

**Global Journal of Advanced Engineering Technologies and Sciences****THE EFFECT OF CASH HOLDING ON IRANIAN CO. PERFORMANCES****Dr. Hassan Ghodrati<sup>\*1</sup>, Allahyar Ashrafi<sup>2</sup>**<sup>\*1</sup>Accounting & Management Department, Kashan Branch, Islamic Azad University, Kashan, Iran.<sup>2</sup>Accounting & Management Department, Kashan Branch, Islamic Azad University, Kashan, Iran.

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**Abstract**

Nowadays, according to the increasing importance of the cash reserves process, decisions for determining the amount of cash reserves have been changed to one of the significant factors in corporate finance literature; therefore, the affecting factors on cash assets have attracted the attention of many researchers. In this research, the relationships between Inc. properties and cash reserves in company have been evaluated. To do this research, a sample consists of 71 companies listed on Tehran stock exchange through the years of 2008-2013 have been chosen. Estimating the statistical model of research, the method of multivariate linear regression by panel data has been used. The research findings show that: 1) The Iranian companies don't maintain a large amount of cash. 2) There is a negative relationship between cash held level and firm scale. 3) There is a positive relationship between cash held level and leverage. 4) There is a positive relationship between cash held level and cash flow. 5) There is a positive relationship between cash held level and working capital. 6) There is not any significant relationship between cash held level and company business growth opportunities and dividends.

**Keywords:** Cash Holding, leverage, growth opportunities, cash flow, and working capital.

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**Introduction**

Cash management requires the best decision made about the use of cash or cash sources of an organization. Cash is among the essential needs of each company. Companies faced with surplus and fractional cash surplus or deficit is both prone to many potential problems. In fact, cash is the best and most liquid asset of the company. Well-managed cash can lead it towards great success. On the contrary, the cash, that is managed and planned improperly, can even bring about bankruptcy. Whenever a company cannot pay its liabilities at the maturity because of the lack of cash, the bankruptcy is getting started. Therefore, cash management is a very important matter for companies. Moreover, the efficient cash management is more valuable than a mere prevention of bankruptcy since it can improve profitability and decrease risks. According to financial officers, cash is both valuable and costly. If it is borrowed, there is financing cost gained from of deposit and income accounts' surplus. Liquidity can be defined as having enough cash to do the transactions at due date, or the access to loans and credits. Cash management is based on identification of Cash known as a valuable source and an operational necessity of business. The cash needed for the operations of a trade unit is predicted in order to make sure about the company's well-timed access to the required liquidity. Meanwhile, the cash collection and payment cycle must be controlled in order to prevent it from being wasted or unnecessarily invested in the components of working capital. Usually, the performance objectives such as budget earning, level of department costs, sale income are set by managers as the target of productivity and measure of efficiency that they are expected to meet. Since liquidity is one of the main resources of a trade unit, it is important to control the costs and level of cash holdings considering the effective factors. This makes the companies regard the identification of target liquidity and the factors that affect it in each and any business-related activity.

As the savings of cash are increasing at the time of economic growth, managers decide whether it should be distribute it among the shareholders, spent to cover the internal expenses, applied for external acquisitions, or saved as well. The way profit-driven managers decide about the consuming or holding cash is ambiguous. Information Asymmetry, Agency, Balance, Hierarchy of Financing (Pecking Order), and Free Cash Flow theories are among those related to the level of cash holdings in companies. According to Information Asymmetry Theory, the decrease in information asymmetry (for instance through increasing the quality of financial statement) can reduce the level of cash held by the companies. As to the Agency Theory, conflicts that bring about agency costs can be applied to explain the manager's cash holding behavior. When it comes to Balance Theory, companies determine the optimum level of cash holdings through keeping a balance between benefits and costs of holding cash. According to Pecking Order Theory, the manager tends to accumulate cash so that they can first finance their company internally without referring to external

resources. As to the Free Cash Flow Theory, managers are motivated to accumulate cash to increase the resources under their own control in order to have enough power to judge the decision made about company's investments. The effective factors in the level of cash holdings in companies according to the foresaid theories are introduced in this research. The relationships between these factors are investigated as the independent variable. The level of cash holdings is studied as the dependent variable. In fact, here is the main problem of the research:

“What is the relationship between the cash held by the corporation and its characteristics in the companies listed in Tehran Stock Exchange?”

### Literature Review

According to **Modigliani and Miller (1963)**, it is not necessary to hold a large sum of cash in the companies. This is an irrelevant action because companies can easily finance their profitable investment projects from capital markets and transact in a very low cost. Nevertheless, many international studies have shown the significance of holding liquidity for companies. For instance, **Ferreira and Vilela (2004)** indicated that the average cash ratio of companies is equal to 15%. Accordant to **Guney (2003)**, the average cash ratio is 14%. Many studies performed in US market (and recently in global market), have tried to answer this question based on Pecking Order (**Myers and Majluf, 1984**), Balance (**Myers, 1977**) and Free Cash Flow (**Jensen, 1976**) theories.

According to Balance Theory, companies determine the optimum level of cash holdings through keeping a balance between benefits and costs of holding cash (**Keynes, 1936**).

Cash holding decreases the risk of financial crisis and it is considered as a reliable source to encounter unexpected losses. Moreover, it makes it possible for companies to pursue optimum investment policies while encountering financial limitations. Finally it decrease the costs of collecting financial resources and liquidation of the existing assets (**Ferreira and Vilela, 2004**).

According to Balance Theory, the relationship between the size of company and cash holding is expected to be negative. Since big companies are more flexible, they are expected to have more stable cash flows. As a result, the risk of bankruptcy is lower in such companies and compared to the smaller companies, they have easier access to financing sources (**Garcia et al. 2009**). Big companies with more bank credits, can borrow with a better interest ratio, and in case, they are able to gain cash easier. Moreover, big companies can always sell a part of their assets to gain cash (**Opler et al. 1999**).

Cash flow provides an accessible source of liquidity. It can be a suitable replacement for cash. Therefore, a negative relationship is expected between cash flow and cash balance (**Kim et al. 1998; kashanipoor et al. 2010**).

Liquidity of current assets: when the companies are faced with the lack of cash, the capability of converting current assets to cash is considered as a replacement for cash (**Izadinia and Raisian, 2009**). Therefore, companies with more power of liquidity are expected to hold less cash.

Companies with more oscillation of cash flows are more prone to encounter a lack of cash, therefore they hold a higher level of cash to face this risk. Thus the relationship between uncertainty of cash flows and cash balance is expected to be positive (**Ferreira and Vilela, 2004; Jeanne et al, 2004, and Ozkan & Ozkan, 2004**).

**Barsley and Smith (1995)** showed that since highly credible companies can easily develop their liabilities, they usually use short-term debts and hold lower levels of cash that makes this relationship positive.

Cash holding decreases the risk of financial crisis and it is considered as a reliable source to encounter unexpected losses. Therefore companies faced with financial crises hold more cash (**Opler et al. 1999**).

Companies with higher levels of cash flow have more cash. This was confirmed in studies on US and UK markets (**Opler et al. 1999; and Ozkan & Ozkan, 2004**) and EU markets (**Ferreira and Vilela, 2004**).

Through controlling the investment factor, bigger companies are presumed to be more successful. Therefore, they should have more cash (**Opler et al. 1999**).

According to the Theory issued by **Jensen (1976)**, more internal cash allows the managers to avoid market control. In such condition, managers don't need the approval of shareholders and according to their authorities; they can freely make decisions about investments.

