*** | 113.665*** |
| size | -0.006*** | -0.004** | -0.042*** | 38.759*** |
| TFA | 0.035*** | 0.016*** | .0164** | -221.169*** |
| Growth | 0.010*** | 0.008*** | 0.008*** | -65.615*** |
| GDP | 0.330*** | 0.353*** | 0.353*** | -25.638 |
| F-test | 19.19*** | 18.83*** | 18.84*** | 9.64*** |
| Observation | 9255 | 9252 | 9252 | 9252 |

*Significant at the10%level; **Significant at the 5%level; ***significant at the1% level

Table 11 Expected and observed impacts on CCC

| Explanatory Variable | Expected sign | Observed Sign | Significant |
|-----------------------------|----------------------|----------------------|--------------------|
|-----------------------------|----------------------|----------------------|--------------------|

| | | | |
|----------|-----|---|-----|
| Leverage | - | + | Yes |
| Size | + | + | Yes |
| Growth | +/- | - | Yes |
| TFA | - | - | Yes |
| GDP | + | - | No |

4.5 Regression across different industries and controller type

Equation (4) is the same as Equation (3) except that the industry dummy variables and Controller type dummy variables are added. The dummy variables were assigned values for each industry. Agriculture was used as the comparison industry. The industry variables are included to control for possible industry type effects.

The results in Equation (4) show industry-type effects on profitability. For example, it can be seen from Table 12 that firms in the construction industry will have the highest gross operating profits (0.044) compared with firms in the basic industry agriculture. If other things in the equation are held constant, manufacture is in the second place, with a GOP of 0.043 which is higher than the firms in agriculture. Because agriculture in China is a basic industry, almost all of the industries have higher gross operating profits when compared with the profit from agriculture. The controller type variable is used to control possible different investor's effects. It can be seen from Equation (4) that if other things are held constant, privately owned companies' GOP is 0.077 pp higher than that of the state owned companies. On the contrary, foreign owned companies' GOP is 0.859 pp lower than that of the state owned companies.

Equation (6) is the same as Equation (5), except that industry dummy variables and

controller type variables are added. The result is similar to the result from Equation (4); compared with agriculture, most industries have higher GOP. Compared with other industries, construction, electricity, heat, and gas, financial industry, manufacture and wholesale and retail have a higher gross operating profit. Hence, in these industries it is expected higher profits than that in the basic industry. For the condition of the controller type, foreign owned companies' GOP is still low compared with that of the state owned companies while other controller types have higher GOP compared with state owned companies.

In Equation (9), the cash conversion cycle is used as an indicator of working capital management across different industries and controller types. As can be seen from Table 12, electricity, heat and gas industry has the shortest CCC; if other factors remain the same, they are 418.8 days shorter compared with the basic industries, and the variance is also large. All the industries have a short CCC compared with agriculture, which indicates that agriculture has a long CCC. When there are different controller types, it can be seen from Table 13, the Private own companies have 5.3 days shorter CCC compared with the State owned companies. The foreign owned companies have 1.6 days longer than the state owned companies; other typed of controller typed all have longer CCC compared with the State owned companies.

Table 12 Regression result – across different industries

| | Equation 4 | Equation 6 | Equation 9 |
|--|------------|------------|------------|
|--|------------|------------|------------|

| Industry | GOP Coef | GOP Coef | CCC Coef |
|--|-------------|----------|----------|
| Construction | 0.044 | 0.039 | -296.086 |
| Culture sports and entertainment | 0.014 | 0.004 | -288.827 |
| Environment and public facility management | 0.018 | 0.012 | -252.224 |
| Financial industry | 0.017 | 0.010 | -260.700 |
| Mining | 0.027 | 0.021 | -195.542 |
| Information transmission software and IT service | 0.022 | 0.014 | -328.289 |
| Wholesale and retail | 0.035 | 0.026 | -371.549 |
| Leasing and business service | 0.019 | 0.011 | -335.876 |
| Manufacture | 0.043 | 0.028 | -320.668 |
| Scientific and technical services | 0.014 | 0.006 | -312.273 |
| Transport and storage | 0.022 | 0.014 | -314.910 |
| Social services | 0.011 | 0.005 | -305.380 |
| Complex | 0.012 | 0.006 | -275.284 |
| Basic industry | Agriculture | | |

Table 13 Regression result – across different controller types

| Equation 4 | Equation 6 | Equation 9 |
|------------|------------|------------|
|------------|------------|------------|

| | GOP Coef | GOP Coef | CCC Coef |
|-----------------------------|-------------|----------|----------|
| Privately Owned | 0.001 | 0.000 | -5.283 |
| Foreign Owned | -0.009 | -0.008 | 1.622 |
| Collectively Owned | -0.001 | 0.002 | 87.909 |
| Social Group Owned | 0.023 | 0.023 | 69.200 |
| Conference of share holding | 0.004 | 0.010 | 228.561 |
| Basic Type | State Owned | | |

5. Conclusions

Working capital management is related to the sources of short-term finance and investments in short-term assets. This study investigates how relatively large publically listed companies in China manage their working capital.

