Radboud Universiteit Nijmegen

MASTER THESIS

"The Impact of Working Capital Management on Firm Value"
Evidence from Public Listed Companies in the Manufacturing Sector

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Abstract

This study investigates the impact of working capital management on firm value. I find empirical evidence that optimizing working capital increases the firm value. The results reveal that one-day reduction in conversion period of working capital increases a firm's Tobins Q by 12 basis-points on an average. However, this relationship is influenced by the financing constraints faced by a firm whereby the effect of working capital efficiency is more severe for financially constrained companies. These results are obtained by using an extensive dataset of approximately 4,500 public listed companies from 20 countries, covering a span of 11 years. Furthermore, I examine the impact of each component of cash conversion cycle on firm value. The findings suggest that lessening receivable and inventory turnover period result in higher firm value by around 19 and 8 basis-points on an average respectively. Conversely, payable turnover period is positively associated with firm value at the degree of 10 basis-points. Additionally, I extend the previous study by testing and discovering the non-linear relationship between working capital and firm value which implies the existence of an optimal investment in working capital. Robustness checks are conducted using the firm performance indicators, namely return on assets and return on equity.

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1. Introduction

Corporate financing considerations consisted of three main features namely capital structure, capital budgeting and working capital management (Ross et al., 2010). While the capital structure and capital budgeting are long-term viewpoints of the company's financial management, working capital is considered as the short-term financing management that should be efficiently managed to operate the daily operations. Working capital plays a pivotal role to generate cash, profit and refinance operational activities. In other words, its management displays a company's ability to generate internal fund and proves its going-concern principle in the long run (Gill et al., 2010). Thus, effective working capital management is often considered as one of the main factors to bring optimal values for the shareholders.

Corporations can mitigate their dependence on external funding by optimising the working capital conversion cycle (Autukaite and Molay, 2011). The efficiency in working capital management could generate more cash inflow to finance the business expansion, technology advancement and continuous growth. Researchers believed that this plays a crucial role for industrial companies which may influence profitability and value (Smith, 1980; Shin and Soenen, 1998). In Southeast Asia, one of the performing regions for manufacturing sector, foreign capital inflow has been raising since 2009 (ASEAN, 2018). This indicates that some of these funds have been invested in the working capital of the local companies. In Singapore itself, however, in addition to almost SGD9 billion cash tied up, net working capital days experienced continuous deterioration from 2013 to 2016, increasing from 38 to 41.5 days (PwC, 2017). It highlights the danger of granting more generous terms to customers and less stringent discipline in cash collection due to continuous slowdown in collecting payments from customers in this industry. Thus, besides local investors, foreign investors will demand more effective working capital management to enhance value-added returns from the invested capital.

In line with the importance of manufacturing sector, a recent report from United Nations shows a total of USD 327 billion foreign direct investments related to cross-border merger and acquisition (M&A) deals in this industry, which represents almost 49% of the global deals around the world (UN, 2018). As working capital is the operational backbone in these companies, this study is beneficial to the financial practitioners to analyse and conduct proper allocation of investment in this sector. Reacting to this enormous foreign direct investment in manufacturing industry, this study will help investors and analysts to evaluate

their investments by analysing the working capital efficiency of the invested firms. On the other hand, from the management perspective, this thesis would help executives and managers to optimize the value-added performance for their shareholders.

1.1. Research Question

The working capital management pertains to trading off between benefits and costs of holding working capital components which are inventory, account receivables and account payables. In general, higher investment in working capital shows the company's strength to finance its short-term obligation, hence reducing the liquidity risk. If the inventory balances are reduced too low, the company risks losing sales from their customers due to stockouts. Likewise, if the receivables conversion period is too low, the firm risks losing potential sales from credit customers and increasing the payables deferral period may result in losing discounts for early payments or debt flexibility (Wang, 2002). Thus, in order to maximize the value-added substances to the shareholders, the management must apply the most effective way to balance operating performance and liquidity risk in the company. Highlighting the importance of working capital management here, the managers should understand the optimal working capital approach by managing three major dimensions in working capital. Efficient management of working capital may increase free cash flows used to value a firm which eventually enhances the entity's value (Berk et al., 2009).

Unfortunately, there are still few empirical researches that have been done in this area. Despite the existence of earnings management and manipulation in the profitability, academically, there is a growing amount of research on the effect of working capital efficiency on profitability (Wasiuzzaman, 2015). Most authors found a negative relationship between working capital management and the firm's profitability. They argued that it will subsequently increase the firm's value if the working capital is less invested (Deloof, 2003; Shin and Soenen, 1998). However, the latter may not be the case because study regarding its direct impact on the firm's value that absorbed real market reaction is still very limited so far. In the literature review, I exhibit on why this may not be applicable because lowering one of its components may bring adverse impacts to future sales and cashflow. Studies on profitability are not enough as working capital affects not only short-term performance such as profitability, but also long-term firm's value (Samiloglou and Demirgunes, 2008). Additionally, prior research by Autukaite and Molay (2011) defined that the worth of excess working capital is valued less by the investors, implying that there is an optimal value that company can obtain to satisfy their

shareholders. However, the practical way to manage each component of working capital is not addressed thoroughly, leaving the unclear remark for the managers to reach the optimal working capital objective. Therefore, my main research question is as follows:

"To what extent do the cash conversion cycle and its components affect the firm value of public listed companies in the manufacturing sector"

This brings us to the three main components of the cash conversion cycle (CCC) which are inventory management, efficiency in collection of account receivable and account payable arrangement.

1.2. Relevance of Study

This study fills the gaps by examining the direct relationship between working capital management and firm value. This provides practical advices and strategy on how to manage the working capital instruments to maximize the firm value for the shareholders. Furthermore, this study will contribute to the limited studies on working capital management in the manufacturing industry, helping investors, analysts and managers to maximize the business operations, investments and economic activities in this sector. By uncovering the ideal balance of working capital, this study contributes to scant literatures regarding the existence of optimal working capital level as pointed out by Kieschnick et al. (2013). In addition to the mainstream application of fixed and random effect regression analysis, this study contributes to the developing use of two-step Generalised Method of Moments (GMM) model to control possible endogeneity problems which have been highlighted in the previous studies (Deloof, 2003).

1.3. Thesis Outline

This thesis is started with an introduction containing the significance and relevance of the study to academic and practical realm. The following chapter examines the literature and previous studies to support the relevance of this thesis both theoretically and empirically, including the formation of the hypothesis judgements in relation to working capital management and firm value. The third chapter explains the data collection and methodology to obtain the empirical results and testing the hypotheses. The fourth chapter comprises analysis and findings of the correlation matrix, statistical description and regression results. The conclusion is written in the last chapter to highlight the important points and further programme to extend this working capital study. Lastly, references and appendices are displayed subsequent to the conclusion chapter.

2. Literature Review and Hypothesis Development

This part aims to review the literature on working capital management and firm value. Notably, this thesis mainly focuses on the impact of working capital management and the importance of its components on the firm value. This chapter is organized into six sections which are the theoretical framework, introduction to working capital, trade credit & inventory motives, discussion on previous studies, conceptual framework and hypothesis development.

2.1. Theoretical Framework

The management is expected to deal with working capital efficiently to enhance the company's performance, value and be accountable to the invested capital. When the entity manages these resources responsibly on behalf of shareholders, it should enhance the corporate value. In order to analyse and evaluate this resource administration, the shareholders would demand financial information regarding control and use of these resources in the company. Thus, as described by Gjesdal (1981) and O'Connell (2007), there is a stewardship demand for information in the form of financial accounts and reporting provided by management. This is because investors delegate internal decision-making process to managers, and subsequently demand for information about the actions that are taken to control them (Gjesdal, 1981). Consequently, if shareholders do not have this relevant information, they may wrongly predict future cash flow and require a higher rate of return on investment, which may again deteriorate firm value (Clarkson et al., 2013). Therefore, conveying this accounting information can affect firm value by either enabling better prediction of future cash flow, or reducing cost of capital. The stewardship theory stated that this fundamental information is an essential component for evaluating and controlling the management activities, also to ensure that management actions are aligned with the shareholder's interests.

Moreover, this stewardship is envisaged as an essential mechanism for financial decision making for both internal organizations and other interested parties (Contrafatto, 2014). This accounting information would reduce the information asymmetry, also increase the transparency between reporting companies and their investors by providing financial information regarding economic affairs of the entity such as working capital management. When the information is reported fairly and truly represented the management's performance, the shareholders could use the information for the decision-making purposes. If the provided information is deemed as positive information, consequently, conveying this information will increase the entity's value and vice versa. Since management accountability is frequently

monitored and assessed, good managers would act diligently and dutifully handle the economic resources in the company to enhance the value for their shareholders (Ali, 2012). This is then will contribute better soundness in the business climate and overall investment activities in the region.

In general, one of the company's primary objectives is to attain the optimal profit and value to its shareholders. Yet, in order to reach this objective, the company needs to deal with its liquidity risk. Therefore, there is trade-off between profitability and liquidity that demands attention on the working capital level in the firms. Net working capital is derived from the subtraction of current assets and current liabilities. The positive balance in working capital implies that there is an excess asset which is financed by the short-term/long-term funds. Maintaining this positive balance may reduce the default risk, but this also carries opportunity costs which may restrict the potential profitability and inefficiency in investments. In the manufacturing industry, keeping high level of excess current assets are considered unwise, as the company may also need to disburse annual capital expenditure for R&D and expansion commitments (Leachman et al., 2005).

The negative balance in working capital points out that the company is unable to meet its short-term commitments. These short-term obligations mainly consist of trade related payables and short-term loan matured in less than a year such as bank overdraft or debts. Inability to pay these obligations on time may lead to growing default risk and adversely affect the reputation of the company which substantially damage its credit rating and exposures for further funding. Pertaining to bank commitments, the company would miserably fail to comply with the bank covenants and may result in necessary winding up and asset liquidation of the firm, to immediately pay the full loan amount. Therefore, from operational perspective, working capital management aims at maximizing firm value by optimising profits and simultaneously minimizing the risks of incapability of satisfying above-mentioned maturing liabilities. The efficiency of working capital management is highly dependent on the firm competence in balancing between liquidity and profitability (Faulkender and Wang 2006; Filbeck et al., 2007).

2.2. Introduction to Working Capital

Corporations are financed either by acquiring debt and/or equity injection by the shareholders. Hence, the management is expected to take care of these financing and distribute them to profitable short-term and long-term investments. Specifically, the investment in short-term assets is considered as a working capital whereby the management approach to optimize this instrument is called working capital management. In a simplified way, working capital is the monetary difference between current assets and current liabilities in a company (Ross et al., 2010). It is derived from the following formula:

Working capital = Current assets – Current liabilities

The main components of current assets are the economic resources which can be liquidated in less than one year (IFRS, 2019). In general, these assets include cash, short-term assets, marketable securities, inventories, work-in-progress, trade receivables, prepaid expenses and other receivables. Meanwhile, current liabilities generally include short-term obligations, trade payables, accrued liabilities, deferred revenue and other payables. Many corporate practitioners agreed that working capital management affects the firm's performance and value. This is supported by the fact that a substantial portion of company assets are tied up in the working capital (Kieschnick et al., 2013). Working capital instruments collectively represent the single largest investments for many firms, while current liabilities accounted for a major part of total financing in many occasions (Smith, 1973; Garcia-Teruel and Martinez-solano, 2007). Hence, working capital is regarded as an important factor to drive firm' success and it is included in the seven drivers of shareholder values which were introduced by Rappaport (1998).

Based on its purposes and the manufacturing cycle, inventory is categorised into three main groups which are raw material, work-in-progress (WIP) inventories and finished goods. Raw materials are basic substance for production which will be processed to be finished goods eventually. WIP are inventories in the middle of production cycle which are transforming from the raw materials to the finished goods. This is the added-value activities where the labours and manufacturing overhead are capitalized. This progress provides a buffer time in the manufacturing cycle and indirectly increase the inventory conversion period. As most of the WIP inventories are not ready to be sold, holding too long in this category would bring detrimental impacts to the firm. Once the inventories have been fully manufactured, WIP inventories are categorised to the finished goods, to be readily sold to the customers based on sales demand in the market. At this stage, the benefits of holding so much finished goods is to

satisfy the customer's expectations and demands. However, producing high capacity of finished goods would be costly to the firm as the cash is trapped in the inventory values. The more funds accumulated in this asset category, the more the costs of the investment are needed to run the business operations.

Trade receivables are the business instruments to attract product sales in the competitive market. Even though customers have their quality preference in determining the products that they want to acquire, credit terms are one of the criteria they consider. Lenient credit terms would increase the sales performance of the firm, hence theoretically yielding higher profit for the company. However, the higher credit terms provided to the customers, the higher trade receivable balance may reach at the end of the year. This results in higher working capital requirement to finance raw material purchase, labour costs and other operational expenses. This impact can be reduced by delaying the payments to the vendors which consequently increase the trade payable balance in the company. Unfortunately, this may influence the available credit limit that the company currently has with its vendors. Besides, the increasing balance may negatively affect the reputation of the company and elimination of early trade discount.

2.2.1. Working Capital Cycle

To illustrate the operational cycle in manufacturing companies (Figure 2.1), it begins from the raw material orders from the suppliers. When the inventories received, and performance obligation has been fulfilled by the suppliers (IFRS, 2019), the entity will record the accrued payables in the financial report. At this point, the entity has increased its current liabilities balances (accrued payables), as well as its current assets balances (inventories). Subsequently, the accrued payables will be recorded as trade payables once the invoices are received and signed by both parties. The acquired inventories are held in the warehouse to be processed in the factory and transformed to be finished goods. Once customers order the finished goods, they will be transferred to the customers. When the performance obligation to the customers have been exercised by the management and the invoices have been signed by both parties, the entity may record the sales in the book, increasing its current assets due to recognition of account receivables (IFRS, 2019). Moreover, cost of goods sold may also be recognised in conjunction with this event, which results in lower inventory balances on hand.

This subsequently reduces the overall current asset balances. The entity needs to pay its obligation to the suppliers in accordance with the credit term provided by the suppliers. On the other side, the cash is also expected to be received from the customers within the agreed

term between both parties. When the cash is transferred to the suppliers, the trade payable balances reduces, so does trade receivable balances when the cash are collected from the customers.

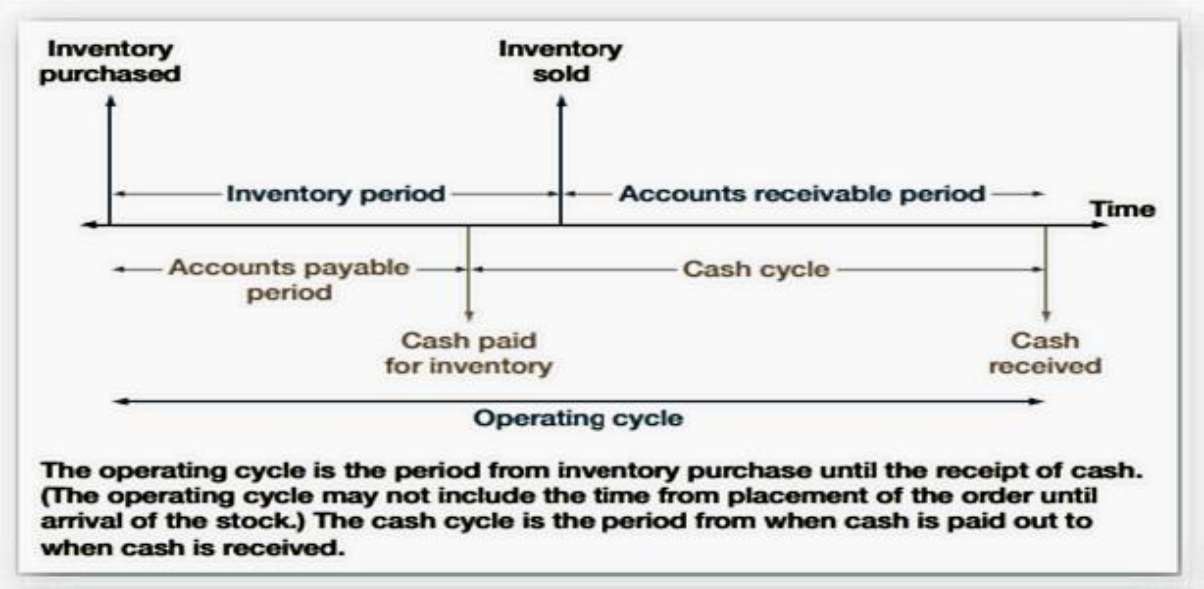

Figure 2.1 *Source: Ross et al. 2010*

These events are the main core in business transactions, the internal cash generation system to sustain the business and to demonstrate the entity's going-concern principle. Lower net working capital will risk the company to meet its short-term obligation, while if it the resources tied up too much in its working capital, the return on capital employed will not be fully maximised. By optimising working capital level, companies could minimise risk, create a ready cash reserve that will assist during difficult times and improve overall performance during the year (Autukaite and Molay, 2011). At the extreme level, although the company experienced continuous positive profitability, inefficient working capital management may lead to bankruptcy (Jafari et al., 2014; Samiloglo and Dermirgunes 2008; Panigrahi, 2014). Therefore, working capital must be attended by the management as efficiently as possible.

