

Investigation the Effects of Working Capital Management and Capital Structure on Profitability and Return on Assets (Case Study: A Selection from the Automotive Companies in Iran)

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ABSTRACT

Full development and advance of working capital management may have effective contribution in creating the value of companies. The purpose of this research is to provide empirical evidence about the effects of working capital management on viability of sample of listed automotive companies in the Tehran Stock Exchange. Data used in the study are given from financial statements of listed companies in stock during the years 2006 to 2010. In this study, three models are used. To investigate the effect of leverage degree (financial and operational), firm size and liquidity on profitability of companies the first model, the effect of inventory turnover on return on assets the second model and the effect of cash conversion cycle on return on assets of companies the third model is estimated. Results from the first model estimation indicate that all studied variables have significant and positive effect on the profitability index of companies. The second and third model estimation also showed that inventory turnover and cash conversion cycle have significant and negative effect on the returns on assets.

KEYWORDS: working capital management, capital structure, profitability, returns on assets, automotive companies.

1. INTRODUCTION

Working capital management is one of the main functions of financial management of companies that show the ability of company about doing short-term obligations. Also it is one of the parts that plays a vital role in the management structure of an organization so that in some cases the issue of working capital and liquidity are likened like blood that flow in the vessels of a business unit that business unit can survive and the management of this part has been mentioned as the beating heart of business unit which its mission is pumping blood into the vessels of organization (Padachi, 2006).

Today working capital management, which is management on resources and current expenditures for the maximization of shareholder wealth, has specific significance as part of the task of financial management. With regard to this fact that the amounts of working capital has effect on the profitability of companies and from the view of investors and stakeholders the amount of profitability of company is important measure in decision-making, doing research on the relationship of this variable can provide useful information for decision making of managers, investors and shareholders.

Accordingly, the subject of working capital management during the years 1995 to 2008 in the other countries were studied abundantly, among such conducted studies we can refer to the conducted research by Lamberson (1995), Dilof (2003), Ghosh and Maji (2003), Filbeck and Krueger (2005), Raheman and Nasr (2007), Nazir et al. (2007) and Samiloglue and demirnes (2008) (Yaghobnezhad et al., 2010).

Importance of this subject in our country due to the following factors is more:

1. Most Iranian companies due to inflation position and decrease purchasing power of currency prefer to convert cash into other assets and this leads that companies stricken with shortage in liquidity at maturity of liabilities and is damaged to the reputation of organization.

2. Shortage of working capital in most companies that face to the financial distress, finally lead to the bankruptcy of some of them.

3. Investors are looking for investments which have the most return on equity and in this situation, investors should be assured of current situation and this assurance will obtain with counseling and planning so that the dark corners of investment route turned on. In this case the investor faces two problems: First, how much money and in which fields enter, second, How to conduct investment in a long-term horizon. For these cases, they need to develop strategies that would identify future market today (Jahankhani and Talebi, 2000).

Given the importance of working capital management and this fact that has been paid to this issue in our country less, therefore in this study, based on research done in other countries and using the models and variables used in that researches, this issue will be discussed in the Tehran Stock Exchange. We introduce the variables used in this study in the followings.

1.1. An overview of some concepts and definitions

Working Capital Management: it is defined as the determination of volume and composition of sources and expenditures of working capital so that increase shareholders wealth.

Capital structure: a combination of debt and equity is said the company's capital structure that are included the left side items of the balance sheet.

Profitability Index: it is demonstrates the ability of the company in obtaining profit. In this study is used the logarithm of firm earnings before taxes and interest as profitability index.

Cash Conversion Cycle: One of the criteria for evaluating working capital is cash conversion cycle. Cash conversion cycle refer to the time between the purchase of raw materials and collecting the proceeds from the sale of made goods.

Degree of operating leverage: it is shows that operational costs of a company are constant. Higher proportion of fixed costs represents higher operating degree.

The degree of financial leverage: it is important when a part of the company's assets are financed through debt. In this study is used the ratio of earnings before tax and interest to earnings before tax (multiplied by hundred) to calculate the degree of financial leverage.