Through accumulating cash, managers can increase the sources under their own control, in order to apply their judgment and recognition power to make decisions about investment. Therefore, managers operate the company's cash in order to avoid giving elaborative information to capital market, although they might make investments that affect the shareholders' wealth negatively (**Ferreira and Vilela, 2004**).

Applying Book-To-Market Ratio as a factor of investment opportunities, the relationship between investment opportunities and cash balance is expected to be negative (**Garcia et al. 2009; Kim et al, 1998; Ozkan & Ozkan, 2004; and Opler et al. 1999**). **Almeida et al. (2004)** argued that the effect of financial limitations on the financing method of companies is illustrated by their tendency to save the major part of their cash flows. As a result, companies with financial limitations are more sensitive to cash flows and those that are not financially limited, shouldn't be systematically dependent on the level and variation of their cash flows. The argument of **Almeida et al.** is based on the motivation of precautionary motivation to hold cash.

**Almeida et al. (2004)** simultaneously investigated the cash-flow investment and cash flow-cash sensitivity in Tunisian Companies. They showed that the cash flow-investment sensitivity is more in companies with financial limitations compared to those that are not financially limited. The difference between the cash flow sensitivity of cash between companies that have financial limits and those that has not. They argued that the effect of financial limitations on the financing method of companies is illustrated by their tendency to save the major part of their cash flows. As a result, companies with financial limitations are more sensitive to cash flows and those that are not financially limited, shouldn't be systematically dependent on the level and variation of their cash flows. The argument of **Almeida et al.(2004)** is based on the motivation of precautionary motivation to hold cash.

In a research Named "Investigation of Cash Holding Behavior of Companies", **Ozkan and Ozkan(2004)** studied the experimental main cash holding division of British companies between 1984 and 1999 considering the main two motivations to hold cash including precautionary motivation and transaction costs. When companies are faced with the lack of internal resources, they can cover this shortage through selling their properties, issuing bonds, equity of shareholders, or cutting off the dividend per share. Although all of these strategies include costs with fixed and variable components, therefore, companies with higher transaction costs are expected to hold more cash.

**Myers and Majluf (1984)** argued that as a result of information asymmetry, companies end to apply a set of hierarchies in their financial policies. I.e. they prefer internal information to external information. They argued that asymmetric information is a more serious issue for companies whose value is determined by growth options.

Moreover, as a matter of significance, companies with more growth opportunity are expected to bear higher bankruptcy costs (**Williamson, 1988; Harris and Ravi, 1990; and Schleifer and Whitney, 1992**).

**Opler et al. (1999)** collected the data related t 1048 explicit transactions of American companies between 1971 and 1994 in order to specify the determinative cash holding factors and concepts of the companies through time series and sectional tests. They found that companies with more growth opportunities and high cash flow risk hold a high present of cash compared to their total non-cash assets. Companies that have the most access to capital market tend to hold lower cash compared to their total non-cash assets. **Opler et al.** also found that companies that tend to accumulate more cash, hold a part of it regarding precautionary (preventive) motivation.

**Harford (1999)** studied a sample of American companies between 1977 and 1993. Harford found that rich companies with a large sum of cash are more probable to acquire other companies and these acquisitions are more probable to be value-decreasing.

**Ditmar et al (2003)** investigated a sample including 11591 companies from 45 different countries in 1998. Results indicated that in countries that provide low support for shareholders, cash balance is considerably higher. It was also indicated that in such countries, other determinative factors of cash are less important. Moreover, in countries where

shareholders have stronger rights and capital markets are more developed, less cash is hold. These results showed that shareholders want to limit the cash in hands of managers and do this as long as they have enough power.

**Ferreira and Vilela (2004)** investigated the effective factors in cash holding in a sample including 400 companies of EU between 1987 and 2000. They applied three different regression models in time series: 1) **Fama and Macbeth** time series annual regression, 2) cumulative cross sectional regression, and 3) cross sectional regression applying the average value of variables. Results showed that the cash in hand can be positively affected by investment opportunities and cash flows, while the effect of asset liquidity, leverage and size is negative. There is also a negative relationship between the cash in hands and bank liabilities. That approves that close relationship with banks enable the company to hold less cash with precaution motives. In countries where more support is provided for investors and ownership concentration, also hold less cash that confirms the role of agency costs derived by managers' authorities.

In their research named “**Corporate Cash Holdings**”, **Drobetz and Gruninger (2007)** investigated the determinative factors of cash in 156 non-financial companies of Switzerland between 1995 and 2004. Results indicated the significant inverse relation of the tangibility of assets and the size of company with liquid assets. There was also a non-linear relationship between leverage ratio and company's liquidity. Dividend per share and cash flows are also positively related to cash holdings. No significant relationship was observed between cash holding and growth opportunities. Some of the findings also showed that the amount of cash held in companies, in which positions of CEO and the head of the board of directors are both occupied by one person (CEO duality), is significantly higher.

**Kim et al. (2011)** investigated a set of panel data obtained from 125 public transactions by US restaurant companies between 1997 and 2008. It was concluded that restaurant companies with more investment opportunities tend to hold more cash. At the same time, big restaurant companies seem to hold different liquid assets from those that pay earning per share. Kim et al. explained that both precautionary and transactional motivations play a significant role in explanation of cash determinative factors for restaurant companies.

In their research named “Determinative Factors of Corporate Cash Holdings”, **Amarjit Gill and Charul Shah (2012)** investigated the factors that determine the cash holdings of non-financial companies listed in Toronto Stock Exchange in Canada between 2008 and 2010. Results indicated that Book-To-Market Ratio, cash flow ratio, net working capital ratio, leverage, size of the company, size of the board of directors, and CEO Duality significantly affect the cash holdings in Canadian companies.

In an Article called “International Evidence on the Non-linear Effect of Leverage on Cash Holdings”, **Guney et al (2003)** investigated the cash holding behavior in companies of France, Germany, Japan, Britain, and USA. They applied the information related to 4069 companies between 1996 and 2000. They specifically concentrated on the nonlinear relationship of leverage and the held cash. Moreover, results showed that the effect of leverage on cash holdings somehow depends on specific characteristics of countries such as the support provided for creditors and shareholders and the owners' surveillance.

**Rajan Damlo et al. (2008)** investigated the determinative factors of cash holdings. Results showed that managers allocate higher cash ratio to smaller companies with more R & D costs, less net working capital and lower leverage. Therefore, a correlation was found between higher rates of cash and difficulty of external capital raising and reduction of the accessibility of cash from internal resources.

**Ramirez and Tadross (2009)** investigated the relationship of uncertainty avoidance, multi-nationality and corporate cash holdings. The evident obtained approved the presented hypotheses: companies tend to hold more cash in countries with high level of uncertainty avoidance. Moreover, according to the results, the multiple-nationality of companies is also in a direct relationship with cash holdings.

**Harford et al (2008)** proceeded to analyze the relationships between the parameters of the corporate governance and cash holdings in USA. Results showed that companies with a weak structure of corporate governance have lower liquid deposits and companies with low equity of shareholders and cash surplus are less profitable.

**Han and kiu (2006)** showed that companies with financial limitations raise their cash holdings responding to the increase in cash flow oscillations; because financial limitations cause a contest and conflict between the current and

future investors that motivates the companies to make precautionary savings in spite of the risks of future cash flows.

