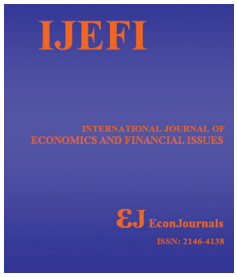

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# Factors Determining the Relation between Firm Expenditure and Working Capital Management in Firms Listed in Tehran Stock Exchange

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**ABSTRACT**

Currently firms' liquidity status is in undesirable condition and due to inflation conditions governing the country, most of Iranian firms prefer to convert the cash fund into other assets and this cause that the firms fail meet debts deadlines and this damages the credit of organization. The experience has shown that one of major reasons which cause that most of firms sustain financial distress and finally, some of them end up with bankruptcy is lack of proper management of working capital. This paper aims to determine the relation between firm expenditure with working capital management in firms listed in Tehran Stock Exchange. Along this, firm expenditure include capital expenditure (CAPEX) and operating expenditure (OPEX) as independent variables and net liquidity balance (NLB) and working capital requirement are considered as criteria of working capital management and study dependent variables. In this paper, one also considers operating cash flow, sale growth, and long-term debt to equity ratio and stock market to book value ratio are considered as independent variables. Data used in this paper include a sample consisted of 128 firms listed in Tehran Stock Exchange over 2009-2013 period. Linear regression pattern in hybrid method is used for analyzing data and testing hypothesis. Results obtained from study hypothesis test based on regression analysis suggest that there is a reverse significant relation between firm expenditure including CAPEX, OPEX with working capital management. Similarly, this conclusion is drawn that rate of firm growth and firm size play mediatory role in the relation between firm expenditure and NLB.

**Keywords:** Capital Expenditure, Operating Expenditure, Working Capital Requirement, Net Liquidity Balance, Working Capital Management
**JEL Classifications:** G1, G2

## 1. INTRODUCTION

Working capital management is one of important areas of financial management of organizations, because it affects directly liquidity and profitability of firms. There is probability of bankruptcy for firms subjected to inappropriate management of working capital in spite of positive profitability. Working capital management deals with assets and current debts. Current assets of a firm consists a considerable part of entire firm assets. Excessive level of current asset can result in realization of investment return less than common limit. However, firms with lower current assets will encounter with some shortcomings and complications within normal course of operations (Rahemannasr, 2007).

The manner of efficient working capital management varies from one firm to another and it relies on production, type of trade, commercial policies, strategies, etc. therefore it is of high relevance of organizations to find a way to managing the working capital in an effective manner. Most of researchers seek to understand those factors affecting and determining the working capital in an organization. Researchers have found that many factors contribute in working capital such as firm growth, size and leverage, etc. (Appuhami and Ranjith, 2010).

The experience has shown that one of significant reasons which cause most firms encounter financial distress, and finally some of them end up with bankruptcy is lack of proper managing of working capital (Rudposhti and Kiaei, 2008).

Inability of financial engineers in planning and controlling assets and debts has ended up to failure of many firms. Failure of lots of businesses represents inefficient management of working

capital. Most of researchers seek to understand factors affecting the working capital. Loo (1984), Lio (1995) and Soo (2001) have found that firm leverage and size, firm growth, type and size of expenditures such as operating, capital and financial expenditures have different impacts on working capital. Along this SFAS#95 have divided the cash flow statement into three parts: Operational, investment and operational cash flow. Mentioned studies also divided the firm expenditures into three classes: Operating, capital (investment) and financing expenditures which all are among factors affecting on working capital management (Appuhami and Ranjith, 2010).

Working capital management has been traditionally assessed using current ratio, quick ratio and net working capital. This paper divides the firm expenditures into three parts: Operating expenditures (OPEX), capital expenditures (CAPEXs) and financing expenditures. This paper classified the net working capital into working capital requirement (WCR), net liquidity balance (NLB), as measuring basis of management of working capital in a firm. For evaluating the working capital management, WC is measured and NLB deals with the power of growth and capital allocation. Therefore the main problem of current paper is as follows:

Which relation is between firm expenditure and working capital management in firms within study realm, and which influence have sale growth and firm size on the relation between firm expenditure and working capital management?

