



## The Effect of Optimal Level of Cash on Future Operation and Cash Interest Coverage in Companies Listed on the Tehran Stock Exchange

**Mehdi Vatanzadeh\* and Zahra Moradi**

Department of Accounting, Science and Research Branch, Islamic Azad University, Damavand, Iran

\*Corresponding Author: M.Vatanzadeh@gmail.com

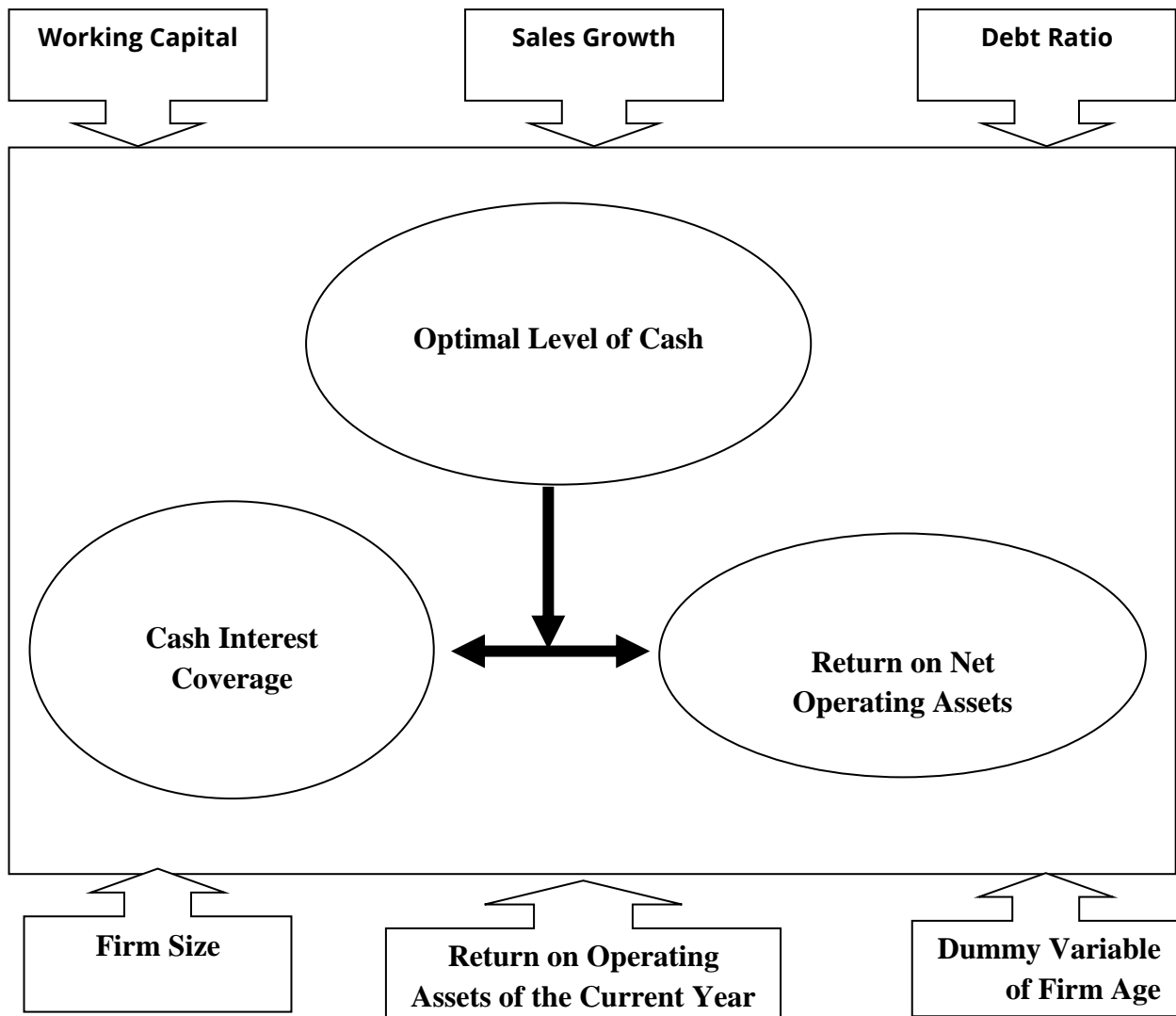
**Abstract:** This study examines the impact of the optimal level of cash on future performance and cash interest coverage of listed companies in Tehran Stock Exchange with emphasis on the type of industry deals. For this study a sample of 107 firms listed in Tehran Stock Exchange was selected using sampling. The purpose of this study was to evaluate the effectiveness of the optimal level of cash on future performance and cash interest coverage of listed companies in Tehran Stock Exchange with emphasis on the type of industry to achieve this goal, two hypotheses have been proposed to be the, The optimal level of cash operating assets with future returns (RNOA) there is a positive direct relationship between the optimal level of cash and cash interest coverage there is a direct and positive correlation between the test data collected for the period 1385 to 1390 in the Tehran Stock Exchange and the Automotive Industry cement, lime and plaster, base metals, ceramic tile, chemical products, Food Products and Beverages except sugar, and Pharma took the study period there were a total of 535 observation. Statistical methods used in this study are multiple regression method. The results of the statistical community and the automotive industry, cement, lime and plaster, base metals, ceramic tile, chemical products, Food Products and Beverages except sugar, and took Pharma shows the relationship between the optimal level of cash for future performance to directly is positive, ie the increase in the company's cash and cash more than the optimal level of performance of the company will be added to future and also by increasing the amount of cash in the company and pass on the optimum amount of company cash, cash interest coverage is added.

