UTCC International Journal of Business and Economics (UTCC IJBE)
Volume 12 Number 2, August 2020

# CASH CONVERSION CYCLE AND PROFITABILITY OF FIRMS LISTED IN SET HIGH DIVIDEND 30 INDEX (SETHD)

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## Article info

**Article history:**

Received
xx August 20xx
Revised
x November 20xx
Accepted
x March 20xx

**Keywords:**

cash conversion cycle, profitability, SETHD

## Abstract

This study examined the effect of cash conversion cycle on the profitability of firms listed in SET high dividend 30 index (SETHD). Multiple regressions with fixed-effects were employed to test 460 sample data gathered from quarterly financial statements of 23 firms during 2013-2017. The findings were consistent with the existing literature. Payables deferral period positively and significantly affected net profit margin. Additionally, current liabilities to total assets ratio negatively and significantly affected net profit margin. Thus, managing working capital more efficiently by negotiating with suppliers for a longer period of trade credit as well as reducing the proportion of short-term loans with interest-bearing in firms' current liabilities can help enhance firms' profitability.

# Introduction

Working capital management is very important for firms; especially, during the economic downturn. To survive, firms must have enough capital for daily operations. One of the key checkpoints for firms' liquidity is cash conversion cycle (CCC) because it shows how many days firms will run out of cash. CCC is the summation of inventory conversion period and receivables conversion period subtracted by payables deferral period. Hence, a long period of CCC indicates weak working capital management. To manage CCC efficiently, firms have to tradeoff between liquidity and operating performance. For example, decreasing inventory conversion period too much, firms may lose sales because firms do not have enough goods to sell to customers. In addition, reducing receivables conversion period too much, firms may lose business to competitors who provide longer trade credit to customers. Moreover, increasing payables deferral period too much, firms may lose opportunity to get discounts for early payments in the future. In general, there is an inverse relationship between CCC and firm performance as suggested in the literature review section of this study.

The SET high dividend 30 index (SETHD) was launched by the Stock Exchange of Thailand on July 4, 2011 in order for investors to use as an investment reference. SETHD displays price movements of stocks that have large market capitalization, high market liquidity and high dividend yields. There is a periodic review of constituent firms in SETHD every six months in June and December. To be sustainable in business, not only small enterprises are in concern with working capital management, but also the large firms with solid fundamentals. Therefore, this study focuses on whether cash conversion cycle and its components have any effect on the profitability of firms listed in SETHD, which are large firms with high and consistent dividend payments. The results of this study are expected to benefit investors to trade the suitable stocks and firms to apply the appropriate working capital management policies.

# Literature review

The research on the relationship between working capital management and corporate profitability has been an interesting topic for decades among various countries around the world. For example, in U.S.A., Jose et al (1996) examined 2,718 listed firms during the period from 1974 to 1993. By using correlation and multiple regression techniques to analyze the data, the result of a negative relationship between cash conversion cycle and profitability was found. Moreover, Ebben and Johnson (2011) investigated a sample of 879 small U.S. manufacturing firms and 833 small U.S. retail firms during 2002-2004. They found that firms with lower cash conversion cycles generated greater profits. Mun and Jang (2015) also studied the financial data of 298 restaurant companies in U.S.A. from 1963 to 2012. A strong U-shape relationship between working capital and profitability as well as the interactive effects among working capital, cash levels and profitability were found. Thus, they suggested that a cash level is a substantial element for firms to achieve efficient working capital management.

Furthermore, in Europe, Deloof (2003) analyzed a sample of 1,009 listed firms in Belgium and found a significant inverse relationship between gross operating income and accounts receivable, inventories and accounts payable. By minimizing the number of days' accounts receivable and inventories to an optimum level, firms can enhance value for their shareholders. However, the negative relationship between gross operating income and accounts payable can be implied that firms with less profits need longer time to pay their operating debts. Additionally, in Greece, Lazaridis and Tryfonidis (2006), employed a sample of 131 firms listed in the Athens Stock Exchange (ASE) during 2001-2004. They found a negative significance between profitability and cash conversion cycle. Garcia-Teruel and Martinez-Solano (2007) studied 8,872 Spanish small to medium-sized enterprises (SMEs) for the years 1996-2002. They utilized the panel data methodology together with the robust test for endogeneity problems and found that reducing the cash conversion cycle increased firms' profitability. Recently, Lyngstadaas and Berg (2016) examined 21,075 small- and medium-sized enterprises in Norway from 2010 to 2013. They employed panel data regressions with fixed effects and a two-stage least squares analysis and found a significant relationship between cash conversion cycle and firm's profitability in the opposite direction.