## 2. LITERATURE REVIEW

Appuhami and Ranjith (2010) has carried out a study about the impact of CAPEX on working capital management .the purpose of this research is to investigate the impact of firms' CAPEX on their working capital management. The author used the data collected from listed companies in the Thailand Stock Exchange. The study used Shulman and Cox's (1985) NLB and WCR as a proxy for working capital measurement and developed regression models. The empirical research found that firms' CAPEX has a significant impact on working capital management. The study also found that the firms' operating cash flow, which was recognized as a control variable has a significant relationship with working capital management, which is consistent with findings of previous similar researches. The findings enhance the knowledge base of working capital situations associated with CAPEX.

Haider (2012) in its study, the relationship between working capital management and firm characteristics selected listed Pakistani firms, he has drawn on the data of 200-2009 period in Pakistan Stock Exchange. Results show that there is a positive relation between working capital management and firm size. While, there is a negative relation between working capital management and financial influence.in addition, the results suggest that there is no relation between working capital management and Tobin's Q.

Ogundipe et al. (2012) in a study have examined the impact of working capital management on firms' performance and market value of the firms in Nigeria. A sample of 54 non-financial quoted firms in Nigeria listed on the Nigeria Stock Exchange was used for this study. Data were collected from annual reports of the sampled firms for the period 1995-2009. This result shows there is a significant negative relationship between cash conversion cycle and market valuation and firm's performance. It also shows that debt ratio is positively related to market valuation and negatively related firm's performance. The findings confirm that there is a significant relationship between market valuation, profitability and working capital component in line with previous studies.

Jannesari (2013) in a study has examined the impact of working capital management on profitability of small to medium firms. He used information of 68 firms listed in Tehran Stock Exchange over 2007-2011 period and adopted multiple regression model to examine the role of optimized working capital management for financing and its impact on small to medium firms profitability. Results show that these firms can improve their profitability by reducing the number of cash flow cycle days as criteria of working capital management and keeping its components in an optimum level.

Qaemi et al. (2008) results showed that stock returns are affected by amount of accruals and its components. In other word, there is a significant difference between stock return which its accruals is reported to minimum and maximum level.

## 3. RESEARCH METHODOLOGY

This paper is of practical purpose, because it seeks to improve the decision making in firms under study by using models, methods and theories. As this study uses stochastic sample, it uses descriptive method for expressing the results regarding the sample and it adopts inferential method for generalizing the results of statistical population. Therefore this is an inferential, descriptive and analytical study. Since it uses performance-related information of firms based on historical financial statement, its plan is of post event feature.

Research operational variables and manner of measuring them:

1. Firm expenditure:
   Firm expenditure in this paper is capital and OPEXs.
2. CAPEX:
   CAPEX represent expenditure that is spent for producing profit in the future.it included all costs of purchasing fixed and productive assets or adding the value of fixed and productive assets. Useful life of these assets should be more than remaining amount of tax year in which this cost is spent (Appuhami and Ranjith, 2010).
   Manner of calculating CAPEX in this paper is as follows:
   CAPEX + cost of purchasing fixed and productive assets + cost of fundamental repairing and promoting the fixed and productive assets + preparation cost+ legal costs + insurance cost + other costs matching the definition and features of CAPEX
3. OPEX:
   Costs required for maintaining firms in operating conditions and unlike Capex, most of its application is for a financial

course and it serves as a cost at that course. Similarly, OPEX occurs on an ongoing basis and in fact it is spent in operating or productive cycle (Appuhami and Ranjith, 2010).
Calculation of OPEX is done as follows:
OPEX = Wage cost + leasing cost + other costs matching with definition and features of OPEX

### 3.1. Working Capital Management

Working capital management is optimum combination of working capital items, namely, operating assets and debts in such manner that it maximized the shareholders' wealth. Profit firms managers should select appropriate strategies considering different conditions and internal and external factors and risk and return for managing the working capital in their firm, so that it can result in increased return, liquidity power, solvency and finally continuance of profit firm activities (Rudposhti and Kiaei, 2008).

In this paper, working capital management is measured by two criteria: NLB and WCR. It is worthy to mention that these two criteria cannot be summed. Therefore, in this paper, the relation of firm expenditure with each one of these criteria is calculated separately.

### 3.2. NLB

NLB resulting from difference of cash and bonds of firm with current debts of firm includes items such short time commercial deeds and current portion of facilities, it addresses power of growth and capital allocation. Shulman and Cox have concluded that NLB performs better than other additional indicators for crisis and liquidity prediction (Haider, 2012).