**Keywords:** Optimal Level, company cash, cash interest coverage

### INTRODUCTION

During the time cash flow has become one of the capital determining factors in net flow. Production requires using cash. Firms first need to buy raw materials for production, and then they manipulate them and make them as manufactured products. Then accounts and notes receivable increase by selling the manufactured stock, and then by collecting the receivables, cash flow period ends. Cash flow starts from the time the firm pays for the raw materials and continues until it gains sales receivables. Cash flow period is calculated using the following method: the average period that the cash is kept as inventory plus the average period of collecting receivables minus the deadline for paying the accounts payable<sup>1</sup>.

According to the following model it can be stated that the estimated optimal level of cash is accompanied by the return on net operating assets (RNOA) and cash interest coverage. In this research we investigate whether future performance of the firms is influenced by optimal level of cash and cash interest coverage.



**Fig1.** Review of research analysis framework

This study investigates the effect of deviation from estimated optimal cash on future performance (future return on operating assets rate) and cash interest coverage because both firms that do not keep cash and those keeping too much cash face many problems<sup>2</sup>. Profitability is a key feature that needs to be investigated in order to start investing in a firm. Profitability ratios and understanding the connection of profit with other important pieces of information are used to evaluate the profitability of the firm<sup>3</sup>.

Total performance and management of the firm are evaluated using these ratios. With regard to these ratios, firm's return on is looked upon from different viewpoints including: views based on each stock's profit, views based on per rial

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of sale, views based on per rial of inventories and based on per rial of stakeholders' salary<sup>4</sup>. Net profit margin, gross profit margin, profit per share, dividend per share, dividend percentage, profit growth per share, P/E index, stock returns, return on sales, Q-Tobin ratio, return on working capital, return on investment and return on equity are used in this research.

Several studies have been carried out in this regard. In what follows we will refer to some of them.

