An Investigation into key factors affecting the Amount of working capital in companies active in the Tehran Stock Exchange

Reza Pirayesh
Assistant Professor of Department of Management and Accounting, University of Zanjan, Zanjan, Iran

Elham Bahrami*
M.A Student of commercial- financial Management, Department of Management, University of Zanjan, Zanjan, Iran
*Corresponding Author: Bahrami.Elham@znu.ac.ir

Abstract

This study intends to investigate the effect of key characteristics of companies on the amount of their working capital. The study is of the regression-based correlation-descriptive type. Using the screening method, a number of companies were selected as the study sample from among the companies in Tehran Stock Exchange between the years 2009 and 2014. The study results suggest that the variables of company size, profitability, and operating cash flow have a significant relationship with the working capital. However, no significant relationship was found between the variables of holders' leverage and a companies' growth and development opportunities.

Keywords: working capital, companies at Tehran Stock Exchange, key factors.
1. Introduction

In today’s challenging economic atmosphere where international organization seek new ways to grow, improve their financial performance, and minimize the risk of bankruptcy, working capital is considered an important source for improving their financial performance. In a number of research and academic resources, working capital has been likened to the blood flowing in the veins of a business entity, and the entity’s management has been compared to its beating heart which pumps the blood into the veins (Padachi, 2006:48). Any decision taken by the managers of a business entity regarding its working capital can dramatically affect its operating performance, which in turn can lead to an increase or decrease in the company’s value and its shareholders’ wealth. A lot of research has been conducted to identify the determining factors in companies’ working capital (Appuhami, 2008:19). The liquidity problem that companies have faced, especially during the 2008 economic crisis, prompted companies to release the valuable money which is trapped in their working capital. The status of the net working capital of companies affects their financing capability. This is of such importance that in order to receive loans from financial organizations, companies must maintain the status of their minimum net working capital (McGuigan et al., 2012:12).

Regarding the importance of the subject of working capital, some studies have shown that a large amount of companies’ assets are invested in their working capital. In their study on the working capital of the top 2000 American companies, Ernst and Young (2011) showed that the amount of their working capital combined was around $1 trillion, which, in addition to being an indication of the considerable size of working capital as part of the companies’ assets, reflected its importance in creating their liquidity (Ernst and Young, 2011:51). If a company’s working capital is not managed appropriately, the company may fail to pay off its liabilities and face difficulties in continuing its activity. In addition, the financial management department spends most of their time on the daily domestic activities of the company, an activity which is simply dubbed as “working capital management.” This is also of great importance for smaller businesses. A small business can minimize their fixed assets by leasing a factory and its equipment, yet investment in current assets is inevitable.

This study intends to identify the key factors affecting the amount of investment in the working capital of companies in the Tehran Stock Exchange. It also aims to answer the question of to what extent the shareholders’ leverage, growth and development opportunities, size and availability of the capital market, profitability, and operating cash flow affect a company’s decision on the amount of its working capital.

2. Theoretical Principles

Working capital is defined as a company’s investment in short-term assets such as cash, short-term securities, accounts receivables, and inventories (Bardia, 1988:35). Ramachandran and Janakiraman (2009) believe that working capital consists of the funds invested in the current assets, i.e. the funds which convert to cash in an ordinary business cycle in a short period of time.
without losing their value or the company becoming bankrupt. Current liabilities are the debts which are paid back in an ordinary business cycle in a short period of time (Ramachandran and Janakiraman, 2009:70). According to financial experts, two functional definitions can be given for working capital. The first definition takes on a viewpoint based on the company’s balance sheet and refers to working capital as the difference amount between a firm’s current assets—such as accounts receivables, inventory of raw materials and manufactured goods, and cash—and its current liabilities, including accounts payables and short-term debts. Working capital is somehow the source of a business’s liquidity, and its amount can show how quickly the business is able to pay off its liabilities to suppliers and contractors. With this definition and from the viewpoint of the company’s total capital, working capital is looked at as both its financial resource and where it can use the financial resources. If a business can create a surplus in its working capital through appropriate management of its accounts receivables and accounts payables—e.g. by increasing the payment period and reducing the collection period—working capital can become a source for cash flow injection into the company’s long-term projects. On the other hand, if the collection period is longer than the pay-out period, the business will face a negative working capital. Working capital plays a role as an absorber of shocks which a business receives due to a possible decrease in finances. Ding (2013) showed that Chinese companies equipped with this mechanism can avoid financial shocks better by using their working capital. As a result, the fixed investments of such companies are not easily affected by their cash flow, while on the other hand, working capital, which has stronger flexibility and a shock absorption role, is more sensitive to the changes in the cash flow (Ding et al., 2013:228).

The second viewpoint is concerned with the production process and focuses on the frozen capital in the supply chain from the purchase of raw material until determining the sales prices of a final product. The existence of sufficient working capital allows a business to optimize the level of production variables, e.g. the amount of available raw material and the final product inventory. When sufficient working capital is not available, either the current operation of the business ceases or the business is compelled to select a suboptimal production process. For instance, it might lower the amount of its ordered raw material, which leads to higher ordering costs. Another drawback could be that the business, due to the shortage of working capital and its effort to reduce its cash flow cycle, decides to produce lower amounts of the manufactured product than the optimum levels, which can lead to the problem of lost sales. Combining the two abovementioned definitions, lack of attention to the amount of working capital can cause irreparable damages to a business (Abdeh Tabrizi, 2014:15). The recent liquidity crises have increased the awareness about the importance of managing the working capital. In order to reach an optimal amount of working capital, managers must create a balance between maximizing their businesses’ profitability and the amount of their liquidity. Empirical research on advanced economies show that effective management of a company’s working capital increases its market value and, as a result, has a positive effect on its shareholders’ wealth (Sandy, 2012:6).

2.2. Factors Affecting the Amount of Working Capital.

Basically, the important components of the working capital in every organization depend on their trade or industry. Most of the people involved in industries have realized the importance of this
issue but seek short-term, extra-organizational solutions. In other words, they find the solution in businesses obtaining sufficient, cheap loans and facilities. From the viewpoint of financial managers, working capital is a simple and clear concept, which enables businesses to understand the difference between their assets and short-term liabilities. Cash, debtors, receivables, material inventories, securities ready for future sale and redemption can be a company’s regular components of working capital. Although the main goal of managers is to identify the factors determining the sufficiency of the working capital based on growth, company size, operating cash flow, etc., businesses’ inability in understanding the determining factors and adequacy of the working capital lead them towards bankruptcy. Most of the researchers in this field have put efforts into understanding the factors which determine the working capital of a certain company. Horrigan (1965), Lo (1984), Liu (1985), Xo (1995), and Su (2001) have found that a company’s growth, size, and financial leverage have an effect on its working capital. In general terms, the characteristics of a company and its relevant industry and its financial environment have been recognized as the determining factors in the company’s working capital. However, there are a large number of companies try to manage their working capital, despite lacking the sufficient understanding of the determining factors. This study is among those which try to identify factors from among the characteristics of a select number of companies, which can affect their working capital. The following sub-sections include five of the important factors, which have been investigated in this study.

2.2.1. Shareholders’ Leverage
One of the most important issues in financial management is the decision making and sound judgment on investments with the goal of maximizing the shareholders’ wealth. To achieve this goal, increasing the income from investments and minimizing the capital are two suitable solutions. Therefore, information on the cost of financing has been of great importance in companies’ decisions. Achieving an appropriate cost rate is of great significance in determining the optimal composition of the financial structures of companies, especially in achieving the best performance in the form of profitability and increasing the stock price. Chiou et al. (2006) argue that according to the theory of hierarchy, in order to reduce shareholders’ supervision and limitations imposed by them and also to lower other costs, a company must try to supply its long-term investments through its domestic capital (Chiou et al., 2006:150). A company with higher amounts of debt means that it has lower domestic financing and may have little capital for its daily operations. Due to the higher cost of external financing (because of its higher commission) compared to that of internal financing, a company with an increasing debt ratio will pay more attention to its working capital in order to prevent the capital which it can use in profitable investment opportunities from being stuck in its operation cycle (Nazir and Afza, 2009:21). Furthermore, since the working capital return is lower, costly investments in the working capital cycle does not seem to be a good idea (Baños-Caballero, 2010:523). After the introduction of the agency theory, the shareholders’ equity can determine their leverage in making decisions on the company’s issues. The general opinion is that whenever a company can invest the borrowed monies with higher rates, it can achieve higher returns with the increase of its financial leverage. A high debt ratio indicates a company’s low level of internal financial resources and that it requires external financial resources to finance its operations. This negative relationship has been
confirmed through a large number of studies in this area (Raheman and Nasr, 2007; Mathuva, 2010; Zariyawati, 2010; Erasmus, 2010).