According to Sartoris and Hill (1983), working capital management previously included cash holdings, account receivables and account payables. However, they argued that there is a need to integrate the cycle, which then accounted for inventories, account payables and account receivables only. Kim and Chung (1990) proved on how the firm's credit policies and inventory management could affect the performance of the company and signify the importance of considering all components altogether because every component influences each other. Therefore, in line with previous research and analysis in this realm, my main focus in

working capital management consists of three main mechanisms which are inventory management, account payables arrangements and receivables collection managements. Generally, there are two ways to manage the working capital (Weinraub and Visscher, 1998). Firstly, the aggressive approach deals with investing minimum working capital to attain higher profitability with higher liquidity risk. Meanwhile, the conservative approach aims to provide large cash and high inventory balance on hand to meet the immediate demand from the customers. The latter results in higher working capital requirement, and relatively lower firm's profitability and liquidity risk. It is found that an aggressive approach leads to higher profitability, compared to the company which implements the opposite approach (Gardner et al., 1986; Weinraub and Visscher, 1998).

2.3. Trade Credit and Inventory

2.3.1. Trade credit management

When determining a policy on working capital financing, the management should consider the relationship between the amount of potential return and bearing risk undertaken in that policy. Trade credit is credit extended by one trader to another when the goods and services are bought without involving immediate cash payments. Beside its significant importance for financial growth, this gives buyers time to plan for the payment, enables them to forecast future cash outlays with greater certainty, and simplifies their cash management (Schwartz, 1974; Ng et al., 1999). Trade credit can be received by a customer in the form of accounts payables or can be given by a supplier in the form of account receivables.

Financial motives

Market imperfections

Trade credit observation is an equilibrium result of supply and demand in the market and a market equilibrium of delayed payment arrangements (Schwartz, 1974). Market imperfections may cause companies to use trade credit without necessarily involving credit rationing from the traditional banking institutions. In this case, trade and bank credit would be imperfect substitutes (Agostino and Trivieri, 2014). From this point of view, the reliance on trade credit increases when firms face difficulties in obtaining bank financing. This motive has been supported by some recent studies such as Nilsen (2002), Fisman and Love (2003), Danielson and Scott (2004), De Blasio (2005); Atanasova (2007), Atanasova (2012), Huang et al. (2011); Ogawa et al. (2011). In this case, the seller may charge lower prices than financial institutions for the credit they extend to risky borrowers because they have lower credit

evaluation cost than traditional financial institutions. Commonly, this is because most sellers run the businesses in the same sector with their customers. Henceforth, a supplier has a greater ability to get recent detailed information about their customers due to the on-going contact with them. This circumstance may produce better or less costly information compared to the limited available information for financial institutions (Elliehausen and Wolken, 1993).

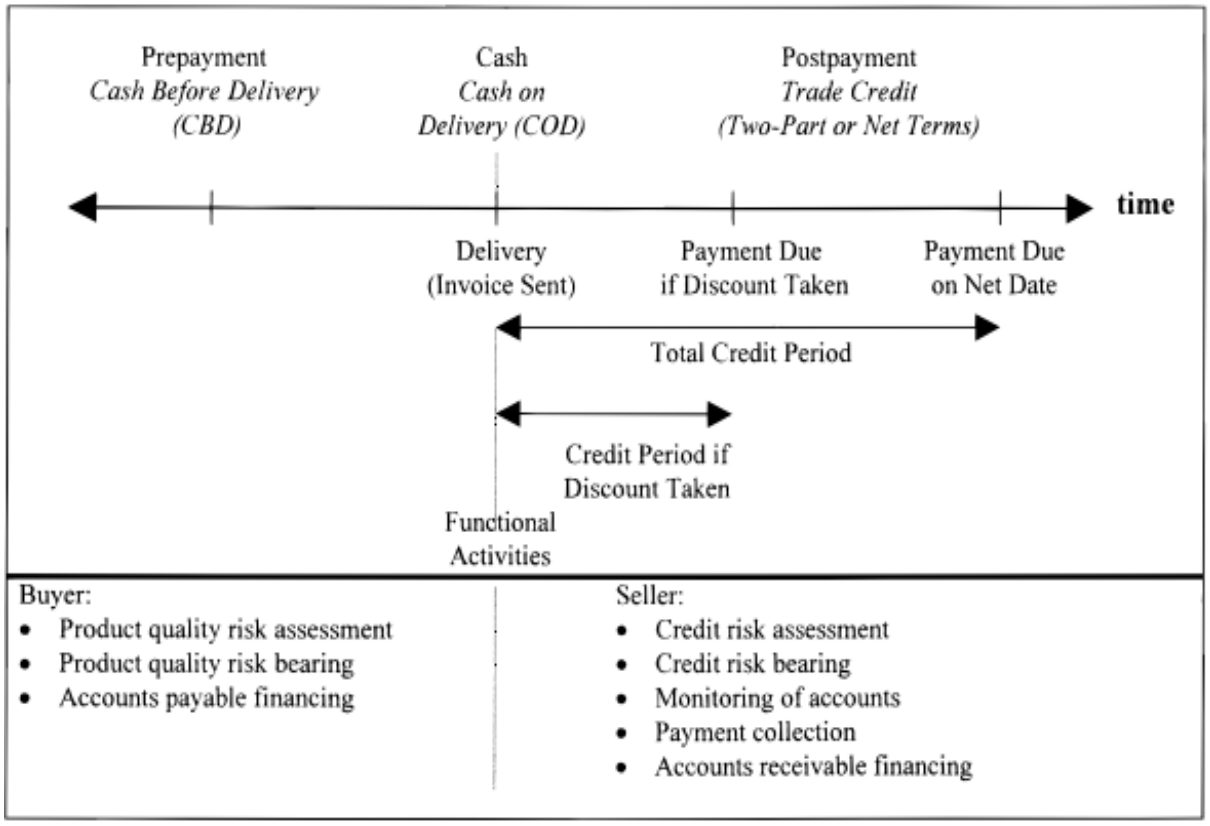

Figure 2.2 *Source: Ng et al., 1999*

Trade credit brings advantage to players in manufacturing industry as the alternative financing channel for the product purchases. Ge and Qiu (2007) indicated that firm using trade credit as an important alternative financing channel to solve the problem of scarce bank loans. This enables certain companies with high creditworthiness to obtain financing from their suppliers. This is financially helpful especially for customers which have difficulties in accessing capital market as the result of low credit rating (Teruel and Solano, 2010; Emery, 1984; Smith, 1987).

Other financial motives

Trade credit extension to assess the buyer's creditworthiness

Imperfect information drives to the uncertainty about the buyer default risk (Ng et al., 1999). A seller can evaluate the creditworthiness by looking at the buyer's payment practices by extending a trade credit to this buyer. This method can identify which buyer may be in operational difficulties and financial distress. The most common credit term given by a seller to their buyers consists of two phases as described in the figure 2.2 (Ng et al., 1999). In the first condition, buyers could get a sales discount if they pay within the specified time that the seller gave. When a buyer decides to not take this opportunity of getting discount, the buyers must pay the respective payables, inclusion an effective interest rate. In short, whenever the buyer fails to pay within the given time could signal financial distress and give an alarm to the seller to monitor these risky buyers more carefully.

Transactional motives

Future cash needs and availability

Trade credit has been a large source of financing and widely used in business transactions whereby the transaction motive is one of the main rationales on why business customers use trade credit. In general, a company must pay for purchase upon delivery under the payment terms and timeline provided by its suppliers. According to Ferris (1981), trade credit provides precise information on future cash collection for the suppliers and future cash needs for the buyers to disburse. With this information, companies could forecast their cash flow activities more accurately. Since sellers get benefit from trade credit by enables them to predict cash receipt accurately, this allows both parties to reduce their precautionary cash balance.

Commercial motives

Price discrimination and product quality assessment

The competition among distributors in the market may create incentives to discriminate among cash and credit customers. In this case, trade credit can be used to price discriminate among customers. Petersen and Rajan (1997) assume that the seller offers credit terms that are invariant to the credit quality of the buyer. Since trade credit contributes to the default risk to the seller, offering credit reduces the effective price to low-quality borrowers. They mentioned that risky borrowers are the more price-elastic segment of the market whereby offering credit would result in a gain for the seller. Moreover, a supplier is in a repeated business relationship

with the buyer, hence this has an implicit equity stake (non-salvageable investment) in the buyer (Ng et al., 1999). Because of this potential for repeat business, the suppliers would gain more sales and business continuity with these buyers.

Smith (1987) suggests that delayed payment can facilitate exchange by allowing the buyer to verify product quality before paying in full amount. Long et al. (1993) find that smaller firms which manufacture products (whose quality requires longer period to assess) are more likely to extend trade credit in comparison with their peers. This phenomenon suggests that difficulty in assessing product quality may increase the likelihood of offered credit financing to customers. This is supporting a statement from Lee and Stowe (1993) where trade credit is a commercial technique to guarantee product quality. As the players in this industry require technical assessment and quality checking procedure before accepting the products or inventories, this motive then fully applies.

2.3.2. Inventory management

There are two management policies for inventory, which provide either provision for lower or higher inventory level. The objective is to hold inventories at the lowest possible cost and to ensure uninterrupted supplies for the daily operations. Following the trade-off theory, this involves a trade-off between the costs associated with keeping inventory versus the benefits of holding inventory (Kontus, 2014). The management should consider a compromised approach to balance among inventory supplying cost, holding costs and other related costs owing to insufficient inventories. Besides, to increase the competitiveness in the market, companies should decrease their overall cost of goods, so they can set a lower selling price to the customers. This can be accomplished by maintaining the inventory acquisition expenses to a minimum level (Guar et al., 2005). Other aspects that drive the inventory balance is that the demand planning to confront the seasonality of the sales and to maximize the capacity portfolio in the production house (Chien et al., 2010).

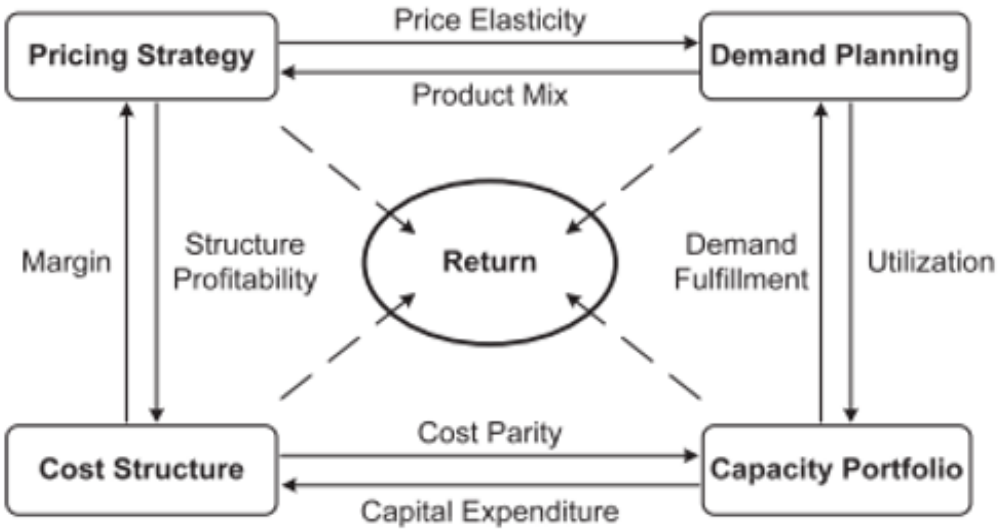

Figure 2.2 *Source: Chien et al., 2010*

Pricing and cost motives

Optimization at lowest cost

The main rationale for companies to increase their finished goods and inventory balance is to produce with relatively lower production costs (Eichenbaum, 1989). This is further explained by Blinder and Maccini (1991) who suggested that higher inventory levels may reduce the material acquisition costs and protects against price fluctuations in the market. Those benefits can be obtained by buying the raw materials in bulk which may reduce the procurement costs of the production in the factory. When the finished goods successfully sold to customers, this then results in lower cost of sales for the company. As the production costs are considerably lower, the management could arrange a better pricing strategy for the market since the overall selling price of the products could be adjusted to certain target profit. Despite its affordability and cost-saving benefits, buying in batches will increase the storage cost as well as increase the holding period of inventory. Meanwhile, when inventory in the warehouse is maintained longer, the company's working capital is tied up even longer which may negatively affect the shareholder's value (Penman, 2007). Subsequently, this may also increase the risk of obsolete inventory and higher provision for slow-moving stocks on hand in the end of financial year (Wu, 2013).

Demand and capacity motives

Fulfilling customer needs

Inventory management relates to developing and managing the inventory levels of raw materials, work-in-progress resources and finished goods. This is to ensure adequate supplies are readily available and the costs associated with the stocks are reasonably low (Kotler, 2000). Given demand uncertainty and forecast errors, the companies often carry safety stocks in the warehouse. A higher level of inventory balance would benefit the manufacturing companies against demand fluctuations and production stoppages (Cuthberson and Gasparro, 1993; Mathuva, 2010). As a result, the inventory handling costs will increase, and more funds are trapped in the working capital balance.

On the other hand, the bullwhip effect may occur when significant changes in consumer demand cause the companies in a supply chain to order more goods to meet the new demand (Lee et al., 1997). In the period of rising demand, down-stream participants would increase the sale orders. Consequently, the variations are amplified as one moves upstream in the supply chain. Thus, it is critical for manufacturing companies to develop proper demand strategies and manage the inventory level to mitigate the negative impacts of the bullwhip effect. This demand planning and forecast is crucial to determine appropriate working capital investments and enhance capacity utilization and effectiveness (Wu, 2013). This will also avoid the stockout situation which may have a detrimental impact on the company's profitability as the current and potential customers are moving away to competitors. This is described as the precautionary motive theory that suggests the positive relationship between inventory holding period and profitability (Christiano and Fitzgerald, 1989).

Furthermore, most companies in the manufacturing sector have invested a huge fund to develop advanced factory and facility. To maximize the quantity production and lower the overhead costs, the management prefers to produce more finished goods to comply with the company's utilization policy in line with the capacity of the factory. Consequently, the raw materials of the company decrease, but, the finished good level starts rising. Capacity planning and the associated capital investment are important considerations for any strategic decisions in the manufacturing industry (Chien et al., 2010). However, this highly depends on demand forecasting. For example, if demand is overestimated, capacity may not be efficiently utilized, resulting in idle capacity and wasted resources. Conversely, if demand is underestimated capacity may be insufficient, resulting in lost orders and customers (Chien et al., 2010).

2.4. Prior Studies on Working Capital Management

Most of the prior studies have been done to examine the relationship between working capital management and the firm's profitability. They concluded that working capital management is an important factor to achieve the optimum profit for the corporate entities. Although they measured the independent variables differently, the most usable variable is the cash conversion cycle which was firstly introduced by Richards and Laughlin (1980).