Results from Jensen's research show that the rate of return on net operating assets with cash surplus (RNOA+1) reduces due to more investments<sup>5</sup>. Dittmar and Mahart Smith showed that firms' future performance at surplus cash level begins to reduce<sup>6</sup>. Mikkelson and Partch investigated the operating performance of the firms with those same in size and industry, using examples of 89 accepted firms in America stock exchange which had maintained more than 25% of their assets in cash or its equivalent at the end of years 1986-1991. The results of their study indicated that the operating performance of firms which maintain a lot of cash is higher compared to others<sup>7</sup>. Ferreira and Viellela investigated the factors influencing cash in a sample firm of Europe Union, from 1987 to 2000. The results of the study showed that cash is positively influenced by investment opportunities and cash flows are negatively influenced by asset liquidity, financial leverage and size. Bank debt and cash balance have negative relationship and this indicates that close bank relationships allow firms to keep less cash balance cautiously<sup>8</sup>. Orouji and Hejazi studied the determining factors of expected cash and its variance effect on operating performance and stock returns; the results showed that previous financing, net output, free cash flow, firm size and cash balance had the most influence on estimated cash and that the expected cash variance from actual cash does not influence return on asset rate<sup>9</sup>. Sharifi and Aghayi studied the effect of maintained amount of cash on future performance of firms. Evidence of analysis based on panel data showed that the future performance of firms which is the future return on net operating asset reduces in case of positive and negative deviation from estimated optimal level of cash<sup>10</sup>. Izadi Nia et al., in a research titled "corporate governance monitoring tools, cash maintenance level and performance of accepted firms in Tehran stock exchange" stated that corporate governance monitoring tools and maintenance level of cash are important influential factors on firms' performance<sup>11</sup>.

Considering the fact that it seems necessary that optimal cash level influences the future performance of firms and cash interest coverage in Tehran stock exchange firms and that they should always keep an amount of cash in firm so that they can keep to their commitments, in this study the researcher investigates the effect of optimal level of cash on future performance and cash interest coverage in Tehran stock exchange firms so that he can suggest practical solutions for the development of Tehran stock exchange firms, as well as various industries within it through empirical experiments.

## MATEREAL AND METHODS

### Research Methodology

In terms of purpose, the current research is an applicable one and in terms of identity and content, it is a correlation research. The statistical population of the current research includes all firms accepted in Tehran stock exchange which confirm to the following conditions:

1. They should be a manufacturing firm.
2. They should have been accepted in Tehran stock exchange in the year 2005 or before that.
3. The financial year of the firms during the research deadline should end in March.
4. They should have uncovered the information required for the measurement of variables in the research.
5. They should not have had trading stoppages for more than 3 months.

107 firms were examined as sample firms. Sampling method was simple and random. Library methods (such as studying M.A theses, financial research journals, accountings and audits, magazines and journals in research field, and a huge amount of information was collected via internet and by referring to scientific centers of universities) were used to collect information. The information was extracted using financial statements of manufacturing firms in Tehran stock exchange and Rahavard-e Novin software, and CDs containing financial statement images and also Tehran stock exchange websites including [www.iranbourse.com](http://www.iranbourse.com) or [www.iranbourse.ir](http://www.iranbourse.ir). After collecting information related to the selected sample firms' financial statements, independent and dependent variables were calculated using Excel and SPSS. Research Variables and Measurement Methods

We will use Oler and Pikoney's research variables to determine the optimal level of cash.

$$\begin{aligned} \text{Cash}_{i,t} = & \beta_0 + \beta_1[\text{Market - to - Book}]_{i,t} + \beta_2[\text{Sales Growth}]_{i,t} + \beta_3[\text{Firm Size}]_{i,t} \\ & + \beta_4[\text{Cash from Opration}]_{i,t} + \beta_5[\text{Net Working Capital}]_{i,t} \\ & + \beta_6[\text{Capital Expenditure}]_{i,t} + \beta_7[\text{R and D}]_{i,t} \\ & + \beta_8[\text{Dividend Dummy}]_{i,t} + \beta_9[\text{Firm Age}]_{i,t} + \beta_{10}[\text{Tax Burden}]_{i,t} \\ & + \beta_{11}[\text{Year Dummies}]_{i,t} + \varepsilon_{i,t} \end{aligned}$$

Cash = cash balance kept in firm

Market - to - book = market value to book value of assets

Sales growth = firm's sales growth

Firm size = size of the firm which equals logarithm of firm's total sales

Cash from operation = cash resulted from operations

Net working capital = (cash - sum of assets) ÷ (cash - working capital)

Capital expenditure = (cash - sum of assets) ÷ (capital expenditure)

R and D = research and development expenditure

Dividend dummy = a dummy variable which equals 1 in case the firm has had dividend profit in previous year, otherwise equals 0.

