THE RELATIONSHIP BETWEEN OPTIMAL TAX RISK AND FIRM VALUE OF COMPANIES LISTED IN TEHRAN STOCK EXCHANGE

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ABSTRACT
The purpose of this study was to investigate the relationship between optimal tax risks and Firm Value. The research was a library and analytical-scientific study based on panel data analysis. In this study, the fiscal data of 109 companies listed in Tehran Stock Exchange during the period 2009 to 2014 were surveyed (654 firm-years). The software that used to analyze of the results of the study were Spss 20, Eviews 7 and Minitab 16. The results of this study in associated with first hypothesis show that there is significant and reverse relationship between tax risk and Firm Value and finally according to the analysis in associated with the second hypothesis we conclude that that there is significant and direct relationship between the tax risk and capital costs of company.

Keywords: Tax Risk, Firm Value, Cost of Capital and Panel Data

INTRODUCTION
The tax is considered as one of the most important sources of government that has been important increasingly from the past given the change of government tasks (Ascioglu et al., 2012). As long as the task of the government was limited to provide security and protection of geographical territory, consequently, the costs are put in low level but with the lapse of time and emerging changes in the different area of economic, the government's role became most notable and higher in responsibilities. Taxes as a significant source of revenue of government were proposed to cover the costs and financial tools to applying charge and direct (Chen et al., 2012). In fact, governments play an important role in economic development through making tax rules to collect tax and direct them for infrastructure investments which is complementary to the activities of private sector investment (Hazarika et al., 2012). Tax at a glance is a tool to be in the presence of the state income. But at a closer look, the monetary policies show that it is an effective and efficient tool for economic development and create a dynamic and productive direction for the country's economy. Tax and fiscal policies has impact on the behavior of economic agents, particularly companies. The decisions relating to the operational activities of the company may affect on the result of changes in tax laws and regulations (Henselmann et al., 2012). Consequently, understanding the interactions could be important in the view of the managers of tax affairs. Also, the managers can be making optimal decisions through recognizing these interactions in the matters associated to the disclosure of tax information, dividend, investment and corporate debt and ultimately increase the Firm Value (Dyreng et al., 2012). Therefore, in this study we will attempt to study the relationship between optimal taxes risks with Firm Value of companies listed in Tehran Stock Exchange. Since attracting investors in the capital market of Iran in considering to the emerging of capital markets than developed countries was most importance in the view point of managers and in order to achieve this objective the identification of factors such as: Tax risk of the company and its impact on Firm Value and cost of capital can be essential strategy in achieving the ultimate goal of the company.

Statement of the Problem
Considering that after the oil, tax is the main source of government revenue and given to the increasing role that be considered in the economic development program for the tax, however, the realization of tax revenues is the major objective of the government. Since wealth and assets is of public interest, so those are not present easily given it to someone or spend it in any way, therefore, the governments faced by...
problems to levy and more offices have established in the country to collect it (Jorissen A and Otley, 2010).

Always, that is the question why did not match the diagnostic tax and collected tax and do not realize the substantial tax revenues, perhaps due to lack of appropriate structures taxes (Khan and Watts, 2009). One of the policies of the managers over the years was compliance with laws and regulations especially the issues associated to the paying of taxes to governments to increase the optimal Firm Value (Jorissen A and Otley, 2010). The fair and timely payment of taxes will not only establish social justice but strengths the blind spots of economy and also in the other hand maximize the risk of losing the financial corporate power (Chiu et al., 2009). The importance of paying the tax because it is remarkable the tax Tkmyn time in the long run will increase the company's market value (Fang et al., 2009).

According to the above description, the changes in the tax structure that make by tax legislators at the macro level will be caused to changes in company policies and investor's policies (Lara et al., 2012). Companies considering the needs of shareholders and investors and long-term plans of companies for investment or other policies, making necessary decisions for the disclosure of tax information related to tax issues in order to implement other policies and reduced tax risks and ultimately increase the intrinsic Firm Value (Suzan et al., 2012). Tax evasion was a major concern for managers of tax organization in most modern and developing countries and the policy tax makers have been followed to guidelines for the prevention of tax evasion (Vocht and Kromhout, 2012).

Optimal and actual tax collection not only increases government tax revenue, but it also makes social justice (Lin and Hsieh, 2012). Tax justice demands that people with higher incomes pay more taxes (Islam et al., 2011). In recent years the government to do more detail planning will aim to determine target taxes (Chekili, 2012).

Establishing the target tax was to reduce tax risk represents programming of governments in associated with their income and expenditure and achievement this goal more originating from correct social and cultural structures (Henselmann et al., 2012).

The relationship between suitable structure of taxation and disclosure of fiscal reports may cause the companies that reduce taxes through tax avoidance or are looking for tax evasion to make hostile decisions in their tax reports and selectively report that it leads to a reduction in tax compared to the actual situation and will reduce the Firm Value in the long run (Suzan et al., 2012).

From the perspective of corporate executives, reduction of tax can be a powerful incentive for management so that achieving to the tax objectives of the company in cost-effective manner, but it is possible to reduce the Firm Value (Vocht and Kromhout, 2012). Considering to conducted researches indicate that the relationship between Firm Value and tax decisions are seriously question and issue of financial markets and investors, but most of these studies are not considered the effect of tax risk (Taylor et al., 2011). This factor is very important, especially in Iran, because it can increase the conflict of interest between major shareholders (controller) and minority shareholders in the economic unit that it is one of the most influential factors in determining the dividend policy and regulation of the intrinsic Firm Value. Therefore, the main purpose of our study was to examine the relationship between optimal tax risk and Firm Value in companies listed in Tehran Stock Exchange.