Most researchers found that there is a negative relationship between working capital management and firm profitability in Norway, Portugal, Sweden, Cyprus and Belgium (Lyngstadaas and Berg, 2016; Pais and Gama, 2015; Yazdanfar and Öhman, 2014; Charitou et al., 2010; Deloof, 2003). They suggested that the aggressive working capital management approach is the finest option to maximize the profitability of the companies. This observation also applies in the US (Shin and Soenen, 1998; Jose et al., 1996) and Asian countries such as Taiwan and Japan (Wang, 2002; Tsuruta, 2018). They argued that this aggressive management could indirectly create value for the shareholders (Deloof, 2003; (Luo et al., 2009). On the other hand, the authors such as Sharma and Kumar (2011), Raheman and Nasr (2007) and Ng et al. (2017) found the opposite relationship between working capital and company's profitability in India, Pakistan and Malaysia respectively. Interestingly, recent studies in the US also found that there is a positive relationship between working capital management and firm's performance, implying that the overall conservative approach is instead more suitable to attain the higher profit (Gill et al., 2010)

However, profitability as an indicator of firm wellbeing is doubted because it is prone to manipulation and earnings management (Wasiuzzaman, 2015). She argued that using profitability as the dependent variable does not display clearer impacts of working capital management to shareholders because each component of this indicator may have been used to manipulate the earnings. Additionally, while the previous studies suggest that lower investment in net working capital may maximize the company's profitability, yet this event does not necessarily increase the firm value afterwards (Kieschnick et al., 2013). In their study, using the following formula of firm valuation, they proved the above-mentioned phenomenon by identifying the key issue in the previous literature.

$$V_{firm} = \sum_{t=1}^{\infty} \frac{FCF_t}{(1 + WACC)^t}$$

WACC is the weighted average cost of capital, while FCF is free cash flow to the company, derived from a total of net operating profit after tax minus changes in working capital minus capital expenditure. From the above equation, it is true that working capital plays a crucial role in valuing the company as its higher existence would reduce future cash inflow to the company. However, reducing the working capital investment may influence the future revenue and profitability of the company. Anderson et al. (2006) confirmed this occurrence, stating that the profitability may drop sharply due to inventory stockouts for two main reasons. Firstly, as a direct reaction, customers are more likely to cancel the out-of-stock items, hence the firm is less likely to earn additional revenue. Secondly, they also identified an indirect effect on other items in the potential orders, whereby a stockout on one item could increase the probability of customers cancelling other items in the stores. In another study, Corsten and Gruen (2004) suggested that companies could lose nearly half of intended purchases when customers encounter stock-outs in their shops which may contribute to adverse impact to the company sales by 4%. This event has been proved by Liberopoulos and Tsikis (2019) who found that the impact of stockouts has an adverse effect on present and future sales especially for frequent customers. Thus, reducing the investment in inventories may lessen sales and profitability of the companies, yet its impact on firm value is still underexplored.

Looking at the other two components, trade credit is the main driver of the entity's payables and receivables. Petersen and Rajan (1997) found that extending trade credit would increase the profit margins because the company may persuade and give more flexibility to customers, consequently raise the current year sales. Nevertheless, if the receivables are issued to less reliable customers and potential default is indicated, this condition may lead to higher bad debt expenses which then negatively contribute loss to the firm in the long run. This occasion is even worse when the company performed market penetration or channel stuffing to enhance its sales, as discussed by Tung et al. (2008). They found that most companies grant an extended credit to avoid reporting losses which is called channel stuffing in the end of reporting period. Hence, this unusual generous credit terms indirectly misrepresent earnings information provided to investors. This indeed may show decent corporate ability to meet the short-term reporting objectives, yet it may be harmful in the long run. Therefore, it is more important to study the direct effect of working capital management on firm value, as working capital plays an influential role in a systematic system of entity valuation.

Nevertheless, the study to understand the direct relationship between working capital to the firm value has been less scrutinised so far. One of the most prominent studies is

conducted by Kieschnick et al. (2013), who found that an incremental dollar invested in net working capital is worth only USD 0.28, less than the incremental cash balances which accounted for around USD 0.69. Even though the value is 31% lower, shareholders prefer the cash availability that can be used for business expansion or dividend disbursement, instead of locking up the cash in the working capital cycle. In this study, excess stock return stands as an indicator of firm value which indicates the importance of managing working capital in US companies to enhance shareholder wealth. By using the similar methodology, this relationship between working capital investments and corporate value has been confirmed by Autukaite and Molay (2011) and Almeida and Eid (2014), who studied this situation in France and Brazil respectively. According to their studies, in France, the cash is valued more by 0.40 than working capital investments, whereas working capital and cash reserve are valued 0.029 and 0.65 respectively in Brazilian companies.

2.5. Conceptual Framework

The following graph shows the operational variables which are used in this thesis. The main purpose of this conceptual framework is to reliably predict the relationship between working capital management and the firm value in accordance with the previous studies on working capital management. Moreover, to gain validity to this research, control variables are added to this research in line with the previous literatures (Sharma and Kumar, 2011; Shin and Soenen, 1998; Karaduman et al., 2011; Deloof, 2003; Falope and Ajilore, 2009; Zariyawati et al., 2009). Further detailed explanations regarding the variables are discussed in the next chapter of data and methodology.

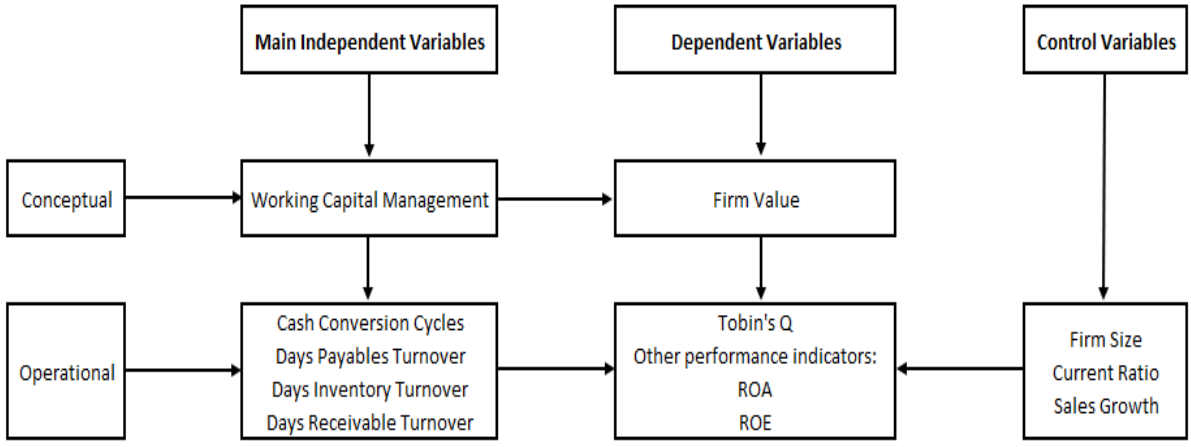

Figure 2.4

2.6. Hypothesis Development

In line with the previous researchers who studied working capital management impact on profitability, working capital management is negatively associated with the value of the company, implying that investors are in favour of lower working capital investments to operate the business. This observation has been confirmed by a study in large and medium-sized firms whereby enterprise value is negatively related to working capital management of the companies (Lifland, 2011). Another literature support found that there is a negative relationship between working capital management and firm's value in Malaysia (Edi and Saad, 2010). This means that shareholders prefer quicker cash conversion cycle as it shows the enterprise capability to generate internal cash rapidly. A shorter conversion cycle with a low number of days is preferable to attain higher profit and the need for external financing is mitigated (Moss and Stine, 1993). Therefore, based on previous research and considering its negative relationship with profitability, I could hypothesize that working capital management could influence the market value of the company. Thus, the following hypothesis will be tested in this study:

H1: Cash conversion cycle negatively affects the firm value of listed companies in the manufacturing industry.

However, the research regarding a detailed approach to manage each component of working capital is still limited, leaving unclear suggestions to managers on how to practically manage their working capital. I understand that the cash is valued more by the shareholders compared to working capital investment (Kieschnick et al., 2013), yet the impact of each component of working capital to the firm value is still underexplored. Therefore, I would like to examine how each constituent of working capital namely inventory, receivables and payables, could stimulate the value of the companies. As previously discussed, most researchers agreed that reduced cash conversion cycle yield better profitability of the company by investing carefully in inventories, quickly collecting the receivables and reasonably delaying the payables to the creditors. To illustrate the association, please refer to cash conversion cycle measurement (Richards and Laughlin, 1980) which is expressed by the following equation:

Cash Conversion Cycle = Days Inventory Outstanding + Days Sales Outstanding

– Days Payable Outstanding

As discussed in the previous section regarding the motives and rationales behind the trade credit and inventory policy, therefore, the following hypotheses will be further tested to assess the direct impact of each working capital component to the corporate value:

H2: Days inventory outstanding negatively affects the firm value of listed companies in the manufacturing industry.

H3: Days sales outstanding negatively affects the firm value of listed companies in the manufacturing industry.

H4: Days payable outstanding positively affects the firm value of listed companies in the manufacturing industry.

Moreover, when the company's capital expenditure is massive, the company will rely on internal financing first and external funding will be carried out when the internal fund is deemed insufficient. The entity would prefer to finance internally as the first option, then acquire debt in the second position, and as the last resort, equity financing will be the choice (Myers and Majluf, 1984). Therefore, working capital management relationship with firm value is affected by financing constraints and the ability of the company to access the external funds (Wasiuzzaman, 2015). This study is then extended to analyse the respective relationship in constrained and unconstrained companies, as the constrained firms could only rely more on its internal financing ability and efficiency in managing working capital. Thus, the following hypothesis is formulated:

H5: The negative relationship between cash conversion cycle and firm value of listed companies is more severe in the constrained firms, due to their limited access to the external funding in the manufacturing industry.

3. Data and Methodology

This chapter begins with the data collection and sampling technique, followed by the operationalization of the main variables, and methodology. This section indicates the research method and explains the development of regression models to test the hypotheses and answer research questions.

3.1. Data Collection

The samples are derived from the Factset Database that can be accessed through its website. The year under review is ranging from 2007 until 2017 which consists of 20 most performing countries in the manufacturing industry. Country performance is calculated by the manufacturing competitive index, a study conducted by Deloitte in 2016 (Deloitte, 2016). The countries that included in this thesis are as per table below:

Global Manufacturing Competitiveness Index: Country rankings		
Rank	Country	Index Score
1	China	100
2	United States	99.5
3	Germany	93.9
4	Japan	80.4
5	South Korea	76.7
6	United Kingdom	75.8
7	Taiwan	72.9
8	Mexico	69.5
9	Canada	68.7
10	Singapore	68.4
11	India	67.2
12	Switzerland	63.6
13	Sweden	62.1
14	Thailand	60.4
15	Poland	59.1
16	Turkey	59
17	Malaysia	59
18	Vietnam	56.5
19	Indonesia	55.8
20	Netherlands	55.7

Figure 3.1

Therefore, the total of 4,503 manufacturing companies and 49,533 firm-year observations has been properly obtained based on the SIC Code of 2000 – 3999 in the FactSet

Database. While retrieving the data, some companies are excluded in this study due to missing data in any of the year. Additionally, few observations have been discarded due to unrealistic values in the main variables. This procedure has been performed by previous researchers including Kieschnick et al. (2013). These unrealistic observations may be influential to impair the estimation result; hence it is required to diminish the impacts of them (Leone et al., 2019). Because the firms with severe liquidity problems are discarded, the result of this study may not be applicable for the most trouble firms in the selected countries. Therefore, admittedly, in line with the previous studies in this subject, the samples selected for this study may suffer from survivor bias since companies with the most liquidity problems have disappeared from the listing (Jose et al., 1996).

3.2. Operationalization of Measurements

Cash conversion cycle is the main independent variable for this thesis, followed by each component of this measurement which are days inventory outstanding, days sales outstanding and days payable outstanding. The cash conversion cycle by Richards and Laughlin (1980) is widely used to assess how well a company manages its working capital because each key component of working capital is captured in this formula. As discussed in the previous section, cash conversion cycle is the total days needed for the company from paying the raw materials to the supplier until the collection of receipt from the customers. Shorter cash conversion cycle implies that there is fewer working capital investment needed in the company. Shin and Soenen (1998) believed that by reducing the conversion days, the management will create value for their shareholders. However, other researcher believed that pushing the conversion days to extremely minimum level may impact the operational and daily business activities in the company (Kieschnick et al., 2013). This will indirectly affect the financial performance of the company throughout the years.

Furthermore, the dependent variable is the corporate value of the entity. To account this value, Tobin's Q is measured as the proxy which has been used for previous cash holdings study by Lee and Lee (2009) and Luo and Hachiya (2005). This variable reduces the inherent shortcomings in accounting profit ratio such as return on assets and return on equity as capital market valuation appropriately incorporates firm risk and minimizes any modifications introduced by tax and accounting regulations (Smirlock et al., 1984; Banos-Caballero et al., 2014). The Tobin's Q has been used as a key indicator particularly by manufacturing companies to explain a number of diverse corporate activities. As outlined by Chung and Pruitt

(1994), this indicator successfully explained various phenomenon in investment and diversification decisions by investors. Moreover, they stated that Tobin's Q has been widely used by other studies to explain the relationship between firm value and managerial performance, financing, dividend and compensation policies. Another study found that Tobin's Q is considered as a significant factor to analyse and evaluate the company investments (Blundell et al., 1992).

Following the previous prominent literatures (Shin and Soenen, 1998; Deloof, 2003), the control variables consist of current ratio, size, and sales growth. The current ratio is the traditional liquidity measure to evaluate the company's ability to meet their short-term obligations by using its liquid assets such as cash, cash equivalents and other short-term instruments. It also portrays the company's overall strength and justification to continue as a strong business against any liquidity and bankruptcy risks, and often viewed by financial auditors and analysts as the main important indicator to monitor the company's performance. Meanwhile, the company's size is the proxy to the company's power in the market. It is presented by the natural logarithm of the net reported sales of the companies. Higher value of the firm size is considered as the top market performer in the industry. The companies with bigger firm size are usually not constrained by funding or capital difficulties as they can simply issue bonds and other capital instruments which are backed by their market size in the competitive market (Wasiuzzaman, 2015). This indicator will be used to categorise the observed companies in answering the last hypothesis. Any company with a value lower than average firm size falls under constrained firms which have limited access to the capital market. Unlike unconstrained companies with higher sales and size, this made constrained entities to be more reliance on working capital efficiency to handle their business and continue the operational activities. Firm size has been employed by many researchers as control variables which determine the company's performance (Falope and Ajilore, 2009; Karaduman et al., 2011). Lastly, to enhance the robustness of this study, sales growth will be used for the regression analyses. This indicator has been used by previous researchers as it is one important factor to determine the value and performance of the company (Sharma and Kumar, 2011; Shin and Soenen, 1998; Karaduman et al., 2011; Deloof, 2003; Falope and Ajilore, 2009; Zariyawati et al., 2009).

3.3. Methodology

As the nature of this study involved multiple years and cross-sectional data, panel data regression analysis is performed. This method has also been used by previous research in this realm as described in the literature review. Prior to proceed with the analysis, several tests are conducted which are White and Breusch Pagan test to detect heteroscedasticity in the observed data, VIF test to uncover the multicollinearity problems, and Hausman test to determine the appropriate procedure for panel data analysis. The white test provides a covariance matrix estimator of the regression coefficient which is consistent even when the error term is conditionally or unconditionally heteroscedastic (White, 1980). Based on the result of this test, heteroscedasticity problems are present in the observed data which may bias and influence the standard errors in the result. Hence, to overcome this weakness in the data, I need to correct the standard errors by adding a robust indication in every regression line. Afterward, I conducted VIF test to uncover the multicollinearity problems in every regression. It is found that no multicollinearity problems have been identified as the VIF value falls below five, the cut-off value for this test as performed by many scholars (O'brien 2007).

Finally, the Hausman test is performed to use either random effects or fixed effects in this study. This test examines whether the unobservable heterogeneity instrument is correlated with explanatory variables, while continuing to assume that regressors are uncorrelated with the disturbance instrument in each period (Hausman, 1978). The result of this test revealed that the fixed-effect model is more suitable to run the panel data regression as the value of Prob>chi2 in every regression result is decent at below 0.05. Moreover, fixed effect regression model is able to control unobserved heterogeneity and eliminates the potential source of large biasness due to unique characteristic of individual firm in the selected samples (Mundlak, 1961).

However, panel data fixed effect model may contain endogeneity problems. Deloof (2003) describes that the relationship between working capital and profitability can also be a consequence of the latter instead of vice versa, causing the possibility of endogeneity problems. Banos-Caballero et al. (2014) highlighted in their study that the endogeneity problems may also arise because the observed relationships between firm performance and firm-specific characteristics reflect not only the effect of independent variables on a firm's performance but also the effect of this performance on those variables. This notes that some factors affecting performance are also likely to influence some other firm-specific characteristics. Firms are

heterogeneous, and there is possibility of missing characteristics in the model which might influence the variables (Banos-Caballero et al., 2012). In this case, even this thesis focuses on the firm value instead of profitability, the possibility of endogeneity problem will not diminish either. Generalized method of moments (GMM) may mitigate the deformation caused due to the fixed effect regression model, simultaneity and endogeneity (Arellano and Bond, 1991; Blundell and Bond, 1998). In another study, De Grauwe and Skudenly (2000) suggested that the lagged dependent variable in the dynamic panel data estimation catches up some of omitted variable effects, hence it may correct for autocorrelation in the model.

