

The Relationship between Working Capital Management and Return on Assets of Companies Listed on the Stock Exchange, Cement, Lime and Plaster Industry

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Abstract: The main purpose of the research is to investigate the relationship between working capital management and return on assets of companies listed on the Stock Exchange, cement, lime and plaster industry. Therefore, four hypotheses were developed and the relationship between the average collection period of receivables, inventory turnover days, the average duration of debt and cash conversion cycle and return on assets in companies listed on the Stock Exchange cement, lime and plaster industry was studied. The period of the research was from 2009 to 2014 and the research sample includes 28 companies listed on the Stock Exchange cement, lime and plaster industry. The research hypotheses were studied based on multiple regression models using statistical software of EViews8. The end result of the test hypotheses using the multiple linear regression model indicates that there is a relationship between the average collection period and the number of days of inventory turnover and return on assets in companies listed on the stock exchange of cement, lime and plaster industry and there is not the relationship between the average duration of debt and cash conversion cycle and return on assets in companies listed on the Stock Exchange of cement, lime and plaster industry.

Keywords: Management Of Working Capital, Return On Assets, Cash Conversion Cycle.

Introduction

Working capital management includes preparing the working capital policies and then combination and integration of these policies in business operations. Working capital management consists of four components of cash, securities, inventory and receivable accounts (Brigham & Ehrhardt, 2004).

Different researchers have different views on managing working capital. Some of them focus on the management of receivable accounts, while others emphasize on efficient management of inventory in working capital management policies in order to maximize the benefits. According to the research of Raheman and Nasr (2007), working capital management directly affects the profitability and liquidity of the company. The main tool for measuring working capital management is cash conversion cycle which it is a time period from the payment for raw materials and labor and payment of accounts receivable related to the sale of the final product (Brigham & Ehrhardt, 2004). In general, shorter cash conversion cycle has more profits for the company and vice versa. It is

necessary that some evidence is obtained by performing the present study so that the issues faced by managers can be studied. Also, thinking about the following points highlights the importance of the issue.

- Now, the situation of liquidity of the company is under adverse conditions and most Iranian companies due to the inflationary situation governed in the country prefer to change cash into other assets and this causes that the companies are left in time of debts and the credit of the organization is damaged.

- Experience has shown that most of those companies faced financial distress and ultimately, the fate of some of them is ended into bankruptcy is one of the main reasons for its working capital management (Rahnamee Roudposhti & Kiaee, 2008; Yaqoubnejad et al., 2010).

Theoretical framework and research background

Working capital is assessed with different criteria and components which they are mentioned as indicators of working capital management here. Liquidity cycle is considered the main components of working capital management which include time of collection of receivables, inventory storage time and duration of payment of payable accounts (Fathi & Tavakkoli, 2009).

Collection period is the average number of days that the company collects the content from the customers. According to Long et al (1993), credit transactions and credit sales are means to attract new customers and many companies are trying to change their credit standards in order to attract new customers. In addition, the granting of concessions to customers allows them to assess product quality before paying. As a result, considering the important investments in accounts receivable by many large companies, credit management can have a significant impact on profitability and thus its value.

The period of maintaining inventory indicates the average number of days that the inventory is kept by the company. The optimal level of inventory will have a direct impact on profitability because working capital resources to invest in the business cycle will be commercial-free (Lazaridis & Tryfonidis, 2007) and the aim is to reduce costs and increase profits, while the needs of customers are answered in the most efficient manner (Koumana, 2008).

Time payment of accounts payable indicates the average time that the organization has refined its debts with its suppliers and the policies adopted towards suppliers also affect the profitability of the organization (Lazaridis Tryfonidis, 2007; Fathi & Tavakkoli, 2009).

Cash conversion cycle is referred to time distance of payment for inventory purchases and for using in the production process and receipt of cash from the sale of the final product. The longer this term is, more investment is needed in working capital. Longer cash conversion cycle may increase the profitability of the company because it leads to increasing sales. However, it is possible that by increasing the cash conversion cycle, the corporate profitability is reduced. This condition occurs when the costs resulting from increased investment in working capital are more than the benefits arising from the maintenance or granting credit to the customers (Deloof, 2003) and whatever the course is less, this reflects better liquidity position of the company (Pourheidari & Houshmand Zaferaniah, 2012).

