

## An empirical study on the relationship between working capital management and profitability: A case study of Mehregan Sangesar Company

Khosro Faghani Makarani<sup>a</sup> and Zahra Bineshian<sup>b\*</sup>

<sup>a</sup>Department of Accounting, Semnan Branch, Islamic Azad University, Semnan, Iran

<sup>b</sup>MA Student in Industrial Management (Finance), Semnan Branch, Islamic Azad University, Semnan, Iran

### CHRONICLE

#### Article history:

Received October 27, 2012

Received in revised format

29 January 2013

Accepted 12 February 2013

Available online

February 14 2013

#### Keywords:

Cash Conversion Cycle

Account Payable period

Inventory Turnover Period

Account Receipt Period

### ABSTRACT

This study examines the relationship between the working capital management and profitability for a real-world case study in Iran over the period 2004-2012. There are three components associated with working capital including account payable period, inventory turnover period and receivable account period. The study uses cash conversion cycle to investigate the impacts of working capital management on profitability, simultaneously. We use Pearson correlation ratios as well as regression techniques to study different hypotheses. The result indicates an inverse relationship between variables of working capital and profitability. It means if account receipt, cash conversion cycle and period of debt payment increase, the profitability of this company will decrease so managers can create more value that is positive for shareholders by decreasing period of debt payment, period of inventory turnover and period of demand collection.

© 2013 Growing Science Ltd. All rights reserved.

## 1. Introduction

Management of working capital plays an important role on increasing profitability and during the past few years, there have been growing interests on working capital management (Xu, 2012; Paul et al., 2012; Mellichamp, 2013). Ding et al. (2012) implemented a panel of over 116,000 Chinese companies of various ownership kinds over the period 2000–2007 to investigate the linkages between investment in fixed and working capital and financing constraints. They reported that those companies characterized by high working capital could manage to display high sensitivities of investment in working capital to cash flow (WKS) and low sensitivities of investment in fixed capital to cash flow (FKS). They also built some firm-level FKS and WKS measures and reported that, in spite of severe external financing constraints, those firms with low FKS and high WKS represented the highest fixed investment rates.

Corresponding author. Tel: +989123319453  
E-mail: z\_bineshian@yahoo.com (Z. Bineshian)

© 2013 Growing Science Ltd. All rights reserved.  
doi: 10.5267/j.msl.2013.02.013

Taghizadeh Khanqah et al. (2012) investigated the impact of working capital management (WCM) on the performance of some selected companies listed in Tehran Stock Exchange (TSE). They collected average collection period, inventory turnover in days, average payment period, cash conversion cycle, and net trading cycle to evaluate WCM, and net operating profitability was chosen to assess their performance. They reported that there was a negative and significant relationship between the variables of average collection period, inventory turnover in day, average payment period, net trading cycle and the performance of the companies. However, they did not find any evidence to believe the existence of any significant relationship between cash conversion cycle and the company's performances. Their results demonstrated that the increase in collection period, payment period, and net trading could lead towards the reduction of profitability in the firm.

Lind et al. (2012) used financial value chain analysis to study WCM by cycle times in the value chain of the automotive industry over the period 2006–2008. They offered a holistic view of the value chain from raw materials to the end customers. They reported that the change of cycle times of working capital followed mainly the change of cycle time of inventories. Lee and Hsieh (2013) investigated the effect of bank capital on profitability and risk in Asian banking. They implemented the generalized method of moments method for dynamic panels using bank-level information for 42 Asian countries over the period 1994–2008 to study the effects of bank capital on profitability and risk. They concluded that persistence of profit was greatly influenced by various profitability variables, and all risk variables indicated persistence from one year to the next.

Howorth and Westhead (2003) examined WCM routines of a large random sample of small firms in the UK and detected substantial variability in the take-up of 11 WCM routines using principal components analysis and cluster analysis. They detected four distinct 'types' of firms based on patterns of WCM where the first three 'types' of firms concentrated on cash management, stock or debtors routines, respectively, but the last 'type' were less likely to take-up any WCM routines. Impacts on the amount and concentration of WCM were also discussed. Their results recommended that small firms concentrated only on areas of WCM where they expected to improve marginal returns.

