The Impact of Working Capital Management on Firm Value: Evidence from Airline Industry

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By Limin Lai (June, 2012)*

Abstract:

This study investigates the impact of working capital management on firm value using panel data of 47 companies from airline industry that covered the period 2003-2011. Working capital management and firm value are measured by cash conversion cycle and market value separately. Results show there is a significant negative relationship between cash conversion cycle and firm value. However, the negative relationship becomes weaker after adding more control variables like-current ratio. This is due to the fact that working capital management affects firm's liquidity and finally affects its value. Based on the findings, managers can create firm value by reducing cash conversion cycle.

Keywords: working capital management, cash conversion cycle, firm value, airline industry

Data availability: all data are available from public sources identified in this paper

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Limin Lai

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Section 1 Introduction:

With the ease of economic crisis, most business in the world starts to resuscitate. Working capital management is identified as an important agent for this development. This is implied by REL[1] 2011 Europe working capital survey, which demonstrated that "most largest companies in Europe have increase their revenue by 14.9 percentage in 2010 and either maintain or increase their margin revenue, which is connect to working capital management" (p.1). Sure enough, working capital management has become an essential part of financial management nowadays. Reflecting the importance of working capital management, *Financial Director, CFO magazine* and *Handelsblatt* all have special reports on the study of working capital management performance annually.

Working capital is the difference between current asset and current liability. It is taken as the key source of internal finance and a good measure for firms' liquidity since working capital involves all the short term items on the balance sheet (Eljelly, 2004). Firm value will be maximized if the optimal level of working capital is held (Deloof, 2003). Therefore, the objective of working capital management is to keep balance of each component of working capital and try to obtain the optimal level of working capital in a firm (Fillbect, Krueger, 2005). Companies can be more financial flexible by managing their working capital effectively. On the opposite, without efficient working capital management, financial constraint will occur. The result of 2008 USA working capital survey from REL and CFO magazine shows that there are 863 dollar billions cash flow in US companies, which are not necessary tied up with working capital (REL, 2008). The worst consequence of financial constraint can lead a firm running out of sufficient cash and go bankrupt. Eljelly (2004) defines efficient working capital management as "planning and controlling current assets and current liabilities in such a manner that eliminates the risk of the inability to meet due short-term obligation on one hand and avoid excess investment on the other hand" (p.48). From the perspective of a business, one of their main goals is to maximize their value. Therefore, applying efficient working capital management should maximize firm value finally.

[1] REL is a global working capital consulting firm dedicated to delivering sustainable working capital improvement across a company's business operations.

Smith (1980) concludes that working capital management is important, because it impacts on firm's profitability and risk and finally it affects firm value. In order to obtain the efficient working capital management, there are four dimensions can be emphasized: cash management, inventory management, account receivable management and account payable management. Each dimension has its own characterizes. Tradeoff is one of the features that cannot be ignored in these dimensions. Thus, keeping balance in and among each component is a big challenge in working capital management. However, there are many proxies can be used to measure how efficiency of working capital management is, such as current ratio, quick ratio. Among those measures, cash conversion cycle, which represents how many days it takes for a firm from the day they bought their raw materials to the day they sell their finished goods, is most often used as an indication of efficiency of working capital management. Many literatures have used this measure to analyze how firm profitability is related to working capital management. Shin and Soenne (1998) study the relationship between cash conversion cycle and firm's profitability in a sample of 58,985 firms covering the period 1975-1994. The result demonstrates that a negative relationship exists between them. It means that when cash conversion cycle is shorter, firms use less time between preparing production to sell products and get cash, firms 'profitability goes higher. This relationship is confirmed by other researches, for instance, Mojtahedzadeh, Tabari and Mosayebi (2011), Deloof (2003), their study results are consistent with the finding of Shin and Soenne (1998).

Although working capital management plays a vital role in maximizing firm value, unfortunately, there are not too many empirical studies on the relationship between working capital management and firm value. With this study, I am going to fulfil this gap, and find out what the relationship between working capital management and firm value is, and how working capital management affects firm value in airline industry. I am going to do that for airline industry is because working capital plays an essential role in the daily business operation of airline industry. Based on the previous studies, a negative relationship between firm value and cash conversion cycle is expected. With this in mind, 47 companies from airline industry with 296 observations are studied. The evidence that firm value is also negatively related to cash conversion cycle in airline industry is found. The results also confirm the idea of Smith (1980) that working capital management strongly affects firms' liquidity and consequently influences its value.

Findings of this study can be beneficial for managers. It gives them more insight when they make their financial decisions, especially the decision on firm liquidity by using working capital. It also gives them insights about how to create the firm value by efficient working capital management. Investors can also gain benefits from this research. They can obtain some knowledge about how to assess a company's financial health by looking at the working capital management. Based on that, investors can make their correct investment decisions. This study is also useful for finance and accounting students. They can have a deeper look at how working capital management works and the impact of working capital management on firm value.

In the next section, the theoretical basis for this study is going to be explained. Knowledge about the working capital, working capital management, and some recent literature studies about working capital management will be presented. Following the existing literature, the hypothesis is formulated. Section 3 describes the data collection and methodology. The reasons that study only emphasize on airline industry will be explained in this section. Section 4 presents the descriptive statistics, and the result of this study. Finally, a summary of this study, limitations and implications for the future study will be described in section 5.

Section 2 Theory Background:

2.1 Theory of working Capital

Shin and Soenen (1998) define working capital as "the result of the time lag between the expenditure for the purchase of raw material and the collection of the sale of finished goods" (p.37). In theory, net working capital is defined as the difference between current asset and current liabilities. It implies that a company's short term asset, account receivable or inventories are financed by their short term liabilities (Akinwande, 2009). Thus, there are four drivers of working capital: cash, account receivable, inventory and account payable. Working capital is a significant source to provide liquidity, which is "a prediction to ensure that firms are able to meet it short-term obligations and its continued flow can be guaranteed from a profitable venture" (Padachi, 2006, p.45). However, increasing investment on working capital is considered as cash outflow since the money which invested in working capital is locked, which cannot be used in other business area (Autukaite and Molay, 2011). Therefore, a well-designed working capital management is an important part of financial management.

With an optimal level of working capital, firm value can be maximized (Deloof, 2003). But, how to reach this optimal level is the very thorny in management. To see this more clearly, I would like to present how working capital relates to firm value theoretically.

In 1958, Modigliani and Miller demonstrated that capital structure is unimportant in a perfect market. However, the market is imperfect in reality. It involves different costs, taxes and bankruptcy. All these require that firms must have an optimal capital structure to fit for their situation most in order to maximize firm value. There are several ways to evaluate firm value, for example, multiple comparison analysis, discount dividend model. The discounted cash flow model is one of the most used alternatives to evaluate firm value, which emphasizes on the current liability and current asset. The discount cash flow method is shown in the following formulas:

$$PV = \sum_{p=1}^{N} FCF_p(1+WACC)^{-p} + \frac{FCF(1+g)}{(WACC-g)}(1+WACC)^{-N}$$

Here PV is the present value of a firm; g is growth rate and WACC is weighted-average cost of capital, which is

$$\left(\frac{debt}{Total\ value} * (1 - tax\ rate) * cost\ of\ debt\right) + \left(\frac{equity}{Total\ value} * cost\ of\ equity\right)$$

FCF is free cash flow, which is calculated by

$$FCF = EBIT * (1 - tax\ rate) + Depreciation\ \&\ Amortization - \boldsymbol{changes\ in\ working\ capital} - captial\ expenditure$$

These mathematical expressions make it clearer that working capital does play an important component in the valuation of firm value. However, what exactly relationship between working capital management and firm value is, we cannot see so far.

