The Study of Cash Conversion Cycle effects on Return on Asset (ROA)

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Abstract
The purpose of this study is to investigate the effect of Cash Conversion Cycle on Return on Asset. In this regard, This study has used Cash conversion cycle index and other control variables such as Financial leverage And GDP index for the accepted companies in Tehran Stock Exchange during 2009-2009. Based on the results of this study, the effect of cash conversion period index on total assets for total companies, will be accepted And it can be said, that cash conversion period has a negative effect on the ROA. But by separation of firms in different industries, the effect is different. Also, the control variables, GDP index have a significant effect on the ROA.

Keywords: Cash Conversion Cycle, Return on Asset, pooling data

1. Introduction

The investors in stock market are always seeking for high earnings. They purchase those stocks that are the best and appropriate the highest earnings and return for themselves. Thus, they purchase and hold such stocks. Performance assessment system determines whether managers' activities accord with stockholders' demands, or in other words, whether their goals were convergent with those of stockholders' benefits and to what extent they have been successful in creating value and wealth for the stockholders (Yahyazadeh, Shams, Larimi, 2010).

Return on assets measures return amount of a firm due to its assets (investment of stockholders on stocks) and is a criterion of earnings and return efficiency. In fact, return on assets helps the investors realize whether a company is an efficient and innovative machine or is suffering from inefficiency. Those firms that are able to receive earnings in return to their operations are more privileged than others due to earnings' payment and creation of return for the investment. This relationship between firm's profitability and earning return on the part of the investors, causes return on assets to be considered as a valuable criterion for analyzing firms. Meanwhile, liquidity is highly important as an effective factor in return on assets that have been specifically noticed by financial managers in firms. Of course some believe that liquidity is more important and believe that if a company is not profitable, it is ill, but if it does not have liquidity, it is dying. In other words, there is a probability that a firm is not profitable and is continuing to its survival, but it can not continue survival without liquidity. Here, cash change period index is used as one of liquidity indexes that has been posed as a critical element in flowing capital management. By cash change period we mean a certain time period between liabilities and cash collection from the items receivable. The shorter period for this would create a better firm (Richard, Laglin, 1980).

Regarding the importance of investment and preparing the investors to make appropriate decisions, it seems to be necessary to investigate about effective factors on investors' decisions. Here return on assets, as an influential factor, is highly important regarding making rationale decisions about investment's importance. The present research is going to try the effect of cash changes into return on assets. Regarding the importance of the issue, in this article we have tried to use the most recent statistical methods whose precision is many folds more than those traditional methods. Thus, the following hypotheses have been devised.

1.1 Main hypothesis:

There is a meaningful relationship between cash change period and return on assets.

1.2 Minor hypotheses:

- There is a meaningful relationship between leverage and return on assets.
- There is a meaningful relationship between gross domestic production (GDP) and return on assets.

2.Research literature:

2.1. Theoretical research:

Return on assets shows the capability of management in efficient use of assets and is mainly affected on operational change section. This criterion, along with liabilities' ratio (the amount of using financial leverage using financial leverage) forms a specific Dupont system. If surplus assets are utilized, it seems as if operating costs have increased. One of the most important advantages of return on assets' rate formula is that managers should control operating assets. They always control operating assets by controlling costs, net profit rate and sales' amount. Return on assets' ratio is gained by dividing net earnings to total assets (Sehhat, Shariat Panahi, Mosaferi Rad, 2011).

Equation (1): return on assets = net earnings / total assets

Return on assets says how much earning has been realized of your invested assets. Return on assets is strongly dependent on the industry and due to this when return on assets is used as an index to make comparison, it would be better to do a similar comparison against the amount of past assets of the firm or return on assets of the other firms.

