

**THE RELATION OF WORKING CAPITAL AND FIXED ASSETS:
A STUDY**

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Abstract

The present study aims to investigate the relationship between working capital changes and fixed assets with asset return of 120 manufacturing listed companies in Tehran Stock Exchange during 2006–2010. Pearson correlation and Regression test are employed to determine the kind of relationship between dependent and independent variables, hypotheses test and evaluating normality of data respectively. The outcomes of the study suggest that there is a significant relationship between working capital changes and fixed assets with assets return in the research community.

Keywords: Manufacturing companies, fixed assets, assets return, Tehran Stock Exchange.

JEL classification: M4, G15, G18.

Introduction

Assets in a commercial firm consist of two kinds: fixed assets and current assets. Fixed assets include land, building, plant, furniture, etc. Investment in these assets represents that part of a firm's capital which is permanently blocked on a permanent or fixed basis and is called the fixed capital that generates productive capacity. The form of these assets does not change in the normal course. In contrast, current assets consist of raw materials, work-in-progress, finished goods, bills receivables, cash, bank balance, etc. These assets are bought for the purpose of production and sales, e.g. to turn raw material into semi-finished products, semi-finished products into finished products, and finished products into debtors, and debtors turned over cash or bills receivables.

A number of business failures are blamed on the inability of financial managers to plan and control the working capital of their firms. Therefore, business units need to manage their working capital and fixed assets to perform their operating and investment activities¹. If a company increases their assets, it will grow over time, and if it is doing it in a right way the result will be the increased production capacity and profitability². In order to achieve this aim, a long-term loan, annual earnings or capital increase might be used, in a way that do not decrease the working capital because an active company will gain long-term assets from increasing the working capital. This research mainly emphasizes the role of the working capital changes and fixed assets on the assets return. The working capital meets the short-term financial requirements of a business enterprise. It is a trading capital, not retained in the business in any form for longer than a year. The money invested in it changes form and substance during the normal course of business operations. The need for maintaining an adequate working capital can hardly be questioned³. Just as circulation of blood is vital for a human body to maintain life, the flow of funds is vital to maintain business. If it becomes weak, the business can hardly prosper and survive. Working capital starvation is generally credited as a major cause of small business failures in many developed and developing countries⁴.

Investment in Fixed Assets is considered a real investment in economic literature. In their investment and lending policies, financial institutions are careful to utilize their funds only for approved objectives. Financial planners and strategists in the corporate world believe that investments in fixed assets and working capital are the alternative uses of financial resources. However, it is commonly observed that an investment in fixed assets is not independent from the liquidity position and funds flow patterns.

1. Literature review

Grablowsky⁵ showed a significant relationship between various success measures and the employment of formal working capital policies and procedures. Managing a cash flow and a cash conversion cycle is a critical component of overall financial management for all firms, especially those who are capital constrained and more reliant on short-term sources of finance⁶.

Peel and Wilson⁷ have stressed the efficient management of working capital and, more recently, a good credit management practice as being pivotal to the health and performance of the firm sector. De Chazal Du Mee⁸ revealed that 60% enterprises suffer from cash flow problems.

Fahimzadeh⁹ studies relationship between debt and profit and assets return of listed companies in Tehran Stock Exchange. In this research, he examines the relationship between the ratio of debts with the profit and return of assets and he has concluded that a low ratio of debt compared with other capital resources convinced financial experts that an appropriate combination of equity and debt in financial structure of company can be an effective factor in increasing profits and stockholders' wealth.

Peel et al.¹⁰ revealed that small firms tend to have a relatively high proportion of current assets and less liquidity, they also exhibit volatile cash flows and a high reliance on short-term debt.

Narasimhan and Murty¹¹ stress on the need for many industries to improve their return on the capital employed.

Yung-Jang¹² studied the relationship between cash management with performance results and company value on the example of Japanese and Taiwanese companies. They used a performance result variable as Return of Efficiency (ROA) and a company value variable as Return of Equity (ROE) of shareholders. The result of this research about Japanese and Taiwanese companies indicated that there is a negative relationship between ROA and cash management as well between ROE and cash management.