Working capital management is the decision which deals with the relationship between short term asset and short term liabilities. With an efficient working capital management, firm's liquidity will be improved, and firm value can be maximized by having an optimal level which meets working capital demands (ACORN). With an efficient working capital management, firms can reduce the possibility of involving in financial constraints, reduce financial cost, and avoid the risk of bankruptcy (Luo, Lee, and Hwang, 2009). Autukaite and Molay (2011) admit the importance of efficient working capital management in their study. They describe that "Companies with efficient working capital management can reduce their dependence on outside funding, and use the released cash for future investment; this will then lead to more financial flexibility" (p.2). Without efficient working capital management, millions of losses can happen on a firm annually. Shin and Soenen (1998) also provide example to show the importance of efficient working capital management. They show that in the supermarket-industry Kmart, which has a comparable capital structure as competitor Wal-Mart, went broke mainly due to poor working capital management.

To make sure the optimal level of working capital management can be reached, there are four dimensions of working capital management should be considered: cash management, inventory management, account receivable management (debtor management) and account payable management (creditor management). Each element has its own characteristics. However, managers should take each component into consideration as a whole, since a trade-off exists in the relationship of each component. For instance, "a large inventory and a generous trade credit policy may lead to higher sales, large inventory and a generous trade credit allows customers to assess product quality before paying (Long, Malitz and Ravid, 1993; Deloof and Jegers, 1996)". However, "the flip side of grating trade credit and keeping

inventory is that money is locked in working capital" (Deloof, 2003). Therefore, having a good knowledge on each element of working capital management can be very helpful in financial decision making.

2.2 Working Capital Management:

2.2.1 Cash management:

In a business, having sufficient cash is very important. Cash is like the oxygen for a company to survive, company needs cash to deal with their daily operations. Padachi (2006) points out that "just as circulation of blood is very necessary in the human body to maintain life, cash flow is necessary to maintain business" (p.47). Akinwande (2009) also mentions in his study that "Cash is life blood of a business, and a manager's key mission is to assist in keeping it to flow and to take the advantage of the cash flow in making profit" (p.12). Therefore, maintaining sufficient cash can decide the destiny of a business. Cash management is mainly about the decision of cash distribution, which is also the most important component of working capital management.

Although cash does not earn profit, there are three motives for a company to hold cash:

1. Transaction motive: company needs certain level of cash to meeting their daily transactions, such as payment for supplier, salaries and son on. Cash holding ensures company to meet their regular cash outflow.

2. Precautionary motives: Sometimes, cash flow is hard for a company to predict because of the difference between the firms and industries. Cash holding can help to relieve the problem of unexpected cash needs, for instance, raised cost of raw material and default of third party.

3. Speculative motives: during the business operation, unexpected investment opportunities can raise, sufficient cash holding allows the company to take advantage of these opportunities and grow in the future.

As one can see, companies can enjoy several benefits under holding sufficient cash. However, holding excessive cash does not make good business sense, since excessive cash can earn interest if they are used in the proper investment (Banjerjee, 2005). Martinez-Sola, Garcia-Teruel and Martinez-Solano (2011) test two questions in the investigation: first,

whether there is an optimal cash level that can maximize firm value, and second whether firm value would be reduced if the cash deviates from the optimal level. Results denote that there is a concave relationship between cash holding and firm value, which means that optimal cash level that to maximized firm value, does exist. Firm value will be decreased if the cash holding is different from this optimal level. Trade-off theory can also explain that there is an optimal level of cash holding which can balance the marginal benefit and cost (Saddour, 2006). These results suggest that having optimal cash holding is the central task of cash management.

Banjerjee (2005) mentions that two constraints which decide how much cash a firm should maintain. The First is the compensating balances, which is the "cash balance required compensating for the services that are rendered by banks to the firms" (p. 213). The second is self-imposed balance, which is "determined by considering factors like the need for cash, the predictability of this need, the interest rate on marketable securities or the borrowing rate, and the fixed cost of effecting a transfer between marketable securities and cash or effecting a loan transaction" (p.213). Saddour (2006) studies the determinants of cash holding by using a sample of French firms. Results confirm that cash holding enable firms to take profitable investment opportunities, which leads to the fact that cash holding level of growth firm is higher than the matured firms. They also find that the determinants of cash holding are different between growth firms and matured firms. Cash holdings in growth companies decrease with the raise of firms' characteristics: size, level of liquid assets and sort-term debt. However, in matured firms, cash level shows a positive relationship with firm size and dividend pay-out and negative relationship with firms' research and development expenses. With In a similar study, cash holding level in firms from Canada is strongly affected by their market to book ratio, cash flow, net working capital leverage, and firm size (Gill and Shah, 2012). Bensoussan, Chutani and Sethi (2009) explain the optimization problem of meeting demands for cash over time with cash deposit in bank or invested in stock. Study shows the solutions of optimal level of cash holding a company should have under different uncertainty by using different model.

The value of cash holding and use of cash holding vary between good and bad-governed firms. This can be illustrated by looking at influence on firm value by using of cash holding in different business environment: In a poorly-governed firm, 1 dollar cash is only valued at 0.88 dollar. To be a contrast to that, in a well-governed firm, 1 dollar cash can double its price.

Firm's future performance in poorly corporate governance will be reduced since cash can be dissipated very fast. On the opposite, in well-governed firms, firms' future operating performance will get a big improvement due to the negative impact of cash holding can be cancelled out (Dittmar, Mahrt-Smith, 2006).

2.2.2 Inventory management

Usually, inventory can be decomposed by three parts: raw materials, work-in-process inventory and finished inventory. Just like cash management, inventory management also has trade-off in its management system. According to Damodaran (1997), there are three motives for a company to hold inventories. First, raw materials are held to make sure that the production process goes well and not interrupted by a shortage of raw materials. Secondly, inventories of intermediate goods appear in the middle of process, it will be used to continue process. Thirdly, holding enough finished goods is to avoid the risk of losing sales, and to avoid the large ordering and administration cost which caused by replenishing inventory. However, the down side of holding too many inventories can cause large carrying cost, for instance, storage cost, security cost, and goods obsolescence and goods perishing. Therefore, with an efficient inventory management, a lot of the risks and costs can be avoided. Singh (2008) studies the relationship between inventory management and working capital management, and he supports the importance of inventory management. He thinks that firms with a poor inventory management can cause serious problems which destroy the long-term profitability and firms' survival chances. A contrary result, with a well-thought inventory management, firm can reduce the inventory to an optimal level which has no negative effect on production and sales. The paper also denotes that the size of inventory directly affects the working capital and its management. Thus, inventory management does attract manager's attentions.

Considerable level of inventories is the main goal of inventory management. In order to find the solution for optimal inventory, Swaminathan (2001) studies the how structural reforms affects inventory management in public and private sectors in India. Findings of this paper verify that adjusting raw material and finished goods as a component of inventory is faster than the inventory as a whole to reach the reasonable level. There are some other methods that can easier inventory management, such as, order quantity method, just-in-time inventories, etc. (AutuKaite and Molay, 2011).

