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# Cost of capital the measure to predict future returns on equity

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**Abstract:** In this research the effect of capital cost on future return on owners' equity in firms enlisted in Tehran Stock Exchange has been investigated. To realize this goal, a hypothesis was devised and 86 firms from among those enlisted in Tehran Stock Exchange during the time between 2007 and 2012 (a 6 years period) were selected and tested. In the present study, we have used two patterns, Gordon and capital assets' pricing, namely to measure capital cost. Results of statistical analysis of research hypotheses showed that capital cost calculated by using Gordon's method had a positive and meaningful effect on future return on owners' equity, but capital cost calculated by using capital assets' pricing did not have any effect on future return on owners' equity. Therefore, hypothesis test was only carried out using Gordon's model. It can be claimed that the research hypothesis was approved. Thus, capital cost can affect future return on owners' equity forecast.

**Key words:** Capital cost; Equity cost; Gordon's method; Capital assets' pricing method; Future return on equity

## 1. Introduction

Regarding that capital absorption capability and firm's financing is considered as one of the most important foundations required to continue survival in today's competitive market, the existence of capital market and active presence of investors in such markets is one of the most inevitable needs of countries for national economic growth. Financial management is in fact defined as the decision making and selection of optimal strategies regarding cash investments in assets and gaining the best financial composition in order to increase an entity's overall value. The concept of capital cost is based on the presupposition that the goal of a company is to maximize stockholders' wealth. In other words, capital cost is the least return rate that a firm should achieve in order to satisfy its investors. To accept the project, if the current value is positive the project is accepted and if its current value is negative, it would be rejected. Thus, the least expected return rate for every project is called its capital cost. The identification and creation of an optimal capital structure or movement towards it can affect firm's value and stockholders' wealth. Without knowing capital cost, a company cannot decide what means to use to collect cashes required for long-term investment and due to limitations in resources, economic units should choose a combination of financing resources to entail the least capital cost (Osmani, 2002).

In accounting and financial literature, several studies have been carried out on capital cost. Regarding researches carried out still the effect of capital cost on future return on equity forecast of stocks is a topical issue. Thus, the goal of the present research is to study the effect of capital cost on future return on equity forecast in firms enlisted in Tehran Stock Exchange.

### 1.1. Theoretical foundations and research literature

Capital cost is considered as one of the basic concepts in financial literature. Capital cost plays an important role in financing decisions. Firm's management should identify financing coat and determine factors affecting it in order to identify financial resources. Capital cost is also used as a criterion to assess performance in economic value added model. Capital cost has also other functions and is considered as a criterion to accept new investment plans and recession rate to calculate market value added (Bulo and Rahani Mehr, 2013). Some important studies in accounting and financial literature have described reverse engineering method of estimation based on firm's capital cost of current price and future cash flows or earning' expectations. The main stimulant of these studies was that capital cost estimation is considered as an important factor in capital budgeting and investment decisions. This shows that these estimates prepare some useful information for investment decisions inside the company. In fact, if a firm has a current positive net value in a project, it should benefit from this overall principle that the higher capital cost should create more future cash flows. We are going to test this relationship (Larocque and Lyle, 2013).

Capital cost estimates are mainly compared with average realized return on stocks as a criterion of expected return. Thus, there were few evidences about a positive correlation between realized return

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and capital cost estimations resulting from current prices and forecast earnings (Easton and Monahan, 2005; Botosan and et al., 2011). The widespread explanation regarding the lack of a positive relationship between return and capital cost estimates is that the realized return has been noised (Elton, 1999). And when the changes in expectations about future cash flows or future reduction rate changes, the realized return of expected return becomes divergent (Easton and Monaham, 2005).

Unlike previous studies through which they wanted to know whether capital cost estimates have had a relationship with future stock return or not, the present study has studied the relationship between capital cost estimations and future accounting return. The reason is very simple and obvious; we can expect capital cost estimates have had a correlation with future accounting return up to the time when managers invest on projects that are expected to have more return than capital cost and the results in Larocque and Lyle (2013) have been a proof for this issue. Of course, previous studies (for example, Easton and Monahan, 2005; Guay and et al, 2001); and Botosan and et al., 2011) have not been able to document this relationship and it can be caused by using market's realized return as a criterion for investment return criterion, such a result has been achieved. As Modigliani and Miller (1958) have stated, capital cost represents both capital cost and expected capital return by firms' managers and as expected achievements that would made investment for the company attractive. The reason to use equity in the present research is that this criterion cannot be affected by entrance or leave outs of uninformed dealers in market compared with stock market results and cannot entail noises unlike market return.