**Ozkan and Ozkan(2004)** investigated the effective parameters in corporate cash holdings for a sample of British companies between 1984 and 1999. They applied cross-sectional regression model and the final dynamic model of cash and concentrated on manager's ownership compared to the other features of corporate governance such as structure of the board of directors. Variables such as the level of managers' ownership showed that there is a particularly significant relationship between manager's ownership and corporate cash balance, and in general, growth opportunities cash flows and liquid assets, leverage and bank liabilities are among the important parameters the determine the corporate cash holdings. There was also important evident on the negative effects of current assets, leverage and bank liabilities on the cash rate.

**Garcia et al. (2009)** applied a sample including companies listed in Spain Stock Exchange between 1995 and 2001 in order to investigate the effect of accounting quality on corporate cash holdings. Results indicated that companies with high quality of accruals hold lower rate of cash compared to those with less qualified accruals. Findings also showed that cash holdings go up with an increase in bank liabilities and companies with higher cash flows hold more cash.

In a case study in Canada named "Why Do SMEs Hold Cash" Pastor (2010) collected information related to Portuguese non-financial SMEs in order to investigate and analyze the determinative factors of liquid assets in such companies between 2001 and 2007. Based on the profits and costs of holding cash presented in the fiscal literature review, three theories were applied to justify the causes of corporate cash holdings including Pecking Order, Balance and Free Cash Flow. Findings are in line with the previous studies that reflect the considerable effect of size, growth opportunities and relationship with banks, cash flow uncertainty, debt structure, liquidity and leverage on cash sources in mom-financial SMEs of Portugal.

**Fakhari and Naghavi (2009)** investigated the effect of financial statement quality (quality of accruals) on cash holdings in Iranian companies. Their analysis showed a significant negative relationship between the qualities of financial statement and cash or cash substitutes. Therefore, the quality of financial statements by the companies is important in decreasing the financing costs of holding the surplus inefficient cash. Results also showed that variables such as growth opportunity, cash flow and liquid assets have a positive effect on cash balance, while the relationship of size, debt maturity, and opportunity cost with cash balance is negative.

**Kashanipoor and Naghdi (2009)** investigated the effect of financial limitations on the variations in levels of cash holdings due to the changes in cash flows. They applied factors such as company's size, age, dividend per share and trade group to represent financial limitations. It was indicated that cash flows affect cash holdings significantly. A significant difference was also found between cash flow sensitivity of cash in companies that have financial limitations and those that have not.

**Yusefi (2001)** investigated the cash prediction and presented an optimum model based on cash flow prediction in Tehran Stock Exchange. Accounts payable was found to be one of the factors based on which, cash flow can be significantly predicted.

**Izadinia and Raisisan (2010)** investigated the relationship of some of the corporate governance mechanisms including the present of non-executive directors, the present of institutional investors and cash holding as independent variables with Tobin's q as the index of corporate value and dependent variable in Tehran Stock Exchange. Results showed a significant positive relationship between the present of institutional investors as owners and the value of listed companies in Tehran Stock Exchange. But no significant relationship was found between the percent of non-executive directors and the value of listed companies in Tehran Stock Exchange. There was also a significant positive relationship between the level of cash holdings and the value of listed companies in Tehran Stock Exchange.

**Aghayi et al (2009)** investigated the effective factors of cash holdings in companies listed in Tehran stock exchange between 2000 and 2005. Results showed that accounts receivable, net working capital, good stock, and short-term liabilities are respectively the most important factors that negatively affect cash holdings. Company's growth opportunities, dividend per share, cash flow swings and net profit are respectively the most factors with positive effect

on cash holdings. But there is no evident about the negative effect of long-term liabilities and size of the company on cash holdings.

### Research's Hypotheses

The Main hypothesis of this research is:

There is a relationship between cash holdings and characteristics of the company.

This hypothesis is divide to 5 minority y hypotheses as following::

- 1) There is an inverse relationship between cash holdings and size of the company.
- 2) There is an inverse relationship between cash holdings and leverage of the company.
- 3) There is a direct relationship between corporate cash holdings and growth opportunities.
- 4) There is an inverse relationship between corporate cash holdings and net working capital to total assets ratio.
- 5) There is a direct relationship between corporate cash holdings and cash flow ratio.

### Research Methodology

This is an applied research In terms of its purpose, a post-event study since it depends on historical information. This is a descriptive-analytic correlational study of correlation due to its method of deduction.

#### Statistical population and sample

The statistical population includes all listed companies in Tehran Stock Exchange with the same financial year that have been active and not unprofitable during the research period. Applying the simple random sampling, 71 companies were selected through following formula, which were studied in a five-year interval. The financial performances of these firms was studied 2009-2013.

$$n = \frac{t_{(\alpha/2,df)}^2 \cdot S^2}{D^2}$$

#### Analytical methods

Two sets of statistical methods were applied for data analysis that is as following:

- 1) Descriptive method and 2) inferential method

Descriptive statistics include a set of methods applied to describe the sample and variables, and collect, regulate and illustrate the distribution form of variables. Descriptive method was applied to calculate mean, median, minimum, maximum and standard deviation of the data.

Inferential statistics is applied to deduce a characteristic of statistical population according to observations on one or several samples taken from it. Two methods were applied in inferential statistics. Firstly, the linear regression is used to measure the magnitude of the relationship between different variables of this research. Then Chi-square independence test was performed for more investigation.

#### Research model

The relationship between dependents and independent variables is defined by following multi-variables linear-equation:

$$CASH_{it} = \beta_0 + \beta_1 MTB_{it} + \beta_2 CF_{it} + \beta_3 NWC_{it} + \beta_4 LVRG_{it} + \beta_5 FS_{it} + \mu_i + \varepsilon_{it}$$

Where:

CASH is the cash amount held by the company;

MTB refers to growth opportunity and calculated with market share's price to its book value.

CF represents cash flow to net asset ratio;

NWC is the net working capital to total assets ratio;

LVRG represents the company's financial leverage and calculated with total debits to total assets.

And, FS is the size of company that calculated based on the natural logarithm of total assets.

#### Research's Findings

The relationship between the characteristics of the company and its cash holdings was investigated in this research. Considering the structure of statistical data (cross-sectional and time series), regression with panel data was applied

for data analysis. Therefore, F-Lamer test was firstly applied. Then, the model justification was examined using Housman test.

Before testing the goodness of fit of the regression model, normality of each of the variables was investigated through Kolmogorov-Smirnov test. It was observed that the distribution of cash holdings by companies is skewed to right. Therefore the Box-Cox transformation was applied in order to resolve this normality. Moreover, correlation matrix benchmark, Wooldridge test of autocorrelation test, and the unit root test were applied to investigate the presumptions. Finally, the hypotheses were tested through F-test and t-test. It should be mentioned that Stata 8 software was applied to perform analyses and Minitab 10 software was merely used for Box-Cox transformation.

**Findings description**

The first step in each statistical analysis is to calculate the descriptive indices. Table 5-1 illustrates the descriptive indices of research variables including mean, standard deviation, minimum and maximum.