Howorth and Westhead¹³ suggest that small companies tend to focus on some areas of working capital management where they can expect to improve marginal returns. They believed that efficient working capital management is a vital component of success and survival; i.e. of both profitability and liquidity¹⁴. They further assert that smaller firms should adopt formal working capital management routines in order to reduce the probability of business closure, as well as to enhance business performance.

Deloof¹⁵ has found a strong significant relationship between the measures of corporate profitability. Their findings suggest that managers can increase profitability by reducing the number of days accounts receivables and inventories. This is particularly important for small growing firms who need to finance increasing amounts of debtors.

Enayati¹⁶ studies and explains the management of working capital of companies listed on Tehran Stock Exchange. The general result of this research shows that the management of cash, the management of outstanding claims, the financing methods effect on a cash situation and the management of inventory are not statistically significant.

Lazaridis and Tryfonidis¹⁷ investigated the relationship between the working capital management and corporate profitability of a company listed on the Athens Stock Exchange. The result from regression analysis indicated that there was a statistical significance between profitability, measured through gross operating profit, and the cash conversion cycle. From those results, they claimed that the managers could create value for shareholders by handling correctly the cash conversion cycle and keeping each different component to an optimum level.

Raheman and Nasr¹⁸ studied the effect of different variables of working capital management on the net operating profitability. As the result of study they showed that there was a negative relationship among the variables of working capital management including the average collection period, inventory turnover in days, average collection period, cash conversion cycle and profitability. Besides, they also indicated that the size of a firm, measured by a natural logarithm of sales, and its profitability had a positive relationship.

Afza and Nazir¹⁹ attempted to investigate the traditional relationship between the working capital management policies and a firm's profitability of companies listed on Karachi Stock Exchange. They found a significant difference among their working capital requirements and financing policies across different industries. Moreover, the regression result demonstrated a negative relationship between the profitability of firms and the degree of aggressiveness of their working capital investment and financing policies. They suggested that managers could create value if they adopted a conservative approach towards working capital investment and working capital financing policies.

Mathuva²⁰ examined the influence of working capital management components on firm profitability by using a sample of 30 firms listed on the Nairobi Stock Exchange for the periods 1993 to 2008. He used Pearson and Spearman's correlations, the pooled ordinary least square (OLS), and the fixed effects regression models to conduct data analysis. The key findings of his study were that: i) there is a highly significant negative relationship between the time it takes for firms to collect cash from their customers (the accounts collection period) and their

profitability, ii) there is a highly significant positive relationship between the period taken to convert inventories into sales (the inventory conversion period) and profitability, and iii) there is a highly significant positive relationship between the time it takes the firm to pay its creditors (the average payment period) and its profitability.

Gill et al.²¹ investigate the relationship between the level of a firms' working capital and its profitability. They find a significant relationship between the cash conversion cycle and a firm's profitability. They postulate that the shorter the accounts receivable collection period is, the more a firm's profitability increases.

Raheman et al.²² investigated the impact of the working capital management on firms' performance in Pakistan in the period of 1998 to 2007. The results indicate that the cash conversion cycle, net trade significantly affected the performance of the firm. The study also concludes that the firms in Pakistan follow the conservative working capital management policy and the firms need to concentrate and improve their collection and payment policy.

Karaduman et al.²³ investigated the relationship between the working capital management and profitability of the companies listed on the Istanbul Stock Exchange in the period of 2005–2009. They use the return of assets as a criterion for profitability evaluation and the cash cycle for the evaluation of the working capital management. Results show that the decrease in the cash cycle has a positive effect on the return of assets. Rajesh and Redy²⁴ studied the relationship between the working capital management and the companies' profitability on the Indian Stock Exchange in the period of 2000–2009. The research findings show that the components of the working capital affect the corporate performance.

2. Research methodology

According to the objective of the study as well the review of literature, the following hypotheses are postulated in the study:

H₁: There is a significant relationship between the working capital changes and the assets return.