In this study, similar to the other related cases of research, the ratio of total debts to total assets has been used to measure this factor.

2.2.2. Growth and Development Opportunities
Growth is crucial for all companies, whether or not they are in growing industries or in developed markets. Investment is the basic requirement of companies which seek growth opportunities. These opportunities are the driving force creating motivation and act as a bonus for investors (Tehrani and Nourbakhsh, 2003:25). There is no consensus of opinion on the relationship between a company’s growth and the amount of investment in its working capital. The existence of surplus is considered valuable by companies due to the fact that in this situation, companies can ensure that they can easily invest in possible profitable opportunities since they have access to sufficient financial resources. This is of greater importance for companies with more growth opportunities. Moreover, in such companies, increased profitability requires maintaining the level of liquidity. In order to have the resources needed for this end, companies must have a shorter cash conversion cycle. Nevertheless, if the company keeps most of its resources in the form of cash or pseudo-cash, it is possible that the management uses the extra available cash in non-productive areas. According to researchers, companies with potential growth opportunities have a tendency to create and maintain the level of liquidity. Kim et al. (2011) showed that there is a positive correlation between a company’s level of liquidity and the growth rate of its future economic activity (Kim et al., 2011:69). Free cash flow is of great importance since it allows the company to seek more opportunities and increase the value of its shares. Without access to cash, development of new products, business acquisitions, payment of cash dividends to shareholders, and reducing debt levels are impossible for a company. However, cash levels should be maintained at a certain degree, such that there is a balance between the cash holding costs and insufficient cash costs.

In this study, in order to measure the effect of growth and development opportunities of a company on the amount of investment in their working capital, the income of the year \( t \) is divided by the income of the year \( t-1 \).

2.2.3. Company Size
The size of the company is defined as how small or large it is. Kieschnich (2006), showed a positive correlation between the size of American companies and the amount of their working capital. The required working capital increases with the size of a company (Grablowsky, 1984:62). Hill et al. (2010) deem a company’s access to the capital an indication of its size because according to Brennan and Hughes (1991), large companies face intense attention from analysts. They argue that since large companies have easier access to external capital, they can have simpler stock and claims policies (Hill et al., 2010:792). With higher levels of sales, larger companies require more investments in their working capital (Moussawi et al., 2006:17). Also, since the size of a company intensifies the issue of agency among shareholders and creditors, a positive relationship is expected (Baños-Caballero, 2010:513). Moreover, larger companies may have more bargaining power with sellers and consumers, and therefore, a negative relationship is
probable. According to the balance theory, the expected correlation between the size of a company and cash holding is negative. Since larger companies possess higher flexibility, more stable cash flows can be expected for them, and as a result, they are less at risk of bankruptcy and have easier access to finance resources compared to smaller companies. Large companies which have bank credits can borrow with lower interest rates and are able acquire funds more easily when necessary. In addition, larger companies can sell a portion of their unnecessary assets in order to obtain funds. Furthermore, larger companies possess more variety and, compared to smaller ones, tend to fail less often. A study by Moss and Stein (1993) showed that larger companies can better manage their cash conversion cycle. The researchers also argued that since larger companies have easier access to capital, their cash level is maintained as minimum, therefore resulting in a negative relationship between the company’s size and its working capital. In this study, size of companies was calculated using the natural logarithm of their total assets (Moss and Stein, 1993:29).

2.2.4. Profitability
Chiou et al. (2006) argue that since financing is easy in profitable companies, the amount cash is always kept at minimum levels, and there is an expected negative relationship between a company’s working capital management and its profitability (Chiou et al., 2006:152), a conclusion which is confirmed in the results obtained by Baños-Caballero et al. (2010). On the contrary, Nazir and Afza (2008) argue that highly profitable companies have sufficient amounts of cash to fund their investment activities and, as a result, pay less attention to effective management of their working capital. Therefore, there must be a positive relationship between profitability and investment in working capital. On the whole, the effect of profitability on working capital investment can be both negative and positive.

The amount of asset returns reflects how much of the assets are used to create profit. In this study, to better understand the effect of profitability on the amount of working capital, the efficiency ratio of assets has been used. This ratio is obtained by dividing the profit or loss after tax by the total assets of a company. It represents the effectiveness of the company’s management in utilizing all of the available resources to achieve higher profitability.

2.2.5. Operating Cash Flow
Operating cash flow is considered as a part of an organization’s liquidity and is defined as the cash which is the outcome of a business’s operation. However, free cash flow is resulted after a number of adjustments in the operating cash flow. Currently, changing the operating cash flow as a company’s source of cash has a significant effect on its asset and capital structures, such as the cash holdings, investments, and external financing. An increase in the amount of a company’s cash results in an increase in its savings and a decrease in its external financing in the short run and, in the long run, leads to an increase in investments and external financing. Companies with a shorter cash conversion cycle possess a faster cash flow due to the faster return of the financial resources to the company. Therefore, there is a negative relationship between the cash conversion cycle and the operating cash flow (Moss and Stein, 1993:32). Chiou and Cheng (2006), in their study on the effect of the operating cash flow on working capital management, found a significant negative relationship between operating cash flow and working capital. Banos-
Caballero et al. (2010) cited the findings of Fazzari and Peterson (1993) who suggested that companies with higher cash flow have a higher capacity to generate internal cash flow due to the low cost of investment on their working capital. On the other hand, higher cash flow leads to the company’s less diligence in terms of paying off operational debts and collection of receivables, causing lower working capital requirements (Banos-Caballero et al., 2010:518). This finding was also confirmed in Appuhami’s study (2008) in which it was found that companies tend to reduce their investment on the working capital by increasing the operating cash flow (Appuhami, 2008:14).

The factor investigated in this study is the operating cash flow the input data of which we have extracted from the cash flow statement of the companies.

2.3. Research Background
Numerous studies have investigated the relationship between the amount and management of working capital and various factors, which are explained in separate to two subsections as “domestic” (Iranian) and “foreign” studies.

2.3.1. Domestic Studies
- Zarafsharian (2015), in his study titled “The Mutual Effect of Working Capital and Cash Flow on Companies' Financial Performance and Profitability” investigated the factors affecting the working capital and cash and their effect on the performance and profitability of companies. These factors included the cash conversion cycle, inventory turnover period and its postponement, creditors payment period and postponement of accounts payables, receivables collection period, sale postponement, and Tobin’s Q ratio. The study is of a descriptive type and reviews the literature in this field. The results suggest that there is a significant inverse relationship between the profitability of a company and its cash conversion cycle, receivables collection period, creditors payment period, and inventory turnover. For instance, the shorter the creditors payment period, the higher the company’s profitability. Also, the shorter the inventory postponement and sales postponement periods, the better the performance of a company.

- Barzegari Khanghah and Mohammadi (2014) conducted a study titled” An Investigation of the Relationship between Working Capital Management and Economic Value Added in Business Cycles,” the goal of which was to investigate the relationship between working capital management and the economic value added as the performance benchmark of companies in various business cycles. The study included 77 companies from among the ones accepted in the Tehran Stock Exchange in the period between the years 2009 and 2011, using the screening method. The cash conversion cycle, receivables collection period, debt payback period, and inventory turnover period were considered as the independent variables, and the economic value added was considered as the dependent variable. The analysis of the data was done, using the regression method and the panel model, and to test the hypotheses, the Chow-Hausman test was utilized. The results obtained from testing the hypotheses showed that during a period of economic recession, the relationship between some variables of working capital and the economic value added become stronger. In addition, the findings of this study suggest that during a period of economic boom this relationship becomes weaker. However, regarding the other
variables, economic recession or boom did not cause any significant change in their relationship with the economic value added.