2.2. Cash change period index:

Cash change period has been defined as the net time interval between liability payments and cash receipt from accounts receivable. The shorter period will represent a better liquidity. The formula to calculate the cash change period index is as follows: (Richard Laglin, 1980)

$$CC = OC - PP \quad (1)$$

$$OC = INVP + RP \quad (2)$$

$$PP = \frac{PA}{DCOGS} \quad (3)$$

PP = delay period in paying accounts payable

OC = operating period

CC = cash change period

RP = collection of receivables period

INVP = inventory holding period

PA = residual of accounts payable

DCOGS = daily cost of good sold (COGS/360).

Cash change period shows how long does it take to change cash spent in operations into cash. The less the interval, there would be more liquidity in the company (Jahankhani, Talebi, 1999).

2.3. Experimental literature:

Kamyabi & et al (2014) concluded in their research on the relationship between fluctuations in cash flow and cash flows sensitivity with dividends policy in Tehran Stock Exchange that there is not a meaningful relationship between cash flow fluctuations and dividends policy. Also the research results showed there has not been any relationship between cash flows sensitivity and dividends policy.

Ghaderi & et al (2014) used time series data for the years between 1988 and 2011 by utilizing banks test method and self-regression with distributive delays (ARDL) to test the relationship between liquidity index and profitability in Iran Khodro Company. Their research results showed that the traditional indexes of immediate ratio and current ratio have had a negative effect on profit per share but the novel and modern indexes of liquidity have had a positive effect on earnings per share in Iran Khodro Company.

Also Alimoradi & Najjar (2013) studied about the effect of surplus flowing capital investment on surplus stock return as an index of value creation for the stockholders in a research entitled: "Studying the relationship between surplus flowing capital and surplus stock return in firms enlisted in Tehran Stock Exchange". They concluded that there has been a negative and meaningful relationship between surplus investment on net operational flowing capital and stock return surplus. Also findings showed that in leverage companies, cash holding will increase stockholders' wealth compared with surplus investment on net operational flowing capital.

Ahmadpour & Ebrahimpour (2012) studied about the effect of main financial and economic indexes on profitability of firms enlisted in Tehran Stock Exchange (automobile industries and machinery manufacturing, chemical and medicine industries) based on annual financial statements of 62 firms for the time period between 2005 and 2009. On the whole, the evidences of their research showed that there has been a meaningful relationship between leverage, sales growth, average stock price, gross domestic product, and profitability. But there has not been a relationship between liquidity and profitability.

Darabi & Molaee (2011) studied about the effect of different factors on profitability in Mellat Bank in a paper about the effect of variables such as liquidity, inflation, capital maintenance, gross domestic product on profitability in Mellat Bank. Their research results approved a relationship between liquidity and profitability.

Asadi & Azizi Basir (2008) investigated about the relationship between profitability and liquidity in firms and its effect on dividends. Results of their research showed a strong relationship between profitability and dividends, a weak relationship between liquidity and dividends, and there was any effect imposed by the industry on dividends (Asadi & Azizi Basir, 2008).

Sonen (1993) studied the relationship between profitability and liquidity on 5043 American firms in 20 industries during the time period between 1970 and 1979 in a research on cash change period and firms' profitability. Results of this research showed a negative and meaningful relationship between profitability and liquidity.

Smith & Bijman (1997) carried out a research entitled: "measuring the relationship between flowing capital and investments' return" on 135 firms enlisted in Johannesburg Stock Exchange during the years between 1984 and 1993 to investigate about the relationship between liquidity and profitability. Their research results showed that current and immediate ratios as liquidity indexes have had a positive relationship with return on assets' ratio. Also, they showed that there has not been a meaningful relationship between cash changing period and return on assets.

Wang (2003) in a research paper entitled: "operating performance of liquidity management and firm value: evidences from Japan and Taiwan", studied the relationship between liquidity and profitability and firm value on 1555 firms in Japan and 275 firms in Taiwan during the years between 1985 and 1996. The results of research showed that there has been a negative and meaningful relationship between cash change period and profitability index. Additionally, adventurous liquidity management happening as a result of a reduction in cash change period leads to firm's performance enhancement and therefore firm value will be increased.