Bei and Wijewardana (2012) studied working capital policy (WCP) practices in Sri Lankan context by implementing multiple regression analysis (MRA) to formulate the industry's 'best practice' limit and measured firm efficiency as the detachment from that limit. They summarized the divergent properties of WCP in terms of two hypotheses including the efficiency, liquidity levels and WCP hypotheses. They used multiple regressions to examine the impact of efficiency on various parameters, which could influence on WCP. They also investigated firm performance, WCP, examined the impact of WCP and determinants of WCP and reported that the effect of various kinds of WCP practices differently influenced the firm liquidity, efficiency, profitability and capacity usage.

One of the primary concerns in privatization is to measure the effect of such decisions on improving efficiency of governmental firms. Privatization, could have positive or negative consequence in various countries. Therefore, it is important to measure the effect of privatization in Iran to understand the outcome of such decision. Miri and Aawani (2012) presented an empirical investigation to measure the financial performance of the privatized firms three years before and three years after privatization happened based on pairwise t-student. They implemented five financial factors of asset turnover, working capital turnover, return on assets, return on equity and earnings per share. Their results indicated that there was no meaningful relationship between these financial factors before and after privatization occurred.

According to Houshmand Neghabi and Morshedian Rafiee (2012), Capital structure plays an important role on market growth investigation. They investigated the relationship between capital

structure as dependent variable and seven independent variables including tax rate, firms' growth rate, fixed assets, firms' size, operating risk, profitability and industry type by using the financial information of 107 selected companies from 18 various industries listed on Tehran Stock Exchange over the period of 2004-2011. They used ordinary least square technique to investigate the relationships and reported that there was a positive relationship between tax rate and firm's growth rate, and capital structure. The result of the survey also indicated there was a negative relationship between firm's profitability and capital structure. They concluded that there was a negative relationship between firm's profitability and capital structure but the results of our survey did not indicate that there was any difference between the mean of profitability in various sectors.

## 2. The proposed study

This study examines the relationship between the working capital management and profitability for a real-world case study in Iran called Mehrگان Sangsar over the period 2004-2012.

Main hypothesis: There is a reverse relationship between working capital and profitability in terms of return on assets.

The main hypothesis consists of three sub hypotheses as follows,

1. There is a reverse relationship between receivable account period and profitability.
2. There is a reverse relationship between inventory turnover period and profitability.
3. There is a reverse relationship between account payable period and profitability.

The proposed study uses Pearson correlation ratio as well as regression analysis to examine different hypotheses of this survey. There are three independent variables and the return on assets is considered as dependent variable. The independent variables are calculated as follows,

Account payable period ( $APP$ ) = (Average payable accounts of the beginning and end of fiscal year/total purchase per year)  $\times$  365

Inventory turnover period ( $ITP$ ) = (Average inventory of fiscal year/cost of sold goods)  $\times$  365

Account receipt period ( $ARP$ ) = (Average receivable accounts of the beginning and end of fiscal year/total revenue per year)  $\times$  365

Cash Conversion Cycle ( $CCC$ ) is also calculated as  $ARP+ITP-APP$ . In addition, sales growth ( $SG$ ) is calculated as the percentage growth in sales compared with the previous year. Debt ratio ( $DR$ ) is also measured as a ratio of total firm's liabilities on total assets and current ratio ( $CR$ ) is calculated by dividing current assets by current liabilities. The proposed study of this paper considers the following four regression models,

$$ROA_{it} = \beta_0 + \beta_1 ARP_{it} + \beta_2 CR_{it} + \beta_3 SG_{it} + \beta_4 DR_{it} + \epsilon_{it} \quad (1)$$

$$ROA_{it} = \beta_0 + \beta_1 ITP_{it} + \beta_2 CR_{it} + \beta_3 SG_{it} + \beta_4 DR_{it} + \epsilon_{it} \quad (2)$$