H₂: There is a significant relationship between the fixed assets and the assets return.

The kind of his research is an empirical research and it is done through a deductive – inductive way. In a deductive approach, we based our considerations on a theoretical basis found in the library, articles and on the internet while by in the inductive approach we collected necessary information in order to accept or reject of hypothesis.

The statistical society listed all manufacturer companies in Tehran Stock Exchange according to the following criteria:

- A) A fiscal year ends at end of March.
- B) From 2006 to 2010 there is not any change in a fiscal year or a company's activity.
- C) The company was not an Investment Company.
- D) Required financial information is unavailable.

With regard to the above mentioned conditions only 120 companies were qualified for the study.

In order to test the hypotheses, initially we calculated the descriptive statistics including a mean, a standard deviation; then the relationship between an independent and a dependent variable was tested by means of the regression method. In addition, considering the quantitative nature of all the tested variables in the analysis of the present or absent relationship between the variables, it is evaluated by means of Pearson correlation coefficient (r).

Regression Model

The regression model is used for testing hypotheses. In this research the relationship between the working capital changes and the fixed assets with the assets return is examined. In this model we have assumed that the dependent variable (the assets return) is the function of independent variable amounts (the working capital changes and the fixed assets). If there is a linear relationship between the dependent and the independent variables, then we can explain the observed changes in the dependent variable by the independent variables, otherwise, we come to the conclusion that there are not any linear relationships between the dependent and independent variables.

Research variables

1. Dependent Variable: in this research, the assets return will be examined as a dependent variable.
2. Independent Variables: in this research, the working capital and fixed assets changes will be examined as independent variables.

Table 1. Types of variables based on the relationship

Hypotheses	Independent variable	Dependent variable
First	Working capital changes	Assets return
Second	Fixed assets changes	Assets return

Source: own study.

In this section, we considered how to calculate the key variables (the assets return, the working capital changes and the fixed assets changes).

Assets return: $\text{Assets return} = (\text{operating profit}) / (\text{the average of total assets})$.

Working capital changes: $\text{Working capital changes} = \text{working capital in year } (t) - \text{working capital in the year } (t - 1)$.

$\text{Working capital} = \text{current assets} - \text{current liability}$.

Fixed assets changes: $\text{Fixed assets changes} = \text{fixed assets in the year } (t) - \text{fixed assets in the year } (t - 1)$.

3. Testing the hypotheses

In this section, in order to obtain concise and perceivable information and gain generality from the samples' characteristics, we supply and regulate descriptive statistics. It includes a mean, a standard deviation, a minimum, a maximum, a variance, the range of changes, a strain coefficient, an amplitude coefficient and a standard error. The descriptive statistics of this study for the 2010 are presented briefly in Table 2.

Table 2. Descriptive statistics of testing variables

Variables	Mean	S.D	Min	Max	Range of changes	Strain coefficient	Amplitude coefficient	Standard error
Assets return	0.30	0.17	0.65	0.75	0.65	0.14	0.61	0.13
Working capital changes	2,432.08	2,281.02	-37,111	34,539	73,654	0.25	0.66	12,365.60
Fixed assets changes	2,511.20	2,122.03	-35,431	11,368	151,456	0.77	0.35	16,354.14

Source: own study.

In three above variables, amount of mean is higher than standard deviation and consider to value of standard deviation, concluded that data scattering is not high. These descriptive statistics indicate that distribution curve have amplitude to right than normal distribution curve in some years and more data are accumulated in the left side of curve.

Kolmogorov-Smirnov Test

Before processing with the hypothesis testing, we should examine variables in order to run a normality test. In this regard, Kolmogorov-Smirnov formula is used the result of which is presented in Table 3.

Table 3. Data Normality Test

Variable	Working capital changes	Fixed assets changes	Assets return
Sig.	0.31	0.73	0.36

Source: own study.

The above results indicate that all the variables are on a significant level that is higher than 0.05. So, the normality of all three variables is confirmed.

Pearson Correlation

The Pearson correlation is one of the significant criterions which are used to examine linear the relationship of the quantities variable. The following test shows the Pearson correlation of the working capital changes and the fixed assets with the assets return.