Botosan (1997) studied the relationship between disclosure amount and capital cost in American companies. Results showed that in those firms that analysts trace issues less, the disclosure increase results in capital cost reduction, but in firms where analysts trace issues a lot, no evidences were found to approve the existence of a relationship between disclosure amount and capital cost.

Butler and et al. (2009) investigated about the relationship between net external financing and future returns forecast of stocks. They found out that net external financing has the capability to forecast future returns for stocks and the relationship between them is negative; but net external financing elements do not have such capability. They stated that the reason to occur abnormal behaviors is financing activities of firms that react negatively to market timing management by changing their investment policies.

Mouselli and et al. (2012), studied the relationship between disclosure quality and owners' equity return. Results of their study showed that high risk of information or low disclosure of information increases owners' equity return risk.

Larocque and Lyle (2013) studied the implied cost of stock capital as forecasting accounting return. Their results showed a positive and meaningful relationship between capital cost and future return of owners' equity.

He and et al. (2013), investigated the relationship between information asymmetry and equity cost. The researchers used inappropriate selection as a criterion for information asymmetry. In their research, after controlling known variables that affected the return needed by owners' equity (such as: beta, firm size, book value to market value, ...), a positive and meaningful relationship between information asymmetry and expected return rate for stockholders was shown.

Osmani (2002), recognized capital cost pattern and effective factors of it. He concluded that accounting assessment pattern has had the highest validity and pricing capital assets' pattern has had the least validity compared to other patterns. Also there has been a meaningful relationship between firm size and industry type and capital cost.

Saghafi and et al. (2010), analyzed the relationship between basic accounting variables to achieve the predetermined risk in equity that was measured with stock's equity in their research about stock owners' equity and accounting variables stimulating risk. Results of their research supported the usefulness of accounting information in identifying risk and its reflection as risk resources.

Setayesh and Sadeghhnia (2012) studied the effect of capital cost on dividends policy in firms enlisted in Tehran Stock Exchange. Results of analyzing research hypotheses based on a random model showed that common stock capital cost, accumulated earning capital cost, and balanced mean of capital cost affect dividends policies of firms positively. But there was not any meaningful relationship found between debt cost and dividends policies of firms.

Jahanshad and Parsaee (2012) analyzed the determinative factors of expected stock return in Tehran Stock Exchange based on implied capital cost model. They were trying to recognize the application of ICC method in calculating expected return on stocks in Iran and estimating this return for the first time by using ICC method. Then they analyzed determinative factors of stock's expected return based on implied capital cost model. Results showed that there has been a meaningful relationship between all criteria including liquidation, long-term returns, potential growth, price level, firm value, financial leverage, and expected return of stocks estimated based on implied capital cost.

Rezaei and Kazem-e-Tabrizi (2013) studied the effect of external financing methods on future return of firms emphasizing at accruals in flowing capital. Results showed that when there is low level flowing capital accruals, external financing through capital, will have a negative and meaningful relationship with future return of firms' stocks. But this relationship between financing activities through debt and stock's future return was not meaningful in low and high levels of flowing capital accruals. Thus,

financing activities through debt do not affect future return of stocks.

## 2. Research hypothesis

The goal of investors in investing is to gain earnings and finally maximize the wealth. In order to realize this goal, the investors invest on assets with high return and a relatively low risk. When investment risk increases, the investors increase their expected return rate. This increase is called risk saving. Increasing expected return rate means to increase capital cost. By increasing capital cost, it is expected that future return of equity forecast of stocks will also increase. Therefore, the hypothesis would be as follows:

Hypothesis: capital cost affects future return on owners' equity forecast.