$$ROA_{it} = \beta_0 + \beta_1 APP_{it} + \beta_2 CR_{it} + \beta_3 SG_{it} + \beta_4 DR_{it} + \epsilon_{it} \quad (3)$$

$$ROA_{it} = \beta_0 + \beta_1 CCC_{it} + \beta_2 CR_{it} + \beta_3 SG_{it} + \beta_4 DR_{it} + \epsilon_{it} \quad (4)$$

where  $\beta_0$  to  $\beta_1$  are coefficients to be estimated and  $\hat{\epsilon}_{it}$  is the residual. Eq. (1) to Eq. (4) include one independent variable and three control variables. In other words,  $CR_{it}$ ,  $SG_{it}$  and  $DR_{it}$  are control variables and  $ARP_{it}$ ,  $ITP_{it}$ ,  $APP_{it}$  and  $CCC_{it}$  are main independent variables.

### 3. The results

Before we perform any analysis on dependent variable, return on assets, Kolmogorov-Smirnov (KV) test is required to make sure about the normality of the data. In our survey the value of KV is equal to 0.147 and it is well greater than 0.05 and we cannot reject the null hypothesis bringing us to conclude that data are normally distributed and we can use linear regression analysis.

#### 3.1. The results of testing the main hypothesis

We have used regression analysis to test the first hypothesis and the results are as follows,

$$ROA_{it} = 0.424 - 0.001CCC_{it} . \quad (5)$$

The implementation of Pearson correlation ratio indicates that there is a negative and meaningful relationship between these two variables with  $r=-0.99$ . As we can observe from the results of Eq. (4), there is a negative relationship between cash conversion cycle and return of assets and R-Square is equal to 0.981, which means cash conversion cycle describes approximately 98% of the changes of return on assets. In other words, an increase of one unit in  $CCC$  will reduce  $ROA$  by  $-0.001$ . In addition, none of the control variables had any impact on  $ROA$  and we have decided to remove them from Eq. (5).

#### 3.2. The results of testing the impact of account receivable period

The implementation of Pearson correlation ratio indicates that there is a negative and meaningful relationship between these two variables with  $r=-0.934$ . We have used regression analysis to examine this hypothesis and the results are as follows,

$$ROA_{it} = 0.464 - 0.001ARP_{it} . \quad (6)$$

As we can observe from the results of Eq. (6), there is a negative relationship between  $ARP$  and  $ROA$ . The value of R-Square is equal to 0.873, which indicates account receivable period describes approximately 87% of the changes of return on assets. In other words, an increase of one unit in  $ARP$  will reduce  $ROA$  by  $-0.001$ . In addition, none of the control variables had any impact on  $ROA$  and we have decided to remove them from Eq. (6).

#### 3.3. The results of testing the impact of inventory turnover period

The implementation of Pearson correlation ratio indicates that there is a negative and meaningful relationship between these two variables with  $r=-0.996$ . We have used regression analysis to examine this hypothesis and the results are as follows,

$$ROA_{it} = 0.604 - 0.001ITP - 0.149DR_{it} . \quad (7)$$

As we can observe from the results of Eq. (7), there is a negative relationship between  $ITP$  and  $ROA$  where R-Square is equal to 0.992, which means inventory turnover period describes approximately 99% of the changes of return on assets. In other words, an increase of one unit in  $ITP$  will reduce  $ROA$  by  $-0.001$ . In addition, only one control variable,  $DR$ , had significant impact on  $ROA$  and the

other variables are removed them from Eq. (7). In summary, we have confirmed the main and all other sub hypotheses of the survey and we may conclude that there is a negative and reverse relationship between working capital components and return of assets.

### 3.4. The results of testing the impact of account payable period

The implementation of Pearson correlation ratio indicates that there is a negative and meaningful relationship between these two variables with  $r=-0.978$ . We have used regression analysis to examine this hypothesis and the results are as follows,

$$ROA_{it} = 0.405 - 0.001APP_{it} . \quad (8)$$

As we can observe from the results of Eq. (8), there is a negative relationship between APP and ROA. The value of R-Square is equal to 95%, which is relatively high value. In other words, an increase of one unit in APP will reduce ROA by -.001. In addition, none of the control variables had any impact on ROA and we have decided to remove them from Eq. (8). Table 1 summarizes the results of our survey.