- Khodadadi, Pouarpanahi, and Karayi Moghadam (2014) believe that if accrual accounting is not used, only cash accounts will be listed in the balance sheet. Therefore, the reports of other asset and debt accounts is created by accrual accounting. As a result, the amount of accruals equals the change in the total non-cash assets minus the change in the total liabilities. If one takes a closer look at the nature of accruals of companies, it can be understood that they represent the management’s ability and authority in all of the activities of the company, such as investment and financing. As a result, a large number of a company’s activities can be affected by the nature of these accruals. In addition, when facing uncertain economic situations, companies make an effort to adopt policies so that they portray their situation as favorable. This led to a study titled “An Investigation of the Relationship between Working Capital Accruals and Environmental Uncertainty in Companies Active in the Tehran Stock Exchange” by the abovementioned researchers, where they made an effort to investigate the relationship between the working capital accruals and the environmental uncertainty of companies in the period between 2006 and 2012. The testing of hypotheses was done, using the panel model. The results obtained from the information on 120 companies selected through screening sampling showed that the variables of environmental uncertainty and bankruptcy risk of companies had a significant positive relationship with the amount of working capital accruals and long-term investments. However, no relationship was found between the operational cycle of companies and the variables of risks caused by environmental uncertainty and the amount of capital accruals.

- Abedi et al. (2014) conducted a study titled “A Model for Coordination of Financing and Working Capital Strategies with Financial Performance,” which presents a panel model with the aim of coordination of financing and working capital strategies with the performance of organizations. In terms of results, the research method was of the developmental type; in terms of the research goal, it was of the descriptive-explanatory type; in terms of the data type, it was of a quantitative and qualitative type; in terms of researcher’s control, it was independent of the research subject; and in terms of the method, it was of the survey type. In this study, 111 companies were selected as the sample group and investigated. The results were also analyzed using the parametric and non-parametric statistical analysis methods. The results showed that the ROE and Tobin’s Q performance of companies whose financing strategies were in coordination with their working capital strategies is higher than the companies which lack such coordination. In other words, better coordination between financing and working capital strategies leads to better performance of companies.

- Regarding the great significance of working capital, Yazdani and Alavi Rad (2013) investigated the relationship between working capital management and companies’ performance, considering the effect of working capital optimum level sensitivity to alternative measures for financial constraints. The goal of this study is was to determine how working capital management and companies’ performance are related and what connection lies between the optimal level of working capital and financing constraints. To
this end, the study considered companies which had been accepted in the Tehran Stock Exchange in the period between 2006 and 2010. Considering the limitations and conditions surrounding the population sampling in this study, 59 companies were investigated. The collected data from the selected companies were described, using the Excel software. Using the Eviews7 software, the research hypotheses were tested with the panel data econometric model. The obtained results suggest that there is an inverse \( U \)-shape relationship between working capital and companies’ performance. In addition, the optimal level of the working capital is lower in companies with more financial limitations.

2.3.2. Foreign Studies

- Patrick (2014) conducted a study titled “The effect on profitability, working capital management firms in different business cycles in Finnish companies,” where he believes that the recent financial crisis has led companies to focus more on the adoption working capital policies. In the study, he investigates the role of working capital management in the level of profitability in different business cycles in a sample consisting of a number of Finnish companies during an 18-year period. The results show that the effect of working capital management is stronger on the level of profitability during recession periods than in periods of economic boom. The study results also indicate the great importance of effective management of inventories, accounts receivables, and cash conversion cycles during recession periods.

- Ahmed (2014), in his study titled “The relationship between working capital management and profitability; A Case Study of Pakistan,” concluded that there is a significant negative relationship between the net operating income and average cash conversion cycle, daily inventory turnover, average payment period, and cash conversion cycle of the companies in the Karachi Stock Exchange.

- Amarjit Gill and Charul Shah (2012) investigated the factors determining the amount of cash of companies in Canada. The results showed that the level of cash holding had a positive relationship with cash flow, financial leverage, size of board of directors, and dual directorship in an industry and a negative relationship with working capital.

- Benjamin Yeboah and Samuel KwakuAgyei (2012) investigated the effect of working capital management on the profitability of companies in Ghanaian banks between 1999 and 2008. The results showed that the receivables collection period, cash conversion cycle, capital structure, and bank size have a significant negative relationship with the cash status of the bank. Also, the findings suggested that creditors payment period and profitability have significant positive relationship with the cash status of the Ghanaian banks.

- Avlaynka (2012) conducted a study on the factors affecting the working capital in Nigeria. The results showed that sales growth, operational cycle, and economic activities have a positive relationship with working capital, while financial leverage has a negative relationship with it.

- Al-Mwalla (2012) investigated the effect of working capital management policies on the profitability and market value of the companies in the Muscat Securities Market between the years 2001 and 2009. He concluded that conservative investment strategies have a positive effect on the profitability and value of a company, while daring investment
policies lead to opposite results. The findings also led to the conclusion that the size of a company, its growth, and the growth of the gross domestic product have a positive effect on its profitability and value.

- Rehn (2012) studied the effects of working capital management on the profitability of Swedish companies. To this end, he used cash conversion cycle and net business cycle as a measure for the amount of working capital and the gross operating profit as a measure for profitability. The results suggested that companies increase their profitability by shortening their cash conversion period and net business cycle. This study also presents important evidence which shows that companies can increase the current net value of their cash flows through effective management of each part of the working capital and, as a result, increase their stock values.

3. Methodology and Tools

3.1. Research Method

In terms of the goal, this study is of the applied type, and is dichotomous in terms of the data type. Also, regarding its conduction method, it is descriptive and is conducted using the correlation method.

3.2. Data Collection Method

The required data can be collected in different locations and using different sources. What is important is that the collection tools do not damage the validity of a study, and also their strengths reinforce the validity of the study. In order to collect the data regarding the theoretical principles and literature of the study, notes were taken from library sources, magazines, books, and theses, and in order to collect the data to test the hypotheses, the study has benefited from the information bank of the companies in the Tehran Stock Exchange, using the RahAvard Novin software. To collect the data regarding the age of companies, we have used the Iranian governmental system of registering the legal entities’ national IDs, which belongs to the State Organization for Registration of Deeds and Properties.

3.3. Population and Statistical Sample

The statistical population is defined as the entire group of people, events, and phenomena which the researcher is interested to investigate and which have one or some characteristics in common. The statistical sample might include all of, a specific group of, or a limited number of the population. The statistical population of this study are all of the 472 companies accepted in the Tehran Stock Exchange and operating between the years 2009 and 2014. Using the screening method, the sample population of 181 companies was obtained. Table 1 depicts the process of sample selection.

Table 1) sample

The total number of companies listed on Tehran Stock Exchange at the end of 2104 | 472
3.4. Research Domain
The research domain is dividable into three areas:
3.4.1. Subject
This study is in the field of management, specifically in the areas of investment and financial management.
3.4.2. Location
This study was conducted on the companies active in the Tehran Stock Exchange.
3.4.3. Time
The study considered the companies operating in the Tehran Stock Exchange between the years 2009 and 2014.
3.5. Research Variables
A variable is a factor, feature, or element whose value is liable to vary or change. The values can vary in different times for a different person or object, or they can vary at one time for a different person or object. The variables in this study have been listed in Table 2 according to their type and measurement parameters.