Return on assets: return on assets is obtained from net income divided by assets of companies multiplied by hundred.

2. LITERATURE REVIEW

Samiloglue and Demirnes (2008), conducted a study on a sample of manufacturing companies in Turkey during the period from 1998 to 2007 to investigate the relationship between profitability and working capital management shows that the period of accounts receivable, inventory turnover and leverages has significant and negative impact on the profitability of the companies, while the growth of the company in most sales has a positive and significant impact on profitability. However, the cash conversion cycle, firm size and fixed financial assets statistically has not significant effect on the profitability of companies. The results suggest that profitability of company increase through decrease in accounts receivable and inventory.

Raheman and Nasr (2007) investigated the effects of working capital management on the profitability of the 94 listed companies in the stock exchanges of Pakistan during the period 1999 to 2004. They studied the effect of different variables of working capital including average collection period, inventory turnover, the average payment period and cash conversion cycle on net operating income of companies and came to this conclusion that there is a strong negative relationship between the ratios of working capital and profitability of company. In addition, administrators can create value for shareholders by reducing the cash conversion cycle up to a desirable level. This study confirms the results of the same studies on the relationship between working capital and profitability.

Lazaridis and Tryfonidis (2006) in this study, 131 companies were investigated between 2001 and 2004. These results suggest that there is inverse and significant relationship between cash conversion cycle and profitability of companies and managers can increase profitability of company by maintaining the desired level of cash conversion cycle and its components, including: collection period, inventory turnover and payment period of creditors.

Yaghobnezhad *et al.* (2010) investigated the relationship between working capital management and profitability of listed companies in Tehran Stock Exchange. To this purpose, 86 companies were selected during the period 2002 to 2007. In this research the effects of different variables of working capital management including average collection period, inventory turnover, and average payment period and cash conversion cycle on the net operating income of companies were studied. The results show that there is an inverse relationship between working capital management and profitability.

Eizadinia and Taki (2010) showed that the full development and advance of working capital management can has effective contribution to the creation of corporate value. Data collected in this study is taken from the financial statements of listed companies in Tehran Stock Exchange for the period 2001 to 2007. Key variables used in this analysis are inventory turnover, accounts receivable period, accounts payable period and cash conversion cycle. The results show that cash conversion cycle has inverse and significant relationship with return on assets and also high investment in accounts receivable and inventory lead to lower profitability of the companies.

Rezazadeh and Heidarian (2010) in their study investigated the effect of working capital management on the profitability of Iranian companies. For this purpose, samples of Iranian listed companies in Tehran Stock Exchange during the period 1997 to 2007 were studied and from these companies 1356 companies were collected and analyzed as data. The results show that management can create value for company by reducing the amount of inventory and

the number of days in collection period. In addition, by making short the cash conversion cycle also can improve the profitability of the companies.

3. RESEARCH METHODOLOGY

3.1. Presentation of Model and Research Hypotheses

Five hypotheses are tested in the present study and to test the research hypotheses three categories of econometric model is stipulated. The first model to test the first three hypotheses of research and two models of second and third respectively for testing the fourth and fifth hypotheses of research will be presented.

3.1.1. Presentation of First Model of Research

In the first model, the profitability index of companies is considered a function of the degree of operating leverage, degree of financial leverage, firm size and liquidity ratio with aim to test the three following hypotheses:

H₁: Degree of leverage has significant effect on the profitability of automotive companies.

H₂: Firm size has significant effect on the profitability of automotive companies.

H₃: Liquidity has significant effect on the profitability of automotive companies.

Accordingly the first model of research is stipulated as follows:

$$PF_{it} = \alpha_i + \beta_t + \gamma_1 DOL_{it} + \gamma_2 Size_{it} + \gamma_3 DFL_{it} + \gamma_4 LQ_{it} + \varepsilon_{it} \quad (1)$$

Where:

PF is profitability index of companies and shows the ability of company in obtaining profits. This index is a relative measure from the success of company in the business. In this study, in the profitability index calculation is used from the log of earnings before interest and taxes (EBIT) as the dependent variable.