Aljili (2004) in a study entitled: "liquidity-profitability balance: an experimental study of a newly emerged market", investigated about the relationship between liquidity and profitability in 29 corporate companies in Saudi Arabia during the years between 1996 and 2000. His research results showed that within all companies there has been a negative

relationship between profitability (return on sales) and liquidity level of firms measured by current and cash change periods. Also, studying the results in industry level showed that cash change period compared to current ratio have had a more important effect on firms' profitability and firm size should be considered as an important factor.

Ramachandran & Jana Kiraman (2009) studied the relationship between efficiency of flowing capital management and earnings before tax and interest in paper industry in India for the time periods between 1997-1998 and 2005-2006. Their research results showed that there has been a positive and meaningful relationship between liquidity and earnings. Also there has been a negative and meaningful relationship between accounts receivable collection period and firms' earnings.

Savatachaterji (2010) studied the effect of flowing capital management on profitability in 30 firms enlisted in London Stock Exchange during the time period between 2006 and 2008. Results of his research showed that there has been a positive meaningful relationship between firm size and profitability but there has been a negative meaningful relationship between liquidity and profitability of firms.

Dang & Sue (2010) investigated about the effect of flowing capital management on profitability of firms enlisted in Vietnam Stock Exchange for the time period between 2006 and 2008. In this article the relationship between cash change and liquidity on firms' profitability was studied. The results showed that there has been a negative meaningful relationship between cash change cycle and profitability. Also there has been a negative meaningful relationship between liquidity and profitability of these firms.

3. Clarification and model estimation:

The present study has used panel data method to investigate about the relationship between cash change period and return on assets. The model utilized was as follows:

$$\begin{aligned} &ROI_{it} = \beta_1 + \beta_2 CC_{it} + \beta_3 FL_{it} + \beta_4 GDP_{it} + \varepsilon_{it} \\ &\quad i = 1,2,\ldots,N \\ &\quad t = 1,2,\ldots,T \\ &\beta_2 < 0, \beta_3 > 0, \beta_4 < 0, \end{aligned} \qquad (4)$$

The model variables were as follows:

ROI_{it}: return on assets of firm i during Tth. year

CC_{it}: cash change period index of firm i during Tth. year

FL_{it}: financial leverage of firm i during Tth. year

GDP_{it}: gross domestic product of firm i during Tth. year

The pattern mentioned was estimated using the strong panel technique. To select from among pooled least square method, fixed effects method, and random effects method we have used Chaw's test, Brecsh Pagan's test, Lagrange's coefficient (LM), and Haussmann's test. To estimate model and carry out the tests we have used Strata11 and Eviews7 software.

3.1. Research methodology:

The present research is applied and it has used a multiple variable regression method and economy measurement models. The research hypothesis was tested based on pooled data and the statistical analyses have been carried out using Strata11 and Eviews7 software.

Regarding the research topic, the statistical population of the present study has been sampled in a non-random mode from among all firms enlisted in Tehran Stock Exchange that have had the following characteristics:

1) The end of fiscal year should be on 20th of March (29 Esfand) and they should have been accepted in bourse before 1998.
2) They should not be from among investment, holding firms, and banks.
3) The stock of firms should have been exchanged at least for 6 months in a year and they should not have had transaction stops for more than 2 months.
4) The data about the firms should be accessible.

The statistical population was chosen to be 191 firms enlisted in Tehran Stock Exchange from 15 different industries. It should be noted that due to quantitative reasons certain numbers of firms in different industries have been chosen to be investigated to test our research hypotheses.