**Table 1**  
The summary of testing different hypotheses

Hypothesis	Pearson	Coefficient determination	Standard	P-Value	Results	Relationship
First hypothesis	-0.99	.981	.976	0.000	Confirmed	Negative (reverse)
Second hypothesis	-0.934	.873	.841	0.006	Confirmed	Negative (reverse)
Third hypothesis	-0.996	.992	.987	0.003	Confirmed	Negative (reverse)
Fourth hypothesis	-0.978	.957	.946	0.001	Confirmed	Negative (reverse)

As we can observe from the results of Pearson correlation ratios reported in Table 1, there are some strong correlations between return of assets and independent variables. All relationships are negative and confirm that there were negative relationships between three independent variables. In other words, there are reverse relationships between account payable period, inventory turnover period, receivable account period and profitability.

## 4. Conclusion

In this paper, we have performed an empirical investigation to study the relationship between working capital components and return on assets. The proposed study of this paper has considered four hypotheses and the following concluding remarks can be stated,

1. Any reduction on the cycle of cash flow could create a positive value and increase in profitability and this could be accomplished by using better financing methods.
2. Similarly, any reduction on cycle of receivable amounts could help keep working capital in positive side and an immediate outcome is an increase in profitability.
3. Any reduction on inventory turnover will also influence profitability, significantly.
4. Finally, on the contrary to what people may think, any reduction in debt payment could help create a better image with suppliers and vendors. This could help firm build better image on industry.

## Acknowledgment

The authors would like to thank the officials of the proposed case study of this paper who cordially cooperated with authors for the accomplishment of this paper.

## References

- Bei, Z., & Wijewardana, W.P. (2012). Working capital policy practice: Evidence from Sri Lankan companies. *Procedia - Social and Behavioral Sciences*, 40, 695-700.
- Ding, S., Guariglia, A., & Knight, J. (2012). Investment and financing constraints in China: Does working capital management make a difference?. *Journal of Banking & Finance*, In Press, Corrected Proof.
- Lee, C.C., & Hsieh, M.F. (2013). The impact of bank capital on profitability and risk in Asian banking. *Journal of International Money and Finance*, 32, 251-281.
- Lind, L., Pirttilä, M., Viskari, S., Schupp, F., & Kärrri, T. (2012). Working capital management in the automotive industry: Financial value chain analysis. *Journal of Purchasing and Supply Management*, 18(2), 92-100.
- Houshmand Neghabi, Z., & Morshedian Rafiee, S. (2012). Investigating different influential factors on capital structure of different sectors of industries listed in Tehran Stock Exchange. *Management Science Letters*, 3(1), 73-80.
- Howorth, C., & Westhead, P. (2003). The focus of working capital management in UK small firms. *Management Accounting Research*, 14(2), 94-111.
- Mellichamp, D.A. (2013). New discounted cash flow method: Estimating plant profitability at the conceptual design level while compensating for business risk/uncertainty. *Computers & Chemical Engineering*, 48, 251-263.
- Miri, S.H., & Aawani, H. (2012). A study to measure the impact of privatized industries. *Management Science Letters*, 2(5), 1505-1510.
- Paul, S.Y., Devi, S.S., & Teh, C.G. (2012). Impact of late payment on Firms' profitability: Empirical evidence from Malaysia. *Pacific-Basin Finance Journal*, 20(5), 777-792.
- Taghizadeh Khanqah, V., Ghanavati, E., Akbari khosroshahi, M., & Ebrati, M. (2012). Working Capital Management and Corporate Performance: Evidence from Iranian Companies. *Procedia - Social and Behavioral Sciences*, 62(24), 1313-1318.
- Xu, J. (2012). Profitability and capital structure: Evidence from import penetration. *Journal of Financial Economics*, 106(2), 427-446