Next, in Africa, Uwuigbe et al (2012) tested a sample of 15 listed manufacturing firms in Nigeria during 2005-2009 for the relationship between cash management and profitability. The results showed that increasing in the cash conversion cycle led to decreasing in the firms' profitability. In addition, Oseifuah and Gyekye (2016) examined the effect of working capital management efficiency on the profitability of 75 non-financial firms listed on the Johannesburg Stock Exchange (JSE) over the 10-year period from 2003 to 2012 by employing panel data regression methodology. A negative relationship between working capital management and profitability, a negative relationship between inventory conversion period and profitability, a negative relationship between accounts receivables conversion period and profitability, and a positive relationship between accounts payable deferral period and profitability were main findings of this study.

Lastly, in Asia, Wang (2002) investigated the relationship between liquidity management and operating performance as well as the relationship between liquidity management and corporate value of companies in Japan and Taiwan during 1985-1996. The results exhibited the negative relationship between cash conversion cycle and firms' profitability for both Japanese and Taiwanese firms despite the differences in structural characteristics and financial system. Moreover, Nobanee et al (2011) studied the relationship between cash conversion cycle and firm's performance of Japanese firms from 1990 to 2004. They found a significant inverse relationship between the cash conversion cycle duration and firm's profitability. In addition, Wasiuzzaman (2015) analyzed the relationship between working capital efficiency and firm value of 192 Malaysian firms over the years from 1999-2008. The findings from the ordinary least squared regression indicated that an increase in firm value

came from a decrease in working capital investment. Recently, Banchuenvijit (2017) assessed how working capital management affected the profitability of 15 listed firms on Market for Alternative Investment (mai) in Thailand. The multiple regression with ordinary least squared was employed on the quarterly financial data during 2011-2015. The results showed that payables deferral period and sales growth were positively related to firms' profitability. Nevertheless, current assets to total assets ratio and current liabilities to total assets ratio were negatively related to firms' profitability.

In addition to the above literature review, Singh et al (2017) studied a sample of 46 research articles on the issue of working capital management and firm profitability by applying the meta-analysis technique. Cash conversion cycle and firm profitability were found to be negatively related, suggesting the use of an aggressive working capital management policy in order for firms to make higher profits. However, most of working capital management literature focused on the developed countries such as U.S.A., European countries and Japan. The results of the study of cash conversion cycle and profitability of firms listed in SET high dividend 30 index (SETHD); therefore, will be very attractive because Thai firms' structural characteristics differ from those in developed countries. Moreover, this study will accomplish the working capital management literature, mainly, in the emerging markets.

# Methodology

## Data

The study of cash conversion cycle and profitability of firms listed in SETHD collected the quarterly relevant data from financial statements during the period from 2013 to 2017. According to SETHD constituent firms in 2018, six firms (Bangkok Bank, Kiatnakin Bank, Krung Thai Bank, The Siam Commercial Bank, Thanachart Capital and Tisco Financial Group) in banking industry and one firm (Star Petroleum Refining) with incomplete data were excluded from the sample. Thus, the final sample comprised of 23 firms (Advanced Info Service, AP (Thailand), Bangchak Corporation, Bangkok Land, Charoen Pokphand Foods, Electricity Generating, Glow Energy, Hana Microelectronics, Land and Houses, L.P.N. Development, Major Cineplex Group, PTT, PTT Global Chemical, Quality Houses, Ratchaburi Electricity Generating Holding, The Siam Cement, Siamgas and Petrochemicals, Sansiri, Tipco Asphalt, Thai Oil, TTW, Thai Union Group and Thai Vegetable Oil) with the total data set of 460. The dependent variable was net profit margin (NPM). The independent variables were cash conversion cycle (CCC), inventory conversion period (ICP), receivables conversion period (RCP), payables deferral period (PDP), natural logarithm of total assets (SIZE), current assets to total assets ratio (CATA) and current liabilities to total assets ratio (CLTA).

## Models

This study investigated the impact of working capital management, which was proxied by cash conversion cycle and its components, on the profitability, which

was proxied by net profit margin, of listed firms in SETHD by utilizing multiple regressions with the tests for fixed effects. There were 4 models employed as shown below.