The manner of calculating NLB in this paper is as follows:

NLB = (Cash and cash equivalent + Short term investment) − (Current debts)

### 3.3. WCR

WCR is obtained from difference between items of current asset with relatively high liquidity power (in terms of liquidity in second place after cash fund and bonds) and current debts and represents gain or loss working capital (Haider, 2012).

Calculation of WCR is done in this paper as follows:

WCR = (funds + received accounts) − (paid accounts + paid costs + other payments)

### 3.4. Firm Size

One of internal factors of firms which affect financial structure and firms' profitability is firm size (Meranjuri, 2006). This variable is obtained from asset log.

SIZE= LOG(ASSET)

### 3.5. Market to Book Ratio (M/B)

One of basic financial ratio addresses investors. Profitability and firms profit growth increase cause that firm resources become greater than resource book value and consequently potential power of attracting investors of firms would be greater too. This ratio can be achieved by dividing stock market value by book value (Shabahang, 2012).

Calculation of M/B in this paper is done as follows:

M/B = Normal stock market value/normal stock book value

### 3.6. Operating Cash Flow (OPCASH)

It is cash from main and ongoing activities which produces operating earnings of commercial unit (Shabahang, 2012).

Calculation of OPCASH in this paper is as follows:

OPCASH = Cash obtained from operational activities of commercial units

### 3.7. Total Long-term Debt on Equity Ratio (D/E)

This ratio is one of leverage ratios which can be obtained from dividing long term debts by equity (Shabahang, 2012).

Calculation of D/E in this paper is done as follows:

D/E = Long term debts/equity

### 3.8. Growth of Sale

It is difference of sale income in the year under consideration and base year divided by sale in base year (Appuhami and Ranjith, 2010).

Calculation of sale growth in this paper is done as follow:

Gt = (sale income in considered year − sale income in previous year)/sale income in previous year

### 3.9. Research Hypothesis

1. Main hypothesis 1: There is a significant relation between firm expenditure and working capital management.
   Subsidiary hypothesis:
   - There is a significant relation between firm expenditure and WCR
   - There is a significant relation between firm expenditure and NLB.
2. Main hypothesis 2: Rate of firm growth plays mediatory role in relation between firm expenditure and working capital management.

Subsidiary hypothesis:
- 1-2 rate of firm growth plays mediatory role in relation between firm expenditure and WCR
- 2-2 rate of firm growth plays mediatory role in relation between firm expenditure and NLB.

3. Main hypothesis 3: Firm size plays mediatory role in relation between firm expenditure and working capital management.
   Subsidiary hypothesis:
   - 1-3 firm size plays mediatory role in relation between firm expenditure and WCR.
   - 3-2 firm size plays mediatory role in relation between firm expenditure and NLB.

### 3.10. Statistical society and sampling method

Statistical society in this study is consisted of all firms listed in Tehran Stock Exchange over 2009-2013 period, given the above situation, 128 firms listed in Tehran Stock Exchange are selected by systematic elimination method as sample.

## 4. RESEARCH FINDINGS

### 4.1. Descriptive Statistics

Firstly, descriptive statistics of data under study are calculated. Table 3 shows descriptive statistics of model variables including information related to mean, standard deviation, medium, skewness and kurtosis facts.

The main central index is mean which represents balance point and center of weight of distribution and is a good proxy for showing the centrality of data. For example mean of NLB variable is −173.303 which denotes that most of data are concentrated around this point (Table 1). Similarly, diffusion parameters serve as criteria for determining degree of dispersion with respect to the mean. Of most important dispersion parameter is standard deviation. Among study variables, sale growth has the least and NLB has the highest level of dispersion.

### 4.2. Other Defaults

#### *4.2.1. Chow test (F Limer) and Hausman test*

In all hypothesis, as P value obtained from F limer test is smaller than 0.05, the null hypothesis is rejected ($P < 0.05$), and panel data method is accepted (Table 2). Similarly, considering the p-value obtained from Hausman test smaller than 0.05 null hypotheses is confirmed and the fixed effects method is accepted.

#### *4.2.2. Normality of research variables distribution*

As it is shown in Table 3, probability of Jarque–Bera statistic for all study variables is <0.05, results show that variables are not of normal distribution, however, in statistical analysis when there are a lot of observations, lack of normality of variable doesn't bring about any hitch in proceeding analysis.