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Firm age = age of the firm

Tax burden = (cash – sum of assets) ÷ (tax cost)

Year dummies = a dummy variable which equals 1 in case the firm age is more than the average age of sample firms, otherwise equals 0.

After the optimal level of cash is measured using the aforementioned formula, the following procedures should be followed to test the hypotheses:

A regression model will be used to test the first hypothesis as follows:

$$\text{RNOA}_{i,t+1} = \beta_0 + \beta_1[\text{sufficient Cash}]_{i,t} + \beta_2[\text{Net Working Capital}]_{i,t} + \beta_3[\text{Sales Growth}]_{i,t} + \beta_4[\text{Leverage}]_{i,t} + \beta_5[\text{Firm Size}]_{i,t} + \beta_6[\text{RNOA}]_{i,t} + \beta_7[\text{Year Dummies}]_{i,t} + \varepsilon_{i,t}$$

RNOA<sub>i,t+1</sub> = operating profit after tax payments ÷ net operating assets of the first period

Sufficient cash = optimal cash level

Leverage = firm debt ratio (cash – sum of assets) ÷ (sum of debts)

A regression model is used to test the second hypothesis as follows:

$$\text{Cash Interest Coverage}_{i,t} = \beta_0 + \beta_1[\text{sufficient Cash}]_{i,t} + \beta_2[\text{Net Working Capital}]_{i,t} + \beta_3[\text{Sales Growth}]_{i,t} + \beta_4[\text{Leverage}]_{i,t} + \beta_5[\text{Firm Size}]_{i,t} + \beta_6[\text{Year Dummies}]_{i,t} + \varepsilon_{i,t}$$

Cash interest coverage = cash interest coverage

$$\text{Cash interest coverage} = \frac{\text{tax payable} + \text{interest payable} + \text{operating cash}}{\text{interest payable}}$$

## RESULTS

**Table 1.** Descriptive indexes of research variables, central indexes, distributive indexes and statistics, distribution figure indexes

Abbreviation	RNOAit.1	Sufficient cash	Net working capital	Sales growth
Number of data	535	535	535	535
Average	0.13037	1.12E+05	-0.05634	5.83933
Mean	0.10594	32184.956	0.09765	0.13338
Mode	.099 <sup>a</sup>	1680412.3	-0.532	-1.000 <sup>a</sup>
Standard deviation	0.123109	3.21E+05	0.59031	83.083322
Variance	0.015	1.03E+11	0.348	6902.838
Skewness	1.086	4.677	-3.36	16.198
Elongation	2.244	24.526	17.817	273.435
Minimum Data	-0.187	-263761.09	-4.549	-1
Maximum Data	0.743	2588215	0.734	1541.742
Sum	69.749	5.97E+07	-30.141	3124.041
Abbreviation	Leverage	Firm Size	RNOAit.0	Year Dummies
Number of Data	535	535	535	535
Average	0.67743	5.70229	0.13898	0.7215
Mean	0.68075	5.61496	0.11349	1
mode	0.887	5.615	0	1
Standard Deviation	0.202899	0.682734	0.131437	0.448683
variance	0.041	0.466	0.017	0.201
Skewness	1.07	0.311	1.605	-0.991

<b>Elongation</b>	7.281	2.99	5.786	-1.022
<b>Minimum Data</b>	0.13	2.272	-0.187	0
<b>Maximum Data</b>	2.156	8.031	1.08	1
<b>Sum</b>	362.426	3050.727	74.354	386

**Result of the First Hypothesis Test:**

There is a positive and direct significant relationship between optimal cash level and future return on net operating assets.

As can be seen in table 2 and according to t-test values, the relationship between the independent variable (optimal level of cash) and future return on net operating assets (RNOA) is direct. There is a positive correlation coefficient between the return on net operating assets variable and optimal level of cash variable which was also tested in automobile, cement, lime and chalk, basic metals industries, ceramic tile industries, chemical products industry, food and beverage industries and medical industry. The results were the same in all cases. Therefore, the relationship between the return on net operating assets (RNOA) and optimal level of cash is confirmed. The values obtained from the t-test in table 2 indicate that the optimal level of cash coefficient is significant.