Therefore, in order to carefully examine the hypothesis, I use panel data fixed effects and random effects model to eliminate the risk of obtaining biased results and use the two-step GMM estimator as well to account the endogeneity problems. This is because, although the estimator of instrumental variables in one stage is always consistent, if the disturbances show heteroskedasticity, the estimation in two stages increases efficiency (Banos-Caballero et al., 2012). Hsiao (2005) explains that the application of this GMM technique to the panel data could bring an efficient estimator of econometrics which primarily considers the estimates of both dimensions such as cross sectional as well as the time series. Hence, to test the hypotheses as addressed in the previous section, the models are presented in order as follows:

1. Random effect model (RE)

$$1.\ TQ_{it} = \beta_0 + \beta_1\, CCC_{it} + \beta_2\, Size_{it} + \beta_3\, Growth_{it} + \beta_4\, CR_{it} + \varepsilon_{it}$$

$$2.\ TQ_{it} = \beta_0 + \beta_1\, DIO_{it} + \beta_2\, DSO_{it} + \beta_3\, DPO_{it} + \beta_4\, Size_{it} + \beta_5\, Growth_{it} + \beta_6\, CR_{it} + \varepsilon_{it}$$

2. Fixed effect model (FE)

$$1.\ TQ_{it} = \beta_0 + \beta_1\, CCC_{it} + \beta_2\, Size_{it} + \beta_3\, Growth_{it} + \beta_4\, CR_{it} + \boldsymbol{\alpha_i} + \varepsilon_{it}$$

$$2.\ TQ_{it} = \beta_0 + \beta_1\, DIO_{it} + \beta_2\, DSO_{it} + \beta_3\, DPO_{it} + \beta_4\, Size_{it} + \beta_5\, Growth_{it} + \beta_6\, CR_{it} + \boldsymbol{\alpha_i} + \varepsilon_{it}$$

3. Generalized method of moment model (GMM)

$$1.\ TQ_{it} = \beta_0 + \beta_1\, TQ_{(t-1)} + \beta_2\, CCC_{it} + \beta_3\, Size_{it} + \beta_4\, Growth_{it} + \beta_5\, CR_{it} + \boldsymbol{\lambda_i} + \varepsilon_{it}$$

$$2.\ TQ_{it} = \beta_0 + \beta_1\, TQ_{(t-1)} + \beta_2\, DIO_{it} + \beta_3\, DSO_{it} + \beta_4\, DPO_{it} + \beta_5\, Size_{it} + \beta_6\, Growth_{it} + \beta_7\, CR_{it} + \boldsymbol{\lambda_i} + \varepsilon_{it}$$

For the fifth hypothesis, the first and second model are reperformed after sub-sampling the samples in accordance with the financial constraint criteria. The company that belongs to unconstrained firms are the ones with the asset size more than median for the respective year. The asset size is measured by the natural logarithm of total assets and the median will be calculated for each year (Wasiuzzaman, 2015).

Beside Tobin's Q, I applied other performance indicators to perform robustness checks in this study. Return on Assets (ROA) and Return on Equity (ROE) are used as dependent variables, while the independent variables as outlined above remain the same. Moreover, to confirm the existence of optimal working capital efficiency, the following regression model is used:

1. $TQ_{it} = \beta_0 + \beta_1 CCC^2_{it} + \beta_2 CCC_{it} + \beta_3 Size_{it} + \beta_4 Growth_{it} + \beta_5 CR_{it} + \varepsilon_{it}$

2. $TQ_{it} = \beta_0 + \beta_1 CCC^2_{it} + \beta_2 CCC_{it} + \beta_3 Size_{it} + \beta_4 Growth_{it} + \beta_5 CR_{it} + \alpha_i + \varepsilon_{it}$

3. $TQ_{it} = \beta_0 + \beta_1 TQ_{(t-1)} + \beta_2 CCC^2_{it} + \beta_3 CCC_{it} + \beta_4 Size_{it} + \beta_5 Growth_{it} + \beta_6 CR_{it} + \lambda_i + \varepsilon_{it}$

The summary of the measurement could be observed in the following tables.

Type of variable	**Variable Name**	**Definition**	**Measurement**
Dependent Variable	Tobin's Q	Firm's value	(Market Value of Equity + Book Value of Liabilities) / Book Value of Total Assets
Independent Variable	CCC	Cash conversion cycle	DIO + DSO - DPO
	DIO	Days inventory outstanding	Inventories / (Cost of Goods Sold/365)
	DSO	Days sales outstanding	Account Receivables / (Net Sales/365)
	DPO	Days payable outstanding	Account Payables / (Cost of Goods Sold/365)
Control Variable	Firm Size	Firm's size	Natural Logarithm of Sales
	Sales Growth	Firm's sales growth	CY Sales – PY Sales0 / PY Sales
	Current Ratio	Firm's current ratio	Current Assets / Current Liabilities
Other Dependent Variables	Return on Asset	Firm's performance	Net Income / Total Assets
	Return on Equity	Firm's performance	Net Income / Shareholders Equity

4. Analysis and Empirical Findings

This chapter offers empirical findings as well as rigorous discussions about the results of the research. In the first section, the statistical summary of observations is described. Then, the impact of each variable is investigated using the Pearson correlation matrix. The variables for robustness checks are included in the correlation matrix result. Afterwards, the relationship between working capital management and its components are examined. The total samples are then divided by its financial position, in order to study the impact of working capital management on the firm's value in the highly constrained and less constrained companies. Dealing with the econometric problems such as unobserved heterogeneity or endogenous issues, it is noticeable that the different methods are applied to evaluate the observed data.

4.1. Descriptive Statistics and Preliminary Analysis

As exhibited in the table 4.1 in the appendix, the average Tobin's Q score is around 1.34 which implies that the observed data are overvalued companies on average because most companies own Tobin's value higher than 1.00. When the company's Tobin's indicator is exceeding 1.00, it means its market value is valued more than its equity's book value (Christiano and Fisher, 1995). Based on the observed data, companies with lower cash conversion cycle days and receivable turnover days tend to experience higher Tobin's score, implying that efficient cash collection is very important to drive the value of the company. On the other hand, the company with significantly high turnover days in receivables and payables experience lower Tobin's Q value and negatively perceived by the investors. On an average, the company with receivable and payable turnover days more than 270 days will suffer undervaluation in the stock market. Therefore, this result has casted a significant attention to trade credit policy made by entity managers to enhance the company's values for their shareholders. Companies in Vietnam experienced a higher average score of Tobin's Q at 2.99, meanwhile Singapore and Japan show the lowest average score of 0.9 in comparison with other countries.

Cash conversion cycle days possessed 102 days on an average, higher than the average days in other studies conducted by Gill et al. (2010) and Deloof (2003). They found that the average days for cash conversion cycle is at 90 days and 44.5 days respectively. While the minimum cash conversion cycle is negative 49 days, the maximum figure is stood at a significantly higher number of 488.6 days, which is higher than the research data by Sharma and Kumar (2011) at 449 days. However, the phenomenon of negative CCC days is normally

obtained due to a significant amount of day's payable turnover, exceeding the total value of inventory and receivable turnover days. This may happen in certain countries with longer credit terms. For instance, in the Netherlands, the government regulation allows company to apply 60 days credit term (Business.gov.nl, 2019) which is reflected on average, based on the observed data, the average Dutch companies experienced 60 days payable turnover rate. This is one of the highest average number among other countries in Europe such as Germany at 42 days, Switzerland at 45 days, and Sweden at 46 days. Despite the regulation in credit terms, the companies that obtained highest negative value of CCC days are located in three manufacturing countries, namely United States (48 days), Japan (49 days) and Taiwan (49 days). Additionally, companies in Germany, Japan, and United Kingdom observed the highest cash conversion days at 489 days, 454 days, and 450 days respectively. Higher value of cash conversion days in these countries are driven by moderately higher days of inventory turnover at the average days of 92, 75, and 82 days respectively.

The average days of receivable turnover is around 76 days which is driven by high value of this indicator in the Asian markets, particularly in Turkey at 92 days, followed by Japan and Singapore at 88 days. High receivable days is mainly resulted from increasing total receivable balance at the end of the year, implying the high risk of default from the customers. The increase generally has two main rationales which are a significant increase of total net sales of the company to reflect good performance, or the inability of the company to collect the long outstanding receivables throughout the years. Most companies in the manufacturing industry are using credit sales instead of cash revenue on the spot (Ng et al., 1999) which is suggesting that the receivables are increasing together with the revenue of the year. As displayed in the table 4.1 of the appendix, the average sales growth is 6.7%. This is somehow supported the judgement by Tung et al. (2008), who mentioned that the company performed market penetration or channel stuffing to enhance its sales, and consequently increase the receivable balances. They found that most companies grant an extended credit to avoid bad performance which is called channel stuffing at the end of reporting period. Hence, some manufacturing companies may grant unusual generous credit terms to increase the earnings and reflect better sales growth which impacts its receivable balances. In any possibility, these two cases have yielded huge value of DSO which is accounted for a maximum of 377 days. High receivable turnover days in this study reflects that most companies rely on a long receivable term to attract customers in the manufacturing industry.

On the payable turnover side, the average payment days is 52, quite similar to the observations found by Deloof (2003) with an average of 56 days. Meanwhile, other researchers collected the data with higher average results of 98 days (Garcia-Teruel and Martinez-Solano, 2007). Scrutinising the observed data, the higher payable days are driven by the companies in Japan and China at average 66 days and 61 days respectively. The impact is more significant for the constrained firms in these countries at 68 and 64 days in Japan and China respectively. This phenomenon agreed to my preliminary belief that the credit payables are the main source of funding for the constrained firms especially for those which have limited ability to obtain financing from bond market and equity financing.

The average days of inventory turnover is around 79 days which is in line with most researchers such as Raheman and Nasr (2007) and Gill et al. (2010). High inventory days is mainly resulted from increasing inventory position by manufacturing companies. The main rationale is to maintain the branding and stock availability to meet increasing or sudden demand from the customers or distributors. As discussed in the literature review, if the inventory balances are reduced too low, the company risks losing sales from their customers due to stockouts. Yet, in the worst circumstances, high inventory balance may also be caused by slow moving stocks or outdated stocks which cannot be easily sold in the market. This is then derived at a higher ratio of DIO which is accounted for a maximum of 290 days. Interestingly, companies with much lower inventory days are less valuable than the companies with average inventory days between 120 – 210 days. This can happen because the inventory availability is very important in the manufacturing industry to quickly respond with the sudden demand in the market. Meanwhile, the company with more than 270 average turnover days suffered the low score of Tobin's Q. Longer turnover days signal the investors that there are inventory problems in the companies and there is huge volume of slow-moving stocks, which can bring detrimental impacts to the company.

The firm size is calculated by using the natural logarithm of net sales. Based on all observations, the average value of firm size is 2.43 worldwide, with the maximum value is owned by Royal Dutch Shell. Examining closely the observations, the longer the cash conversion cycle period, the lower the size of the observed firms. This implies that the bigger companies have a stronger base to manage their working capital, which results in lower cash conversion period. Larger firms have better access to both the money and capital markets, so they can afford to hold fewer current assets and meet cash requirements just as quickly and efficiently through various borrowing (Moss and Stine, 1993). For the companies with cash

conversion cycle less than 30 days, they experienced higher net sales on average, consequently obtain the higher firm size value. On average, the highest firm size is 2.8 for the company with a conversion cycle of 0-30 days, followed by 2.7 for 31-60 days and 2.5 for 61-90 days. Therefore, this has a strong implication that the firm size of the companies in certain countries are highly influencing the capability to manage their working capital. This is consistent with the empirical findings by Moss and Stine (1993).

Company's sales growth is one of the most important factors in analysing the firm financial performance. Based on the observed data, the lowest score for sales growth is at -87%, meanwhile the highest score is stood at 472%. Among the data, 36% of them experienced a decrease in net sales in any period over the years. Similar to the firm size, the faster the cash conversion period, the higher the sales growth of the companies. On average, the company with CCC period of 0-60 days, experienced significant sales growth of more than 9% annually. Meanwhile, the company that has CCC of more than 210 days, experienced the negative sales growth in any period over the years. There are 2,578 observations with CCC days of more than 210 days, representing 5.2% of total observations in this study. In contrary, current ratio shows the positive relationship with the cash conversion period. The higher the cash conversion cycle, the higher the current ratio yielded for the companies. Companies with lower CCC days experienced the lowest current ratio at an average of 1.28. This phenomenon is in line with my preliminary judgement whereby the companies with quick cash conversion ability do not hold so many current assets to run their business. As a result, their current ratio is significantly lower than other peers within the industry. Subsequently, I analyse the movement of each variable over the period. It is noted that, during the year of 2008 crisis, the cash conversion cycle is impacted in certain countries especially in the United States and its influential partner countries. Looking at the company's sales growth, the companies experienced lower growth in 2009 with an average of -7% decrease from the previous years. However, the impact seems not significant in the manufacturing industry whereby the business has then been recovered well in the following year.

4.2. Pearson Correlation Matrix

Correlation matrix is used to measure the potential association among the variables (Tabachnick and Fidell, 2007). The positive correlation figure indicates that when a variable increase, another variable will increase as well, meanwhile the negative figure shows the inverse relationship (Pallant, 2007). The strength of linear association between two variables is quantified by the correlation coefficient. The formula to compute this association is as follows:

$$r = \frac{1}{n-1}\sum \left(\frac{x - \bar{x}}{S_x}\right)\left(\frac{y - \bar{y}}{S_y}\right)$$

The formula to calculate this relationship will standardize the variables, hence any changes in scale or unit of measurement may not affect the value. That's why the correlation coefficient is often used in many studies and considered more useful than graphical depiction to identify the strength of relationship between two variables. The table shows the results of the correlation analyses of the period under review. The significant results of this analysis will be compared to other researchers who conducted similar studies.

Refer to table 4.2.1, 4.2.2 and 4.2.3 in the appendix, the result shows that cash conversion cycle days is negatively related to the Tobin's Q score. This means that an increase in CCC days will contribute lower Tobin's value by 0.06, 0.03 and 0.08 for all observed companies, unconstrained companies and constrained companies respectively. Therefore, it can be said that the higher the company need time to convert its working capital, the lower the Tobin's value. As Tobin's Q is representing the company's valuation, lower score indicates lower value of the market capitalisation in comparison of its actual accounting book value. This applies to both receivable and payable days which shows a negative relationship. However, the receivable turnover days hold stronger coefficient at negative 0.17, 0.18, 0.15 compared to negative 0.04, 0.05, 0.04 of the payable turnover days. This indicates that investors value more aggressive payment collection from customers instead of disbursement of payments to the creditors.

Looking to another performance indicators such as ROA and ROE, the relationship of receivable turnover days and payable turnover days are also negative, demonstrating that higher ROA and ROE can be obtained by lowering down the value of turnover in receivables and payables. Likewise, lower cash conversion period would contribute to higher ROA and ROE. To this end, the result shows that lower CCC days confirm the negative relationship with three

main company's performance indicators namely Tobin's Q, ROA and ROE. These correlation matrix results are consistent with the results of the correlation analyses conducted by Falope and Ajilore (2009), Karaduman et al. (2011), Deloof (2003), Raheman and Nasr (2007) and Garcia-Teruel and Martinez-Solano (2007). Yet, the contradicting evidence is found with the correlation analyses of Lazaridis and Tryfonidis (2006) and Dong and Su (2010), who found a positive relationship between the number of days accounts payables and a firm's performance.

Moreover, Inventory days shows a positive correlation against the Tobin's Q score. Even though the coefficient is not that strong, the result indicates that the investors prefer more inventories on hand in this manufacturing industry to meet the sudden demand in the market. However, the relationship is different when the ROA and ROE are analysed. Surprisingly, there is a negative relationship between these variables, indicating that lower inventory balance is preferable to obtain higher ROA and ROE. This can be explained by the accounting structure, where the higher inventory can result in significant slow-moving stocks and obsolete stocks where this will impact the profit and loss statement in the company. When the inventory balance is too high, there is an indication of slow moving or outdated stocks which can result in stock loss provision due to lower inventory values. This loss will be reported in the income statement, which then reduces the value of net profit of the company. As a result, the ROA and ROE ratio is then reduced following the inventory loss provision.

The control variable of sales growth shows a positive relationship with the main dependent variable, Tobin's Q at 0.13 coefficient value. This positive relationship can also be found against other performance indicators which are ROA and ROE at a coefficient of 0.23 and 021 respectively. This is again consistent with the previous study by Deloof (2003), Shin and Soenen (1998), Falope and Ajilore (2009), Karaduman et al. (2011), Zariyawati et al. (2009) and Padachi et al. (2010). Firm size also affects the Tobin's Q score positively. This implies that companies with bigger market share are valued more by their investors. Additionally, another control variable, the current ratio shows a significant positive relationship with Tobin's Q and other two performance indicator. This is consistent with the finding of Zariyawati et al. (2009) and Shin and Soenen (1998).