#### *4.2.3. Examining heteroscedasticity*

In all of these hypotheses, as statistic of these tests are significant at 5% level, therefore the homoscedasticity is rejected and heteroscedasticity of residuals is accepted (Table 4). This derives from violating the assumption Var $(U_i) = \delta^2 I$. This hitch in regression cause that ordinary least squares results would be no longer the most efficient. For solving this problem, the generalized squares least method is used.

**Table 1: Descriptive statistics of research model variables**

| Variables | Sign | Mean±SD | Skewness | Kurtosis |
|---|---|---|---|---|
| Dependent | | | | |
| Net liquidity balance | NLB | −2E+06±7,605,764.0 | −8.159 | 77.11948 |
| Working capital requirement | WCR | −318,276±−2,656,618.0 | −7.6067 | 68.05923 |
| Independent | | | | |
| Capital expenditure | CAPEX | 173,531.6±899,689.8 | 13.16753 | 228.6811 |
| Operating expenditure | OPEX | 2,963,547.0±14,408,833 | 8.450288 | 84.15155 |
| Sale growth | Gt | 0.184552±0.468671 | 5.165655 | 57.23837 |
| Firm size | SIZE | 5.758490±0.657913 | 0.731038 | 3.746553 |
| Control | | | | |
| Market to book value ratio | M/B | 1.927609±3.643979 | −7.3723 | 116.7568 |
| Long term debt to equity debt | D/E | 0.481431±8.824978 | 22.05563 | 549.4833 |
| Operating cash flow | OPCASH | 475,278.5±1,831,906.0 | 6.344622 | 48.63676 |

SD: Standard deviation, NLB: Net liquidity balance, WCR: Working capital requirement, CAPEX: Capital expenditure, OPEX: Operating expenditure

**Table 2: Chow test (F limer) and Hausman test**

| Hypothesis | Chow statistic (F limer) | P | P value | Result | Hausman statistic | P | P value | Result |
|---|---|---|---|---|---|---|---|---|
| Subsidiary hypothesis 1 | 29.420390 | 0.0000 | P<0.05 | Panel data | 22.178915 | 0.0005 | P<0.05 | Fixed effects |
| Subsidiary hypothesis 2 | 38.652494 | 0.0000 | P<0.05 | Panel data | 51.207894 | 0.0000 | P<0.05 | Fixed effects |
| Subsidiary hypothesis 1 | 31.162758 | 0.0000 | P<0.05 | Panel data | 207.96556 | 0.0000 | P<0.05 | Fixed effects |
| Subsidiary hypothesis 2 | 36.947144 | 0.0000 | P<0.05 | Panel data | 400.52890 | 0.0000 | P<0.05 | Fixed effects |
| Subsidiary hypothesis 1 | 10.916235 | 0.0000 | P<0.05 | Panel data | 204.29312 | 0.0000 | P<0.05 | Fixed effects |
| Subsidiary hypothesis 2 | 22.336913 | 0.0000 | P<0.05 | Panel data | 268.97851 | 0.0000 | P<0.05 | Fixed effects |

**Table 3: Normality test (Jarque-Bera)**

| Parameter description | Variables | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | NLB | WCR | CAPEX | OPEX | GT | SIZE | MB | DE | OPCASH |
| Number | 640 | 640 | 640 | 640 | 640 | 640 | 640 | 640 | 640 |
| Test criteria | 159599.3 | 123694.3 | 1415399. | 190389.6 | 83707.74 | 74.67416 | 364586.3 | 8316317. | 62170.03 |
| Significance level | 0.0000 | 0.0000 | 0.00000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

NLB: Net liquidity balance, WCR: Working capital requirement, CAPEX: Capital expenditure, OPEX: Operating expenditure

**Table 4: White heteroscedasticity test results**

| Hypothesis | description | Statistic value | P | P value | Result |
|---|---|---|---|---|---|
| Subsidiary hypothesis 1 | F-statistic | 17.35429 | 0.0000 | P<0.05 | Heteroscedasticity |
| | Obs*$R^2$ | 231.4884 | 0.0000 | | |
| Subsidiary hypothesis 2 | F-statistic | 12.31578 | 0.0000 | P<0.05 | Heteroscedasticity |
| | Obs*$R^2$ | 180.7387 | 0.0000 | | |
| Subsidiary hypothesis 1 | F-statistic | 250.0226 | 0.0000 | P<0.05 | Heteroscedasticity |
| | Obs*$R^2$ | 583.6497 | 0.0000 | | |
| Subsidiary hypothesis 2 | F-statistic | 13.54097 | 0.0000 | P<0.05 | Heteroscedasticity |
| | Obs*$R^2$ | 195.8809 | 0.0000 | | |
| Subsidiary hypothesis 1 | Obs*$R^2$ | 43.00844 | 0.0000 | P<0.05 | Heteroscedasticity |
| | F-statistic | 365.8240 | 0.0000 | | |
| Subsidiary hypothesis 2 | Obs*$R^2$ | 156.9600 | 0.0000 | P<0.05 | Heteroscedasticity |
| | Obs*$R^2$ | 547.0032 | 0.0000 | | |