Theoretical Principle and Literature

Value of each assets depend on various factors such as the one who the valuation done for him investment, type of the value that should be measured, when the values are estimated and objective of valuation. Financial Accounting Standards Board in 2000 has provided the following definition:

"The value is estimated economic cost of a firm so to be determined when it sold in the reporting date and on the real deal and in normal commercial circumstances"

The stock valuations patterns can be divided into three general groups include: pattern based on capital market, pattern based on the predicted accounting data and pattern based on historical accounting data (Anand and Facerook, 2008).

On the other hand, the risk is probability of not become fulfilled of anticipation; the risk is a concept. However, the concept of risk in the minds of many people's is means of financial aspects. Financial risk
means that to be spending money in a way that there is a possibility of losing it. However, the risk that applied for anything means that there is the possibility of losing it or its threat.

The investigating of statistical evidence in the tax system and relative comparison with other countries are well represented that the gap exists between the current situations of tax system in the economy of Iran with favorable conditions. The deviation from optimal conditions will be eliminable through identification of the problems prevailing in the system and its roots; then try to resolving them. Thus, it is essential to accurately assess the prevailing problems in the tax system.

One of the research done in this field is research by Yantov (2014) which was to test the relationship between corporate governance mechanisms for cash and the impact on the value of the company in the Singapore Stock Exchange. His results showed that the companies by less effectiveness of corporate governance have more tended to hold their cash. Other results also showed that due to the flexibility and the conflict between managers and owners, and representation theory, the managers save cash in order to precaution. In addition, the companies by a pyramidal ownership structure in contrast with single-owner companies or centralized hold less cash and have a higher Firm Value.

Wilin (2013), in his study investigates the effect of the interest management on the being relation on the financial statements. In this study he used of the Jones model to measure earnings management. In his research he classified the discretionary accruals into two categories: short-term and long-term. His results showed that earnings management through discretionary accruals has effect on being relationship of the interest and the book value. But, earnings management through long-term discretionary accruals in contrast to earnings management through short-term discretionary accruals has greater impact on the being relationship and book value.

Taylor et al., (2012), in their study examines the impact of international tax structures in companies on the financial disclosure patterns. They result that the coefficients of partial income tax is considered as one of the crucial factor for disclosure of financial reports. The relationship between tax coefficients and disclosure of financial reports may be caused that the companies that reduce taxes through tax avoidance or are looking for tax evasion make hostile decisions in their tax reports and selectively report that it leads to a reduction in tax compared to the actual situation. They also found that, from the perspective of corporate managers, reduction of tax can be powerful motivating factor for the management to recognize the company's financial goals by cost-effective manner.

Marquardt and Wiedman (2012), study the effect of the earning management to being relationship of accounting information. Their results showed that the earnings management caused to reduce the being relationship of earnings and the decrease for optional components of earning is more than non-optional components of earnings.

Taylor et al., (2011), in a study entitled “The impact of international taxes structure on financial disclosure patterns,” investigate the relationship between the variables. They analyzed how international tax structures in companies are effective on financial disclosure patterns. They result that the coefficients of partial income tax is considered as one of the crucial factor for disclosure of financial reports. The relationship between tax coefficients and disclosure of financial reports may be caused that the companies that reduce taxes through tax avoidance or are looking for tax evasion make hostile decisions in their tax reports and selectively report that it leads to a reduction in tax compared to the actual situation. They also found that, from the perspective of corporate managers, reduction of tax can be powerful motivating factor for the management to recognize the company's financial goals by cost-effective manner. However, our research followed by the study of Taylor et al., (2011), but given the economic conditions of the country and differences in the exchange stock between the two countries, A number of variables were examined and with respect to our capital markets have been modified by the researcher.

Platt et al., (2011), study the equity of Firm Value with present cash low value of company's actual future capital in 1821 the companies during the period of to 5 years up to maximum 12 years, their results found that the equity of Firm Value with the present value of future cash flow is not true, in fact, the company being valuation less than their present value of future cash and thus the price of securities may not be reflective of future revenues of companies. And the discounted value of future cash has a very little
Impact on the valuation of companies, also taking into account the effect of firm size; it will also be less. Finally, it should be stated that the Firm Value has relationship with the present value of future cash.

**Research Hypotheses**

According to previous research Ascioglu et al., (2012) and Reebika et al., (2012), after reviewing the research and preliminary studies on possible solutions, to answer the questions raised in the section of the explanation of problem, the following hypotheses were formulated:

1. There is significant relationship between the tax risk and Firm Value.
2. There is significant relationship between the tax risk and corporate capital costs.

**MATERIALS AND METHODS**

**Research Methodology**

The research is applied in term of objective and is considered as survey-correlation in term of method. In this research, the multivariate regression and panel data are used in order to test of the hypothesis. The populations of this research were all companies listed in Tehran Stock Exchange during a period of six years, from 1387 to 1392. Elimination method used to select the sample and the following criteria were considered for this purpose and if a company has met all the criteria, thus selected as the sample.

1. According to the required information from year 2009, the companies were listed at Tehran Stock Exchange by the end of March 2008 and the names of the companies listed above, is not removed by the end of 2014.
2. During the desired period, their shares are actively traded on the stock market.
3. Their fiscal year should be ended 29 March and should not have been changed in the period under study.
4. They are not being involved of financial intermediation firms (investment, holding, leasing and banking and insurance) because they have different functions.
5. The required information is available.

After consideration of all the above criteria; 109 companies remains which has been chosen. Thus, our observations were 654 year-firm in 19 different industries.