DOL is the degree of operating leverage and shows that operational costs of company are fixed. Higher proportion of fixed costs shows higher operating degree. It is expected that higher operating degree increase the operating profit of company. To calculate the degree of operating leverage is used the ratio of change percentage in the company's earnings before interest and taxes to the change percentage in sales of company.

SIZE is the firm size and to calculate is used from the logarithm of sales. It is expected that by increasing the firm size and by increasing the sales of companies, the amount of profitability of company also increase. In other words, it is expected that this factor has direct effect on the profitability index of the companies.

DFL is the degree of financial leverage and it is important when some of the company's assets are financed through debt. Accordingly, a company may attempt to increase the profit before tax but if the financing is through creating debt more than the profit before tax; damages and losses will also increase. As debt can create fixed cost, larger proportion of the company's assets is financed through debt and this is increase in financial leverage. For example, some theorists consider the amount of long-term debt as a proxy for financial leverage. Also, they used from the ratio of long-term debt to total assets and the ratio of total debt to total assets as a measure for financial leverage. In this study is used from the ratio of earnings before interest and tax to the earnings before tax (multiplied by hundred) to calculate the degree of financial leverage.

LQ is the ratio of company's liquidity. As it is stated by Eljelly and Abuzar (2004), if efficient liquidity management improve corporate profitability, inverse relationship between liquidity and profitability indexes can be expected. In other words, there is expectation of an inverse relationship between the ratio of current assets to current liabilities (liquidity ratio) and earnings before interest and taxes.

Also in the mentioned regression equation, *i* represent the 25 companies (section) and *t* is the time period of research that is included 2006 to 2010.

3.1.2. Presentation of Second Model of Research

The purpose of second model estimation is to test the fourth hypothesis of research which is:

H₄: The effect of inventory turnover on return on Assets is significant.

The most important recognition factor of the cash conversion cycle is inventory turnover (especially in manufacturing companies). Research is conducted by Padachi (2006) shows that about 67% of the time between cash outflow from purchase of goods to cash inflow from the sale of goods depends on the inventory turnover. We can say that maneuver power of companies in accounts receivable collection period and accounts payable payment period is much lower than inventory turnover. Because firms can easily reduce this period using advanced technologies and modernization and have tried to lower the cash conversion cycle which it will lead to increase return on assets (Padachi 2006). Based on inspiration from Padachi (2006), to investigate the effect of the inventory turnover on return on assets, the second model of research is stipulated as follows:

$$ROA_{it} = \alpha_i + \beta_t + \gamma_1 MINV_{it} + \gamma_2 Size_{it} + \gamma_3 SGrowth_{it} + \gamma_4 Debt_{it} + \gamma_5 GNP_{it} + \varepsilon_{it} \quad (2)$$

Where:

ROA is return on assets which is obtained from dividing the net income by assets of the company multiplied by hundred, which is considered as the dependent variable.

MINV is the inventory turnover and is obtained from the 360 multiplied by the proportion of inventories to the cost of goods sold.

SGrowth is sales growth of company and is obtained from the proportion of difference in sales of current year than the previous year to the sales of previous year. It is expected that this variable will have a positive effect on return on assets of the company.

Debt is the debt ratio of the company. This variable is calculated as the ratio of total debt to total assets multiplied by hundred. Size and QNP also respectively are the firm size (log of sales) and the logarithm of GDP to constant prices in 1997.

3.1.3. Presentation of Third Model of Research

The test of research fifth hypothesis is the aim of third model estimation. This hypothesis is:

H₅: The effect of cash conversion cycle on return on assets is significant.