## 4.3. Hypothesis Analysis

### *4.3.1. First main hypothesis test*

There is a significant relation between firm expenditure and working capital management.

This hypothesis is tested according to following subsidiary hypothesis.

### *4.3.2. First subsidiary hypothesis test*

There is a significant relation between firm expenditure and WCR (Table 5).

### *4.3.3. Second subsidiary hypothesis test*

There is a significant relation between firm expenditure and NLB (Table 6).

## 4.4. Second Main Hypothesis Test

Rate of firm growth plays a mediatory role in relation between firm expenditure and working capital management.

### *4.4.1. First subsidiary hypothesis test*

Rate of firm growth plays a mediatory role in relation between firm expenditure and WCR (Table 7).

### *4.4.2. Second subsidiary hypothesis test*

Rate of firm growth plays a mediatory role in relation between firm expenditure and NLB (Table 8).

## 4.5. Third Main Hypothesis Test

Firm size plays mediatory role in relation between firm expenditure and working capital management.

This hypothesis would be tested according to following subsidiary hypothesis.

### *4.5.1. First subsidiary hypothesis test*

Firm size plays mediatory role in relation between firm expenditure and WCR (Table 9).

### *4.5.2. Second subsidiary hypothesis test*

Firm size plays mediatory role in relation between firm expenditure and NLB (Table 10).

## 4.6. General Conclusion of Research

Following conclusions are found in this study (Table 11).

**Table 5: Results of data analysis for first main hypothesis test (first subsidiary)**

| Dependent variable: WCR | | | | |
|---|---|---|---|---|
| **Variables** | **Coefficient** | **SD** | **Statistic t** | **P value** |
| C | 15.11599 | 28182.40 | 0.000536 | 0.9996 |
| CAPEX | −0.577018 | 0.021611 | −26.70075 | 0.0000 |
| OPEX | −0.073454 | 0.010880 | −6.751439 | 0.0000 |
| MB | 3066.720 | 510.7570 | 6.004265 | 0.0000 |
| DE | −718.8567 | 243.2303 | −2.955457 | 0.0033 |
| OPCASH | −0.014360 | 0.012207 | −1.176376 | 0.2400 |
| Durbin–Watson statistic | | 1.873243 | | |
| P (F-statistic) | | 0.0000 | | |
| F-statistic | | 26.80353 | | |
| Adjusted $R^2$ | | 0.443477 | | |

SD: Standard deviation, WCR: Working capital requirement, CAPEX: Capital expenditure, OPEX: Operating expenditure

**Table 6: Results of data analysis for first main hypothesis (second subsidiary)**

| Dependent variable: NLB | | | | |
|---|---|---|---|---|
| **Variables** | **Coefficient** | **SD** | **Statistic t** | **P value** |
| C | −1,172,170.0 | 61,581.90 | −19.03432 | 0.0000 |
| CAPEX | −0.683959 | 0.056817 | −12.03785 | 0.0000 |
| OPEX | −0.194482 | 0.022112 | −8.795164 | 0.0000 |
| MB | −339.2739 | 459.0837 | −0.739024 | 0.4602 |
| DE | 125.9301 | 879.7262 | 0.143147 | 0.8862 |
| OPCASH | 0.261378 | 0.024075 | 10.85689 | 0.0000 |
| Durbin–Watson statistic | | 1.902497 | | |
| P (F-statistic) | | 0.0000 | | |
| F-statistic | | 86.56225 | | |
| Adjusted $R^2$ | | 0.447003 | | |

SD: Standard deviation, CAPEX: Capital expenditure, OPEX: Operating expenditure, NLB: Net liquidity balance

# 5. SUGGESTIONS

Considering results of study, suggestions of this paper are presented in two parts.