**Results of the Second Hypothesis Test**

There is a positive and direct significant relationship between the optimal level of cash and cash interest coverage.

As can be seen in table 2 and according to t-test values, the relationship between the independent variable (optimal level of cash) and cash interest coverage is direct. There is a positive correlation coefficient between these two variables, i.e. between cash interest coverage and optimal level of cash. This fact was also tested in automobile industry, cement, lime and chalk industries, basic metals industries, ceramic tile industries, chemical products industry, sugar-free food and beverage industries and medical industry. The results were the same in all cases. Therefore, the relationship between cash interest coverage and optimal level of cash was confirmed. The values obtained from t-test in table 2 indicate the significance of optimal level of cash coefficient.

**Table 2.** Results of research hypothesis test

Type o industry	Independen t variable	Dependen t variable	Correlatio n coefficient	Adjusted coefficient of determinatio n	Watson -Durbin test	f-test	t-test	Level of significanc e	Result
<b>Total population</b>	Optimal level of cash	Return on net operating assets (RNOA)	0.585	0.334	1.515	39.011	9.556	0.000	Positive and direct relationship confirmed
<b>Automobile industry</b>	Optimal level of cash	Return on net operating assets (RNOA)	0.400	0.188	1.693	3.020	8.793	0.000	Positive and direct relationship confirmed
<b>Cement, lime and chalk industries</b>	Optimal level of cash	Return on net operating assets (RNOA)	0.520	0.332	1.760	6.590	8.293	0.000	Positive and direct relationship confirmed

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<b>Basic metals industries</b>	Optimal level of cash	Return on net operating assets (RNOA)	0.486	0.269	1.760	4.523	7.252	0.000	Positive and direct relationship confirmed
<b>Ceramic tile industries</b>	Optimal level of cash	Return on net operating assets (RNOA)	0.700	0.359	1.671	3.708	8.657	0.000	Positive and direct relationship confirmed
<b>Chemical products industry</b>	Optimal level of cash	Return on net operating assets (RNOA)	0.447	0.301	1.566	2.902	10.570	0.000	Positive and direct relationship confirmed
<b>Sugar-free food and beverage industries</b>	Optimal level of cash	Return on net operating assets (RNOA)	0.855	0.680	1.631	14.365	12.715	0.000	Positive and direct relationship confirmed
<b>Medical industry</b>	Optimal level of cash	Return on net operating assets (RNOA)	0.859	0.713	1.744	29.000	2.697	0.009	Positive and direct relationship confirmed
<b>Total population</b>	Optimal level of cash	Cash interest coverage	0.478	0.218	1.662	22.245	2.524	0.012	Positive and direct relationship confirmed
<b>Automobile industry</b>	Optimal level of cash	Cash interest coverage	0.575	0.274	2.016	5.799	2.989	0.004	Positive and direct relationship confirmed
<b>Cement, lime and chalk industries</b>	Optimal level of cash	Cash interest coverage	0.618	0.484	2.145	3.903	7.701	0.000	Positive and direct relationship confirmed
<b>Basic metals industries</b>	Optimal level of cash	Cash interest coverage	0.514	0.330	2.094	3.387	2.395	0.022	Positive and direct relationship confirmed
<b>Ceramic tile industries</b>	Optimal level of cash	Cash interest coverage	0.734	0.439	2.482	5.441	13.221	0.000	Positive and direct relationship confirmed
<b>Chemical products industry</b>	Optimal level of cash	Cash interest coverage	0.544	0.327	2.199	4.494	13.774	0.000	Positive and direct relationship confirmed
<b>Sugar-free food and beverage industries</b>	Optimal level of cash	Cash interest coverage	0.775	0.537	1.790	9.497	2.477	0.018	Positive and direct relationship confirmed
<b>Medical industry</b>	Optimal level of cash	Cash interest coverage	0.519	0.209	1.830	4.483	12.247	0.000	Positive and direct relationship confirmed

## CONCLUSION

### Results of the first hypothesis test:

1. There is a positive and direct significant relationship between optimal level of cash and return on net operating assets (RNOA).