Bahar Moqaddam et al (2011) discuss on investigating the effects of the management of working capital on the profitability of the company stock. The findings show that there is a significant and positive relationship between operational efficiency in working capital management and the profitability. There was also found a significant and positive relationship between these two variables and the profitability with regard to control, liquidity and size of the company.

Pourheidari and Houshmand Zaferaniah (2013) discuss on evaluating domestic and international studies about the relationship between working capital management and profitability in a research. The findings show that there is a significant and reverse relationship between receivables collection period, inventory turnover period and the cash conversion cycle and the profitability and the managers of the corporates can increase the profitability of the company by reducing the period of inventory turnover period and the cash conversion cycle and receivable collection. But in connection with the payment of payable accounts by the profitability, the studies in this field have not reached the same conclusion.

Setayesh et al (2008) discuss on investigating the impact of working capital management on the profitability of listed companies in Tehran Stock Exchange in this research. The findings of the study indicate a negative and significant relationship between the variables receivables collection period, inventory conversion period and the cash conversion cycle profitability of listed companies in Tehran Stock Exchange. There was no found evidence on the significant relationship between the period of payment of payable accounts and the profitability. However, there is a significant and negative relationship between profitability and cash conversion cycle which measures the joint effect of receivables collection, inventory conversion period and payment of payable accounts.

Sunday et al (2012) discuss on investigating the impact of capital management on the performance and market value of Nigerien companies. The results show that there is a significant and positive relationship between cash

conversion cycle, market value and company performance. Also, the results show that there is a positive relationship between the ratio of debt and the market value and company performance.

Niresh (2012) discusses on studying the relationship between working capital management and performance of manufacturing firms in Sri Lanka stock in a research. Regression analysis is used to analyze. The findings show that there is a relationship between the cash conversion cycle and the performance.

Javid (2014) discusses on investigating the relationship between working capital management and the performance. The findings show that small and medium-sized companies with receivable account collection period includes shorter period of payable accounts and shorter periods of inventory include more profitability and value creation for the company. However, the evidence show that cash conversion cycle and the business cycle have no impact on profitability and market value of small and medium sized companies. Control variable of leverage has a strong and positive impact on the performance of small and medium companies. The results of the analysis show that index working capital management has a tangible effect on the performance of companies studied.

Tauringana and Afrifa (2013) discuss on investigating the importance of the management of working capital and its components for profitable companies. The results show that receivable and payable account management is important for small and medium-sized profitable companies. The management of inventory and cash conversion cycle is not important for small and medium enterprises.

Research hypotheses

Research hypotheses can be formulated as follows:

Hypothesis 1: there is a relationship between the average collection period and return on assets in companies listed on the Stock Exchange of cement, lime and plaster industry.

Hypothesis 2: there is a relationship between the number of days of inventory turnover and return on assets in companies listed on the stock exchange of cement, lime and plaster industry.

Hypothesis 3: there is a relationship between the average duration of debt and return on assets in companies listed on the stock exchange of cement, lime and plaster industry.

Hypothesis 4: there is a relationship between the cash conversion cycle of the company and return on assets in companies listed on the Stock Exchange of cement, lime and plaster industry.

Materials and Methods

The study population includes all companies of manufacturing cement, lime and gypsum listed in the Tehran Stock Exchange. The research period is from 2009 to 2014. The number of samples in this study to elimination method is selected according to the following criteria:

- Information of each of the companies studied is complete.
- In order to comparability of information, the end of the fiscal year of study is 29 March.
- They are not for financial companies and investment.

Data of independent variable, dependent variable and control variable is collected using the achievements of modern software and also available financial statements of the company in Kodal.