## 5.1. Practical Suggestions Based on Research Results

Results of study deriving from first main hypothesis: First subsidiary showed that there is reverse relation between firm expenditure and WCR. Thus managers are recommended to reduce the WCR as firm expenditure increases; this action assists in efficient working capital

management. Under such circumstance, payment of operating debts would be more prolonged and operating received accounts also can be collected rapidly and this brings about reduction of demand for working capital. Results of first main hypothesis - second subsidiary show that there is a reverse relation between firm expenditure and NLB. Thus, managers are recommended to deal with investment by considering the NLB and purchase stocks of firms with positive NLB (by considering other factors affecting stock return) because positive NLB increases firm's flexibility for using growth opportunity and profitable investments.

Results of study from second main hypothesis-first subsidiary showed that rate firm growth plays mediatory relation in firm expenditure and working capital management. Thus, managers are recommended that if firm operation is in growth, they prevent any type of pause in main process of firm by holding higher liquidity for supplying firm's expenditure. Results derived from second main hypothesis- second subsidiary shows that rate of firm growth plays role in relation between firm expenditure and NLB. Thus, managers are recommended that in case of growth of firm operation, they prevent any type of pause in main process of firm by holding higher liquidity for supplying firm's expenditure.

Results of study from third main hypothesis-first subsidiary showed that firm size plays mediatory relation in firm expenditure and WCR. Thus managers are recommended to pay further attention to firms' size in taking economic decision for stock sale and purchase. Study results of third main hypothesis - second subsidiary shows that firm size plays mediatory relation in firm expenditure and NLB. Thus managers are recommended to pay further attention to firms' size in taking economic decision for stock sale and purchase.

**Table 7: Results of data analysis for second main test (first subsidiary)**

| Dependent variable: WCR | | | | |
|---|---|---|---|---|
| **Variables** | **Coefficient** | **SD** | **Statistic t** | **P value** |
| C | 207,446.2 | 21,658.21 | 9.578176 | 0.0000 |
| CAPEX | −0.677199 | 0.049950 | −13.55740 | 0.0000 |
| OPEX | −0.166014 | 0.005390 | −30.79989 | 0.0000 |
| GT | 12,387.36 | 2654.486 | 4.666577 | 0.0000 |
| CAPEX*GT | 0.139420 | 0.075631 | 1.443421 | 0.0495 |
| OPEX*GT | 0.064297 | 0.010923 | 5.886239 | 0.0000 |
| MB | 2661.895 | 539.9729 | 4.929683 | 0.0000 |
| DE | −608.3359 | 211.8260 | −2.871866 | 0.0042 |
| OPCASH | 0.056261 | 0.014930 | 3.768354 | 0.0002 |
| Durbin–Watson statistic | | 1.870783 | | |
| P (F-statistic) | | 0.000 | | |
| F-statistic | | 23.78847 | | |
| Adjusted $R^2$ | | 0.430314 | | |

SD: Standard deviation, WCR: Working capital requirement, CAPEX: Capital expenditure, OPEX: Operating expenditure

**Table 8: Results of analysis data for second main test (second subsidiary)**

| Dependent variable: NLB | | | | |
|---|---|---|---|---|
| **Variables** | **Coefficient** | **SD** | **Statistic t** | **P value** |
| C | −734,539.1 | 45,563.32 | −16.12128 | 0.0000 |
| CAPEX | −0.747145 | 0.143834 | −5.194513 | 0.0000 |
| OPEX | −0.379990 | 0.016296 | −23.31803 | 0.0000 |
| GT | 45,821.14 | 9625.180 | 4.760549 | 0.0000 |
| CAPEX*GT | −0.046268 | 0.020411 | −2.266851 | 0.0197 |
| OPEX*GT | 0.193625 | 0.031404 | 6.165697 | 0.0000 |
| MB | −1506.797 | 701.8639 | −2.146850 | 0.0323 |
| DE | 811.4080 | 597.6948 | 1.357562 | 0.1752 |
| OPCASH | 0.275796 | 0.009686 | 28.47262 | 0.0000 |
| Durbin–Watson statistic | | 1.885720 | | |
| P (F-statistic) | | 0.000 | | |
| F-statistic | | 60.97029 | | |
| Adjusted $R^2$ | | 0.427939 | | |

SD: Standard deviation, CAPEX: Capital expenditure, OPEX: Operating expenditure, NLB: Net liquidity balance