H_1 : There is a relationship between the working capital changes and the assets return.

Table 4. The correlation between the working capital changes and the assets return

Variable	Test	Assets return
Working capital changes	Pearson correlation	0.568
	Sig.	0.009

Source: own study.

According to Table 4 the significant level of the Pearson correlation test is equal to 0.009 that is less than 0.05. Therefore, H_0 is rejected so there is a relationship between the working capital changes and the assets return.

H_2 : There is a relationship between the fixed assets changes and the assets return.

According to Table 5, the significant level of Pearson correlation test is equal than 0.000 that is less than 0.05. Therefore, H_0 is rejected so there is a relationship between the fixed asset changes and the assets return.

Table 5. The correlation between the fixed assets and the assets return

Variable	Test	Asset return
Working capital changes	Pearson correlation	0.627
	Sig.	0.000

Source: own study.

The First Hypothesis Test

The First Hypothesis: “There is a significant relationship between the working capital changes and the assets return.”

After having collected the data, the relationship between the assets return (ROA) and the changes of working capital (CHWC) were tested. The results of the examination of the relationship between ROA and CHWC in regression analysis table and regression equation on the error level equal 0.05 are presented below.

Regression equation: $ROA = 0.585 + 0.343 CHWC$

Table 6. The statistics of the first hypothesis test

Year	Correlation coefficient	Determination coefficient	Modified determination coefficient	Beta coefficient	(t)	Sig.
2006 to 2010	0.567	0.49	0.48	0.389	11.012	0.009

Source: own study.

In this test the error level is considered to be 0.05 i.e. the confidence level equals 0.95. Because the significant level is 0.009, i.e. less than 0.5, so the assumption ($\beta = 0: H_0$) (lack of relationship) is rejected. Therefore, there is a significant relationship between the assets return and the working capital changes and since the Beta coefficient is a positive value ($\beta = 0.389$), we concluded that there is a direct relationship between the assets return and the working capital changes.

Statistical findings confirmed that there is a significant relationship between the working capital changes and the assets return. The coefficient of modified determination means that about 43 per cent of the dependent variable changes (the assets return) could be described by an independent variable (the working capital changes). Meanwhile, considering the positive value of Beta coefficient, we concluded that there is a direct relationship between the variables. In other words, the research hypothesis is confirmed.

The Second Hypothesis testing is based on the size of a company

In the Second Hypothesis, companies are divided into two groups, large and small, basing on the total mean of their assets. The companies that are higher than a mean amount are considered large and the companies which are less than mean amount are regarded as small. The number of samples in each group is 120 (60 big companies and 60 small companies) and a separate test is run for each group. The results are as follows:

The Pearson Correlation

The Pearson correlations between the working capital changes and the assets return for small and big companies are shown in the test below.

The First Hypothesis: There is a relationship between the fixed assets and the assets return depending on the size of a company.

A statistical hypothesis test:

H_0 = Variables do not have any relationship,

H_1 = Variables have a relationship.

Table 7. The correlation between the fixed assets changes and the assets return according to the size of a company

Variable	Test	Assets return
Fixed asset changes of big companies	Pearson correlation	0.3.54
	Sig.	0.002
Working capital changes of small companies	Pearson correlation	0.398
	Sig.	0.020

Source: own study.

Table 8. The result of the Second Hypothesis according to the size of a company

Name	Correlation	Determination coefficient	Modified determination coefficient	Beta coefficient	Statistic (t)	Sig.	Result
Big companies	0.321	0.089	0.081	0.461	0.079	0.002	H_0 is rejected
Small companies	0.398	0.115	0.085	0.475	0.089	0.020	H_0 is rejected

Source: own study.

A significant level of the Pearson correlation test related to big and small companies is less than 0.05, thus H_0 is rejected. Therefore, there is a relationship between the fixed assets and the assets return of big and small companies.

For the needs of this study, the error level is considered to be 0.05 i.e. the confidence level equals 0.95.