**Research Variables**

Research models derived from study by Ascioglu et al., (2009) and modified variants for research by Reebika et al., (2012) have been estimated as follows:

The model associated to the first hypothesis of the study:

There is significant relationship between tax risk and Firm Value.

\[
\text{LOG}_{\text{MKT}_i} = \alpha_0 + \beta_1 \text{TAXRISK}_i + \beta_2 \text{DEBT}_i + \beta_3 \text{BTM}_i + \beta_4 \text{LEV}_i + \beta_5 \text{LOG(ASS)}_i + \epsilon_i
\]

**DISCR _ ACC**: Optimal tax risk

**DEBT** : Debt-to-equity ratio

**BTM** : Growth opportunities

**LEV**: leverage ratio

**LOG (ASS)**: firm size

**LT _ GROW**: rate of growth

**DISCR _ ACC**: discretionary accruals

The model associated to the second hypothesis:

There is significant relationship between the tax risk and capital cost

\[
r_{i,t} = \alpha_0 + \beta_1 \text{TAXRISK}_i + \beta_2 \text{DEBT}_i + \beta_3 \text{BTM}_i + \beta_4 \text{LEV}_i + \beta_5 \text{LOG(ASS)}_i + \beta_6 \text{LOG}(\text{ASS})_i + \epsilon_i
\]

\[
r_{i,t} = \alpha_0 + \beta_1 \text{TAXRISK}_i + \beta_2 \text{DEBT}_i + \beta_3 \text{BTM}_i + \beta_4 \text{LEV}_i + \beta_5 \text{LOG(ASS)}_i + \beta_6 \text{LOG}(\text{ASS})_i + \epsilon_i
\]

\[
r_{i,t} = \alpha_0 + \beta_1 \text{TAXRISK}_i + \beta_2 \text{DEBT}_i + \beta_3 \text{BTM}_i + \beta_4 \text{LEV}_i + \beta_5 \text{LOG(ASS)}_i + \epsilon_i
\]
Definitions of Dependent Variables

Firm Value (Log_MKT_Value, t)
According to the research of Dayrung et al., (2012), the Firm Value will be calculated by the formula:

\[ \text{Log}_i \text{MKT}_t \text{Value} = MV_{i,t} + DI_{i,t} / BV_{i,t-1} \]

Where
- \( MV_{i,t} \) = The value of the stock market.
- \( DI_{i,t} \) = the amount of dividends.
- \( BV_{i,t-1} \) = the book value of equity in the previous year.

Capital Cost (\( r_{i,t} \))
According to the research of Hamdan et al., (2011), the capital cost is calculated as follows:

\[ r_{i,t} = [(1 - S)V] / [E - (1 - p) - (1 - S)V] \]

Where
- \( r_{i,t} \) = capital cost
- \( S \) = amount of sold shares.
- \( V \) = value of convertible shares
- \( E \) = expected value of the stock.
- \( p \) = current stock price.

Definitions of Independent Variables

Optimal Tax Risk (TAXRISK, t)
Optimal tax predicates to obtain maximum taxation according to economic status of companies and applicable government tax policies and the optimal tax risk represents the deviations rate in achieving optimal tax. According to research and Ewert and Wagenhofer (2011), the optimal tax risk will be calculated by the formula:

\[ \frac{\text{Total Tax Deferred}}{\text{Book Value of Total Assets}} = \text{TAXRISK}_t \]

Definitions of Control Variables

Debt-to-equity Ratio (DEBT, t)
Debt-to-equity ratio reflects the corporate commitment to the corporate equity (Lin and Hsieh, 2012) and calculates as follows:

\[ \text{DEBT}_t = \frac{\text{total liabilities}}{\text{market value of equity}} \]

Growth Opportunities (BTM, t)
The growth opportunity is the market value of equity to book value of equity (Lara et al., 2012).
Leverage Ratio ($LEV_{i,t}$)
In this study, we follow the leverage ratio in the research by Vocht and Kromhout (2012), and the leverage ratio ($LEV_{i,t}$) will be calculated as follows:

$$LEV_{i,t} = \frac{\text{book value of total liabilities}}{\text{book value of total assets}}$$

Firm Size ($LOG(ASS)_{i,t}$)
It indicates the natural log of book value of total assets of firm (Suzan et al., 2012).

$$LOG(ASS)_{i,t} = \ln \left( \sum_{k=1}^{6} \text{Total Assets} \right)$$

Growth Rate ($GROW_{i,t}$)
According to a study Humpery (2012), the growth rate is calculated as follows:

$$LT_{GROW_{i,t}} = GR_{i,t} \times GP_{i,t} = \frac{R_{i,t} - R_{i,t-1}}{R_{i,t-1}} \times GR_{i,t}$$

Where:
- $GR_{i,t} = \text{Rate of return on equity of firm } i \text{ in year } t$
- $R_{i,t} = \text{Stock returns of firm } i \text{ in year } t$
- $R_{i,t-1} = \text{Stock returns of firm } i \text{ in year } t-1$

And

$$GP_{i,t} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}} \times GP_{i,t}$$

Where:
- $P_{i,t} = \text{Stock prices of firm } i \text{ in year } t$
- $P_{i,t-1} = \text{Stock price of company } i \text{ in year } t-1$

Discretionary Accruals ($DISCR_{i,t}$)
In this study, we will follow by the basic model Henselmann et al., (2012) and Dyreng et al., (2012) and modified model by Lara et al., (2012), to estimate discretionary accruals as following:

Initially, total accruals will be calculated by the formula:

$$\frac{TA_{i,t}}{A_{i,t-1}} = \alpha_1 \frac{1}{A_{i,t-1}} + \left( \frac{\Delta REV_{i,t}}{A_{i,t-1}} - \frac{\Delta AR_{i,t}}{A_{i,t-1}} \right) + \alpha_3 \frac{PPE_{i,t}}{A_{i,t-1}} + \alpha_4 \frac{\text{NetIncome}_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t}$$

Where:
- $\alpha = \text{constant factor}$
- $TA_{i,t} = \text{Total accruals}$
- $TA_{i,t} = NI - OCF$

Where:
- $NI = \text{Net Income}$
- $OCF = \text{operating cash flows}$
- $A_{i,t-1} = \text{Accruals in the previous year}$