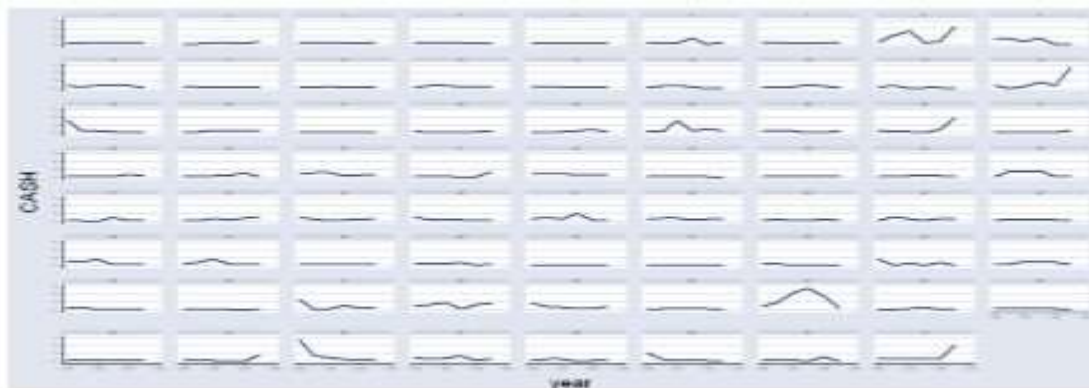
*Table 5-1: Descriptive Results*

Variable	Number	Average	S. t	Min	Max
Cash	426	0.058	0.076	0.000	0.57
FS	426	13.880	1.425	9.840	19.520
LVRG	426	0.626	0.329	0.000	2.150
MTB	426	1.063	0.533	-1.960	4.490
NWC	426	0.555	0.246	-0.260	1.450
CF	426	0.104	0.100	-0.230	0.560
DIV	426	0.002	0.102	-0.460	0.480

According to data illustrated in table 5-1, the average sum of cash holdings in the studied companies is equal to 0.058. This shows that the sample companies hold a high level of cash.

Time series graph is very useful to identify the companies with different behavior from the others'. The cash holdings of different companies are linked one to another along a line in this graph. The horizontal axis represents the year of observation and vertical axis is related to the companies' cash holdings. For more accurate investigations, the time series graph have been separately plotted for different companies. Figure 5-1 illustrates the mentioned graph.

*Figure 5-1: Cash Holding Distribution*

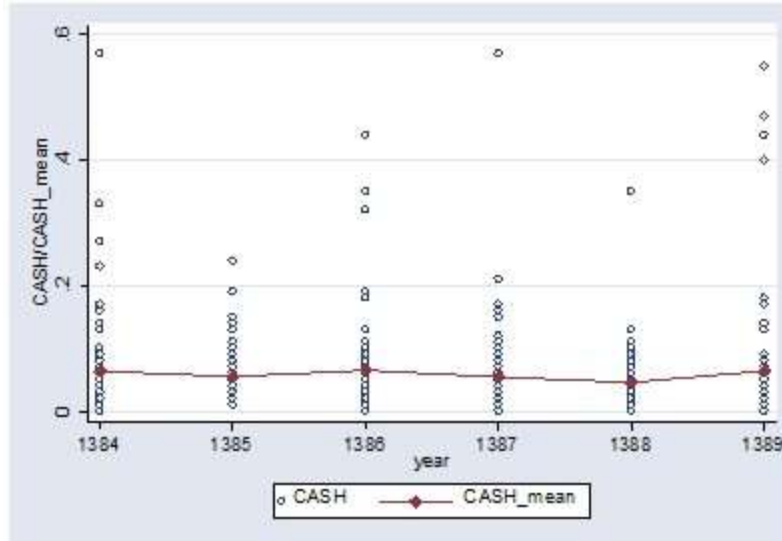


According to the accurate investigation of time series graph of the cash holdings in the studied companies, it was indicated that during the research period, many of these companies have shown similar cash holdings variation pattern. Nevertheless, some of the companies have expressed a totally distinguishable behavior. For instance, according to

figure 5-1, three companies that have such behavior are: Absal Group, Isfahan Petrochemical Company, and Nirou Chlor co.

Figure 5-2 illustrates the time series graph for the mean cash holdings of the sample companies during the research period. In this graph, the mean cash in different years have been linked one to another along the red line. As it is observed, as time goes by, no significant change is made in the mean sum of cash held by the companies.

Figure 5-2: The mean cash holding distribution



**Investigating the Normality of variables**

Normality of research variable has to be investigated before testing the hypotheses. The first step is to look at the rectangular of response variable. This diagram is illustrated in figure 5-3. As it can be observed in this figure, the statistical distribution of CASH is skewed to right that is against the symmetry of normal distribution around the mean point.

Figure 5-3: Cash holding Histogram

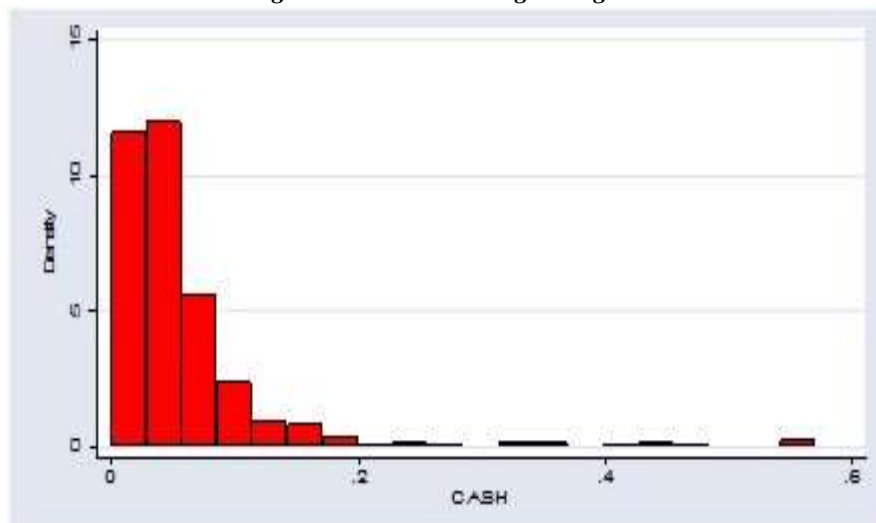
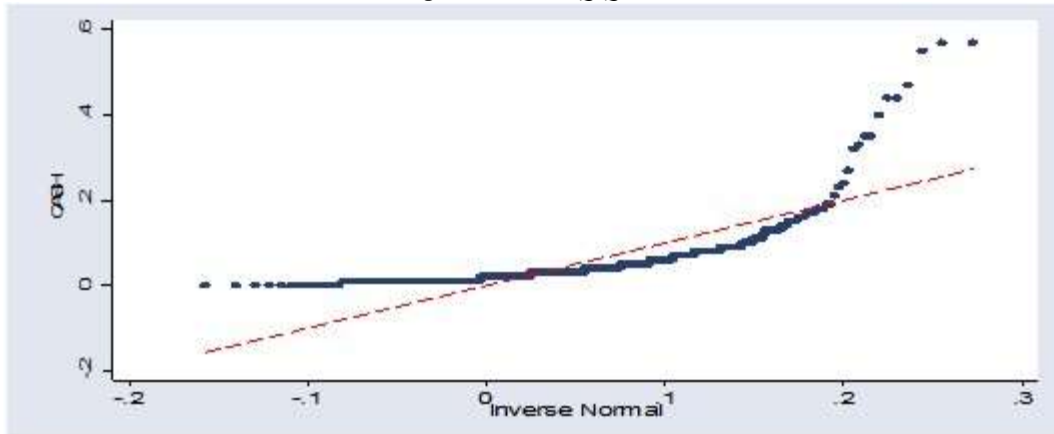




Figure 5-4: Cash Q-Q Plot



Meanwhile, the Q-Q plot presented in figure 5-4 shows that deviation of CASH statistical distribution from the statistical distribution of response variable (the plot points are not along a straight line). Box-Cox transformation is used in order to resolve the skewness of the statistical distribution of response variable. Therefore the Minitab software is applied. The rectangular diagram and Q\_Q plot of transformed data are illustrated in figures 5-5 and 5-6.