## 3. Research methodology

### 3.1. The research method and data collection

This research is applied regarding its nature, also a descriptive one emphasizing at the correlation relationships because on the one hand it investigates about the present status, and on the other hand, identifies the relationship between different variables by using a regression analysis. Additionally, it resides within the realm of post-incidental studies (by using previous information) and based on real information of financial statements in firms. In this research the data have been collected with one of the previous methods:

1-To enrich the theoretical foundations of the current research, we have used books, and Persian and English journals.

2-The data related to research variables have been collected by referring to financial statements, descriptive notes, and by using Rahaward-e-Novin software version 3.

### 3.2. Statistical population, sampling method, and sample amount

The statistical population for this research entailed all firms enlisted in Tehran Stock Exchange for the time period between 2007 and 2011. Since we needed information about future year to calculate future return, practically the information about the year 2012 have been utilized. Information quality and the ease of access to information in financial statements and other information have been among the most important reasons for the selection of this statistical society. Regarding the research nature and the existence of some disharmony between firms enlisted in Tehran Stock Exchange, we have used a systematic (purposeful) deletion method of sampling. The following conditions were taken into consideration in identifying statistical population of the research.

1- They should not be among banks, financial entities, investment entities, holding, and leasing because due to the certain activity nature of them, the relationship between elements introduced in this research was not the same among them all and it cannot be generalized to other cases.

2- The companies should have been enlisted in Stock Exchange up to 21st March 2006 and they should have not gone out of stock exchange during the years between 2007 and 2012.

3- To observe comparability, the fiscal year should end on 29th Esfand (20th March) and there should not be fiscal year change.

4- Financial statements and firms' information to should be accessible and the calculated variables should not be unrelated or meaningless.

By applying the conditions above, 86 firms were selected as statistical sample for the time period between 2007 and 2012.

## 4. Research variables and models

To test the hypothesis, we have used the multiple variable regression models as follows:

$ROE_{i,t+1} = \alpha + \beta 1\ COEC_{i,t} + \beta 2\ Beta_{i,t} + \beta 3\ Size_{i,t} + \beta 4\ BM_{i,t} + \beta 5\ LEV_{i,t} + \varepsilon_{i,t}$

In this model,

$ROE_{i,t+1}$: return on equity of firm i in the year t+1

$COEC_{i,t}$: cost of equity of stocks of firm i in the year t

$Beta_{i,t}$: covariance of firm i stock return and market portfolio divided by market portfolio variance in the year t

$Size_{i,t}$: size of firm i in the year t

$\varepsilon_{i,t}$: model errors

The variables in the present research are divided into three groups as independent, dependent, and control variables.

### 4.1. Independent variable

The independent variable in this research is capital cost. Any company has a specific risk and return (of course, any firm that aims to gain earnings). Each of investor groups, for example those who own bonds, outstanding stocks and common stocks demand a rate of return that is appropriate to the risk related. To measure capital cost two methods of Gordon and capital assets' pricing were utilized.

### 4.2. Gordon's method

In this method, stockholders' expected return rate (equity cost) is calculated as follows (Gordon, 1997):

$$K_e = \frac{D_1}{P_0} + g$$

Where,

$K_e$: stockholders' expected return rate

$D_1$: next year's expected stock earnings

$P_0$: stock price at the start of the year
G: expected growth rate

It should be noted that expected growth rate would be calculated based on geometrical mean of sales' growth rate.

### 4.3. Capital assets' pricing method

This method considers stock return as a function of market risk and is based on the following equation (Sharpe, 1964):

$$E(r_i) = r_f(1 - \beta_i) + \beta_i E(r_m)$$

Where,
$E(r_i)$: share i's expected return rate
$r_f$: return rate without risk
$\beta_i$: sensitivity of share return changes to market return changes. To calculate beta of any company we have used an average beta for the firm during 5 years of study. The reason is that beta of each year is different from another one and the expectations of investor or analyst are formed based on the mean of what happens in reality.
$E(r_m)$: market's expected return

### 4.4. Dependent variable

The dependent variable in this research is future return of equity. This ratio states that firm's management has been efficient in using stockholders' money and it shows the power of management in increasing firm's value acceptably. In fact, owners' equity return is a condition through which managers control all aspects of activity precisely in order to use accessible resources of an entity better and more profitably. One of the main duties of management is to assess and develop firm's owners' equity (Moradi and Pourhossein, 2010). In this research we have used the following equation to calculate equity's future return rate.

$$ROE_{i,t+1} = NI_{i,t+1} / Equity_{i,t+1}$$

Where,
$ROE_{i,t+1}$: future return on equity of firm i in the year t+1
$NI_{i,t+1}$: net income of firm i in the year t+1
$Equity_{i,t+1}$: owners' equity of firm i in the year t+1

#### 4.4.1. Control variables

The control variables used in this research were beta, firm size, the ratio of book value to market value, and financial leverage.