The presented empirical research investigates the relation between working capital and WCM policies as well as the effect of working capital on profitability of some listed firms in China.

Through statistics analysis, we confirm that the working capital policy is different across different industries of the listed companies in China, and the result is in agreement with the result of the firms in Pakistan mentioned in the literature review. The controller type also influences the working capital policy. Chinese listed firms hold a high level of current assets, and they prefer a more conservative investment policy and finance policy. The impact of aggressive/conservative working capital investment and the financing policies has been examined using panel data regression models between working capital policies and profitability. The study finds a negative relation between the profitability measures of firms and the degree of aggressiveness of working capital investment and financing policies. Firms can have negative returns if they follow an aggressive working capital policy. These results are further validated by examining the impact of aggressive working capital policies on market measures of profitability, the conservative working capital policy in China and its relation to the profitability are in line with the research results of Afza and Nazir (2008, 2009).

A significantly negative relation is found between the indicator of GOP and the cash conversion cycle in the research. The result indicates that firms can create value by keeping their cash conversion cycle to a minimum, such as cutting the cash spending in inventory and prolonging the time that firms need to pay to get the CCC to the minimum level. An optimal relation between WCM and the listed firms' profitability is not found, and further research is needed. It can also be seen that the relation between profit and the control variables are partly consistent with previous studies,

leverage is negatively associated with profitability which implies that increase in debt financing, adversely affect the performance of a firm measured by profitability. Regarding size and profitability, an increase in size leads to a decrease in the profitability of a company. While sales growth has a positive relation with profitability, because growth, as an indicator of firm's business opportunities, is a very important factor which allows the firm to generate more profits, but it probably costs a lot, it is one of the reasons why a larger size may bring less profit. In the consideration of GDP, the higher GDP is, the higher the profit will be. In the research a significant positive relation is found between GDP and gross operating profit. In other words, firms with conservative financial policies, relatively lower CCC, less leverage, smaller size, more tangible fixed asset, greater sales growth have a higher potential to get higher profits.

The WCM's determinant variable leverage has a positive relation with the WCM, which is not in line with our work hypothesis. The result suggests that firms use more external finance when the working capital is high. This is probably due to the economic environment of China because it is easy to get a loan from the bank, and the cost of the debt is not so high, especially for the listed firms that are perceived as in good business condition. With a large leverage, firms are expected to gain more profit. However, contrary to the findings from the pecking order theory, firm should use working capital as a resource of funding when it is still available, especially when the cost of debt is high. It is considered that this situation is temporary in China.

Besides the unusual result of the leverage, all other variables tested get the results that verify the hypotheses that the size is positively related to cash conversion cycle, and the sales growth and tangible fixed asset are negatively related to cash conversion cycle.

The research focuses on the working capital management and its effect on the listed firms' profitability across all industries. Previous researches focused on only one or two industries or only on one indicator such as cash conversion cycle. The empirical research tries to fulfill the gaps, by following the recent methodologies and previous

research notes and comparing our findings with the previous major findings in working capital management. During the research, an overview of the working capital condition of the listed firms in China is obtained. The study also focuses on the working capital policy and its effect on the firms' profitability and the indicators that might affect the relation between working capital and profitability. Several policy implications can be drawn from the findings of the study: efficient management of working capital policy (Conservative Investment Policy and Conservative Financing Policy) can increase the operating profitability of the listed firms; firm managers can enhance performance of the firm by reducing the number of days in the cash conversion cycle to a reasonable minimum.

Recommendation for future study

As accomplishing our research, we find some articles about the working capital and firm's policy. Those researches focus on small and medium sized firms. Because of the information asymmetric problem, the small and medium sized companies may face more dilemmas when gathering debt from outside sources. Further research could focus on small and medium sized firms and consider working capital as a very important factor in their daily business.

In our research we find variables that may influence the working capital condition. Due to the limitation of the database, it did not include the firms' age as a variable, which might also be a determinant in working capital management according to previous researches. For the dependent variables, we did not include variables that show a firm's value such as Tobin Q. Further research can focus on this variable and find the relation between working capital and the firm's value.

Another recommendation for the future research is to examine the influence factors of working capital and their effects on profitability on a regional base, and compare the results between regions so as to study the impact of WCM policies and its effect on profitability between other developing countries, and to check if the results of working capital policy and its effect on the firms profitability still remain the same.