Figure 5-5: The Histogram of Cash Box-Cox transformation

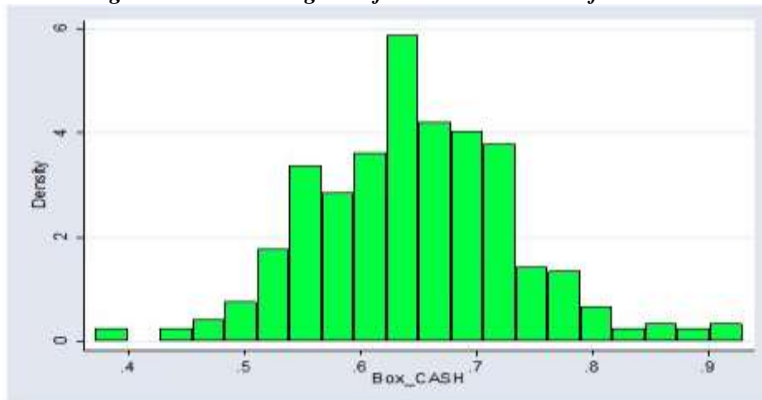
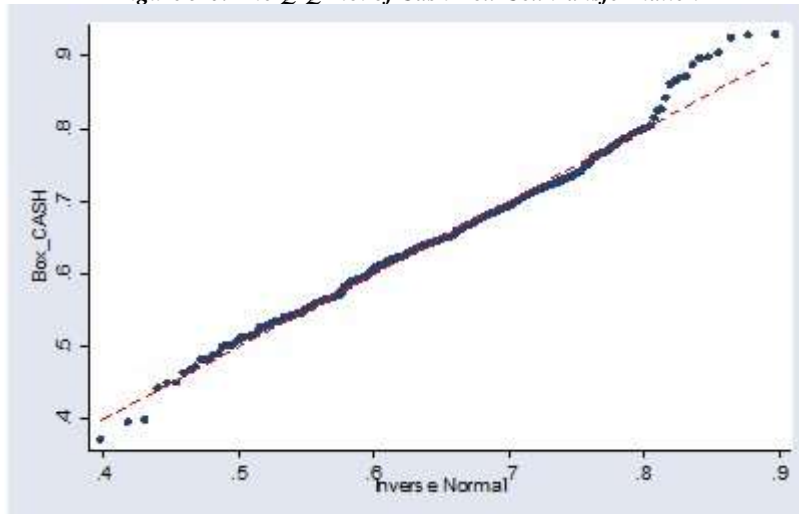


Figure 5-6: The Q-Q Plot of Cash Box-Cox transformation



No more sign of skewness is observed in rectangular diagram (figure 5-5) and deviation from the straight line in Q-Q plot (figure 5-6). Kolmogorov-Smirnov test is applied in order to investigate the normality of response variable more accurately. Table 5-2 illustrates the results of response variable normality test before and after the transformation. The skewness and kurtosis of both sets of data are illustrated as well. The Zero assumption according to the outputs of Kolmogorov-Smirnov test, the CASH normality assumption is not disapproved at p-level of 0.005 before the Box-Cox transformation ( $P < 0.05$ ,  $KS = 4.659$ ). But after the Box-Cox transformation, the normality assumption is confirmed at p-level of 0.05 ( $P < 0.05$ ,  $KS = 0.753$ ).

*Table 5-2: The result of Kolmogorov-Smirnov Test for Dependent Variable*

Variable	Skewedness	Kurtosis	Statistic	Sig. Level	Test Result
Primal	3.930	22.130	4.695	0.000	H0 is accepted.
Converted	0.095	3.124	0.753	0.632	H0 is rejected.

Based on table 5-2, Skewedness and kurtosis coefficients calculated for two sets of data indicate that the mentioned transformation has greatly approximated the CASH statistical distribution to the standard normal distribution (skewness is close to zero and Kurtosis is close to 3). The results of Kolmogorov-Smirnov test on each of the independent variables before and after Box-Cox transformation are illustrated in table 5-3.

*Table 5-3: The result of Kolmogorov-Smirnov Test for In-Dependent Variable*

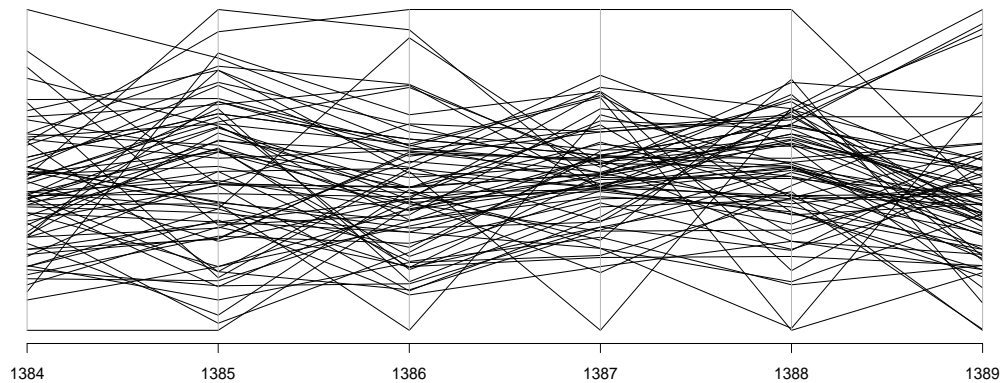
Variable	Situation	Statistic	Sig. Level
Growth Opportunity	Primal Value	8.543	0.000
	Converted Variable	0.442	0.993
Cash Flow Ratio	Primal Value	9.870	0.000
	Converted Variable	1.672	0.345
Net Working Capital Ratio	Primal Value	7.664	0.000
	Converted Variable	1.038	0.231
Financial Leverage	Primal Value	6.875	0.000
	Converted Variable	0.692	0.721
Firm's Size	Primal Value	8.214	0.000
	Converted Variable	0.754	0.684
Dividend Ratio	Primal Value	8.351	0.000
	Converted Variable	1.012	0.548

According to the results in table 5-3, before the normalizing transformation, Normality of no independent variable was confirmed at p-level of 0.05 ( $P < 0.05$ ). But after this transformation, among the six independent variables, the normality assumption of four (growth opportunity, working capital, leverage and size) was confirmed at p level of 0.05 ( $P > 0.05$ ). The cash flow normality assumption could also be confirmed at level of 0.01 with a small tolerance. Yet, the normality of dividend per share was not confirmed. It should be considered that Kolmogorov-Smirnov statistic was reduced after the transformation, i.e. the sample distribution has been more approximated to the normal distribution after the transformation.

**Variations Homoscedasticity**

Parallel axes plot was applied in order to investigate the homoscedasticity. The time series of cash holdings in all sample companies is plotted in a single diagram in this plot. Seeing the response oscillations in different time sections on parallel axes on y-axis, a general idea of variance homoscedasticity can be obtained.