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$$\Delta REV_{it} = \text{changes in sales as follows:}$$

$$\Delta REV_{it} = \frac{S_{it} - S_{it-1}}{S_{it-1}}$$

$$\Delta REV_{it} = \text{Sales growth of firm } i \text{ in year } t$$

$$S_{it} = \text{Net sales of firm } i \text{ in year } t$$

$$S_{it-1} = \text{Net sales of firm } i \text{ in year } t-1.$$ 

$$\Delta AR_{it} = \text{changes in the corporate demands.}$$

$$\Delta AR_{it} = \frac{AR_{it} - AR_{it-1}}{AR_{it-1}}$$

$$\Delta AR_{it} = \text{Growing demands for firm } i \text{ in year } t$$

$$AR_{it} = \text{Demands for firm } i \text{ in year } t$$

$$AR_{it-1} = \text{Demands for firm } i \text{ in year } t-1$$

$$PPE_{it} = \text{the net book value of assets, property and equipment.}$$

$$NetIncome_{it-1} = \text{net income of firm in the previous year of the survey.}$$

After calculating the total accruals and paste it in the following model, the discretionary accruals will be calculated by the formula:

$$DISCR_{ACC_{it}} = \varepsilon_{it} = \frac{TA_{it}}{A_{it-1}} - \left(\alpha_1 \frac{1}{A_{it-1}} + \alpha_2 \left(\frac{\Delta REV_{it}}{A_{it-1}} - \frac{\Delta AR_{it}}{A_{it-1}}\right) + \alpha_3 \frac{PPE_{it}}{A_{it-1}} + \alpha_4 \frac{NetIncome_{it-1}}{A_{it-1}}\right)$$

$$\varepsilon_{it} = \text{Random error of firm } i \text{ in year } t.$$ 

The required data for research for test of the hypothesis have been gathered through referring to the audited financial statements of companies listed in Tehran Stock Exchange (available in the library Stock Exchange) and the database "Rahavard Novin" and sites for manage research, development and Islamic Studies affiliated with the Securities and Exchange at www.rdis.ir and Codal network, comprehensive information systems to publishers at www.codal.ir, and the processing of financial information at www.fipiran.com. A library method using books and Persian and Latin scholarly articles and dissertations were used to theoretical study and review of the literature. Preliminary calculations were done on a spreadsheet, Excel Office and the data were prepared for analysis, then the Software 20 Spss, Eviews 7 and Minitab16 were used to final analysis.

RESULTS AND DISCUSSION

Research Findings Results

Analysis and Hypothesis Testing

In this study the multi-variables linear-regression model was used to data analysis and hypothesis test. A statistical method used in this research is panel data method. To test the hypotheses, firstly, the correctness of data integration was tested using f bound test then the type of test method (fixed effects or random effects) was determined based on the Hausman test and then proceed to estimate depending on the method.

To determine the significance of the model the F-statistics was used and to determine the significance of the coefficients of the independent variables in the model, the t-statistic of 95% for accept or reject the hypothesis was making decision. Also, in order to evaluate the normality of the variables, matches of variance of errors and independence of errors Jarque - Bera test, Breusch–Pagan test and Durbin-Watson statistics used respectively.
Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of Observations</th>
<th>average</th>
<th>Standard deviation</th>
<th>Minimum</th>
<th>maximum</th>
<th>Skewness</th>
<th>elongation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm Value</td>
<td>654</td>
<td>0.2996</td>
<td>0.2564</td>
<td>0.0002</td>
<td>2.5957</td>
<td>2.114</td>
<td>11.161</td>
</tr>
<tr>
<td>Capital costs</td>
<td>654</td>
<td>0.6328</td>
<td>0.3447</td>
<td>0.0110</td>
<td>6.8448</td>
<td>8.979</td>
<td>161.508</td>
</tr>
<tr>
<td>Optimal tax risk</td>
<td>654</td>
<td>0.2709</td>
<td>0.3578</td>
<td>0.0001</td>
<td>2.9326</td>
<td>3.576</td>
<td>16.428</td>
</tr>
<tr>
<td>Debt-to-equity ratio</td>
<td>654</td>
<td>0.1390</td>
<td>0.2548</td>
<td>0.0000</td>
<td>2.5554</td>
<td>4.850</td>
<td>30.619</td>
</tr>
<tr>
<td>Growth opportunities</td>
<td>654</td>
<td>0.1473</td>
<td>0.7506</td>
<td>0.0001</td>
<td>17.4459</td>
<td>20.363</td>
<td>448.207</td>
</tr>
<tr>
<td>Leverage ratio</td>
<td>654</td>
<td>0.7689</td>
<td>0.0433</td>
<td>0.6791</td>
<td>0.9025</td>
<td>0.445</td>
<td>0.124</td>
</tr>
<tr>
<td>Firm size</td>
<td>654</td>
<td>0.0881</td>
<td>0.0684</td>
<td>0.0000</td>
<td>0.2357</td>
<td>0.592</td>
<td>0.846</td>
</tr>
<tr>
<td>Growth rate</td>
<td>654</td>
<td>0.0881</td>
<td>0.0684</td>
<td>0.0000</td>
<td>0.2357</td>
<td>0.592</td>
<td>0.846</td>
</tr>
<tr>
<td>Discretionary accruals</td>
<td>654</td>
<td>0.5593</td>
<td>0.1746</td>
<td>0.1157</td>
<td>1.2175</td>
<td>0.279</td>
<td>0.097</td>
</tr>
</tbody>
</table>

Test Results of Statistical Hypothesis

Dependent Variables Distributed Normality Test

In the present study ordinary least squares method was used to estimate the model parameters and this method is based on the assumption that the dependent variable of research has normal distribution so that non-normal distribution of the dependent variable leads to a violation of the assumptions of the method for parameter estimation and does not provide accurate results. Hence it is necessary that normal distribution of the variables being tested.