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Symbol</th>
<th>Variable type</th>
<th>Measurement indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Capital</td>
<td>NWC</td>
<td>The dependent</td>
<td>Total current assets - Total current liabilities</td>
</tr>
<tr>
<td>Shareholders Leverage</td>
<td>LEV</td>
<td>independent</td>
<td>total assets / Total debt</td>
</tr>
<tr>
<td>Growth and Development Opportunities</td>
<td>GROWTH</td>
<td>independent</td>
<td>Total income in the year t / total income in the year t-1</td>
</tr>
<tr>
<td>Company Size</td>
<td>SIZE</td>
<td>independent</td>
<td>The natural logarithm of total assets</td>
</tr>
<tr>
<td>Profitability</td>
<td>PROFIT</td>
<td>independent</td>
<td>Return on assets</td>
</tr>
<tr>
<td>Operating Cash Flow</td>
<td>OCF</td>
<td>independent</td>
<td>Earning after tax + depreciation</td>
</tr>
</tbody>
</table>

Criteria :
The number of companies that have been active in the time span of 2009 to 2014. (29)
The number of companies that have been accepted in exchange After 2009. (119)
The number of companies that in the time domain 2009 to 2014 have changed Financial year or Their fiscal year ending is not in March. (99)
The number of companies that are in industrial investment, financial intermediation, banks and credit institutions, rental and leasing, investment funds and activities auxiliary to financial institutions that are interfaces. (42)
The number of companies that their data is not available in the time domain 2009 to 2014. (2)
The number of samples: 181
3.6. Research Hypotheses
Hypothesis 1: A company’s shareholders’ leverage has a significant effect on the amount of investment in its working capital.
Hypothesis 2: A company’s growth and development opportunities have a significant effect on the amount of investment in its working capital.
Hypothesis 3: A company’s size has a significant effect on the amount of its investment in the working capital.
Hypothesis 4: A company’s profitability has a significant effect on the amount of its investment in the working capital.
Hypothesis 5: A company’s operating cash flow has a significant effect on the amount of its investment in the working capital.

3. Data Analysis

In this study, in order to analyze the collected data and to test the hypotheses, descriptive and inferential statistical methods were utilized. In the descriptive-correlational method, the goal is to describe the research data using tables and descriptive statistical tools such as indices of dispersion and central tendency in order to better clarify the descriptive data. Also, in the inferential statistical methods, in order to test the research hypothesis, the research data are extracted from various sources, transferred to an Excel spreadsheet, and analyzed. Afterwards, using statistical tests, the assumptions of the classical regression model and the correlations between the research data are analyzed. Next, through the analysis of the regression model resulted from the research process and by investigating the significance of the regression model of the research hypotheses and variable coefficients, using the Eviews software, the hypotheses are confirmed or rejected with the t-test. In order to analyze the regression models of the research hypotheses, panel data sets have been utilized, i.e. more than one company are studied simultaneously in a given period. To test the research hypotheses, first the F-Limer test must be used to select between the pool model and the panel model in the panel data sets. If the calculated F-Limer is less than the F-Limer of the table, the panel model must be used; otherwise, the pool model must be utilized. If the data are in the form of panel, the Hausman test must be utilized. To investigate whether the intercept is in the form of fixed effects or random effects, the Hausman test is utilized. If the probability of the Hausman test is less than 5%, the random-effects method is rejected and the fixed-effects method is used. In the case of using the random-effects method, the problem of heterogeneity of variance must be resolved. To do this, the generalized least squares regression method must be used for model estimation. Afterwards, for each one of the hypotheses, the F-Limer and Hausman tests are used separately, and the obtained regression results are analyzed with the t-statistic, F-statistic and its probability, and coefficient of determination.

4.1. Descriptive Analysis
In order to investigate the basic and general features of the variables for model estimation and its accurate analysis, estimation of the descriptive statistics of the variables is required. The most important central characteristic of a distribution is the mean, and the most important
A characteristic of its dispersion is variance. Practically, in order to determine the dispersion amount of a distribution, the square root of the variance (standard deviation) is utilized. Using these tools, we can have an overview of the amount of each of the variables. Table 3 contains the descriptive statistics of the variables of Working Capital, Shareholders’ Leverage, Growth Opportunities, and Company Size. According to the results obtained from Table 3, the coefficient of skewness is positive for all the variables except for the variable of Working Capital. Therefore, positive skewness, compared to the normal distribution, shows that the distribution of the variables is pulled to the right. For the variable of Working Capital, the negative skewness coefficient shows that the distribution of the variables is pulled to the left. To investigate the kurtosis measure, if the obtained value is positive, there is a lower dispersion of data around the mean, while a negative value indicates a higher level of dispersion of data around the mean. The zero value of the kurtosis coefficient indicates a normal distribution. The investigation of the kurtosis measure suggests that the probability distribution of the data is more stretched compared to the normal distribution (i.e. there is a lower level of dispersion).

Table 3) Descriptive statistics of working capital, Shareholders Leverage, Growth and Development Opportunities and Company size variables

<table>
<thead>
<tr>
<th>Icon Model</th>
<th>WC</th>
<th>LEV</th>
<th>GROWTH</th>
<th>SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>-89840/62</td>
<td>1/549105</td>
<td>1/442115</td>
<td>12/72604</td>
</tr>
<tr>
<td>Median</td>
<td>-700/1533</td>
<td>0/794559</td>
<td>1/000000</td>
<td>12/58684</td>
</tr>
<tr>
<td>Maximum</td>
<td>31424434</td>
<td>58/98935</td>
<td>3/272724</td>
<td>18/81726</td>
</tr>
<tr>
<td>Minimum</td>
<td>-32319829</td>
<td>0/062177</td>
<td>0/005721</td>
<td>7/754482</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>2272687/0</td>
<td>4/660082</td>
<td>9/328724</td>
<td>1/987382</td>
</tr>
<tr>
<td>Skewness</td>
<td>-1/263952</td>
<td>10/68744</td>
<td>32/50129</td>
<td>0/195762</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>114/4426</td>
<td>128/8211</td>
<td>1065/648</td>
<td>2/930028</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>562269/3</td>
<td>736345/3</td>
<td>51288462</td>
<td>7/151346</td>
</tr>
<tr>
<td>Probability</td>
<td>0/000000</td>
<td>0/000000</td>
<td>0/000000</td>
<td>0/027997</td>
</tr>
<tr>
<td>Observations</td>
<td>1085</td>
<td>1085</td>
<td>1085</td>
<td>1085</td>
</tr>
</tbody>
</table>

The descriptive statistics of the variables of Profitability, Cash Flow, Quick Ratio, and Current Ratio are presented in Table 4. According to the results of Table 4, the coefficient of skewness is positive for all of the variables except for the variable of Profitability. Therefore, a positive skewness, compared to the normal distribution, shows that the distribution of the variables is pulled to the right, while the negative coefficient of skewness for the variable of Profitability shows that distribution of the variables is pulled to the left. To investigate the kurtosis measure, if the obtained value is positive, there is a lower dispersion of data around the mean, while a negative value indicates a higher level of dispersion of data around the mean. The zero value of the kurtosis coefficient indicates a normal distribution. The investigation of the kurtosis measure suggests that the probability distribution of the data is more stretched compared to the normal distribution (i.e. there is a lower level of dispersion).
Table 4: Descriptive statistics of profitability, cash flow, quick ratio, and current ratio

<table>
<thead>
<tr>
<th>Icon Model</th>
<th>ROA</th>
<th>OCF</th>
<th>QR</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>1/07559/7</td>
<td>0/70519/3</td>
<td>0/0/70519</td>
<td>0/0/70519</td>
</tr>
<tr>
<td>Median</td>
<td>2/47928/6</td>
<td>0/57736/3</td>
<td>0/0/57736</td>
<td>0/0/57736</td>
</tr>
<tr>
<td>Maximum</td>
<td>275/576/8</td>
<td>8/35820/7</td>
<td>10/8497/4</td>
<td>4/0/8497/4</td>
</tr>
<tr>
<td>Minimum</td>
<td>-314/428/9</td>
<td>0/01304/2</td>
<td>0/0/02784</td>
<td>4/0/02784</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>43/3469/4</td>
<td>460540/0</td>
<td>0/66159/2</td>
<td>0/79240/5</td>
</tr>
<tr>
<td>Skewness</td>
<td>-4/20565/0</td>
<td>8/20934/0</td>
<td>4/25294/6</td>
<td>3/88704/1</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>30/7638/5</td>
<td>83/2357/3</td>
<td>33/7320/5</td>
<td>33/2571/4</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>38081/5/7</td>
<td>303507/4</td>
<td>46010/6/0</td>
<td>44160/8/7</td>
</tr>
<tr>
<td>Probability</td>
<td>0/00000/0</td>
<td>0/00000/0</td>
<td>0/00000/0</td>
<td>0/00000/0</td>
</tr>
<tr>
<td>Observations</td>
<td>1085/1085/1085/1085</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.2. Assumptions of the Regression Models of the Study

In order to use any regression model, certain assumptions must be true, and if any of the assumptions is violated, the desired properties of the estimates of the regression parameters or the hypothesis testing of the study encounter difficulties. The assumptions and their appropriate statistical tests to measure them have been presented in Table 5.