Model 1:

$NPM_{it} = C + CCC_{it} + SIZE_{it} + CATA_{it} + CLTA_{it} + e_{it}$

Model 2:

$NPM_{it} = C + ICP_{it} + SIZE_{it} + CATA_{it} + CLTA_{it} + e_{it}$

Model 3:

$NPM_{it} = C + RCP_{it} + SIZE_{it} + CATA_{it} + CLTA_{it} + e_{it}$

Model 4:

$NPM_{it} = C + PDP_{it} + SIZE_{it} + CATA_{it} + CLTA_{it} + e_{it}$

## Hypotheses

The followings were hypotheses examined in this study.

Model 1:

$H_0$: None of the independent variables, consisting of CCC, SIZE, CATA and CLTA, affects NPM.

$H_1$: At least one of independent variables, consisting of CCC, SIZE, CATA and CLTA, affects NPM.

Model 2:

$H_0$: None of the independent variables, consisting of ICP, SIZE, CATA and CLTA, affects NPM.

$H_1$: At least one of independent variables, consisting of ICP, SIZE, CATA and CLTA, affects NPM.

Model 3:

$H_0$: None of the independent variables, consisting of RCP, SIZE, CATA and CLTA, affects NPM.

$H_1$: At least one of independent variables, consisting of RCP, SIZE, CATA and CLTA, affects NPM.

Model 4:

$H_0$: None of the independent variables, consisting of PDP, SIZE, CATA and CLTA, affects NPM.

$H_1$: At least one of independent variables, consisting of PDP, SIZE, CATA and CLTA, affects NPM.

In order to get the data overview, this study firstly used descriptive statistics, including mean, median, maximum, minimum and standard deviation. Next, the correlation matrix was implemented to test for multicollinearity problem. Later, hausman test for cross-section random effects was executed to test if multiple regressions with either random effects or fixed effects were appropriate to generate the results.

# Results

**Table 1** Descriptive statistics

| | **NPM** (%) | **CCC** (Days) | **ICP** (Days) | **RCP** (Days) | **PDP** (Days) | **SIZE** (Baht) | **CATA** (%) | **CLTA** (%) |
|---|---|---|---|---|---|---|---|---|
| Mean | 16.2047 | 83.9979 | 89.2963 | 23.5800 | 31.5122 | 25.1052 | 45.6937 | 23.3543 |
| Median | 11.3500 | 44.1400 | 48.2200 | 20.7350 | 28.3450 | 25.1050 | 38.0700 | 22.8900 |
| Maximum | 335.7200 | 234.0400 | 240.0000 | 82.7800 | 99.8100 | 28.4400 | 97.8200 | 62.3900 |
| Minimum | -71.3300 | -36.1500 | 0.9400 | 0.0000 | 0.7100 | 22.9700 | 8.9600 | 0.8200 |
| Std. Dev. | 22.0606 | 85.9680 | 87.0795 | 19.4428 | 19.5624 | 1.2946 | 23.6951 | 11.2823 |
| Observations | 460 | 460 | 460 | 460 | 460 | 460 | 460 | 460 |

Table 1 shows the descriptive statistics of 23 sample firms listed on SETHD during the period from quarter 1 of 2013 to quarter 4 of 2017. For the dependent variable, net profit margin (NPM) has a mean of 16.20% with the maximum of 335.72% and the minimum of -71.33%. For the independent variables, cash conversion cycle (CCC) has a mean of 84 days with the maximum of 234 days and the minimum of -36 days. Inventory conversion period (ICP) has a mean of 89 days with the maximum of 240 days and the minimum of 1 days. Receivables conversion period (RCP) has a mean of 24 days with the maximum of 83 days and the minimum of 0 days. Payables deferral period (PDP) has a mean of 32 days with the maximum of 100 days and the minimum of 1 days. Natural logarithm of total assets (SIZE) has a mean of 25.11 Baht with the maximum of 28.44 Baht and the minimum of 22.97 Baht. Current assets to total assets ratio (CATA) has a mean of 45.69% with the maximum of 97.82% and the minimum of 8.96%. Current liabilities to total assets ratio (CLTA) has a mean of 23.35% with the maximum of 62.39% and the minimum of 0.82%.