2.2.3 Accounts receivable management

Accounts receivable management, which is also known as debtor management, is a company giving their customers a specific credit term to pay for products or services. These credit terms, which are called trade credit, can help ease customer's financial frictions (Meltzer, 1960). Customers who buy products or service on trade credit are called sundry debtor for the company. Account receivable is a major component in business finance. In Europe country, such as Germany and Italy, account receivable is more than one quarter of their total asset (Bougheas, Mateut and Mizen, 2009). Rajan and Zingales (1995) study capital structure of firms. They show that in a sample of American firms, 17.8 percent of total assets are the accounts receivable. We can see that an efficient account receivable management is indispensable. Smith (1987) points out that providing trade credit to customers is very important to suppliers whose sales or investment depend on consumer's financing ability. Emery (1984) uses operational and financial method to explain the reasons that behind extending trade credit: firstly, extending trade credit is due to pure operating flexibility. He explains that the demand of customers is irregular since the market is imperfect. There is always a deviation from expected demand, which may cause the excess production. Temporary relaxations of credit terms allows account receivable account fluctuate correspond to the deviation in demand, which illustrates the formation of a sale queen instead of customer or products queen. Secondly, pure financial intermediary motive explicates extension of trade credit. Due to the imperfect market, firms are required to maintain liquid reserve for the unexpected needs of cash. Offering trade credit to customers can be seen as offering loan to customers, which is also a part of liquid reserve. Ferris (1981) defines trade credit as a "particular type of short term loan: a loan that is tied in both timing and value to the exchange of goods" (p. 243). Therefore, firms can receive lending rate of return from this loaned liquid reserve. Extending trade credit gives suppliers an opportunity to earn a higher rate of return than the marginal return. Hill, Kelly and Lockhart (2012) reveal that trade receivable significantly and positively affect shareholders wealth by studying all non-financial, non-utility, and SIC classifiable firms in the period 1971-2006. This result confirms the importance of a reasonable trade credit policy. However, the risks behind offering trade credit to customers are: firstly, customers may default, which causes the company to run the risk of bad debts. Secondly, company will lose the interest between time of sale and time of payment by the customer. (Damodaran, 1997)

Based on the trade-off of credit sale, controlling and managing account receivables become very important. Kumar (2010) explains the meaning of debtor management as a process of making decision which relates to the investment in the business debtors. And the aim of debtor management is to stimulate the sales and meanwhile minimize the risk of not receiving money from the debtors. If debtor management is in a poor condition, working capital ratio could be stressful which causes the needs of more capital input or increased debt (Turner Hopkins, 2009). Gillbert and Reichert (1995) find out that 59 percent firms of Fortune 500 are using account receivable management model to improve their working capital management.

In order to achieve effective account receivables management, there are two elements should be focused. On the one hand, company needs to know which credit policy is suit for their business. Credit policy gives firms a guideline about how to deal with the debtor and how much credit they should liberalize to their customers. With a liberated credit policy, the sale and profitability of a firm may increase largely, but the risk of bad debts or interest foregone may also increase. With a strict credit policy, the security and liquidity of a firm may rise, but profitability of the firm may go down. Obtaining the optimal level of security and profitability is the one task of financial manager (graph 1). On the other hand, company should know their customers well, that is what we called credit analysis. Damodaran (1997) defines credit analysis is "an analysis designed to evaluate the creditworthiness of customer" (p.378). Based on customers' capacity analysis, company can make their credit decision, which is whether to sell the products or service on credit.

2.2.4 Accounts payable management

Suppliers offer trade credit will create account receivable, opposite to that, customers accept the trade credit will generate account payable. Account payable, which occurs when firms purchase goods or services on credit, is the payment for vendors for products, services inventories and supplies. One merit of having trade credit from sellers is that company can reduce some investment in working capital management and save some resource (Damodaran, 1997). Maximizing the account payable and stretching the payment term could be a competitive advantage for firms. In the United Kingdom, on average there are 70 percentage of the total short term debt. 55 percentage of these short term debt are recorded under account payable (Kohler et al, 2000, Guariglia and Mateut, 2006). However, the risk of maximizing account payables by having a longer credit period from the supplier is that firms may not get a discount from their vendors or bad quality products or service may get from suppliers, which

can ruin the business relationship between suppliers and demanders. Finally it will affect firm's profitability (Ganesan, 2007). Some elements of account payable management, such as account payable policy, implementation of the policy and monitoring result, can help manager ensure that efficiency of account payable management reached (Sagner, 2011).

2.3 Working Capital Management Policies

Characteristics of each component of working capital management alert that the management should not underestimate the importance of working capital management. Decision of working capital management can be affected by a company's working capital management policy as well. Working capital management policy is a method of making investment by using current assets and financing firms' assets by using short-term liabilities (Bandara, and Weerakoon-Banda, 2011). Basically, there are three types of working capital policies: matching working capital policy, aggressive working capital policy and conservative working capital policy.

First, matching working capital policy is by using current asset to match current liability perfectly. It implies that company will simply keep enough cash on hand to pay for their due liabilities. Second, aggressive working capital policy is that companies usually has low account receivable and try to pay their payable as late as possible. They invest most of their asset into the investment and keep less cash on hand. Though this policy has high return, the risk is high. Third, conservative working capital policy is preferred by risk aversion. Companies under this policy usually make sure they can pay their liability on time, and they keep extra cash on hand just for the uncertainty (Kulkarni, 2011).

Firms can minimize financial risk and improve its overall performance if firms have a well-though working capital management policy by understanding the role and drivers of working capital management (Nazir, and Afza, 2009). Weinraub and Visscher (1998) investigate the relationship between aggressive and conservative working capital practice in ten diverse industry groups. They find out that industries do have significantly different policies on their working capital management, and the policy in each industry keeps stable over time. Besides this, the study also denotes that industry asset and liabilities polices have a significantly negative relationship. Nazir and Afza (2009) reiterate the importance of working capital management policies. They discussed the how working capital management policy affects

firms' profitability. A negative relationship between profitability and degree of aggressiveness of working capital policies is concluded in their research. They suggest that managers can create firm value by adopting a conservative approach in working capital management.

In recent years, working capital management policy still attracts economists' attentions. In 2011, Bandara, and Weerakoon published their research "the impact of working capital management practices on firm value". The study indicates that working capital management has impact on firms' value by studying a sample of 74 companies listed in the Colombo stocking exchange. The result is similar to the result of Nazir and Afza (2009), reveals a significant positive relationship between conservative working capital management policy and firm value. A significant negative relationship between aggressive working capital management and firm value proves that aggressive working capital management policy may destroy firm value. Moreover, the study explains that firms following match working capital management policy can generate higher value than the firms with conversion working capital management. Al-Mwalla (2012) further validates the positive relationship between conservative working capital management policy, which uses more long term debt to finance firms' activities, and firms' profitability and its value; and the negative relationship between aggressive working capital management policy, which use more short term liabilities to finance firms' activities, and firms' profitability and value. Thus, a well-designed working capital management policy can be a competitive advantage for firms to create value for their shareholders. Furthermore, in the study of Al-Shubiri (2011), he confirms that there is no significant relationship between working capital management policy and operating and financial risk.

