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# Investigating Effects of Sales Uncertainty and Financial Power of Companies on the Levels of Investment in Inventory over companies Listed on Tehran Stock Exchange

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# ABSTRACT

The inventory level of companies is one of the critical factors for the progress of long-term and short-term goals of companies. Changes in the level of inventory in some way are related to the increase or decrease in cash and the sales of companies. Thus, increase or decrease in the sales of company is somehow associated with the financial power of them. The basic objective of the present study is to examine the relationship between investment in inventories, uncertainty in the sales and the financial power of the firms listed on Tehran Stock Exchange. The sample population included 159 companies listed in Tehran stock market, which are selected using systematic elimination method from the statistical population. The required data were collected for a period of 10 years. Test hypotheses period included 6 years, from 2008 to 2013. Based on results, a significant positive relationship found between uncertainties in companies' sales and the ratio of investment in inventories. It seems that the investment behavior of managers of the companies in the sample potentially is influenced by the existing information about the future vision of the company's sales and with respect to ambiguity in this regard, company have more tendency for boosting investments. In addition, according to the findings, with increasing the financial power of company, the level of investment in inventory decreases. Given the role of each component of financial power, the net credit exchanges and liquidity had a negative impact on the level of investment in inventory. It seems that companies with appropriate financial power are potentially less willing to hold high inventory.

KEYWORDS: the rate of investment in inventories, uncertainty in sales, financial power of company

# **INTRODUCTION**

With increasing economic uncertainty in early 2009, many companies announced major changes in their voluntary disclosure policies. For example, BMV and Cisco developed their perspective and insight into earnings and sales' forecasts, predicted a broader range of outcomes or all together refused to create a guide for investment and earnings. This issue widely covered in the business journals. For example, the Economist Journal in its issue of 28 in February 2009 stressed on reduced guidance of earnings. Uncertainty in previous analytical studies was included in voluntary disclosure models, but usually it is focused on the measurement of uncertainty on the company's level. However, evidences and theories suggest that the impact of macroeconomic uncertainty is greater than the effect of uncertainty on the company's level and it likely plays a major role in the forecasting decisions of managers.

Regarding policies associated to the long-term goals, most companies attempt by increasing the inventory level to balance the amount goods production. Balancing the production requires company's sales (Benito, 2005). Darypa and Nielsen (2011) concluded that in order to achieve to the high liquidity, we should boost the company's financial power and in order to increase the company's financial power, we need to increase sales through advertising. In this study, the relationship between investment in inventories, uncertainty in sales and financial power of companies are examined. For this reason, variable the ratio of investment in inventories as the dependent variable and variables uncertainties in the company's sales, and company's financial power as the independent variable are used. To determine the proper relationship between the dependent and independent variables, e.g. the investment growth rate compared to two last periods of company, company's sales growth rate, sales growth rate compared to two last periods of company, were used. These control variables have an indirect effect on the relationship between the dependent and independent variables. Finally, the main purpose and question of the research is that is there any significant relationship between investment in inventories, uncertainty in the sales and the financial power of companies or not?

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## The necessity of research

According to some researchers, the investment management type that companies are facing with increases the importance of the relationship between investment in inventories and the sales of companies. Investigating the effects of investment and the motivation creating factors in relation to the types of investment has been the subject of debate in recent years. The reason for this is that companies with financial constraints are facing with higher cost differences between the inner and outer capitals (Roodman, 2009). Therefore, we should rely more on the inner cash flow created through increased sales for the investment. As stated in the problem description section, the amount of investment is associated with sales of company. Since liquidity and cash flows are one of the important issues in accounting and financial power (Mateut and Guariglia, 2006), thus, the review of the cash flows generated through more sales provides more useful information in financial evaluations. In addition, it can be useful in decision making on investment by managers. Based on the foregoing context and the necessity of investment in inventory, sales of companies and financial power of company seems to be necessary. In this context, investigating influential factors on the magnitude of this relationship and investment in inventories with respect to higher financial resources can be useful in conclusions.

The way of employing internal resources is an important decision on the conflict between Shareholders and managers, because these decisions potentially affect the value of the company and the interests of owners. In this regard, consideration of investment behaviors of managers and the inventory management method used by them is one of the crucial necessities of the research. In addition, funding from outside resources is one of the important factors that influence on the investment behaviors of for-profit businesses. Empirical evidences shows that success of companies in attracting these resources determines their financial flexibility level. Investigating managers' efficiency in the combination method of internal and external resources with the aim of enhancing the value of company through optimal investment is another necessary of the research.