#### 4.4.2. Beta

Beta means a systematic risk (market risk). To calculate beta coefficient we have used stock return of sample firms and market's portfolio return.

$$\beta = \frac{Cov\ (Ri, Rm)}{\partial^2\ Rm}$$

Where,
Cov: covariance
Ri: firm return
Rm: market return
$\partial^2$: variance

To calculate this variable we have used its amount for each year and this amount would be different from several years' average where capital assets' pricing method (CAPM) is used. Thus, beta variable is not used as a systematic risk criterion does not necessarily have a linear relationship the capital cost gained by using capital assets' pricing method.

#### 4.4.3. Firm size

In this research natural sales' logarithm was used to identify firm size.

#### 4.4.4. Book value to market value ratio

To measure this variable we have used book value ratio to market value ratio of equity in firm I in the year t.

#### 4.4.5. Financial leverage

In the present research, it would be calculated by dividing liabilities into assets (Bozorg-Asl, 2006).

## 5. Research findings

### 5.1. Descriptive statistics

The summary of descriptive statistics' status related to research variables has been represented in table (1) to present an overall perspective of the data mentioned and central tendency methods and their dispersion.

**Table 1:** The descriptive statistics of research variables

| Standard deviation | Minimum | Maximum | Median | Average | Count | Variables |
|---|---|---|---|---|---|---|
| 0.246266 | 0.888260 | 2.812931 | 0.337906 | 0.35412 | 430 | Future return on equity |
| 0.199264 | 0.029712 | 1.354432 | 0.318824 | 0.350236 | 430 | Capital cost usin Gordon's method |
| 9.918516 | 10.16933 | 54.38210 | 20.35979 | 23.82294 | 430 | Capital cost using CAMP method |
| 0.773560 | -1.918751 | 4.705562 | 0.281387 | 0.402421 | 430 | Systematic risk |
| 1.215515 | 9.691408 | 17.36011 | 12.98503 | 13.06908 | 430 | Firm size |
| 0.246469 | 0.217320 | 1.590961 | 0.773265 | 0.784261 | 430 | Book value to market |
| 0.163800 | 0.096415 | 0.923101 | 0.567614 | 0.557072 | 430 | Financial leverage |

The descriptive statistics used in this research for 430 observations (86 firms during 5 years) have been presented in table 5. The amounts for average, mode, maximum, minimum, and standard deviation of any variable in table 1, showed us an overall perspective of the variables.

By using Kolomogorov- Smirnov's test we clarified the normality of the distribution of capital cost using Gordon's and CAMP's method. Results of Kolomogorov-Smirnov's test have been represented in Table 2.

### 5.2. Studying the normality of the distribution of dependent variable

**Table 2:** Results of Kolomogorov- Smirnov's test of the dependent research variable

| Capital cost using CAMP | Capital cost using Gordon's method | Description |
|---|---|---|
| 2.280 | 1.413 | Kolomogorov-Smirnov |
| 0.204 | 0.137 | Meaningfulness level |

Regarding that the meaningfulness level of Kolomogorov- Smirnov statistic is higher than 0.05, the hypothesis $H_0$ based on the normality of the research's dependent variable was approved in an assurance level of 95%. This showed that the variable of equity cost has had a normal distribution in Gordon's method and CAMP.

If research variables are calculated with a ratio and continuous index, Pearson's correlation coefficient is used to measure the correlation among them. Results of Pearson's correlation coefficient test of the research variables have been presented in Table 3.