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Appendix 1 List of variables

| Variable | Type of Variable | Description | Calculation |
|--------------------|------------------|-----------------------------------|--|
| GOP | Dependent | Gross Operating Variable | $(\text{Sales}-\text{COGS})/(\text{Total assets}-\text{Financial Assets})$ |
| CCC | Dependent | Cash conversion Cycle | $(\text{Account Receivable}/\text{Sales}+\text{Inventories}/\text{COGS}-\text{Account Payable}/\text{COGS})\times 365$ |
| AIP | Independent | Aggressive investment Policy | $\text{Total Current Asset}/\text{Total Assets}$ |
| AFP | Independent | Aggressive Financial Policy | $\text{Total Current Liabilities}/\text{Total Assets}$ |
| CCC | Independent | Cash conversion Cycle | $(\text{Account Receivable}/\text{Sales}+\text{Inventories}/\text{COGS}-\text{Account Payable}/\text{COGS})\times 365$ |
| LEV | Control Variable | Leverage | $\text{Total leverage}/\text{Total Asset}$ |
| SIZE | Control Variable | Company Size | $\text{Ln}(\text{Total Asset})$ |
| GROWTH | Control Variable | Sales Growth Rate | $(\text{Sales}_1-\text{Sales}_0)/\text{Sales}_0$ |
| TFA | Control Variable | Tangible Fixed Asset | $\text{Tangible Fixed Assets}/\text{Total Asset}$ |
| GDP | Control Variable | Gross Domestic Product | GDP Growth Rate |
| INDUSTRY | Control Variable | Industry Dummy Variable | Industry Dummy Variable |
| CONTROLLE RTYPE | Control Variable | Controller type Dummy Variable | Controller type Dummy Variable |

Appendix 2 Descriptive statistics of all variables in groups (2010-2014)

| Variable | | Mean | Std. Dev. | Min | Max | Observations |
|------------|---------|----------|-----------|-----------|----------|-----------------|
| STOCKC | overall | 273374.9 | 276731.9 | 2 | 603998 | N = 11866 |
| | between | | 273299.8 | 2 | 603998 | n = 2607 |
| | within | | 0 | 273374.9 | 273374.9 | T-bar = 4.55159 |
| industry | overall | 10.0023 | 2.808154 | 1 | 15 | N = 11737 |
| | between | | 2.459915 | 1 | 15 | n = 2568 |
| | within | | 1.31906 | 1.6023 | 18.8023 | T-bar = 4.57048 |
| controller | overall | 5.716297 | 1.150641 | 1 | 7 | N = 11861 |
| | between | | 1.046225 | 1 | 7 | n = 2607 |
| | within | | .4366613 | .9162971 | 9.716297 | T-bar = 4.54967 |
| COGS | overall | 4.55e+09 | 1.22e+10 | 6099096 | 8.50e+10 | N = 11866 |
| | between | | 1.18e+10 | 6099096 | 8.50e+10 | n = 2607 |
| | within | | 2.48e+09 | -5.65e+10 | 5.93e+10 | T-bar = 4.55159 |
| GOP | overall | .1449962 | .0986996 | -.0066821 | .5194009 | N = 11865 |
| | between | | .0923186 | -.0066821 | .5194009 | n = 2607 |
| | within | | .0405724 | -.2535932 | .5527583 | T-bar = 4.55121 |
| CCC | overall | 235.9216 | 521.6719 | -256.4513 | 3677.793 | N = 11863 |
| | between | | 440.5448 | -256.4513 | 3677.793 | n = 2607 |
| | within | | 255.8861 | -2911.474 | 3383.317 | T-bar = 4.55044 |

Appendix 2 Descriptive statistics of all variables in groups (2010-2014 continued)

| | | | | | | |
|--------|---------|----------|-----------|-----------|----------|-----------------|
| AIP | overall | .5862825 | .2197552 | .080161 | .974571 | N = 11866 |
| | between | | .2035251 | .080161 | .974571 | n = 2607 |
| | within | | .0822793 | .0643667 | 1.074322 | T-bar = 4.55159 |
| AFP | overall | .3566449 | .2021605 | .0276368 | .9691461 | N = 11866 |
| | between | | .1852064 | .0276368 | .9691461 | n = 2607 |
| | within | | .0801647 | -.3037189 | 1.023957 | T-bar = 4.55159 |
| LEV | overall | .4407314 | .2323925 | .0368428 | 1.056381 | N = 11866 |
| | between | | .2174276 | .0368428 | 1.056381 | n = 2607 |
| | within | | .0823387 | -.2661604 | 1.177553 | T-bar = 4.55159 |
| SIZE | overall | 21.80685 | 1.29787 | 18.96439 | 25.76811 | N = 11866 |
| | between | | 1.252535 | 18.96439 | 25.76811 | n = 2607 |
| | within | | .3512169 | 17.77283 | 24.51061 | T-bar = 4.55159 |
| growth | overall | .2538181 | .9683453 | -.7019515 | 8.202123 | N = 9255 |
| | between | | .5011606 | -.6106885 | 4.302452 | n = 2480 |
| | within | | .8289137 | -4.455136 | 6.846903 | T-bar = 3.73185 |
| GDP | overall | .0840844 | .0115566 | .074 | .1045 | N = 11866 |
| | between | | .0035329 | .074 | .1045 | n = 2607 |
| | within | | .0112831 | .0692511 | .1036444 | T-bar = 4.55159 |
| TFA | overall | .2257469 | 0.1691629 | 0.0017086 | .7268857 | N = 11866 |
| | between | | .1564463 | 0.017086 | .7268857 | n=2607 |
| | within | | .0607088 | -.2668262 | .7396736 | T-Bar=4.55159 |