Figure 5-7: The Variances Homoscedasticity



As it is observed in figure 5-7, dispersion of observations is almost similar in all years (dispersion of lines on parallel axes of y-axis). Therefore, it can be admitted that the variable variance is fixed and it doesn't change along the time.

**Collinearity**

Since there are many explanatory variables in the research model, the correlation between them might cause collinearity. Correlation matrix benchmark is applies to investigate this matter. Pearson correlation coefficients between the different variables are illustrated in table 5-4.

Table 5-4: The result of Pearson Correlation for Dependents Variables

Variable	Growth Opportunity	Cash Flow Ratio	Working Capital Ratio	Financial Leverage	Firm Size
<b>Growth Opportunity</b>	1				
<b>Cash Flow Ratio</b>	0.222 (0.000)	1			
<b>Working Capital Ratio</b>	0.041 (0.037)	-0.081 (0.112)	1		
<b>Financial Leverage</b>	-0.011 (0.942)	-0.215 (0.000)	0.249 (0.000)	1	
<b>Firm Size</b>	-0.074 (0.162)	-0.0161 (0.000)	-0.213 (0.000)	-0.027 (0.701)	1

According to the results obtained through Pearson correlation test, among the ten calculated correlation coefficients, five were significant at p-level of 0.05 ( $P > 0.05$ ). Other correlation coefficients were not significant at p-level of 0.05 and their absolute value is not that big. In fact, the bigger significant correlation coefficient was the one between working capital ratio and financial leverage (0.249). Therefore, the problem of collinearity between independent variable was not admitted.

**Investigating the normality of remainders and the autocorrelation between them**

The distribution histogram and Q-Q plot illustrated in following figures were applied to investigate the distribution of remainders. These diagram are as figure 5-8 and 5-9.

Figure 5-8: Regression Reminders Histogram

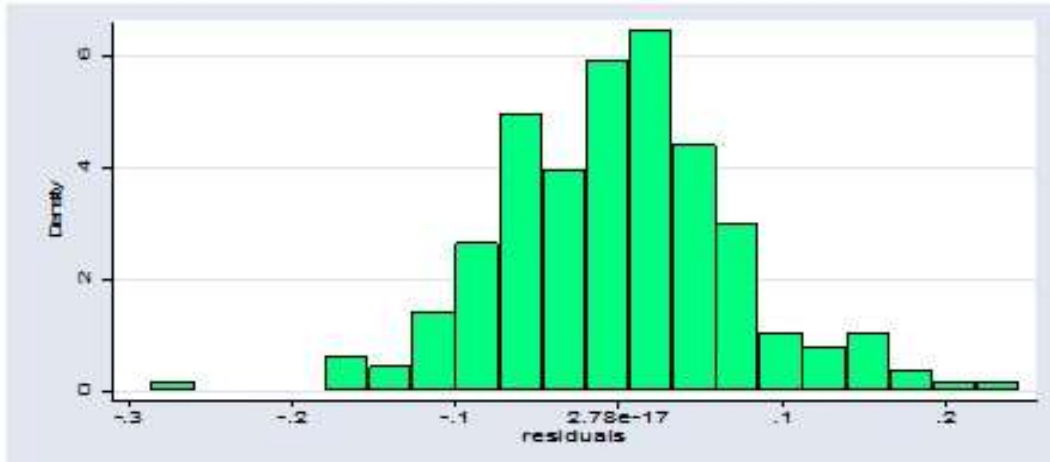
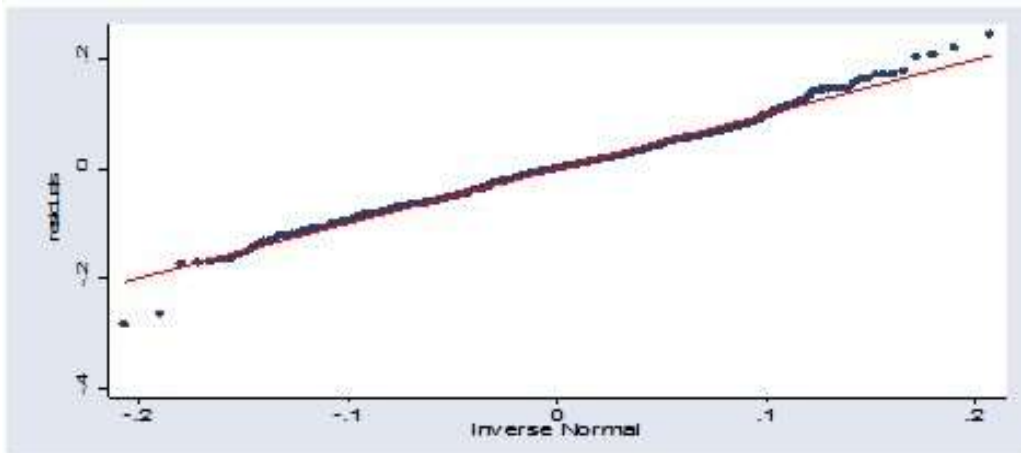


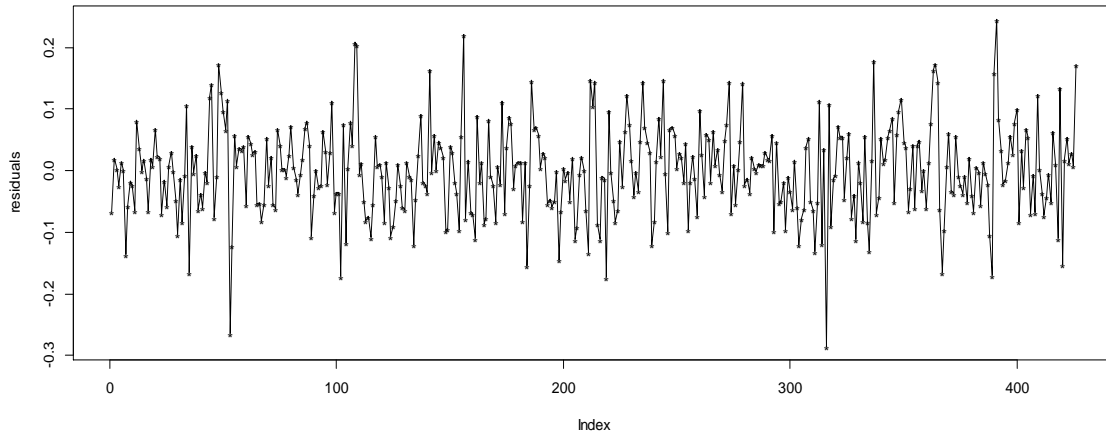
Figure 5-9: Regression Reminders Q-Q Plot



Normality of remainders can be clearly observed in figures 5-8 and 5-9, since no deviation from the normal distribution is observed in rectangular diagram and Q-Q plot. Moreover, the outputs of Kolmogorov-Smirnov test also confirm this result (KS=0.636, P>0.05). The result of this test is illustrated in table 4-5.

Another important feature is that model remainders should not be serially correlated. Graph 5-10 illustrates the time series of all remainder respectively.

Figure 5-10: Regression Reminders Trend



As it is observed in figure 5-10, there are no specific patterns in consecution of the plotted points. This shows that the model-remainders are not serially correlation. This result is also confirmed through Durbin-Watson test (DW=1.728, P>0.05). The result of this test is illustrated in table 5-5.