2.4 Measures of working capital management

Since working capital management is such important for businesses, how do managers know whether their management is efficient or not? There are several ways to assess the efficiency of working capital management. The traditional way is by using liquidity ratios, for instance, current ratio, and quick ratio. The drawback of these ratios is that they are too general, there is not too much detailed information of working capital management can be reached. However, the cash conversion cycle (CCC), which is defined as the total time that a company takes from the days they bought their raw materials to the moment when they sell their finished goods, is

deemed as the best measure for working capital management. A short cash conversion cycle implies that company has a good liquidity. Firms have sufficient cash or capital to run their daily operation. If the duration of cash conversion cycle is too long, it implies that company needs more cash to finance its cycle (Mathur, 2010). Cash conversion cycle is calculated by Days Sales Outstanding (DSO) + Days Inventory Outstanding (DIO) -Days Payable Outstanding (DPO). From this equation, the performance of each dimension of working capital management can be evaluated as well. That is one of the reasons it has been used so often as the measure of working capital management. Following shows the calculation of each components of cash conversion cycle.

-Days Sales Outstanding (DSO) is used to measure how many days it takes a firm to collect their account receivable. It is calculated by account receivable (trade) / total revenue*365

-Days Inventory Outstanding (DIO) evaluates how many days does a firm take to convert their inventory to sales. It is calculated by Inventory/ cost of goods sold*365

-Days payable Outstanding (DPO) is measuring how many days a firm needs to pay for their vendors or supplier for the goods or service they use. It is calculated by account payables (trade) / cost of goods sold*365

From the perspective of Days Sales Outstanding and Days Inventory Outstanding, the result are expected to be the shorter the better, since shorter Days sales outstanding and shorter Days inventory outstanding implies that company can get cash in a short time. Opposite to the Days Sales outstanding and Days inventory outstanding, Days Payable Outstanding is expected to be longer. Basically, if firms can have a longer payment terms it can help company to reduce working capital investment. However, the disadvantages of doing this are: first, companies may lose the opportunity of discount. Second, it may cause a bad relationship with vendors. In the research of Deloof (2003), the relationship between three components of cash conversion cycle and firm's profitability are also studied. The results exhibit that a negative relationship between the numbers of days account receivable and cross operating income. Same applied to the numbers of inventory days and cross operating income in his research. The results confirm that a decrease in Days Sales Outstanding and Days Inventory Outstanding is an improvement for companies. A significant and negative relationship between Days Payable Outstanding and cross operating income (net operating income) is found in the research of Deloof (2003). This is not in line with my expected sign. The

potential reason for negative relationship between Days Payable Outstanding and profitability is the downside of paying vendors late, such as, no discount and bad quality of service, has more effects on the industry which Deloof (2003) used in his study. Garcia-Teruel and Martinez-Solano (2006) focus on the impact of working capital management on small and median firms' profitability. Outcomes are in line with the conclusions from Deloof (2003) that firm's profitability is negatively related to days account receivables and Days Inventory Outstanding. These findings mean that firms' performance or profitability can be generated by reducing the Days Sales Outstanding and Days Inventory Outstanding. Equally, Lower cash conversion cycle implies that cash move fast around the cycle and this can become a competitive advantage for firms (Autukaite, and Molay, 2011).

Net trade cycle (NTC), which is used in the study of Shin and Soenen (1998), is another measure for working capital management. Basically, NTC is similar to cash conversion cycle. Three components (account receivable, inventory and account payable) are presented as a percentage of sales (Shin and Soenen, 1998). Shin and Soenen indicate the advantage of NTC is that "it provides an easy estimate for addition financing needs with regard to working capital expressed as a function of the projected sales growth", and "NTC is also closely related to the issue of firm valuation and creation of shareholder value" (p. 38).

Research in different industries would like to use different measures of working capital management, which is proved by Filbeck and Kureger (2005). They examine the working capital performance across industries by investigating the annul rating of working capital performance of firms of CFO Magazine. The study illustrates the different measure of working capital management that is used in companies cross industries, and list how often each company within an industry change their measure of working capital measurement over time. They concluded that among industries, there is a significant difference exist regarding to the proxy of working capital management and within an industry, working capital management measures are different over time.

2.5 Strategies for improving working capital management

It is vital for leaders in treasury to know how they can improve the working capital management. Unfortunately, there is no standard solution for all firms. Features of firm decide what kind of working capital management they should apply. However, the following dimensions may give managers some insights.

Six Sigma methodologies have been recognized as a helpful method to improve working capital management. Generally speaking, "Six sigma is a disciplined, data-driven approach and methodology for eliminating defects (driving toward six standard deviations between the mean and the nearest specification limit) in any process-from manufacturing to transactional and from product to service" (six sigma, 2012). It helps companies to measure liquidity and make sure the liquidity goes well in the all areas of institution. "Six sigma methodologies can decrease the Days Sales Outstanding, accelerates the payment cycle, improves customer satisfaction and reduces necessary amount and costs of working capital needs" (Filbeck, and Krueger, 2005). Waxer (2003) tests four companies which applied six sigma methodologies. The result shows that costs saving are significant in these four companies. These savings are ranged from 1.2 to 4.5 percentage of revenue. Waxer (2003) indicates that six sigma methodologies is not a "short-cut" that allow firms to be profitability immediately. Six Sigma is a saving method which takes some times before companies be profitable if companies plan properly.

Rule (2004), the director and global head of liquidity and investments in Citigroup, gives her suggests to improving working capital management: first, liquidity management is an effective tool in managing working capital. Liquidity management has been concentrated by managers for many years, but there are two parts are emphasized: 1. the real time information integration is very important since it help the manager to know where their position is in the cash cycle, and how to make their budget for next step. 2. Invest extra money in vehicles to earn higher return instead of putting in the deposition and generate minimal interest. Second, there are some new tools, for instance, electronic invoice presentment and payment and continuous linked settlement, which can help improving working capital management.

Section 3 Literature Review and Hypothesises Formulating

3.1 Literature review

The relationship between working capital management and firms' profitability does attract many scholars' attentions. The relationship has been investigated on a sample that covers different industries and periods, giving a clear and reliable result. Besides Shin, and Soenen (1998), Deloof (2003), Gill, Biger, and Mathur (2010) test this relationship on the sample of firms listed on the New your stock exchange. And Falope and Ajilore (2009) examined this relationship on non-financial firms for the period 1996-2005. Both results show a significant negative relationship between cash conversion cycle and firm's profitability. The suggestions they gave are in line with the suggestion given by Shin and Soenne (1998) and Deloof (2003): managers can create value for firm by minimizing the number of cash conversion cycle into a reasonable level. Furthermore, no significant difference in the effect of working capital management on the firm's size is found in the study of Falope and Ajilore (2009).

How working capital management affects firms' performance on small manufacturing firms is examined by Padachi (2006). Return on asset is used to measure firms' profitability (performance) in the paper. The paper gives the relationship between working capital management and firms' profitability a further look. It can be distinguished from other papers because this study gives a detailed test on how each component of working capital management impacts on firms' performance. This can give manager more insight when making decision on working capital. The results show that higher investment in inventories and receivables, the lower the profitability is. And that cash conversion cycle is negatively reacted to the firms' profitability.

Eljelly (2004) tests the relationship between firm profitability and liquidity since working capital can be considered as an indication of firms' liquidity. Eljelly (2004) studies a sample of 929 Joint stock companies in Saudi Arabia. The big difference in his paper from the previous paper is that Eljelly uses two measures, current ratio and cash conversion cycle, for liquidity. There are two significant study results are found: firstly, firm's profitability has a negative relationship with its liquidity level, which is measured by current ratio. Second, cash conversion cycle is more important than current ratio that affects profitability as a measure of liquidity. Two study results stay stable over time in the study sample.