The research models and operational definition of variables

The test model of the hypotheses is as follows:

$$ROA_{i,t} = \alpha_0 + \beta_1 ACP_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 GROWTH_{i,t} + \beta_4 DR_{i,t} + \varepsilon_{i,t}$$

$$ROA_{i,t} = \alpha_0 + \beta_1 INV_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 GROWTH_{i,t} + \beta_4 DR_{i,t} + \varepsilon_{i,t}$$

$$ROA_{i,t} = \alpha_0 + \beta_1 APP_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 GROWTH_{i,t} + \beta_4 DR_{i,t} + \varepsilon_{i,t}$$

$$ROA_{i,t} = \alpha_0 + \beta_1 CCC_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 GROWTH_{i,t} + \beta_4 DR_{i,t} + \varepsilon_{i,t}$$

In these models, $ROA_{i,t}$ is the return on assets, $ACP_{i,t}$ is the average collection period, $INV_{i,t}$ is the average inventory turnover period, APP is the average debt payment period, CCC is the cash conversion cycle of the company, $size$ is the size of the company, $GROW_{i,t}$ is sale growth and $DR_{i,t}$ is financial leverage of the company.

The method of calculating the variables is as follows:

Dependent variable

$ROA_{i,t}$: return on assets is equal to net income divided by total assets

Independent variable

$ACP_{i,t}$: the average collection period: $365 / (\text{receivable accounts} / \text{sales})$

$INV_{i,t}$: the average inventory turnover period: $365 / (\text{inventory} / \text{purchase})$

APP: the average term debt $365 / (\text{Accounts Payable} / \text{Purchase})$

$CCC_{i,t}$: cash conversion cycle: the period of debt - inventory turnover period + receivables collection period

Control variables

$SIZE_{i,t}$: company size: the log of total sales.

$GROW_{i,t}$: sale growth (sales this year - last year sales) / last year sales

$DR_{i,t}$: financial leverage of the company: total debt to total assets.

The assumptions underlying the model which are investigating the Kolmogorov-Smirnov normality test, reviewing lack of solidarity in the remainder of Watson camera statistic are used to determine homogeneity of variance (homogeneous distribution) and for the absence of co-linearity errors Arch statistics of the correlation matrix among the independent variables.

The results of the test of hypotheses

The results of the unit root test on the combined data for variables are presented in Table 1. It is observed that based on the levels, the probability of statistics for all variables Levin and Chu is less than the significance level 0.05. H_0 hypothesis is rejected. As a result of this, the variables are lack of false root and they are continuous.

Table 1. The results of the test of Levin, Lin and Chu.

Variables	Statistics test	Significance
Return on Assets (ROA)	-3.819	0.000
The average collection period (ACP)	-10.232	0.000
The average debt payment period (APP)	-10.19	0.000
The average inventory turnover period (INV)	16.401	0.000
The company's cash conversion cycle (CCC)	-8.972	0.000
Firm size (SIZE)	-1.204	0.0142
Sales growth (GROW)	-35.228	0.000
Financial leverage (DR)	-4.001	0.007

The first hypothesis test

The correlation matrix among the variables is presented in Table 2. The results suggest that the same movement among the variables is not acute.

Table 2. Pearson's correlation matrix among the independent variables of the first model.

	The average collection period	Firm size	Sales growth	Financial leverage
The average collection period	1			
Firm size	-0.243	1		
Sales growth	-0.227	0.271	1	
Financial leverage	-0.053	0.155	0.176	1

Based on the results from Table 3, the data used in this study has the ability to integrate in panel data.

Table 3. F test for the integration of data.

Null hypothesis	F calculated	F table	Result
$\delta_i = \delta$	12.5	1.51	H_1 accepted

According to Table 4, Hausman statistical probability level (0.0077) using a random effects model is rejected.

Table 4. Test using random effects panel data (Hausman test).

Test	Statistic test	Significance	Selected model
Hausman test	13.871	0.0077	Fixed model

The first hypothesis test results are given in Table 5.

Table 5. The results of statistical analysis of the model 1 (Panel data regression - fixed effects).