Table 5-5: The results of Regression Reminders Co-relation

K.S Statistic	K.S Sig Level	Durbin Watson Statistic	Durbin Watson Sig Level
0.754	0.636	1.728	0.768

**The type of panel data tests**

F-Lamer and Housman tests were applied in order to select a suitable model (the model with shared y-intercept, the model with different and fixed y-intercept, and the model with different and random y-intercept) to estimate the relationship between research variables. Therefore, F-test was applied firstly. The results are illustrated in table 5-6.

Table 5-6: The results of F-Lamer Test

F- Statistic	The first d.f	The second d.f	Sig. Level	Test Result
3.225	70	349	0.000	H0 is Accepted.

Considering the obtained outputs, the assumption of equality effects of all units is disconfirmed at p-level of 0.05 (F (70, 350) = 3.225; P<0.05). Then, Housman test was applied to select between two models (with random and fixed effects). Results of Housman test are applied in table 5-7.

Table 5-7: The results of Houseman Test

Houseman - Statistic	Degree of Freedom	Sig. Level	Test Result
8.645	4	0.197	H0 is Accepted.

Considering the obtained outputs, the zero assumption of Housman test is disconfirmed at p-level of 0.05 (m= 8.60, P<0.05). I.e. the effects of companies do not depend on explanatory variables in the considered model. Therefore, according to what have been mentioned in previous chapter, the panel data with random effects was applied for hypothesis testing.

Since panel data is a combination of cross-sectional and time series data, their stability is very important for reliability of the outputs of linear regression. The augmented Dickey-Fuller statistic was applied to test this hypothesis. Based on the performed test, the instability assumption is disconfirmed for the applied data at p=level of 0.05 (DF=2002.73, P<0.05). All results are illustrated in table 5-8.

*Table 5-8: The results of Dickey-Fuller Test*

Statistic	Degree of Freedom	Sig. Level
2002.73	34	0.0000

**Analyzing the relationship between variables**

After preliminaries testes, the relationship between dependents and in-dependent variable was estimated with multi-variables linear regression based on data panel analysis. The summary of regression estimation results are explained on table 5-9.

*Table 5-9: The results of Regression Estimation*

Variable	Coefficient	T- Student Statistic	Sig. Level
Firm value	-0.011	-1.69	0.09
Financial Leverage	0.014	3.02	0.003
Growth Opportunities	-0.007	-1.96	0.051
Net Capital Working Capital	0.002	0.38	0.706
Cash Flow Ratio	0.012	2.53	0.012
Dividend	0.004	0.79	0.427
Constant	0.648	99.20	0.000
<b>Fisher-Statistic</b>	<b>Fisher Sig. Level</b>	<b>R-Squared</b>	
21.47	0.002	4.79%	

According to the obtained outputs, generally, there is a linear significant relationship between the company’s characteristics and its cash holdings (F=21.47, P<0.05).

$CASH = 0.648 + 0.004DIV + 0.012CF + 0.002NCWC - 0.007GO + 0.014\beta_4 + 0.011FL - 0.011FS + \mu_i + \varepsilon_{it}$   
Moreover, goodness of fit for the model above was performed twice (once regarding DIV, and once ignoring it) in order to investigate the effect of dividend payout on the relationship between the characteristics and cash holdings of companies. The results of model fit regarding DIV are illustrated in table 5-9.

Then, dividend payout is excluded from the model in order to investigate its effect on the relationship between the characteristics and cash holdings of companies. The results of model fit regardless of DIV are illustrated in table 5-10.

*Table 5-10: The results of Regression Estimation after Dividend elimination.*

Variable	Coefficient	T- Student Statistic	Sig. Level
Firm value	-0.010	-1.63	0.103
Financial Leverage	0.015	3.12	0.002
Growth Opportunities	-0.007	-1.93	0.054
Net Capital Working Capital	0.003	0.44	0.637
Cash Flow Ratio	0.112	2.44	0.015

<b>Constant</b>	0.647	99.76	0.000
<b>Fisher-Statistic</b>	<b>Fisher Sig. Level</b>		<b>R-Squared</b>
20.82	0.000		4.66%

As it is observed, the estimated related to the model that doesn't include DIV are not that different from those related to the first model. The only mentionable difference is the insignificance of the company's size, while in the model that contained dividend payout, the size of company was found to be significant at Sig-level of 0.1. Therefore, dividend payout does not affect the linear relationship between the characteristics and cash holdings of companies. Considering the sign of the estimated regression coefficients, of all characteristics of the studied companies, size and growth opportunities have an inverse linear relationship with its cash holdings, while the relationship of net working capital and cash flow ratio with cash holdings is a direct linear one. Dividend payout has no effect on the level of cash holdings.

As to the independent variables, the linear relationship of leverage and cash flow ratio with cash holdings is significant at p-level of 0.05 ( $p < 0.05$ ). Moreover, the linear relationship between the size of company and its growth opportunities was found to be significant at p-level of 0.1 ( $P < 0.1$ ), while the linear relationship between working capital and cash holdings is not significant even a p-level of 0.1 ( $P > 0.1$ ).

## Conclusion

The relationship between cash holdings and size of the company is evaluated with the first hypothesis. FS Variable-coefficient is equal to -0.011 which is significant on p-level of 10%. Therefore, there is a significant linear relationship between the size of company and its cash holdings. According to this finding, the level of cash holdings decreases with an increase in the size of company. Considering the coefficient of determination (0.0479) that tends to zero, Chi-square independence test was applied to examine the equation validity. According to the results, cash holdings and size of the company are not independent from each other and there is a relationship between them.

The relationship between cash holdings and leverage of the company is evaluated with the second hypothesis. LVRG Variable-coefficient is equal to 0.014 which is significant on p-level of 5%. Therefore, there is a significant linear relationship between the leverage of company and its cash holdings. According to this finding, the level of cash holdings goes up with an increase in the liabilities of company in order to assure their payment at the due date. Considering the coefficient of determination (0.0479) that tends to zero, Chi-square independence test was applied to examine the equation validity. According to the results, cash holdings and leverage are not independent from each other and there is a relationship between them.

The relationship between cash holdings and growth opportunities is evaluated with the third hypothesis. MTB Variable-coefficient is equal to -0.007 which is significant on p-level of 10%. Therefore, there is a significant linear relationship between the company's growth opportunities and its cash holdings. According to this finding, the level of cash holdings is inversely related to growth opportunities. Considering the coefficient of determination (0.0479) that tends to zero, Chi-square independence test was applied to examine the equation validity. According to the results, cash holdings and growth opportunities are not independent from each other and there is a relationship between them.

The relationship between cash holdings and net working capital to total assets ratio is evaluated with the fourth hypothesis. NWS Variable-coefficient is equal to 0.002 which is significant on p-level of 5%. Therefore, there is no significant linear relationship between net working capital to total assets ratio of the company and its cash holdings. Of course, it doesn't mean that there is absolutely no relationship between these two variables. Considering the low value of coefficient of determination, Chi-square independence test was applied. According to the results, there is a lack of independence between the two variables. Therefore, there is a relationship between corporate cash holdings and net working capital to total assets ratio.

The relationship between corporate cash holdings and cash flow ration is evaluated with the fifth hypothesis. CF Variable-coefficient is equal to 0.012 which is significant on p-level of 5%. Therefore, there is a significant linear relationship between the corporate cash flow ratio and its cash holdings. According to this finding, the level of cash holdings is directly related to cash flow ratio. Considering the low value of coefficient of determination, Chi-square

independence test was applied. According to the results, there is a lack of independence between the two variables. Therefore, there is a relationship between corporate cash holdings and cash flow ratio.