**Table 2** Correlation matrix

| | **CCC** | **ICP** | **RCP** | **PDP** | **SIZE** | **CATA** | **CLTA** |
|---|---|---|---|---|---|---|---|
| **CCC** | 1.0000 | | | | | | |
| **ICP** | 0.9787 | 1.0000 | | | | | |
| **RCP** | -0.3345 | -0.3538 | 1.0000 | | | | |
| **PDP** | 0.0634 | 0.1131 | 0.4869 | 1.0000 | | | |
| **SIZE** | -0.2643 | -0.2727 | 0.0590 | -0.0252 | 1.0000 | | |
| **CATA** | 0.6240 | 0.6201 | -0.4940 | -0.1024 | -0.4145 | 1.0000 | |
| **CLTA** | 0.1067 | 0.1567 | -0.2530 | -0.0567 | -0.2596 | 0.3756 | 1.0000 |

Table 2 exhibits correlation matrix among independent variables. The correlation between any pair of independent variables is within the range of -0.80 and 0.80 (indicating no multicollinearity problem), besides a pair of CCC and ICP. However, this study examined four separate models for each of CCC, ICP, RCP and PDP.

**Table 3** Hausman test for cross-section random effects

| Model | Chi-Sq. Statistic | Prob. | Appropriate method |
|---|---|---|---|
| (1) CCC | 19.9924 | 0.0005 | Fixed-effect |
| (2) ICP | 22.5119 | 0.0002 | Fixed-effect |
| (3) RCP | 11.4648 | 0.0218 | Fixed-effect |
| (4) PDP | 10.8752 | 0.0391 | Fixed-effect |

Since this research uses panel data, Hausman's test is employed to determine whether fixed-effect or random-effect multiple regression model is suitable. Table 3 shows the results of Hausman's test. For each model, there is a statistically significant p-value (Prob. < 0.05) so that there is the rejection of the null hypothesis that random effects model is appropriate and the acceptance of the alternative hypothesis that fixed effects model is appropriate. Therefore, the fixed-effect multiple regression model is used in this research.

**Table 4** Multiple regressions with fixed-effects

| Variable | (1)<br>Coefficient<br>(t-Statistic) | (2)<br>Coefficient<br>(t-Statistic) | (3)<br>Coefficient<br>(t-Statistic) | (4)<br>Coefficient<br>(t-Statistic) |
|---|---|---|---|---|
| Constant | -49.6355<br>(-0.3213) | -27.1754<br>(-0.1764) | -41.4058<br>(-0.2678) | -51.8602<br>(-0.3422) |
| CCC | 0.0384<br>(1.1329) | - | - | - |
| ICP | - | 0.0456<br>(1.4090) | - | - |
| RCP | - | - | 0.0247<br>(0.4079) | - |
| PDP | - | - | - | 0.1812<br>(4.0014)*** |
| SIZE | 2.2820<br>(0.3788) | 1.3718<br>(0.2281) | 1.9868<br>(0.3295) | 2.3723<br>(0.4012) |
| CATA | 0.2778<br>(1.4350) | 0.2625<br>(1.3515) | 0.3138<br>(1.6385) | 0.1932<br>(1.0151) |
| CLTA | -0.3153<br>(-1.9925)** | -0.3051<br>(-1.9857)** | -0.3077<br>(-1.9732)** | -0.2582<br>(-1.6546)* |
| R-Squared | 0.4998 | 0.5006 | 0.4985 | 0.5162 |
| F-Statistic | 16.6396 | 16.6934 | 16.5540 | 17.7687 |
| Prob(F-Statistic) | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

*** = *statistical significance at 0.01 level*
** = *statistical significance at 0.05 level*
* = *statistical significance at 0.10 level*

Table 4 displays the results of multiple regressions with fixed-effects. From model 1, F-Statistic is 16.6396 and Prob(F-Statistic) is 0.0000, meaning that at least one independent variable significantly affects net profit margin. Moreover, R-Squared indicates that all the independent variables in the model can explain the dependent variable 49.98%, the rest 50.02% can be explained by other factors. According to t-Statistics as shown in parentheses, only CLTA negatively affects NPM at 95 percent confidence level. The coefficient of CLTA is -0.3153, meaning that, when other variables are constant, one percentage change in current assets to total assets leads to 0.3153 percentage change in net profit margin in the opposite direction.

From model 2, F-Statistic is 16.6934 and Prob(F-Statistic) is 0.0000, meaning that at least one independent variable significantly affects net profit margin. Moreover, R-Squared indicates that all the independent variables in the model can explain the dependent variable 50.06%, the rest 49.94% can be explained by other factors. According to t-Statistics as shown in parentheses, only CLTA negatively affects NPM at 95 percent confidence level. The coefficient of CLTA is -0.3051, meaning that, when other variables are constant, one percentage change in current assets to total assets leads to 0.3051 percentage change in net profit margin in the opposite direction.