### **Research** objectives

### The main objective:

The main objective of the research is investigating effects of sales uncertainty and financial power of companies on investments in inventory.

# Subsidiary objectives:

First subsidiary objective was investigating effects of sales uncertainty on the amount of their investment in inventory and the second one was investigating effects of the financial power of companies on the amount of their investment in inventory.

### **Research hypotheses:**

The first main hypothesis: sales uncertainty of companies has significant impact on the amount of their investment in inventory.

The second main hypothesis: the financial power of companies has significant impact on the amount of their investment in inventory.

The first subsidiary hypothesis: The net credit exchange of companies has significant impact on the amount of their investment in inventory.

The second subsidiary hypothesis: Short-term debt of companies has significant impact on the amount of their investment in inventory.

The third subsidiary hypothesis: The liquidity of companies has significant impact on the amount of their investment in inventory.

### Scope of study

### Subject-scope of study

The theoretical basis for this study is based on agency theory, in which the impact of information conditions on procedures and managerial strategies is of interest. The present accounting study is based on capital market data and test hypotheses are done over companies listed on this market. More obviously, present study examines the impact of sales uncertainty and the financial power of companies on investments in inventory over companies listed in the securities market of Tehran.

## Time and location scope of research

The period of study included 10 consecutive years from 2004 to 2013 and research hypotheses of the study were tested using real data of these years. Given the purpose of the study, data relating to the above period and data of in companies that in this period were present in the securities market of Tehran were involved in the analysis.

## Cash management and its impact on the financial power of for-profit units

It seems that companies with faster and cheaper access to foreign funds take specific policies for holding precautionary cash reserves in the company. In this section, concepts related to cash management is explained from the perspective of authors and researchers of financial and managerial fields.

## The importance of cash flows

Cash flows in a business unit are one of the most essential events based which accounting measurement carries out. It seems that creditors and investors take their decisions based on cash flows. Since cash flows represents public purchasing power, it can simply be used in economic exchanges to help different persons and organizations to meet their own needs and to acquire goods and services.

We do most accounting measurements based on the past, present and expected future cash flows. Earnings usually measures based on the net expected cash obtained from the sale of goods or services and costs measures based on payable cash or payable expected cash for goods and services (Arab Mazar-Yazdi, 2006).

Theoretical measurement of assets, debts and earnings to great extent is based on expected actual cash flows. Present value of an asset generally defines as equal to the expected discounted net receipts, which creates asset. In addition, the debt measurement is based on discounted sums of future expected payables. One of the presented definitions for earnings is "The ratio of net surplus of expected discounted cash, which measures at the end of period, to the same expectations at the beginning of the period plus payments of actual divided."

Two major objections issues to the above analysis method:

- 1- The lack of availability of some average ratios of industry, and
- 2- The proposed method is based on the average of industry, but the average of industry is not always an appropriate criterion for all companies and other considerations must also be taken into consideration.

## The relationship between basic variables of study theoretically

Inventory management reflects management strategies for the optimal provision of needed goods with the aim of generating sales earnings. These strategies include the company's market share, elasticity of demand, marketing management, nature of goods, warehousing facilities of company, available cash resources, financing techniques and other related issues. Inventory management in manufacturing companies has more complex structures and it depends on the company's production procedures (Basu and Wang, 2011).

### Conceptual model of the research

Based on the above theoretical principles and the basic purpose of the research, the conceptual model defines as in Figure 1.



Figure 1: conceptual model of the research

#### LITERATURE

Ghosal and Longani (1996), studying on American companies found a reverse effect of price variations on investment only in competitive industries. Girard and Vorsorn (2002) to find the investment behavior of Belgian companies studied the relationship between financial structure and investment decisions as well as discussed the relationship between investment and uncertainty. Their research on two-dimensional data of 2329 companies from 1985 to 1999 showed that previous researches were unable to show a convincing relationship between liquidity, e.g. earnings, investment.

Leuz and Schrand (2009) showed that companies respond to the increased uncertainty, which is caused by the collapse of the money markets, and they will revise in their disclosure and financial reporting policies. They suggested that reporting strategies of managers of joint stock companies potentially would be influenced by external factors, including financial resources.

Choi (2010) showed that volatility in the uncertainty of market changes the reaction of stock prices to the unexpected earnings. The study suggested that when investors are faced with uncertainty in the occurrence of economic boom or recession, the bad news on the predicted gain would have greater impact on the decline of stock prices. This is because that bad news increases investors' uncertainty about future economic conditions. In addition, when investors during business recession periods are faced with uncertainty, the good news would more severe impact on increasing the stock prices.