DIV variable-coefficient is equal to 0.004 which is significant at the p-level of 5%. The output related to the model that doesn't include dividend payout is not that different from the first model. Therefore, dividend payout has no significant effect on the linear relationship between the characteristics of company and its cash holdings. According to the findings, company's characteristics including size, leverage, net working capital to total assets ratio, and cash flow are all related to its level of cash holdings.

## References

1. Aghayi, Mohammad Ali; Nezafat, Ahmadreza; Nazemi Ardakani, Mahdi; and Javan, Ali Akbar, (2009), *"Investigation of the Effective Factors of Cash Holdings in Listed Companies in Tehran Stock Exchange"*, Financial Accounting Studies, first year, issues 1 & 2, pp. 53-70
2. Almeida H, Campello M, Weisbach MS, (2004), *"The cash flow sensitivity of cash"* Journal of Finance 2004;59; 1777-1804
3. BARCLAY, M.J., SMITH, C.W. (1995) *"On financial architecture: Leverage, maturity, and priority"* Journal of Applied Corporate Finance 8, 4-17
4. DITTMAR, A., MAHRT-SMITH, J., SERVAES, H. (2003) *"International corporate governance and corporate cash holdings"* Journal of Financial and Quantitative Analysis 38, 111-133
5. Drobet.W.Gruninger.M.C.(2007) *"Corporate cash holding: Evidence from Switzerland"* Swiss Society for Financial Market Research.
6. Ferreira, M.A., A. Vilela (2004), *"Why do Firms Hold Cash? Evidence for EMU Countries"*, European Finance Management, Vol. 10, p. 295-319
7. Fakhari, Hussain; and Taghavi, Sayyid Ruhollah, 2009, *"Quality of Accruals and Cash Balance"*, Accounting and Auditing Investigations, period 16, issue 57, Fall of 2009, pp. 69-84.
8. Ferreira, M.A., A. Vilela (2004), *"Why do Firms Hold Cash? Evidence for EMU Countries"*, European Finance Management, Vol. 10, p. 295-319
9. Garcia-Teruel, P. J., P. Martinez-Solano, J. P. Sánchez-Ballesta, (2009), *"Accruals quality and corporate cash holdings"*, Journal of Accounting and Finance.
10. Gill,A,Shah,CH,(2012); *"Determinants of Corporate Cash Holdings: Evidence from Canada"* International Journal of Economics and Finance Vol. 4.
11. Guney, Y., A. Ozkan, N. Ozkan (2003), *"Additional International Evidence on Corporate Cash Holding"*, Working Paper (SSRN Electronic Library).
12. Guney, Y., Ozkan, A., Ozkan, N, 2009 *"International evidence on the non-linear impact of leverage on corporate cash holdings"*. Working Paper
13. Han, S. and Qiu J. (2006), *"Corporate precautionary cash holdings"*, Journal of Corporate Finance, Volume 13, Issue 1, March 2007, Pages 43-57.
14. Harford, J., Mansi, S.A., Maxwell, W.F. (2008). *"Corporate governance and firm cash holdings"*. Journal of Financial Economics 87. 535–555.
15. Harford, J. (1999), *"Corporate Cash Reserves and Acquisitions"* Journal of Finance, Vol. 54, pp. 1969-1997
16. HARRIS, M., RAVIV, A., (1991) *"The theory of the capital structure"* Journal of Finance 46, 297-355.
17. Izadinia, Naser; and Raisian, Amir ,2009, *"Investigation of the Relationship between Leverage and Asset Liquidity in Tehran Stock Exchange"*, Quarterly Journal of Financial Accounting, Islamic Azad University, Mobarakeh Branch, first year, issue 2, pp. 18-41
18. Izadinia, Naser; and Raisian, Amir, (2010), *"Strategically Corporate Control Tools, Cash Holdings and the Performance of the Listed Companies in Tehran Stock Exchange"*, Journal of Economic Studies and Policies, issue 55, pp. 141-154
19. JANI, E., HOESLI, M., BENDER, A. (2004) *"Corporate cash holdings and agency conflicts"*, Working paper, University of Geneva
20. Jensen, M., 1986, *"Agency Costs of Free Cash Flow, Corporate Finance and Takeovers," American Economic Review*, 76, pp. 323-29
21. Kashanipoor, Muhammed; and Taghinejad, Bijan, (2009), *"Investigation of the Effect of Financial Limitations on Cash Flow Sensitivity of Cash in Listed Companies in Tehran Stock Exchange"*, Journal of Accounting Studies, first year, second issue, pp. 72-93



22. Kashanipoor, Muhammed; Rasekhi, Saeed; Taghinejad, Bijan; and Raisian, Amir, (2010), "**Financial Limitations and Investment-Cash Flow Sensitivity in Tehran Stock Exchange**", Journal of Accounting Developments, issue 3, pp. 51-74
23. KALCHEVA, I., LINS, K.V. (2004) "**International evidence on cash holdings and expected managerial agency problems**" Working Paper
24. KEYNES, J.M. (1936) "**The general theory of employment interest and money**" Edinburgh, 1936.
25. Kim, Chang-Soo, Mauer, D.C. and Sherman, A.E. (1998) "**The determinants of corporate liquidity: Theory and evidence**", *Journal of Financial and Quantitative Analysis*, 33, pp. 335-359
26. Maddala G.S. and Wu S. (1999). "**A Comparative Study of Unit Root Tests with Panel Data and a New Simple Test**", *Oxford Bulletin of Economics and Statistics*, 61, Supplement 1, pp. 631–652.
27. Modigliani, F. and Miller, M.H. (1963) "**Corporate income taxes and the cost of capital: A correction**", *American Economic Review*, 53, pp. 433-443
28. MYERS, S., MAJLUF, N. (1984) "**Corporate financing and investment decisions when firms have information that investors do not have**" *Journal of Financial Economics* 13, 187-220
29. MYERS, S. (1977) "**Determinants of corporate borrowing**" *Journal of Financial Economics* 5, 147-175
30. Opler, T., L. Pinkowitz, R. Stulz, R. Williamson (1999), "**The Determinants and Implications of Corporate Cash Holdings**", *Journal of Financial Economics*, Vol.52, p.3-46.
31. Ozkan A., and N. Ozkan, 2004, "**Corporate Cash Holdings: An Empirical Investigation of UK Companies,**" *Journal of Banking and Finance*, 28, 2103-2134
32. Ramirez. A., Tadesse S., (2009), "**Corporate cash holdings, uncertainty Avoidance, and the multi-nationality of firms**", *International Business Review*, Volume 18, Issue 4, August 2009, Pages 387-403.
33. Ranjan D'Mello, Sudha Krishna swami, Patrick J. Larkin, (2008). "**Determinants of corporate cash holdings: Evidence from spin-offs**". *Journal of Banking & Finance* 32, 1209–1220.
34. SHLEIFER, A., VISHNY, R. (1992) "**Liquidation values and debt capacity: A market equilibrium approach**" *Journal of Finance* 6, 1343-1366
35. Williamson, O. (1988) "**Corporate finance and corporate governance**". *Journal of Finance* 43, 567–591..
36. Yoosefi, Murtaza, 2001, "**Prediction of Cash Flows and Presenting an Optimum Model Based on Cash Flow Prediction in Tehran Stock Exchange**", master thesis in Accounting, Faculty of Human Sciences, Tarbiat Modares University.