Table 5: Statistical tests used

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Statistical tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normally distributed variables</td>
<td>Jarque-Bera test</td>
</tr>
<tr>
<td>Assess the reliability of variables</td>
<td>Reliability Test Levin, Lin and Chu, Fisher - Dykly Fuller and Fisher - Philips, Peron</td>
</tr>
<tr>
<td>Detection and estimation appropriate model</td>
<td>F Limer test and Hausman test</td>
</tr>
<tr>
<td>Heterogeneity of variance</td>
<td>White test</td>
</tr>
<tr>
<td>Autocorrelation of variables</td>
<td>Durbin Watson (D-W)</td>
</tr>
</tbody>
</table>
4.2.1. Normality Test of Variables
Since one of the assumptions of a regression model is the normality of data distribution, the normality of the distribution of the research variables was put to test with the Jarque-Bera test. To test the normality of the distribution of the variables, the null hypothesis is that the data distribution is normal. Provided that the probability resulting from the test is greater than 5%, the null hypothesis is accepted and, otherwise, rejected. The probability of the Jarque-Bera statistic, given in Tables 3 and 4, shows that the probability of the variables is less than 5%. Therefore, the null hypothesis is rejected, and it is concluded that the distribution of the research data is not normal. However, due to the high number of observations (n>30) and based on the central limit theorem, we can assume that the distribution of the variables is normal.

4.2.2. Variable Stationarity
In order to ensure the accuracy of the study, the authenticity of the relationships in the regression, and the significance of the variables, the stationarity test and calculation of the unit root were performed. The test was conducted using the Eviews application and the Levene, Lin and Cho, generalized Fischer-Dickey-Fuller, Fischer-Phillips, and Perron tests and Bartlett’s scale. Provided that the probability presented based on the mentioned tests is greater than 5%, the null hypothesis is accepted and, otherwise, rejected. The test results in Table 6 show the stationarity of the variables. Therefore, the null hypothesis based on the variable’s having a unit root is rejected, and as a result, the variables are stationary.

H₀: existence of unit root ⇔ The variable is non-stationary.
H₁: lack of unit root ⇔ The variable is stationary.

Table 6 ) The results of stationary variables

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Tests</th>
<th>Coefficient</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Capital</td>
<td>Levin, Lin and Chu</td>
<td>-15/6491</td>
<td>0/0000</td>
</tr>
<tr>
<td></td>
<td>Fisher - Dykly Fuller</td>
<td>146/952</td>
<td>0/0004</td>
</tr>
<tr>
<td></td>
<td>Fisher - Philips, Peron</td>
<td>178/697</td>
<td>0/0000</td>
</tr>
<tr>
<td>Shareholders Leverage</td>
<td>Levin, Lin and Chu</td>
<td>-10/1909</td>
<td>0/0000</td>
</tr>
<tr>
<td></td>
<td>Fisher - Dykly Fuller</td>
<td>122/486</td>
<td>0/1041</td>
</tr>
<tr>
<td></td>
<td>Fisher - Philips, Peron</td>
<td>157/384</td>
<td>0/0006</td>
</tr>
<tr>
<td>Growth and Development Opportunities</td>
<td>Levin, Lin and Chu</td>
<td>-20/1055</td>
<td>0/0000</td>
</tr>
<tr>
<td></td>
<td>Fisher - Dykly Fuller</td>
<td>171/889</td>
<td>0/0000</td>
</tr>
<tr>
<td></td>
<td>Fisher - Philips, Peron</td>
<td>216/756</td>
<td>0/0000</td>
</tr>
<tr>
<td>Company Size</td>
<td>Levin, Lin and Chu</td>
<td>-17/4104</td>
<td>0/0000</td>
</tr>
<tr>
<td></td>
<td>Fisher - Dykly Fuller</td>
<td>100/493</td>
<td>0/5791</td>
</tr>
<tr>
<td></td>
<td>Fisher - Philips, Peron</td>
<td>119/774</td>
<td>0/0382</td>
</tr>
<tr>
<td>Profitability</td>
<td>Levin, Lin and Chu</td>
<td>-15/9708</td>
<td>0/0000</td>
</tr>
</tbody>
</table>
4.3. Results of Tests and Estimations

In this study, the mixed data method was utilized to test the hypotheses. In this method, in order to choose between the pool model and the panel model, the chow test—also referred to as the structural change test—is employed. In the fixed effects model, each one of the components have a fixed specific value, and since in order to work with each one of these fixed values, a dummy variable is allocated, the fixed effects estimator is also referred to as the least squares dummy variable estimator. The chow test is a test of equality between a set of coefficients in a linear regression.

4.3.1. The Chow Test (Structural Change Test)

In order to test the hypotheses in the study, first the temporal fixed effects model is estimated, and afterwards, the structural change test is employed to investigate the significance difference. This test is hypothesized as the following to investigate the existence of fixed effects:

H₀: lack of fixed effects ⇔ the pool model
H₁: existence of fixed effects ⇔ the fixed-effects model

The results obtained from this test are presented in Table 7. The significance level below 5% shows the rejection of the H₀ hypothesis, which means the fixed-effects model is selected as the superior model.

<table>
<thead>
<tr>
<th>models</th>
<th>Cross-section</th>
<th>Statistics</th>
<th>Degrees of freedom</th>
<th>Significant</th>
<th>Top Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>The first Model</td>
<td>F statistic</td>
<td>5/180673</td>
<td>(180,901)</td>
<td>0/0000</td>
<td>Fixed effects</td>
</tr>
<tr>
<td></td>
<td>Chi-square</td>
<td>770/879810</td>
<td>180</td>
<td>0/0000</td>
<td></td>
</tr>
</tbody>
</table>
4.3.2. The Hausman Test
According to the results in Table 7, the chow test led to the selection of the fixed-effects model. However, now the fixed-effects model needs to be tested against the random-effects model, which is achieved with the Hausman test. It is set as the following in order to investigate the existence of random effects:
$H_0$: There is no correlation between the individual effects and the explanatory variables. $\Rightarrow$ the random-effects model
$H_1$: There is a correlation between the individual effects and the explanatory variables. $\Rightarrow$ the fixed-effects model
The results are presented in Table 8.