Cash management, as an important part of working capital management, is a hot topic for researching as well. Whether cash holding is in a reasonable level can also affect the management of working capital and firm value. Autukaite and Molay (2011) try to find out the relationship between cash holding and working capital and firm value separately. They take French listed companies as sample in their paper. The test shows that: for an extra one Euro company holds is less than one Euro for investors. The similar methodology is applied in the relationship of working capital and firm value. It shows that one Euro invested in cash or working capital is valued less than one Euro. Based on this result, the importance of cash holding and working capital management should not be underestimated by managers. However, the relationship between working capital management and firm value is not shown directly.

Most literature shows the clear and significant negative relationship between working capital management and firm profitability. Whether working capital management and firm size also has a significant relationship is still unclear. In order to find out the answer, Moss and Stine (1993) and Uyar (2009) both have a close look at this relationship. Studies show that small firms have long cash conversion cycle is concluded in both studies. The suggestion that small firms should be more motivate to have a better management on cash conversion cycles is given in these two papers. However, results from both studies are different from study of Falope and Ajilore (2009), which shows no significant relationship between working capital management and firm size. The difference can be caused by many reasons. Such as, the sample they used and methodologies they applied are different from each other.

Working capital management is under the spotlight in every country. Even though in the emerging economy, such as China in which its economy developed rapidly, working capital management still plays significant role in firms operation. Ding, Guariglia and Knight (2012) question themselves that whether good working capital management can make a difference in keeping fixed investment for firms even if when firms have cash flow fluctuation and financial constraints. They expound this question by using panel data of a sample of 116,000 Chinese firms of different ownership type covered period 2000-2007. The study exhibits that those non-state owned firms have sensitivity of investment to cash flow, which indicates that firms suffer from financial constraints. Additionally, they find out that even though with financial constraints, firms with high working capital has lower sensitive of fixed capital

investment to cash flow , which suggests an efficient working capital management can help firms to relieve the pressure of financing constraints.

Maximize firm value is one of the most important goals of working capital management. Besides this there are other priorities that managers can consider when managing their working capital. The most recent working capital management surveys which were launched RBS and Greenwich Associates, shows that building an efficient working capital management has been incorporated in most companies' strategy to ensure firm's liquidity and reduce risk. There are four biggest priorities are explored in the survey: liquidity, risk, centralization and automation. Each priority are focus differently by region, for instance, reducing risk is the on the top consideration in working capital management. However, in Asia and North American, increasing liquidity is more important than reducing risk when managing working capital. In conclusion, the survey acknowledges that part of large companies create their value by maximizing the effectiveness of working capital management. Most companies that join the survey also recognize working capital management strategy is a very important component in their financial management process. (Working capital management, 2012)

3.2 Hypothesises formulating

In the literature review, we can see that most studies have been done are about how working capital management impact on firm's profitability. All the outcomes reach a similar conclusion that: with an efficient working capital management, which is shorter cash conversion cycle, firm's profitability is higher. Autukaite and Molay (2011) and Kieschnick, Laplante, and Moussawi (2011) both study the relationship between working capital and firm's value (performance), a similar conclusion is draw from both studies that: one Euro invested in the working capital management will generate less than one Euro for the firm. . In the research of Luo, Lee and Hwang (2009), they examine how efficiency of working capital affects firm's further performance and firm's value. They find out firm value increase when working capital management is efficient, which cash conversion cycle decrease. However, how firm value reacted to working capital management has been investigated barely so far. I am wondering whether the directly relationship between working capital management and firm value exists. Therefore, in this paper, I want to explore whether the negative relationship between working capital management and firm value is visible, whether this relationship is

strongly exists, and how working capital management affects firm value in my empirical study. Based on the literature review, there are four hypothesizes will be tested in the study:

First, account receivable management is a part of working capital management. Days sales outstanding (DSO) measures firms' account receivable policy that describes what kind of credit firms can offer to clients and how long to collect account receivables. If it takes a firm shorter time to collect their account receivables, the risk of bad debt and financial constrains will decrease, which leads to a higher firm value.

Hypothesis I: There is a possible negative relationship between firm's Days sales Outstanding (DSO) and firm value. Firms with shorter Days Sales Outstanding are expected to have a higher firm value.

Second, how quick management can turn inventories into cash is described by Days Inventory Outstanding. Usually, a lower Days inventory Outstanding indicates a better performance in Inventory management since company can sell inventory fast and get rid of costs and risks. If a company takes longer time to sell its inventories, firm needs to afford carrying costs and the risk that inventory will be decadent or out of date.

Hypothesis II: There is a negative relationship exists between firm's Days Inventory Outstanding (DIO) and firm value. If a firm uses less time to convert their inventories to sales, firm value is expected to be higher.

Third**,** as an important element of working capital, account payable catches well attention from managers. Days Payable Outstanding measures how many days it takes for a firm to pay their credit. The benefit of stretching Days payable Outstanding is that it can save some working capital investment for companies. On the other side, taking a long time for a company to pay for their vendors runs the risk of having a bad business relationship with suppliers.

Hypothesis III: A positive relationship may exist between firm value and Days Payable Outstanding (DPO). Therefore, if Days Payable Outstanding (DPO) is longer, firm value is larger.

Last, based on the theory background and previous literature result, a negative relationship between firm value and cash conversion cycle is expected. Cash conversion cycle measure the length of time a firm uses between actual cash expenditure on material resource and cash

revenue from products (Eljelly, 2004). A shorter cash conversion cycles illustrates that firm has an efficient working capital management, which also indicates a better liquidity. With an efficient working capital management, firm can have sufficient cash to run their daily business and future growth investment. The risk of financial constraints can be reduced. Consequently, firm value can increase.

Hypothesis IV: **There is a possible negative relationship between firm value and working capital management (cash conversion cycle). When working capital is efficient, which is indicated by shorter cash conversion cycle, firm value can be higher.**

Section 4 Data Collection and Methodology

4.1 Data collection

The sample consists of 47 companies from airline industry. The reasons that the sample focuses on airline industry is because: airline industry is very capital sensitive. Working capital management plays an essential role in their business operation. Therefore, their performance is highly related with their working capital management. With sufficient working capital management, airline companies can maximize their financial flexibility and increase liquidity which can bring more value for firms. Without sufficient working capital, the business would run out of track very fast. Next, airline industry experience seasonal and fluctuate demand. Due to this, the movement of cash would be seasonal. Vasigh, Fleming and Mackay (2010) state that "since industry revenue is typically collected in advance, significant revenue is generated in the first two quarters of the year for travel during the third and fourth quarter. As a result, the first two quarters of the year typically generate positive working capital, while the latter two quarters experience increased costs and reduced revenue generation, resulting in cash burns during the last two quarters of the year, such cyclicality makes it critical to effectively manage working capital" (p.280). Third, in recent years, airline industry is suffering the cash crunch. For instance, Jet Airways and Air India have to expand their air-fleet by heavy borrowing. Within the airline industry, "fuel taxes, high maintenance charges and irrational ticket pricing have stretched working capital cycles creating a huge strain on the cash position of the companies" (Working capital management across industry, 2011).