Shafi'i et al. (2007) studied the impact of fiscal policies on the economic growth over the years 1960 to 2004. The results showed that among government's fiscal policy tools, constructional costs and taxes had significant direct and negative impact on the economic growth, respectively, but consuming expenses showed no significant effect on economic growth.

Tehrani and Hesarzadeh (2010) investigated the impact of free cash flows and financial constraints on investment levels over 120 companies listed in Tehran Stock Exchange during the period from 2001 to 2007. The results showed that the relationship between free cash flows and high levels of investment is direct and statistically significant. However, no significant relationship found between restrictions on financing and investment levels over companies listed in Tehran Stock Exchange.

Poorheydari et al. (2012) studied circumstances in which capital budgeting procedures vary among companies and what governs on these differences. They argued that managers might understand ambiguity in general, industry and company environment. This study provides an opportunity for the analyses of effects of outsource uncertainties, e.g. competitive uncertainties, exchange rates, political uncertainty, and in-company uncertainties, e.g. behavioral uncertainty and debts receipts, in capital budgeting methods. The findings showed that increase in specific uncertainties is effective on the application of advanced capital budgeting methods.

## METHODOLOGY

The study in term of objective is application and investigates impact of financial reporting strategic on the operating environment of non-profit businesses. The research in terms of implementation is descriptive and correlational and examines the relationships between variables and attempts to prove this relationship in the current situation based on available historical data. Therefore, it could be considered a post-event study. In these types of researches, researcher investigates the cause and effect relationship, i.e. dependent and independent variables, after their occurrence. In this study, there was a statistical relationship between variables and we aim to determine this relationship. To examine the relationship between research's variables and test hypotheses, the correlational test based on regression models was used.

The study in terms of data collection methods is descriptive and the needed information for test hypotheses were extracted from audited financial statements and other financial and nonfinancial information of companies listed on Stock Exchange. To analyze research hypotheses, descriptive and inferential statistics was used. Descriptive statistics includes central and dispersion criteria and multiple regression based inferential tests were used.

#### The operational definition of variables and their calculation method

Variable is a unit observed characteristic. It is a quantity, which can vary from unit to unit, or from an observed condition to other can take different values. Variables can be defined in two ways: conceptual and operational. Conceptual definition refers to the definition of a word by other words. In other words, in this type of definition, abstract and assumption criteria are used. Operational definition is a definition based on observable characteristics. Operational definition determines researcher's activities in measurement or manipulation of one variable (Sarmad et al., 2005).

In studies that are based on correlation and causal-effect relationships, variables are divided into two categories: a set of independent variables and another set of dependent variables. This type of classification due to its simplicity, general application and special importance in conceptualizing and planning the research as well

as providing report of results is of great usefulness and value. Operational definition and calculation method of variables in this study based on above classification is as follows.

# **Dependent** variable

Dependent variable in this study is the ratio of investment in inventories ( $\Delta I_{it}$ ) that is increase in the monetary level of inventories of the company compared to that of previous year (Roodman, 2009).

### **Independent variables**

Uncertainty in the sales ( $\sigma_{it}$ ): It is deviation of variations created in the sales and investments of company during the studied years (Sarafidis et al., 2009).

**Financial power of company** ( $Fin_{it}$ ): It means the quick and easy access to financial resources. In the present study, consistent with Caglayanm et al. (2012), the financial power of companies calculates based on three net variables of current credits (NTC), current debts (Debt) and liquidity (Liq). The calculation method of each of these variables is as follows.

$$NTC = \frac{\text{Receivable accounts and documents - Payable accounts and documents}}{\text{Sum of assets}}$$
$$Debt = \frac{\text{Current received facilities}}{\text{Sum of assets}}$$
$$Liq = \frac{\text{Current assets - Goods inventory - Receivable accounts and documents}}{\text{Sum of assets}}$$

## **Control variables**

Growth rate of investment compared to two last periods ( $\Delta I_{it-1}$ ): It is the positive and negative growth rates of investment based on inventory indices of companies compared to two consecutive last years prior to the studied year (Binito, 2005).

Sales growth rate ( $\Delta S_{it}$ ): According to the study by Baum (2010), the company's sales growth rate is the percentage of increase or decrease in the company's sales volume compared to the year prior to the study year.

The rate of sales growth compared to two previous periods ( $\Delta S_{it-1}$ ): In the research did by Binito (2005), sales growth rate of company compared to two previous periods is the percentage of increase or decrease in company's sales volume compared to two years prior to the study year.