Basing on the results obtained in the first hypothesis test in terms of a company size, we concluded that because a significant level is less than 0.05, the assumption ($\beta = 0: H_0$) (the lack of relationship) must be rejected. Therefore, with the error level equal 0.05, there is a significant relationship between the assets return and the working capital changes. Also, since the Beta coefficient is a positive amount, we concluded that there is a direct relationship between the assets return and the fixed assets changes.

The significant level of the hypothesis test is 0.089, that is less than the error level (0.05), which confirms the research hypothesis saying that there is a significant relationship between the working capital changes and the assets return. Also, because the amount of the regression equation Beta is positive, ($\beta > 0$), then there is the direct relationship between the working capital changes and the assets return. The classification of companies is done in terms of their size and activities. Then the first hypothesis is evaluated in each item. The results indicate that there is a significant relationship between the working capital changes and the assets return. The significant level of the hypothesis test is 0.000, that is less than error level (0.05), which confirms the research hypothesis saying that there is a significant relationship between the fixed assets changes and the assets return. Also, because the amount of the regression equation Beta is positive, ($\beta > 0$), there is a direct relationship between the fixed assets changes and the assets return. In addition, the classification of companies is done in terms of their size and activities. Then the second hypothesis is evaluated in each item. The results indicate that there is a significant relationship between the fixed assets changes and the assets return.

Conclusions

The working capital management is the most important decision in the knowledge of financial management. The corporation is able to run long-term activity related to this subject when financial managers apply optimum management rules when managing their working capital. A manager can create the balance between the corporation's profitability and liquidity and thus get optimum working capital management. It will have significant effect on the working capital, because purchasing new equipment results in the increase in using raw material in production and

it leads to increased production. Therefore, the production volume, the sale volume and cash flow resulting from the sale are the main factors of the working capital. Among this, companies which enjoy continuous growth in sale require changes in their working capital. Therefore, real and predicted sale have significant effect on the amount of working capital that a company uses.

The analysis of the results shows that high tax rates led to the depreciation of expenses, i.e. created an impediment tax in the research period because these expenses did not trigger the cash flow. Teheran stock exchange used this impediment tax to protect sale and introduce new fixed assets. In addition, these results indicated that long-term asset changes would increase production and bring benefits to capacity because such investment would be followed by profitability power and finally it will increase the total value of a company. The changes in fixed assets reflect the organizations' & business units' basic guidelines, particularly of the productive units and have a significant effect on their economic successes in the long run. A business unit must obtain a reasonable return of invested funds to realize its long-term goals. When companies can make optimal use of their assets, their long-term assets can create a high output for stockholders. In addition, reducing or increasing the long-term assets leads to negative or positive outputs in listed companies and it will affect the company value. In this hypothesis, we argue that productive assets are main factors in companies, changes will affect production, and finally it will change the profitability power of companies. Consequently, the long-term assets changes are regarded as an independent variable and can affect the company's output.

Notes

¹ Salehi (2008); Rostami, Salehi (2011).

² Namazi, Salehi (2010).

³ Salehi (2009).

⁴ Rafuse (1996).

⁵ Grablowsky (1976).

⁶ Deakins, Logan, Steele (2001).

⁷ Peel, Wilson (1996).

⁸ De Chazal Du Mee (1998).

⁹ Fahimzadeh (1998).

¹⁰ Peel, Wilson, Noworth (2000).

¹¹ Narasimhan, Murty (2001).

¹² Yung-Jang (2002).

¹³ Howorth, Westhead (2003).

¹⁴ Peel, Wilson (1996).

¹⁵ Deloof (2003).

- ¹⁶ Enayati (2004).
¹⁷ Lazaridis, Tryfonidis (2006).
¹⁸ Raheman, Nasr (2007).
¹⁹ Afza, Nazir (2009).
²⁰ Mathuva (2009).
²¹ Gill, Biger, Mathur (2010).
²² Raheman, Afaza, Qayym, Mahamood (2010).
²³ Karaduman, Akbas, Caliskan (2011).
²⁴ Rajesh, Reddy (2011).

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