Table 8) Hausman test

<table>
<thead>
<tr>
<th>Model</th>
<th>F statistic</th>
<th>Chi-square</th>
<th>Df</th>
<th>P-value</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second Model</td>
<td>4/952262</td>
<td>746/362177</td>
<td>3</td>
<td>0/0000</td>
<td>Fixed effects</td>
</tr>
<tr>
<td>Third Model</td>
<td>4/940120</td>
<td>744/949531</td>
<td>3</td>
<td>0/0000</td>
<td>Fixed effects</td>
</tr>
<tr>
<td>Fourth Model</td>
<td>5/170509</td>
<td>769/894169</td>
<td>3</td>
<td>0/0000</td>
<td>Fixed effects</td>
</tr>
<tr>
<td>Fifth Model</td>
<td>5/364985</td>
<td>790/441835</td>
<td>3</td>
<td>0/0000</td>
<td>Fixed effects</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>P-value</td>
<td>Df</td>
<td>statistic</td>
<td>Model</td>
<td></td>
</tr>
<tr>
<td>The first Model</td>
<td>0/0190</td>
<td>3</td>
<td>9/953366</td>
<td>Fixed effects</td>
<td></td>
</tr>
<tr>
<td>Second Model</td>
<td>0/0034</td>
<td>3</td>
<td>13/69344</td>
<td>Fixed effects</td>
<td></td>
</tr>
<tr>
<td>Third Model</td>
<td>0/0177</td>
<td>3</td>
<td>10/10584</td>
<td>Fixed effects</td>
<td></td>
</tr>
<tr>
<td>Fourth Model</td>
<td>0/0000</td>
<td>3</td>
<td>32/52025</td>
<td>Fixed effects</td>
<td></td>
</tr>
<tr>
<td>Fifth Model</td>
<td>0/0000</td>
<td>3</td>
<td>43/88102</td>
<td>Fixed effects</td>
<td></td>
</tr>
</tbody>
</table>
4.3.3. Variance Heteroscedasticity
In sequential statistics, the phenomenon of random variables having different variance values is referred to as heteroscedasticity. On the contrary, a sequence of random variables having fixed variance values is referred to as homoscedasticity.
In order to identify the heteroscedasticity problem, a number of tests have been proposed, such as Park, Breusch-Pagan-Godfrey, Harvey, Glejser, ARCH, White, and Goldfeld-Quandt tests. This study has benefited from the White test to discover potential heteroscedasticity, the results of which are presented in Table 9.
H₀: lack of heteroscedasticity
H₁: existence of heteroscedasticity

Table 9 ) Volatility assumptions identified

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Statistic</th>
<th>The probability statistic</th>
<th>Dissimilarity</th>
<th>The Model Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>first</td>
<td>F-statistic</td>
<td>2/606577</td>
<td>0/050</td>
<td>Does not exist</td>
</tr>
<tr>
<td></td>
<td>Obs*R-squared</td>
<td>7/792298</td>
<td>0/050</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scaled explained SS</td>
<td>442/3173</td>
<td>0/000</td>
<td></td>
</tr>
<tr>
<td>second</td>
<td>F-statistic</td>
<td>1/90E+08</td>
<td>0/000</td>
<td>There is</td>
</tr>
<tr>
<td></td>
<td>Obs*R-squared</td>
<td>1084/998</td>
<td>0/000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scaled explained SS</td>
<td>569197/7</td>
<td>0/000</td>
<td></td>
</tr>
<tr>
<td>Third</td>
<td>F-statistic</td>
<td>25/79117</td>
<td>0/000</td>
<td>There is</td>
</tr>
<tr>
<td></td>
<td>Obs*R-squared</td>
<td>72/47254</td>
<td>0/000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scaled explained SS</td>
<td>4165/610</td>
<td>0/000</td>
<td></td>
</tr>
<tr>
<td>Fourth</td>
<td>F-statistic</td>
<td>1/634466</td>
<td>0/179</td>
<td>Does not exist</td>
</tr>
<tr>
<td></td>
<td>Obs*R-squared</td>
<td>4/899324</td>
<td>0/179</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scaled explained SS</td>
<td>281/3017</td>
<td>0/000</td>
<td></td>
</tr>
<tr>
<td>Fifth</td>
<td>F-statistic</td>
<td>50/53528</td>
<td>0/000</td>
<td>There is</td>
</tr>
<tr>
<td></td>
<td>Obs*R</td>
<td>133/4656</td>
<td>0/000</td>
<td></td>
</tr>
</tbody>
</table>
The significance level below 5% represents the rejection of the $H_0$ hypothesis. Under this condition, the ordinary least squares (OLS) method is no longer considered the best linear unbiased estimator (BLUE), and therefore, the generalized least squares (GLS) method is used as its substitute for model estimation. The GLS method is different from the OLS only in terms of the type of data conversion, such that the assumptions required for the OLS method are provided. The GLS method is sometimes introduced as the weighted least squares method because in this method, the weighted sum of the squared remainders is minimized, while in the OLS method, their non-weighted sum is minimized.

4.4. Hypothesis Testing
The method used in this study is the regression method by using the panel data. In order to estimate the regression model, the ordinary least squares (OLS) method and the estimated generalized least squares (EGLS) method were utilized. The hypotheses were tested, using the results obtained from econometric and regression models. In order to investigate the significance of the independent variables coefficient, Student’s $t$-test at the significance level of 95% was employed.

4.4.1. Testing the Hypotheses
Hypothesis 1: A company’s shareholders’ leverage has a significant effect on the amount of investment in its working capital.

\[ wc_{it} = \alpha_{i,t} + \beta_1 lev_{it} + \beta_2 qr_{it} + \beta_3 cr_{it} + \epsilon_{i,t} \]

$WC_{it}$: Net Working Capital
$LEV_{it}$: Shareholders’ Leverage
$QR_{it}$: Quick Ration
$CR_{it}$: Current Ratio

$H_0$: There is no significant relationship between the amount of working capital and shareholders’ leverage. 

$H_1$: There is a significant relationship between the amount of working capital and shareholders’ leverage. 

The results obtained from testing the abovementioned hypothesis, using the ordinary least squares (OLS) method, is presented in Table 10. The results show that the variables used in the model explain 56% of the behavior of the dependent variable. As seen in Table 10, the probability value of the F-statistic rejects this hypothesis, which states that all of the explanatory variables combined do not have an effect on the dependent variable. In other words, at least one explanatory variable has a significant effect on the dependent variable, and the regression equation is significant. For the variable of Shareholders’ Leverage, the t-statistic value is 1.23, and therefore, regarding the obtained significance level, the $H_0$ hypothesis is accepted, i.e. there is no significant relationship between the shareholders’ leverage and the amount of the working capital.
Hypothesis 2: A company’s growth and development opportunities have a significant effect on the amount of investment in its working capital.

$$wc_{i,t} = \alpha_{i,t} + \beta_1 growth_{i,t} + \beta_2 qr_{i,t} + \beta_3 cr_{i,t} + \epsilon_{i,t}$$

WC$_{it}$: Net Working Capital

Growth$_{it}$: Growth and Development Opportunities

H$_0$: There is no significant relationship between the amount of working capital and growth and development opportunities.

H$_1$: There is a significant relationship between the amount of working capital and growth and development opportunities.

The results obtained from testing the abovementioned hypothesis, using the estimated generalized least squares (EGLS) method, is presented in Table 10. The results show that the variables used in the model explain 98% of the behavior of the dependent variable. As seen in Table 10, the probability value of the F-statistic rejects this hypothesis, which states that all of the explanatory variables combined do not have an effect on the dependent variable. To put it in another way, at least one explanatory variable has a significant effect on the dependent variable, and the regression equation is significant. For the variable of Growth and Development Opportunities, the t-statistic value is -0.46, which means that regarding the obtained significance level, the H$_0$ hypothesis is accepted, i.e. there is no significant relationship between a company’s growth and development opportunities and the amount of the working capital.

Hypothesis 3: A company’s size has a significant effect on the amount of its investment in the working capital.

$$wc_{i,t} = \alpha_{i,t} + \beta_1 size_{i,t} + \beta_2 qr_{i,t} + \beta_3 cr_{i,t} + \epsilon_{i,t}$$

WC$_{it}$: Net Working Capital

Size$_{it}$: Company Size

H$_0$: There is no significant relationship between the amount of a company’s working capital and its size.

H$_1$: There is a significant relationship between the amount of a company’s working capital and its size.

The results obtained from testing this hypothesis, using the estimated generalized least squares (EGLS) method, is presented in Table 10. The results show that the variables used in the model explain 96% of the behavior of the dependent variable. According to Table 10, the probability value of the F-statistic rejects this hypothesis, which states that all of the explanatory variables combined do not have an effect on the dependent variable. In other words, at least one explanatory variable has a significant effect on the dependent variable, and the regression equation is significant. For the variable of Company Size, the t-statistic value is 5.91, which means that regarding the obtained significance level leads to the rejection of the H$_0$ hypothesis, i.e. there is a significant relationship between a company’s size and the amount of the working capital.