## The test method of hypotheses

To test hypotheses of the present study, the regression models proposed by Kagolayan et al. (2013) were used. In these models, the level of investment in inventory was considered as the dependent variable and a function of the independent and control variables.

$$\Delta I_{it} = \alpha_i + \beta_1 \Delta I_{it-1} + \beta_2 \Delta S_{it} + \beta_3 \Delta S_{it-1} + \beta_4 \sigma_{it} + \varepsilon_{it}$$

## Testing model of the first hypothesis

Where,

**Ration of investments in inventories (** $\Delta I_{ii}$ **):** It means increase in monetary level and volume of company's inventories compared to the previous year (Roodman, 2009).

Uncertainty in sales ( $\sigma_{ii}$ ): It is deviation of created variations in company's sales during the studied years (Sarafidis et al., 2009).

Investment growth rate compared to two previous periods ( $\Delta I_{it-1}$ ): It the positive and negative growth rate of investment based on indices of company's goods inventories compared to two consecutive years prior to the study year (Binito, 2005).

Sales growth rate ( $\Delta S_{it}$ ): According to Baum (2010), the company's sales growth rate is the increase or decrease percentage in the amount and volume of company's sales compared to two the year before the study year.

Sales growth rate compared to two previous periods ( $\Delta S_{i(-1)}$ ): According to Binito (2005), the company's sales growth rate compared to two previous periods is the increase or decrease percentage in the sales volume of company compared to two years prior to the study.

Given the independent variable of the first hypothesis is the sales uncertainty and as this variable is based on measured standard deviation, in order to fit regression model, Generalized Method of Moments (GMM) method was used.

## Testing model of the first hypothesis

$$\Delta I_{it} = \alpha_i + \beta_1 \Delta I_{it-1} + \beta_2 \Delta S_{it} + \beta_3 \Delta S_{it-1} + \beta_4 Fin_{it} + \varepsilon_{it}$$

Fin: It reflects the financial power of companies and calculates based on the average of three variables: net current credits, short-term debt and liquidity.

The test model of the first subsidiary hypothesis

$$\Delta I_{it} = \alpha_i + \beta_1 \Delta I_{it-1} + \beta_2 \Delta S_{it} + \beta_3 \Delta S_{it-1} + \beta_4 NTC_{it} + \varepsilon_{it}$$

NTC: It is the net current credits, which is one of the criteria of company's financial power in this research.

 $NTC = \frac{\text{Receivable accounts and documents} - Payable accounts and documents}{\text{Receivable accounts and documents}}$ 

Sum of assets

## The test model of the second subsidiary hypothesis

$$\Delta I_{it} = \alpha_i + \beta_1 \Delta I_{it-1} + \beta_2 \Delta S_{it} + \beta_3 \Delta S_{it-1} + \beta_4 Debt_{it} + \varepsilon_{it}$$

Debt: It the ratio of short-term receivable facilities to the sum of assets, which is one of the criteria of company's financial power in this research.

$$Debt = \frac{Current received facilities}{Sum of assets}$$

# The test model of the third subsidiary hypothesis

$$\Delta I_{it} = \alpha_i + \beta_1 \Delta I_{it-1} + \beta_2 \Delta S_{it} + \beta_3 \Delta S_{it-1} + \beta_4 Liq_{it} + \varepsilon_{it}$$

Liq: It reflects the liquidity of the company, which is one of the criteria of company's financial power in this research.

# $Lig = \frac{Current assets - Goods inventory - Receivable accounts and documents}{Current assets - Goods inventory - Receivable accounts and documents}$ Sum of assets

## Data analysis method

After collecting the data, the researcher must classify and analyze them, and then he can by testing hypotheses to found answers for the research questions. Data analysis is a multi-stage process in which collected data summarizes, classifies and ultimately processes to provide the field for the data analysis to asses hypotheses. In this process, data conceptually and empirically refines and various statistical methods play an important role in conclusions.

To analyze the data in this study, first data were analyzed descriptively. This section contains central and dispersion statistics of data. To test the first and third subsidiary hypotheses the cross sectional with the least squares method was used and for the second subsidiary hypothesis the logistic regression was used.

## **Descriptive analysis of data**

Central and dispersion indices for research variables were determined for descriptive analysis of variables before testing hypotheses. The mean as the most important central indicator and standard deviation as the most important dispersion indicator were calculated. In addition, the standard deviation shows the distribution of data. This action is designed to provide a holistic view of the statistical population and more cognition.