The results are summarized below:

Table (1): Industries

No.	Industry type	Number of firms
1	Automobile and kit manufacturing	15
2	Other machinery and electrical machines	6
3	Basic metals	17
4	Other non-metal mineral products	14

5	Materials and medicine products	21
6	Metallic products	5
7	Sugar and cube sugar	10
8	Oil, coal, and nuclear fuel	5
9	Ceramics and tile	6
10	Chemical products	31
11	Metal mineral extraction	5
12	Plastic and rubber	8
13	Cement, lime, plaster	19
14	Foods and drinks except sugar	18
15	Machinery and equipments	11
Total		191

3.2. Research findings for all firms:

In first stage and in order to recognize whether our model uses pooled data model or a model with fixed effects or a model with random effects, we studied the firms based on Chaw's test, Lagrange's coefficient (LM) test, and Haussmann's test. Table (2), has presented the results of Chaw's test, Lagrange's coefficient (LM) test, and Haussmann's test for all firms. Based on models mentioned, fixed effects model has been selected.

Table (2): Results of Chaw, Lagrange coefficient, and Haussmann's test

Model	Test type	Test statistic	Meaningfulness level	Test result
Total firms	Chaw's test	21.42	0.0000	fixed effects' model approved against pooled data model
	Lagrange's coefficient test	2201.2	0.0000	random effects' model approved against pooled data model
	Haussmann's test	34.21	0.0000	fixed effects' model approved against

				random effects model

Based on results in table (2), the research model for all firms using fixed effects and the estimation results have been presented in table (3).

Table (3): Results of model estimation for all firms

Dependent variable: return on assets			
Descriptive variable	**Testing pooled data**		
	coefficient	**t statistic**	**P-Value**
Cash change period index	-0.013	-2.48	0.0074
Financial leverage	0.00033	-6.56	0.0002
Gross domestic product index	0.0039	1.57	0.5348
F statistic	489.42		
P-Value	0.0000		
R^2	0.8372		
Adjusted R^2	0.8235		
Durbin-Watson statistic	1.89		

Based on table (2), the usual F statistic test showed the meaningfulness of the whole regression. Also in the selected model we have R^{-2}=0.82 that shows the descriptive variables could explain 82 percent of the changes in dependent variable. Also Durbin-Watson statistic is between 1.5 and 2.5 and this shows that there has not been self-correlation problem between utterances in the estimation model.

As it was represented in table (2), cash change period index coefficient was negative and statistically meaningful. Therefore, the first research hypothesis was approved regarding all firms. Based on other results, financial leverage coefficient was positive and it was meaningful in %1. Gross domestic product coefficient was positive and statistically meaningful.

3.3.Research findings based on industry effect:

In this part we dealt with estimating the relationship between cash change period and return on assets based on industry type. Thus, 15 different industries were taken into consideration.

Like the previous section first we carried out Chaw's test, Lagrange's coefficient (LM) test, and Haussmann's test.
Table (4) shows the results of Chaw's test, Lagrange's coefficient (LM) test, and Haussmann's test. Based on tests mentioned, for each group of 15 industries we have chosen fixed effects model.

Table (4): Results of Chaw, Lagrange coefficient, and Haussmann's test

Model	Test type	Test statistic	Meaningfulness level	Test result
Total industries	Chaw's test	459.75	0.0000	fixed effects' model approved against pooled data model
	Lagrange's coefficient test	642.85	0.0000	random effects' model approved against pooled data model
	Haussmann's test	5.32	0.0973	fixed effects' model approved against random effects model

Based on results in table (4), the research model for all industries using fixed effects and the estimation results have been presented in table (3).

Equation (6)

$$ROI_{it} = \beta_1 + \beta_2 CC + \beta_3 CC \times D_1 + \beta_4 CC \times D_2 + \beta_5 CC \times D_3 + \beta_6 CC \times D_4 + \beta_7 CC \times D_5 + \beta_8 CC \times D_6 + \beta_9 CC \times D_7 + \beta_{10} CC \times D_8 + \beta_{11} CC \times D_9 + \beta_{12} CC \times D_{10} + \beta_{13} CC \times D_{11} + \beta_{14} CC \times D_{12} + \beta_{15} CC \times D_{13} + \beta_{16} CC \times D_{14} + \beta_{17} CC \times D_{15} + \beta_{17} CC_{it} + \beta_{18} GDP_{it} + \varepsilon_{it}$$

To do second research hypothesis testing we have used variable D that would be equal to 0 and 1 and it would investigate the effect of industry in the related model and the results were shown in the table below.