The normality of rest of the regression model is one of the regression assumptions indicating the validity of the regression analysis, however, the normality of the dependent variables leads to normality of model (the difference between the estimated values with the actual value). So be sure to control the normality of the dependent variable before estimation of the parameter and if this condition is not established, the appropriate solution to normalize them (including transferring it) shall be adopted. This issue was examined in this research through Kolmogorov-Smirnov (K-S) statistic. The null and contrary hypothesis for this test is as follows:

\[
H_0 : \text{Normal Distribution} \\
H_1 : \text{Not Normal Distribution}
\]

If the significance level of the test statistic is greater than 0.05 (Prob > 0.05), the null hypotheses will be accepted based on the normal distribution of the variables. Table 1 presents the results of the K-S test for dependent variables of studied corporates

Table 1: Shows the results of tests of normality of the dependent variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number (n)</th>
<th>Statistic (K-S)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm Value</td>
<td>654</td>
<td>3.0107</td>
<td>0.019</td>
</tr>
<tr>
<td>Capital cost</td>
<td>654</td>
<td>4.336</td>
<td>0.043</td>
</tr>
</tbody>
</table>

Given that the dependent variables so that the significance level of K-S statistic is less than 0.05, thus the null hypothesis based on normality of distribution of the variables was rejected at 95% and indicates that the variables do not have a normal distribution.

Normality of the dependent variables is a prerequisite for regression models, therefore, it is necessary that the variables being normalized before testing the hypothesis. In this research the Johnson Transformation
was used to normalize the data and was analyzed by Minitab 16 software. K-S test results after normalization process data is summarized in Table 2.

Table 2: Shows the results of tests of normality of the dependent variables after normalization process

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number (N)</th>
<th>Statistic (K-S)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm Value</td>
<td>654</td>
<td>0.798</td>
<td>0.548</td>
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<tr>
<td>Capital cost</td>
<td>654</td>
<td>0.496</td>
<td>0.967</td>
</tr>
</tbody>
</table>

According to Table 2, since after the data normalization the significance level of Kolmogorov-Smirnov test for dependent variables is greater than 0.05 (0.548) and (0.967), thus the hypothesis was confirmed in 95% and indicates that the dependent variables after normalization process has a normal distribution.

Correlation between Variables

In this section, to be examined the relationship between variables and the correlations between them using the Pearson correlation coefficient.

<table>
<thead>
<tr>
<th></th>
<th>Firm Value</th>
<th>capital cost</th>
<th>optimal tax risk</th>
<th>Debt-to-equity ratio</th>
<th>growth opportunities</th>
<th>leverage</th>
<th>Firm size</th>
<th>growth rate</th>
<th>Discretionary accruals</th>
</tr>
</thead>
<tbody>
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<td>Firm Value</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>capital cost</td>
<td>0.051</td>
<td>0.004</td>
<td>-0.020</td>
<td>0.038</td>
<td>0.026</td>
<td>0.002</td>
<td>0.002</td>
<td>-0.000</td>
<td>-0.000</td>
</tr>
<tr>
<td>(P – Value)</td>
<td>0.190</td>
<td>(0.296)</td>
<td>(0.617)</td>
<td>(0.338)</td>
<td>(0.513)</td>
<td>(0.965)</td>
<td>(0.965)</td>
<td>(0.965)</td>
<td>(0.965)</td>
</tr>
<tr>
<td>optimal tax risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(P – Value)</td>
<td>-0.020</td>
<td>0.014</td>
<td>0.038</td>
<td>0.038</td>
<td>0.026</td>
<td>0.002</td>
<td>0.002</td>
<td>-0.000</td>
<td>-0.000</td>
</tr>
<tr>
<td>(P – Value)</td>
<td>0.617</td>
<td>(0.296)</td>
<td>(0.338)</td>
<td>(0.513)</td>
<td>(0.513)</td>
<td>(0.965)</td>
<td>(0.965)</td>
<td>(0.965)</td>
<td>(0.965)</td>
</tr>
<tr>
<td>Debt-to-equity ratio</td>
<td>0.038</td>
<td>0.034</td>
<td>0.019</td>
<td>0.012</td>
<td>0.002</td>
<td>0.002</td>
<td>0.002</td>
<td>-0.000</td>
<td>-0.000</td>
</tr>
<tr>
<td>(P – Value)</td>
<td>0.338</td>
<td>(0.381)</td>
<td>(0.632)</td>
<td>(0.757)</td>
<td>(0.965)</td>
<td>(0.533)</td>
<td>(0.533)</td>
<td>(0.533)</td>
<td>(0.533)</td>
</tr>
<tr>
<td>growth opportunities</td>
<td>0.026</td>
<td>0.041</td>
<td>0.019</td>
<td>0.012</td>
<td>0.002</td>
<td>0.002</td>
<td>0.002</td>
<td>-0.000</td>
<td>-0.000</td>
</tr>
<tr>
<td>(P – Value)</td>
<td>0.513</td>
<td>(0.298)</td>
<td>(0.632)</td>
<td>(0.757)</td>
<td>(0.965)</td>
<td>(0.533)</td>
<td>(0.533)</td>
<td>(0.533)</td>
<td>(0.533)</td>
</tr>
<tr>
<td>Debt-to-equity ratio</td>
<td>0.002</td>
<td>-0.084</td>
<td>0.017</td>
<td>0.012</td>
<td>0.002</td>
<td>0.002</td>
<td>0.002</td>
<td>-0.000</td>
<td>-0.000</td>
</tr>
<tr>
<td>(P – Value)</td>
<td>0.965</td>
<td>(0.032)</td>
<td>(0.656)</td>
<td>(0.757)</td>
<td>(0.965)</td>
<td>(0.533)</td>
<td>(0.533)</td>
<td>(0.533)</td>
<td>(0.533)</td>
</tr>
<tr>
<td>Firm size</td>
<td>-0.002</td>
<td>-0.034</td>
<td>-0.007</td>
<td>-0.006</td>
<td>-0.049</td>
<td>-0.014</td>
<td>-0.014</td>
<td>-0.026</td>
<td>-0.000</td>
</tr>
<tr>
<td>(P – Value)</td>
<td>0.965</td>
<td>(0.380)</td>
<td>(0.858)</td>
<td>(0.878)</td>
<td>(0.210)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Growth rate size</td>
<td>0.024</td>
<td>-0.047</td>
<td>0.020</td>
<td>-0.014</td>
<td>0.031</td>
<td>-0.026</td>
<td>-0.026</td>
<td>-0.000</td>
<td>-0.000</td>
</tr>
<tr>
<td>(P – Value)</td>
<td>0.533</td>
<td>(0.230)</td>
<td>(0.618)</td>
<td>(0.720)</td>
<td>(0.435)</td>
<td>(0.503)</td>
<td>(0.843)</td>
<td>(0.843)</td>
<td>(0.843)</td>
</tr>
<tr>
<td>Discretionary accruals</td>
<td>0.056</td>
<td>0.110</td>
<td>0.015</td>
<td>-0.014</td>
<td>-0.061</td>
<td>0.013</td>
<td>0.013</td>
<td>0.077</td>
<td>0.076</td>
</tr>
<tr>
<td>(P – Value)</td>
<td>0.153</td>
<td>(0.005)</td>
<td>(0.703)</td>
<td>(0.716)</td>
<td>(0.119)</td>
<td>(0.744)</td>
<td>(0.049)</td>
<td>(0.053)</td>
<td>(0.053)</td>
</tr>
</tbody>
</table>