### Correlation

The statistical analysis with wide use in estimation and forecasting is regression and correlation analysis, which is used to determine the relationship between variables and impact of independent variables on the dependent variable.

Correlation analysis is a statistical tool by which we can measure the degree to which one variable has linear correlation with another variable. The correlation issue is related to two criteria of correlation coefficient ( $\gamma$ ) and coefficient of determination (R<sup>2</sup>) (Adel Azar, 2005, p. 182).

## Correlation coefficient $(\gamma)$

The correlation coefficient  $(\gamma)$  is the square root of the coefficient of determination, which can take a value between -1 and +1. Its sign is consistent with the sign of the slope of the regression line  $(\beta)$  so that, if the slope of the regression line is positive, the correlation coefficient is also positive, and if the slope of the regression line is negative, the correlation coefficient will be negative. Finally, if the slope of the regression line equals to zero, the correlation coefficient would be also zero.

$$\gamma = \frac{S_{xy}}{\sqrt{S_{xx}S_{yy}}}$$
$$S_{xx} = \sum_{i=1}^{n} (x_i - \overline{x})^2$$
$$S_{yy} = \sum_{i=1}^{m} (y_i - \overline{y})^2$$
$$S_{xy} = \sum_{i=1}^{n} (x_i - \overline{x})(y_i - \overline{y})$$

## Coefficient of determination (R<sup>2</sup>)

It is the most important criterion by which we can explain the relationship between two variables x and y and measure the deviation of the observations y by estimating the regression line. This coefficient varies between zero and one and the value of zero indicates that the regression line never has been able to attribute changes in y to the independent variable of x. The value of one also indicates that the regression line has been able to attribute changes in y to the independent variable of x.

In the multivariate regression, if the sample size is small, adjusted coefficient of determination will be used instead of coefficient of determination and with increasing the sample size, these two coefficients approaches to each other (Momeni and Qayomi, 2008, p. 122).

### **Regression models**

There are many different types of regression models that the most common of them are simple and combined regression models. Simple includes the relationship between two variables and multivariate regression examines the relationship between one variable with two or more variables. Multivariate regression examines the relationship between a dependent variable with one independent variable in the condition that other variables are kept constant.

In simple regression with one variable, the equation  $y = \alpha + \beta x$  presents the regression line, which estimates by the equation  $\hat{y} = a + bx$ . In multivariate linear regression, the equation representing the regression of the community is as follows:

$$y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n$$

In order to estimate the above equation, we use of the following equation:  $y = \alpha + \beta x + \beta x + \beta x + \beta x$ 

$$y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_n x_n$$

 $b = r(S_y/S_x)$  $a = \overline{y} - b\overline{x}$ 

*Y* is the dependent variable, *x* is the independent variable, *b* is the regression coefficient, *r* is the correlation coefficient between *x* and *y*, *S<sub>y</sub>* is standard deviation of the dependent variable, *S<sub>x</sub>* is standard deviation of the independent variable,  $b_1, b_2, ..., b_n$  are regression coefficients,  $\overline{x}$  and  $\overline{y}$  are the mean of observations for *x* and *y*.

## Logistic regression

Logistic regression is a mathematical model that can be used to describe the relationship between some dependent variable of X with one binary or multi-mode dependent variable of Y. This model can be considered a generalized linear model that uses the Logit function as the link function and its error has a polynomial distribution.

A binary variable means a variable with only two variables, e.g. 0 or 1. For these variables, we use usually zero and one codes. Code 1 is for positive modes, e.g. success, and code 0 is for negative modes, e.g. failure. Logistic regression has the following general form.

$$\log\left(\frac{\pi}{1-\pi}\right) = \alpha + \beta_i x_i$$

In this model, in order to fit the relationship between the independent and dependent variables the coefficient  $\beta_i$  must be estimated as an independent variable. The most common method to estimate this coefficient is the least squares method.

# The basic assumptions of regression

Researcher can use the regression only when the following conditions are satisfied:

- 1. The mean of the errors is equal to zero, i.e. E(ei) = 0. This assumption means that factors forming errors have such positive and negative effects that the mean of errors is equal to zero.
- 2. The dependent variable is normally distributed. This assumption means that the distributions of the variable is such that its dispersion around the average has the maximum density and as we go away from the average value, its density decreases on the left and right sides equally and thus it has a bell-shaped distribution.
- 3. Error terms in the various observations are uncorrelated, i.e.  $cov(e_i, e_j) = 0$ . If this assumption is

violated, we will be faced with a problem called autocorrelation. Generally, when the error terms follow a certain pattern, the assumption of uncorrelated error terms will be violated and positive, negative or combined autocorrelation will arise.