Variable	β	t	P-value
C	0.097	0.678	0.498
The average collection period (ACP)	-0.000	-2.378	0.0187
Firm size (SIZE)	0.053	2.336	0.0209
Sales growth (GROW)	-0.000	-0.052	0.958
Financial leverage (DR)	-0.428	-10.466	0.000
The coefficient of determination (R2)	0.553	Model adjusted coefficient of determination ((adj) R2)	0.521
Durbin-Watson (Durbin- Watson)	1.890	Kolmogorov-Smirnov	0.301
F statistic	26.763	The probability of statistic F	0.0000

According to Table 5, the adjusted coefficient of the determination of the model is 0.521 and this means that about 52 percent of the dependent variable is the explanation by the independent variables. F statistical probability value is less than 0.05; therefore, the statistical null hypothesis on the inadequacy of the model (: H0 all regression coefficients equal to zero) is rejected with the confidence 95%, as a result, the adequacy of the model to test hypotheses and to generalize the results of the sample is confirmed. According to t-statistic and the value of the possibility which for the variable mentioned 0.0187 which is less than 0.05, it is concluded that this factor was statistically significant and statistical null hypothesis is rejected and The first research hypothesis is confirmed that there is a relationship between the average collection period and return on assets in companies listed on the stock exchange of cement, lime and plaster industry. According to Table 5, the probability of Kolmogorov-Smirnov test is 0.301 that this is more than 0.05. Therefore, the normality of the residuals is confirmed with the confidence 95%. The statistical value of Durbin - Watson is equal to 1.890 and due to the fact that this amount is close to the number 2, so we can accept the independence of the residuals in the model fitted.

The second hypothesis test

According to Table 6, the correlation coefficients of less than 50% among any pair of independent variables should be considered plausible and there is not concerning about the lack of co-linearity.

Table 6. Pearson's correlation matrix among the independent variables of the second model.

	The average inventory turnover period	Firm size	Sales growth	Financial leverage
The average inventory turnover period	1			
Firm size	-0.45	1		
Sales growth	-0.32	0.41	1	
Financial leverage	0.18	-0.25	-0.15	1

Based on the results from Table 7, the method of the panel cannot be used for estimating.

Table 7. F test for the integration of data.

Null hypothesis	F calculated	F table	Result
$\delta_i = \delta$	0.11	1.51	H ₁ accepted

The second hypothesis test results are presented in Table 8.

Table 8. The results of statistical analysis of the model 2 (Panel data regression - fixed effects).

Variable	β	t	P-value
C	-0.017	-3.744	0.0003
The average inventory turnover period	0.0002	2.614	0.0098
Firm size (SIZE)	0.26	5.865	0.00

Variable	β	t	P-value
Sales growth (GROW)	0.007	1.132	0.2591
Financial leverage (DR)	-0.277	-7.587	0.000
The coefficient of determination (R2)	0.45	Model adjusted coefficient of determination ((adj) R2)	0.44
Durbin-Watson (Durbin- Watson)	2.138	Test probability	0.733
F statistic	32.99	The probability level	0.0000
Arch statistic	4.25	The probability of arch statistic	0.141

According to Table 8, the adjusted coefficient of the determination of the model is 0.44 and this means that about 44 percent of the dependent variable is the explanation by the independent variables. F statistical probability value is less than 0.05; therefore, the adequacy of the model to test hypotheses and to generalize the results of the sample is confirmed. The decision to approve or reject the hypothesis on the significance of the first variable coefficient model is the average inventory turnover period (INV). According to t-statistic and the value of the possibility which for the variable mentioned 0.0098 which is less than 0.05, it is concluded that this factor was statistically significant and the second research hypothesis is confirmed. The probability of Kolmogorov-Smirnov test is 0.733 that this is more than 0.05. Therefore, the normality of the residuals is confirmed with the confidence 95%. The statistical value of Durbin - Watson is equal to 2.138; therefore, we can accept the independence of the residuals in the model fitted. Arch statistical probability value is 0.141 that this is more than 5%, so the assumption of homogeneity of variance between the residuals will be confirmed.

The third hypothesis test

According to Table 9, the correlation coefficients of less than 50% among any pair of independent variables should be considered plausible and there is not concerning about the lack of co-linearity.

Table 9. Pearson's correlation matrix among the independent variables of the third model.