Values obtained from t-test indicate the significance of optimal level of cash. According to t-test values, the relationship between the independent variable (optimal level of cash) and return on net operating assets (RNOA) is direct, i.e. it is probable that the return on net operating assets increase in a firm by the increase in its optimal level of cash. This fact was tested in total population, automobile industry, cement, lime and chalk industries, basic metals industries, ceramic tile industries, chemical product industry, sugar-free food and beverage industries and medical industry. The results were the same in all cases.

Results obtained from this research hypothesis were consistent with results of Oler and Pikoney's research<sup>2, 12</sup>.

The results of this research hypothesis were also consistent with results of Jensen's (1986) research, as well as with Dittmar and Mahart Smith's (2007) research findings. In other words the results of all of these studies were the same<sup>5, 6</sup>.

### **Results of the second hypothesis test:**

**2.** There is a positive and direct significant relationship between optimal level of cash and cash interest coverage.

Values obtained from t-test indicate that optimal level of cash is significant. According to the t-test values, the relationship between the independent variable (optimal level of cash) and cash interest coverage is direct, i.e. it is probable that cash interest coverage increases in a firm with the increase of optimal level of cash. Therefore, it can be stated that when the cash becomes or is becoming more than the optimal level of cash available in the firm, the power for defraying payments of financial receivables and related interests increases. They will also have the power to pay for their financial installments in time, which ultimately leads to the higher cash interest coverage. This fact was tested in total population, automobile industry, cement, lime and chalk industries, basic metals industries, ceramic tile industries, chemical products industry, sugar-free food and beverage industries and medical industry. The results were the same in all cases.

### **Suggestions**

It has been suggested to keep the cash level close to the optimal level because according to the results of the research hypothesis, if the cash level is estimated to be close to optimal level, then the return on net operating assets will increase. It is recommended that managers and counselors of firms attempt to find alternative methods to get loans for cash payments and providing working capital because according to the results of the research hypothesis, if the cash amount in firms begins to become less than the optimal level of cash, then the cash interest coverage will decrease.

### **REFERENCES**

### **The Effect of Optimal Level of Cash on Future ...**

1. Neveu, P. & Raymond. (2006). "Financial Management", translated by A. Jahankhany and Ali Parsaeian, (1).
2. Oler, D. & Picconi, M. (2009). Implications of insufficient and excess cash for future performance. *Journal of Financial Economics*, 65:223-247.
3. Shanqy Jafarzadeh, M. (2010) "The relationship between leverage ratios, profitability and cost of capital for firms listed in Tehran Stock Exchange", MSc Thesis, Islamic Azad University of Arak.
4. Jhankhany, A. & Parsaeian, A. (2009)."Financial Management", samat publication, (2).
5. Jensen, M. (1986). Agency costs of free cash flow, corporate finance, a takeovers. *American Economic Review*, 76: 323-329.
6. Dittmar, A. & Mahrt-Smith, J. (2007). Corporate governance and the value of cash holdings. *Journal of Financial Economics*, 83: 599-634.
7. Mikkelsen, W. & Partch, M. (2003). Do persistent large cash reserves hinder performance? *Journal of Financial and Quantitative Analysis*, 38: 275– 294.
8. Ferreira, M.A. & Vilela, A. (2004). "Why do firms hold cash? Evidence form EMU countries" *European Financial Management*, 10 (2): 295-319 .
9. Arooji, A. (2011). Investigate the relationship between deviations from expected cash company operating performance and stock returns, master's thesis, Alzahra University.
10. Sharifi, S. & Aghaei M. A. (2011). Effect of the amount of cash kept on the Company's future performance, master's thesis, University of Mazandaran.
11. Izadnia N. & Rasaiean A. (2011)."Corporate Governance regulatory instruments, cash holdings and performance of listed companies in Tehran Stock Exchange," *Journal of Economic Policies* 18(55): 141-154.
12. Oler, D. & Picconi, M. (2012). Implications of Insufficient and Excess Cash for Future Performance. *Texas Tech University*, (10) :1-53.