### 5.3. Testing research variables' correlation

**Table 3:** Results of Pearson's correlation test of research variables

| Financial leverage | Book value to market | Firm size | Systematic risk | Capital cost using CAMP | Capital cost using Gordon's method | Future equity return | Variables |
|---|---|---|---|---|---|---|---|
| | | | | | | 1 | Future equity return |
| | | | | | 1 | $^{**}$0.290 (0.000) | Capital cost using Gordon's method |
| | | | | 1 | 0.026 (0.586) | 0.081 (0.090) | Capital cost using CAMP |
| | | | 1 | $^{**}$0.156 (0.001) | -0.012 (0.800) | -0.023 (0.626) | Systematic risk |
| | | 1 | $^{**}$0.136 (0.004) | $^{**}$0.175 0.000) | $^{**}$0.142 (0.003) | 0.060(0.666) | Firm size |
| | 1 | $^{*}$-0.094 (0.049) | 0.022 (0.645) | -0.041 (0.390) | -0.033 (0.488) | $^{**}$-0.460 (0.000) | Book value to market |
| 1 | $^{**}$0.175 (0.000) | 0.087 (0.069) | -0.031 (0.509) | -0.004 (0.923) | -0.084 (0.078) | $^{**}$-0.137 (0.004) | Financial leverage |

The amounts within parentheses represent the meaningfulness level in 0.01 and 0.05 levels

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## 6. Research hypothesis test

To test the hypothesis and since the operationalization of the independent variable (equity cost) has been done by using two criteria, in the next section and within two parts the issues related to hypothesis testing will be described by using two independent variables that have been previously described, too.

In this section first capital cost variable was calculated by using Gordon's pattern and was entered into the model as the independent variable to be used in testing the hypothesis. Due to what has been presented above, in this study and to test research hypothesis, we should first identify an appropriate regression pattern. Results of pattern selection to estimate the research model have been presented in Table 4.

### 6.1. Hypothesis testing by using Gordon's pattern

**Table 4:** Results of pattern selection to estimate research model by using Gordon's pattern

| Result | Meaningfulness level | Degree of freedom | test statistic | Test type |
|---|---|---|---|---|
| Panel method | 0.000 | (33.585) | 2.056 | Chaw's test |
| Fixed effects' efficiency | 0.000 | 5 | 32.680 | Haussmann's test |

Regarding the results of Chaw's test, and since the meaningfulness level of it is less than 0.05 (0.000), the divergence of latitude from the bases was approved and it would be necessary to use panel data method in model estimation. Also due to the results of Haussmann's test, since the meaningfulness level of this test is smaller than 0.05 (0.000), the existence of fixed effects has been approved and the model should have been estimated using a fixed effects estimation approach. Results of model estimation and also results related to statistics and classic regression presuppositions have been presented in Table 5.

**Table 5:** Results of hypothesis test through research model estimation by using Gordon's pattern

| Meaningfulness level | t student statistic | Standard deviation | Coefficient | Variables |
|---|---|---|---|---|
| 0.000 | 3.400 | 0.143 | 0.230 | Latitude from base |
| 0.000 | 9.203 | 0.034 | 0.321 | Capital cost (Gordon) |
| 0.948 | -0.064 | 0.004 | -0.000 | Systematic risk (beta) |
| 0.124 | -1.538 | 0.010 | -0.016 | Firm size |
| 0.000 | - 4.272 | 0.023 | -0.100 | Book value to market |
| 0.135 | 1.497 | 0.056 | 0.084 | Financial leverage |
| 0.791 | | | | Adjusted $R^2$ |
| 40.015 | | | | F-statistic |
| 0.000 | | | | sig (F-statistic) |
| 2.369 | | | | Durbin-Watson |

In studying the overall meaningfulness of the model, regarding that the meaningfulness level (sig) of F statistic has been smaller than 0.05 (0.000), we can approve the meaningfulness of total models with an assurance level of 95%. Also the model's identification coefficient showed that 79.1 percent of changes in future equity return can be identified by variables entered into the model. Additionally, since the amount of Durbin-Watson statistic has been between 1.5 and 2.5 (2.369), the independence of model's residuals is approved.