From model 3, F-Statistic is 16.5540 and Prob(F-Statistic) is 0.0000, meaning that at least one independent variable significantly affects net profit margin. Moreover, R-Squared indicates that all the independent variables in the model can explain the dependent variable 49.85%, the rest 50.15% can be explained by other factors. According to t-Statistics as shown in parentheses, only CLTA negatively affects NPM at 95 percent confidence level. The coefficient of CLTA is -0.3077, meaning that, when other variables are constant, one percentage change in current assets to total assets leads to 0.3077 percentage change in net profit margin in the opposite direction.

From model 4, F-Statistic is 17.7687 and Prob(F-Statistic) is 0.0000, meaning that at least one independent variable significantly affects net profit margin. Moreover, R-Squared indicates that all the independent variables in the model can explain the dependent variable 51.62%, the rest 48.38% can be explained by other factors. According to t-Statistics as shown in parentheses, PDP positively affects NPM at 99 percent confidence level, and CLTA negatively affects NPM at 95 percent confidence level. Additionally, the coefficient of CLTA is -0.2582, meaning that, when other variables are constant, one percentage change in current assets to total assets leads to 0.2582 percentage change in net profit margin in the opposite direction. The coefficient of PDP is 0.1812, meaning that, when other variables are constant, one-day change in payables deferral period makes net profit margin changes 0.1812% in the same direction.

# Conclusions and discussions

To conclude, the study of cash conversion cycle and profitability of

firms listed in SET high dividend 30 index (SETHD) used quarterly data of financial statements during 2013-2017. The findings from multiple regressions with fixed effects indicated that current liabilities to total assets ratio (CLTA) was the only independent variable in every model that inversely and statistically impacted net profit margin (NPM), at least, at 0.05 significance level. One of the reasons was that the large proportion of the sample firms' current liabilities was short-term debt with the obligation of interest payment, resulting in less profits. This negative relationship found was also consistent with Banchuenvijit (2017).

In addition, payables deferral period (PDP) positively affected NPM in model 4 at 0.01 statistical significance level, meaning that the longer the period firms took to pay their accounts payables, the higher was the firms' profits. Since the sample firms were listed in SETHD, they continuously distributed dividends to shareholders. Thus, suppliers perceived that these firms were financially trustworthy, and provided them a longer period of trade credit than usual. Otherwise, the sample firms could negotiate for a longer period of trade credit from suppliers because of their solid financial reliability. This finding aligned with Oseifuah & Gyekye (2016) and Banchuenvijit (2017).

Overall, this study indicated that firms with lower cash conversion cycle as the results of less short-term loans as well as longer period of trade credit, have higher profitability. For business implication, firms should shorten their cash conversion cycles by increasing payables deferral period to the optimal level. Firms should also be aware that deferring the period of payment too much may result in losing opportunities to receive early payment discounts for future purchases. To manage working capital more efficiently, firms should reduce the proportion of short-term loans in their current liabilities; instead, they should replace it with non-interest bearing current liabilities from operations.

Furthermore, for academic point of view, these findings not only went along with Jose et.al. (1996), Wang (2002), Deloof (2003), Lazaridis & Tryfonidis (2006), Garcia-Teruel & Martinez-Solano (2007), Ebben & Johnson (2011), Nobanee et.al. (2011), Uwuigbe et.al. (2012), Mun & Jang (2015), Wasiuzzaman (2015), Lyngstadaas & Berg (2016), Oseifuah & Gyekye (2016), Banchuenvijit (2017), and Singh et.al. (2017) but also fulfilled the literature of working capital management and firm profitability; especially, in the case of emerging markets.

However, future studies may employ the new measurement, namely working capital efficiency multiplier (WCEM) which exhibits firm's investment cost in net working capital, as suggested by Prasad et.al. (2019) to examine the relationship between working capital efficiency and firm's financial performance. Lower WCEM leads to higher working capital efficiency. Therefore, the result of an inverse relationship between WCEM and firm profitability will support the existing literature in this area. Additionally, future research can use mixed approaches of both quantitative and qualitative methods, including regressions, questionnaires, surveys and interviews to test the impact of working capital management on firm profitability.

Furthermore, future research should put the squared term of cash conversion cycle (CCC), inventory conversion period (ICP), receivables conversion period (RCP), and payables deferral period (PDP) in the model in order to test if there is a tradeoff between liquidity and operating performance in working capital management. Last but not least, to investigate the effect of all three components of CCC (i.e. ICP, RCP, and PDP) at the same time in a single model, future studies may use structural equation modeling (SEM) via treating working capital management as a latent variable which is measured by all those three components of CCC.

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