Hypothesis 4: A company’s profitability has a significant effect on the amount of its investment in the working capital.

$$wc_{i,t} = \alpha_{i,t} + \beta_1 roa_{i,t} + \beta_2 qr_{i,t} + \beta_3 cr_{i,t} + \epsilon_{i,t}$$

WC$_{it}$: Net Working Capital

roa$_{it}$: Profitability
H₀: There is no significant relationship between a company’s amount of working capital and its profitability.

H₁: There is a significant relationship between a company’s amount of working capital and its profitability.

The results, obtained from testing this hypothesis, used the ordinary least squares (OLS) method, is presented in Table 10. The results show that the variables used in the model explain 58% of the behavior of the dependent variable. According to Table 10, the probability value of the F-statistic rejects this hypothesis, which states that all of the explanatory variables combined do not have an effect on the dependent variable. In other words, at least one explanatory variable has a significant effect on the dependent variable, and the regression equation is significant. For the variable of Profitability, the t-statistic value is 4.50. As a result, regarding the obtained significance level, the H₀ hypothesis is rejected, i.e. there is a significant relationship between a company’s profitability and the amount of the working capital.

Hypothesis 5: The operating cash flow has a significant effect in the amount of a company’s investment on the working capital.

\[ WC_{it} = \alpha_{i,t} + \beta_1 ocf_{it} + \beta_2 qr_{it} + \beta_3 cr_{it} + \epsilon_{i,t} \]

WC<sub>it</sub>: Net Working Capital
ocf<sub>it</sub>: Operating Cash Flow
H₀: There is no significant relationship between the operating cash flow and the amount of working capital.

H₁: There is a significant relationship between the operating cash flow and the amount of working capital.

The results obtained from testing this hypothesis, using the estimated generalized least squares (EGLS) method, is presented in Table 10. The results show that the variables used in the model explain 78% of the behavior of the dependent variable. As seen in Table 10, the probability value of the F-statistic rejects this hypothesis, which states that all of the explanatory variables combined do not have an effect on the dependent variable. In other words, at least one explanatory variable has a significant effect on the dependent variable, and the regression equation is significant. For the variable of Operating Cash Flow, the t-statistic value is 13.55, and therefore, regarding the obtained significance level, the H₀ hypothesis is rejected, i.e. there is a significant relationship between the operating cash flow and the amount of working capital.

Table 10 ) test hypotheses

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>F-statistic</th>
<th>Prob(F-statistic)</th>
<th>Adjusted R-squared</th>
<th>T statistic</th>
<th>p-value</th>
<th>Durbin-Watson stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>first</td>
<td>7/32045</td>
<td>0/0000</td>
<td>0/56291</td>
<td>-</td>
<td>0/219</td>
<td>1/93053</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>00</td>
<td>6</td>
<td>1/230072</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>second</td>
<td>17934/1</td>
<td>0/0000</td>
<td>0/98755</td>
<td>-</td>
<td>0/642</td>
<td>1/95591</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>00</td>
<td>5</td>
<td>0/464358</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Third</td>
<td>7084/43</td>
<td>0/0000</td>
<td>0/96911</td>
<td>5/91463</td>
<td>0/000</td>
<td>2/01406</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>00</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
4.5. Autocorrelation
A serial correlation (autocorrelation) in the regression is a situation in which there is some sort of correlation among the error terms. Such a situation is due to the relationship between an error term of observation (the difference between the value of a dependent variable and its estimated value) and an error term of another observation. The importance of attending to this issue is because the existence of autocorrelation affects the effectiveness of ordinary least squares estimator. The common solution is the use of the Durbin-Watson statistic—also used in this study—in order to determine the existence of autocorrelation. This statistic usually varies between 0 and 4. The approximate boundary between the negative and positive autocorrelation is 2. If the statistic is greater than 2, there is a negative autocorrelation, while the statistic of less than 2 mean that there is a positive autocorrelation. If the statistic is close to 2 (between 1.5 and 2.5), it is concluded that there is not a first-order autocorrelation in the regression. By referring to Table 10, the existence of autocorrelation can be confirmed or rejected. As seen in the estimation results of the hypotheses, the statistic is close to 2 in all of the hypotheses, which is interpreted as lack of autocorrelation.

5. Conclusions
In this section, the results for each of the hypotheses are separately presented as follows:
5.1. Results of Testing Hypothesis 1
According to the obtained results, it was observed that the probability value of the F-statistic was 0.000, which is less than the margin of error of 0.05, and this reflects the significance of the regression model of the Hypothesis 1. The results suggest that the model is significant with the confidence level of 99%. Also, the adjusted coefficient of determination of the regression model of Hypothesis 1 reflects the level of relevance of the independent variable with the dependent variable of Working Capital. According to the results presented in Table 10, the adjusted coefficient of determination is 0.56, and this indicates that the changes in the dependent variable has been explained effectively by the independent variable in the regression model of Hypothesis 1, and that at an average level, 56% of the changes in the dependent variable is caused by the variable of Shareholders’ Leverage. In addition, to investigate the significance of the correlation coefficient between the dependent and independent variables, the t-statistic with margin of error of 0.05 was used in the regression model of Hypothesis 1. Regarding the results obtained from this test, it is seen in Table 10 that the t-statistic equals 1.23, which, with 95% confidence level, lies in the area where the null hypothesis is not rejected, and this reflects its lack of significance. The significance level between the independent variable of Shareholders’ Leverage and the dependent variable of Working Capital equals 0.21, which is greater than the margin of error of 0.05. As a result, the H₀ hypothesis of the test is confirmed and Hypothesis 1 is rejected. In other words, there is no significant relationship between the shareholders’ leverage and the amount of the working capital of the companies in this study. This result is not in line with the findings of
Raheman and Nasr (2007), Mathuva (2009), Zariyawati (2010), and Erasmus (2010), who had reported significant negative relationship.

5.2. Results of Testing Hypothesis 2
In the second hypothesis, it was stated that there is significant relationship between a company’s growth and development opportunities and the amount of its investment in the working capital. According to the obtained results, it was observed that the probability value of the F-statistic equals 0.000, which is less than the margin of error of 0.05, and this reflects the significance of the regression model of the Hypothesis 2. The results suggest that the model is significant with the confidence level of 99%. Furthermore, the adjusted coefficient of determination of the regression model of Hypothesis 2 reflects the level of relevance of the independent variable with the dependent variable of Working Capital. According to the results presented in Table 10, the adjusted coefficient of determination is 0.98, and this indicates that the changes in the dependent variable have been explained effectively by the independent variable in the regression model of Hypothesis 2, and that at a very desirable level, 98% of the changes in the dependent variable is caused by the variable of Growth and Development Opportunities. Moreover, to investigate the significance of the correlation coefficient between the dependent and independent variables, the t-statistic with margin of error of 0.05 was used in the regression model of Hypothesis 2. Regarding the results obtained from this test, it is seen in Table 10 that the t-statistic equals 0.46, which, with 95% confidence level, lies in the area where the null hypothesis is not rejected, and this reflects its lack of significance. The significance level between the independent variable of Growth and Development Opportunities and the dependent variable of Working Capital equals 0.64, which is greater than the margin of error of 0.05. As a result, the H₀ hypothesis of the test is confirmed and Hypothesis 2 is rejected. In other words, there is no significant relationship between a company’s growth and development opportunities and the amount of the working capital of the companies in this study. It is noteworthy that in the past studies no clear significant relationship has been found between the growth and development opportunities and the amount of the working capital. According to the theory of hierarchy, a company which expects more growth and development opportunities needs more working capital. This is in accordance with the findings of Liang et al. (2009) and Kim et al. (2011). Also, the results of testing Hypothesis 2 was not in accordance with the findings of Viviani (2008) in which it was shown that according to the correlated equilibrium theory, there was a significant negative relationship between growth and development opportunities and working capital.