4.3. Regression Analysis: Cash Conversion Cycle and Tobin's Q

Panel data regression analyses are used to investigate the impact of working capital management and its components on firm value. Each regression equation as given earlier in the methodology chapter is discussed in its corresponding tables in this section. Firstly, I discuss the impact of the cash conversion cycle on firm value, followed by its components and the role of financial constraints in driving this relationship. Other performance indicators, namely ROA and ROE will be used to perform robustness check to each result obtained. As described in the methodology section, the first regression is to establish the regression line between cash conversion cycle and Tobin's Q. Secondly, the relationship of three main variables which construct the cash conversion period will be tested against the dependent variable of Tobin's Q.

Refer to table 4.3.1, the table shows that there is a negative relationship between cash conversion days and firm value, in line with the previous researchers who studied working capital management impact on profitability. This strongly describes that investors are in favor of lower working capital investments to operate on day-to-day basis. Lifland (2011) stated that an increase in the cash conversion cycle and committed funds to maintain higher working capital position could lead to the erosion of the firm's core cash flow and enterprise value. His logic is consistent with the regression results where shareholders prefer quicker cash conversion cycle as it shows the enterprise capability to generate internal cash rapidly. Shortening cash conversion cycle is preferable to attain higher profit and valuation while the need for external financing is simultaneously mitigated (Moss and Stine, 1993). As a result, the market reaction is positive for lower cash conversion cycle, as the company is continuously generating greater profit together with strong cash availability to expand the business and distribute dividends to their investors. These results are statistically significant with a 1% significance level, where an increase in cash conversion period will result in lower Tobin's Q ratio. This shows that the companies in the manufacturing industry could enhance the firm value by lowering down the cash conversion period.

Five different regression models are employed to obtain the empirical evidences. To interpret each regression result, each coefficient shown in the table is multiplied by 10,000 to generate the basis-points value. All regression results show the negative relationship between cash conversion period and firm value where the fixed effect model with year dummy shows the biggest impact at 16 basis-points. This model includes the unobserved firm specific and

individual invariant time effects in the analysis to control for unobserved heterogeneity (Mundlak, 1961). Moreover, this model confines the complete information including omitted variable effects and cannot be biased because of omitted time invariant characteristics (Booth et al., 2001). Whereas the random effect model assumes that the individual specific effects are uncorrelated with the independent variables. On the other hand, the GMM model yields the lowest coefficient at 9 basis-points whereby this model accounts for the distortion caused by endogeneity (Arellano and Bond, 1991; Blundell and Bond, 1998). Despite the varied coefficient results in each regression model, all results have confirmed that cash conversion cycle negatively affects the firm value of listed companies in the manufacturing industry.

To analyse the magnitude of the main independent variable effect on Tobin's Q, an assumption is made for the company with a million asset-book value, where the market capitalization value is equivalent to $0.5 million and book value of liabilities is $0.5 million (1:1 debt to equity ratio). Therefore, one day decrease in cash conversion period could result in an increase of around 12 basis-points of Tobin's Q value on an average, raising the market value of the entity by $1,200. Besides, the results confirm that the control variables, namely sales growth and firm size bring positive impact on a firm value which is considered reasonable and normal. The positive effect of the current ratio is expected as a reasonable liquidity level is required by every enterprise. Otherwise, it may indicate an inefficiency concerning the cash management of the companies (Ross et al., 2010).

Involving other performance indicators (table 4.3.2 and 4.3.3), negative relationships between cash conversion period with the return on assets and return on equity are discovered at the magnitude of 210 and 348 basis-points on an average. These results are consistent with the previous study by Shin and Soenen (1998) who believed that by reducing the conversion days, the management will create value for their shareholders. Other earlier researchers including Deloof (2003), Lazaridis and Tryfonidis (2006), Garcia-Teruel and Martinez-Solano (2007), Uyar (2009), Wang (2002) and Karaduman et al. (2011) found the similar negative association between cash conversion days and corporate performance. These findings have established the significant negative relationship between cash conversion cycle with firm value and accept the first hypothesis of this study. Reducing the cash conversion cycle does not only constitute better financial performance, but also improve value of the corporations.

Table 4.3.1
Regression Result for All Companies
Cash Conversion Cycle, Days Payable Outstanding, Days Receivable Outstanding and Days Inventory Days with Tobin's Q

Regression Model	**Fixed Effect Model**		**Random Effect Model**		**GMM Model**	**Fixed Effect Model**		**Random Effect Model**		**GMM Model**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q
CCC	-0.00109***	-0.00168***	-0.00101***	-0.00151***	-0.000949***					
	(0.000172)	(0.000176)	(0.000149)	(0.000153)	(0.000138)					
Current Ratio	0.0211***	0.0156***	0.0262***	0.0209***	-0.000956	0.0209***	0.0144***	0.0255***	0.0194***	-0.000819
	(0.00555)	(0.00524)	(0.00505)	(0.00482)	(0.00372)	(0.00554)	(0.00519)	(0.00501)	(0.00474)	(0.00373)
Annual sales growth	0.00261***	0.00261***	0.00282***	0.00282***	0.000979***	0.00257***	0.00244***	0.00273***	0.00262***	0.00101***
	(0.000231)	(0.000237)	(0.000226)	(0.000233)	(0.000142)	(0.000244)	(0.000250)	(0.000235)	(0.000242)	(0.000157)
Firm Size	0.140***	0.111***	0.123***	0.101***	0.0273**	0.140***	0.108***	0.121***	0.0980***	0.0274**
	(0.0215)	(0.0201)	(0.0144)	(0.0136)	(0.0115)	(0.0214)	(0.0200)	(0.0142)	(0.0134)	(0.0114)
Tobin's Q $_{(t-1)}$					-0.0138					-0.0134
					(0.0376)					(0.0376)
DPO						0.00103***	0.000979***	0.000999***	0.000955***	0.00103***
						(0.000345)	(0.000339)	(0.000314)	(0.000310)	(0.000254)
DSO						-0.00154***	-0.00221***	-0.00210***	-0.00264***	-0.000848***
						(0.000260)	(0.000263)	(0.000237)	(0.000241)	(0.000226)
DIO						-0.000729***	-0.00141***	-0.000204	-0.000776***	-0.00102***
						(0.000247)	(0.000248)	(0.000201)	(0.000203)	(0.000192)
Constant	1.044***	1.277***	1.066***	1.267***	-115.2***	1.055***	1.344***	1.093***	1.341***	-115.1***
	(0.0570)	(0.0545)	(0.0420)	(0.0422)	(3.002)	(0.0592)	(0.0568)	(0.0444)	(0.0448)	(3.017)
Year dummies	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
Regression model	FE	FE	RE	RE	GMM	FE	FE	RE	RE	GMM
Observations	49,533	49,533	49,533	49,533	40,527	49,533	49,533	49,533	49,533	40,527
Number of Company	4,503	4,503	4,503	4,503	4,503	4,503	4,503	4,503	4,503	4,503
R-squared	0.024	0.094	0.035	0.030	N/A	0.024	0.095	0.059	0.054	N/A

This table represents the coefficients of panel data regression results, namely from fixed effects, random effects and GMM regression models. Year dummy is used in each regression (2)(4)(5)(7)(9) and (10). The dependent variable in all regressions is firm value (Tobin's Q). The main independent variables are cash conversion cycle (CCC), days payable outstanding (DPO), days receivable outstanding (DSO) and days inventory days (DIO), controlled by the relevant variables noted as current ratio, annual sales growth and firm size.
* indicates significance at the 0.1 level
** indicates significance at the 0.05 level
*** indicates significance at the 0.01 level
Standard errors are in parentheses

Table 4.3.2
Regression Result for All Companies
Cash Conversion Cycle, Days Payable Outstanding, Days Receivable Outstanding and Days Inventory Days with Return on Assets

Regression Model	**Fixed Effect Model**		**Random Effect Model**		**GMM Model**	**Fixed Effect Model**		**Random Effect Model**		**GMM Model**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	ROA	ROA	ROA	ROA	ROA	ROA	ROA	ROA	ROA	ROA
CCC	-0.0233***	-0.0244***	-0.0166***	-0.0172***	-0.0233***					
	(0.00215)	(0.00217)	(0.00147)	(0.00148)	(0.00290)					
Current Ratio	0.667***	0.662***	0.683***	0.679***	0.440***	0.636***	0.628***	0.641***	0.635***	0.440***
	(0.0744)	(0.0744)	(0.0657)	(0.0658)	(0.100)	(0.0735)	(0.0735)	(0.0649)	(0.0649)	(0.0982)
Annual sales growth	0.0617***	0.0597***	0.0654***	0.0635***	0.0621***	0.0578***	0.0554***	0.0615***	0.0594***	0.0606***
	(0.00272)	(0.00282)	(0.00271)	(0.00282)	(0.00338)	(0.00276)	(0.00283)	(0.00272)	(0.00281)	(0.00363)
Firm Size	1.569***	1.603***	1.275***	1.282***	0.525***	1.485***	1.519***	1.223***	1.229***	0.526***
	(0.176)	(0.178)	(0.108)	(0.108)	(0.187)	(0.174)	(0.176)	(0.107)	(0.107)	(0.185)
Tobin's Q $_{(t-1)}$					0.363***					0.363***
					(0.0142)					(0.0142)
DPO						0.00269	0.00198	-0.00195	-0.00234	0.0197***
						(0.00400)	(0.00402)	(0.00326)	(0.00328)	(0.00556)
DSO						-0.0265***	-0.0288***	-0.0229***	-0.0244***	-0.0352***
						(0.00364)	(0.00369)	(0.00282)	(0.00284)	(0.00530)
DIO						-0.0253***	-0.0259***	-0.0156***	-0.0160***	-0.0136***
						(0.00291)	(0.00294)	(0.00184)	(0.00186)	(0.00420)
Constant	0.611	1.692***	0.572	1.650***	-413.4***	2.380***	3.656***	2.189***	3.418***	-414.5***
	(0.537)	(0.541)	(0.413)	(0.416)	(30.45)	(0.592)	(0.598)	(0.447)	(0.451)	(30.41)
Year dummies	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
Regression model	FE	FE	RE	RE	GMM	FE	FE	RE	RE	GMM
Observations	49,533	49,533	49,533	49,533	40,527	49,533	49,533	49,533	49,533	40,527
Number of Company	4,503	4,503	4,503	4,503	4,503	4,503	4,503	4,503	4,503	4,503
R-squared	0.097	0.109	0.081	0.079	N/A	0.100	0.112	0.092	0.090	N/A

This table represents the coefficients of panel data regression results, namely from fixed effects, random effects and GMM regression models. Year dummy is used in each regression (2)(4)(5)(7)(9) and (10). The dependent variable in all regressions is firm performance (ROA). The main independent variables are cash conversion cycle (CCC), days payable outstanding (DPO), days receivable outstanding (DSO) and days inventory days (DIO), controlled by the relevant variables noted as current ratio, annual sales growth and firm size.
* indicates significance at the 0.1 level
** indicates significance at the 0.05 level
*** indicates significance at the 0.01 level
Standard errors are in parentheses

Table 4.3.3
Regression Result for All Companies
Cash Conversion Cycle, Days Payable Outstanding, Days Receivable Outstanding and Days Inventory Days with Return on Equity

Regression Model	**Fixed Effect Model**		**Random Effect Model**		**GMM Model**	**Fixed Effect Model**		**Random Effect Model**		**GMM Model**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	ROE	ROE	ROE	ROE	ROE	ROE	ROE	ROE	ROE	ROE
CCC	-0.0398***	-0.0417***	-0.0262***	-0.0273***	-0.0419***					
	(0.00537)	(0.00543)	(0.00341)	(0.00343)	(0.00727)					
Current Ratio	1.322***	1.317***	1.129***	1.129***	1.018***	1.238***	1.224***	1.028***	1.021***	1.000***
	(0.138)	(0.138)	(0.105)	(0.106)	(0.201)	(0.136)	(0.136)	(0.103)	(0.104)	(0.196)
Annual sales growth	0.142***	0.137***	0.149***	0.145***	0.133***	0.132***	0.126***	0.140***	0.135***	0.126***
	(0.00653)	(0.00675)	(0.00643)	(0.00669)	(0.00767)	(0.00646)	(0.00664)	(0.00638)	(0.00661)	(0.00791)
Firm Size	3.168***	3.343***	3.440***	3.489***	1.277***	2.941***	3.122***	3.330***	3.376***	1.211**
	(0.436)	(0.446)	(0.243)	(0.244)	(0.484)	(0.430)	(0.440)	(0.242)	(0.243)	(0.484)
Tobin's Q $_{(t-1)}$					0.317***					0.315***
					(0.0195)					(0.0195)
DPO						-0.0157	-0.0178	-0.0133	-0.0145*	0.0187
						(0.0111)	(0.0112)	(0.00826)	(0.00831)	(0.0170)
DSO						-0.0535***	-0.0586***	-0.0419***	-0.0449***	-0.0837***
						(0.00901)	(0.00910)	(0.00652)	(0.00655)	(0.0141)
DIO						-0.0407***	-0.0415***	-0.0229***	-0.0234***	-0.00987
						(0.00763)	(0.00771)	(0.00435)	(0.00438)	(0.0107)
Constant	-0.536	1.820	-2.187**	0.346	-892.2***	4.287***	7.125***	1.366	4.240***	-905.9***
	(1.312)	(1.324)	(0.933)	(0.933)	(78.48)	(1.457)	(1.475)	(1.005)	(1.015)	(79.30)
Year dummies	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
Regression model	FE	FE	RE	RE	GMM	FE	FE	RE	RE	GMM
Observations	49,533	49,533	49,533	49,533	40,527	49,533	49,533	49,533	49,533	40,527
Number of Company	4,503	4,503	4,503	4,503	4,503	4,503	4,503	4,503	4,503	4,503
R-squared	0.065	0.075	0.086	0.085	N/A	0.068	0.078	0.090	0.088	N/A

This table represents the coefficients of panel data regression results, namely from fixed effects, random effects and GMM regression models. Year dummy is used in each regression (2)(4)(5)(7)(9) and (10). The dependent variable in all regressions is firm performance (ROE). The main independent variables are cash conversion cycle (CCC), days payable outstanding (DPO), days receivable outstanding (DSO) and days inventory days (DIO), controlled by the relevant variables noted as current ratio, annual sales growth and firm size.
* indicates significance at the 0.1 level
** indicates significance at the 0.05 level
*** indicates significance at the 0.01 level
Standard errors are in parentheses

4.4. Regression Analysis: Three Components of Cash Conversion Cycle

In order to reach the optimal cash conversion cycle, the management should balance the inventory, receivable and payable conversion activities. Refer to table 4.3.1, the regression results illustrate that inventory turnover days (DIO) has a negative relationship with the company's value. The coefficients are rather small however, this confirms a significant relationship at below 1% confidence. Higher inventory days can be described as a huge balance of inventory on hand which increases the overall current assets of the company and its book value. Indeed, the investors value stocks availability to meet the sales demand from customers, however, the lower turnover rate to convert them to the expected sales are more important in general. The firm value seems to be lower if the company hold so much inventory on hand, as this shows the cash and liquid assets trapped in the working capital. This also shows the management inefficiency to handle the inventory and finished goods.

As exhibited in the table 4.3.1, the increase in inventory cycle period by one day could lower the Tobin's Q score at the magnitude of 8 basis-points on an average. This means, according to the earlier assumption if the market value and book value of the company are $0.5 million and $1 million respectively, increase in inventory days is associated with 8 basis-points depreciation in Tobin's Q which is equivalent to $800 of market value (16 basis-points decrease in market value). Employing other accounting indicators, the result shows that inventory turnover days has a negative relationship with both return on assets and return on equity at the average magnitude of 193 and 277 basis-points respectively. This negative relationship was supported by other researchers such as Deloof (2003), Lazaridis and Tryfonidis (2006), Garcia-Teruel and Martinez-Solano (2007), Karaduman et al. (2011) and Raheman and Nasr (2007).

By agreeing with the second hypothesis and earlier discussions, overdue inventory balance will increase the potential inventory loss provision, which contributes expenses to the company's returns. This also drops the Tobin's Q score, heading to undervaluation of the company's common stocks. Having said that, lowering the inventory balance will diminish the possibility of slow-moving and obsolete stocks, hence lessen the provision of inventory valuation loss. As the company needs to perform the inventory stock inspection and stock evaluation annually, when the inventories consist of obsolete or outdated stocks, the value of these inventories are needed to be revalued. Once this impairment is indicated or the net realisable value in the market is lower, the company will record expenses, lowering their returns for the financial year. As a result, the return on assets and return on equity then lower

due to higher loss provision during the year. Added value benefits of funding the inventory is significantly influenced by a firm's future sales expectations and its financial constraints (Kieschnick et al., 2013). Henceforth, it is advisable to keep the inventory at acceptable level to deal with expected revenue demands only, under condition that the management can quickly sell the finished goods. By implementing this strategy, the inventory conversion period is then remained lower. The impact of financial constraint is discussed in the next section as less constrained companies encounter the opposite relationship instead.