- 4. The variance of every error term is equal to the constant value of  $\delta^2$ . If this assumption violates, we will be faced with the problem of inequality of variances.
- 5. The error term is independent of the independent variable. If this assumption violates, the exact study of the effect of x on y is not possible.

Another assumption that is specific to the multivariate regression model is that the number of observations must be more than the number of parameters and no perfect linear relationship between the independent variables is allowed. This assumption is the necessary condition for obtaining the solution of normal equations and estimating coefficients of multivariate regression.

## Significance test for the regression

In a multivariate regression equation, if there is no relationship between the dependent variable and independent variables, all the coefficients of the independent variables in the equation must be equal to zero. This way, we can test the significance of the regression equation, which can be done using F statistics. If the F statistics calculated from the regression equation is less than F statistics obtained from the table, then the regression equation will be significant.

### Significance test of coefficients

The purpose of significance test of the regression is to determine whether calculated coefficients at the intended confidence level are zero or not?

To test these hypotheses, t-statistic was used. If at the confidence level of 95% the t-statistic obtained from the test is less than t-value obtained from the table with the same degree of freedom, thus, the regression coefficients will be nonzero.

## Autocorrelation test of error terms

As stated in the regression assumptions, in the regression models the assumption is that error terms are independent from one period to other one, but, in many applications, error terms in different periods are autocorrelated. In such cases, the error terms are so called with autocorrelation or serial correlation. To investigate error terms in a regression model whether or not are auto-correlated, some tests are designed, which amongst them the most common one is Durbin–Watson test.

## Durbin–Watson test (DW)

One of the assumptions considered in the regression is independency of the error terms, which are the difference between the actual values and the values predicted by the regression equation. If the assumption of

independence of errors terms is rejected and errors are correlated with each other, we cannot use of the regression model (Momeni, 2008).

In order to assess the independence of errors terms, we use of Durbin–Watson test, which its statistic can be calculated by using the following formula

$$DW = \frac{\sum (e_t - e_{t-1})^2}{\sum e_t^2}$$
(12-3)

Where

 $e_t$  The amount of disturbance or error in time period t

 $e_{t-1}$  The amount of disturbance or error in the period before the time period t

If we show the correlation between the errors by  $\rho$ , then DW statistic can be calculated by using the following equation:

$$DW = 2(1-\rho) DW = 2(1-\rho)$$
(13-3)

The value of this test is in the range of 0 to +4 because if  $\rho = 0$  then DW = 2, which indicates the errors are independent of each other (the lack of autocorrelation).

If  $\rho = 1$ , then DW = 0, which indicates positive autocorrelation among errors. If  $\rho = -1$ , then DW = 4, which indicates errors are with negative autocorrelation.

H<sub>0</sub>: Errors are not correlated,

H<sub>1</sub>: Errors are correlated.

The judgment is as follows: If this statistics is in the range of 1.5 to 2.5, the null hypothesis, i.e. the lack of correlation between errors, confirms and otherwise the alternative hypothesis, i.e. correlation between the errors, confirms. When the assumption of correlation between errors rejects, the regression model can be used.

## **Description of researches' variables**

The starting point is the analysis of data that are measured based on quantitative principles. To analyze the data, it is necessary first to calculate descriptive statistics based on available data. Descriptive analysis is a technique in which we assess the central and dispersion indicators. The number of observations in the study is 954 year-company, which the result of combination of data from 159 companies listed on the stock exchange and the study period is from 2008 to 2013. In addition, since some variables of the research are based on the trend of changes during the previous periods, data from the years 2004 to 2007 were also collected and considered in calculation of basic variables. Table 1 shows descriptive analysis of the variables used in testing model hypotheses.

Tuble 1. Descriptive analysis of the variables used in the test hypotheses models							
	Sales growth rate	Net current credits	Liquidity	Current debt	Company's financial power	Sales uncertainties	Ratio of investments in inventory
Average	0.898857	0.128147	0.092891	0.274758	0.165266	0.701665	2.399559
Median	0.135350	0.123743	0.148755	0.219379	0.181966	0.167202	0.122947
Maximum	126.3397	0.650134	0.871787	2.375833	0.964193	277.2273	1332.791
Minimum	-0.990400	-0.673316	-30.37793	0.000000	-10.12342	0.004073	-0.999743
Standard deviation	6.672205	0.163145	0.175907	0.268363	0.404733	9.527203	44.74790
Skewness	14.14691	-0.209452	-20.47847	3.046582	-19.09965	26.82931	28.18837
Elongation	235.7653	4.107589	495.5106	18.28775	457.1139	759.9149	828.9521
Number of observations	954	954	954	954	954	954	954