Collinearity among Variables

In the present study, the collinearity relationship between independent variables using Pearson correlation coefficient was conducted. The results show that there is direct correlation between the results of optimal tax risk that this correlation is very strong. Therefore due to existence of problem among the variables, the
simultaneous entry of these variables in a model was not possible and it is necessary to survey and test them in the separate model. In the case of other variables due to the lack of strong correlations one can say there is no problem of collinearity among them and the entry of them at the same time will not cause to collinearity problem.

**The Results of First Hypothesis**

The aim of test of the first hypothesis was to study the relationship between tax risk and Firm Value, and statistical hypothesis is defined as follows:

**H0**: there is not significant between tax risk and Firm Value.

**H1**: there is significant relationship tax risk and Firm Value.

This hypothesis is estimated using the model (1) supported by panel data and if the coefficient of $\beta_1$ being in significant at 95% will be approved.

$$
\log_{10} \text{MKT Value}_{i,t} = \alpha_0 + \beta_1 \text{TaxRisk}_t + \beta_2 \text{DEBT}_{i,t} + \beta_3 \text{BTM}_{i,t} + \beta_4 \text{LEV}_{i,t} + \beta_5 \log(\text{ASS})_{i,t} + \beta_6 \text{GROW}_{i,t} + \beta_7 \text{DISCR ACC}_{i,t} + \epsilon_{i,t}
$$

(1)

The Chow test or F bound was used in order to determine whether using panel data would be effective in the estimation of given model and the Hausman test was used to specified which method (fixed effects or random effects) is better to estimation (recognition of fixed or random of variation of sectional units). The results of these tests are presented in Table 3.

<table>
<thead>
<tr>
<th>Test</th>
<th>Number</th>
<th>Statistic</th>
<th>Statistic value</th>
<th>Degrees of freedom</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chow</td>
<td>654</td>
<td>$F$</td>
<td>3.1402</td>
<td>(108,538)</td>
<td>0.0286</td>
</tr>
<tr>
<td>Hausman</td>
<td>654</td>
<td>$\chi^2$</td>
<td>7.5039</td>
<td>7</td>
<td>0.0193</td>
</tr>
</tbody>
</table>

According to the results of the Chow test and P-Value (0.0286), the $H0$ hypothesis was rejected at 95%, indicating that one can be used from panel data method. Also according to the results of the Hausman test and P-Value (0.0193) which is less than 0.05, the $H0$ hypothesis was rejected at 95% and the $H1$ is accepted. Therefore it is necessary that the model is estimated using fixed effects.

Jarque-Bera test results shows that the residual from an estimation of the research model in 95% has the normal distribution, so that the probability of the test (0.4829) is larger than 0.05. In this study, we used to Breusch–Pagan test for homogeneity of variance. Due to the importance of this test which is smaller than 0.05 (0.0293), the null hypothesis based on being homogeneity of variance was rejected and can be said that the model has heterogeneity of variance. In this study to address the problem of estimating, the generalized least squares estimation method (GLS) has been used. According to the preliminary results of estimating the Durbin-Watson statistic of 2.27 and since it is between 1.5 and 2.5. It may be concluded that the residuals are independent of each other because the level of the encoded test (0.7655) is larger than 0.05, however, the null hypothesis of this test based on linearity of model is confirmed and the model has not specified error is not. Summary of results of these tests are presented in Table 4.

<table>
<thead>
<tr>
<th>Jarque-Bera statistic</th>
<th>Breusch-Pagan statistic</th>
<th>Durbin-Watson statistic</th>
<th>Ramsey statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\chi^2$</td>
<td>$P$-Value</td>
<td>$F$</td>
<td>$P$-Value</td>
</tr>
<tr>
<td>1.4295</td>
<td>0.4829</td>
<td>4.0758</td>
<td>0.0293</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.27</td>
<td>8.4919</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.7655</td>
</tr>
</tbody>
</table>
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According to the results of Chow and Hausman tests and also the results of statistical assumptions of the classical regression model (1), the research is estimated using panel data as fixed effects. The results are presented in Table 5. The estimated form of the model using Eviews 7 software will be as follows:

$$\text{LoG}_t \text{_MKT}_t \text{_Value}_i, t = -1.9010 - 0.1277 \text{TAXRISK}_t \text{_SQ}_i, t + 0.2451 \text{DEBT}_i, t - 0.0037 \text{BTM}_i, t + 2.8405 \text{LEV}_i, t - 0.0178 \text{LOG(ASS)}_i, t + 0.1776 \text{LT}_i, t \text{_GROW}_i, t - 0.1826 \text{DISCR}_i, t \text{_ACC}_i, t + \epsilon_i, t$$