To investigate above hypothesis, a model is presented that assets is dependent variable and cash conversion cycle is explanatory variable in it. Also, in order to control internal and external factors affecting on the variables that can change the result of study, the variables of sales growth, debt levels, GDP and firm size are considered as control variables. As Padachi (2006) stated whatever the cash conversion cycle is shorter, return on assets increases, according to the theoretical bases this relationship exists because whatever this period is shorter, on the one hand it causes that income statement is closer to the cash basis and lead to increase the company's liquidity power. On the other hand, assuming that the company succeeded in selling goods, cause to raise operational profit and as a result this fact will cause to increase return on asset. To test this hypothesis, the following regression model inspired by Padachi (2006) study can be expressed as follows:

$$ROA_{it} = \alpha_i + \beta_t + \gamma_1 CCC_{it} + \gamma_2 Size_{it} + \gamma_3 SGrowth_{it} + \gamma_4 Debt_{it} + \gamma_4 GNP_{it} + \varepsilon_{it} \quad (3)$$

Where:

CCC is the cash conversion cycle and is obtained from the fraction of total inventory turnover and accounts receivable cycle from accounts payable cycle. Other variables are the same as previous model. As it is clear in the third model than the second model the cash conversion cycle is replacement of inventory turnover.

3.2. Statistical Population and Sampling

The statistical population in this study included all listed automotive companies in the stock exchange which are related to the period 2006 to 2010 and have the following conditions:

1. They are listed in the Stock Exchange until the end of December 2005 and its fiscal year lead up to the end of December 31.
2. Companies should not change their fiscal year during the given period.
3. Given companies had continuum activity during the period of research and its stocks were traded and book value of equity isn't negative in any year.
4. Their financial statements are presented in full from 2006 to 2010.

Thus, the numbers of 25 companies which have all mentioned conditions are considered as samples.

3.3. Data Collection Method

The research data collection is based on a library method and required information is developed from the site of stock exchange market.

3.4. Method of Data Analysis

Methodology in this study is based on econometric technique of Panel data and to estimate models is used from Eviwes6 software. Also, for data processing, Excel software is used. In the panel data technique is used three methods to estimate model which include Consolidation method, fixed effects and random effects. To choose the best method to estimate the model is used two tests of Chaw and Housman. First to choose the best way between the two methods of Consolidation method and fixed effects is used Chaw test. In this test, the null and opposite hypotheses are as follows:

H₀: Consolidation method is more efficient.

H₁: fixed effects method is more efficient.

To choose between the combined least squares model and fixed effects model is used F modal test. This test can be stated as follows:

$$F = \frac{(R_{FE}^2 - R_{Pooling}^2) / N - 1}{(1 - R_{FE}^2) / (NT - N - K)}$$

In the above equation, R_{FE}^2 is determination coefficient in the fixed effects method, $R_{Pooling}^2$ is determination coefficient in the Consolidation method (combined least squares), N is the number of sections, K is the number of explanatory variables and T is length of time period. If the size of F computational statistic is greater than the size of F critical statistic, opposite hypothesis is accepted and therefore the fixed effects method is more efficient than Consolidation method and if the size of F computational statistic is less than F critical statistic, the reverse is true.

Then by choosing the fixed effect method, it is necessary to choose between this method and random effect method and it is achieved using Housman test. The null and opposite hypotheses in this test are as follows:

H₀: random effects method is more efficient.

H₁: fixed effects method is more efficient.

Housman test function has an asymptotic chi-square distribution and its degree of freedom is equal to the number of explanatory variables of model. According to Housman test, if the size of computational chi-square is greater than the size of critical chi-square, the null hypothesis isn't accepted and fixed effects method is more efficient. If computational chi-square is less than critical values, the null hypothesis is accepted and random effect is more efficient. Therefore it is necessary after estimating the model with three mentioned methods; two tests of Chaw and Housman are done respectively in order to select the best method.

4. RESEARCH FINDINGS

In this section, research models are calculated and acceptance or rejection of hypotheses associated with each model is investigated. It should be noted that each models are calculated with three methods of Consolidation, fixed effects and random effects and according to Chaw test and Housman test among three estimation methods, one method is selected as a best method. Then results from the selected method (which in all three models is fixed effects method) are presented in table format and the estimated coefficients of the explanatory variables are interpreted.