 Table 1: Descriptive analysis of the variables used in the test hypotheses models

Descriptive analysis statistics provide the researcher with useful information on the distribution of the collected data as well as the calculated variables. For example, the results presented in Table 1 show that standard deviation of the variable of investment in inventories, as the dependent variable, is higher than its average. This finding indicates that the data of this variable are of high variability, which causes the distribution of these variables to be somewhat different of a normal distribution. The results presented in Table 1 about the variable of sales uncertainties showed severe fluctuations in this variable, because the standard deviation, skewness and elongation of this variable is high. This finding shows that the product market of companies in the sample during the research period have had high variability and likely the future trends and sales of companies have been faced with ambiguities. Descriptive statistics of the variable of financial power suggests that the values of this variable include also negative numbers. It should be noted that these figures belong to companies that in the intended year have been faced with losses, but the average obtained for this variable is positive, which indicates that, on average, companies in the sample during the research period have been faced with appropriate financial

power. In addition, the average obtained for the variable of sales growth rate is positive, which indicates that the sales of companies in the sample during the study period have been rising.

# Checking the normality of dependent variables

In the present regression model, the variable of the ratio of investment in inventories was considered as the dependent variable. The model of test hypotheses is based on regression equations and normality of the dependent variable is one of the basic and primarily assumptions of the regression, which leads to the normality of the regression's residuals. In this study, in order to assess the normality of the data, Jarque-Bera test was used. Statistical hypotheses related to this test are as follows.

- H<sub>0</sub>: The data distribution is normal,
- H<sub>1</sub>: The data distribution is not normal.

The results from the above statistical test are shown in Table 2.

	Table 2: No	ormality	y test of the d	ependent variable of research
Variable		Ianana	Dana atatiatias	Significan ea laval

Variable	Jarque-Bera statistics	Significance level
The ratio of investments in inventories ( $\Delta I$ )	27590554	0.000

Regarding that the significant level of Jarque-Bera statistics for the dependent variable is less than 0.05 (0.000), thus, the null hypothesis, i.e. normality of the distribution of dependent variable confidence level of 95% rejects. This finding suggests that the dependent variables have not normal distribution. Therefore, it is necessary that before testing hypotheses to normalize these variables. In this study, in order to normalize data, their natural logarithm is used. Results obtained from the Jarque-Bera test after normalization process of data are presented in Table 3.

## Table 3: Normality test of the dependent variables of the study after normalization

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Variable	Jarque-Bera statistics	Significance level
Natural logarithm of the ratio of investment in inventories (Ln (Ln )	5.157	0.124

According to the results, the significant level obtained of Jarque-Bera test for the dependent variable, after normalization, is more than the level of test's error ( $\alpha = 0.05$ ) and the null hypothesis confirms. In other words, data related to the dependent variable after normalization follow a distribution close to the normal distribution and normality is accepted for this variable as one of the basic assumptions of the regression.

## Summary of results obtained from hypothesis testing

In the present chapter, the research hypotheses are analyzed statistically. The basic objective of the present study is investigating the relationship between investment in inventories, uncertainty in the sales and financial power of companies listed in Tehran Stock Exchange. In this context, two main hypotheses and three subsidiary hypotheses were issued that are statistically analyzed in the present chapter. Summary results of the statistical analysis of hypotheses are presented in Table 4.

Hypothesis	Significance level	Coefficient of independent variable	Result
Sales uncertainties of companies have significant impact on investment of companies in inventories.	0.000	1.18	Confirm
Financial power of companies has significant impact on investment of companies in inventories.	0.002	-0.838	Confirm
Net credit exchanges of companies have significant impact on investment of companies in goods inventories.	0.002	-2.481	Confirm
Short-term liability of companies has significant impact on investment of companies in goods inventories.	0.847	0.104	Reject
Liquidity of companies has significant impact on investment of companies in goods inventories.	0.004	-0.262	Confirm

## Table 4: Summary of results obtained from testing hypotheses

Overall, the findings show that both the main proposed hypotheses in the study are accepted. Based on the results, there is a direct and significant relationship between uncertainty in the sales of companies and the ratio of investments in inventories. It seems that investment behaviors of managers of the companies in the sample potentially are influenced by available information on the future perspective of company's sales and ambiguity in this case causes that company to be interested in developing its investments. In addition, according to the findings, increasing financial power of companies leads to lower levels of investment in goods inventory. Noting the role of each components of financial power of companies indicates that net exchange of credits and liquidity has a negative impact on the level of investments in inventories. It seems that companies with good financial power potentially have less willing to hold high levels of inventory.