**Table 5: The results of the first research hypothesis testing using fixed effects**  
**dependent variable: Firm Value**

**number of observations: 654 year-firm**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t- statistical</th>
<th>P-Value</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed component</td>
<td>-1.9010</td>
<td>-3.1320</td>
<td>0.0018</td>
<td>negative</td>
</tr>
<tr>
<td>Optimal tax risk</td>
<td>-0.1277</td>
<td>-1.3898</td>
<td>0.0385</td>
<td>negative</td>
</tr>
<tr>
<td>Debt-to-equity ratio</td>
<td>0.2451</td>
<td>1.9523</td>
<td>0.0271</td>
<td>positive</td>
</tr>
<tr>
<td>Growth opportunities</td>
<td>-0.0037</td>
<td>-0.3969</td>
<td>0.6915</td>
<td>non-significant</td>
</tr>
<tr>
<td>leverage ratio</td>
<td>2.8405</td>
<td>1.5215</td>
<td>0.0295</td>
<td>positive</td>
</tr>
<tr>
<td>Firm size</td>
<td>0.1776</td>
<td>1.7071</td>
<td>0.0484</td>
<td>positive</td>
</tr>
<tr>
<td>Growth rate</td>
<td>0.1776</td>
<td>1.7071</td>
<td>0.0484</td>
<td>positive</td>
</tr>
<tr>
<td>discretionary accruals</td>
<td>-0.1826</td>
<td>-1.8619</td>
<td>0.0391</td>
<td>negative</td>
</tr>
<tr>
<td>coefficient of determination</td>
<td></td>
<td></td>
<td>0.3572</td>
<td></td>
</tr>
<tr>
<td>F- statistics</td>
<td></td>
<td></td>
<td>2.5998</td>
<td></td>
</tr>
<tr>
<td>$P – Value$</td>
<td></td>
<td></td>
<td>(0.0000)</td>
<td></td>
</tr>
</tbody>
</table>

For significance of the model, because the probability of F statistics is smaller than 0.05 (0.0000), with a significant 95%, the significance of the model is confirmed. The coefficient of determination of model also shows that 35.72% of the Firm Value is explained by introduced variables in the model.

For be significant of coefficient given to the results presented in Table 5, since the probability of t-statistic for variable coefficient of optimal tax risk of corporate is smaller than 0.05 (0.0385), thus, existence of a significant relationship between optimal tax risk and Firm Value at 95 percent is approved. Therefore, the first research hypothesis is accepted and we can say at 95% confidence that there is an inverse relationship between tax risk and Firm Value. Being negative of coefficient of the variable (-0.1277) indicates that there is an inverse relationship between tax risk and Firm Value so that with increasing of 1 unit tax risk, the Firm Value also reduced to amount of 0.1277 unit. Thus, according to the analysis in associated to the first hypothesis can be concluded that there is an inverse relationship between tax risk and Firm Value.

**Second Hypothesis Test Results**

The purpose of test of the second hypothesis is there a significant relationship between the tax risk and capital cost? The statistical hypothesis is expressed as follows:

$H_0$: there is not significant between tax risk and capital cost.  
$H_1$: there is significant relationship tax risk and capital cost.

This hypothesis is estimated using the model (2) supported by panel data and if the coefficient of $\beta_1$ being in significant at 95% will be approved.
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\[ r_{i,t} = \alpha_0 + \beta_1 \text{TAXRISK}_i + \beta_2 \text{DEBT}_{i,t} + \beta_3 \text{BTM}_{i,t} + \beta_4 \text{LEV}_{i,t} + \beta_5 \text{LOG(ASS)}_{i,t} + \beta_6 \text{LT}_i \text{GROW}_{i,t} + \beta_7 \text{DISCR}_i \text{ACC}_{i,t} + \varepsilon_{i,t} \]

(1)

\[ H_0 : \beta_1 = 0 \]

\[ H_1 : \beta_1 \neq 0 \]

The Chow test was used to determination for using panel data or fixed effects and the Hausman test was used to recognition of fixed or random effects in using panel data. The results of these tests are presented in Table 6.

Table 3: The results of Chow and Hausman test for the model (1)

<table>
<thead>
<tr>
<th>Test</th>
<th>Number</th>
<th>Statistic</th>
<th>Statistic value</th>
<th>degrees of freedom</th>
<th>of P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chow</td>
<td>654</td>
<td>( F )</td>
<td>3.1402</td>
<td>(108,538)</td>
<td>0.0286</td>
</tr>
<tr>
<td>Hausman</td>
<td>654</td>
<td>( \chi^2 )</td>
<td>7.5039</td>
<td>7</td>
<td>0.0193</td>
</tr>
</tbody>
</table>

According to the results of the Chow test and P-Value (0.0286), the \( H_0 \) hypothesis was rejected at 95%, indicating that one can be used from panel data method. Also according to the results of the Hausman test and P-Value (0.0418) which is less than 0.05, the \( H_0 \) hypothesis was rejected at 95% and the \( H_1 \) is accepted. Therefore it is necessary that the model is estimated using fixed effects.

Jarque-Bera test results shows that the residual from an estimation of the research model in 95% has the normal distribution, so that the probability of the test (0.5196) is larger than 0.05. In this study, we used to Breusch–Pagan test for homogeneity of variance. Due to the importance of this test which is smaller than 0.05 (0.0298), the null hypothesis based on being homogeneity of variance was rejected and can be said that the model has heterogeneity of variance. In this study to address the problem of estimating, the generalized least squares estimation method (GLS) has been used. According to the preliminary results of estimating of the Durbin-Watson statistic of 2.38 and since it is between 1.5 and 2.5. It may be concluded that the residuals are independent of each other because the level of the encoded test (0.5349) is larger than 0.05, however, the null hypothesis of this test based on linearity of model is confirmed and the model has not specified error is not. Summary of results of these tests are presented in Table 7.