Consistent with my third hypothesis, the value of the company grows when the receivables are quickly collected from the customers. In contrary, Petersen and Rajan (1997) found that extending trade credit would increase the profit margins because the management may persuade and give more flexibility to customers, consequently raise the current year sales. However, obtaining higher sales by compromising longer credit terms seems bad for the market reaction and needs to be carefully assessed by management. This is supporting the assumption by Tung et al. (2008) whereby trade receivables that issued to less reliable customers (where potential default is enormous) may contribute adverse impact to company's cashflow and going-concern principle. This long-outstanding receivables may lead to higher bad debt expenses which then negatively contribute loss to the firm in the long run. Therefore, even though the net profit of the company is high, the huge balance in the receivable is less valued by the investors, pushing the management to oversee the credit management with their existing customers and to collect the receivables promptly. Referring to table 4.3.1, the increase in receivable turnover by one day will lower the Tobin's Q ratio by around 19 basis-points on an average. This means, as per the earlier assumption, increase in DSO score is associated with 19 basis-points decrease in Tobin's Q which is equivalent to $1,900 decrease in market value. Thus, in comparison with the inventory management, corporate financial executives should look attentively at cash collectability management more.

Using the corporate performance indicators to run the regression analysis, the result shows a significant negative relationship with 1% significance level at the coefficient of 275 and 565 basis-points on an average for ROA and ROE respectively. This indicates that firms can create profit by keeping the levels of their account receivables to a minimum level. This negative effect of accounts receivables on a firm's profitability is found by majority of studies on working capital management. This includes studies by Dong and Su (2010), Lazaridis and Tryfonidis (2006), Garcia-Teruel and Martinez-Solano (2007), and Farzinfar and Arani (2012), who found a significant negative relationship between the number of days accounts receivables

and the company's performance. In other studies, stronger negative impact of 0.3% to firm profitability is found by Gill et al. (2010) which is likely caused their samples of public listed companies in the New York Stock Exchange. Conversely, once small and medium companies are included in the observations, Deloof (2003) found that a one day increase in receivable turnover is associated with a decrease in company's profitability by 0.04% instead. This implies that bigger companies are expected to have better cash collectability management. As the samples in this thesis are listed companies in major stock exchanges in 20 selected countries, the observed companies are commonly large in nature. Thus, the impact of days sales outstanding escalation is more severe to the observed firm value.

The result demonstrates that market value has a positive relationship with longer payable days with the confidence value at 1% significant level. As displayed in the table 4.3.1, in every regression result, the increase in days payable turnover by one day will rise the Tobin's Q score by around 10 basis-points. Hence, pursuant to the earlier assumption, increase in DPO score is associated with 10 basis-point appreciation in Tobin's Q which is equivalent to $1,000 increase in market value. This result challenges the conclusion by Deloof (2003) who argued that most firms pay their payables earlier to get purchase discount which in the end, increase their profitability. Contrary to his assumption, the evidence shows that shareholders prefer reasonable high trade payables to support the company's inventory balance, which then helps them to sell ready-stock materials to their distributors. Indirectly, it is also because most companies pay their creditors once they already secure the potential revenue, not necessarily driven by chasing the purchase discount. In the end, once the revenue is obtained, the purchase without discount will eventually bring more profit and positive cashflow stability as long as the inventories are readily present, instead of rushing the payment in order to get lower purchase value and distort the operating cashflow of the manufacturing companies. Manufacturing industry is considered as capital-intensive industry and it is noted that the inventory cost will only be recognized in income statement when the revenue is performed, not when the inventories or materials are purchased from the suppliers. Additionally, for less leveraged companies, trade payables are considered as financing sources to support their daily business and operational business events.

Running the regression analysis with the accounting indicator ROA, the result shows that there is insignificant positive result. This result aligns with other earlier authors including Lazardis and Tryfonidis (2006), GarciaTeruel and Martinez-Solano (2007) and Deloof (2003) who found the significant positive relationship between account payable days and firm's

performance. However, when the other accounting indicator (ROE) is used, surprisingly the result shows a negative relationship instead. Yet, again the result is not statistically significant. Lastly, similar with the result presented in the table 4.3.1, it confirms that the control variables are associated positively with the firm's value which is again considered normal.

4.5. Regression Analysis: Constrained and Unconstrained Companies

To move forward with the last hypothesis, I perform the sub-sampling of the data based on the financial constraint criteria. In total there are 2,313 companies categorised under constrained criteria and 2,190 companies for the bigger firms. As shown in the table 4.4, both results in constrained and unconstrained firms have shown significant level at 1%, displaying that the companies regardless of their financing capacity, cash conversion cycle are required to be lower to get higher valuation in the market. However, the result shows that constrained companies have stronger coefficient between cash conversion period and Tobin's Q score, especially after treating the endogeneity problems under two-step generalized method of moments (GMM) model. In comparison with 7 basis-points of unconstrained firms, the constrained firm yields higher coefficient at 11 basis-points, indicating that constrained firms are slightly valued more with lower cash conversion period. This means that the increase in cash conversion period in constrained companies by one day will decrease the Tobin's Q score by around 11 points. According to the earlier assumption if the market value and asset book value of the company are $0.5 million and $1 million, one-day increase in cash conversion days is associated with 11 basis-point depletion of Tobin's Q which is equivalent to $1,100. Meanwhile, in a similar setting, unconstrained companies only suffered 7 basis-points deterioration in Tobin's Q score. This is equivalent to only $700 decline, considerably lower by $400 in comparison with $1.1K effect for constrained firms.

Accepting the last hypothesis, this circumstance can be described as most constrained firms have limited access to external finance, therefore they put more reliance on the internal funding from their working capital. This argument is consistent with Kieschnick et al. (2013) who stated that the constraining companies are facing limited access to credit markets and available funds for them are then more expensive. This increased debt expense negatively affects the shareholders' values; hence the working capital investments of financially constrained firms are less valued in this case (Kieschnick et al., 2013). Pursuant to this understanding, for constrained companies, public investors will value its lower cash conversion cycle to quickly generate more internal fund and refinance the daily operations independently.

Table 4.4
Regression Result for Constrained Companies
Cash Conversion Cycle, Days Payable Outstanding, Days Receivable Outstanding and Days Inventory Days with Tobin's Q

Regression Model	**Fixed Effect Model**		**Random Effect Model**		**GMM Model**	**Fixed Effect Model**		**Random Effect Model**		**GMM Model**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q
CCC	-0.00113***	-0.00163***	-0.00110***	-0.00151***	-0.00107***					
	(0.000221)	(0.000223)	(0.000180)	(0.000183)	(0.000182)					
Current Ratio	0.0161**	0.0103*	0.0200***	0.0147***	-0.00190	0.0148**	0.00864	0.0185***	0.0129**	-0.00154
	(0.00628)	(0.00587)	(0.00542)	(0.00512)	(0.00395)	(0.00621)	(0.00580)	(0.00533)	(0.00504)	(0.00396)
Annual sales growth	0.00239***	0.00235***	0.00263***	0.00260***	0.00103***	0.00223***	0.00216***	0.00246***	0.00240***	0.00114***
	(0.000234)	(0.000237)	(0.000227)	(0.000231)	(0.000199)	(0.000247)	(0.000249)	(0.000237)	(0.000240)	(0.000217)
Firm Size	0.181***	0.154***	0.149***	0.126***	0.0157	0.176***	0.149***	0.144***	0.121***	0.0167
	(0.0330)	(0.0308)	(0.0300)	(0.0282)	(0.0186)	(0.0328)	(0.0306)	(0.0298)	(0.0280)	(0.0185)
Tobin's Q $_{(t-1)}$					0.114**					0.115**
					(0.0513)					(0.0512)
DPO						0.000211	0.000465	0.000364	0.000540	0.00150***
						(0.000454)	(0.000444)	(0.000387)	(0.000381)	(0.000353)
DSO						-0.00118***	-0.00157***	-0.00173***	-0.00203***	-0.000939***
						(0.000329)	(0.000327)	(0.000287)	(0.000288)	(0.000296)
DIO						-0.00126***	-0.00190***	-0.000774***	-0.00129***	-0.00109***
						(0.000310)	(0.000312)	(0.000245)	(0.000247)	(0.000255)
Constant	1.019***	1.192***	1.061***	1.213***	-123.1***	1.092***	1.284***	1.136***	1.305***	-123.1***
	(0.0676)	(0.0659)	(0.0606)	(0.0608)	(4.279)	(0.0710)	(0.0700)	(0.0643)	(0.0648)	(4.287)
Year dummies	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
Regression model	FE	FE	RE	RE	GMM	FE	FE	RE	RE	GMM
Observations	25,443	25,443	25,443	25,443	20,817	25,443	25,443	25,443	25,443	20,817
Number of Company	2,313	2,313	2,313	2,313	2,313	2,313	2,313	2,313	2,313	2,313
R-squared	0.025	0.095	0.023	0.022	N/A	0.025	0.096	0.035	0.030	N/A

This table represents the coefficients of panel data regression results, namely from fixed effects, random effects and GMM regression models. Year dummy is used in each regression (2)(4)(5)(7)(9) and (10). The dependent variable in all regressions is firm value (Tobin's Q). The main independent variables are cash conversion cycle (CCC), days payable outstanding (DPO), days receivable outstanding (DSO) and days inventory days (DIO), controlled by the relevant variables noted as current ratio, annual sales growth and firm size.
* indicates significance at the 0.1 level
** indicates significance at the 0.05 level
*** indicates significance at the 0.01 level
Standard errors are in parentheses

Table 4.5
Regression Result for Unconstrained Companies
Cash Conversion Cycle, Days Payable Outstanding, Days Receivable Outstanding and Days Inventory Days with Tobin's Q

Regression Model	**Fixed Effect Model**		**Random Effect Model**		**GMM Model**	**Fixed Effect Model**		**Random Effect Model**		**GMM Model**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q
CCC	-0.00102***	-0.00181***	-0.000916***	-0.00159***	-0.000671***					
	(0.000269)	(0.000280)	(0.000247)	(0.000257)	(0.000190)					
Current Ratio	0.0416***	0.0358***	0.0501***	0.0446***	-0.00567	0.0431***	0.0352***	0.0505***	0.0430***	-0.00578
	(0.00940)	(0.00923)	(0.00865)	(0.00855)	(0.00599)	(0.00953)	(0.00926)	(0.00874)	(0.00856)	(0.00600)
Annual sales growth	0.00290***	0.00293***	0.00307***	0.00311***	0.000877***	0.00307***	0.00281***	0.00313***	0.00293***	0.000859***
	(0.000448)	(0.000474)	(0.000444)	(0.000471)	(0.000194)	(0.000475)	(0.000499)	(0.000463)	(0.000488)	(0.000227)
Firm Size	0.102***	0.0741***	0.108***	0.0829***	0.0307***	0.108***	0.0767***	0.111***	0.0839***	0.0305***
	(0.0275)	(0.0260)	(0.0220)	(0.0210)	(0.0117)	(0.0274)	(0.0259)	(0.0217)	(0.0206)	(0.0117)
Tobin's Q $_{(t-1)}$					-0.113***					-0.112**
					(0.0439)					(0.0436)
DPO						0.00239***	0.00198***	0.00223***	0.00190***	0.000539
						(0.000532)	(0.000523)	(0.000511)	(0.000501)	(0.000351)
DSO						-0.00221***	-0.00334***	-0.00284***	-0.00378***	-0.000715**
						(0.000430)	(0.000450)	(0.000403)	(0.000421)	(0.000309)
DIO						0.000338	-0.000497	0.000830**	0.000143	-0.000627**
						(0.000390)	(0.000388)	(0.000325)	(0.000324)	(0.000267)
Constant	1.082***	1.373***	1.038***	1.306***	-98.14***	0.970***	1.373***	0.961***	1.324***	-98.02***
	(0.0901)	(0.0861)	(0.0773)	(0.0775)	(3.633)	(0.0941)	(0.0882)	(0.0763)	(0.0759)	(3.661)
Year dummies	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
Regression model	FE	FE	RE	RE	GMM	FE	FE	RE	RE	GMM
Observations	24,090	24,090	24,090	24,090	19,710	24,090	24,090	24,090	24,090	19,710
Number of Company	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190
R-squared	0.024	0.098	0.052	0.037	N/A	0.027	0.100	0.097	0.094	N/A

This table represents the coefficients of panel data regression results, namely from fixed effects, random effects and GMM regression models. Year dummy is used in each regression (2)(4)(5)(7)(9) and (10). The dependent variable in all regressions is firm value (Tobin's Q). The main independent variables are cash conversion cycle (CCC), days payable outstanding (DPO), days receivable outstanding (DSO) and days inventory days (DIO), controlled by the relevant variables noted as current ratio, annual sales growth and firm size.
* indicates significance at the 0.1 level
** indicates significance at the 0.05 level
*** indicates significance at the 0.01 level
Standard errors are in parentheses

Both inventory and receivable turnover days are negatively associated with firm value at average coefficient of 12 and 15 basis-points where p-value score is statistically lower than 1% significant level. This implies that the constrained companies rely on receivable and inventory management to fasten the overall cash conversion period. If the financially constrained companies could promptly convert the inventory to revenue and collect cash receipts even faster from these customers, they will be valued more by the shareholders and public investors. This consequently increase the cash reserve in the entity to fund other business purposes and manufacturing expansion. Referring to table 4.4, the impact of receivable turnover on firm value are 12, 16, 17, 20 and 9 basis-points for fixed effect model without/with year dummy, random effect model without/with year dummy, and GMM regression model respectively. This means, based on the earlier assumption if the market value and asset book value of the company are $0.5 million and $1 million respectively, increase in DSO rate is associated with 20 basis-point decrease in Tobin's Q which is equivalent to $2,000 in extreme case. Additionally, the impact of inventory turnover on firm value are 13, 19, 7, 13 and 11 basis-points for fixed effect model without/with year dummy, random effect model without/with year dummy, and GMM regression model respectively. Similar to the negative impact of the inventory days, yet the magnitude is slightly lower at approximately $1,900. Overall, these results have confirmed that both inventory days and receivable days are the main drivers of working capital efficiency in constrained firms.

For constrained companies, the impact of days payable outstanding is positively associated with Tobin's Q score as expected at 15 basis-points under GMM regression model. Interestingly, even though the coefficient value is still positive, payable days seems insignificant under fixed and random effect model. This is because the smaller companies usually do not have a strong connection with their supplier in comparison with their unconstrained counterparts. Therefore, smaller companies only granted with lower credit terms, small chance for negotiation and unable to easily increase their credit limit. Moreover, delaying the payment indeed will provide credit financing for the operational purposes, however, this may lead to increased credit and reputation risks from the creditors and elimination of business partners. Although it remains valid that the DPO of constrained companies have a positive relationship with the Tobin's Q score, the management of these firms need to focus more on inventory and receivable administrations since both instruments are under entity's full controls.

Inventory turnover days turns out to be less significant compared to other working capital components for unconstrained firms. In fact, some of the regression results show the positive relationships. Thus, unconstrained firms have more flexibility to develop sales strategies and balance the factory's capacity utilization and effectiveness. This highlights the importance of immediate actions to prevent inventory stockout for them as underlined by the earlier working capital studies. Based on these findings, significantly lower inventory balance may derive in inventory stockouts, which may result in declined potential revenue in the future. In the worst scenario, a stockout on one item could intensify the probability of distributors cancelling other available items. Consistent with Corsten and Gruen (2004), their study reveals that companies could lose nearly half of intended purchases when customers encounter stockout situation. This event has been previously proved by Anderson et al. (2006) and Liberopoulos and Tsikis (2019) who found serious impacts of stockouts which affects present and future sales particularly for frequent customers. In line with the precautionary theory as explained by Christiano and Fitzgerald (1989), the management of larger firms can simply avoid the stockout situation and effectively deal with the bullwhip effect or unexpected demand from the customers by carefully increasing the inventory balances. The management can easily obtain external funding to finance these short-term investments.

To maintain lower overall cash conversion period, the companies should emphasize more on their trade credit functions. Such importance is reflected in this evidence that receivable turnover days is negatively related to Tobin's Q score at 38 basis-points at its highest coefficient under random effect regression result, almost double the magnitude of 20 basis-points in constrained companies. Referring to table 4.5, the impact of receivable turnover on firm value are 22, 33, 28, 38 and 7 basis-points for fixed effect model without/with year dummy, random effect model without/with year dummy, and GMM regression model respectively. These coefficient magnitudes are higher than the coefficients shown in constrained companies. This phenomenon is confirmed by another study by Gill et al. (2010) who found that a one day increase in DSO is associated with a decrease in public listed company's profitability by 0.3% in the United States. This implies that bigger companies are expected to have better cash collectability management. While the companies could simulate their net sales by granting more favourable credit term to customers, this practice is not well appreciated by the shareholders.