The meaningfulness level (sig) of t statistic related to Gordon's method has been less than 0.05 (0.000) and its coefficient has been positive (0.321), thus, we can say that there is a direct and meaningful relationship between capital cost using Gordon's method and future equity return. Therefore, when firm's capital cost increases in current year, it is expected that the return in next year should increase. Thus, the calculated capital cost using Gordon's method affects future return on equity and therefore can be used in forecasting the future return on equity. From among control variables, book value to market value has a reverse relationship with future return. Thus, the closer book value to market value will result in less future return on equity.

### 6.2. Testing the hypothesis by using capital assets pricing pattern

In this part first we entered capital cost as independent variable in the model by using capital assets' pricing pattern to be used to test hypothesis. Due to what have been posed above, in this study first an appropriate regression pattern should be posed to test research hypotheses. Results of pattern selection to estimate research model have been presented in Table 6.

**Table 6:** Results of pattern selection to estimate research model by using capital asset pricing pattern

| Result | Meaningfulness level | Degree of freedom | test statistic | Test type |
|---|---|---|---|---|
| Panel method | 0.000 | 335.85 | 2.462 | Chaw's test |
| Fixed effects' efficiency | 0.000 | 5 | 39.745 | Haussmann's test |

Regarding the results of Chaw's test, and since the meaningfulness level of it is less than 0.05 (0.000), the divergence of latitude from the bases was approved and it would be necessary to use panel data method in model estimation. Also due to the results of Haussmann's test, since the meaningfulness level of this test is smaller than 0.05 (0.000), the existence of fixed effects has been approved and the model should have been estimated using a fixed effects estimation approach. Results of model estimation and also results related to statistics and classic regression presuppositions have been presented in Table 7.

In studying the overall meaningfulness of the model, regarding that the meaningfulness level (sig) of F statistic has been smaller than 0.05 (0.000), we can approve the meaningfulness of total models with an assurance level of 95%. Also the model's identification coefficient showed that 72.8 percent of changes in future equity return can be identified by variables entered into the model. Additionally, since the amount of Durbin-Watson statistic has been between 1.5 and 2.5 (2.041), the independence of model's residuals is approved. The meaningfulness level (sig) of t statistic related to capital asset pricing method has been more than 0.05 (0.151). Thus, we can say that there has not been a relationship between capital cost and future return on equity using a capital asset pricing method. The reason may be due to the different structure of the two methods to measure capital and different characteristics of these two criteria to measure capital cost. Results for

control variables would be the same as the previous ones and only the variable of book value to market affects future returns in a reverse direction.

**Table 7:** Results of hypothesis test through research model estimation by using capital asset pricing pattern

| Meaningfulness level | t student statistic | Standard deviation | Coefficient | Variables |
|---|---|---|---|---|
| 0.011 | 2.542 | 0.132 | 0.336 | Latitude from base |
| 0.151 | -1.436 | 0.006 | -0.000 | Capital cost (capm) |
| 0.726 | 0.350 | 0.004 | 0.001 | Systematic risk (beta) |
| 0.103 | -1.632 | 0.010 | -0.017 | Firm size |
| 0.000 | - 4.752 | 0.024 | -0.115 | Book value to market |
| 0.074 | 1.788 | 0.054 | 0.098 | Financial leverage |
| | 0.728 | | | Adjusted R2 |
| | 40.597 | | | F-statistic |
| | 0.000 | | | sig (F-statistic) |
| | 2.041 | | | Durbin-Watson |

## 7. Additional test

In this part we will discuss about whether capital cost during periods longer than one year will affect future return on equity or not? To do so, we will put the hypothesis test model to be tested as follows:

$ROE_{i,t+1} = \alpha + \beta 1\ COEC_{i,t} + \beta 2\ COEC_{i,t-1} + \beta 3\ COEC_{i,t-2} + \beta 4\ Beta_{i,t} + \beta 5\ Size_{i,t} + \beta 6\ BM_{i,t} + \beta 7\ LEV_{i,t} + \varepsilon_{i,t}$

In the model above, the effect of current period's capital cost, one previous period and two previous periods on future return on equity will be tested. For example, we have used capital costs of the years 2007, 2008, and 2009 to study about the effect of capital cost on return on equity in the year 2011. Thus, for all additional tests, the number of periods used for panel tests would be three periods. Next, the model above would be tested by using two capital cost's measurement methods.