The 47 companies sample is collected by using the CRSP/COMPUSTAT Merged based on annual update. In order to avoid the effect of 9.11, 2001 on the airline industry, the period is covered year 2003 to 2011. The SIC code for airline industry range from 4500 to 4599. After dropping the missing data, there are in total 296 company year observations.

4.2 Methodology

The main principle of this paper is to find out what kind of relationship between firm value and working capital management, and how working capital management affects firm value by using the sample from airline industry. The relationship will be examined by running ordinary

least square (OLS) regressions. The model is based on the model of Deloof (2003) and Padachi (2006), which are used to test working capital management's impact on firm's performance. I slightly changed the model by adding variable which measure firm value and some other control variables. The main methodologies are shown in the following:

$$MV = \beta_0 + \beta_1 * LEV + \beta_2 * TURNOVER + \beta_3 * DSO + \varepsilon_i$$

$$MV = \beta_0 + \beta_1 * LEV + \beta_2 * TURNOVER + \beta_3 * DIO + \varepsilon_i$$

$$MV = \beta_0 + \beta_1 * LEV + \beta_2 * TURNOVER + \beta_3 * DPO + \varepsilon_i$$

$$MV = \beta_0 + \beta_1 * LEV + \beta_2 * TURNOVER + \beta_3 * CCC + \varepsilon_i$$

$$MV = \beta_0 + \beta_1 * LEV + \beta_2 * TURNOVER + \beta_3 * CATA + \beta_4 * CLTA + \beta_5 * CURA + \beta_6 * CCC + \varepsilon_i$$

In **Table I**, all the variables involved in the test are presented. For the purpose of this study, firm value is measured by market value, which is defined as common share outstanding times the annual share price close. The cash conversion cycle (CCC)[2] is used as a proxy for working capital management. The longer the cash conversion cycle, the inefficient working capital management is, since there are large amount of money are blocked in working capital, which cannot be used for other purposes. Days Sales outstanding (DSO), Days Inventory Outstanding (DIO) and Days Payable Outstanding (DPO) are three components of cash conversion cycle, they are also the proxies of each element of working capital management.

In addition, there are five control variables added. LEV stands for leverage ratio, defined as total debt divided by shareholder's equity. It is used to measure firm's capital structure. It is included in the model to ensure the effect of capital structure on firm value is included. TURNOVER is the ratio between sales and current assets. It measures how efficiency that total asset can be converted to sales revenue. Current ratio (CURA), current assets divided by current liabilities, measures the firm's liquidity. Current ratio is also used in the study of

[2] Due to the feature of Airline industry that there are huge amount of deferred revenue generated each year since travelers usually book their tickets in advance, deferred revenue is considered as an important component of working capital in airline industry. Therefore, Cash conversion cycle= Days sales outstanding+ Days Inventory outstanding – Days payable outstanding – Days deferred income outstanding. Days deferred income outstanding= deferred revenue / revenue *365

Eljelly (2004), which investigates the relationship between profitability and liquidity. CLTA is the ratio of current liabilities to total assets, which is used as indication of the degree of financial policy, the higher ratio the more aggressive financial policy is (Padachi, 2006). CATA is the ratio of current asset to total assets.

Table II presents the descriptive statistics for the main variables used in the study. Over the period 2003 to 2011, the average market value in airline industry is around 2.6 billion dollars having the highest market value 34 billion dollar and lowest 0.004 billion. In the sample firms, the leverage ratio, indication of firm's structure, shows a mean value 3.4 with the maximum 302 and a minimum negative 66. The mean turnover ratio is around 4.8. However the variation in the data is quite big, since the standard deviation is 25, which means each company are quite different from each other. The current ratio, which is the measure for firm's liquidity, was on average 1.8265 with the maximum value 11.633. On average, sample firms' CLTA, the proxy of aggressive financial policy, is around 0.2624. The highest ratio is 3.8 and the lowest is 0.01. In the sample, the longest time for a firm to convert their receivable to sales is 147 days, the shortest days is less than one day. On average, the DSO is takes approximate 30 days. The mean of DIO and DPO are 24 days and 45 days separately. The mean of cash conversion cycle (CCC) is only around 2 days with the Maximum CCC is 171 days and minimum CCC is negative 480 days. The gap between the highest and lowest cash conversion cycles is around 650 days, but the volatility among each company is huge, standard deviation is 64. A negative cash conversion cycle suggests that company can still earn some profit from managing working capital instead of selling their products or service. The results illustrate a huge variation in cash conversion cycle variable.

Section 5 Empirical Analysis

5.1 Correlation analysis

With an efficient working capital management, firm value should be higher. I expect a negative relationship exists between market value and cash conversion cycle. **Table III** illustrates the person correlation coefficients for all the variables that considered in the study. The market value shows a negative relationship with DSO and DIO, which is consistent with the expected relationship. The DPO is positively related to the firm value, it shows that a firm value will go up if firms can keep their payable longer. The table shows a significant negative relationship between the firm's market value and the cash conversion cycle, measure of working capital management. This relationship confirms the hypothesis that if the time lag between purchasing the raw material to collecting the sale of finished goods is shorter, and then firm value will be higher (Deloof, 2003). The positive and significant relationship between current ratio (CURA) and cash conversion cycle (CCC) matches the result in the investigation of Eljelly (2004), and verified that "more firms with high current ratio and longer cash conversion cycle" (Eljelly, 2004). This is because that with efficient working capital management, firms' liquidity (CURA) will be improved, which is shown as lower current ratio. The negative relationship between market value and CATA, CLTA and CURA are the same as the expected relationship.

Although Pearson correlation matrix can give indications of relationship between each variable, it cannot really explain the reasons behind these relationships. For instance, it is very difficult to say it is long cash conversion cycle leads to lower firm value or lower firm value causes longer cash conversion cycle. This is also the drawback of Pearson correlation matrix. (Shin and Soenen, 1998)

5.2 Regression analysis

In order to have further investigation the impact of working capital management on firm value, regression analysis is followed. **Table IV** illustrates the results of the impact of working capital management on firm value including other control variables, which described in methodology section.

In panel A, the determinants of market value are estimated and 8 year dummies variables are included. Industry dummy variables are not involved since the sample comes from the same industry. In regression (1) to (4), the tests purely emphasize the impact of working capital management and its components on firm value.

In the regression (1), the relationship between firm value and Days Sales Outstanding, which is the proxy of company's receivable policy, is tested. The result shows a negative relationship between them. Unfortunately, this result is not significant from zero in the sample firms.

In regression (2), Days Inventory Outstanding negatively and highly significant reacts to firm value. It implies that an increase in Days Inventory Outstanding by 1 day, the firm value will decrease by 0.3235. It confirms hypothesis II that the shorter days of inventory, the larger firm value will be.

In the regression (3), a positive relationship between firm value and Days Payable Outstanding is tested, and the positive sign is consistent with the sign that I expected. However, this result is not consistent with the result in Deloof (2003), but the relationship is insignificant as the regression (1), it cannot explain too much for reality.

In the regression (4), the result does present that a cash conversion cycle is negatively related to firm value, and it is highly significant. It confirms the hypothesis IV that with an efficient working capital management, shorter cash conversion cycle, firm value will increase.

The expected signs do appear in the regression (1) to (4). Unfortunately, regression (1) and regression (3) are not significantly different from zero. Thus, Hypothesis I and III cannot be proved yet in the sample. Hypothesizes II and IV are proved by the regression (2) and (4). The negative relationships between firm value and Days Inventory Outstanding (DIO) and cash conversion cycle are tested. The findings from regression (1) to (4) alert financial mangers that they should pay attention to each component of working capital management, reduce number of day's receivable and inventory, increase the days of account payables, and try to shorter cash conversion cycle in order to add more value for firms.