On the other side, for DPO impact on company's value in unconstrained firms, the coefficients are statistically significant and stood at around 20 basis-points under fixed and

random effect equation models. This suggests that a one unit increase in DPO days would rise the firm value by around 20 basis-points. These results are in line with other researchers such as Banos-Caballero et al. (2009) who find that larger firms have greater bargaining power with their suppliers and customers in comparison with the constrained companies. This also supports the statement from long et al. (1993) and Smith (1987) who mentioned that the bigger firms need more time to assess the lower quality goods produced by the smaller firms. Larger firms can extend their trade credit or delaying their payments with the creditors easily which eventually favour better cash conversion periods. Hence, companies with less financing constraints are considered better at managing their cash conversion cycles (Moss and Stine, 1993). Therefore, these results imply that the bigger firms confront higher expectations from their shareholders to manage their credit collection and disbursement efficiently to acquire higher market valuation.

4.6. The Existence of Optimal Working Capital Level

In previous section, it is described that a firm has an optimal working capital level, as the outcome of the trade-off between the costs and benefits of having net working capital. Hence, I perform additional regression analysis by adding the square value of cash conversion cycle in the models to uncover the existence of this phenomenon. Examining the regression result in the table 4.6, there is indeed an optimal working capital level for companies in manufacturing industry. The cash conversion period shows the negative relationship with the Tobin's Q in all regression findings. However, the impact is positive for the square value of CCC days, suggesting the presence of non-linear relationship. Under GMM Model, the turning optimal point is higher at 352 days, in comparison with 66.95 days found by Banos-Caballero et al. (2014) in their study in the United Kingdom. Meanwhile, by using the fixed effect model, the result shows lower turning point at 344 days instead.

These results suggest that when the working capital levels below the turning point, the effect of quick cash collection and inventory turnover may dominate and consequently, the relationship becomes negative. However, when the turning point has reached, the relationship between working capital level and firm value turns to be positive instead. This may be caused by other important actions that need to be immediately taken by the company such as cash holdings and liquidity management regardless of its working capital level. Most companies with significantly high cash conversion period suffer the liquidity problems due to higher bad debt value and extreme slow-moving inventories. These findings support the trade-off theory and illustrate both advantages and disadvantages of holding working capital which need to be appropriately taken into account by the management in order to maximize the company's value for the shareholders.

Table 4.6
Regression Result of Equation Cash Conversion Cycle with Tobin's Q

Regression Model	Fixed Effect Model		Random Effect Model		GMM Model
	(1)	(2)	(3)	(4)	(5)
Variables	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q	Tobin's Q
Tobin's Q $_{(t-1)}$					-0.0139
					(0.0375)
CCC ^{2}	2.67e-06**	4.32e-06***	2.34e-06***	3.65e-06***	2.84e-06***
	(1.19e-06)	(1.17e-06)	(7.14e-07)	(6.91e-07)	(7.36e-07)
CCC	-0.00188***	-0.00297***	-0.00168***	-0.00257***	-0.00190***
	(0.000443)	(0.000445)	(0.000228)	(0.000222)	(0.000287)
Current Ratio	0.0213***	0.0158***	0.0263***	0.0211***	-0.000857
	(0.00556)	(0.00524)	(0.00232)	(0.00225)	(0.00372)
Annual sales growth	0.00261***	0.00260***	0.00282***	0.00283***	0.000947***
	(0.000231)	(0.000237)	(0.000115)	(0.000114)	(0.000143)
Firm Size	0.141***	0.111***	0.123***	0.100***	0.0270**
	(0.0215)	(0.0201)	(0.00868)	(0.00858)	(0.0115)
Constant	1.087***	1.347***	1.103***	1.325***	-115.8***
	(0.0608)	(0.0585)	(0.0301)	(0.0302)	(3.013)
Year dummies	No	Yes	No	Yes	Yes
Regression model	FE	FE	RE	RE	GMM
Observations	49,533	49,533	49,533	49,533	40,527
R-squared	0.024	0.095	0.024	0.095	N/A
Number of Company	4,503	4,503	4,503	4,503	4,503

This table represents the coefficients for three panel data regression results, namely fixed effects, random effects and GMM regression models. Year dummy is used in each regression (2) (4) and (5). The dependent variable in all regressions is firm value (Tobin's Q). The main independent variables are the square value of cash conversion cycle (CCC ^{2}) and cash conversion cycle (CCC), controlled by the relevant variables noted as current ratio, annual sales growth and firm size.

* indicates significance at the 0.1 level
** indicates significance at the 0.05 level
*** indicates significance at the 0.01 level
Standard errors are in parentheses

5. Conclusion

This research investigates the relationship between working capital management and firm value in the manufacturing sector. Net working capital consists of current assets and current liabilities which mainly involve inventory, trade receivables, and trade payables to operate the daily business activities. Managing these instruments are considered as the short-term financing management that should be efficiently optimised by the company in this industry. Considering its importance, it is feasible that inefficient working capital management can drive a firm to bankruptcy, even if the profitability of a firm is constantly positive (Kargar and Bluementhal, 1994). Earlier empirical studies revealed that there is a negative relationship between working capital management and the firm's profitability. They argued that it will subsequently increase the firm's value if the working capital is less invested (Shin and Soenen, 1998; Deloof, 2003). However, the existence of earnings management and manipulation in the profitability measurement may impair the reliability of performance indicator used by the previous studies. While most earlier authors solely investigated the impact working capital on firm performance and assumed this indicator is indirectly transmitted to the firm value, this study fills the gap by directly obtain the empirical evidences on how working capital management affects the firm value. The outcome of this research is beneficial to financial manager, analysts and the policy makers to develop and implement a comprehensive policy in working capital management.

This thesis addresses the existence of optimal working capital value which is aligned with the trade-off theory. Furthermore, beside the application of mainstream fixed and random effect regression models to handle unobserved heterogeneity, in this study, two-step GMM model is also used to deal with endogeneity problems. The results imply that one-day reduction in cash conversion cycle appreciates a firm's Tobin's Q by 12 basis-points on an average. Moreover, reduction in receivable and inventory turnover period result in higher firm value by around 19 and 8 basis-points on an average respectively while payable turnover period is positively associated with firm value at the degree of 10 basis-points.

Those relationships are influenced by the financing constraints faced by a firm whereby the effect of working capital efficiency is more severe for financially constrained companies. It is relatively easy for larger firms to apply conservative approach and increase the inventory to meet the unforeseen cumulative demand from customers. They are expected to play with its

competitive advantage in the market by controlling trade credit with their customers and creditors. On the other hand, the constrained companies are not recommended to lock up the working capital investments in their inventories as the evidence advises them to apply the aggressive approach instead. These constrained companies are highly suggested to lower down their receivable balance and increase the ability to roll out the recovery plan from the trade credit faster. For constrained entities, the payable management is the last option to be achieved as the attention is weighted more towards the inventory management and recoverability of their receivable balances.

This research contains some limitations. Firstly, the study only focuses on manufacturing industry which is characterised by capital intensiveness and driven by huge inventory balances. Therefore, the result may not apply to other industries which do not match these criteria such as services, energy and telecommunication fields. Analysing other industries individually could lead to a better understanding of working capital impacts on firm value in more detailed manner. Thus, a potential avenue for future research may be extended to study the working capital management in different industries.

Secondly, as discussed in the methodology section, the observed samples are limited to only top performing countries for manufacturing industry. Furthermore, the selected samples for this study may suffer from survivor bias since companies with the most liquidity problems have disappeared from the observation listing. Consequently, the result may not apply to less performed companies and may not be generalized to other companies outside the selected country list. Moreover, it is advisable to perform more stringent sub-sampling to analyse the impact of financial constraints on the relationship between working capital management and firm value. This can be done by dividing and comparing the samples based on the highest and lowest quartiles. Additional study can also be extended by exploring the quadratic relationships in each component of working capital.

Thirdly, the time frame and sampling technique used in this research can be considered as limitation of the study. This thesis only studies the annual data from 2007 to 2017, hence the generalizability of the findings may be questionable due to the limited time frame. Thus, further study can be commenced by analysing the impact of working capital management on firm value by using quarterly data of the companies instead. By doing this analysis, the seasonality of the sales demand, company's value and performance would be more accounted for, resulting in more accurate interpretation for the findings.

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Table 4.1
Summary of Descriptive Statistics

Category of Data	All Company Data *Total observations: 49,533*				Constrained Company Data *Total observations: 25,433*				Unconstrained Company Data *Total observations: 24,090*			
Variables	**Mean**	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**
Annual Sales Growth	6.76	24.78	-87	472	6.8	26.71	-87	472	6.72	22.56	-87	451
Current Ratio	2.32	2.041	0	66	2.53	2.413	0	66	2.08	1.52	0	27
DIO	78.88	44.92	0.26	289.9	81.70	46.94	0.26	289.9	75.9	42.47	0.66	289.6
DSO	75.53	36.85	0	377	79.25	38.67	0	377	71.6	34.40	1	345
DPO	52.15	29.74	0.022	329.2	50.43	30.47	0.07	326.9	53.96	28.84	0.022	329.2
ROA	4.012	8.158	-134	136	3.52	9.41	-134	136	4.53	6.54	-85	84
ROE	7.15	19.85	-397	290	5.39	21.39	-397	244	9	17.89	-306	290
Tobin's Q	1.34	1.009	0.06	23.29	1.28	0.96	0.06	18.31	1.41	1.05	0.25	23.29
CCC	102.3	59.12	-49.01	488.6	110.5	61.44	-49	453.3	93.54	55.25	-48.88	488.6
Firm Size	2.44	0.87	0.010	6	1.82	0.49	0.01	3	3.09	0.67	1	6

The table describes the statistical summary of the observed data with total observations of 49,533 (4,503 companies) ranging from 2007 to 2017 in 20 selected countries. The table are divided based on the financial constraint category. The total companies fall under the constraining category is 2,313 companies, while the other category is consisted of 2,190 companies.

Table 4.2.1
Pearson Correlation Matrix for All Companies

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Annual Sales Growth	1.000									
(2) Current Ratio	-0.056	1.000								
(3) DIO	-0.094	0.158	1.000							
(4) DSO	-0.159	-0.015	0.124	1.000						
(5) DPO	-0.123	-0.213	0.073	0.447	1.000					
(6) ROA	0.234	0.124	-0.050	-0.148	-0.119	1.000				
(7) ROE	0.213	0.036	-0.055	-0.127	-0.081	0.835	1.000			
(8) Tobin's Q	0.138	0.073	0.029	-0.171	-0.043	0.349	0.268	1.000		
(9) CCC	-0.108	0.218	0.800	0.493	-0.169	-0.071	-0.080	-0.063	1.000	
(10) Firm Size	0.026	-0.196	-0.145	-0.177	0.036	0.114	0.156	0.088	-0.239	1.000

This table represents the coefficients of Pearson correlation matrix results. The main variables are Tobin's Q, cash conversion cycle (CCC), days payable outstanding (DPO), days receivable outstanding (DSO) and days inventory days (DIO). In this table, control variables are noted as current ratio, annual sales growth and firm size. This includes two dependent variables for robustness check which are return on assets (ROA) and return on equity (ROE).

Table 4.2.2
Pearson Correlation Matrix for Unconstrained Companies

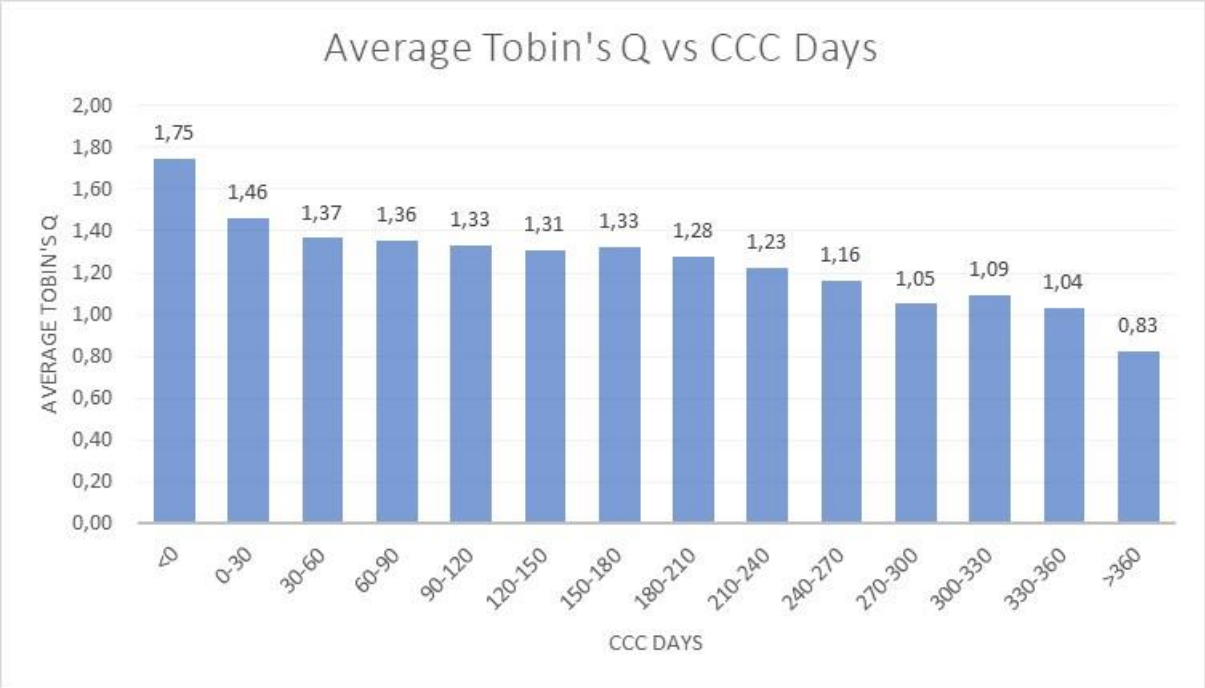
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Annual Sales Growth	1.000									
(2) Current Ratio	-0.035	1.000								
(3) DIO	-0.068	0.208	1.000							
(4) DSO	-0.155	-0.011	0.144	1.000						
(5) DPO	-0.133	-0.196	0.089	0.489	1.000					
(6) ROA	0.241	0.164	-0.015	-0.169	-0.105	1.000				
(7) ROE	0.200	0.024	-0.020	-0.139	-0.061	0.802	1.000			
(8) Tobin's Q	0.136	0.116	0.075	-0.184	-0.054	0.524	0.397	1.000		
(9) CCC	-0.079	0.255	0.812	0.478	-0.149	-0.062	-0.070	-0.029	1.000	
(10) Firm Size	0.015	-0.200	-0.133	-0.181	-0.003	0.069	0.130	0.077	-0.213	1.000

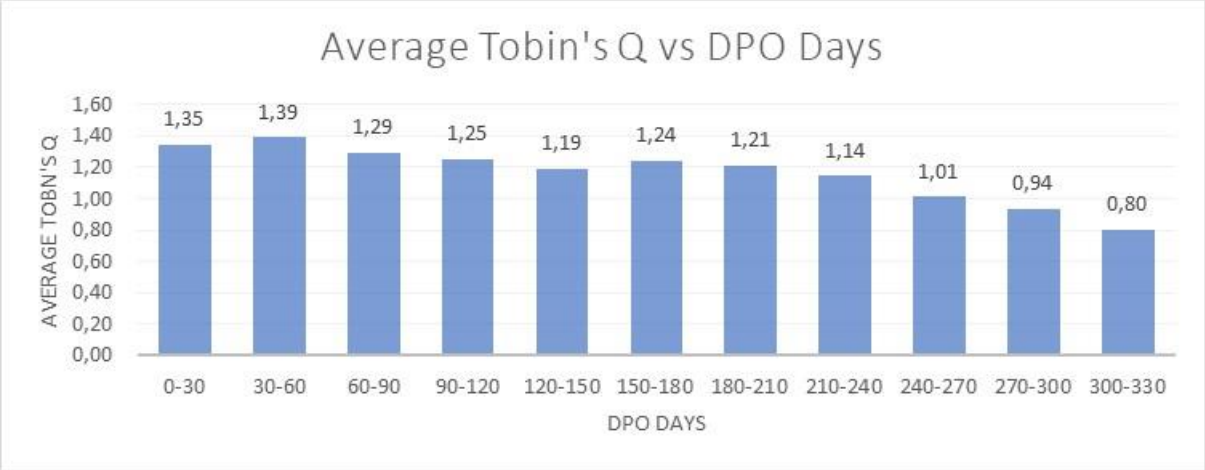
This table represents the coefficients of Pearson correlation matrix results. The main variables are Tobin's Q, cash conversion cycle (CCC), days payable outstanding (DPO), days receivable outstanding (DSO) and days inventory days (DIO). In this table, control variables are noted as current ratio, annual sales growth and firm size. This includes two dependent variables for robustness check which are return on assets (ROA) and return on equity (ROE).