### 7.1. Additional test by using Gordon's pattern

In this section first capital cost variable was calculated by using Gordon's pattern and was entered into the model as the independent variable to be used in additional testing. Due to what has been presented above, in this study and for additional research testing, we should first identify an appropriate regression pattern. Results of pattern selection to estimate the research's additional model have been presented in Table 8.

**Table 8:** Results of pattern selection to estimate research's additional model by using Gordon's pattern

| Result | Meaningfulness level | Degree of freedom | test statistic | Test type |
|---|---|---|---|---|
| Panel method | 0.000 | 163.85 | 2.082 | Chaw's test |
| Fixed effects' efficiency | 0.000 | 7 | 37.906 | Haussmann's test |

Regarding the results of Chaw's test, and since the meaningfulness level of it is less than 0.05 (0.000), the divergence of latitude from the bases was approved and it would be necessary to use panel data method in model estimation. Also due to the results of Haussmann's test, since the meaningfulness level of this test is smaller than 0.05 (0.000), the existence of fixed effects has been approved and the model should have been estimated using a fixed effects estimation approach. Results of model estimation and also results related to statistics and classic regression presuppositions have been presented in Table 9.

**Table 9:** Results of additional testing through research's additional model estimation by using Gordon's pattern

| Meaningfulness level | t student statistic | Standard deviation | Coefficient | Variables |
|---|---|---|---|---|
| 0.000 | 3.400 | 0.143 | 0.230 | *Latitude from base* |
| 0.000 | 11.736 | 0.010 | 0.120 | Capital cost this year (Gordon) |
| 0.000 | 3.713 | 0.030 | 0.114 | The capital cost of a year ago (Gordon) |
| 0.000 | 5.965 | 0.025 | 0.153 | Two years ago, the cost of capital (Gordon) |
| 0.321 | -0.994 | 0.001 | -0.001 | Systematic risk (beta) |
| 0.300 | 1.038 | 0.004 | 0.005 | Firm size |
| 0.000 | - 4.593 | 0.018 | -0.084 | Book value to market |
| 0.091 | 1.654 | 0.011 | 0.037 | Financial leverage |
| | *0.840* | | | *Adjusted $R^2$* |
| | *45.713* | | | *F-statistic* |
| | *0.000* | | | *sig (F-statistic)* |
| | *2.031* | | | *Durbin-Watson* |

In studying the overall meaningfulness of the model, regarding that the meaningfulness level (sig) of F statistic has been smaller than 0.05 (0.000), we can approve the meaningfulness of total models with

an assurance level of 95%. Also the model's identification coefficient showed that 84 percent of changes in future equity return can be identified by variables entered into the model. Additionally, since the amount of Durbin-Watson statistic has been between 1.5 and 2.5 (2.031), the independence of model's residuals is approved. The meaningfulness level (sig) of t statistic related to Gordon's method for the current year, the previous year, and two years earlier has been less than 0.05 (0.000) and its coefficient has been positive. Thus, we can say that there is a direct and meaningful relationship between capital cost using Gordon's method and future equity return. Therefore, when firm's capital cost increases, it is expected that the return should increase. Thus, the calculated capital cost using Gordon's method affects future return on equity and therefore can be used in forecasting the future return on equity.

### 7.2. Additional testing by using capital assets pricing pattern

In this part first we entered capital cost as independent variable in the model by using capital assets' pricing pattern to be used for additional testing. Due to what have been posed above, in this study first an appropriate regression pattern should be posed for additional research testing. Results of pattern selection to estimate research's additional model have been presented in Table 10.

**Table 10:** Results of pattern selection to estimate research's additional model by using capital asset pricing pattern

| Result | Meaningfulness level | Degree of freedom | test statistic | Test type |
|---|---|---|---|---|
| Panel method | 0.000 | 163.85 | 2.009 | Chaw's test |
| Fixed effects' efficiency | 0.000 | 7 | 34.905 | Haussmann's test |

Regarding the results of Chaw's test, and since the meaningfulness level of it is less than 0.05 (0.000), the divergence of latitude from the bases was approved and it would be necessary to use panel data method in model estimation. Also due to the results of Haussmann's test, since the meaningfulness level of this test is smaller than 0.05 (0.000), the existence of fixed effects has been approved and the model should have been estimated using a fixed effects estimation approach. Results of model estimation and also results related to statistics and classic regression presuppositions have been presented in Table 11.