In order to have a future understanding of the impact of working capital management on firm value, especially how working capital management affect firm value, regression (5) to (11) give some insight for the explanation. The intention of regression (5) to (7) is to show how

each control variables' effect on firm value. In regression (5), current asset to total asset ratio is included. CATA and firm value show a negative relationship between each other, and this relationship is significant at 1% level. It indicates that if current asset is increasing, for example, more accounts receivables and inventory, firm value can be affected negatively.

Regression (6) explores how CLTA, the proxy of financial policy, affects firm value. A negative sign is shown but it is insignificant. We observe in regression (7) that the better liquidity a firm has, which is measure by lower value of current ration, the higher firm value will be. The highly significant level suggests the importance of firm's liquidity.

Regression (8) studies effect of cash conversion cycle include considering the effect of CATA. The significant and negative relationship between cash conversion cycle and firm value is maintained. However, the significant level (T value) of CCC goes down from 2.14 to 1.66, and significant level of CATA decreases from 2.48 to 1.79 as well. This can be explained that CATA plays a role in the relationship between working capital management and firm value. The result of regression (9), which takes financial policy (CLTA) into account, does not change too much. The significant difference in regression (10) is cash conversion cycle is not significant any more after including the variables current ratio (CURA). The situation can be explained by that working capital management impact affects firm's liquidity and lastly its value. (Smith, 1980)

In order to test that working capital management affects firm liquidity and finally goes to its value, in **Table IV panel B**, the relationship between cash conversion cycle reacts and firm's liquidity is illustrated. In regression (1), a positive and highly significant relationship is observed between the number of day receivable and firm's liquidity. It exhibits that the longer days for a firm to collect their receivables, the worse liquidity a firm has, which is shown by higher current ratio. The same sign is applied in the regression (2). The Days Inventory Outstanding is positively and highly significant related to firm liquidity. It confirms that if it takes one day more for a firm to sell their inventory, firm liquidity will decrease by 0.0212 (higher current ratio). A negative relationship between Days Payable Outstanding and firms' liquidity is observed in regression (3), which is in line with the result in the **table III.** However, an insignificant relationship cannot explain too much. The result in regression (4) confirms that working capital management does affect firm liquidity. The positive and highly significant relationship between cash conversion cycle and firm's liquidity indicates that if the gap between the days a company bought their raw materials to the moment when they sell

their finished goods is shorter, the liquidity of firm is better. The firm has higher ability to pay for their debt without other cost.

The result in **Table IV panel B** confirms that with an efficient working capital management, a firm's liquidity can be improved. **Table IV panel A** regression (11) shows that liquidity has a significant relationship with firm value. This relationship shows an negative sign, which means that firms have better accounting liquidity, which shown by 1 unit current ratio decrease, firm value will increase by 0.6432.

To summarize, the results show that: working capital management does affect firm value. With an efficient working capital management (shorter cash conversion cycle), firm value can be raised. This funding is consistent with the result in Luo, Lee and Hwang (2009). Study also includes that the impact of each component of working capital management on firm value. However, only the negative relationship between Days Inventory Outstanding and firm value is proved. How working capital management affect firm value is interpreted in the empirical study as well. That is an efficient working capital management can improve firm's liquidity. firm has sufficient cash to run their business, make their investment and pay their debt without other costs. With improved liquidity, firm's financial situation become more flexible and less financial constraints. Consequently, firm value will goes up.

Section 6 Conclusion

6.1 Conclusion

A Large numbers of research and examples show that working capital management is an important part of financial management of a firm. Working capital management can therefore be expected to be as efficient as possible. Most literature proves there is a negative relationship between working capital management and firm profitability. Luo, Lee and Hwang (2009) illustrate that efficiency working capital management has lasting effect on firm performance and with efficient working capital management, cash conversion cycles is shorter, firm value is higher.

The aim of this investigation is to test whether firm value can negatively relate to cash conversion cycle in the sample of airline industry study, and how working capital management affects firm value. With this in mind, I used a sample of 296 firm years from airline industry, covering the period 2003-2011. The findings of this paper are in line with findings of Luo, Lee and Hwang (2009). Days Inventory Outstanding is negatively and significantly related to firm value, it suggests that managers can create firm value by reducing DIO. Although Days Sale Outstand and Days Payable Outstanding is not significant in the empirical tests, but theoretically speaking, minimize Day Sales Outstanding (DSO) and stretching Days Payable Outstanding (DPO) can have positive effect on firm value. The negative relationship between firm value and cash conversion cycle, which is approved in the paper, suggests manager should try to minimize cash conversion cycle to create firm value. This negatively relationship can be explained by that: working capital management is directly and closely related to firms' liquidity. Liquidity will be improved if efficient working capital management (shorter cash conversion cycle) is applied in firms. Finally, firm value can be increased due to better liquidity. The explanation also confirmed by the investigation of Bandara and Weerakoon-Banda (2011) that working capital management affects firm's profitability and liquidity before affecting firm value.

These findings are important because they show the relationship between working capital management and firm value, and the way how it affects firm value. They give managers some insights that firm value can be created by reducing the cash conversion cycle to improve the liquidity. In order to do this, reducing Days Sales Outstanding (DSO) and Day Inventory Outstanding (DIO) or increasing Day Payable Outstanding (DPO) is necessary. Findings also

give investors some insights when they evaluate firms' financial health and make their correct investment decision. Students can understand how working capital works and the importance of working capital management to firm value.

6.2 Limitation

The limitations of this study are the sample is only from airline industry firms. The finding of this study can only apply to the airline industry. Since the sample comes from airline industry and the study consider the feature of airline industry that deferred revenue is an important element of working capital. The application of the result from airline industry can be limited to other industry. Secondly, the size of sample is rather small. The accuracy of result can be affected. Due to the limitation of database, there are only 296 observation are available, this can be the drawback of study. Thirdly, there may some outliner exist in the sample, which may cause skewness in the result.

6.3 Future research

Future research can enlarge the sample of airline industry or the sample beyond the airline industry. The scope of future investigation can be extended to focus on the detail of relationship between each component of working capital management and firm value or other performance. Especially focus on Days Sales Outstanding and Days Payable Outstanding since they are not significant in this airline industry study. More proxies of firm value and working capital management can be applied into the research in order to make sure findings are more accurate.

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Tables

Table I

Description of each variable which are involved in the research and their expected signs

The variables are the following: Market Value (MV) is the product of common share outstanding times annual price closed and then divided by 1000. TURNOVER is current sales to total assets. LEV is the leverage ratio, total debt divided by shareholder's equity. CATA is the ratio of current assets to total assets. CATA is current assets to total assets. CURA, current assets divided by current liabilities, measures the firm's liquidity. DSO is Days Sales Outstanding, it is calculated by accounts receivables divided by total revenue per day. DIO is short for Days Inventory Outstanding, which is Inventory divided by cost of goods sold per day. DPO is Days Payable Outstanding that is account payables divided by cost of goods sold per day. CCC is cash conversion cycle, which is calculated by Days sales outstanding plus days inventories outstanding minus the sum of days payable outstanding and days deferred revenue outstanding.