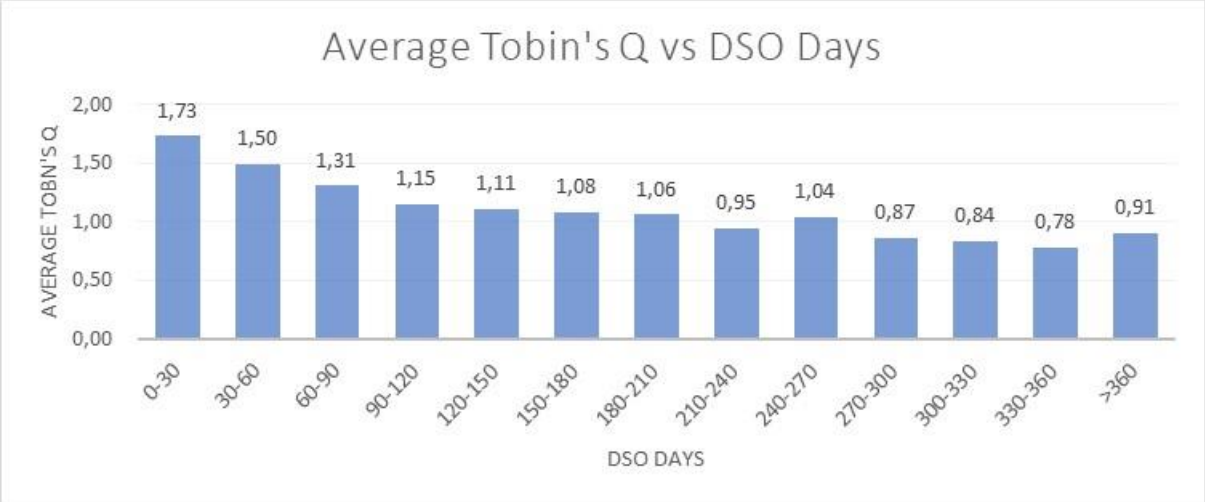
Table 4.2.3
Pearson Correlation Matrix for Constrained Companies

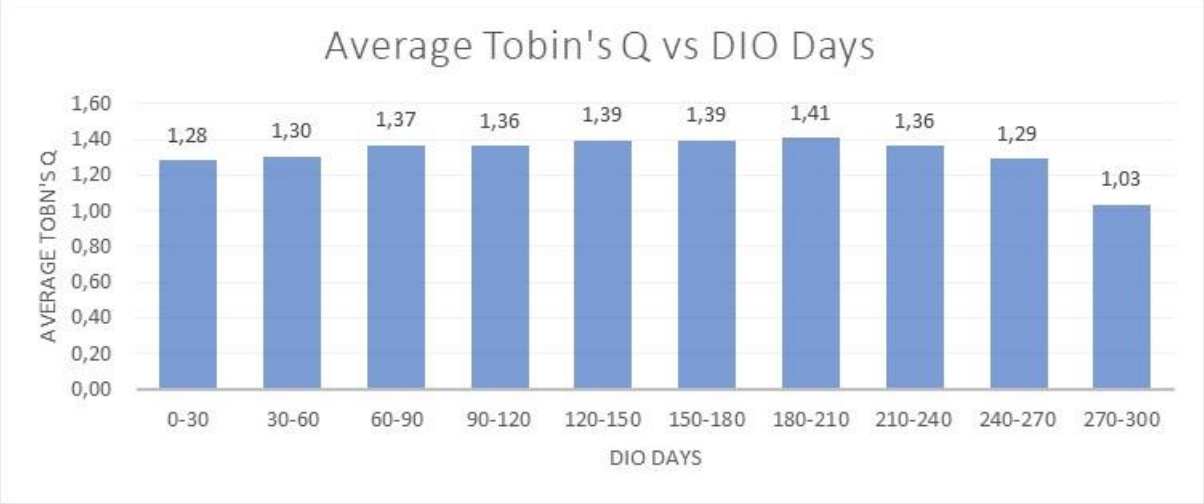
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Annual Sales Growth	1.000									
(2) Current Ratio	-0.069	1.000								
(3) DIO	-0.113	0.126	1.000							
(4) DSO	-0.163	-0.036	0.099	1.000						
(5) DPO	-0.115	-0.222	0.069	0.430	1.000					
(6) ROA	0.232	0.118	-0.066	-0.128	-0.136	1.000				
(7) ROE	0.223	0.058	-0.070	-0.104	-0.106	0.857	1.000			
(8) Tobin's Q	0.142	0.062	-0.005	-0.151	-0.040	0.234	0.153	1.000		
(9) CCC	-0.131	0.184	0.792	0.491	-0.173	-0.064	-0.066	-0.079	1.000	
(10) Firm Size	0.072	-0.174	-0.166	-0.122	-0.022	0.143	0.142	0.033	-0.193	1.000

This table represents the coefficients of Pearson correlation matrix results. The main variables are Tobin's Q, cash conversion cycle (CCC), days payable outstanding (DPO), days receivable outstanding (DSO) and days inventory days (DIO). In this table, control variables are noted as current ratio, annual sales growth and firm size. This includes two dependent variables for robustness check which are return on assets (ROA) and return on equity (ROE).

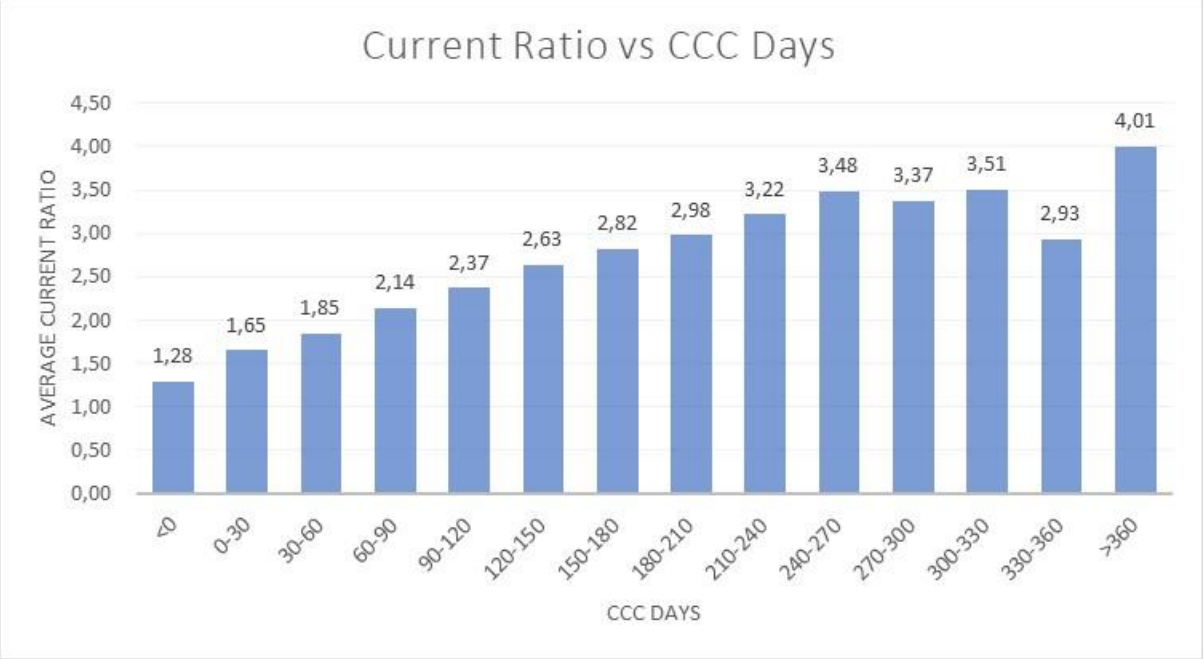

Average Tobin's Q vs CCC Days
AVERAGE TOBIN'S Q
2,00
1,80
1,60
1,40
1,20
1,00
0,80
0,60
0,40
0,20
0,00
1,75
1,46
1,37
1,36
1,33
1,31
1,33
1,28
1,23
1,16
1,05
1,09
1,04
0,83
<0
0-30
30-60
60-90
90-120
120-150
150-180
180-210
210-240
240-270
270-300
300-330
330-360
>360
CCC DAYS

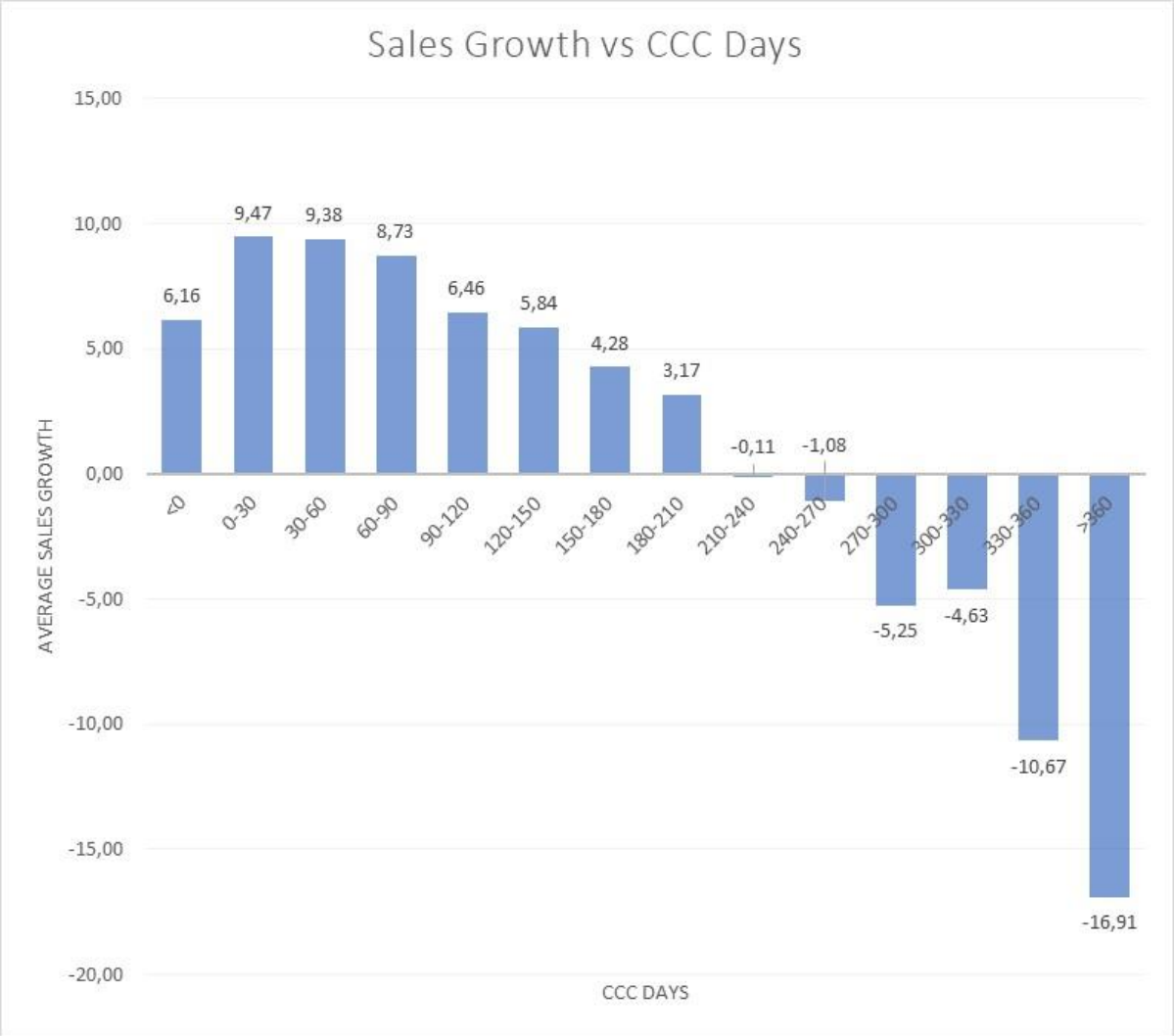

Average Tobin's Q vs DPO Days
AVERAGE TOBN'S Q
1,60
1,40
1,20
1,00
0,80
0,60
0,40
0,20
0,00
1,35
1,39
1,29
1,25
1,19
1,24
1,21
1,14
1,01
0,94
0,80
0-30
30-60
60-90
90-120
120-150
150-180
180-210
210-240
240-270
270-300
300-330
DPO DAYS


Average Tobin's Q vs DSO Days
AVERAGE TOBN'S Q
2,00
1,50
1,00
0,50
0,00
1,73
1,50
1,31
1,15
1,11
1,08
1,06
0,95
1,04
0,87
0,84
0,78
0,91
0-30
30-60
60-90
90-120
120-150
150-180
180-210
210-240
240-270
270-300
300-330
330-360
>360
DSO DAYS


Average Tobin's Q vs DIO Days
AVERAGE TOBN'S Q
1,60
1,40
1,20
1,00
0,80
0,60
0,40
0,20
0,00
1,28
1,30
1,37
1,36
1,39
1,39
1,41
1,36
1,29
1,03
0-30
30-60
60-90
90-120
120-150
150-180
180-210
210-240
240-270
270-300
DIO DAYS


Firm Size vs CCC Days
AVERAGE FIRM SIZE
3,00
2,50
2,00
1,50
1,00
0,50
0,00
2,68
2,80
2,67
2,52
2,42
2,29
2,23
2,12
2,02
1,98
1,93
1,81
1,81
1,52
<0
0-30
30-60
60-90
90-120
120-150
150-180
180-210
210-240
240-270
270-300
300-330
330-360
>360
CCC DAYS


Current Ratio vs CCC Days
AVERAGE CURRENT RATIO
4,50
4,00
3,50
3,00
2,50
2,00
1,50
1,00
0,50
0,00
1,28
1,65
1,85
2,14
2,37
2,63
2,82
2,98
3,22
3,48
3,37
3,51
2,93
4,01
<0
0-30
30-60
60-90
90-120
120-150
150-180
180-210
210-240
240-270
270-300
300-330
330-360
>360
CCC DAYS


Sales Growth vs CCC Days
15,00
10,00
5,00
0,00
-5,00
-10,00
-15,00
-20,00
AVERAGE SALES GROWTH
6,16
9,47
9,38
8,73
6,46
5,84
4,28
3,17
-0,11
-1,08
-5,25
-4,63
-10,67
-16,91
<0
0-30
30-60
60-90
90-120
120-150
150-180
180-210
210-240
240-270
270-300
300-330
330-360
>360
CCC DAYS

ADDITIONAL SUMMARY OF DATA

Row Labels	Min of CCC Days	Max of CCC Days	Average of Tobin	Average of Inventory Turnover Days	Average of Receivable Turnover Days	Average of Days Payable Outstanding
CANADA	-34.72	358.65	1.41	79.27	55.16	45.81
CHINA	-39.76	349.34	1.72	69.69	75.07	61.46
GERMANY	-21.24	488.63	1.47	92.92	66.72	42.08
INDIA	-48.20	438.55	1.49	82.13	75.83	56.50
INDONESIA	-40.19	401.04	1.60	87.06	57.58	42.30
JAPAN	-48.88	453.72	0.97	74.64	88.47	66.46
MALAYSIA	-31.20	437.61	1.15	81.44	77.04	38.42
MEXICO	-25.90	272.88	1.53	75.64	59.46	50.34
NETHERLANDS	-17.23	232.19	1.42	78.45	63.52	60.27
POLAND	-9.51	354.26	1.16	87.02	69.60	49.48
SINGAPORE	-17.30	393.82	0.92	72.92	88.65	53.58
SOUTH KOREA	-45.42	453.25	1.04	68.91	75.51	41.28
SWEDEN	-1.51	384.93	1.82	87.24	73.46	46.43
SWITZERLAND	-16.23	345.98	1.88	94.89	70.55	44.76
TAIWAN	-49.01	441.74	1.28	76.66	81.14	52.45
THAILAND	-3.18	336.78	1.24	79.43	59.22	37.36
TURKEY	-31.85	336.98	1.49	79.09	91.90	60.96
UNITED KINGDOM	-45.46	450.37	1.68	82.07	68.63	56.18
UNITED STATES	-48.23	351.79	1.89	85.38	55.64	41.34
VIETNAM	37.25	250.34	2.99	97.04	73.69	38.50
Grand Total	**-49.01**	**488.63**	**1.34**	**78.88**	**75.53**	**52.15**