4.1. Estimation of First Research Model

Determination coefficient in the fixed effects method and the determination coefficient in the Consolidation method respectively are equal to 0.99 and 0.69 that by insertion in equation (4) F computational statistic obtain 120 and hence it is greater than F critical with degrees of freedom 24 and 96 at a significance level of 95 percent (1.61), the null hypothesis in Chaw test isn't accepted and fixed effects method choose between these two methods. Also to determine the most efficient method between the fixed and random effects methods were used Housman test that here because computational chi-square is larger than critical chi-square with degrees of freedom 4 at a significance level of 95 percent (9.49), fixed Effects method is chosen. Results from the first model estimation are as follows:

Table 1: Results from the estimation of first research model

Variables	Fixed Effect		
	Coefficient	t-statistics	Prob.
DOL	0.0041	1.71	0.091
Size	0.412	5.86	0.000
DFL	0.0008	1.78	0.078
LQ	0.01	3.47	0.001
R ²		0.99	
Adjusted R ²		0.99	
F-statistic		743	
Prob(F-statistic)		0.000	
F Limer test (F statistic)		120	
Chi-square statistic (Housman test)		10.81	
Prob (Housman test)		0.000	
Durbin-Watson		1.98	

Profitability index is dependent variable. Source: Research findings

Degree of operating leverage (DOL) and degree of financial leverage (DFL) had a positive effect on the profitability index and both of them are significant at the 90% level (confirming the first hypothesis of the study). Firm size has also positive and significant effect (at the 99% level) on corporate profitability (confirming the second hypothesis of the study). Liquidity ratio has positive effect on the profitability index and it is equal to 0.01 and is significant at the 99% level (confirming the third hypothesis of the study).

Determination coefficient and adjusted determination coefficient is equal to 99% and means that the explanatory variables of model in fixed effect estimation method explain 99% changes in profitability index. Also significance of F test statistic means that all the estimated coefficients in this method have significant difference from zero and therefore estimated regression overall has acceptable significance (at 99% level).

4.2. Estimation of Second Research Model

According to the results of fixed effects method that is selected method in the second model estimation (Note 1), inventory turnover on the company's return on assets has a negative effect of 0.014 which is significant at the 90% level (confirming the fourth hypothesis of the study). Variables of firm size and sales growth has a positive effect on return on assets of companies but only the effect of sales growth has acceptable significance (at 99% level). The debt ratio of companies and Logarithm of GDP such as inventory turnover has significant and negative effect on return on assets of companies.

Determination coefficient and adjusted determination coefficient is equal to 81 and 75 percent respectively and means that the explanatory variables of model in fixed effect estimation method explain 75% changes in profitability index. Also significance of F test statistic means that all the estimated coefficients in this method have significant difference from zero and therefore estimated regression overall has acceptable significance (at 99% level).

Table 2: Results from the estimation of second research model

Variables	Fixed Effect		
	Coefficient	t-statistics	Prob.
MINV	-0.014	-1.92	0.057
Size	0.18	0.12	0.901
SGrowth	3.74	2.86	0.005
Debt	-0.036	-2.09	0.039
GNP	-35.7	-5.64	0.000
R ²		0.81	
Adjusted R ²		0.75	
F-statistic		13.9	
Prob(F-statistic)		0.000	
F Limer test (F statistic)		11.04	
Chi-square statistic (Housman test)		92.03	
Prob (Housman test)		0.000	
Durbin-Watson		2.23	

Return on assets is dependent variable. Source: Research findings

4.3. Estimation of Third Research Model

According to the results of selected method in the third model estimation (Note 2) in table (3), cash conversion cycle had a negative effect on the rate of 0.006 on return on assets of the companies which is not significant at the 90% level (not verified fifth research hypothesis).

Variables of firm size and sales growth has a positive effect on return on assets of the companies and just like the previous model, only the effect of sales growth variable has acceptable significance (at 99% level).