**Table 11:** Results of additional testing through research's additional model estimation by using capital asset pricing pattern

| Meaningfulness level | t student statistic | Standard deviation | Coefficient | Variables |
|---|---|---|---|---|
| 0.661 | -0.438 | 0.001 | -0.000 | Latitude from base |
| 0.534 | -0.621 | 0.001 | -0.001 | Capital cost this year (CAPM) |
| 0.860 | -0.175 | 0.003 | -0.000 | The capital cost of a year ago (CAPM) |
| 0.124 | 1.539 | 0.012 | 0.018 | Two years ago, the cost of capital (CAPM) |
| 0.073 | -1.841 | 0.003 | -0.007 | Systematic risk (beta) |
| 0.000 | -12.958 | 0.008 | -0.108 | Firm size |
| 0.137 | 1.493 | 0.015 | 0.023 | Book value to market |
| 0.000 | 23.116 | 0.024 | 0.562 | Financial leverage |
| 0.811 | | | | Adjusted $R^2$ |
| 39.900 | | | | F-statistic |
| 0.000 | | | | sig (F-statistic) |
| 1.916 | | | | Durbin-Watson |

In studying the overall meaningfulness of the model, regarding that the meaningfulness level (sig) of F statistic has been smaller than 0.05 (0.000), we can approve the meaningfulness of total models with an assurance level of 95%. Also the model's identification coefficient showed that 81.1 percent of changes in future equity return can be identified by variables entered into the model. Additionally, since the amount of Durbin-Watson statistic has been between 1.5 and 2.5 (1.916), the independence of model's residuals is approved. The meaningfulness level (sig) of t statistic related to capital asset pricing method for current year, previous year, and two years ago has been more than 0.05. Thus, we can say that there has not been a relationship between capital cost and future return on equity using a capital asset pricing method.

## 8. Discussion and conclusion

As it was observed through the previous section, the hypothesis testing by using two criteria of Gordon and CAPM resulted in controversial outcomes. The main reason for this is due to the specific characteristics of the two criteria mentioned and their ratios regarding capital market's structure in Iran and specifically Tehran Stock Exchange. CAPM is useful for an efficient market. The studies carried out in Tehran Stock Exchange have shown that it is not efficient statistically. For example, Talaneh and Hejran kesh-e-Raad (2011) studied the market efficiency of Tehran Stock Exchange in two levels of weak and semi-strong. Their findings showed that Tehran Stock Exchange is not efficient even in weak level. Thus, it is natural to consider that

in Tehran Stock Exchange, the results of testing the hypothesis by using equity cost in the presence of capital asset pricing pattern would not be valid enough. Also the results of this research can be used as indirect evidence regarding the inefficiency of capital market in Iran. Regarding the above issues, results of regression by using equity cost calculated by capital assets pricing pattern would not be used in hypothesis testing in final conclusion. Therefore, testing the hypothesis by using the results gained from Gordon's model would be our main source and we can say that the research hypothesis was approved. Thus, equity cost can be effective in future return on equity forecast.

Results of the present research accord with those in similar researches specifically the research by Larocque and Lyle (2013) and they concluded that capital cost has a direct relationship with accounting return.

Results of this research remark an important principle: capital projects of firms should be made wealthy enough to account for capital costs to administer all steps in order to make it justifiable economically. On the other hand, when capital cost increases, firms should increase equity return to avoid firm's value reduction. Thus, increasing capital cost during current period is related with increasing equity return during next year.

Regarding the research results it is suggested to investors and analysts to study current capital cost rate of the firm more in order to analyze future return on equity and consider the relationship between future return rate on equity and capital cost that is resulted from the economic justification of the capital project.

Also the investors should consider current capital cost as a signal of firm's program to plan the firm to have profitable capital projects and make their investment decisions solely based on current equity return. To do future researches related to this research, the followings are suggested:

1. Doing the research regarding industry types in isolation
2. Using other models in order to calculate capital cost such as OHanlon's and Steel's
3. Studying the effect of debt cost on future equity return forecast

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