	The average debt payment period	Firm size	Sales growth	Financial leverage
The average debt payment period	1			
Firm size	0.16	1		
Sales growth	-0.12	0.12	1	
Financial leverage	0.097	0.056	-0.067	1

Based on the results from Table 10, given that f statistic calculated is smaller than F statistic of Table of H_0 hypothesis, the method of the panel cannot be used for estimating.

Table 10. F test for the integration of data.

Null hypothesis	F calculated	F table	Result
$\delta_i = \delta$	0.10	1.51	H_0 accepted

The third hypothesis test results are presented in Table 11.

Table 11. The results of statistical analysis of the model 3 (Panel data regression - fixed effects).

Variable	β	t	P-value
C	0.203	3.96	0.000
The average debt payment period (APP)	-4.73	-1.75	0.082
Firm size (SIZE)	0.107	3.299	0.001
Sales growth (GROW)	0.011	1.45	0.1489
Financial leverage (DR)	-0.134	-4.002	0.000
The coefficient of determination (R2)	0.18	Model adjusted coefficient of determination ((adj) R2)	0.16
Durbin-Watson (Durbin- Watson)	1.69	Test probability	0.806
F statistic	8.55	The probability level	0.0000
Arch statistic	0.49	The probability of arch statistic	0.48

According to Table 11, the adjusted coefficient of the determination of the model is 0.16 and this means that about 16 percent of the dependent variable is the explanation by the independent variables. F statistical probability value is less than 0.05; therefore, the adequacy of the model to test hypotheses and to generalize the results of the sample is confirmed. The decision to approve or reject the hypothesis on the significance of the first variable coefficient model is the average debt payment period (APP). According to t-statistic and the value of the possibility which for the variable mentioned 0.082 which is more than 0.05, it is concluded that this factor was not statistically significant and the third research hypothesis is rejected. The probability of Kolmogorov-Smirnov test is 0.806 that this is more than 0.05. Therefore, the normality of the residuals is confirmed with the confidence 95%. The statistical value of Durbin - Watson is equal 1.69; therefore, we can accept the independence of the residuals in the model fitted. Arch statistical probability value is 0.48 that this is more than 5%, so the assumption of homogeneity of variance between the residuals will be confirmed.

The fourth hypothesis test

According to Table 12, the correlation coefficients of less than 50% among any pair of independent variables should be considered plausible and there is not concerning about the lack of co-linearity.

Table 12. Pearson's correlation matrix among the independent variables of the fourth model.

	The average cash conversion cycle (CCC)	Firm size	Sales growth	Financial leverage
The average cash conversion cycle (CCC)	1			
Firm size	0.054	1		
Sales growth	0.093	0.207	1	
Financial leverage	0.148	0.11	0.17	1

Based on the results from Table 13, given that f statistic calculated is smaller than F statistic of Table of H_0 hypothesis, the method of the panel cannot be used for estimating.

Table 13. F test for the integration of data.

Null hypothesis	F calculated	F table	Result
$\delta_i = \delta$	0.09	1.51	H_0 accepted

The fourth hypothesis test results are presented in Table 14.

Table 14. The results of statistical analysis of the model 4 (Panel data regression - fixed effects).

Variable	β	t	P-value
C	-0.02	-5.191	0.000
The company's cash conversion cycle (CCC)	8.39	0.399	0.69
Firm size (SIZE)	0.04	7.507	0.000
Sales growth (GROW)	-0.006	-0.704	0.4823
Financial leverage (DR)	-0.19	-5.363	0.000
The coefficient of determination (R2)	0.52	Model adjusted coefficient of determination ((adj) R2)	0.51
Durbin-Watson (Durbin- Watson)	2.08	Test probability	0.864
F statistic	36.68	The probability level	0.0000
Arch statistic	0.408	The probability of arch statistic	0.524

According to Table 14, the adjusted coefficient of the determination of the model is 0.51 and this means that about 51 percent of the dependent variable is the explanation by the independent variables. F statistical probability value is less than 0.05; therefore, the adequacy of the model to test hypotheses and to generalize the results of the

sample is confirmed. The decision to approve or reject the hypothesis on the significance of the first variable coefficient model is the company's cash conversion cycle (CCC). According to t-statistic and the value of the possibility which for the variable mentioned 0.69 which is more than 0.05, it is concluded that this factor was not statistically significant and the fourth research hypothesis is rejected. The probability of Kolmogorov-Smirnov test is 0.864 that this is more than 0.05. Therefore, the normality of the residuals is confirmed with the confidence 95%. The statistical value of Durbin - Watson is equal 2.08 and given that this value is close to the number 2, so, we can accept the independence of the residuals in the model fitted. Arch statistical probability value is 0.524 that this is more than 5%, so the assumption of homogeneity of variance between the residuals will be confirmed.