Proxy variables	Definitions	Predicted sign
MV	Common share outstanding times annual share price closed	
TURNOVER	Sales divided by total asset	+
LEV	Total debt divided by total shareholders' equity	-
CATA	Current asset divided by total assets	-
CLTA	Current liability divided by total assets	-
CURA	Current liability dividied current assets	-
DSO	Account receivables (trade) divided by revenu per day (365)	-
CIO	Inventory divided by costs of goods sold per day (365)	-
DPO	Account payable (trade) divided by costs of goods sold per day (365)	+
CCC	DSO plus DIO minus DPO	-

MV=market value
TURNOVER=Working Capital Gross Turnover
LEV= Leverage
CURA=Current Ratio
DSO=Days Sales Outstanding
CIO=Days Inventory Outstanding
DPO=Days Payable Outstanding
CCC=Cash Conversion Cycle

Table II

Descriptive statistics

The initial sample consists of 296 firm years observations from the CRSP/COMPUSTAT Merged. The period is covered from year 2003 to 2011. This table provides descriptive statistics for the data employed in the analysis.

Variables	Observations	Mean	Std. Dev.	Min	Max
MV/1000	296	2.6131	5.0059	0.0044	34.3566
TURNOVER	294	4.7816	25.1746	0.0000	433.8784
LEV	296	3.0453	19.7398	-66.5396	302.6861
CATA	296	0.3208	0.1765	0.0571	1.0000
CLTA	296	0.2624	0.2599	0.0105	3.8179
CURA	296	1.8265	1.6033	0.1100	11.6330
DSO	293	29.8999	27.0326	0.6646	147.2924
DIO	293	15.5073	23.6997	0.0000	199.4965
DPO	294	29.8173	45.0963	0.1975	598.3193
CCC	260	2.4430	64.2615	-480.3130	171.0409

Table III

Pearson correlation coefficients

The initial sample consists of 296 firm years from CRSP/COMPUSTAT Merges for the period 2003-2011. Pearson correlation coefficient is shown in the following table. ***, **, * denotes statistical significant at the 1%, 5% and 10% two tailed levels respectively.

	MV	LEV	TURNOVER	CATA	CLTA	CURA	DSO	DIO	DPO	CCC
MV	1.0000									
LEV	0.0043	1.0000								
TURNOVER	-0.0261	-0.0080	1.0000							
CATA	-0.1451*	-0.0890	0.0254	1.0000						
CLTA	-0.0454	0.0008	0.8158	0.1888***	1.0000					
CURA	-0.1400*	-0.0853	-0.0942	0.2111***	-0.3815**	1.0000				
DSO	-0.0295	-0.0505	-0.0833	0.0047	-0.2486**	0.3915	1.0000			
DIO	-0.1549*	-0.0220	-0.0545	0.2418***	-0.1483**	0.3036**	0.4915***	1.0000		
DPO	0.0059	-0.0160	-0.0466	-0.1716***	-0.0967	-0.0303	0.4366***	0.0873	1.0000	
CCC	-0.1357*	-0.5014	-0.0067	0.2552***	-0.1072	0.4071**	0.3820***	0.5812***	-0.4997***	1.0000

Table IV

Regression analysis

The initial sample consists of 296 firm years from CRSP/COMPUSTAT Merges for the period 2003-2011. The table shows the regression result with pooled sample. In Panel A, regressions (1) to (4) test the relationship between working capital management and firm value. Regressions (5) to (11) explore how working capital management impact on the firm value. In Panel B, regressions (1) to (4) study how working capital management relate to firm liquidity. The regression also involved 8 years dummies variables which are not shown in the table. T-statistics are in parentheses and ***, **, * denotes statistical significant at the 1%, 5% and 10% two tailed levels respectively.

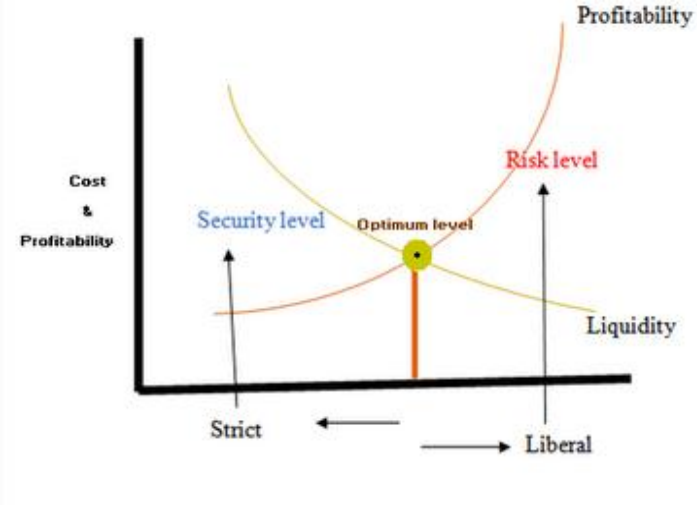
Panel A

Dependent variable:	**Market Value (MV)/1000**										
	OLS with Year Dummaries										
Regression model:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
LEV	0.0014 (0.09)	0.0007 (0.04)	0.0019 (0.12)	0.0018 (0.11)	--	--	--	-0.0012 (-0.08)	-0.0011 (-0.07)	-0.0034 (-0.21)	-0.0036 (-0.24)
TURNOVER	-0.0041 (-0.35)	-0.0057 (-0.49)	-0.0035 (-0.29)	-0.0041 (-0.33)	--	--	--	-0.0037 (-0.30)	0.0020 (0.08)	0.0309 (1.16)	0.0287 (1.19)
CATA	--	--	--	--	-4.1334*** (-2.48)	--	--	-3.4930** (-1.79)	-3.3253* (-1.63)	-1.6453 (-0.76)	-1.8867 (-0.95)
CLTA	--	--	--	--	--	-0.6804 (-0.60)	--	--	-0.6709 (-0.29)	-4.5452* (-1.56)	-4.2575* (-1.63)
CURA	--	--	--	--	--	--	-0.4648*** (-2.56)			-0.6060** (-2.23)	-0.6432*** (-2.65)
DSO	-0.0067 (-0.6)	--	--	--	--	--	--	--	--	--	--
DIO	--	-0.3235*** (-2.58)	--	--	--	--	--	--	--	--	--
DPO	--	--	0.0009 (0.14)	--		--	--	--	--	--	--
CCC	--	--	--	-0.0111** (-2.14)	--	--	--	-0.0088** (-1.66)	-0.0092** (-1.67)	-0.0056 (-0.97)	--
Year dummy variables	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Industry dummy variables	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded	Excluded
R Square	0.02	0.04	0.01	0.03	0.01	0.02	0.04	0.04	0.05	0.06	0.06

Panel B

Dependent variable:	**CURA (LIQUIDITY)**			
	OLS with Year Dummaries			
Regression model:	**(1)**	**(2)**	**(3)**	**(4)**
DSO	0.0230*** (7.07)	--	--	--
DIO	--	0.0212*** (5.53)	--	--
DPO	--	--	-0.0011 (-0.54)	--
CCC	--	--	--	0.0108*** (7.17)
Year dummy variables	Included	Included	Included	Included
Industry dummy variables	Excluded	Excluded	Excluded	Excluded
R Square	0.15	0.1	0.01	0.2

Appendix:



Graph 1 debtor management [3]

[3] The chart is strived from: http://www.svtuition.org/2010/03/debtor-management-finance.html