### **Discussing the first hypothesis**

Statistical analysis obtained from the first hypothesis testing showed that there is a significant positive relationship between uncertainty in the sale of companies and investment in inventories. Uncertainty is the rate of changes or variations in an environment in which the for-profit company, which could be customers, competitors, government regulations and labor organizations, operates. Organization theory defines uncertainty as the lack of information for decision-making. Accordingly, when managers do not have the information needed for making future decisions, then the operating environment makes the non-profit organization unpredictable and in this case, the uncertainty occurs (Hatch, 1997). Uncertainty, either directly or indirectly affects the performance and efficiency of the company and increasing its level makes it difficult to evaluate and predict future trends of companies.

Given the above theoretical basis, it seems that a direct relationship between uncertainty in sales of companies and the ratio of investments in inventories there exists, which in turns will be affected by some decisions by financial managers and their uncertainty regarding the future trend of the company's sales. In this regard, we can find two inferential arguments. First, managers of the companies in the sample in the case of uncertainty and because of their conservatism may have tried to increase the inventory level of company so that thereby to reduce the risk of a lack of inventory. Second, it is possible that in the conditions of sales uncertainty, the company's sales will decrease substantially, which raises the company's inventory level.

### Discussing the second hypothesis

Statistical analysis obtained from the second hypothesis testing showed that there is a significant inverse relationship between the financial power of companies and the ration of investment in inventories. In this context, Brown (2009) showed that companies with financial constraints in order to finance new projects are forced to use internal resources, because providing external financing in the form of debts is extremely costly for them. However, companies without financial constraints likely have no willing in using internal resources in new projects and in order to get access to funds with low interest rate, they attempt to finance new investments by obtaining new credits. It seems that companies with less financial power keep their level of inventories low and this procedure as a desirable managerial procedure is of great importance. It is because that companies with low financial power in order to fulfill their obligations on time need to have enough cash resources. Given the findings of the second hypothesis of the research and the significant relationship between financial power of companies and the ratio of investment in inventories, it argues that managers of companies in the sample in determination of investment policies in inventories have not considered financial power of companies. The overall procedure of managers may be that inventory of goods is essential for the survival of the company and inability in payment of financial costs should not prevent the supply of goods for the company. In addition, it should be noted that because of the role of financial decisions of managers in benefits of various groups involved in the company is more notices by these groups. One of the most important and difficult financial decisions of managers is decision on investments in inventory and determination of policies related to it, because the inventory of goods constitutes major part of working capital and ensures the company's main activities. These strategies include consideration of company's market share, the elasticity of demand, marketing management, nature of goods, warehousing facilities of company, available cash resources, financing methods and so on.

Based on the above discussion, it seems that investment in inventory requires evaluation of different data and information by managers. In companies that managers give special attention to this issue, inventory of goods is considered as an important item in the current assets. This item is important because for its provision, company should potentially maintain its financial power. Findings of research suggest that in normal conditions, managers give importance to the setting of investment procedures, which are not based on their financial ability. However, in the case of uncertainty, the important of this item rises for them. Therefore, it can be concluded that uncertainty forces managers to reform their policies and procedures of investment in inventory.

### **Research's summary**

The main objective of the present study was investigating the relationship between investments in inventories and uncertainty in the sales and financial power of the companies listed in Tehran Stock Exchange. In this context, two hypotheses were proposed and analyzed statistically. The sample included 159 companies listed in Tehran stock market, which was selected by systematic elimination method from the statistical population for testing hypotheses and their data was collected for a period of 10 years. The test period of hypotheses was 6 years from 2008 to 2013. Overall, according to the findings, two hypotheses proposed in the research are accepted.

Overall, the findings show that both main hypotheses of the study are accepted. Based on the obtained results, there is a direct and significant relationship between uncertainty in the sales of company and the ratio of investments in inventories. It seems that the investment behavior of managers of the companies in the sample potentially may be affected by the available information about the company's future perspective of sales so that the ambiguity in this regard makes companies to have more willing for developing their investments. In

addition, according to the findings, increasing the financial power of companies leads to lower levels of their investment in inventory. The role of each component of financial power of companies shows that the liquidity and net exchange of credits have negative impact on the level of investments in inventory. It seems that companies with appropriate financial power have potentially less willing to maintain high levels of inventory.

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