## 5.2. Implications for Future Studies

1. This study is carried out at the level of all industries, therefore some differences which may be among various industries are overlooked. Thus, in future studies, one can determine the relation of firm expenditure and working capital management

**Table 9: Results of analysis data for third main test (first subsidiary)**

| Dependent variable: WCR | | | | |
|---|---|---|---|---|
| **Variables** | **Coefficient** | **SD** | **Statistic t** | **P value** |
| C | 712,453.8 | 98,669.51 | 7.220607 | 0.0000 |
| CAPEX | 0.789225 | 0.146630 | 5.382436 | 0.0000 |
| OPEX | −0.974477 | 0.072940 | −13.35991 | 0.0000 |
| SIZE | −131793.2 | 15579.92 | −8.459174 | 0.0000 |
| CAPEX*SIZE | −0.205583 | 0.028049 | −7.329520 | 0.0000 |
| OPEX*SIZE | 0.154813 | 0.012077 | 12.81911 | 0.0000 |
| MB | 1942.537 | 1007.779 | 1.927542 | 0.0545 |
| DE | −1109.007 | 472.8299 | −2.345467 | 0.0194 |
| OPCASH | −0.008764 | 0.015347 | −0.571082 | 0.5682 |
| Durbin–Watson statistic | | 1.843592 | | |
| P (F-statistic) | | 0.000 | | |
| F-statistic | | 25.61704 | | |
| Adjusted $R^2$ | | 0.440093 | | |

SD: Standard deviation, WCR: Working capital requirement, CAPEX: Capital expenditure, OPEX: Operating expenditure

**Table 10: Results of analysis data for third main test (second subsidiary)**

| Dependent variable: NLB | | | | |
|---|---|---|---|---|
| **Variables** | **Coefficient** | **SD** | **Statistic t** | **P value** |
| C | −2,577,264.0 | 60,335.31 | −42.71569 | 0.0000 |
| CAPEX | −0.455171 | 0.937803 | −0.485358 | 0.6276 |
| OPEX | −4.569469 | 0.167003 | −27.36164 | 0.0000 |
| SIZE | 280,486.2 | 7996.085 | 35.07794 | 0.0000 |
| CAPEX*SIZE | −0.049932 | 0.015275 | −3.268919 | 0.0081 |
| OPEX*SIZE | 0.734101 | 0.029178 | 25.15912 | 0.0000 |
| MB | 84.55537 | 470.4235 | 0.179743 | 0.8574 |
| DE | 828.6791 | 905.1522 | 0.915514 | 0.3603 |
| OPCASH | 0.310464 | 0.026721 | 11.61863 | 0.0000 |
| Durbin–Watson statistics | | 1.859549 | | |
| P (F-statistic) | | 0.000 | | |
| F-statistic | | 89.44754 | | |
| Adjusted $R^2$ | | 0.449688 | | |

SD: Standard deviation, CAPEX: Capital expenditure, OPEX: Operating expenditure, NLB: Net liquidity balance

**Table 11: Study hypothesis test results**

| Hypothesis | Description of hypothesis | Hypothesis test result based on regression analysis |
|---|---|---|
| Main 1 | There is a significant relation between firm expenditure and working capital management | |
| Sub 1 | There is a significant relation between firm expenditure and WCR | Hypothesis accepted |
| Sub 2 | There is a significant relation between firm expenditure and NLB | Hypothesis accepted |
| Main 2 | Rate of firm growth plays a mediatory role in relation between firm expenditure and working capital management | |
| Sub 1 | Rate of firm growth plays a mediatory role in relation between firm expenditure and WCR | Hypothesis accepted |
| Sub 2 | Rate of firm growth plays a mediatory role in relation between firm expenditure and NLB | Hypothesis accepted |
| Main 3 | Firm size plays mediatory role in relation between firm expenditure and working capital management | |
| Sub 1 | Firm size plays mediatory role in relation between firm expenditure and WCR | Hypothesis accepted |
| Sub 2 | Firm size plays mediatory role in relation between firm expenditure and NLB | Hypothesis accepted |

WCR: Working capital requirement, NLB: Net liquidity balance

in an industry-specific manner and to compare industries and present a clearer conclusion

2. Determining the relation between firm expenditure and inventory turnover period, average collection period, debts payment period and cash conversion cycle as variables of assessing working capital management
3. Determining the relation between firm expenditure and working capital management for recession and prosperity period separately
4. Determining the relation between mechanisms of working capital management with firm expenditure.

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