Table 7: Results the statistical assumptions for model (2)

<table>
<thead>
<tr>
<th>Jarque-Bera statistic</th>
<th>Breusch-Pagan statistic</th>
<th>Durbin-Watson statistic</th>
<th>Ramsey statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \chi^2 )</td>
<td>( P-Value )</td>
<td>( F )</td>
<td>( P-Value )</td>
</tr>
<tr>
<td>1.5232</td>
<td>0.5196</td>
<td>3.4507</td>
<td>0.0298</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.38</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9.6263</td>
<td>0.5349</td>
</tr>
</tbody>
</table>

According to the results of Chow and Hausman tests and also the results of statistical assumptions of the classical regression model (2), the research is estimated using panel data as fixed effects. The results are presented in Table 8.

The estimated form of the model using Eviews 7 software will be as follows:

\[ r_{i,t} = 0.9454 + 0.0633 \text{TAXRISK}_i - 0.0615 \text{DEBT}_{i,t} + 0.0213 \text{BTM}_{i,t} - 0.5219 \text{LEV}_{i,t} + 0.0162 \text{LOG(ASS)}_{i,t} - 0.1746 \text{LT}_i \text{GROW}_{i,t} + 0.0020 \text{DISCR}_i \text{ACC}_{i,t} + \varepsilon_{i,t} \]

For significance of the model, because the probability of F statistics is smaller than 0.05 (0.0000), with a significant 95%, the significance of the model is confirmed. The coefficient of determination of model also shows that 34.61% of the capital cost is explained by introduced variables in the model.
For be significant of coefficient given to the results presented in Table 8, since the probability of t-statistic for variable coefficient of optimal tax risk of corporate is smaller than 0.05 (0.0325), thus, existence of a significant relationship between optimal tax risk and capital cost at 95 percent is approved. Therefore, the second research hypothesis is accepted and we can say at 95% confidence that there is a direct and significance relationship between tax risk and capital cost. Being positive of coefficient of the variable (0.0633) indicates that there is direct relationship between tax risk and capital cost so that with increasing of 1 unit tax risk, the capital cost also increased to amount of 0.0633 unit.

Table 8: The results of the first research hypothesis testing using fixed effects

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-statistical</th>
<th>P-Value</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed component</td>
<td>0.9454</td>
<td>1.6027</td>
<td>0.1096</td>
<td>non-significant</td>
</tr>
<tr>
<td>Optimal tax risk</td>
<td>0.0633</td>
<td>1.5467</td>
<td>0.0325</td>
<td>positive</td>
</tr>
<tr>
<td>Debt-to-equity ratio</td>
<td>-0.0412</td>
<td>-1.9929</td>
<td>0.0271</td>
<td>negative</td>
</tr>
<tr>
<td>Growth opportunities</td>
<td>0.0213</td>
<td>1.6840</td>
<td>0.1927</td>
<td>non-significant</td>
</tr>
<tr>
<td>leverage ratio</td>
<td>-0.5219</td>
<td>-1.6807</td>
<td>0.0163</td>
<td>negative</td>
</tr>
<tr>
<td>Firm size</td>
<td>0.0162</td>
<td>1.0904</td>
<td>0.0360</td>
<td>positive</td>
</tr>
<tr>
<td>Growth rate</td>
<td>-0.1746</td>
<td>-1.5968</td>
<td>0.1109</td>
<td>non-significant</td>
</tr>
<tr>
<td>discretionary accruals</td>
<td>0.0020</td>
<td>1.0387</td>
<td>0.0291</td>
<td>positive</td>
</tr>
<tr>
<td>coefficient of determination</td>
<td></td>
<td></td>
<td>0.3461</td>
<td></td>
</tr>
<tr>
<td>F- statistics</td>
<td></td>
<td>2.4768</td>
<td>(0.0000)</td>
<td></td>
</tr>
<tr>
<td>(P – Value)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thus, according to the analysis in associated to the second hypothesis can be concluded that there is significance and direct relationship between tax risk and capital cost.

**Conclusion**

Test results of the hypothesis led to confirmation of the first and second research hypotheses. The results show that:

1- There is significance and inverse relationship between tax risk and Firm Value so that with increasing of 1 unit tax risk, the Firm Value reduced to amount of 0.1277 units.

2- There is significance and direct relationship between tax risk and capital cost so that with increasing of 1 unit tax risk, the capital cost increased to amount of 0.0633 units.

The results of this research study were consistent by Marquardt and Wiedman (2012), Chiu (2011), Wi (2013) and Taylor et al., (2012).

**Recommendations based on the Results**

- According to the first hypothesis, "There is significance relationship between tax risk and Firm Value ", it is recommended that:

  1. The Securities and Exchange organization may be due to the results of the research and similar research published the comprehensive information regarding to the Firm Value to the shareholders.

  2. It is recommended to Accounting Standards references to voluntary disclosure of information about the level of optimal tax risk and Firm Value.

- According to the second hypothesis, "There is significance relationship between the tax risk and cost of capital." It is recommended that:

  1. Because the increasing of the level of optimal tax risk have important effects on investment decisions, providing complete and clear information by the management for optimal tax risk and capital cost would be very useful.
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2- it is better that the active financial analysts in the capital markets, the investment adviser in the Securities and Exchange along with the analysis and conventional techniques, make specific analyzes based on the cost of capital and its effective factors and optimal tax risk in accordance with the accounting standards.

Suggestions for Future Research
1. Study of the effect of industry on the relationship between optimal tax risk, Firm Value and capital cost.
2. Using of other control evaluation variables such as corporate credit rating and expected stock returns to survey of the relationship between optimal tax risk and Firm Value.
3. Investigation of the effect of macroeconomic variables such as inflation, oil prices and exchange rates to examines the relationship between optimal tax risk and Firm Values.

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