Discussion and Conclusion

The main purpose of the research is to investigate the relationship between working capital management and return on assets of companies listed on the Stock Exchange, cement, lime and plaster industry. In the first hypothesis, there is a relationship between the average collection period and return on assets in companies listed on the Stock Exchange of cement, lime and plaster industry. Due to the variable coefficient average collection period which is (-0.00), this means that there is a negative relationship between the average collection period and return on assets. Therefore, by reducing the average collection period, return on assets is increased. Credit transactions and credit sales are some means to attract new customers and many companies are trying to change their credit standards in order to attract new customers. In addition, the granting of concessions to customers allows them to assess product quality before paying. As a result, considering the important investments in accounts receivable by many large companies, credit management can have a significant impact on profitability and thus its value. This result is consistent with the results of Bahar Moqaddam et al (2011), Pourheidari and Houshmand Zaferaniah (2013), Setayesh et al (2008) and Javid (2014). In the second hypothesis, there is a relationship between the number of days of inventory turnover and return on assets in companies listed on the stock exchange of cement, lime and plaster industry. This result is non-consistent with the results of Bahar Moqaddam et al (2011), Pourheidari and Houshmand Zaferaniah (2013), Setayesh et al (2008) and Javid (2014). Due to the variable coefficient of the average inventory turnover period which is (0.0002), this means that there is a positive relationship between the average inventory turnover period and return on assets. Therefore, by increasing the average inventory turnover period, return on assets is increased.

In the third hypothesis, there is not a relationship between the average duration of debt and return on assets in companies listed on the stock exchange of cement, lime and plaster industry. This shows that the policies adopted by the companies on receiving debt of people do not effect on the profitability of the company. This result is consistent with the studies of Pourheidari and Houshmand Zaferaniah (2013), Setayesh et al (2008) and is not consistent with the studies of Bahar Moqaddam et al (2011) and Javid (2014).

In the fourth hypothesis, there is not a relationship between the cash conversion cycle of the company and return on assets in companies listed on the Stock Exchange of cement, lime and plaster industry. While longer cash conversion cycle may increase the company profitability which results in increasing sales, however this may reduce the corporate profitability by increasing the period of the conversion cycle into the cash and there was no significant relationship between these two variables. The lack of the significant relationship between cash conversion cycle and return on assets is that the companies did not realize the importance of working capital as a basic requirement to create an optimal position liquidity which this is vital for living the organization and this has been effective as a resource on financial performance of the organization and results in increasing the profitability of the organization. This result is consistent with the studies of Javid (2014) is not consistent with the studies of Bahar Moqaddam et al (2011), Pourheidari and Houshmand Zaferaniah (2013), Setayesh et al (2008), Niresh (2012).

According to the results of research, the following recommendations are presented:

1. According to the first hypothesis and its results, the managers are suggested that they reduce their receivables collection period to the possible minimum and they benefit the positive effects of increased profitability through this.
2. According to the second hypothesis, one of the items affecting the cash conversion cycle is Inventory Company. Optimize inventory management can increase the company cash balance while reducing storage costs.
3. According to the third hypothesis, contrary to the general impression of people that the delay in the payment of accounts payable is considered as a positive step towards improving profitability, the companies are suggested that to achieve profitability, time period of the payment of accounts payable be minimized.
4. According to the fourth hypothesis and its results, it can be said that the managers can create positive value and profitability for their shareholders by reducing the cash conversion cycle as much as possible and this requires

cash planning and effective administration of collections and payments and appropriate utilization of investment opportunities and financing services.

Conflict of interest

The authors declare no conflict of interest

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