Determination coefficient and adjusted determination coefficient is equal to 80 and 73 percent respectively and means that the explanatory variables of model in fixed effect estimation method explain 73% changes in profitability index. Also significance of F test statistic means that all the estimated coefficients in this method have significant difference from zero and therefore estimated regression overall has acceptable significance (at 99% level).

Table 3: Results from the estimation of third research model

Variables	Fixed Effect		
	Coefficient	t-statistics	Prob.
CCC	-0.006	-0.92	0.358
Size	0.799	0.53	0.594
SGrowth	3.60	2.64	0.009
Debt	-0.036	-2.01	0.047
GNP	-38.22	-6.12	0.000
R ²		0.80	
Adjusted R ²		0.73	
F-statistic		12.8	
Prob(F-statistic)		0.000	
F Limer test (F statistic)		10.29	
Chi-square statistic (Housman test)		125.2	
Prob (Housman test)		0.000	
Durbin-Watson		2.23	

Dependent variable in all three methods is return on assets. Source: Research findings

5. DISCUSSION AND CONCLUSION

In the present study by estimating the three models, we investigated five hypotheses that include:

1. Degree of leverage has significant effect on the profitability of automotive companies.
2. Firm size has significant effect on the profitability of automotive companies.
3. Liquidity has significant effect on the profitability of automotive companies.
4. The effect of inventory turnover on return on assets is significant.
5. The effect of the cash conversion cycle on return on assets is significant.

Furthermore, the time and place of research is related to the years 2006 to 2010 and for the 25 listed automotive companies in Tehran Stock Exchange.

First, the first research model was calculated with aim to test three first hypotheses. In this model, the profitability index was considered as the dependent variable and the degree of operating leverage, degree of financial leverage, firm size Liquidity ratio were considered as explanatory variables. The results of model estimation showed that all explanatory variables have positive and significant effect on profitability index. Accordingly, all three hypotheses associated with this model were accepted.

The purpose of the second model estimation was to test the fourth hypothesis of research. According to the results, inventory turnover, the debt ratio of companies and the log of GDP have significant and negative effect on return on assets of companies which indicate the fourth hypothesis of research was confirmed. Variables of firm size and sales growth have a positive effect on return on assets of the companies but only sales growth variable has acceptable significance.

The fifth hypothesis testing was the aim to the third model estimation and according to the results, this hypothesis was not accepted. Because cash conversion cycle have a negative effect on returns on asset of companies but this effect was not significant. The signs and significance of coefficient in other variables was similar to the second method of research.

5.1. Suggestions Based on Research Findings

The amount of relationship between working capital management and profitability of companies depends on many factors including the production cycle or cash conversion cycle, therefore, the following instances is recommended:

With regard to the effect of working capital on profitability and return on asset, it is worthy that companies create committee to get economic decisions in order to observe the optimal extent of working capital.

Companies have procedures and programs which can reduce the cash conversion cycle. Because this reduction in one side is equal to the increase return on assets and in other words is a criteria to measure management performance in the implementation of their decisions about the amount of working capital and liquidity. Therefore, according to confirming the fourth hypothesis of present study, managers can create a positive value and profitability for shareholders by reducing the inventory turnover to a possible extent and this fact will allow by proper management of inventory.

According to the fifth research hypothesis, we can say that managers can create a positive value and profitability for shareholders by reducing the cash conversion cycle and this fact requires liquidity planning and proper management of proceeds and payment and appropriate usage from investment and financing opportunities.

5.2. Suggestions for Future Research

According to this research that is for the automobile industry, it is recommended that similar research perform for other industries and comparison take place between them.

It is suggested that future research perform on the components of working capital management particularly cash management, Securities traded in the market, accounts receivable and inventory independently.

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Notes:

Note 1. Because F statistic and chi-square in the table(2) are greater than critical values that respectively are equal to 1.62 and 11.07, finally fixed effects method is selected.

Note 2. F statistic and chi-square and critical values in third model like second model respectively are equal to 1.62 and 11.07, therefore finally fixed effects method is selected.