Table (5): Results of model estimation based on industry's effect

Dependent variable: return on assets			
Descriptive variable	**Testing pooled data**		
	coefficient	**t statistic**	**P-Value**
Cash change period	-0.310	-2.788	0.045
Effect of automobile and kit production	-0.0038	-3.3998	0.0073
Effect of other machinery and electrical machines	-0.07565	-8.4856	0.2253

Effect of basic metals	0.0201	1.3562	0.2014
Effect of non-metal minerals	-0.095	-3.0125	0.023
Effect of materials and medicines	-0.0047	-3.4012	0.0064
Effect of metal products	-0.0756	-8.3621	0.2875
Effect of sugar and cube sugar	0.0225	1.3668	0.0133
Effect of oil, coal, and nuclear fuel	-0.0138	-3.1638	0.0083
Effect of tile and ceramic	-0.1266	-4.5669	0.3251
Effect of chemicals	0.0325	2.3168	0.2021
Effect of metal minerals	0.0135	2.3998	0.5412
Effect of rubber and plastic	-0.2354	-1.3654	0.0070
Effect of cement, lime, and plaster	0.0235	2.4120	0.4132
Effect of foods and drinks except sugar	-0.3201	-2.2351	0.0121
Effect of machinery and equipments	0.0214	1.2415	0.3242
Financial leverage	-0.0128	-6.84	0.0001
Gross domestic product index	0.0124	1.95	0.7524
F statistic	198.34		
P-Value	0.0000		
R^2	0.6802		
Adjusted R^2	0.6231		
Durbin-Watson statistic	1.74		

As it can be seen in table (5), cash change period coefficient was calculated to be meaningful regarding different industries. Also the relationship between cash change period and return on capital in automobile industries and kit production, other machinery and electrical machines, other non-metal mineral products, materials and medicines products, metal products manufacturing, oil, coal, and nuclear fuel industry, tile and ceramic industry, rubber and

plastic industry, foods and drinks except sugar, and sugar and cube sugar industries have had negative and meaningful effects and in machinery industries, basic metals, chemicals, metal minerals, cement, lime, and plaster industries, machinery and equipments industry there has not been a positive and meaningful relationship.

Regarding table (5), the amount of adjusted identification coefficient (R^{-2}) for the industries has been calculated to be %62 and this showed that the descriptive variables could define about 62 percent of changes in the dependent variables. Therefore, regarding that Durbin-Watson statistic has been within the distance between 1.5 and 2.5, we can approve that the errors or the difference between the real amounts and the predicted values by regression model have been independent. As it can be seen, the meaningfulness level for F statistics for all industries was equal to (0.000) and it was 0.05; i.e. the model is valid.

Research results:

The present research was trying to study the effect of cash change period on return on assets. Regarding the importance of the issue, in this research we tried to use the newest statistical methods whose precision was much more than the traditional methods. The present research investigated the effect of cash change index effect on return on assets in 191 firms enlisted in Tehran Stock Exchange during the time period between 2003 and 2009 by using panel data. Based on research results, the effect of cash change period on return on assets was accepted for all companies and it can be said that cash change period has had a negative effect on assets. According to other results, financial leverage coefficient was positive and it was meaningful in %1 level. The coefficient of gross domestic product was positive and statistically meaningful. But by isolating firms into different industries this effect varied. Results of the present research accorded with results in researches by Aljili (2004) and Dang (2010).

Based on research results, it is suggested:

Due to the negative effect of cash change period on return on assets, it is suggested to firms' managers to try to reduce net time period between paying liabilities and receiving cash from accounts receivable because the shorter the period, there would be more desirable performance for the firm.

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