5.3. Results of Testing Hypothesis 3
In Hypothesis 3, it was stated that there is significant relationship between a company’s size and the amount of its investment in the working capital. According to the obtained results, it was observed that the probability value of the F-statistic equals 0.000, which is less than the margin of error of 0.05, and this reflects the significance of the regression model of the Hypothesis 3. The results suggest that the model is significant with the confidence level of 99%. Furthermore, the adjusted coefficient of determination of the regression model of Hypothesis 3 reflects the level of relevance of the independent variable with the dependent variable of Working Capital. According to the results presented in Table 10, the adjusted coefficient of determination is 0.96, and this
indicates that the changes in the dependent variable has been explained effectively by the independent variable in the regression model of Hypothesis 3, and that at a very desirable level, 96% of the changes in the dependent variable is caused by the variable of Size. Moreover, to investigate the significance of the correlation coefficient between the dependent and independent variables, the t-statistic with margin of error of 0.05 was used in the regression model of Hypothesis 3. Regarding the results obtained from this test, it is seen in Table 10 that the t-statistic equals 5.91, which, with 95% confidence level, lies in the area where the null hypothesis is rejected, and this reflects its significance. The significance level between the independent variable of Size and the dependent variable of Working Capital equals 0.000, which is less than the margin of error of 0.05. As a result, the H₀ hypothesis of the test is rejected and Hypothesis 3 is confirmed. In other words, there is a significant relationship between the size and the amount of the working capital of the companies in this study. The obtained result is completely in accordance with the findings of previous studies. For instance, Kieschnich (2006), Grablowsky (1984), Moussawi (2006), and Banos-Caballero (2010) concluded that since the size of the company intensifies the agency issues between the shareholders and creditors, there is a significant positive relationship between the size of a company and the amount of its working capital. However, Moss and Stein (1993), based on the theory of equilibrium, concluded that there is a significant negative relationship between the size of a company and the amount of its working capital. Hill et al. (2010) reached the same conclusion on the grounds that those larger companies have easier access to capital and, as a result, maintain the amount of their capital at minimum levels.

5.4. Results of Testing Hypothesis 4

In Hypothesis 4, it was stated that there is significant relationship between a company’s profitability and the amount of its investment in the working capital. According to the obtained results, it was observed that the probability value of the F-statistic equals 0.000, which is less than the margin of error of 0.05, and this reflects the significance of the regression model of the Hypothesis 4. The results suggest that the model is significant with the confidence level of 99%. Moreover, the adjusted coefficient of determination of the regression model of Hypothesis 4 reflects the level of relevance of the independent variable with the dependent variable of Working Capital. According to the results presented in Table 10, the adjusted coefficient of determination is 0.57, and this indicates that the changes in the dependent variable has been explained effectively by the independent variable in the regression model of Hypothesis 4, and that at an average level, 57% of the changes in the dependent variable is caused by the variable of Profitability. Also, to investigate the significance of the correlation coefficient between the dependent and independent variables, the t-statistic with margin of error of 0.05 was used in the regression model of Hypothesis 4. Regarding the results obtained from this test, it is seen in Table 10 that the t-statistic equals 4.49, which, with 95% confidence level, lies in the area where the null hypothesis is rejected, and this reflects its significance. The significance level between the independent variable of Profitability and the dependent variable of Working Capital equals 0.000, which is less than the margin of error of 0.05. As a result, the H₀ hypothesis of the test is rejected and Hypothesis 4 is confirmed. In other words, there is a significant relationship between the profitability and the amount of the working capital of the companies in this study. The
obtained results are in line with the findings of Banos-Caballero (2010), Chiou et al. (2006), Garcia (2007), who believed that there was a significant relationship between profitability and the amount of working capital because when a company is profitable, financing becomes easier, and therefore, there is no need to keep a large amount of working capital. However, this relationship is inverse. Nazir and Afza (2008) believe that companies with higher profitability do not pay much attention to their working capital management, and as a result, the amount of their working capital increases. Raheman and Nasr (2007) investigated the effect of the amount of working capital on the profitability of 94 companies in the Pakistani stock market between 1994 and 2004 and concluded that there was a significant relationship between working capital and profitability.

5.5. Results of Testing Hypothesis 5
In Hypothesis 5, it was stated that there is significant relationship between a company’s operating cash flow and the amount of its investment in the working capital. According to the obtained results, it was observed that the probability value of the F-statistic equals 0.000, which is less than the margin of error of 0.05, and this reflects the significance of the regression model of the Hypothesis 5. The results suggest that the model is significant with the confidence level of 99%. Also, the adjusted coefficient of determination of the regression model of Hypothesis 5 reflects the level of relevance of the independent variable with the dependent variable of Working Capital. According to the results presented in Table 10, the adjusted coefficient of determination is 0.77, and this indicates that the changes in the dependent variable has been explained effectively by the independent variable in the regression model of Hypothesis 5, and that at a desirable level, 77% of the changes in the dependent variable is caused by the variable of Operating Cash Flow. In addition, to investigate the significance of the correlation coefficient between the dependent and independent variables, the t-statistic with margin of error of 0.05 was used in the regression model of Hypothesis 5. Regarding the results obtained from this test, it is seen in Table 10 that the t-statistic equals 13.55, which, with 95% confidence level, lies in the area where the null hypothesis is rejected, and this reflects its significance. The significance level between the independent variable of Operating Cash Flow and the dependent variable of Working Capital equals 0.000, which is less than the margin of error of 0.05. As a result, the H0 hypothesis of the test is rejected and Hypothesis 5 is confirmed. In other words, there is a significant relationship between the operating cash flow and the amount of the working capital of the companies in this study. These findings are in line with the theoretical principles and also with findings of Appuhami (2008), who had identified a significant relationship as well and who believes that higher levels of operating cash flow in causes companies to be more lenient about the paying off their liabilities and collecting their claims. This results in companies seeing themselves less in need of the working capital. Moreover, Chiou et al. (2008) and Banos-Caballero (2010) argue that due to an increase in cash holding and short-term investments, investing in the working capital is positively affected by the operating cash flow. Companies with higher levels of operating cash flow have a better capacity of creating internal cash flow and will, therefore, possess a higher amount of assets compared to the present time.

Suggestions for Future Research
In this section, some of the research suggestions resulting from our study are presented:
A) Regarding the results of testing Hypothesis 1, no significant relationship was observed between the shareholders’ leverage and the amount of investment in the working capital. Since the ratio of total liabilities to total assets is used to measure the variable of shareholders’ leverage, we suggest that companies delay the payment of the shareholders’ profits as much as possible in order to be able to invest the capital at hand in profitable projects. In other words, companies should develop and implement profit management and profit distribution strategy based on the amount of their activity and growth rate. In addition, the companies investigated in this research operated in a state-centered economy, and the governments internal and external issues would influence their operation to a certain degree. Regarding this, it can be concluded that the growth of privatization can influence the amount of companies’ working capital.

B) In testing the second hypothesis, there was no significant relationship found between a company’s growth and development opportunities and the amount of the working capital. Therefore, we suggest that when companies find promising investment opportunities, instead of paying off debts and utilizing their capital in receivables and accounts payables, they can invest their money in the investment opportunities and maintain their low amounts of working capital.

C) Testing Hypothesis 3 showed that there is significant relationship between the company size and the amount of working capital. It can be suggested that smaller companies keep the level of their working capital lower compared to larger companies, and make investments in profitable opportunities.

D) Through testing Hypothesis 4, it was observed that there is a positive significant relationship between profitability and the amount of working capital. That means the higher the level of profitability, the more the amount of working capital. This finding can help individuals who would like to invest in companies as a shareholder, since by studying the level a company’s profitability in its profit and loss statements, they can discover the status of the company’s working capital and have lucrative investments. Also, since the study results showed that there is a relationship between the working capital and return on assets (ROA), it is suggested that before making a decision on which business to lend money to, banks, financial institutions, and creditors analyze the working capital and return on assets of companies and select the ones which show a growth in their working capital and have higher return on assets. Also, it is recommended that companies with lower profitability seek adjusting their accounts receivables through effective management of their accounts receivables and credits.

E) In testing Hypothesis 5, a significant relationship was found between the operating cash flow and the amount of working capital. In other words, a company’s operating cash flow has a significant effect on the amount of its working capital. Therefore, we suggest that shareholders attend to the cash flow statement of a company to find out about the amount of its cash flow, which is an effective factor in the amount of the company’s working capital.
References


